

ENVIRONMENTAL OVERLAY ZONE MAP CORRECTION PROJECT



VOLUME 2, PART F:
Johnson Creek, Natural
Resources Inventory and
Protection Decisions



**PROPOSED DRAFT,
AS AMENDED**



July 2021



THE BUREAU OF
**PLANNING &
SUSTAINABILITY**

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You may submit comments to the Portland Planning and Sustainability Commission on the Environmental Overlay Zone Map Correction Project Proposed Draft – As Amended in the following ways:

Use the Map App:

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Click on “Ezone Project” and then click the “Testify” button.

By U.S. Mail

Planning and Sustainability Commission
Ezone Map Correction Project Testimony
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Portland, OR 97201

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The hearing on August 24, 2021 will be held virtually. The meeting starts at 5 p.m. Please check the PSC calendar at www.portland.gov/bps/psc/events a week in advance to confirm the time of this agenda item. You can use a computer, mobile device or telephone to testify during the hearing.

To testify during the hearing, please visit the project website to register:

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Acknowledgements

This plan is the culmination of three years of work across the City of Portland. Many thanks to the thousands of stakeholders, property owners, renters, business owners and interested people who attended dozens of neighborhood and community meetings and invited staff to their homes and businesses to perform site visits.

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Andrea Durbin, Director
Joe Zehnder, Chief Planner
Sallie Edmunds, River and Environmental Planning Manager

Core Team

Mindy Brooks, Environmental Planner, Project Manager
Daniel Soebbing, City Planner
Neil Loehlein, GIS Analyst
Marc Peters, Environmental Specialist (BES)
Chad Smith, Environmental Specialist (BES)
Matt Vesh, Environmental Specialist (BES)
Xanthia Wolland, Intern

Contributing Staff

Shannon Buono, Eden Dabbs, Krista Gust, Carmen Piekarski, Derek Miller

Bureau of Environmental Services: Kaitlin Lovell, Marie Walkiewicz, Paul Ketcham, Jennifer Antak, Heidi Berg, Ethan Brown, Melissa Brown, Lisa Moscinski, Darian Santer, Naomi Tsurumi, and Christa Von Behren

Bureau of Parks and Recreation: Brett Horner, Laura Lehman, Emily Roth, Katie Dunham, Kendra Peterson-Morgan, Laura Guderyahn, Christian Haaning, Marshall Johnson, Steve Lower, Nathan Schulte and Becca Shively

Bureau of Development Services: Stephanie Beckman and Morgan Steele

Consultants: Barney & Worth, facilitation services



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A. INTRODUCTION

Volume 2, Part F, includes the results for the Johnson Creek geography (see Map 1). For each resource site the following is presented:

1. Verification riparian corridors and wildlife habitat features, functions and classifications pursuant to Metro Rule 3.07.1320 and Table 3.07-13d, and OAR 660-023-0110.
2. Confirmation of Habitat Conservation Areas, pursuant to Metro Rule 3.07.1320 and Table 3.07.13a.
3. Economic, Social, Environmental and Energy analysis pursuant to OAR 660-023-0110 for areas that are not Habitat Conservation Areas.
4. Program implementation recommendations pursuant to Metro Rule 3.07.1330 and 3.07.1340, and OAR 660-023-0110. Program implementation is presented in Volume 1, Part B.

B. HOW TO USE THIS DOCUMENT

Below is a description of how to use the information found in this volume during quasi-judicial reviews.

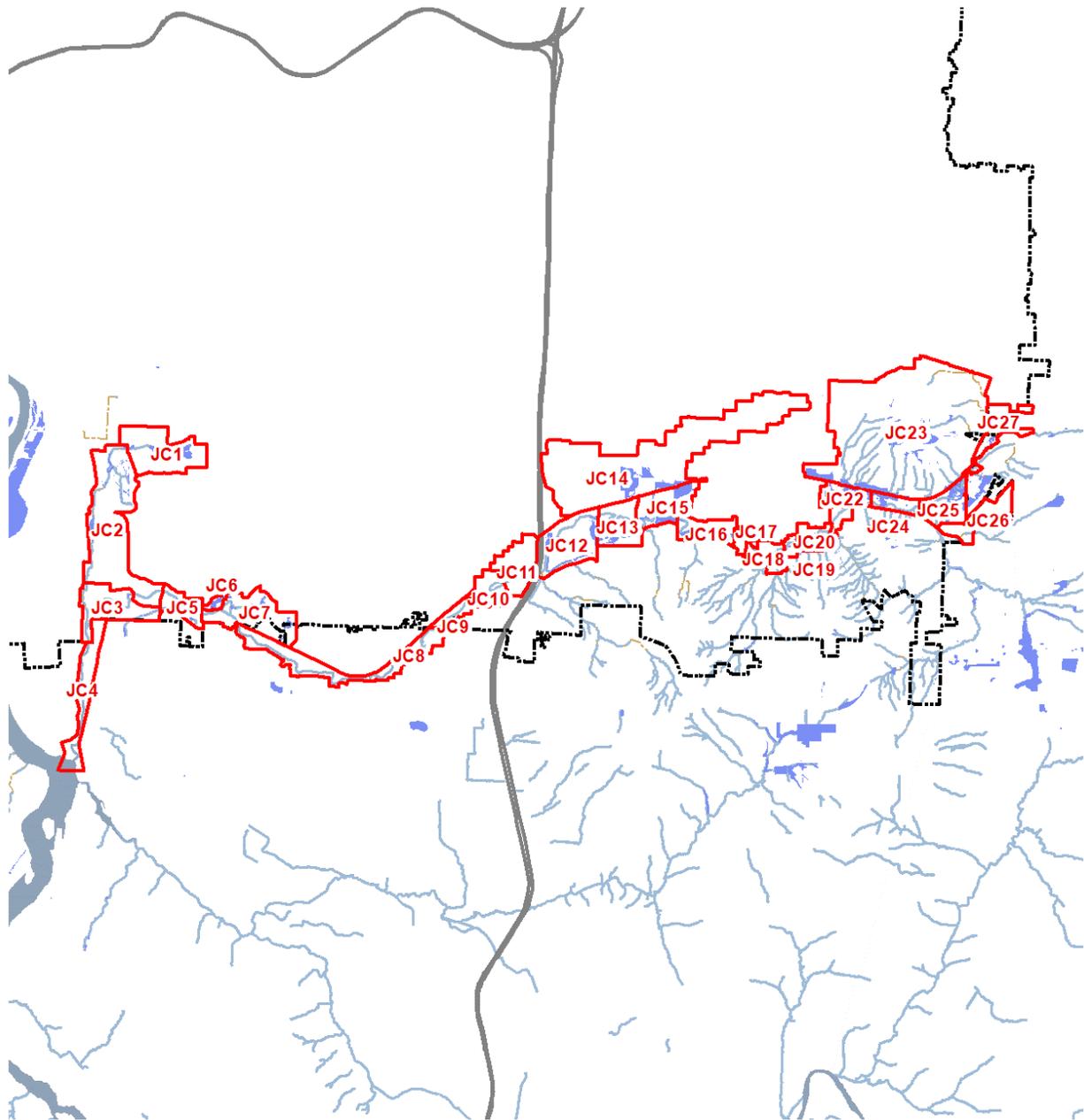
Area Descriptions

Volume 2, Part F, begins with an overview of the area's features, functions and conditions, including land use patterns. This information is provided for context but is also applicable to each resource site and should be used in conjunction with resource site-specific maps and descriptions during quasi-judicial reviews.

Natural Resource Features and Classification Maps

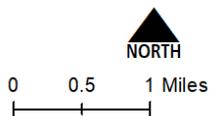
Metro Title 13 and Statewide Planning Goal 5, wildlife habitat, rules require verification of natural resource features and classifications. Natural resource features include rivers, streams, wetlands, flood area, vegetation (forest, woodland, shrubland and herbaceous), steep slopes and Special Habitat Areas. The methodology used to identify and map these features and the functions provided (also referred to in the zoning code as "functional values") is document in in Volume 3, Natural Resources Inventory. The methodology to verify the classifications is documented in Volume 4, Title 13 and Goal 5 Compliance.

Each Resource Site begins with maps that document the location and extent of natural resource features, functions and classifications. The decisions regarding which natural resources to protect are based on the mapped features. The natural resource features maps can be updated at any time based on current conditions and additional factual data, such as a wetland delineation performed by a qualified professional. The environmental overlay zone boundaries may be corrected based on new topographic feature data through 33.885.070, Correction to the Official Zoning Maps, or through 33.430.250.D, Modification of Zone Boundaries.



**Johnson Creek
Resource Sites**

Updated: April 2020



- Resource Sites
- open stream channel
- piped stream segment
- wetlands
- rivers
- freeways
- City of Portland



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The information on the map was derived from digital databases. Care was taken in the creation of this map but it is provided "as is". The City of Portland ensures meaningful access to city programs, services, and activities to comply with Civil Rights Title VI and ADA Title II laws and reasonably provides: translation, interpretation, modifications, accommodations, alternative formats, auxiliary aids and services. To request these services, contact 503-823-7700, City TTY 503-823-6868, Relay Service: 711.

Map 1: Johnson Creek Resource Geography

Habitat Conservation Area and ESEE Decision Maps

Metro Title 13 requires confirmation of Habitat Conservation Areas. The methodology used to determine Habitat Conservation Areas is documented in Volume 4, Title 13 and Goal 5 Compliance. For natural resources that are not a Habitat Conservation Area, and for which Portland intends to protect the resources, Statewide Planning Goal 5 OAR 660-023-0110 must be followed to show the ESEE decisions. The methodology used to make the ESEE decisions is documented in Volume 4, Title 13 and Goal 5 Compliance. The Habitat Conservation Area determinations and ESEE decisions are the legislative intent regarding which resources should be protected and to what level of protection. The legislative intent should be consulted during quasi-judicial review.

Natural Resource Features and Functions Descriptions

Descriptions of the natural resource features and functions are not required by Metro Title 13 or Statewide Planning Goal 5; a map of the features is sufficient. However, Portland Zoning Code Title 33 requires that impacts to natural resources be fully mitigated to address both features and functions (also referred to as “functional values” in the zoning code). The functions provided by the resources are mapped based on the city’s Natural Resources Inventory methodology, see Volume 3. The area descriptions provided at the beginning of this document also provide information about functions that pertain to each resource site. Both the resource site descriptions and area description should be used to assess natural resource impacts and mitigation alternatives during quasi-judicial reviews. Additional factual information about the resource functions may also be provided by a qualified professional.

Metro Title 13 and Oregon Goal 5 Compliance

An explanation of compliance requirements for Metro Urban Growth Management Functional Plan Title 13, Nature in Neighborhoods, and Oregon Statewide Land Use Planning Goal 5, Open Spaces, Scenic and Historic Areas, and Natural Resources is found in Volume 4. The natural resource protection requirements are summarized and recommendations are made for each Resource site. For natural resources that are not a Title 13 Habitat Conservation Area, the general ESEE analysis and recommendations are affirmed, clarified or modified based on resource site-specific information. An ESEE decisions is made and describes the significant natural resource features and functions to protected from the impacts of conflicting uses.

Implementation

Results of Metro Title 13 and Oregon Goal 5 requirements are explained and presented in Map I for each Resource site. The results are implemented by updates to the official zoning maps and zoning code, documented in Volume 1, Part B.

C. NATURAL RESOURCE DEFINITIONS

The natural resource definitions are part of the citywide Natural Resources Inventory (see Volume 3) and used to explain how resources are mapped and classified. These are not regulatory definitions.

Waterbodies

Stream: A stream is a channel that has a defined bed and bank and carries water continuously for a week or more during at least the wet season (October through April). Streams may be naturally occurring or may be a relocated, altered or created channel. Streams may contribute water into another waterbody or the water may flow into a pipe or culvert. Streams may flow for some distance underground. Streams are also referred to as *drainageways*, *ditches*, or *drainages* in other City of Portland reports, codes and rules or by other agencies including but not limited to Oregon Department of State Land or US Army Corps of Engineers. Streams include:

- the water itself, including any vegetation, aquatic life or habitat;
- the channel, bed and banks located between the top-of-bank; the channel may contain water, whether or not water is actually present;
- intermittent streams, which flow continuously for weeks or months during the wet season and normally cease flowing for weeks or months during dry season;
- sloughs, which are slow-moving, canal-like channels that are primarily formed by tidal influences, backwater from a larger river system, or groundwater;
- oxbows and side channels connected by surface flow to the stream during a portion of the year; and
- drainage from wetlands, ponds, lakes, seeps or springs, which may or may not form a defined bed and bank.

Drainage: A drainage is an area on the land that conveys flowing water for only hours or days following a rainfall. If a drainage drains water from a wetland, pond, lake, seep, or spring even if it does not have a defined bed and bank, then it is classified as a stream.

Roadside Ditch: A roadside ditch is a constructed channel typically parallel and directly adjacent to a public or private road. A roadside ditch is designed to capture and convey stormwater runoff from the road and is routinely cleaned (i.e., mechanically scoured or scraped of vegetation and debris) to maintain water conveyance capacity. Naturally occurring streams and drainages that have been relocated due to the construction of a road are not considered a *roadside ditch*.

Wetlands: Areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions; although due to landscaping, seeding, mowing or grazing wet-adopted vegetation (hydrophytes) may not be present.

Flood area: The combination of the FEMA 100-year floodplain, the Special Flood Hazard Area (those areas with a 1% or greater chance of flooding in any given year), as well as areas that were inundated with water during the February 1996 floods.

Floodway: The floodway consists of the channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood (100-year flood) without cumulatively increasing the water surface elevation more than one foot.

Vegetation

Vegetation Patch: An area of contiguous vegetation greater than ½ acre in size containing a distinct pattern, distribution, and composition of vegetation relative to surrounding vegetated and non-vegetated areas.

Forest: Trees with their crowns overlapping, generally forming 60-100% of cover.

Woodland: Open stands of trees with crowns not usually touching, generally forming 25-60% of cover. Tree cover may be less than 25% in cases where it exceeds shrubland and herbaceous vegetation.

Shrubland: Shrubs generally greater than 0.5 m tall with individuals or clumps overlapping to not touching, generally forming more than 25% of cover with trees generally less than 25% of cover. Shrub cover may be less than 25% where it exceeds forest, woodland, and herbaceous vegetation. Vegetation dominated by woody vines (i.e., blackberry) is generally included in this class.

Herbaceous: Herbs (graminoids, forbs, ferns and shrubs less than 0.5m tall) dominant, generally forming at least 25% of cover. Herbaceous cover may be less than 25% where it exceeds forest, woodland and shrubland vegetation. This includes shrubs less than 0.5 m tall.

Land: The ground itself and any features associated with or located on the ground including but not limited to flood area, vegetation, rip rap, paved areas, structures, buildings, trails, etc.

Steep slopes: Land with a 25% or greater slope.

Riparian Corridors: Rivers, streams, wetlands and flood areas plus the areas bordering the waterbodies; the width of the riparian corridor varies by waterbody size, as well as the vegetation and slopes surrounding the waterbody.

Wildlife Habitat: Waterbodies, flood areas, land, vegetation and other features that support fish and wildlife during one or more life cycle phase; manmade features may provide wildlife habitat.

Special Habitat Areas: Habitats designated by the City of Portland in accordance with Metro's Urban Growth Management Functional Plan Title 13, Nature in Neighborhoods, criteria for Habitat of Concern. These are areas that contain or support special status species, sensitive/unique plant populations, or other unique natural or manmade habitat features.

D. RESOURCE SITE BOUNDARIES

Portland established resource sites through previously adopted conservation and protection plans in accordance with Statewide Planning Goal 5. OAR 660-023-0010 defines resource site, or site, as “a particular area where resources are located. A site may consist of a parcel or lot or portion thereof or may include an area consisting of two or more contiguous lots or parcels.”

Metro Title 13 does not require the designation of resource sites. However, because there is significant wildlife habitat throughout Portland that is not a Habitat Conservation Area, and therefore subject to Goal 5 OAR 660-023-0110, resource site will continue to be used.

This project is remapping resource site boundaries to be more consistent and easier to implement. The resource sites were remapped in the following way:

1. The previous resource site boundaries were used to the maximum extent practicable. The intent is to maintain consistency between the past plans and this plan.
2. Resource site boundaries were expanded to capture contiguous or similar and adjacent natural resource features that were not within a resource site.
3. Resource site boundaries were expanded to eliminate unnecessary gaps between resource sites.
4. Very small resource sites, with similar natural resource features and functions, were consolidated into one single larger resource site.
5. Resource site boundaries were adjusted to include entire properties within a single resource site. In some cases, adjacent lots under the same ownership may be in different resource sites; however, in these situations the resource site boundary follows lot lines.
6. Centerlines of streets, bridges, railroad tracks or other transportation facilities are often used to delineate resource site boundaries.
7. The City Boundary or Urban Service Boundary is used along the edges of Portland to provide the outer edge of resource sites.

E. RESULTS

The results begin with a general description of Johnson Creek natural resources. The general description is applicable within each resource site. Following the general description are results for the resource sites. For each resource site the following information is provided:

1. Maps
 - A. Water Features – rivers, streams, wetlands and flood areas
 - B. Land Features – forest, woodland, shrubland and herbaceous vegetation, steep slopes
 - C. Special Habitat Areas
 - D. Riparian Corridor Classifications
 - E. Wildlife Habitat Classifications
 - F. Urban Development Value
 - G. Metro Title 13 Habitat Conservation Areas
 - H. Statewide Planning Goal 5 Areas
 - I. Natural Resource Protections

2. Natural Resource Descriptions – A narrative that provides additional site-specific information about the types, quantity, quality or functionality (aka resource functions or functional values) of the natural resource features present in the resource site.

3. Metro Title 13 and Oregon Goal 5 Compliance – The compliance requirements are documented in Volume 4 and summarized here. If there are natural resources that are not a Habitat Conservation Area present in the resource site, then the general ESEE recommendation (Volume 4) will be confirmed, modified or clarified based on resource site-specific conditions.

4. Natural Resource Protection Decisions – At the end of each resource site section is the final decisions regarding which riparian corridors and wildlife habitat should be protected. These decisions are repeated in Volume 1; if there is a discrepancy between sections, the decisions in Volume 2, Part A take precedence.

E.1. Johnson Creek Resources

The Johnson Creek Watershed is approximately 54 square miles and falls under the jurisdictions of two counties, Multnomah and Clackamas; and the cities of Gresham, Happy Valley, Milwaukie, and Portland. No city is entirely within the watershed's boundaries. Johnson Creek originates in the foothills of Mount Hood near the City of Boring in Clackamas County, and flows generally westward for approximately 25 miles before entering the Willamette River just south of Portland in the City of Milwaukie, which is 18.5 river miles upstream of the Willamette River's confluence with the Columbia River.

Johnson Creek flows relatively unimpeded, unlike most other Portland streams. The creek and its tributaries connect natural areas, parks, and wetlands, as well as highly urbanized residential and industrial areas. The associated impacts and inputs of these differing land uses can be seen and felt throughout the Johnson Creek watershed and impact water temperature, sediment and pollutant loads, and in-stream and riparian habitat. Culverts under roads, trails and driveways impede fish passage and alter stream flow. Over time, local governments (including the City of Portland), nonprofits and property owners have restored floodplain, forested and riparian habitat to improve conditions in the watershed and have removed or retrofitted many culverts to improve conditions in the creek.

E.1.a. Geology

The majority of the Johnson Creek drainage basin is characterized by the geologic classification of alluvium. Alluvial deposits include all of the material in the channels of present-day streams, their floodplains, and abandoned channels. Alluvium consists of very poorly consolidated gravel and sand in the stream channels, gravel and sand lenses usually overlain by silt and minor clay on the floodplain, and organic material usually in abandoned channels beneath several feet of silt or clay.' Alluvial soils are deposited and subject to erosion and redeposition by water.

The thickness of the alluvium is variable. The sand and gravel layer is generally thin and rests on bed rock in small stream channels where gradients are high. The smaller floodplain deposits of silt and gravel tend to be narrow, thinning out at the canyon sides, whereas the larger floodplains may contain recent alluvium up to 30 feet thick or more.

E.1.b. Surface Water

Streams and Flooding

Hydrology in Johnson Creek is driven by rainfall and groundwater inflows. High flows are natural events that occur in the winter during \ heavy rainfall events coupled with high groundwater and saturated soils. Flooding may also occur when heavy rain falls on accumulations of snow. In

many areas, the topography near Johnson Creek is flat and the floodplain is wide, sometimes covering hundreds of acres.

Prior to European settlement, flood waters would have flowed to lowlands and wetlands, enhancing habitat for native species. Over time, extensive fill has occurred in the floodplains along with residential and industrial development. This constrains the area where flood waters can go and contributes to frequent flooding that impacts homes, businesses and public infrastructure including roads. In the summer, low flows are sustained largely by groundwater inputs.

In the 1930s, the Works Progress Administration cleared, straightened, widened and rock-lined most of the lower 15 miles of the creek channel within the City of Portland in an unsuccessful effort to prevent flooding. This work disconnected the stream from the floodplain, causing a significant loss of habitat and encouraging development in the floodplain. In some portions of the creek, the armored channel gradually filled with sediment through natural processes, causing flooding to return. As a result, water flow in the creek is severely restricted. The armoring also inhibited natural deposition of gravels, migration of the creek channel and recruitment of wood within the stream bed and banks. These impacts, along with development in the riparian corridor, severely altered habitat for aquatic species and limited creek access terrestrial wildlife.



Example of Works Progress Administration Modification, Johnson Creek near Foster Road

As urban development has increased throughout the watershed, large areas are now covered with impervious surfaces such as driveways, streets, parking lots, and rooftops. Increase in impervious surface, coupled with the removal of vegetation, results in the land surface becoming less permeable, limiting groundwater recharge, further intensifying overland water runoff, quantity and timing, while also impacting water quality.

During the winter, runoff from the drainage basin area upstream of the USGS's Sycamore gage (near SE 157th & Foster Road) contributes more to peak streamflow and peak volume than the drainage basin area between the Sycamore and Milwaukie sites. A study by the USGS in 2009 found that the decreased contribution in the lower area of the drainage basin is a result of infiltration, interception by underground injection controls (UICs) and the combined sewer system, and temporary flood storage (U.S. Geological Survey, 2009).

Summertime low flows in Johnson Creek vary from year to year and between different reaches across the system based on groundwater supply. Groundwater supply is dependent on precipitation and the ability of the precipitation to infiltrate into the soils and recharge that supply. Currently, normal precipitation years leave Johnson Creek low flows vulnerable to warming that exceed temperature standards and the ability to sustain cold water species such as salmonids. During years of drought, Johnson Creek flows are so low they go subsurface at the oxbow and fish ladder near SE Harney and SE 44th creating a fish passage barrier to upstream habitat.

Johnson Creek is highly reliant on cool seep and spring flows during dry summer months. Spring flow and groundwater upwelling occur in many areas along Johnson Creek. Most notable are flow form stream systems that flow from Flavel Wetlands, Errol Creek and Crystal Springs Creek. Errol Creek and flows from Flavel Wetland enter Johnson Creek downstream of the fish ladder and the SE Harney bridge crossing. These spring flows come out of the ground at about 14 degrees Celsius, providing cool water necessary for salmon to thrive. The largest spring fed system in Johnson Creek is Crystal Springs Creek. When the mainstem of Johnson Creek flows are very low and warm (e.g. <2cf/s; >22°C; USGS Sycamore Gage Data 08/06/2019), a relatively large volume of inflow from Crystal Springs Creek (>8cfs), provides a consistent source of relatively cool water, reducing mainstem temperatures from the its confluence with Crystal Springs Creek, all the way to the Johnson Creek mouth at the Willamette River in Milwaukie. These spring-fed tributaries, also k provide refuge for salmonids, who need cool water to survive.

Water Quality

Johnson Creek is listed as water quality limited for biocriteria, dichlorodiphenyldichloroethylene (DDE), dichlorodiphenyltrichloroethane (DDT), dieldrin, endosulfan, polychlorinated biphenyls (PCBs), polycyclic aromatic hydrocarbons (PAHs), and water temperature on the Department of Environmental Quality's (DEQ) 303(d) list of impaired waterbodies. Water quality samples

collected from Johnson Creek indicate that conditions in the stream exceed the applicable water quality criteria for these parameters.

The Oregon DEQ has developed plans to improve water quality, known as total maximum daily loads (TMDLs), that address DDT, dieldrin, *E. coli*, and water temperature impairments in Johnson Creek (Oregon DEQ, 2006). The TMDL for DDT and dieldrin is based on the use of a surrogate measure using total suspended solids (TSS). DEQ set a TSS target of 15 mg/L for nonpoint sources to achieve the necessary DDT and dieldrin load reductions.

The 2006 temperature TMDL for the Lower Willamette basin includes nonpoint source load allocations for all perennial streams that drain to the Willamette River. The Lower Willamette temperature TMDL includes site-specific shade targets for the Johnson Creek mainstem. These site-specific shade targets were calculated as part of the TMDL modeling process and range from approximately 45 to 85%. For all other perennial streams in the Lower Willamette subbasin (including the tributaries to Johnson Creek), the applicable nonpoint source load allocation is system potential shade. DEQ defines system potential shade as the maximum effective shade possible for a stream reach. System potential shade is achieved when the riparian plant community has reached its mature, undisturbed condition in which vegetation heights are at or near their expected potential, resulting in the maximum effective shade.

The temperature TMDL identifies restoration and protection of riparian vegetation as the primary methods for increasing stream shading and bases the nonpoint source load allocations on achieving system potential shade conditions. In Johnson Creek, DEQ identified the following actions as the means of achieving the conditions necessary to meet system potential shade: (1) restoring and protecting riparian vegetation, (2) increasing instream flows, and (3) narrowing stream channel widths, where appropriate.

Wetlands

Wetlands play an important role in the health of water bodies, such as Johnson Creek. Fully functioning wetlands are highly productive and biologically diverse systems that provide a home to at least one third of all threatened and endangered species (nps.gov). Wetlands provide mitigation for climate change as the vegetation and water absorb and deflect thermal radiation (Kadlec, 2006; Kadlec & Reddy, 2001; Kadlec & Wallace, 2009).

For the Johnson Creek basin, functional values of wetlands include flood control, erosion control, carbon sequestration, sediment trapping, water quality improvement, groundwater recharge and discharge, fish and wildlife habitat, neighborhood attractiveness, education, and recreation. Due to urbanization and the filling of wetlands, fewer wetlands remain along Johnson Creek. Because of their rarity, it is critical to overall watershed health to retain remaining wetlands.

E.1.c. Vegetation

Vegetation that borders waterbodies, particularly streams and wetlands, provides multiple riparian corridor functions. Loss of riparian vegetation and its replacement with impervious surfaces negatively impacts water quantity and quality by increasing sediment, pollutant loading and water runoff, as well as decreasing groundwater recharge.

Riparian systems contain the four critical habitat components: water, cover, food and movement. Due to the variety of plant composition and structure, this habitat serves a great diversity of wildlife. A buffer of riparian vegetation along streams maintains suitable water temperatures for aquatic life and reduces impairment of water quality, while also providing excellent wildlife habitat. The functions of a given riparian habitat component varies from species to species, and even seasonally for the same species. The composition and structure of the upper canopy may have the greatest habitat benefits for some species, while other species may nest and forage in the understory, based on the size of branches, extent of herbaceous ground cover, or an intermingling of several of these factors.

Roots of herbaceous and woody vegetation help stabilize streambanks and reduce erosion. Vegetation can also create overhanging banks which provide cover for fish. Large trees in the riparian area are a source of large woody debris (tree trunks and large limbs) in stream channels and along stream banks. Large woody debris in streams is highly regarded as vital structure for streams and riparian corridors that forms and maintains habitat processes. The fallen trees and logs provide highly productive side channels for food, resting pools, cover, and the accumulation of spawning gravel. Logs in the stream bed decay over time and serve as a basic food source for invertebrates, which in turn are food for fish.

Trees and large shrubs in the riparian area shade the stream during the warm summer months, intercepting thermal radiation and mitigating temperature loads. Keeping waters cool is essential for the survival of fish at all life stages including spawning, egg and fry incubation, and rearing. Riparian vegetation is also an important piece of the food web dynamic. Vegetation supports food inputs, such as branches and leaf litter. Macroinvertebrates feed on the biofilm that grows on the dead vegetation, and are a food source predatory species (Alberts, Fritz, & Buffam, 2018).

Riparian vegetation also mitigates air temperatures through evapotranspiration and by absorbing heat from the sun, a critical issue for ecological and human health as the region experiences the impacts of climate change. (Kadlec & Reddy, 2001; Kadlec & Wallace, 2009).

E.1.d. Aquatic Species

Since 2006, BES has conducted fish salvages as part of restoration projects along Johnson Creek. The associated fish counts reveal that the almost all fish in Johnson Creek are native species. Most of the native species present are those tolerant of warm water and disturbed conditions. These include red-sided shiners, sculpin, largescale suckers, and speckled dace. During these salvages, steelhead, coho, Pacific lamprey and brook lamprey have also been found in the creek. Historically, large populations of salmon inhabited Johnson Creek. Numbers declined dramatically once urbanization began and after the channelization work was completed.

Other fish presence/absence studies conducted by the City of Portland Bureau of Environmental Services (BES), Oregon Department of Fish and Wildlife and Multnomah County show Johnson Creek and some of its tributaries contain populations of salmonids that are listed as threatened under the Endanger Species Act (ESA) at all life stages. Cutthroat and steelhead or rainbow trout have been found at the headwaters of Johnson Creek. Coho salmon have been found in Johnson Creek and its tributaries as far upstream as Damascus, Oregon. Chinook have been observed nearly to the City of Portland limits and up to the headwaters of Crystal Springs Creek. Figure 1 presents the field documents presence of cutthroat trout and ESA-listed Steelhead trout and Chinook and coho salmon in Johnson Creek and its tributaries (Bureau of Environmental Services, 2018).

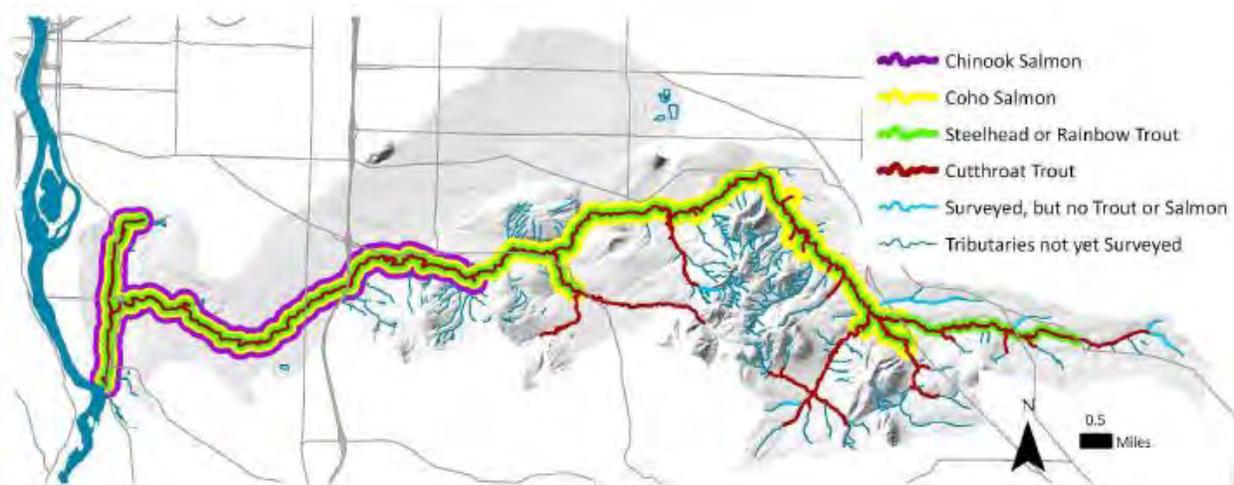


Figure 1: Cutthroat and Steelhead trout and Chinook and coho salmon in Johnson Creek (2015)

Disconnected or developed floodplains have detrimental effects on salmonid populations in Johnson Creek. Studies show that frequently inundated vegetated floodplains provide feeding and resting opportunities for juvenile salmonids that greatly increase their growth and survival rate, compared to streams where flow is confined to the stream channel (Sommer, Nobriga, Harrell, Batham, & Kimmerer, 2001). Confined channels like Johnson Creek have high stream

velocities creating erosive force to the stream's bed and banks. Fine sediment then becomes suspended in the water column later to deposit in riffles and pool tailouts, which are spawning and feeding grounds for native salmonids and lamprey. These fine sediments can negatively affect fish survival by limiting the flow of nutrient and oxygen rich water into interstitial spaces. This limits the supply of oxygen available to incubating eggs and fry. Fine sediment can attach to and accumulate on the gill filaments of fish inhibiting their ability to aerate the blood, which may lead to death (Kondolf, 2000). Frequently inundated vegetated floodplains and wetlands can significantly reduce sedimentation in the water column by allowing the creek to spread out, providing roughness, slowing stream velocity, and allowing sediment to settle out on the floodplain.

Coho generally spawn in small, lower-gradient stream reaches and side channels during mid-autumn or early winter. In Johnson Creek, coho likely spawn from mid-October through the end of January. Juvenile coho favor relatively slow-moving water such as pools downstream of riffles. Juvenile coho have been observed in lower mainstem reaches of Johnson Creek and in lower reaches of Crystal Springs. Instream DNA testing strongly detected coho upstream of Badger Creek, east of Gresham. In Johnson Creek and nearby streams, smolts move into the Willamette River and then into the Columbia River estuary where they may feed and rear for periods of a few days to months prior to entering the ocean.

Native steelhead in the Willamette River are classified as winter-run (Busby et al. 1996). Summer-run steelhead may occur as well, but these are the result of hatchery releases in the Clackamas River and elsewhere in the Willamette system. In the Clackamas River, winter steelhead usually spawn from January through April. However, in Johnson Creek, the spawning period would likely end earlier as a result of the warm temperatures in Johnson Creek late spring. Juvenile steelhead have been observed as far east in the system as Portland's eastern boundaries in Johnson Creek (Reach 16).

Fall Chinook spawn in mainstem reaches and generally favor larger river areas compared to coho and steelhead. They have been documented up to the Kelley Creek tributary; however, chinook have not been observed upstream of there. Adult spring chinook have been observed (2018 summer snorkel survey in Crystal Springs) in the Johnson Creek system.

During the summers of 2019 and 2020, staff from the Oregon Department of Fish and Wildlife (ODFW) conducted stream habitat surveys in the Portland area using ODFW's wadeable stream survey protocol.¹ As part of the surveys, ODFW staff walked each stream, measuring and characterizing each individual habitat unit (e.g. riffles, pools, glides, culverts) they observed. At

¹ Kelly Moore, Kim Jones, Jeff Dambacher, Charlie Stein, et al. May 2021. Methods for Stream Habitat and Snorkel Surveys. Version 31.1. Oregon Department of Fish and Wildlife, Aquatic Inventories Project, Conservation and Recovery Program, Corvallis, OR.

<https://odfw.forestry.oregonstate.edu/freshwater/inventory/pdffiles/hmethd21.pdf>

https://odfw.forestry.oregonstate.edu/freshwater/inventory/basin_portland_reports.html

each unit, staff measured the size (wetted length, width, and water depth), slope, streambank condition, large wood volume, canopy cover, and substrate composition. Along each stream reach, staff measured the bankfull width, terrace height, floodprone width, and valley width. The surveys also included a riparian assessment, where staff assessed a 30-meter (approx. 100 feet) transect perpendicular to the stream and characterized canopy closure, ground cover, and tree abundance.

The data was then analyzed by city staff to characterize the current quality of stream habitat in Portland’s streams. Stream condition is characterized by stream reach (segments of the stream that are approximately 0.5–1 mile long). The habitat quality of a stream reach represents how well the physical characteristics of the stream can support fish and other aquatic organisms by providing sources of food, refuge from predators, and areas to spawn. The metrics used to evaluate how well each stream reach provides these ecological functions are:

Grouping	Metric	Metric Description
Bank Condition	Percent artificial bank stabilization	Percent of the reach with artificial bank stabilization or riprap
Floodplain Condition	Floodplain connection	Vertical containment of the stream channel, calculated as floodprone width/bankfull width
	Floodplain development	Percentage of the current floodplain with vegetation
Habitat Connectivity	Percent Piped	Percentage of the stream flowing through pipes or culverts
	Road crossings	Number of road crossings per kilometer
Large Wood	Large wood volume	Volume of wood with diameter \geq 15cm & length \geq 3m, normalized by stream length
Pool Habitat	Pool frequency	The number of channel widths (active channel width) between pools in the reach
	Pool habitat cover	Cover includes a combination of residual pool depth, wood pieces per 100m, boulder count per 100m ² , undercut banks, debris jams
Riffle Habitat	Percent gravel	Percent of riffle area composed of gravel-sized substrate
	Percent fines	Percent of riffle area composed of fine substrate (silt, organic matter, sand)
	Riffle frequency	The number of channel widths (active channel width) between riffles in reaches where stream gradient is between 0.2 and 6%.
Riparian Condition	Shade	Current riparian shade as a proportion of the site potential
	Invasive cover	Invasive species cover in the riparian area (30 m)
	Natural Resource Inventory	Percentage of undeveloped high, medium and low quality riparian area as ranked by the NRI (50 ft)

The stream habitat metrics are computed for each stream reach and then converted to an index score that represents the ecological function provided by that metric. Index scores provide a consistent way of characterizing condition across a variety of habitat metrics and stream reaches. ODFW stream habitat benchmarks² and the City's Watershed Health Index³ were used to establish the stream conditions that correspond to high quality habitat and which correspond to poor quality habitat for each metric.

Streams with 'excellent' stream habitat quality (dark blue lines on the map) are those where close to all of the habitat metrics meet or exceed the desired thresholds. These are areas with very high quality habitat that can support a variety of fish and aquatic organisms across their many different life stages. Conversely, stream reaches with 'very poor' stream habitat quality (red lines on the map) are those with little to no physical habitat that fish and other aquatic organisms require to survive.

Figures 2 and 3 show the results of the streams survey within the Johnson Creek area.

In 2019, a study of Johnson Creek's potential to support salmon populations identified reaches in the main stem and in Crystal Springs as priorities for habitat restoration and protection for chinook and coho salmon. Known habitat types, distribution, quality, and function values were used to develop a salmonid production model, which ranked and prioritized specific reaches based on their projected ability to yield the greatest increase in fish abundance. The scores, rankings, and limiting factor impacts for each stream reach can be viewed in this webtool:

<https://ecosystems.azurewebsites.net/EDT/Portland/Restoration/>

² Scott Foster, Charles Stein, Kim Jones. 2001. A guide to interpreting stream survey reports. Edited by P.A. Bowers. Information Reports 2001-06. Oregon Department of Fish and Wildlife, Portland, OR.

<https://odfw.forestry.oregonstate.edu/freshwater/inventory/pdf/interpgd.pdf>

³ City of Portland Bureau of Environmental Services, Watershed Health Index and Report Cards.

<https://www.portlandoregon.gov/bes/reportcards>.

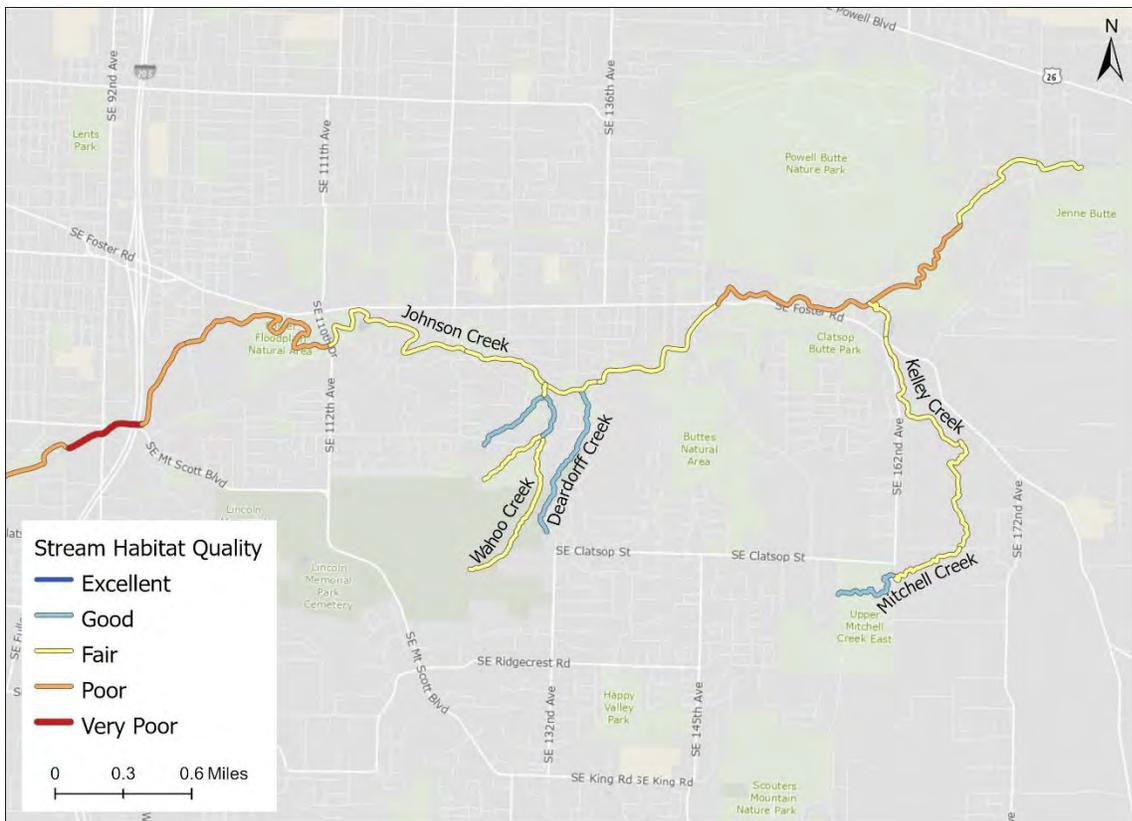
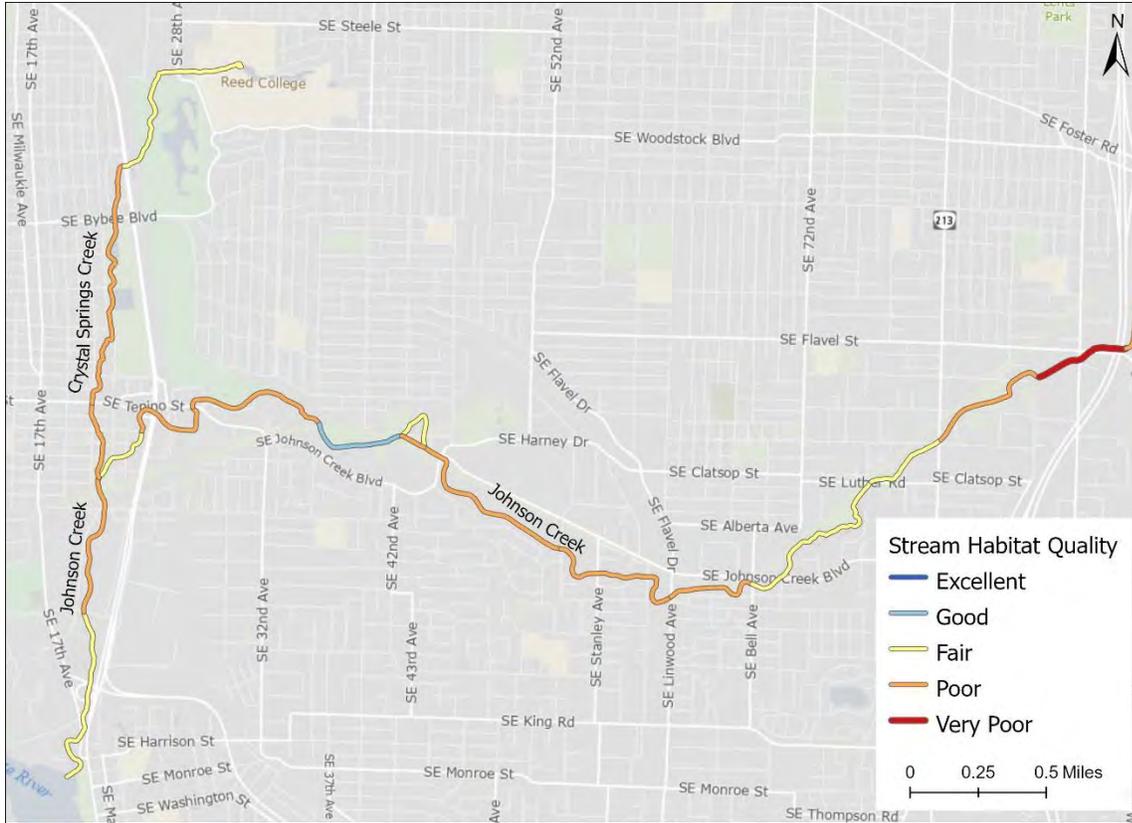


Figure 2 and 3: Results of Stream Survey

Benthic macroinvertebrates are an important source of food for fish and other aquatic organisms. In 1999, The U. S. Environmental Protection Agency, Portland State University, and other agencies conducted a pilot bio-assessment study of urban streams for Environmental Services. The main objective was to compare the differences of biota in two urban streams (Johnson and Tryon Creek) and two adjacent rural ecosystems (Clear Creek and Deep Creek). Of 65 sites sampled for physical, chemical, and biological parameters during late August through early September 1999, 30 were in Johnson Creek, 25 of which were on the main stem. Sites were sampled monthly for diatoms, macroinvertebrates, and water chemistry. The results of the study found that benthic communities in Johnson and Tryon creeks are degraded in comparison to regional reference creeks within the same ecoregion. Specifically in Johnson Creek the results indicated marginal conditions for physical habitat, macroinvertebrates and lack of a quality food base (Hill et al., 2001).

E.1.e. Wildlife

Johnson Creek acts as a wildlife corridor for the passage of species not normally observed in large cities, including deer, coyote, bear, cougar, and many woodland and meadow birds. Beaver are found throughout the area and river otter are observed in Crystal Springs.

Sensitive amphibian species known to reside in the riparian areas of Johnson Creek include three pond-breeding salamander species (long-toed salamander, northwestern salamander, and rough-skinned newt) and two frog species (chorus frog and red-legged frog). The Pacific giant salamander has also been found in the watershed, as well as other stream-breeding and terrestrial-breeding amphibian species. Amphibians are highly susceptible to the impacts of a changing climate and these species are listed as sensitive. The only State-listed amphibian of concern is the red-legged frog. Western painted turtles have also been identified in the watershed.

Forested riparian vegetation is considered excellent songbird habitat and is often inhabited by species with specific habitat requirements. Riparian areas are important not only to breeding bird populations but to winter residents and migrants as well. Breeding bird densities in riparian communities are dependent upon specific riparian vegetative type and, as a result, are generally higher than in the surrounding habitat.

Special status bird species observed in the Johnson Creek resource area include American bittern, American dipper, American kestrel, American white pelican, band-tailed pigeon, bald eagle, black-throated gray warbler, brown creeper, bufflehead, Bullock's oriole, bushtit, chipping sparrow, common yellowthroat, common nighthawk, downy woodpecker, great blue heron, green heron, Hammond's flycatcher, hooded merganser, house wren, Hutton's vireo, loggerhead shrike, merlin, Nashville warbler, northern harrier, olive-sided flycatcher, orange-crowned warbler, osprey, Pacific-slope flycatcher, Pacific wren, peregrine falcon, pileated woodpecker, purple finch, purple martin, red crossbill, red-necked grebe, rufous hummingbird, short-eared

owl, sora, streaked horn lark, Swainson's thrush, varied thrush, Vaux's swift, vesper sparrow, western bluebird, western meadowlark, western wood-pewee, white-breasted nuthatch, willow flycatcher, Wilson's warbler, wood duck, yellow warbler, and yellow-breasted chat.

E.1.f. Special Habitat Areas

Johnson Creek, the channel, is designated a Special Habitat Area because it provides critical habitat for Cutthroat, steelhead and rainbow trout and Chinook and Coho salmon. In addition, Johnson Creek meets the following SHA criteria:

- Special Status Species (S) – A habitat area or feature that supports an at-risk wildlife species on more than an incidental basis to complete one or more life history stages.
- Habitat Corridor (C) – An area that provides a wildlife movement corridor between larger habitat patches.

Reed Lake is designated a Special Habitat Area because it meets the following criteria:

- Wetland (W)- Wetlands and associated seeps and springs provide criteria watershed functions including improving water quality, storing water and reducing flood risks, contributing to summer in-stream flows and providing habitat for wildlife, including some at-risk species like red-legged frog.
- Bottomland Hardwood Forest (B) – An area that contains remnant bottomland hardwood forest species; other tree species and vegetation may be present.
- Migratory Stopover Habitat (M) – An area or feature used by migratory birds for nesting, resting, feeding or cover on more than an incidental basis.
- Habitat Corridor (C) – An area that provides a wildlife movement corridor between larger habitat patches.

Crystal Springs is designated a Special Habitat Area because it meets the following SHA criteria:

- Special Status Species (S) – A habitat area or feature that supports an at-risk wildlife species on more than an incidental basis to complete one or more life history stages.
- Habitat Corridor (C) – An area that provides a wildlife movement corridor between larger habitat patches.

Tideman Johnson Park and Riparian Area is designated a Special Habitat Area because it meets the following criteria:

- Wetland (W) - Wetlands and associated seeps and springs provide critical watershed functions including improving water quality, storing water and reducing flood risks, contributing to summer in-stream flows and providing habitat for wildlife, including some at-risk species like red-legged frog.
- Bottomland Hardwood Forest (B) – An area that contains remnant bottomland hardwood forest species; other tree species and vegetation may be present.
- Migratory Stopover Habitat (M) – An area or feature used by migratory birds for nesting, resting, feeding or cover on more than an incidental basis.
- Habitat Corridor (C) – An area that provides a wildlife movement corridor between larger habitat patches

Errol Heights Wetland is designated a Special Habitat Area because it meets the following criteria:

- Special Status Species (S) – A habitat area or feature that supports an at-risk wildlife species on more than an incidental basis to complete one or more life history stages.
- Wetland (W) - Wetlands and associated seeps and springs provide critical watershed functions including improving water quality, storing water and reducing flood risks, contributing to summer in-stream flows and providing habitat for wildlife, including some at-risk species like red-legged frog.
- Migratory Stopover Habitat (M) – An area or feature used by migratory birds for nesting, resting, feeding or cover on more than an incidental basis.
- Habitat Corridor (C) – An area that provides a wildlife movement corridor between larger habitat patches

SE 55th and Harney Wetland is designated a Special Habitat Area because it meets the following criteria:

- Wetland (W) - Wetlands and associated seeps and springs provide critical watershed functions including improving water quality, storing water and reducing flood risks, contributing to summer in-stream flows and providing habitat for wildlife, including some at-risk species like red-legged frog.
- Migratory Stopover Habitat (M) – An area or feature used by migratory birds for nesting, resting, feeding or cover on more than an incidental basis.
- Habitat Corridor (C) – An area that provides a wildlife movement corridor between larger habitat patches

Springwater Wetland Complex is made up of several interconnected wetlands and surrounding areas where are designated a Special Habitat Area because it meets the following criteria:

- Special Status Species (S) – A habitat area or feature that supports an at-risk wildlife species on more than an incidental basis to complete one or more life history stages.
- Special Status Plants (P) – An area where rare or unique plant species have been documented. (Note – Because rare plants are often sought out for harvesting, the exact location of these species will not be documented in this report.)
- Wetland (W) - Wetlands and associated seeps and springs provide critical watershed functions including improving water quality, storing water and reducing flood risks, contributing to summer in-stream flows and providing habitat for wildlife, including some at-risk species like red-legged frog.
- Migratory Stopover Habitat (M) – An area or feature used by migratory birds for nesting, resting, feeding or cover on more than an incidental basis.
- Bottomland Hardwood Forest (B) – An area that contains remnant bottomland hardwood forest species; other tree species and vegetation may be present.
- Habitat Corridor (C) – An area that provides a wildlife movement corridor between larger habitat patches

Flavel Wetland is designated a Special Habitat Area because it meets the following criteria:

- Wetland (W) - Wetlands and associated seeps and springs provide critical watershed functions including improving water quality, storing water and reducing flood risks, contributing to summer in-stream flows and providing habitat for wildlife, including some at-risk species like red-legged frog.
- Migratory Stopover Habitat (M) – An area or feature used by migratory birds for nesting, resting, feeding or cover on more than an incidental basis.
- Habitat Corridor (C) – An area that provides a wildlife movement corridor between larger habitat patches

Brookside Wetlands is designated a Special Habitat Area because it meets the following criteria:

- Wetland (W) - Wetlands and associated seeps and springs provide critical watershed functions including improving water quality, storing water and reducing flood risks, contributing to summer in-stream flows and providing habitat for wildlife, including some at-risk species like red-legged frog.
- Migratory Stopover Habitat (M) – An area or feature used by migratory birds for nesting, resting, feeding or cover on more than an incidental basis.
- Habitat Corridor (C) – An area that provides a wildlife movement corridor between larger habitat patches

Kelley Creek Refuge is designated a Special Habitat Area because it meets the following criteria:

- Special Status Species (S) – A habitat area or feature that supports an at-risk wildlife species on more than an incidental basis to complete one or more life history stages.
- Bottomland Hardwood Forest (B) – An area that contains remnant bottomland hardwood forest species; other tree species and vegetation may be present.
- Habitat Corridor (C) – An area that provides a wildlife movement corridor between larger habitat patches

Schweitzer Wetland Complex is designated a Special Habitat Area because it meets the following criteria:

- Special Status Species (S) – A habitat area or feature that supports an at-risk wildlife species on more than an incidental basis to complete one or more life history stages.
- Wetland (W) - Wetlands and associated seeps and springs provide critical watershed functions including improving water quality, storing water and reducing flood risks, contributing to summer in-stream flows and providing habitat for wildlife, including some at-risk species like red-legged frog.
- Migratory Stopover Habitat (M) – An area or feature used by migratory birds for nesting, resting, feeding or cover on more than an incidental basis.
- Habitat Corridor (C) – An area that provides a wildlife movement corridor between larger habitat patches

Circle Avenue Wetland Complex is designated a Special Habitat Area because it meets the following criteria:

- Wetland (W) - Wetlands and associated seeps and springs provide critical watershed functions including improving water quality, storing water and reducing flood risks, contributing to summer in-stream flows and providing habitat for wildlife, including some at-risk species like red-legged frog.
- Habitat Corridor (C) – An area that provides a wildlife movement corridor between larger habitat patches

Powell Butte Complex is designated a Special Habitat Area because it meets the following criteria:

- Upland Grassland (G) - Upland habitat or landscape feature important to individual grassland-associated species or assemblages of grassland-associated species on more than an incidental basis.
- Migratory Stopover Habitat (M) – An area or feature used by migratory birds for nesting, resting, feeding or cover on more than an incidental basis.
- Habitat Corridor (C) – An area that provides a wildlife movement corridor between larger habitat patches

Wetlands are also designated Special Habitat Areas because they meet the criterion for wetland (W). Wetlands and associated seeps and springs provide critical watershed functions including improving water quality, storing water and reducing flood risks, contributing to summer in-stream flows and providing habitat for wildlife, including some at-risk species like red-legged frog. Some of these wetlands are found within Forest Park and others are on private property outside of the park. The relationship between forests and wetlands, in and outside of Forest Park is particularly important to red-legged frog, a Special Status Species.

E.1.h. Stormwater Management

Portland's stormwater system is a complex network of engineered and natural assets that provide conveyance, protect water quality, and provide and protect habitat and biological communities. In addition to hundreds of miles of pipes and ditches, and thousands of sumps and pollution reduction facilities; the city depends on the natural areas that intercept rainfall and the acres of wetlands and hundreds of miles of streams and drainageways that function as a critical part of the stormwater conveyance network.

Within the City of Portland there are three methods of conveying stormwater runoff from impervious areas. When soils allow infiltration, stormwater runoff may be directed to sumps or other stormwater facilities to be infiltrated into the ground, after being treated to protect groundwater. Some portions of the City direct stormwater to the combined sewer system, which sends stormwater along with sewage to the sanitary treatment plant for processing. In the remainder of the City, stormwater is directed to a natural stream system.

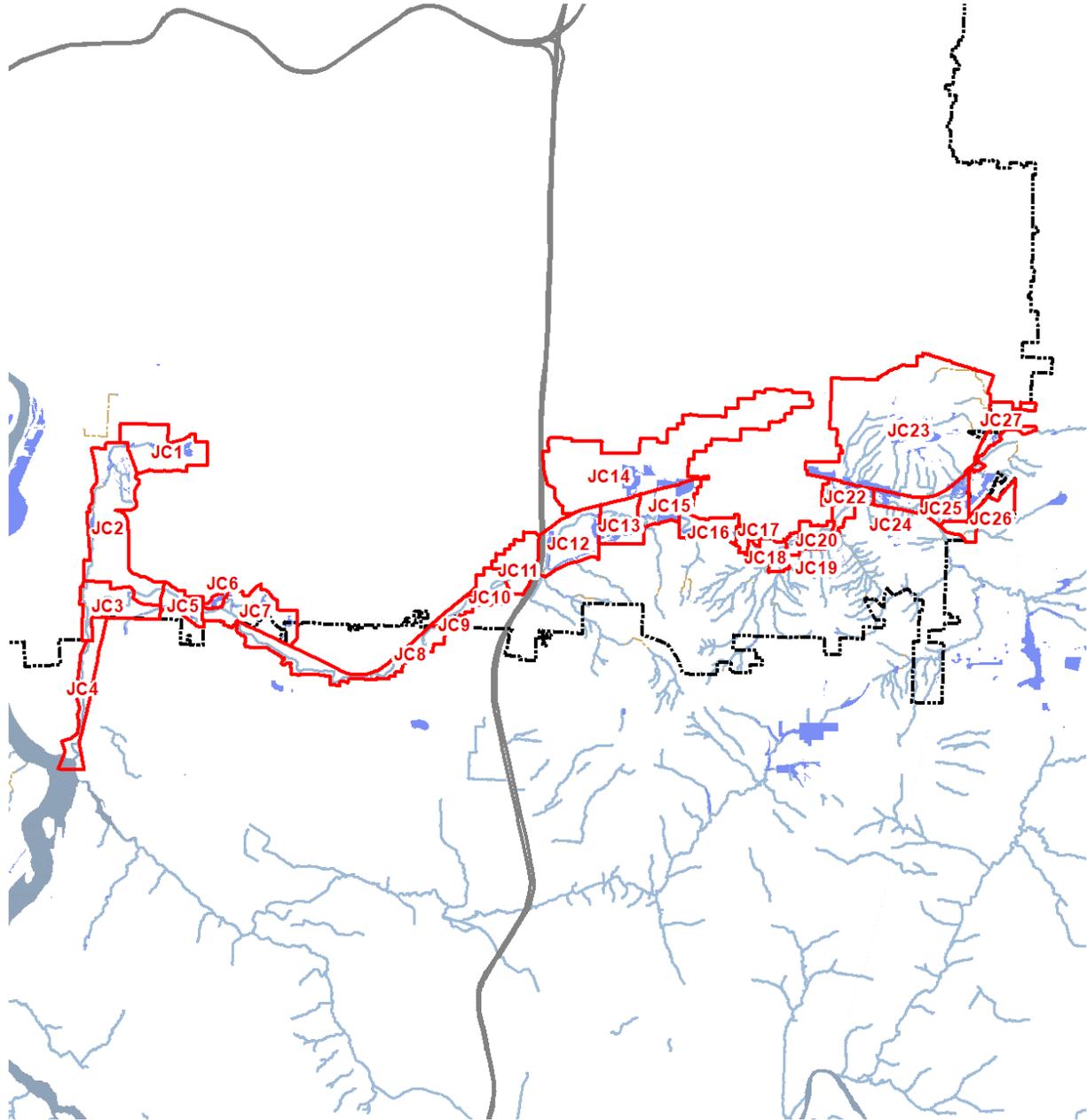
When natural areas are developed, the services provided by those natural areas are lost. Many of these services are critical to the healthy functioning of natural resources and are difficult or impossible to replace. For example, forest vegetation slows and takes up runoff from precipitation, thereby minimizing erosion and allowing the forest floor to filter out sediments and nutrients as the water soaks down into groundwater or passes into streams. By decreasing runoff and increasing groundwater infiltration, the forest protects downstream neighborhoods from flooding. The forest canopy helps to maintain stream flows, filter out potential pollutants, and moderate stream temperatures, thereby sustaining habitat for fish, amphibians and aquatic organisms as well terrestrial wildlife. Replacement of these functions through built stormwater management measures can only address a subset of the service provisions provided by natural systems.

Natural resources found within urban boundaries are vulnerable to negative impacts from unmanaged or inadequately managed stormwater. Pavement, roofing, and other impervious surfaces prevent infiltration of stormwater into the ground and increase the amount of runoff during storm events. This can disrupt the natural hydrologic cycle and increase pollution levels

of stormwater washing into rivers, streams, wetlands and groundwater resources. Significant problems can result from urbanization and inappropriately managed stormwater:

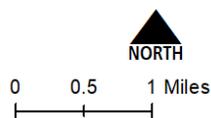
- Stormwater collects pollutants and sediment from impervious surfaces and carries those materials to streams, rivers and groundwater. Particulates and pollutants from streets, autos, landscaping, roofs, animal waste and other sources can harm ESA-listed salmon, other native fish and aquatic species.
- Increased in-stream erosion and decreased groundwater recharge occurs due to changes in the timing, routing and amount of runoff. As a result, streambanks can be undercut, impacting stream health and potentially damaging buildings, roads and bridges. Streams become “flashy” – rising and falling very quickly – increasing flood risks during wet weather and resulting in very low stream flows in the summer.
- Landslide risks can be exacerbated by deficient or inadequate stormwater management.
- Problems with incomplete or ineffective stormwater system could be made worse with climate change due to increases in temperature and changes in precipitation patterns. This could further impact water temperatures in rivers and streams, a serious problem in Portland streams, which exceed temperature standards in the summer. More intense storm patterns can also increase the risks of erosion, landslides and flooding.
- Reduced groundwater and aquifer recharge due to impervious surfaces also negatively impacts water availability during dry periods, which are expected to increase with climate change.

E.2. Resource Sites



Johnson Creek Resource Sites

Updated: April 2020



- Resource Sites
- open stream channel
- piped stream segment
- wetlands
- rivers
- freeways
- City of Portland



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The information on the map was derived from digital databases. Care was taken in the creation of this map but it is provided "as is". The City of Portland ensures meaningful access to city programs, services, and activities to comply with Civil Rights Title VI and ADA Title II laws and reasonably provides translation, interpretation, modifications, accommodations, alternative formats, auxiliary aids and services. To request these services, contact 503-823-7700, City TTY 503-823-6868, Relay Service: 711.

Map 2: Johnson Creek Resource Sites

Resource Site No.: JC1 Resource Site Name: Reed Lake

Previous Plan: Johnson Creek Basin Protection Plan

Previous Resource Site No.: 1

The results of the analysis found in Volume 3, Natural Resources Inventory, Volume 4, Title 13 and Goal 5 Compliance, and the resource site-specific evaluation, are presented in the following maps:

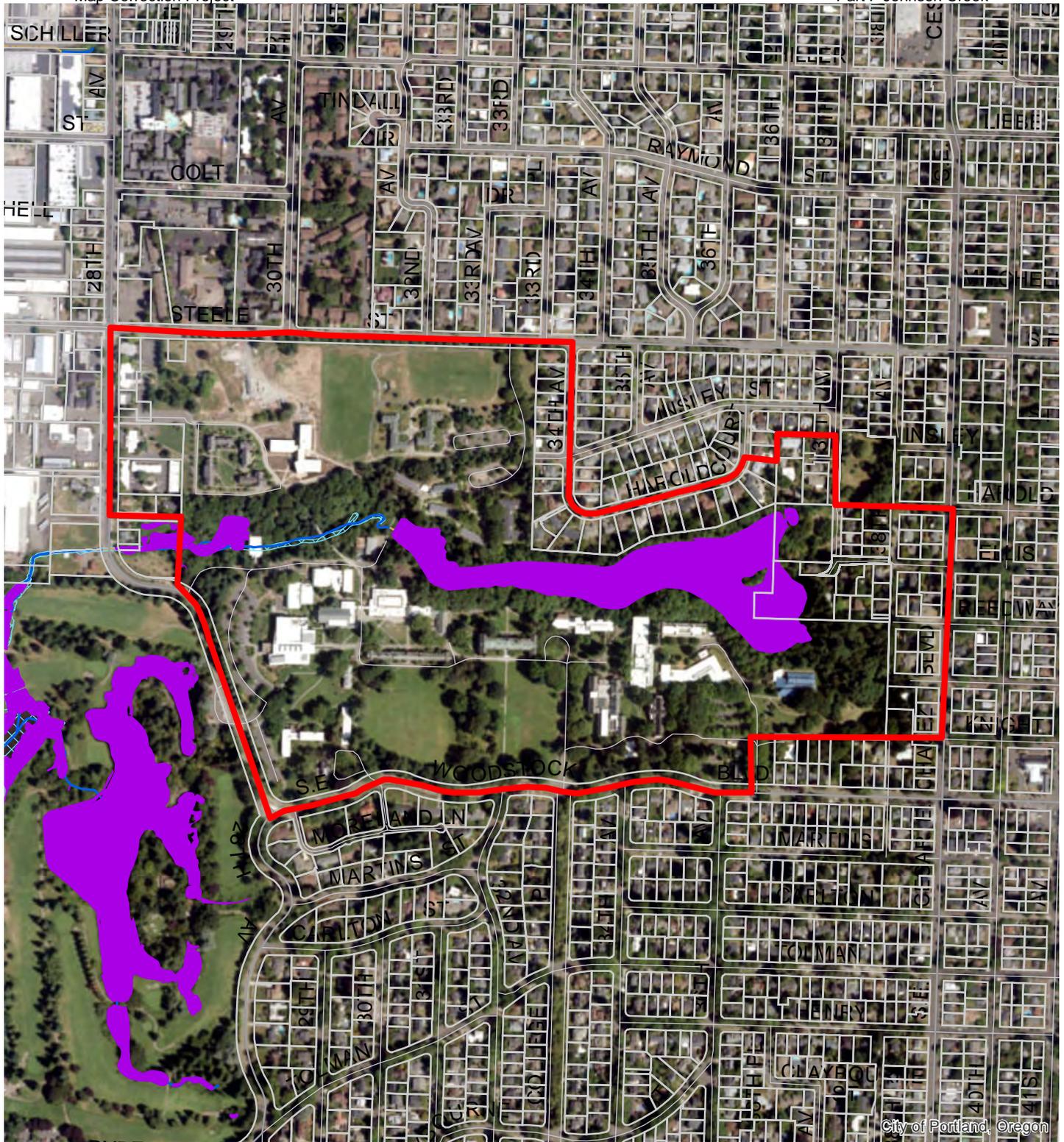
- A. Water Features – rivers, streams, wetlands and flood areas
- B. Land Features – forest, woodland, shrubland and herbaceous vegetation, steep slopes
- C. Special Habitat Areas
- D. Riparian Corridor Classifications
- E. Wildlife Habitat Classifications
- F. Urban Development Value
- G. Metro Title 13 Habitat Conservation Areas
- H. Statewide Planning Goal 5 Areas
- I. Recommended Natural Resource Protections

Following the maps, additional information about existing natural resource features and functions in the resource site is presented.

Implementation of the results is found in Volume 1, Part B, updates to zoning maps and zoning code.

Resource site JC1 includes the following:

Site (acres)	133.0
Base zone (acres)	
CE	<1
CI1	113.4
CM1	<1
OS	<1
R2.5	<1
R5	9.9
R7	9.6
RM1	<1
RM2	<1



Map A: Water Features

**Resource Site:
JC1**

Updated: July 2021



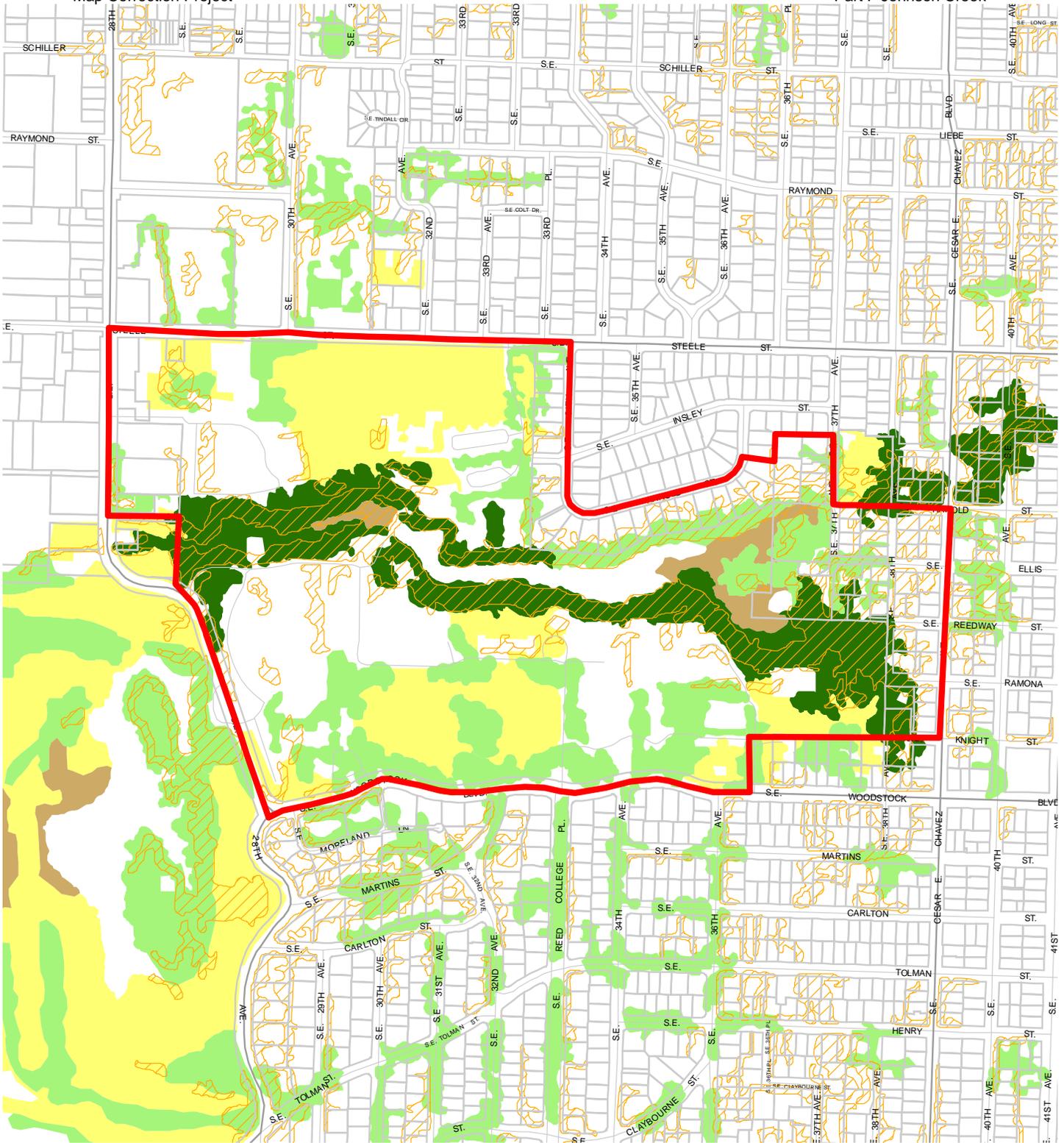
0 325 650 Feet

Proposed Draft - As Amended

- Resource Sites
- Urban Service Boundary
- Taxlots
- Wetlands
- Rivers
- Open stream channel
- Piped Stream Segment
- Flood Area



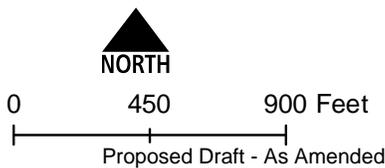
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Map B: Vegetation and Steep Slopes

Resource Site: JC1

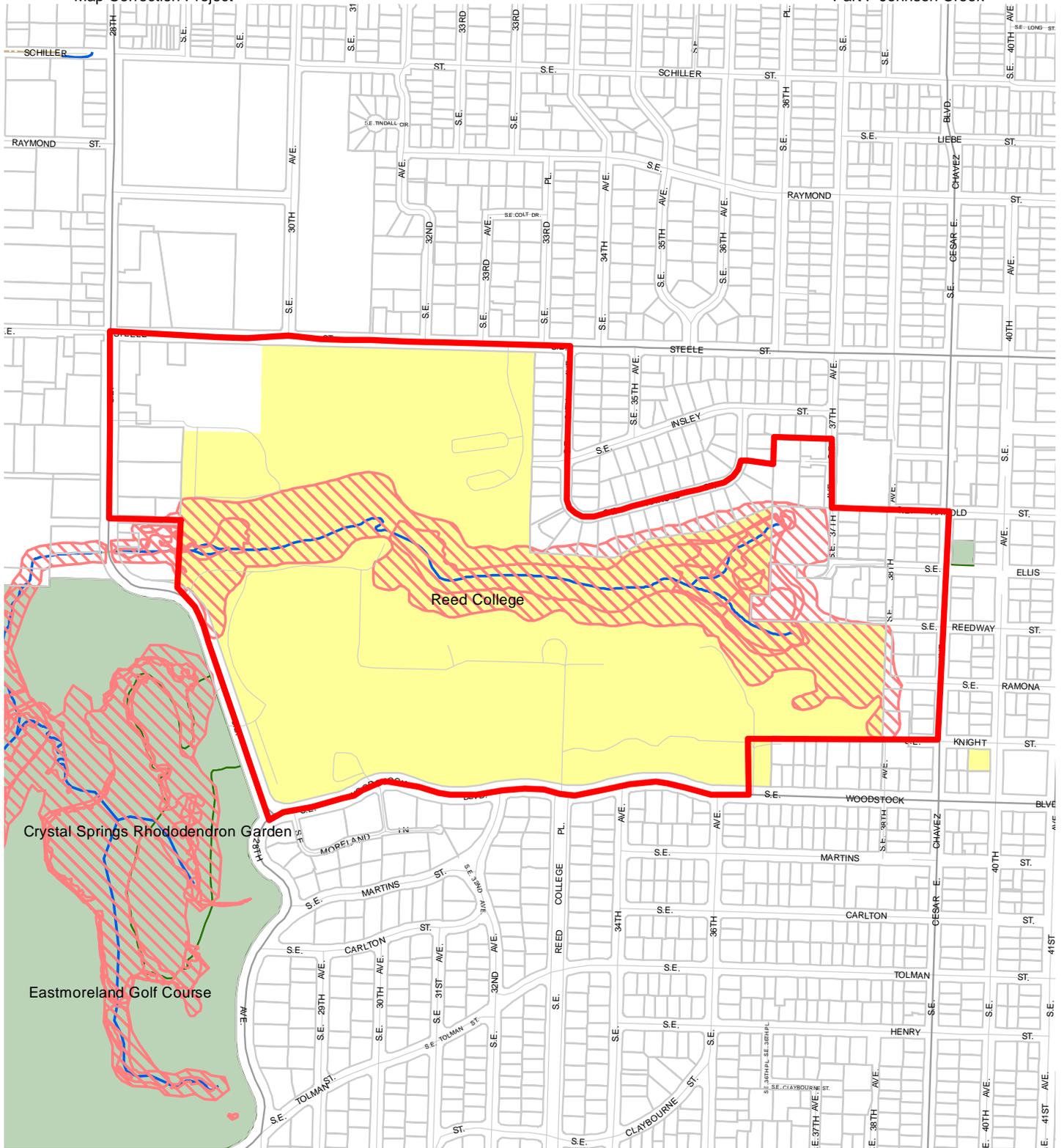
Updated: July 2021



- Resource Sites
- Urban Service Boundary
- Taxlots
- Slopes >25%
- Forest
- Woodland
- Shrubland
- Herbaceous



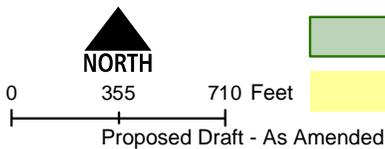
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July 2021



**Map C: Special
Habitat Areas**

**Resource Site:
JC1**

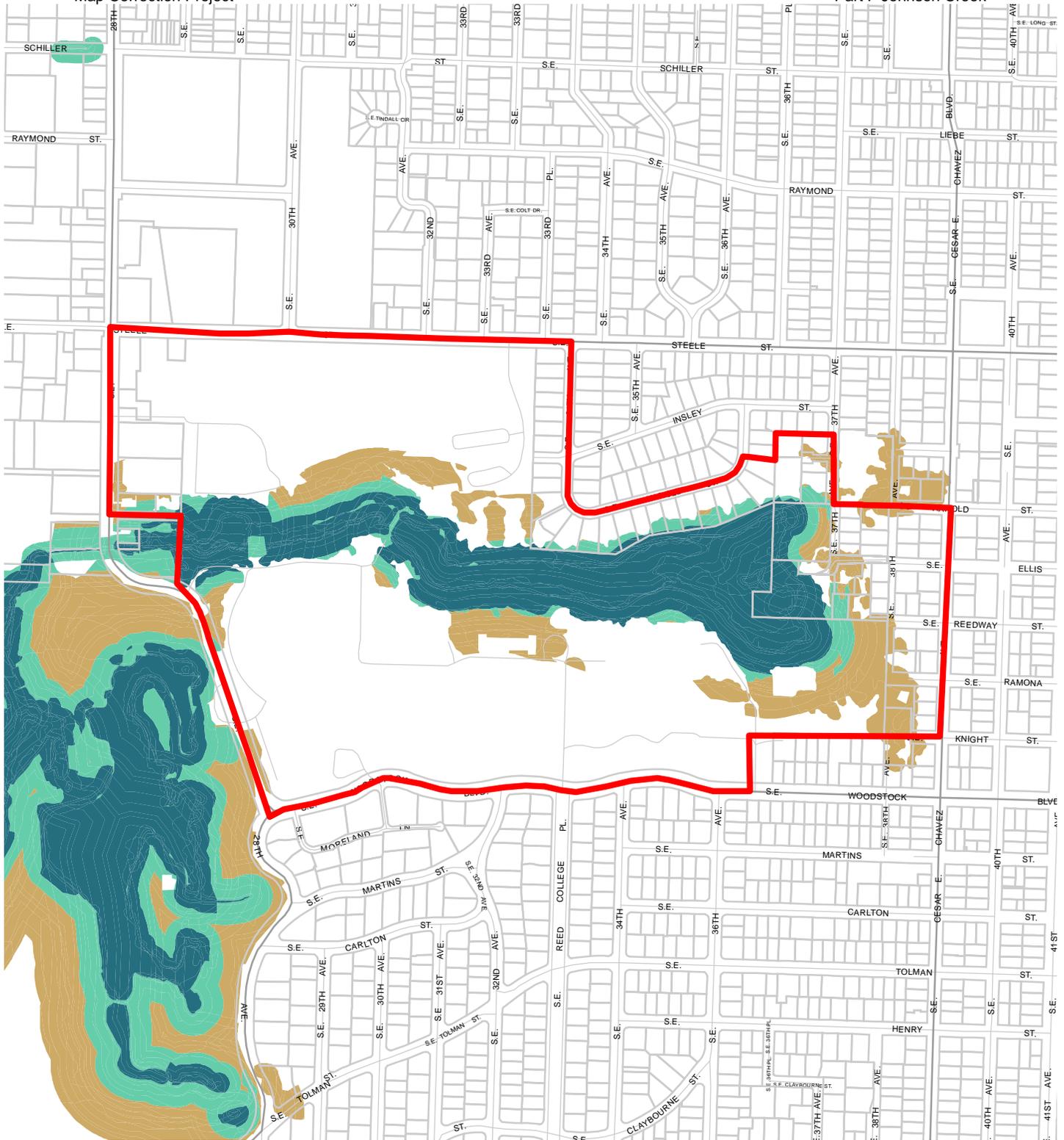
Updated: June 2021



-  Resource Sites
-  Special Habitat Areas (SHAs)
-  Open Stream Channel
-  Piped Stream Segment
-  Parks
-  Schools
-  Urban Service Boundary
-  Taxlots



The information on the map was derived from digital databases. Care was taken in the creation of this map but it is provided "as is". The City of Portland ensures meaningful access to city programs, services, and activities to comply with Civil Rights Title VI and ADA Title II laws and reasonably provides: translation, interpretation, modifications, accommodations, alternative formats, auxiliary aids and services. To request these services, contact 503-823-7700, City TTY 503-823-6868, Relay Service: 711. July 2021

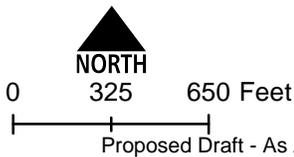


**Map D: Riparian
Corridors Habitat
Classification**

**Resource Site:
JC1**

Updated: July 2021

- Resource Sites
- Urban Service Boundary
- Class I (high rank)
- Taxlots
- Class II (medium rank)
- Class III (low rank)

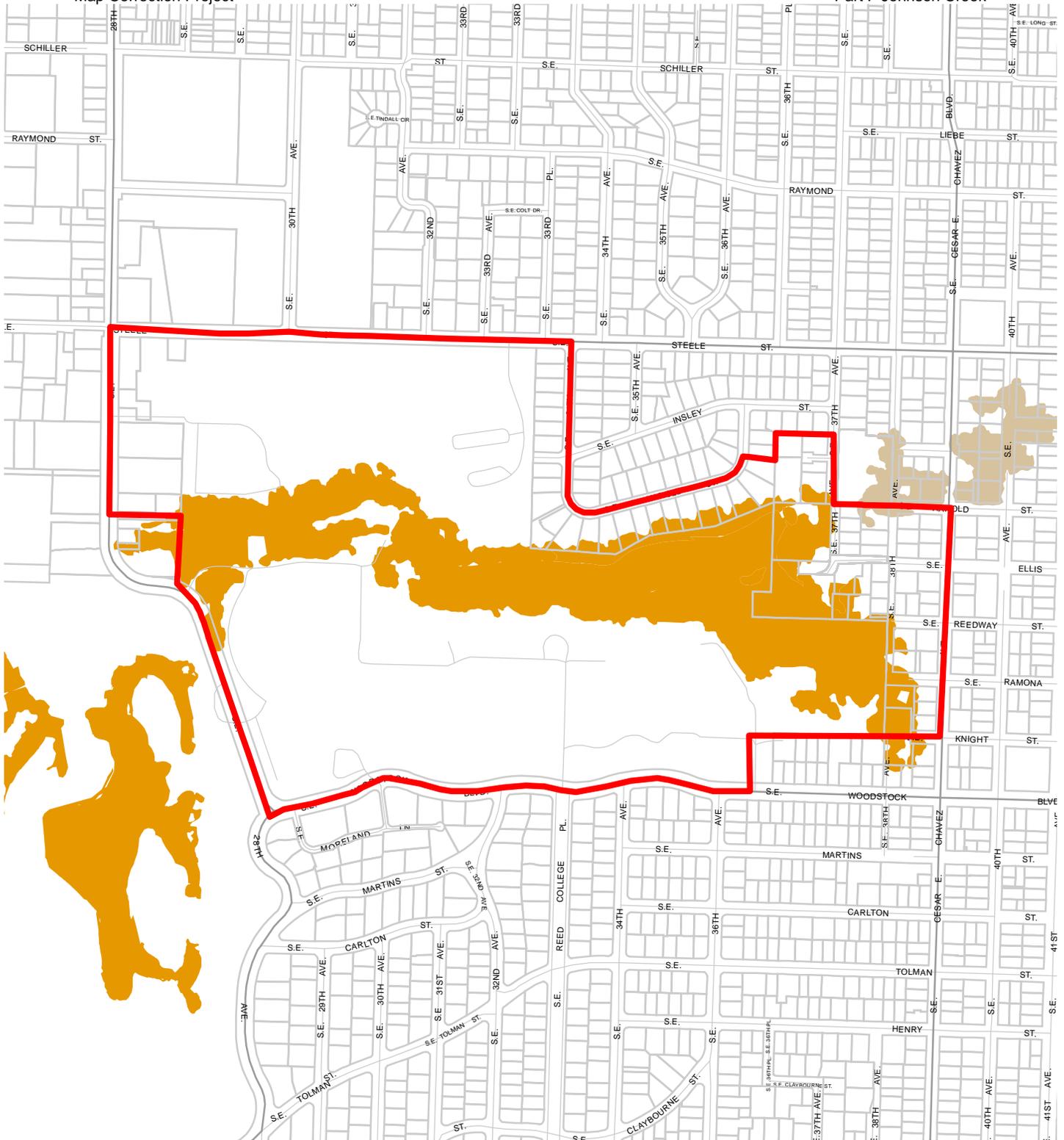


Proposed Draft - As Amended



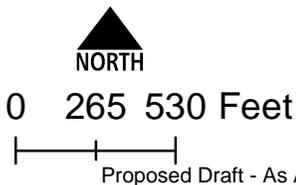
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July 2021



**Map E: Wildlife
Habitat Classification
Resource Site:
JC1**

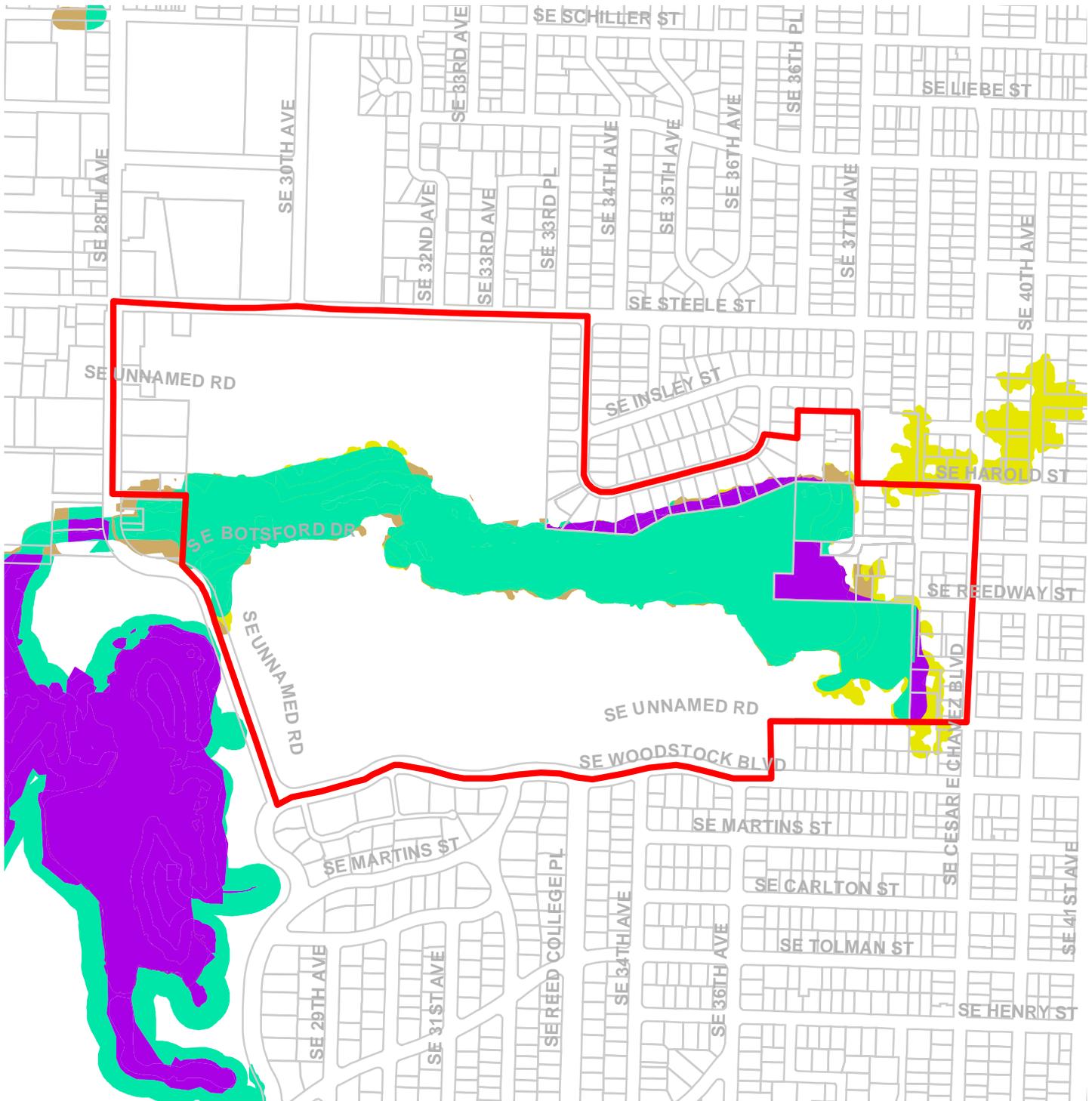
Updated: July 2021



-  Resource Sites
-  Class A (high rank)
-  Class B (medium rank)
-  Class C (low rank)
-  Urban Service Boundary
-  Taxlots



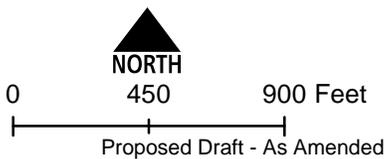
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July 2021



Map G: Title 13 Habitat Conservation Areas (HCA) and Goal 5 Areas

Resource Site: JC1

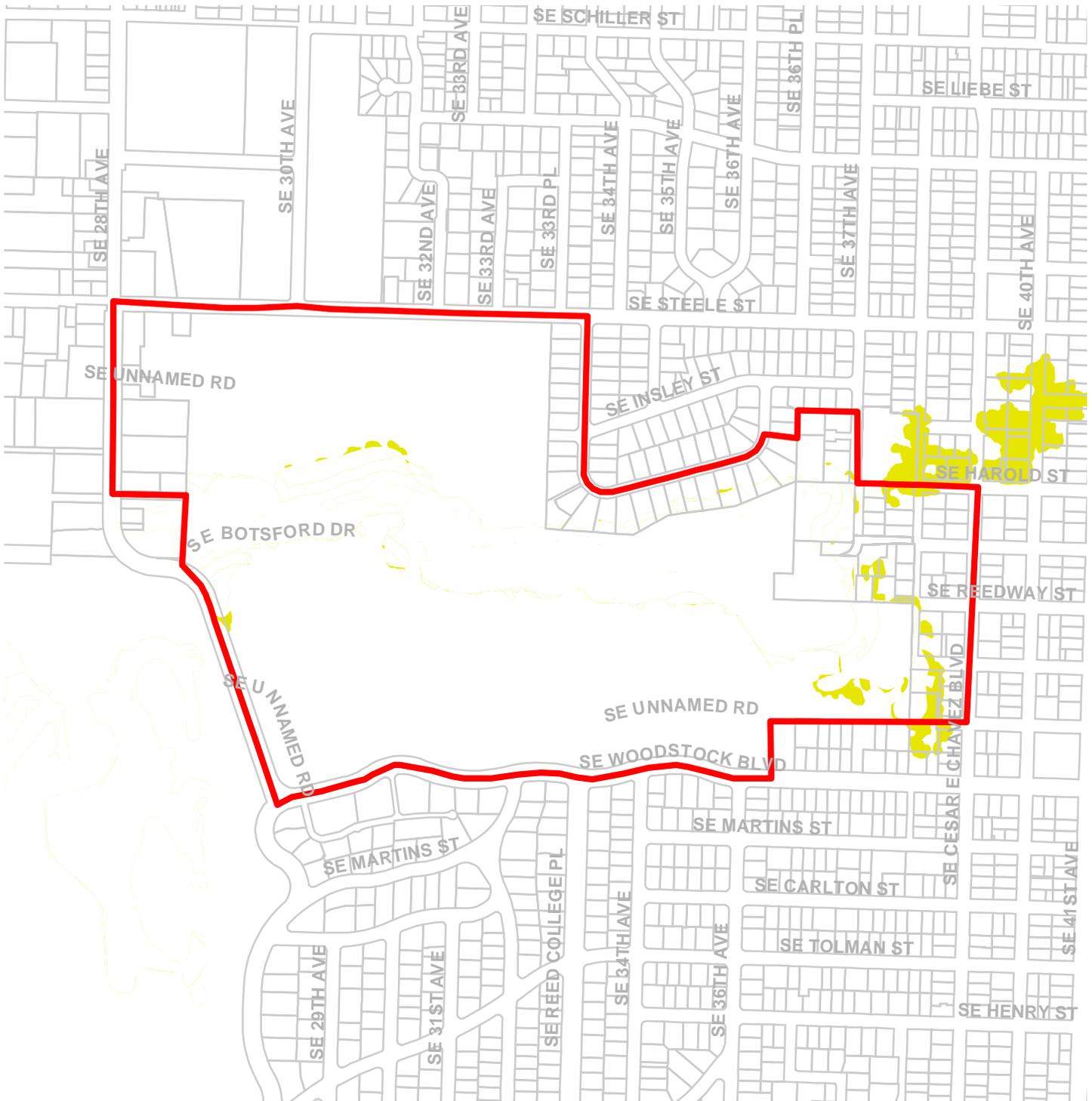
Updated: July 2021



- Urban Service Boundary
- ▭ Resource Sites
- ▭ HCA High Value
- ▭ HCA Moderate Value
- ▭ HCA Low Value
- ▭ Goal 5 Significant Natural Resources



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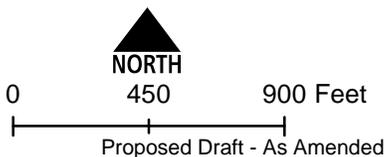


Map H: Goal 5 Resources

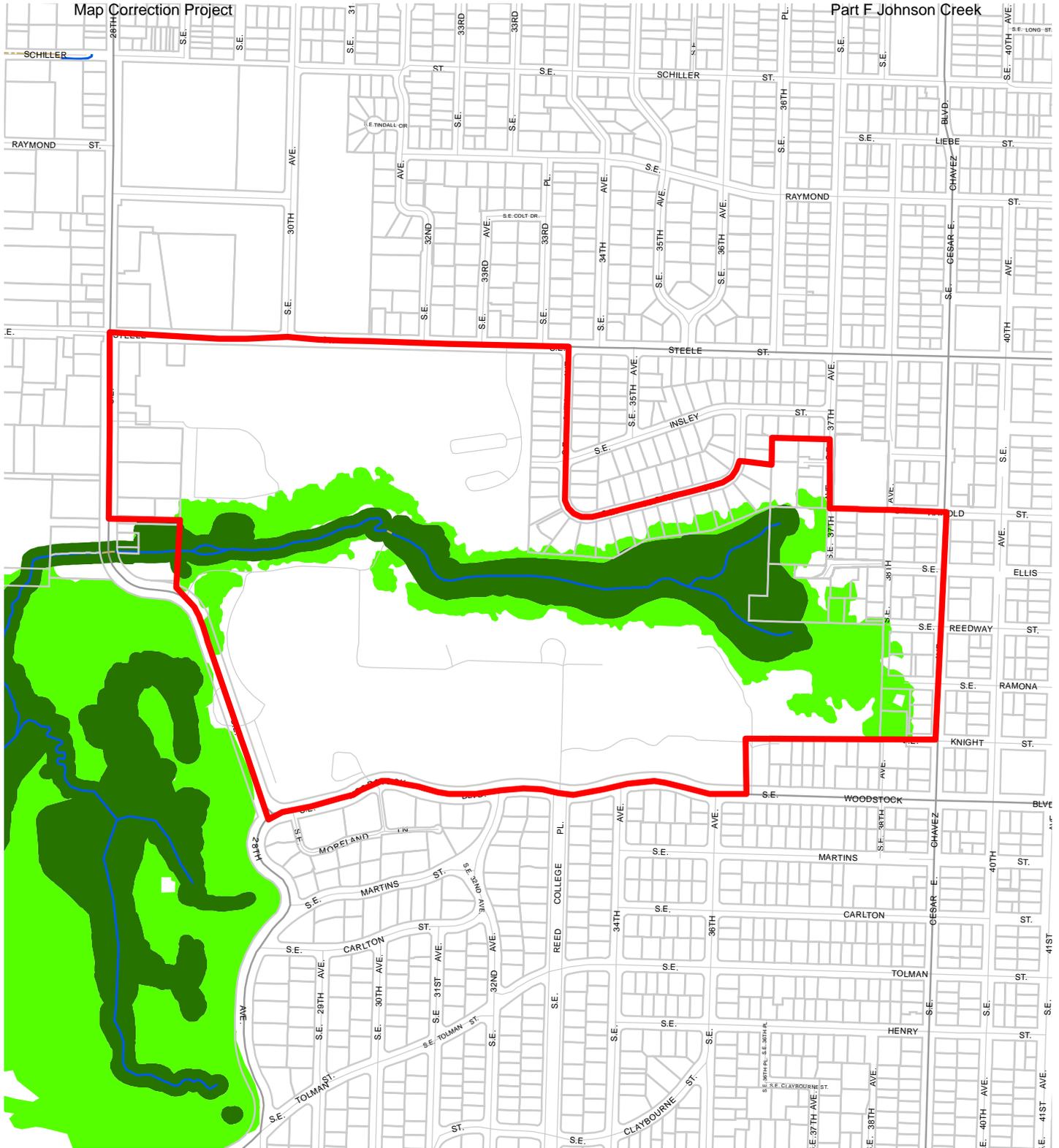
Resource Site: JC1

Updated: July 2021

- Urban Service Boundary
- Resource Sites
- Goal 5 Significant Natural Resources



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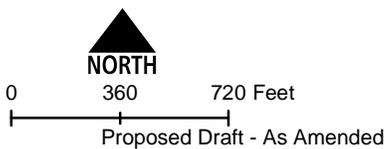


Map I: DRAFT Proposed Environmental Overlay Zones

**Resource Site:
JC1**

Updated: July 2021

-  Resource Sites
-  Open Stream Channel
-  Urban Service Boundary
-  Proposed Conservation Zone
-  Proposed Protection Zone
-  Piped Stream Segment
-  Taxlots



The information on the map was derived from digital databases. Care was taken in the creation of this map but it is provided "as is". The City of Portland ensures meaningful access to city programs, services, and activities to comply with Civil Rights Title VI and ADA Title II laws and reasonably provides: translation, interpretation, modifications, accommodations, alternative formats, auxiliary aids and services. To request these services, contact 503-823-7700, City TTY 503-823-6868, Relay Service: 711. July 2021

Natural Resource Description

Within resource site JC1 the following significant natural resource features and functions are present:

Significant Riparian Corridor Features: open stream; wetland; flood area; land within 50 feet of waterbodies; forest, woodland, shrubland and herbaceous vegetation within 300 feet of waterbodies; and forest vegetation on steep slopes (>25% slope) contiguous to and within 780 feet of waterbodies.

Significant Wildlife Habitat Features: forest patches, and associated and contiguous wetlands, two acres in size or larger.

Special Habitat Areas: Reed Lake (W, B, M, C)

Riparian Corridor Functions: microclimate and shade; stream flow moderation and water storage; bank function and sediment, pollution and nutrient control; large wood and channel dynamics; organic inputs, food web and nutrient cycling; and riparian wildlife movement corridor.

Wildlife Habitat Functions: interior area; food and water; resting, denning, nesting and rearing; movement and migration; reduction of noise, light and vibration; and habitat patches that support special status fish and wildlife species.

Table A: Quantity of Natural Resource Features in Resource Site		JC1
		Study Area
Stream (Miles)		0.7
Wetlands (acres)		10.7
Vegetated Areas >= 1/2 acre (acres)		
	Forest (acres)	22.9
	Woodland (acres)	25.6
	Shrubland (acres)	3.1
	Herbaceous (acres)	24.3
Flood Area*		
	Vegetated (acres)	0.4
	Non-vegetated (acres)	0.0
Steep Slopes (acres)**		29.3
* The flood area includes the FEMA 100-year flood plain plus the adjusted 1996 flood inundation area.		
**Slopes are derived from LiDAR. Steep slopes are areas with a slope greater than 25%.		

Reed Lake is a year-round, spring-fed pond, located on the Reed College campus, with associated springs, wetland and upland areas. The lake provides habitat for beaver, river otter, coho salmon and steelhead. The high structural vegetative and species diversity provides habitat for wildlife including woodpecker, waterfowl (wintering and breeding), kingfisher and raptor species.

Reed Lake accounts for about 20% of the flow in Crystal Springs, a tributary of Johnson Creek. The source of water is ground water which emerges from the Portland Terraces as multiple cold-water springs. The slopes around Reed Lake, the Crystal Springs mainstem and two headwater tributaries are steep, at a 25% grade or higher.

A large proportion of the summer water flow into Johnson Creek is provided by Crystal Springs, which is a source of consistent flow and lower water temperatures, in support of salmonid presence in the lower portion of Johnson Creek. Coho salmon, chinook salmon, steelhead trout and Pacific lamprey have been observed in this reach of Crystal Springs.

In 2019, a study of Johnson Creek's potential to support salmon populations identified Crystal Springs Creek as a high priority for habitat restoration and protection for chinook and coho salmon.

Special status bird species observed in or adjacent to this resource site include American dipper, band-tailed pigeon, bald eagle, black-throated gray warbler, brown creeper, bufflehead, bushtit, chipping sparrow, common yellowthroat, downy woodpecker, great blue heron, green heron, Hammond's flycatcher, hooded merganser, house wren, Hutton's vireo, merlin, Nashville warbler, olive-sided flycatcher, orange-crowned warbler, Pacific-slope flycatcher, pileated woodpecker, peregrine falcon, purple finch, red crossbill, rufous hummingbird, Swainson's thrush, varied thrush, Vaux's swift, western meadowlark, western wood-pewee, white-breasted nuthatch, willow flycatcher, Wilson's warbler, wood duck, and yellow warbler.

Site interspersions with Johnson Creek, Crystal Springs, and Oaks Bottom/Willamette River increases the value of this resource site. The canyon is a mixture of deciduous and coniferous riparian vegetation with small pockets of vegetated emergent islands. Large Grand Fir, Western Red Cedar, Douglas Fir, Big Leaf Maple, and Red Alder form the overstory canopy. Elderberry, spirea, and willow form a shrub layer immediately adjacent to portions of the creek. Small islands in the lake are vegetated by spirea, cattail, and nightshade with pondweed on the surface of the water. Amphibian habitat is provided by numerous downed logs within the creek.

Reed Lake has scenic values, which are enhanced by the 100-foot drop from the top of the canyon walls to the lake. With the exception of late winter, when there are no leaves on the deciduous trees, the canyon is completely enclosed with little visual intrusion from surrounding

properties. There has been some invasion of non-native plant species into the canyon. The lake environment serves as an "outdoor classroom" for Reed College students, as well as for passive and active recreation for the Reed campus and surrounding community, including bird watching, picnicking, walking, canoeing and boating.

Table B: Quality of Natural Resource Functions in Resource Site JC1				
Resource Site (acres) = 133				
	Class 1/A	Class 2/B	Class 3/C	Total
Riparian Corridors*				
acres	23.7	5.3	13.1	42.2
percent total inventory site area	17.8%	4.0%	9.8%	31.7%
Wildlife Habitat*				
acres	0.0	33.4	0.3	33.7
percent total inventory site area	0.0%	25.1%	0.2%	25.4%
Special Habitat Areas**				
acres	32.9			
percent total inventory site area	24.7%			
Combined Total*				
acres	23.7	11.2	7.2	42.2
percent total inventory site area	17.8%	8.4%	5.4%	31.7%
* Class I riparian resources, Special Habitat Areas, and wildlife habitat include open water. ** Metro Title 13 designated all Special Habitat Areas as Class I riparian corridors. +Because riparian resources, Special Habitat Areas, and wildlife Habitat overlap, the results cannot be added together to determine the combined results.				

Stormwater runs off impervious surfaces (e.g., rooftops, driveways, parking areas, streets, etc..) rapidly. Without a place to retain the water (such as wetlands or adequate stormwater facilities), stormwater runoff results in spikes in stream levels which can cause or exacerbate flooding and increase stream erosion. In addition, when water runs off quickly, it does not have a chance to infiltrate and recharge streams or aquifers to provide water during drier periods.

The type and capacity of stormwater facilities to manage the runoff from impervious surfaces varies in the city, affecting the local rate and amount of runoff, and the amount of pollutants in the water. Much of the city was developed prior to any stormwater regulations and receives limited or no management prior to discharging to pipes and surface waters.

Table C shows the total amount of impervious area within the resource site and how much of that impervious area lacks stormwater management; the percentage of total impervious area that is not managed is called "effective impervious area." The higher the percent of effective

impervious area in a watershed, the greater the negative impacts of stormwater runoff to streams. Stream science indicates that when effective impervious area reaches 10% of a watershed, negative stream impacts become significant; and at 25%, these impacts on waterways can be substantial. An additional consideration is the differences in soil conditions and other factors that influence the ability of pervious areas to retain, infiltrate or filter pollutants from stormwater. For example, a mature forest is much more effective in managing stormwater than a manicured lawn; both areas would have a lower effective impervious surface percentage than a developed site, but they have different outcomes for stormwater management.

For resource site JC1, 6.8% of the total area is effectively impervious. This indicates a significant degree of stormwater management and/or existing natural resources that should be preserved. Areas with very low impervious cover and existing vegetation are more likely to be functioning properly to support biologic systems.

Table C. Impervious Area within Resource Site JC1			
Total area (acres)	Total impervious Area (acres)	Total unmanaged impervious area* (acres)	Percent of resource site that is effectively impervious
133	33.2	9.0	6.8%

*Total unmanaged impervious area refers to the number of acres within a resource area that receives no formal stormwater management measures to regulate flow or treat pollutants before they reach surface waters, also referred to as effective impervious area.

Metro Title 13 and Oregon Goal 5 Compliance

The following information supplements evaluation of natural resource protections presented in Volume 4 and supports compliance with Metro Title 13 and Oregon Plan Goal 5.

Title 13 Habitat Conservation Areas

Map G presents the Habitat Conservation Areas (HCA) within the Resource site JC1. Natural resources should be protected within HCA as follows:

1. *Strictly limit* or *limit* conflicting uses within Class I/High Rank Riparian Areas in all Urban Development Areas.
2. *Strictly limit* or *limit* conflicting uses within Class II/Medium Rank Riparian Areas within Moderate and Low Value Urban Development Area as well as parks and open spaces.
3. *Strictly limit* or *limit* conflicting uses within Class A/High or B/Medium Rank Wildlife Habitat within parks and open spaces.

4. *Allow* conflicting uses or conducted a local Goal 5 ESEE for Class III/Low Rank Riparian Areas in all Urban Development Areas.
5. *Allow* conflicting uses or conducted a local Goal 5 ESEE for Class A/High, Class B/Medium or Class C/Low Rank Wildlife Habitat in all Urban Development Area, except parks and open space.

Strictly limiting or *limiting* conflicting uses in HCA will protect and conserve existing streams and wetlands to maintain significant natural resource functions including: microclimate and shade; stream flow moderation and water storage; bank function and sediment, pollution and nutrient control; large wood and channel dynamics; organic inputs, food web and nutrient cycling; and fish and wildlife habitat. *Strictly limiting* or *limiting* conflicting uses in HCA will allow for additional urban development that is sensitive to the natural resource features and requires mitigation for unavoidable negative impacts to features and functions. The recommendation will also contribute towards meeting other regulatory requirements including the Metro Title 3, Water Quality and Flood Management; Oregon Goal 6, Air, Water and Land Resources Quality; Oregon Goal 7, Areas Subject to Natural Hazards; the Clean Water Act; and the Endangered Species Act.

Goal 5 Significant Natural Resources

Resource site JC1 contains natural resource features that are not a Title 13 HCA and are therefore subject to Statewide Planning Goal 5 OAR 660-023-0110. The General ESEE analysis, Volume 4, describes the conflicting uses and provides an overarching analysis of the economic, social, environmental and energy consequences of prohibiting, limiting or allowing the conflicting uses within areas of significant natural resources. In addition to the General ESEE analysis, the following resource site-specific consequences are considered.

The common impacts of conflicting uses in the resource site include clearing vegetation; grading activities and soil compaction; adding impervious surface; modifying streams, wetlands and flood areas; generating pollution; landscaping with non-native or invasive vegetation; building fences or other wildlife barriers; and other impacts such as noise, light, litter and pets.

Within the resource site, residential uses are allowed outright or conditionally in the R7 and R10 base zones. Campus institutional uses are allowed, and residential uses are allowed outright or conditionally in the CI1 base zone. Development of new uses may involve vegetation clearing, grading, filling, and soil compaction, as well as the addition of impervious surfaces and landscaping with non-native plants, with associated impacts on the natural resources. Basic utilities and other infrastructure are allowed in all base zones. New or upgraded utility corridors may be cleared of vegetation and may fragment wildlife habitat.

A significant portion of the resource site is occupied by Reed College, which is an institutional use. Reed College is one of 10 colleges and universities in Portland. Reed College was founded

in 1908 and was established on a tract of land known as Crystal Springs Farm. In addition to the academic buildings there are 18 residence halls on the property, as well as landscaped lawns, mature trees, trails and recreational fields.

Reed College plays an active and important role in protecting and restoring Reed Canyon and Crystal Springs Creek. In 2010, Reed College continued their restoration efforts by restoring a small section of Crystal Springs upstream of SE 28th Avenue as the stream exits the canyon. The project included removing riprap along the straightened section of channel, remaindering the channel through the site, reconnecting wetland and floodplain habitat, creating pools and riffles, adding instream cobbles, boulders and large wood habitat, an enhanced adjacent riparian buffer and creating a native oak meadow.

The analysis of economic, social, environmental and energy consequences provided in Volume 4 is confirmed for resource site JC1, with the following additional information that clarifies the analysis.

Strictly limiting or limiting conflicting uses would retain the wildlife habitat functions provided by significant natural resource features including maintaining habitat for at risk plant, fish and wildlife species, maintaining vegetation on steep slopes, and maintaining the stormwater management and air-cooling functions of the tree canopy. Mitigation for negative consequences of additional development in areas of Class A or Class B wildlife habitat should be required.

Natural Resources Protection Decisions

Based on the analysis presented in Volume 3, Natural Resources Inventory, Volume 4, Title 13 and Goal 5 Compliance, and the resource site-specific evaluation for JC1, the following decisions are applied to protect the significant riparian corridors and wildlife habitat:

1. Apply a protection overlay zone ('p' zone) to stream channels from top-of-bank to top-of-bank, wetlands and land within 50 feet of stream top-of-bank or 30 feet of wetlands.
2. Apply a conservation overlay zone ('c' zone) to areas of forest or woodland vegetation contiguous to but more than 50 feet from stream top-of-bank or contiguous to but more than 30 feet from wetlands.
3. Allow conflicting uses within all other areas containing significant natural resources.

Resource Site No.: JC2 Resource Site Name: Crystal Springs

Previous Plan: Johnson Creek Basin Protection Plan

Previous Resource Site No.: 2

The results of the analysis found in Volume 3, Natural Resources Inventory, Volume 4, Title 13 and Goal 5 Compliance, and the resource site-specific evaluation, are presented in the following maps:

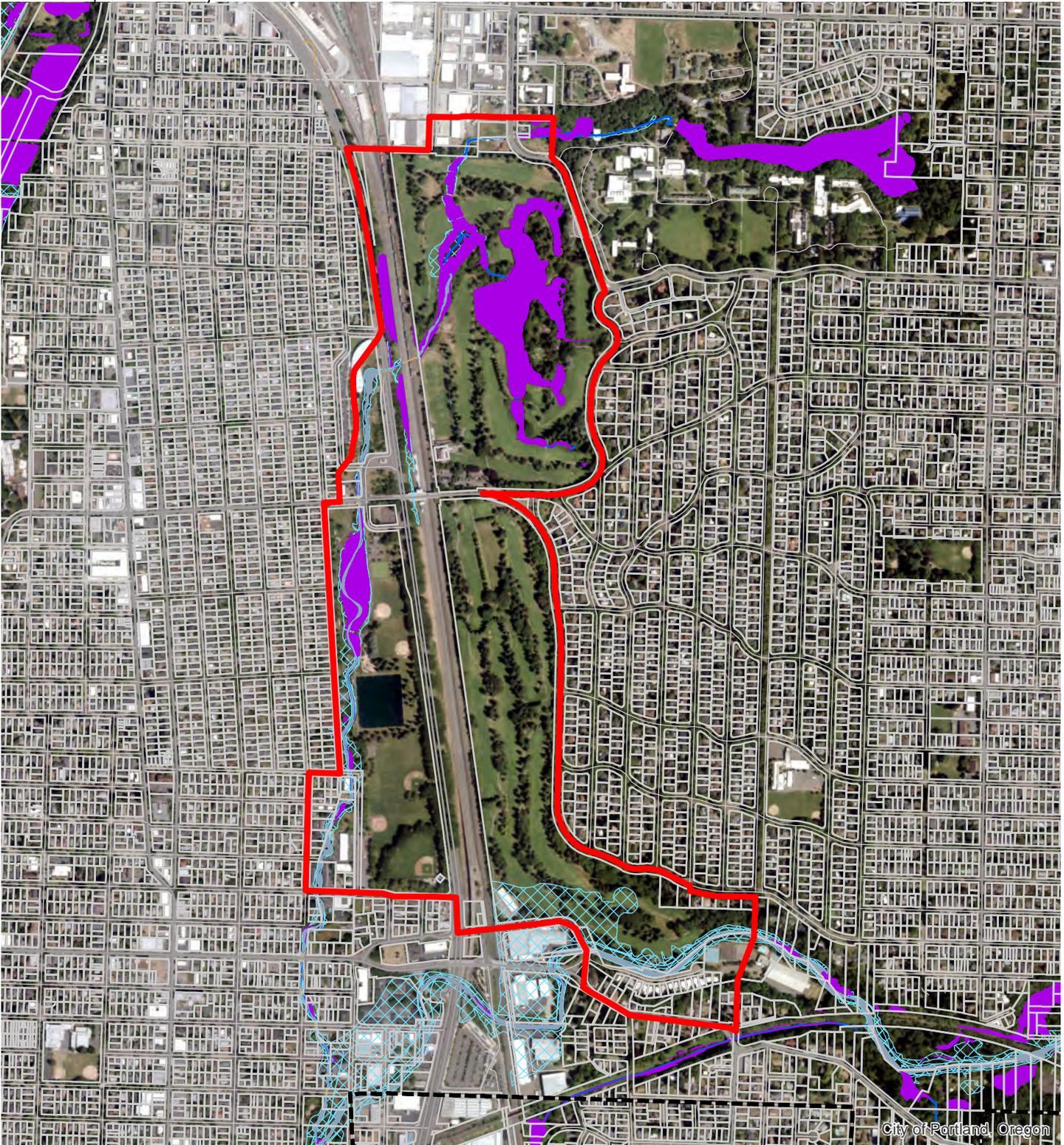
- A. Water Features – rivers, streams, wetlands and flood areas
- B. Land Features – forest, woodland, shrubland and herbaceous vegetation, steep slopes
- C. Special Habitat Areas
- D. Riparian Corridor Classifications
- E. Wildlife Habitat Classifications
- F. Urban Development Value
- G. Metro Title 13 Habitat Conservation Areas
- H. Statewide Planning Goal 5 Areas
- I. Recommended Natural Resource Protections

Following the maps, additional information about existing natural resource features and functions in the resource site is presented.

Implementation of the results is found in Volume 1, Part B, updates to zoning maps and zoning code.

Resource site JC2 includes the following:

Site (acres)	284.1
Base zone (acres)	
CE	1.3
CI1	2.1
CM1	<1
IG1	2.8
IG2	<1
OS	245.3
R7	<1
R5	17.3
RM1	9.0
RM2	6.2



City of Portland, Oregon

Map A: Water Features

Resource Site: JC2

Updated: July 2021



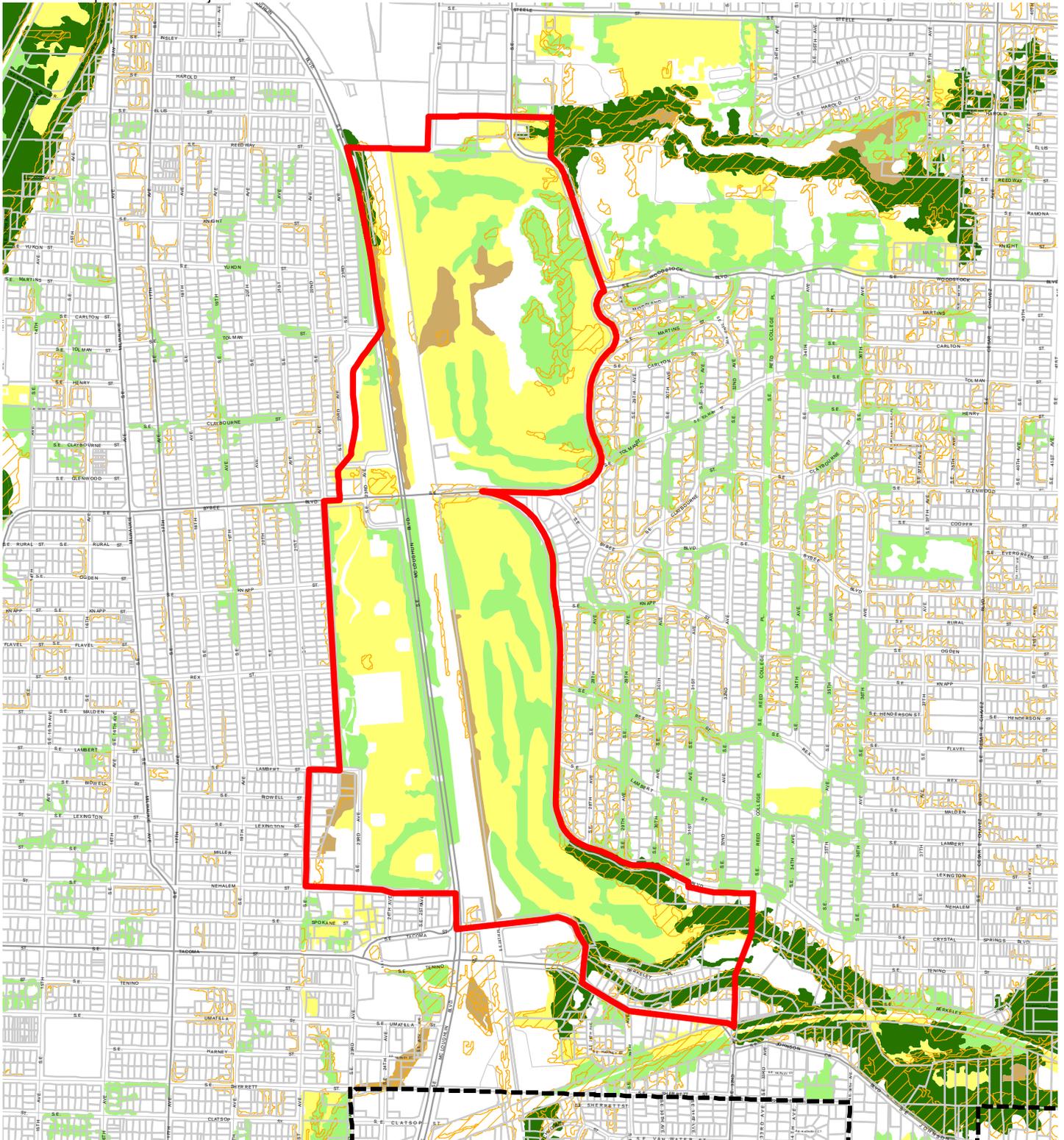
0 500 1,000 Feet

Proposed Draft - As Amended

- Resource Sites
- Urban Service Boundary
- Taxlots
- Wetlands
- Rivers
- Open stream channel
- Piped Stream Segment
- Flood Area



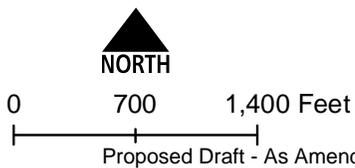
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July 2021



**Map B: Vegetation and
Steep Slopes**

**Resource Site:
JC2**

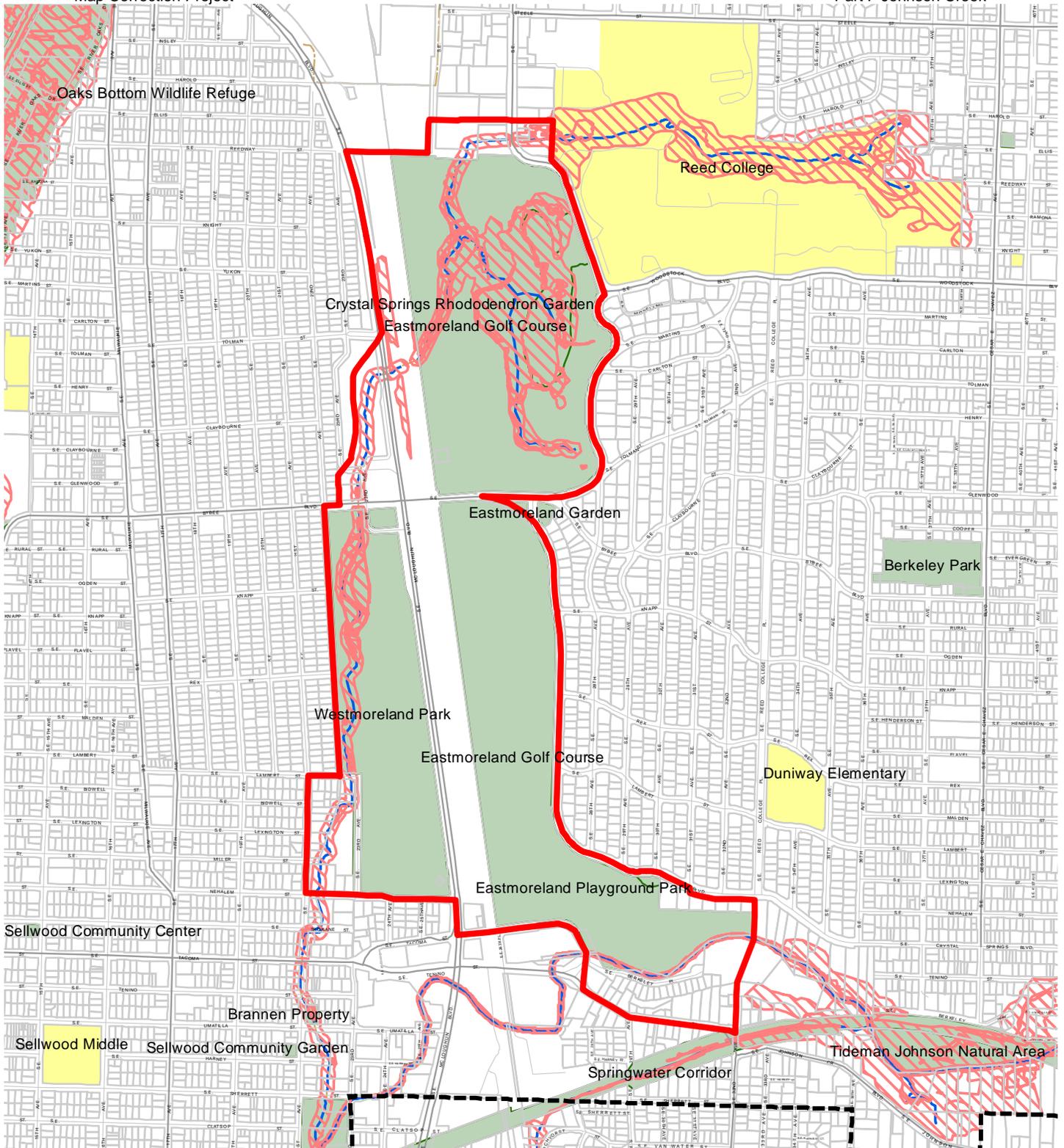
Updated: July 2021



-  Resource Sites
-  Urban Service Boundary
-  Taxlots
-  Slopes >25%
-  Forest
-  Woodland
-  Shrubland
-  Herbaceous



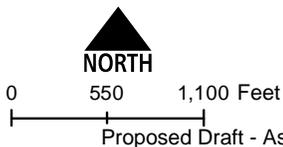
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**Map C: Special
Habitat Areas**

**Resource Site:
JC2**

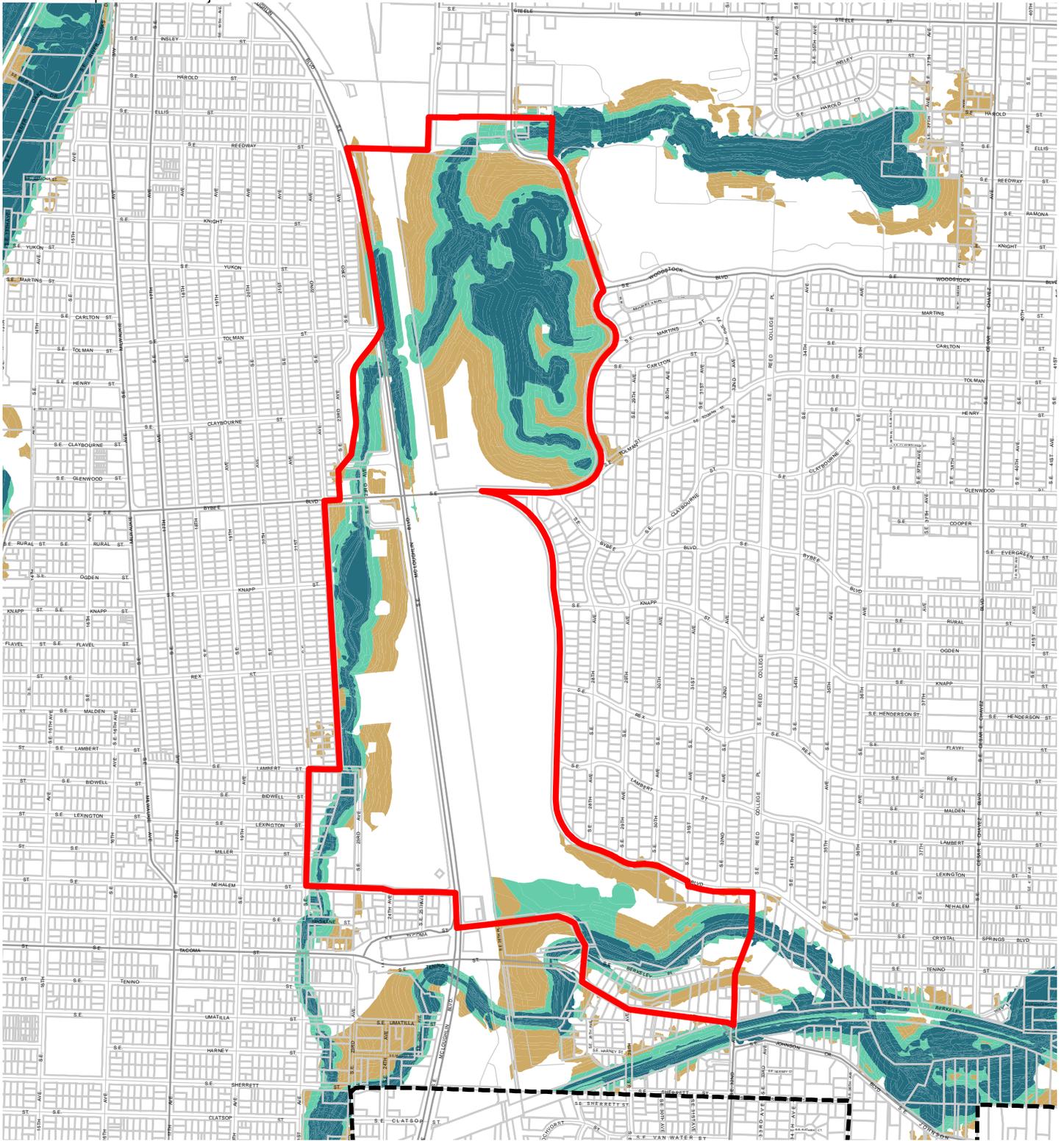
Updated: June 2021



- Resource Sites
- Special Habitat Areas (SHAs)
- Open Stream Channel
- Piped Stream Segment
- Parks
- Schools
- Urban Service Boundary
- Taxlots



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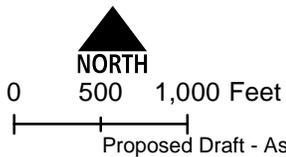


**Map D: Riparian
Corridors Habitat
Classification**

**Resource Site:
JC2**

Updated: July 2021

- Resource Sites
- Urban Service Boundary
- Class I (high rank)
- Class II (medium rank)
- Class III (low rank)
- Taxlots



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July 2021



**Map E: Wildlife
Habitat Classification
Resource Site:
JC2**

Updated: July 2021

NORTH
0 462.5925 Feet

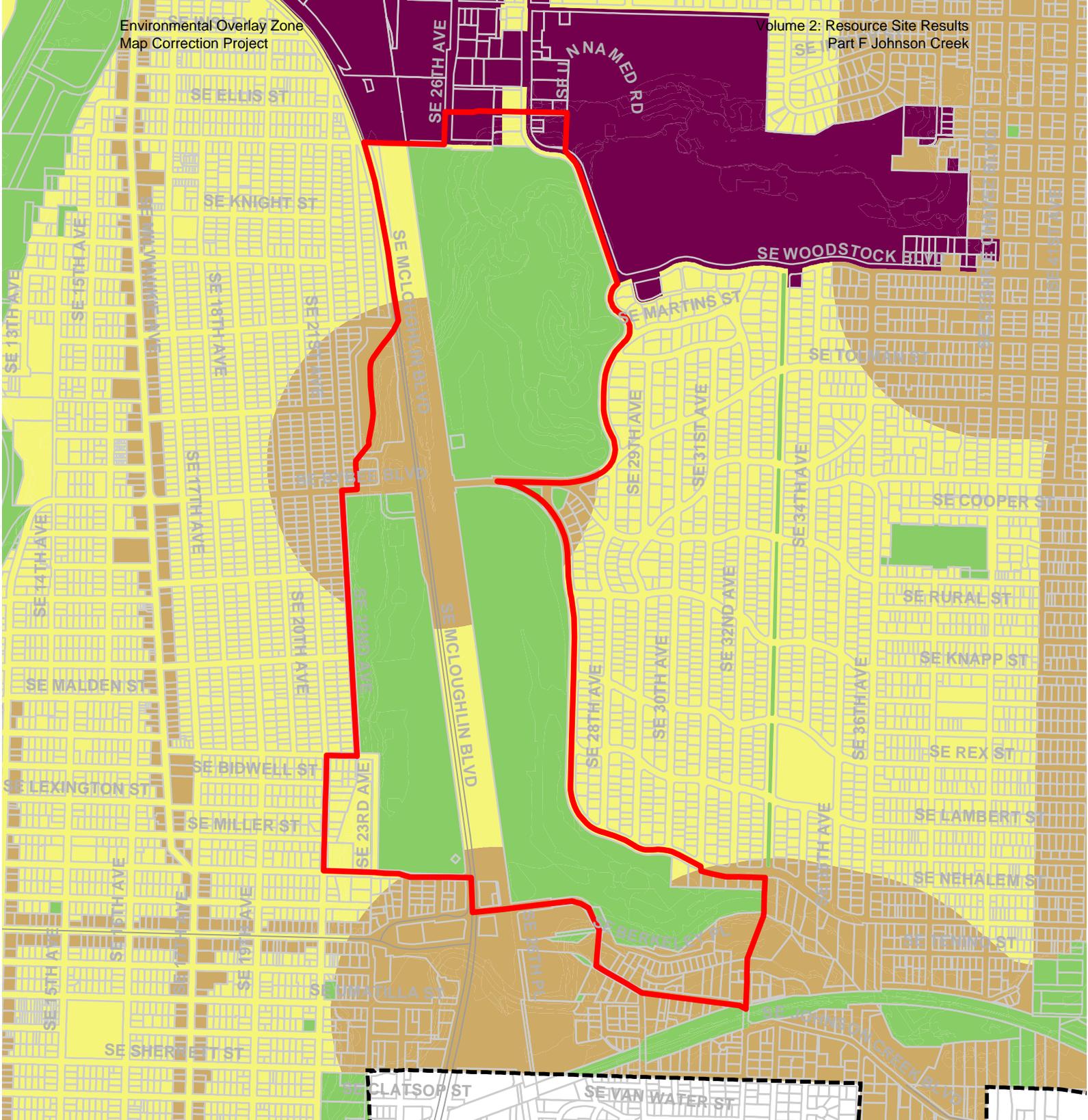
Proposed Draft - As Amended

-  Resource Sites
-  Class A (high rank)
-  Class B (medium rank)
-  Class C (low rank)
-  Urban Service Boundary
-  Taxlots



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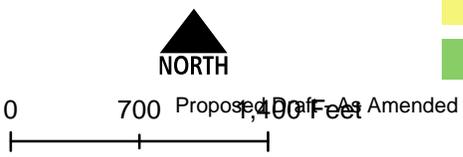


Map F: Urban Development Value (Title 13)
Resource Site: JC2

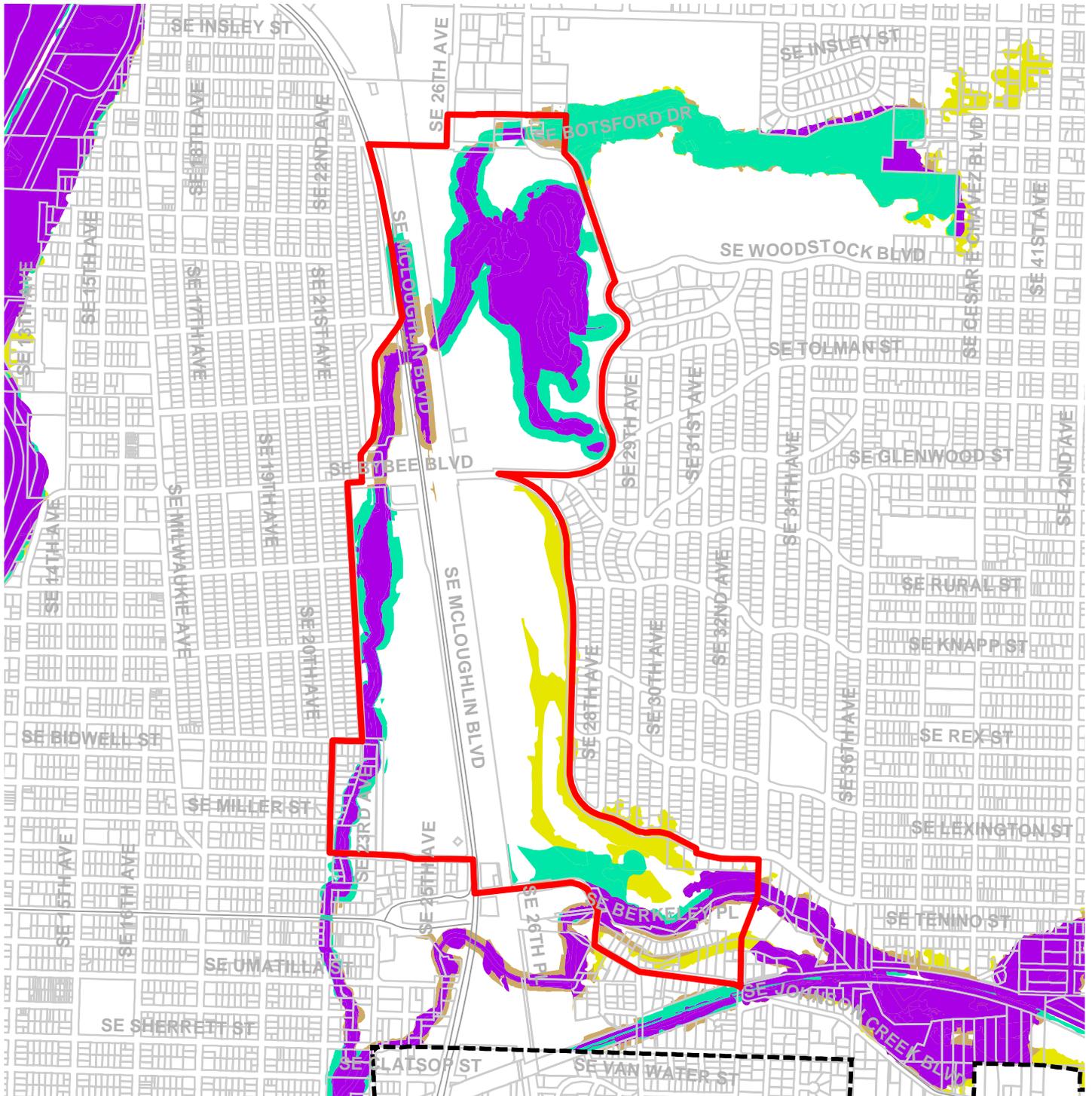
-  Urban Service Boundary
-  Resource Sites
-  High Development Value
-  Medium Development Value
-  Low Development Value
-  Parks



Updated: July 2021



The information on the map was derived from digital databases. Care was taken in the creation of this map but it is provided "as is". The City of Portland ensures meaningful access to city programs, services, and activities to comply with Civil Rights Title VI and ADA Title II laws and reasonably provides: translation, interpretation, modifications, accommodations, alternative formats, and aids and services. To request these services, contact 503-823-7700, City TTY 503-823-6868, Relay Service: 711.



Map G: Title 13 Habitat Conservation Areas (HCA) and Goal 5 Areas

Resource Site: JC2

Updated: July 2021

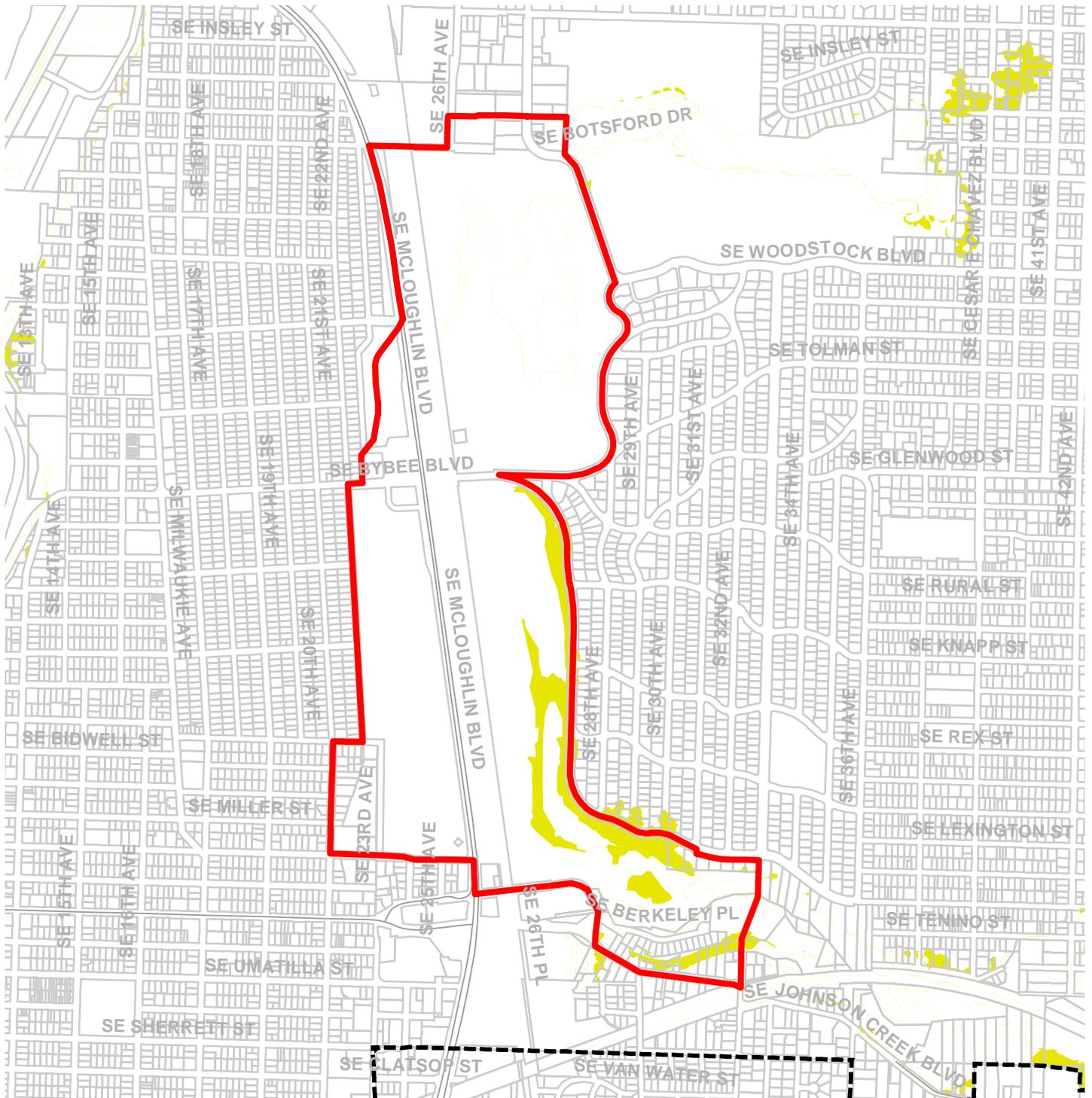


Proposed Draft - As Amended

- Urban Service Boundary
- Resource Sites
- HCA High Value
- HCA Moderate Value
- HCA Low Value
- Goal 5 Significant Natural Resources



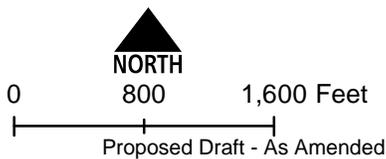
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Map H: Goal 5 Resources

Resource Site: JC2

Updated: July 2021



- Urban Service Boundary
- ▭ Resource Sites
- Goal 5 Significant Natural Resources



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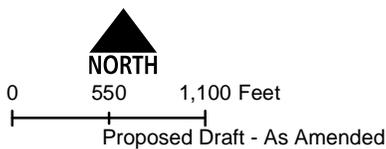


Map I: DRAFT Proposed Environmental Overlay Zones

**Resource Site:
JC2**

Updated: July 2021

- Resource Sites
- Open Stream Channel
- Piped Stream Segment
- Proposed Conservation Zone
- Proposed Protection Zone
- Urban Service Boundary
- Taxlots



The information on the map was derived from digital databases. Care was taken in the creation of this map but it is provided "as is". The City of Portland ensures meaningful access to city programs, services, and activities to comply with Civil Rights Title VI and ADA Title II laws and reasonably provides: translation, interpretation, modifications, accommodations, alternative formats, auxiliary aids and services. To request these services, contact 503-823-7700, City TTY 503-823-6868, Relay Service: 711.

Natural Resource Description

Within resource site JC2 the following significant natural resource features and functions are present:

Significant Riparian Corridor Features: open stream; wetland; flood area; land within 50 feet of waterbodies; forest, woodland, shrubland and herbaceous vegetation within 300 feet of waterbodies; and forest vegetation on steep slopes (>25% slope) contiguous to and within 780 feet of waterbodies.

Significant Wildlife Habitat Features: forest patches, and associated and contiguous wetlands, two acres in size or larger.

Special Habitat Areas: Crystal Springs (S, C)

Riparian Corridor Functions: microclimate and shade; stream flow moderation and water storage; bank function and sediment, pollution and nutrient control; large wood and channel dynamics; organic inputs, food web and nutrient cycling; and riparian wildlife movement corridor.

Wildlife Habitat Functions: interior area; food and water; resting, denning, nesting and rearing; movement and migration; reduction of noise, light and vibration; and habitat patches that support special status fish and wildlife species.

Table A: Quantity of Natural Resource Features in Resource Site		JC2
		Study Area
Stream (Miles)		2.2
Wetlands (acres)		21.8
Vegetated Areas >= 1/2 acre (acres)		
	Forest (acres)	14.4
	Woodland (acres)	67.8
	Shrubland (acres)	11.9
	Herbaceous (acres)	112.7
Flood Area*		
	Vegetated (acres)	22.8
	Non-vegetated (acres)	3.2
Steep Slopes (acres)**		26.6
* The flood area includes the FEMA 100-year flood plain plus the adjusted 1996 flood inundation area.		
**Slopes are derived from LiDAR. Steep slopes are areas with a slope greater than 25%.		

This site is an historic wetland and 100-year floodplain; a channel was created to drain the wetland to create more buildable land. Both Crystal Springs and Johnson Creeks are located within this resource area. The area includes water bodies, two creek channels, fisheries, and extensive landscaped areas that provides rain infiltration and habitat.

Crystal Springs is primarily spring fed, has a year-round flow and receives little surface runoff. About 75-80% of the flow in Crystal Springs Creek is from Crystal Springs Lake, which is fed by numerous springs (Buccola and Stonewall 2016). While portions of this resource site remain highly landscaped, more natural conditions have been restored along the creek in several locations. This reach of Crystal Springs which supports populations of native populations of fish including cutthroat and steelhead trout, Chinook and coho salmon and Pacific lamprey. Crystal Springs is a high priority area for enhancement and restoration for at-risk aquatic species.

The site includes the Eastmoreland Golf Course, Crystal Springs Rhododendron Gardens and Westmoreland Park. Single and multi-family residential development exists in small portions at the northwest, southwest, and southeast corners, and a single commercial lot on the corner of SE McLoughlin Boulevard and SE Tacoma is also included. The resource site is bisected by major transportation routes – Highway 99E/McLoughlin Blvd, the MAX light rail and a freight rail line. In the 2010s, creek crossings were retrofitted with new bridges or culverts that were designed to facilitate fish passage, where it was previously impeded. Riparian conditions along these portions of the creek were also improved.

In most of the site, the floodplain is confined to the parks within the resource site. A portion of floodplain also covers industrial land between the railroad/light rail lines and the slopes at the southeastern portion of the resource site, which is steeply sloped.

Crystal Springs Lake and a smaller open water body are connected to the channel of Crystal Springs Creek on Eastmoreland Golf Course. Crystal Springs Lake also borders the Rhododendron Gardens. It is fed by both the creek and by springs under the lake and emerging from the steep slopes along the eastern edge of the park and golf course. These impoundments are largely unshaded and contribute to increased stream temperatures downstream from the site.

Crystal Springs, Westmoreland Park and the Rhododendron Gardens provide scenic, ecological and educational values. Hummingbirds and warblers and other birds nest in the Rhododendron Gardens' azaleas, rhododendron, and other flowering shrubs. Golf course ponds and Crystal Springs Lake provide food and cover for wintering waterfowl. Mallards, wigeons, mergansers, shovelers wood ducks, and coot can commonly be observed.

In 2012, a major wetland and stream restoration project was completed at Westmoreland Park, converting an artificial duck pond into more natural wetland and meandering stream channel. The project also enhanced conditions in the creek to add deep pools, and riffles to improve fish habitat. After project completion, there has been an increase in native fish, birds and dragonflies observed at the site and fewer sightings of invasive carp. The natural features are complemented by a trail network and a nature-play facility for children.

Parts of the site area are predominantly ornamental landscaping and other non-native plants. Within the golf course, the combination of grassland and adjacent water bodies provides important wintering habitat for waterfowl within the urban environment. Restoration at Westmoreland Park has reduced local populations of nuisance waterfowl and improved water temperatures.

Vegetation along the stream banks provides some local temperature regulation of the stream for fish and limited habitat for mammals. The riparian fringe functions as a wildlife corridor in a densely urbanized area.

Special status bird species observed in or adjacent to this resource site include American white pelican, American kestrel, American bittern, bald eagle, band-tailed pigeon, black-throated gray warbler, brown creeper, bufflehead, Bullock's oriole, bushtit, chipping sparrow, common nighthawk, downy woodpecker, great blue heron, green heron, hooded merganser, house wren, Hutton's vireo, merlin, northern harrier, olive-sided flycatcher, orange-crowned warbler, Pacific-slope flycatcher, peregrine falcon, pileated woodpecker, purple finch, purple martin, red crossbill, red-necked grebe, rufous hummingbird, sora, Swainson's thrush, varied thrush, Vaux's swift, western meadowlark, western wood-pewee, white-breasted nuthatch, Wilson's warbler, wood duck, and yellow warbler.

Table B: Quality of Natural Resource Functions in Resource Site JC2				
Resource Site (acres) = 284				
	Class 1/A	Class 2/B	Class 3/C	Total
Riparian Corridors*				
acres	45.9	46.4	50.1	142.4
percent total inventory site area	16.2%	16.3%	17.6%	50.1%
Wildlife Habitat*				
acres	0.0	25.1	17.4	42.4
percent total inventory site area	0.0%	8.8%	6.1%	14.9%
Special Habitat Areas**				
acres	44.2			
percent total inventory site area	15.6%			
Combined Total*				
acres	45.9	48.7	59.4	154.1
percent total inventory site area	16.2%	17.2%	20.9%	54.2%
* Class I riparian resources, Special Habitat Areas, and wildlife habitat include open water. ** Metro Title 13 designated all Special Habitat Areas as Class I riparian corridors. +Because riparian resources, Special Habitat Areas, and wildlife Habitat overlap, the results cannot be added together to determine the combined results.				

Stormwater runs off impervious surfaces (e.g., rooftops, driveways, parking areas, streets, etc..) rapidly. Without a place to retain the water (such as wetlands or adequate stormwater facilities), stormwater runoff results in spikes in stream levels which can cause or exacerbate flooding and increase stream erosion. In addition, when water runs off quickly, it does not have a chance to infiltrate and recharge streams or aquifers to provide water during drier periods.

The type and capacity of stormwater facilities to manage the runoff from impervious surfaces varies in the city, affecting the local rate and amount of runoff, and the amount of pollutants in the water. Much of the city was developed prior to any stormwater regulations and receives limited or no management prior to discharging to pipes and surface waters.

Table C shows the total amount of impervious area within the resource site and how much of that impervious area lacks stormwater management; the percentage of total impervious area that is not managed is called "effective impervious area." The higher the percent of effective impervious area in a watershed, the greater the negative impacts of stormwater runoff to streams. Stream science indicates that when effective impervious area reaches 10% of a watershed, negative stream impacts become significant; and at 25%, these impacts on waterways can be substantial. An additional consideration is the differences in soil conditions

and other factors that influence the ability of pervious areas to retain, infiltrate or filter pollutants from stormwater. For example, a mature forest is much more effective in managing stormwater than a manicured lawn; both areas would have a lower effective impervious surface percentage than a developed site, but they have different outcomes for stormwater management.

For resource site JC2, 11.8% of the total area is effectively impervious, indicating a critical level of vulnerability, with the risk of negative impacts to natural functions, while natural processes are in place to support to biologic systems.

Table C. Impervious Area within Resource Site JC2			
Total area (acres)	Total impervious Area (acres)	Total unmanaged impervious area* (acres)	Percent of resource site that is effectively impervious
284.1	34.2	33.4	11.8%

*Total unmanaged impervious area refers to the number of acres within a resource area that receives no formal stormwater management measures to regulate flow or treat pollutants before they reach surface waters, also referred to as effective impervious area.

Metro Title 13 and Oregon Goal 5 Compliance

The following information supplements evaluation of natural resource protections presented in Volume 4 and supports compliance with Metro Title 13 and Oregon Plan Goal 5.

Title 13 Habitat Conservation Areas

Map G presents the Habitat Conservation Areas (HCA) within the Resource site JC2. Natural resources should be protected within HCA as follows:

1. *Strictly limit* or *limit* conflicting uses within Class I/High Rank Riparian Areas in all Urban Development Areas.
2. *Strictly limit* or *limit* conflicting uses within Class II/Medium Rank Riparian Areas within Moderate and Low Value Urban Development Area as well as parks and open spaces.
3. *Strictly limit* or *limit* conflicting uses within Class A/High or B/Medium Rank Wildlife Habitat within parks and open spaces.
4. *Allow* conflicting uses or conducted a local Goal 5 ESEE for Class III/Low Rank Riparian Areas in all Urban Development Areas.
5. *Allow* conflicting uses or conducted a local Goal 5 ESEE for Class A/High, Class B/Medium or Class C/Low Rank Wildlife Habitat in all Urban Development Area, except parks and open space.

Strictly limiting or limiting conflicting uses in HCA will protect and conserve existing streams and wetlands to maintain significant natural resource functions including: microclimate and shade; stream flow moderation and water storage; bank function and sediment, pollution and nutrient control; large wood and channel dynamics; organic inputs, food web and nutrient cycling; and fish and wildlife habitat. *Strictly limiting or limiting* conflicting uses in HCA will allow for additional urban development that is sensitive to the natural resource features and requires mitigation for unavoidable negative impacts to features and functions. The recommendation will also contribute towards meeting other regulatory requirements including the Metro Title 3, Water Quality and Flood Management; Oregon Goal 6, Air, Water and Land Resources Quality; Oregon Goal 7, Areas Subject to Natural Hazards; the Clean Water Act; and the Endangered Species Act.

Goal 5 Significant Natural Resources

Resource site JC2 contains natural resource features that are not a Title 13 HCA and are therefore subject to Statewide Planning Goal 5 OAR 660-023-0110. The General ESEE analysis, Volume 4, describes the conflicting uses and provides an overarching analysis of the economic, social, environmental and energy consequences of prohibiting, limiting or allowing the conflicting uses within areas of significant natural resources. In addition to the General ESEE analysis, the following resource site-specific consequences are considered.

The common impacts of conflicting uses in the resource site include clearing vegetation; grading activities and soil compaction; adding impervious surface; modifying streams, wetlands and flood areas; generating pollution; landscaping with non-native or invasive vegetation; building fences or other wildlife barriers; and other impacts such as noise, light, litter and pets.

Within the resource site residential uses are allowed outright or conditionally in the R5, R2 and R1 base zones. Commercial uses are allowed in the CI1 base zone. Open Space uses are allowed in the OS base zone. Development of new uses may involve vegetation clearing, grading, filing, and soil compaction, as well as the addition of impervious surfaces and landscaping with non-native plants, with associated impacts on the natural resources. Basic utilities and other infrastructure are allowed in all base zones. New or upgraded utility corridors may be cleared of vegetation and may fragment wildlife habitat.

The analysis of economic, social, environmental and energy consequences provided in Volume 4 is confirmed for resource site JC2, with the following additional information that clarifies the analysis.

Strictly limiting or limiting conflicting uses would retain the wildlife habitat functions provided by significant natural resource features including maintaining habitat for at risk plant, fish and wildlife species, and maintaining the stormwater management and air-cooling functions of the

vegetation. Mitigation for negative consequences of additional development in areas of Class A or Class B wildlife habitat should be required.

Natural Resources Protection Decisions

Based on the analysis presented in Volume 3, Natural Resources Inventory, Volume 4, Title 13 and Goal 5 Compliance, and the resource site-specific evaluation for JC2, the following decisions are applied to protect the significant riparian corridors and wildlife habitat:

1. Apply a protection overlay zone ('p' zone) to stream channels from top-of-bank to top-of-bank, wetlands and land within 50 feet of stream top-of-bank or 30 feet of wetlands.
2. Apply a conservation overlay zone ('c' zone) to areas of forest or woodland vegetation contiguous to but more than 50 feet from stream top-of-bank or contiguous to but more than 30 feet from wetlands.
3. Apply a conservation overlay zone ('c' zone) to areas of shrubland or herbaceous vegetation within public parks and areas of forest or woodland vegetation contiguous to but outside of public parks.
4. Allow conflicting uses within all other areas containing significant natural resources.

Resource Site No.: JC3 Resource Site Name: Johnson Creek Park

Previous Plan: Johnson Creek Basin Protection Plan

Previous Resource Site No.: 3

The results of the analysis found in Volume 3, Natural Resources Inventory, Volume 4, Title 13 and Goal 5 Compliance, and the resource site-specific evaluation, are presented in the following maps:

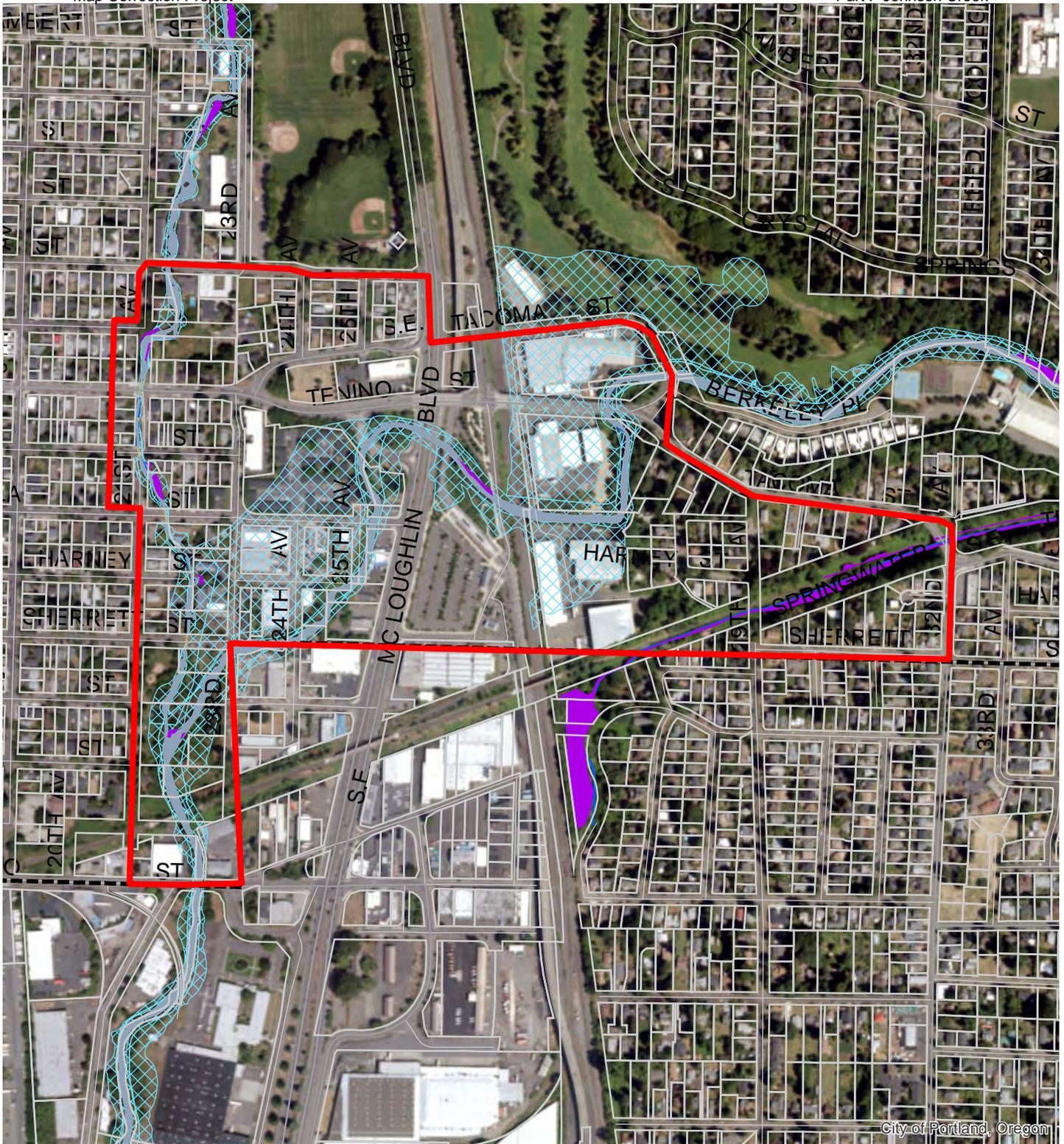
- A. Water Features – rivers, streams, wetlands and flood areas
- B. Land Features – forest, woodland, shrubland and herbaceous vegetation, steep slopes
- C. Special Habitat Areas
- D. Riparian Corridor Classifications
- E. Wildlife Habitat Classifications
- F. Urban Development Value
- G. Metro Title 13 Habitat Conservation Areas
- H. Statewide Planning Goal 5 Areas
- I. Recommended Natural Resource Protections

Following the maps, additional information about existing natural resource features and functions in the resource site is presented.

Implementation of the results is found in Volume 1, Part B, updates to zoning maps and zoning code.

Resource site JC3 includes the following:

Site (acres)	103.5
Base zone (acres)	
CE	11.9
CM1	0.0
EG2	17.7
IG2	18.1
OS	7.6
R2.5	<1
R5	21.8
R7	<1
RM1	20.8
RM2	5.5



City of Portland, Oregon

Map A: Water Features

Resource Site: JC3

Updated: July 2021



0 300 600 Feet

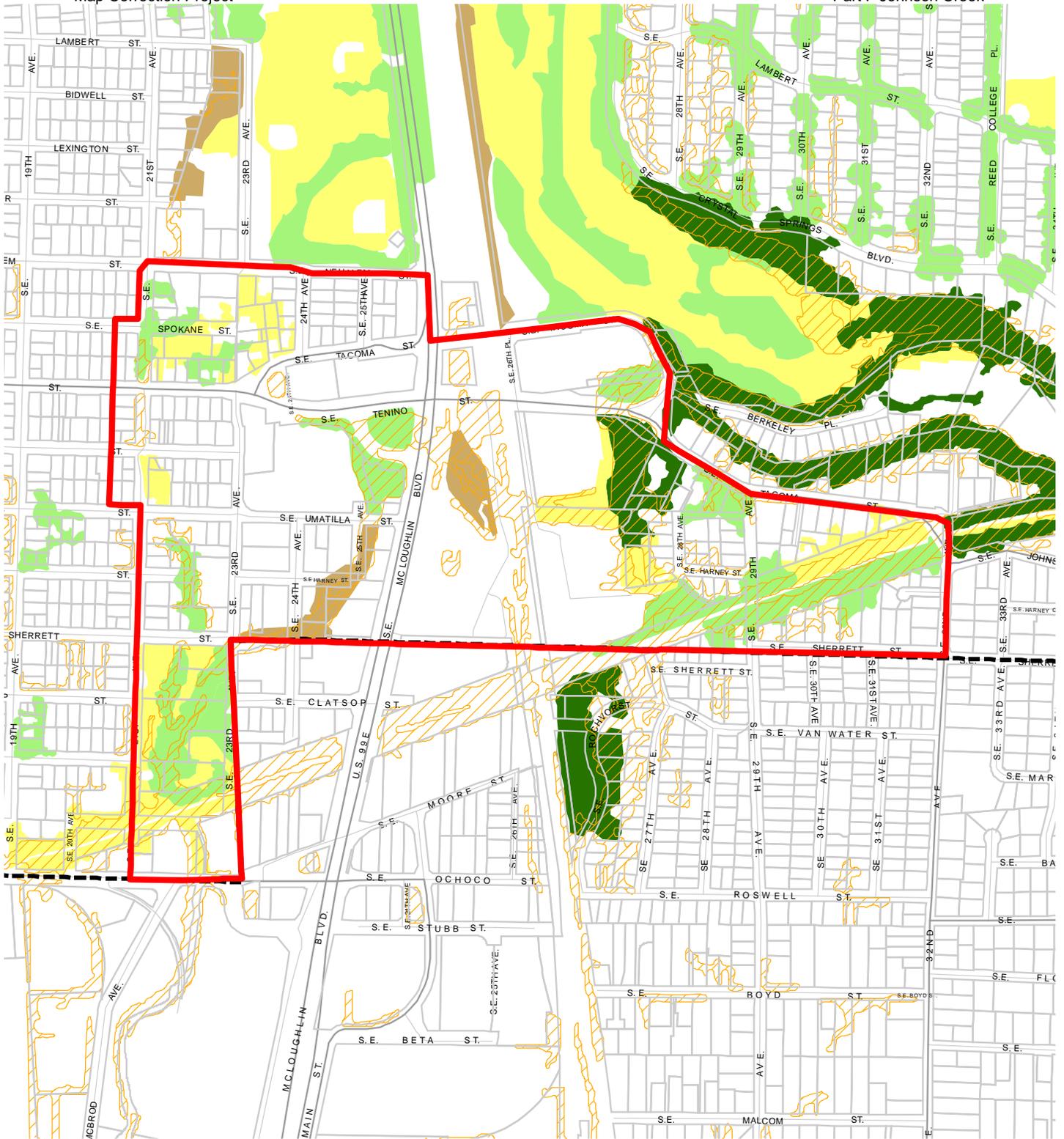
Proposed Draft - As Amended

- Resource Sites
- Urban Service Boundary
- Taxlots
- Wetlands
- Rivers
- Open stream channel
- Piped Stream Segment
- Flood Area



The information on the map was derived from digital databases. Care was taken in the creation of this map but it is provided "as is". The City of Portland ensures meaningful access to city programs, services, and activities to comply with Civil Rights Title VI and ADA Title II laws and reasonably provides: translation, interpretation, modifications, accommodations, alternative formats, auxiliary aids and services. To request these services, contact 503-823-7700, City TTY 503-823-6868, Relay Service: 711.

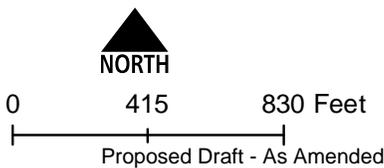
July 2021



Map B: Vegetation and Steep Slopes

Resource Site: JC3

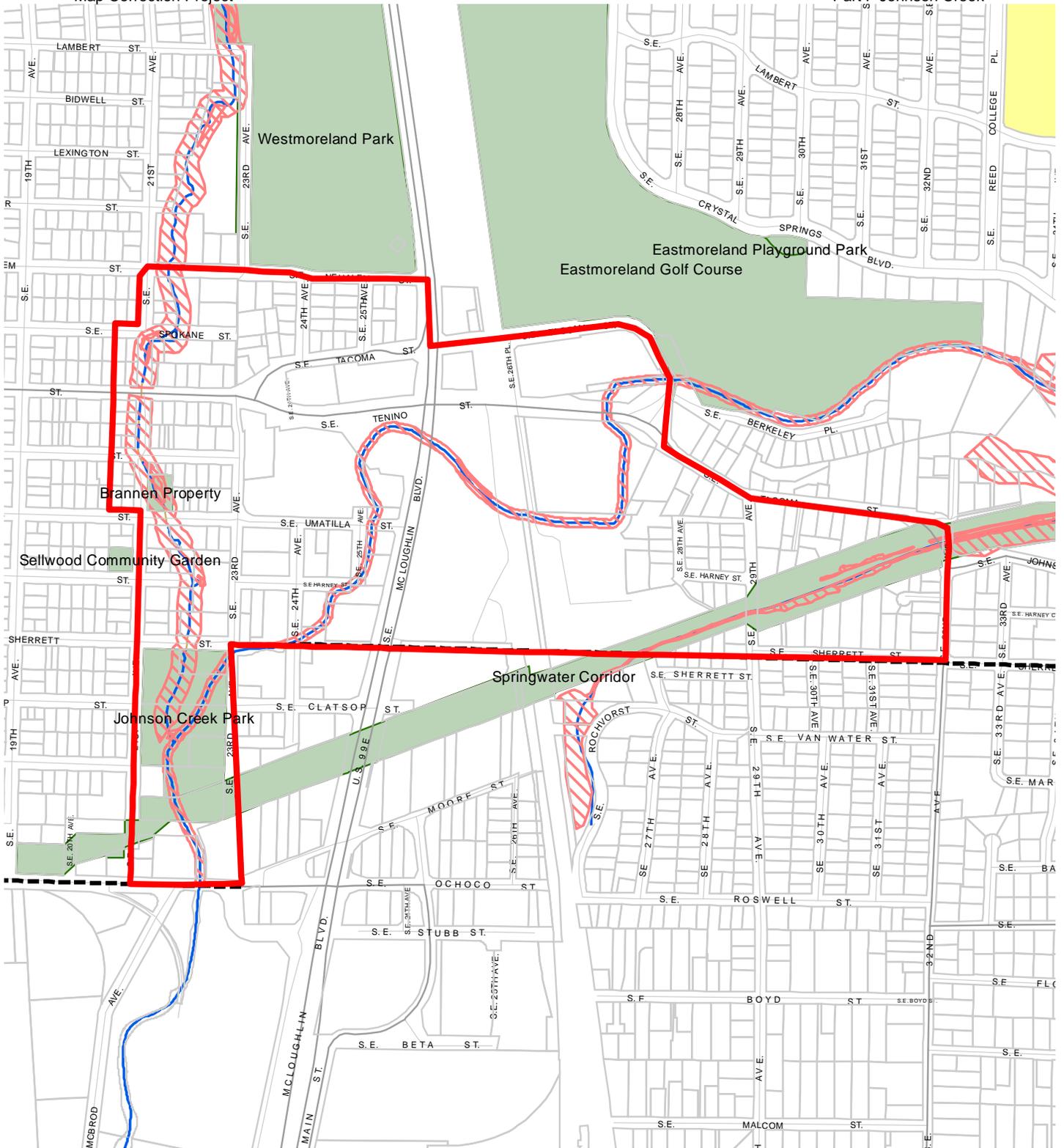
Updated: July 2021



- Resource Sites
- Urban Service Boundary
- Taxlots
- Slopes >25%
- Forest
- Woodland
- Shrubland
- Herbaceous



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**Map C: Special
Habitat Areas**

**Resource Site:
JC3**

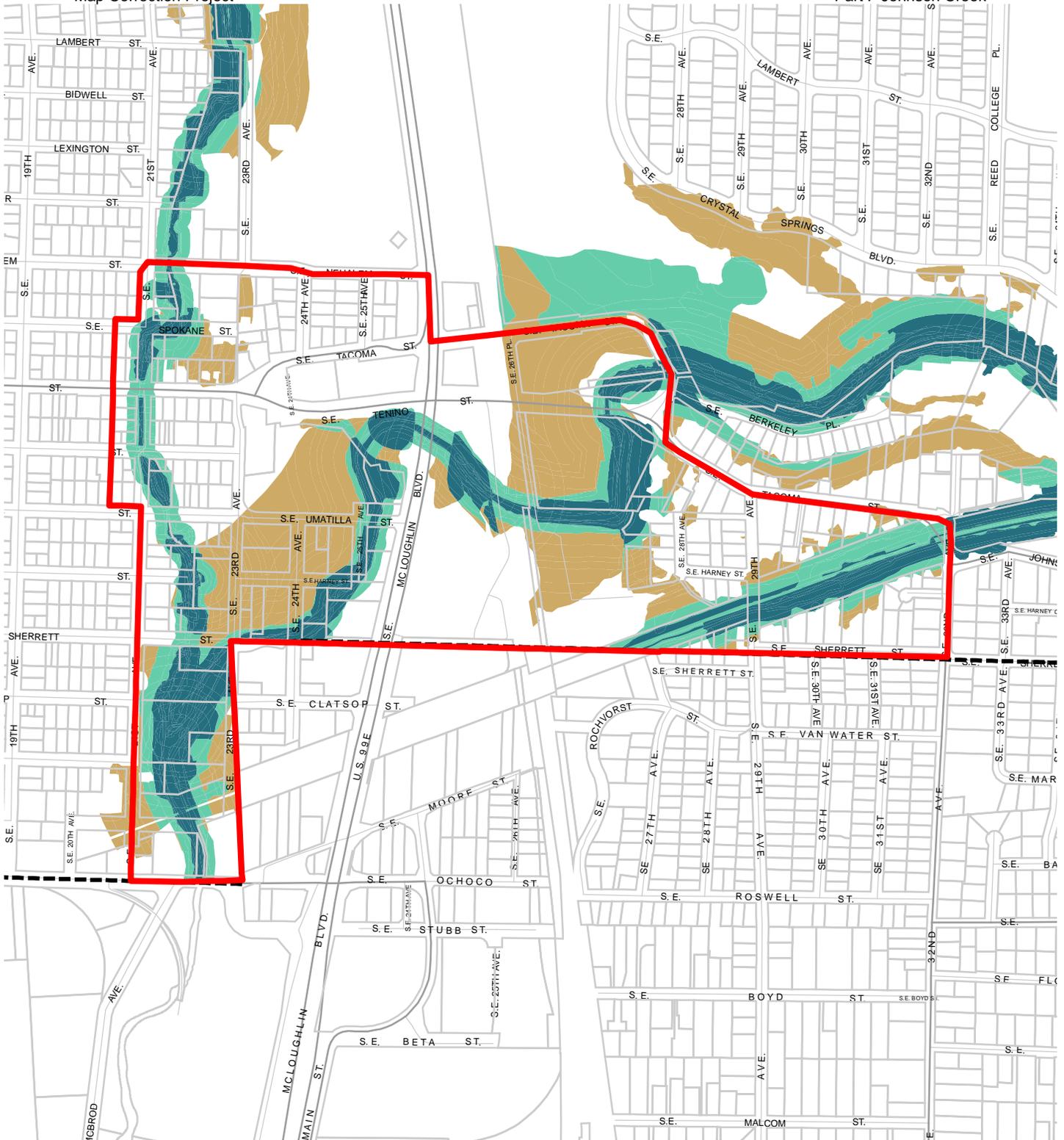
Updated: June 2021



- Resource Sites
- Special Habitat Areas (SHAs)
- Open Stream Channel
- Piped Stream Segment
- Parks
- Schools
- Urban Service Boundary
- Taxlots



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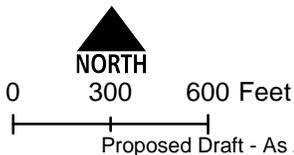


**Map D: Riparian
Corridors Habitat
Classification**

**Resource Site:
JC3**

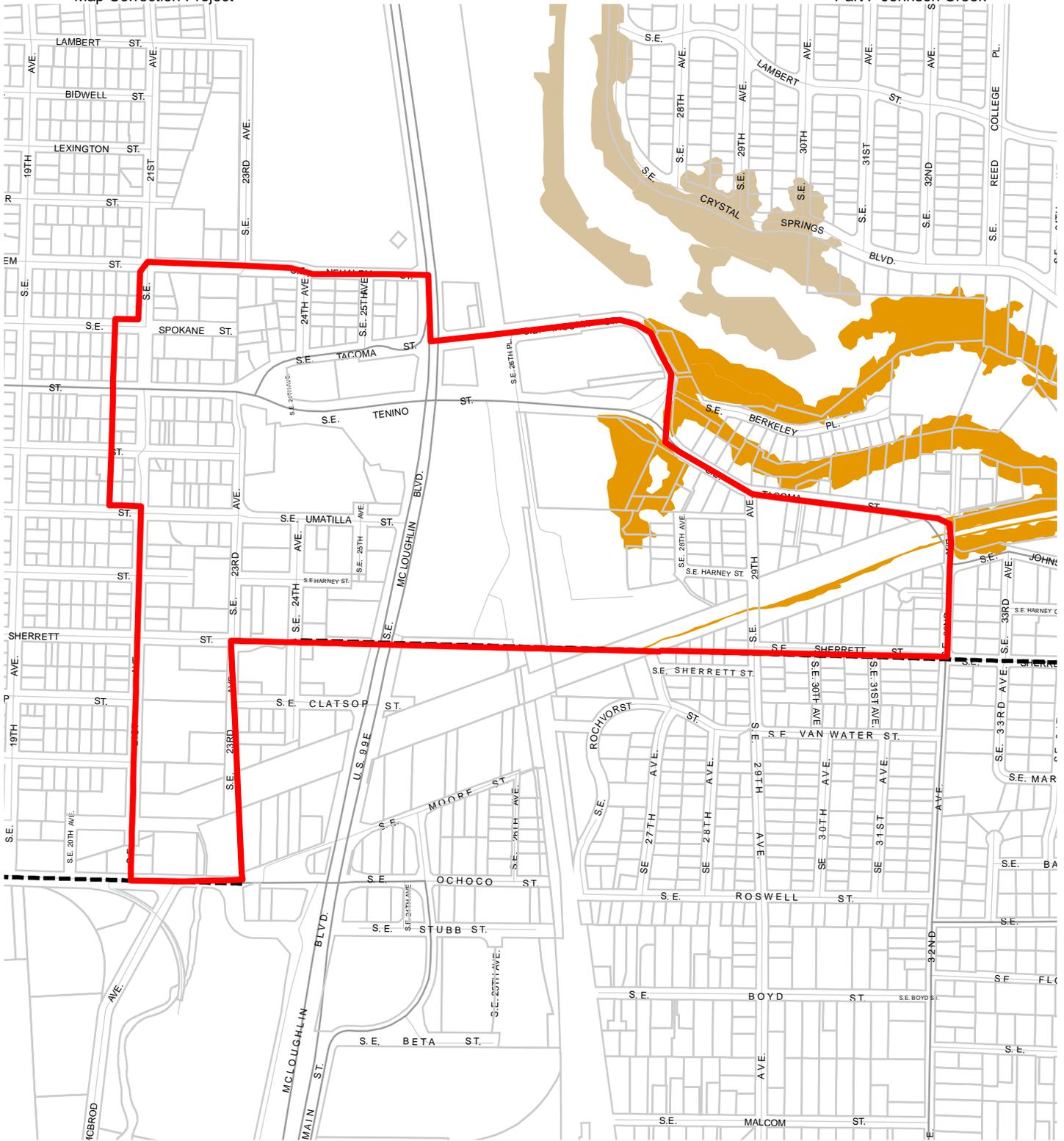
Updated: July 2021

- Resource Sites
- Urban Service Boundary
- Class I (high rank)
- Class II (medium rank)
- Class III (low rank)
- Taxlots



The information on the map was derived from digital databases. Care was taken in the creation of this map but it is provided "as is". The City of Portland ensures meaningful access to city programs, services, and activities to comply with Civil Rights Title VI and ADA Title II laws and reasonably provides: translation, interpretation, modifications, accommodations, alternative formats, auxiliary aids and services. To request these services, contact 503-823-7700, City TTY 503-823-6868, Relay Service: 711.

July 2021



**Map E: Wildlife
Habitat Classification
Resource Site:
JC3**

Updated: July 2021



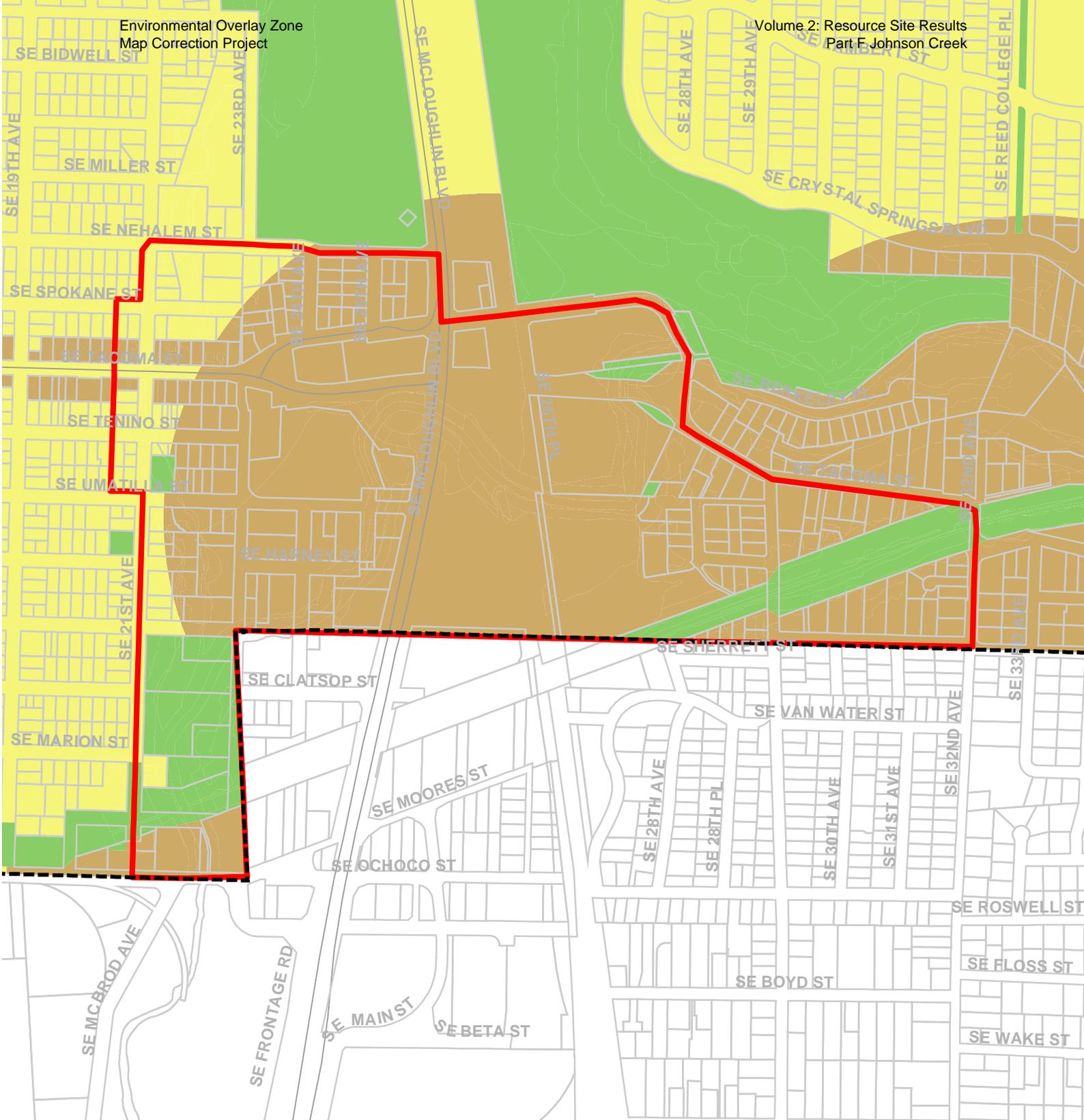
Proposed Draft - As Amended

-  Resource Sites
-  Class A (high rank)
-  Class B (medium rank)
-  Class C (low rank)
-  Urban Service Boundary
-  Taxlots



The information on the map was derived from digital databases. Care was taken in the creation of this map but it is provided "as is". The City of Portland ensures meaningful access to city programs, services, and activities to comply with Civil Rights Title VI and ADA Title II laws and reasonably provides: translation, interpretation, modifications, accommodations, alternative formats, auxiliary aids and services. To request these services, contact 503-823-7700, City TTY 503-823-6868, Relay Service: 711.

July 2021



Map F: Urban Development Value (Title 13)
Resource Site: JC3

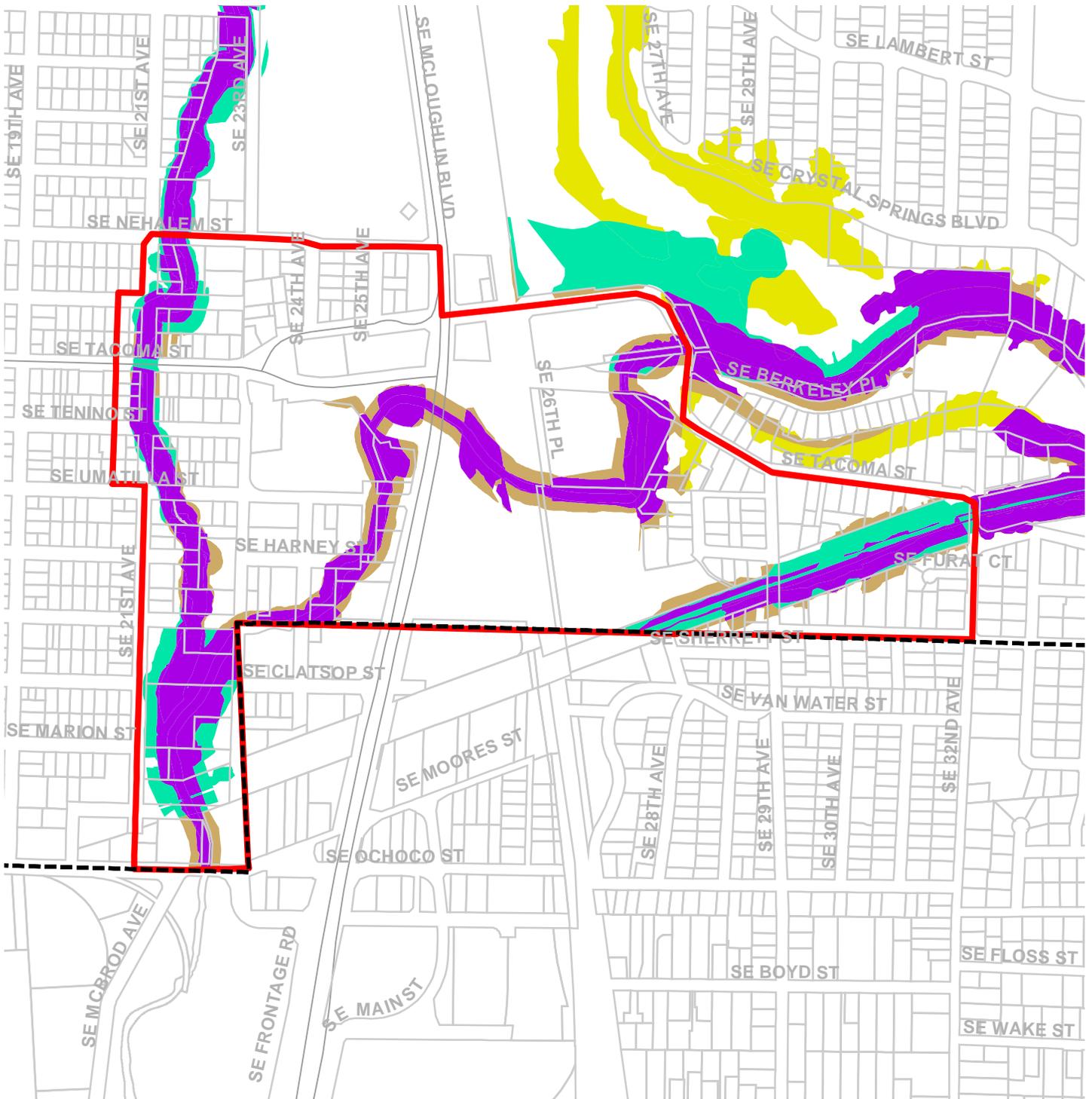
-  Urban Service Boundary
-  Resource Sites
-  High Development Value
-  Medium Development Value
-  Low Development Value
-  Parks



Updated: July 2021



The information on the map was derived from digital databases. Care was taken in the creation of this map but it is provided "as is". The City of Portland ensures meaningful access to city programs, services, and activities to comply with Civil Rights Title VI and ADA Title II laws and reasonably provides: translation, interpretation, modifications, accommodations, alternative formats, and aids and services. To request these services, contact 503-823-7700, City TTY 503-823-6868, Relay Service: 711.

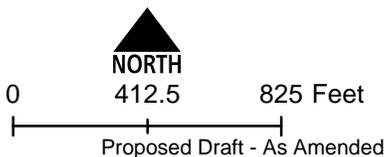


Map G: Title 13 Habitat Conservation Areas (HCA) and Goal 5 Areas

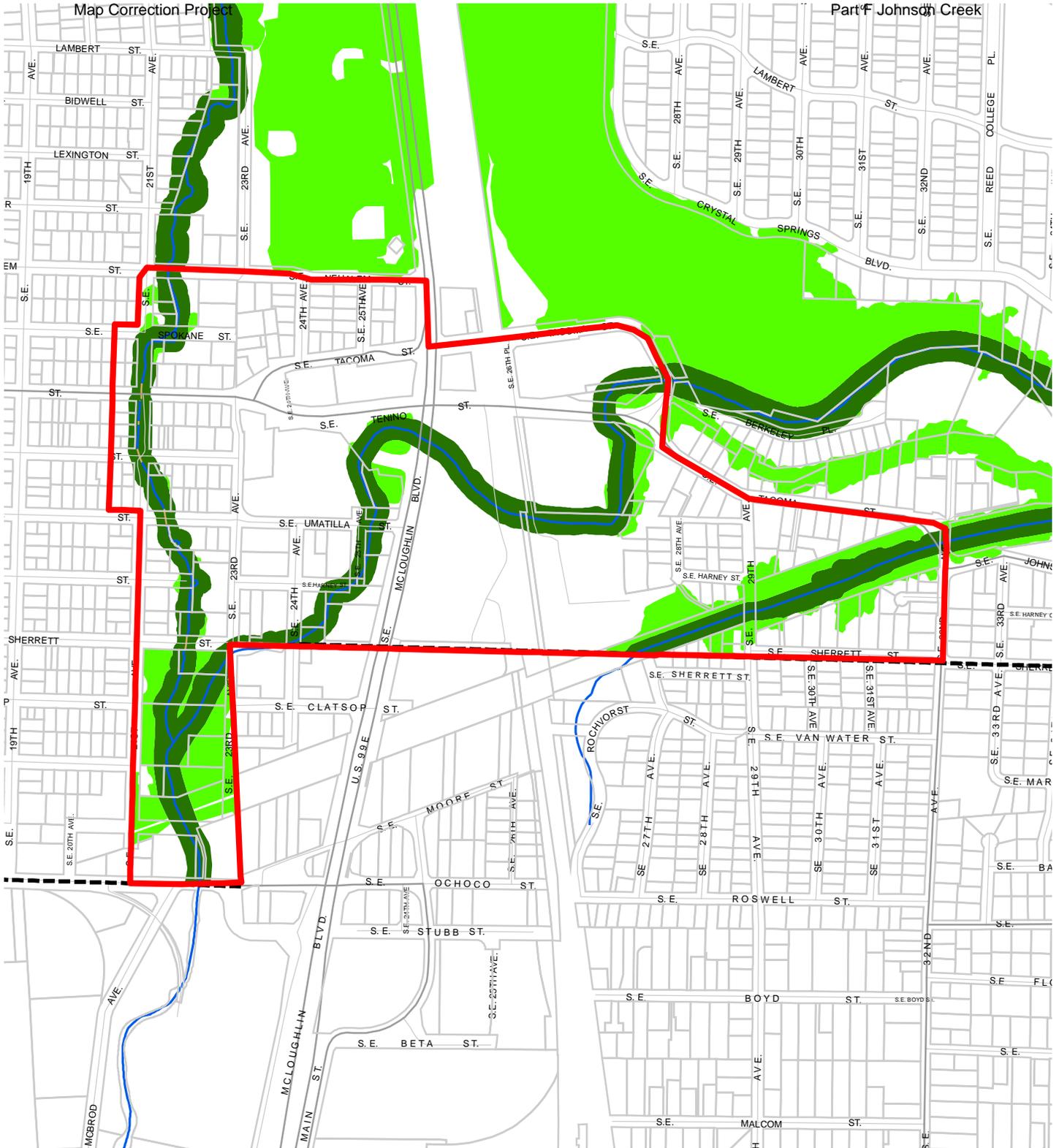
Resource Site: JC3

Updated: July 2021

-  Urban Service Boundary
-  Resource Sites
-  HCA High Value
-  HCA Moderate Value
-  HCA Low Value
-  Goal 5 Significant Natural Resources



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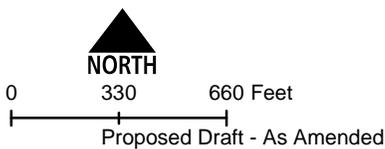


Map I: DRAFT Proposed Environmental Overlay Zones

**Resource Site:
JC3**

Updated: July 2021

-  Resource Sites
-  Open Stream Channel
-  Piped Stream Segment
-  Proposed Conservation Zone
-  Proposed Protection Zone
-  Urban Service Boundary
-  Taxlots



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Natural Resource Description

Within resource site JC3 the following significant natural resource features and functions are present:

Significant Riparian Corridor Features: open stream; wetland; flood area; land within 50 feet of waterbodies; forest, woodland, shrubland and herbaceous vegetation within 300 feet of waterbodies; and forest vegetation on steep slopes (>25% slope) contiguous to and within 780 feet of waterbodies.

Significant Wildlife Habitat Features: forest patches, and associated and contiguous wetlands, two acres in size or larger.

Special Habitat Areas: Johnson Creek (S, C); wetlands (W)

Riparian Corridor Functions: microclimate and shade; stream flow moderation and water storage; bank function and sediment, pollution and nutrient control; large wood and channel dynamics; organic inputs, food web and nutrient cycling; and riparian wildlife movement corridor.

Wildlife Habitat Functions: interior area; food and water; resting, denning, nesting and rearing; movement and migration; reduction of noise, light and vibration; and habitat patches that support special status fish and wildlife species.

Table A: Quantity of Natural Resource Features in Resource Site		JC3
		Study Area
Stream (Miles)		1.5
Wetlands (acres)		0.8
Vegetated Areas >= 1/2 acre (acres)		
	Forest (acres)	2.5
	Woodland (acres)	14.4
	Shrubland (acres)	2.6
	Herbaceous (acres)	10.1
Flood Area*		
	Vegetated (acres)	11.4
	Non-vegetated (acres)	21.1
Steep Slopes (acres)**		21.9
* The flood area includes the FEMA 100-year flood plain plus the adjusted 1996 flood inundation area.		
**Slopes are derived from LiDAR. Steep slopes are areas with a slope greater than 25%.		

This site comprises the lower portion of Crystal Springs Creek, its confluence with Johnson Creek, and about one and one-quarter miles of Johnson Creek downstream from Johnson Creek Canyon. This site borders the Milwaukie city limits and is mostly developed with a wide variety of land uses including single and multi-family housing, commercial, and industrial facilities. The stream channel is generally 30-50 feet wide in this reach. Johnson Creek Park, at the confluence of Crystal Springs Creek, is roughly 10 acres, with about one-third (including the waterways) in more natural conditions and heavily treed, providing stormwater management, air-cooling and habitat.

Major transportation facilities in the site include Highway 99E, a freight rail line, and the MAX light rail line and park-and-ride, which run roughly north and south. The Springwater Corridor Trail runs east and west through the site. Johnson Creek passes under the highway and rail lines near the Tacoma Street overpass. Crystal Springs crosses under Tacoma Street before it reaches its confluence with Johnson Creek.

The floodplain extends between Crystal Springs and Johnson Creek in the residential area near their confluence. It also covers industrial land between the railroad/light rail lines and the slopes to the east. Steep slopes, of 25% or higher are found along Johnson Creek at Highway 99E and along the slopes and the Springwater Corridor Trail.

In the 2010s, creek crossings were retrofitted with new bridges or culverts designed to facilitate fish passage, where it was previously impeded. As part of these projects, riparian plantings were enhanced. Stream restoration was also done at a City-owned property located between SE Tenino and Umatilla Streets on SE 21st Avenue. These projects, along with upstream enhancements in Crystal Springs, have improved conditions for resident and anadromous fish, including Pacific lamprey, cutthroat trout, steelhead, Chinook, and coho salmon. Beaver and river otter have been observed in this reach of the creek.

In more developed portions of the resource site, invasive species are dominant with scattered stands of black cottonwood, alder, and willow. Lawns, parking areas, and roads are immediately adjacent to the narrow riparian vegetation.

In 2019, a study of Johnson Creek's potential to support salmon populations identified the Crystal Springs Creek reach as high priority for habitat restoration and protection for chinook and coho salmon. The Johnson Creek reach just upstream of the Crystal Springs Creek confluence ranks very high in habitat restoration and protection for chinook salmon production, and habitat restoration to benefit coho salmon and steelhead trout production.

Special status bird species observed in or adjacent to this resource site include American kestrel, bald eagle, band-tailed pigeon, black-throated gray warbler, brown creeper, bufflehead,

Bullock's oriole, common yellowthroat, downy woodpecker, great blue heron, green heron, hooded merganser, merlin, orange-crowned warbler, peregrine falcon, red crossbill, rufous hummingbird, varied thrush, Vaux's swift, western wood-pewee, wood duck, and yellow warbler.

Table B: Quality of Natural Resource Functions in Resource Site JC3				
Resource Site (acres) = 103				
	Class 1/A	Class 2/B	Class 3/C	Total
Riparian Corridors*				
acres	16.0	13.8	23.1	52.9
percent total inventory site area	15.5%	13.4%	22.3%	51.1%
Wildlife Habitat*				
acres	0.0	3.1	0.0	3.1
percent total inventory site area	0.0%	3.0%	0.0%	3.0%
Special Habitat Areas**				
acres	8.2			
percent total inventory site area	8.0%			
Combined Total*				
acres	16.0	14.2	22.7	52.9
percent total inventory site area	15.5%	13.7%	22.0%	51.1%
* Class I riparian resources, Special Habitat Areas, and wildlife habitat include open water. ** Metro Title 13 designated all Special Habitat Areas as Class I riparian corridors. +Because riparian resources, Special Habitat Areas, and wildlife Habitat overlap, the results cannot be added together to determine the combined results.				

Stormwater runs off impervious surfaces (e.g., rooftops, driveways, parking areas, streets, etc..) rapidly. Without a place to retain the water (such as wetlands or adequate stormwater facilities), stormwater runoff results in spikes in stream levels which can cause or exacerbate flooding and increase stream erosion. In addition, when water runs off quickly, it does not have a chance to infiltrate and recharge streams or aquifers to provide water during drier periods.

The type and capacity of stormwater facilities to manage the runoff from impervious surfaces varies in the city, affecting the local rate and amount of runoff, and the amount of pollutants in the water. Much of the city was developed prior to any stormwater regulations and receives limited or no management prior to discharging to pipes and surface waters.

Table C shows the total amount of impervious area within the resource site and how much of that impervious area lacks stormwater management; the percentage of total impervious area that is not managed is called "effective impervious area." The higher the percent of effective impervious area in a watershed, the greater the negative impacts of stormwater runoff to

streams. Stream science indicates that when effective impervious area reaches 10% of a watershed, negative stream impacts become significant; and at 25%, these impacts on waterways can be substantial. An additional consideration is the differences in soil conditions and other factors that influence the ability of pervious areas to retain, infiltrate or filter pollutants from stormwater. For example, a mature forest is much more effective in managing stormwater than a manicured lawn; both areas would have a lower effective impervious surface percentage than a developed site, but they have different outcomes for stormwater management.

For Resource Area JC3, 38% of the total area is effectively impervious, indicating significant negative impacts are occurring due to the level of unmanaged impervious area and any additional impacts will cause further degradation.

Table C. Impervious Area within Resource Site JC3			
Total area (acres)	Total impervious Area (acres)	Total unmanaged impervious area* (acres)	Percent of resource site that is effectively impervious
104	48	39	38%

*Total unmanaged impervious area refers to the number of acres within a resource area that receives no formal stormwater management measures to regulate flow or treat pollutants before they reach surface waters, also referred to as effective impervious area.

Metro Title 13 and Oregon Goal 5 Compliance

The following information supplements evaluation of natural resource protections presented in Volume 4 and supports compliance with Metro Title 13 and Oregon Plan Goal 5.

Title 13 Habitat Conservation Areas

Map G presents the Habitat Conservation Areas (HCA) within the Resource site JC3. Natural resources should be protected within HCA as follows:

1. *Strictly limit* or *limit* conflicting uses within Class I/High Rank Riparian Areas in all Urban Development Areas.
2. *Strictly limit* or *limit* conflicting uses within Class II/Medium Rank Riparian Areas within Moderate and Low Value Urban Development Area as well as parks and open spaces.
3. *Strictly limit* or *limit* conflicting uses within Class A/High or B/Medium Rank Wildlife Habitat within parks and open spaces.
4. *Allow* conflicting uses or conducted a local Goal 5 ESEE for Class III/Low Rank Riparian Areas in all Urban Development Areas.

5. *Allow* conflicting uses or conducted a local Goal 5 ESEE for Class A/High, Class B/Medium or Class C/Low Rank Wildlife Habitat in all Urban Development Area, except parks and open space.

Strictly limiting or *limiting* conflicting uses in HCA will protect and conserve existing streams and wetlands to maintain significant natural resource functions including: microclimate and shade; stream flow moderation and water storage; bank function and sediment, pollution and nutrient control; large wood and channel dynamics; organic inputs, food web and nutrient cycling; and fish and wildlife habitat. *Strictly limiting* or *limiting* conflicting uses in HCA will allow for additional urban development that is sensitive to the natural resource features and requires mitigation for unavoidable negative impacts to features and functions. The recommendation will also contribute towards meeting other regulatory requirements including the Metro Title 3, Water Quality and Flood Management; Oregon Goal 6, Air, Water and Land Resources Quality; Oregon Goal 7, Areas Subject to Natural Hazards; the Clean Water Act; and the Endangered Species Act.

Goal 5 Significant Natural Resources

Resource site JC3 contains natural resource features that are not a Title 13 HCA and are therefore subject to Statewide Planning Goal 5 OAR 660-023-0110. The General ESEE analysis, Volume 4, describes the conflicting uses and provides an overarching analysis of the economic, social, environmental and energy consequences of prohibiting, limiting or allowing the conflicting uses within areas of significant natural resources. In addition to the General ESEE analysis, the following resource site-specific consequences are considered.

The common impacts of conflicting uses in the resource site include clearing vegetation; grading activities and soil compaction; adding impervious surface; modifying streams, wetlands and flood areas; generating pollution; landscaping with non-native or invasive vegetation; building fences or other wildlife barriers; and other impacts such as noise, light, litter and pets.

Within the resource site residential uses are allowed outright or conditionally in the R5, R2 and R1 base zones. Industrial uses are allowed in the IG2 base zone. Employment uses are allowed in the EG2 base zone. Commercial uses are allowed in the CE base zone. Open Space uses are allowed in the OS base zone. Development of new uses may involve vegetation clearing, grading, filing, and soil compaction, as well as the addition of impervious surfaces and landscaping with non-native plants, with associated impacts on the natural resources. Basic utilities and other infrastructure are allowed in all base zones. New or upgraded utility corridors may be cleared of vegetation and may fragment wildlife habitat.

The analysis of economic, social, environmental and energy consequences provided in Volume 4 is confirmed for resource site JC3, with the following additional information that clarifies the analysis.

Strictly limiting or limiting conflicting uses would retain the wildlife habitat functions provided by significant natural resource features including maintaining habitat for at risk plant, fish and wildlife species, and maintaining the stormwater management and air-cooling functions of the tree canopy. Mitigation for negative consequences of additional development in areas of Class A or Class B wildlife habitat should be required.

Natural Resources Protection Decisions

Based on the analysis presented in Volume 3, Natural Resources Inventory, Volume 4, Title 13 and Goal 5 Compliance, and the resource site-specific evaluation for JC3, the following decisions are applied to protect the significant riparian corridors and wildlife habitat:

1. Apply a protection overlay zone ('p' zone) to stream channels from top-of-bank to top-of-bank, wetlands and land within 40 feet of stream top-of-bank or 30 feet of wetlands.
2. Apply a conservation overlay zone ('c' zone) to areas of forest or woodland vegetation contiguous to but more than 40 feet from stream top-of-bank.
3. Apply a conservation overlay zone ('c' zone) to areas of shrubland or herbaceous vegetation within public parks and areas of forest or woodland vegetation contiguous to but outside of public parks.
4. Allow conflicting uses within all other areas containing significant natural resources.

Note – There is no Resource Site JC4. The resource site numbering in the Ezone Map Correction Project skips from JC3 to JC5.

The original Johnson Creek Basin Protection Plan included a resource site 5; but it is located outside City of Portland’s city limits and urban service boundary, where the City of Portland has no planning authority over the land and water. Therefore, the resource site is being eliminated from the Ezone Map Correction Project.

Resource Site No.: JC5 **Resource Site Name:** Tideman Johnson
Natural Area West

Previous Plan: Johnson Creek Basin Protection Plan

Previous Resource Site No.: 5

The results of the analysis found in Volume 3, Natural Resources Inventory, Volume 4, Title 13 and Goal 5 Compliance, and the resource site-specific evaluation, are presented in the following maps:

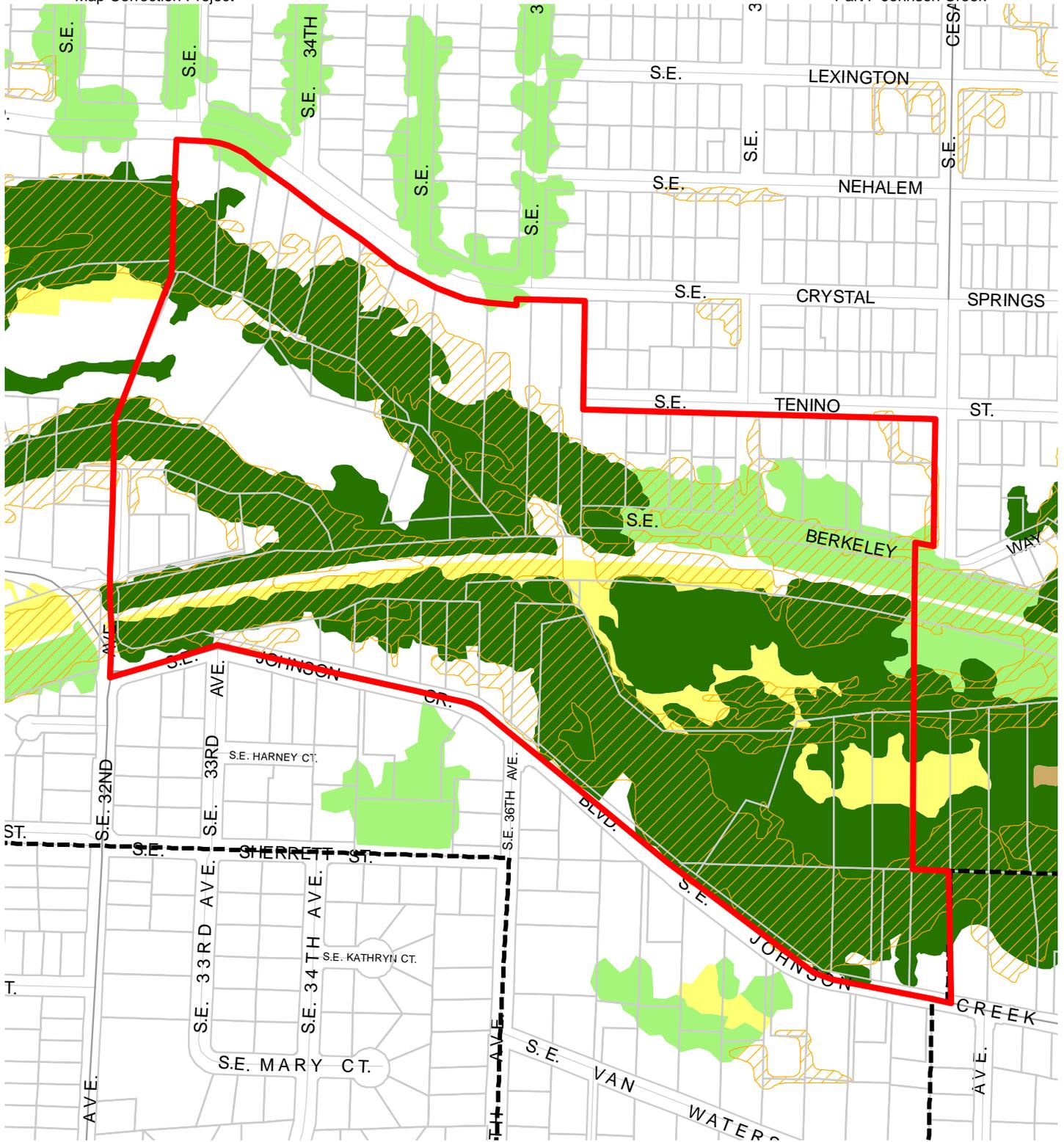
- A. Water Features – rivers, streams, wetlands and flood areas
- B. Land Features – forest, woodland, shrubland and herbaceous vegetation, steep slopes
- C. Special Habitat Areas
- D. Riparian Corridor Classifications
- E. Wildlife Habitat Classifications
- F. Urban Development Value
- G. Metro Title 13 Habitat Conservation Areas
- H. Statewide Planning Goal 5 Areas
- I. Recommended Natural Resource Protections

Following the maps, additional information about existing natural resource features and functions in the resource site is presented.

Implementation of the results is found in Volume 1, Part B, updates to zoning maps and zoning code.

Resource site JC5 includes the following:

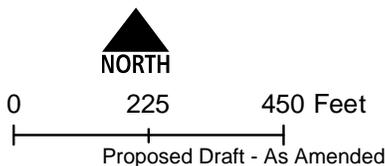
Site (acres)	45.1
Base zone (acres)	
CM1	<1
OS	12.3
R10	6.1
R5	8.6
R7	18.1



Map B: Vegetation and Steep Slopes

Resource Site: JC5

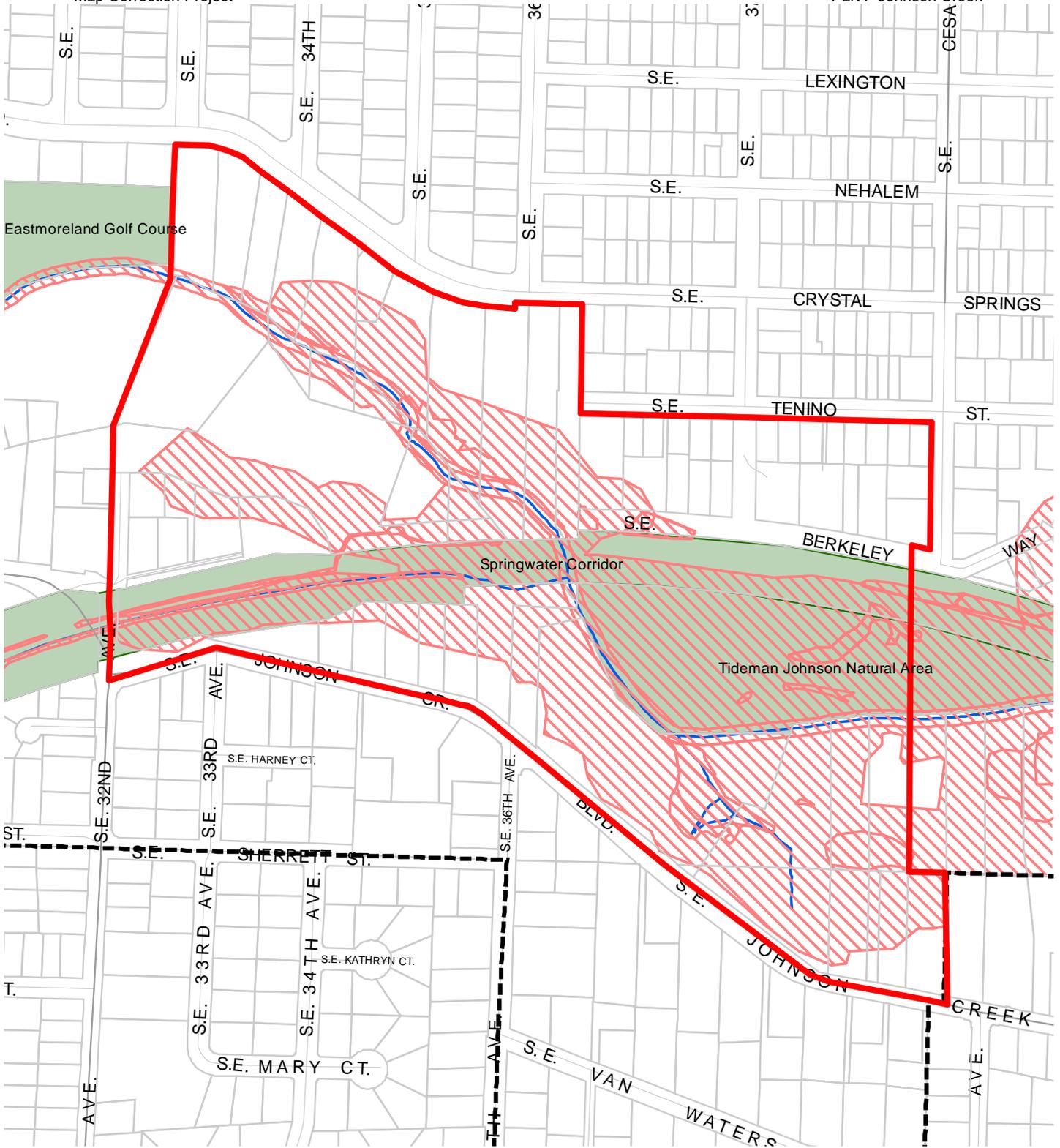
Updated: July 2021



- Resource Sites
- Urban Service Boundary
- Taxlots
- Slopes >25%
- Forest
- Woodland
- Shrubland
- Herbaceous



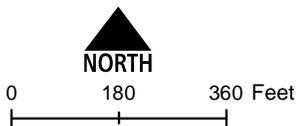
The information on the map was derived from digital databases. Care was taken in the creation of this map but it is provided "as is". The City of Portland ensures meaningful access to city programs, services, and activities to comply with Civil Rights Title VI and ADA Title II laws and reasonably provides: translation, interpretation, modifications, accommodations, alternative formats, auxiliary aids and services. To request these services, contact 503-823-7700, City TTY 503-823-6868, Relay Service: 711. July 2021



**Map C: Special
Habitat Areas**

**Resource Site:
JC5**

Updated: June 2021



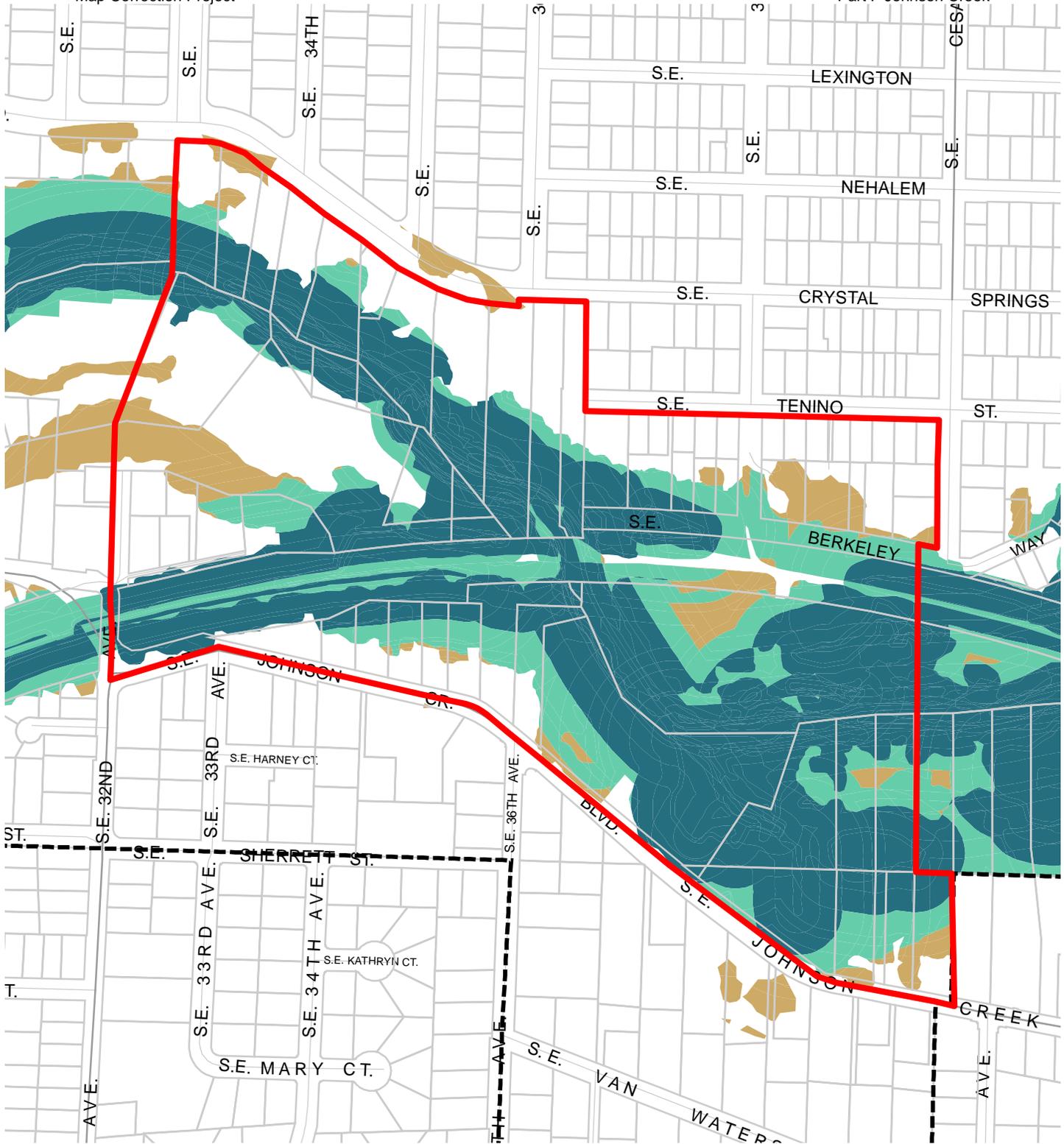
Proposed Draft - As Amended

-  Resource Sites
-  Special Habitat Areas (SHAs)
-  Open Stream Channel
-  Piped Stream Segment
-  Parks
-  Schools

-  Urban Service Boundary
-  Taxlots



The information on the map was derived from digital databases. Care was taken in the creation of this map but it is provided "as is". The City of Portland ensures meaningful access to city programs, services, and activities to comply with Civil Rights Title VI and ADA Title II laws and reasonably provides: translation, interpretation, modifications, accommodations, alternative formats, auxiliary aids and services. To request these services, contact 503-823-7700, City TTY 503-823-6868, Relay Service: 711. July 2021

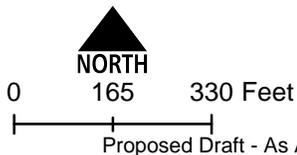


**Map D: Riparian
Corridors Habitat
Classification**

**Resource Site:
JC5**

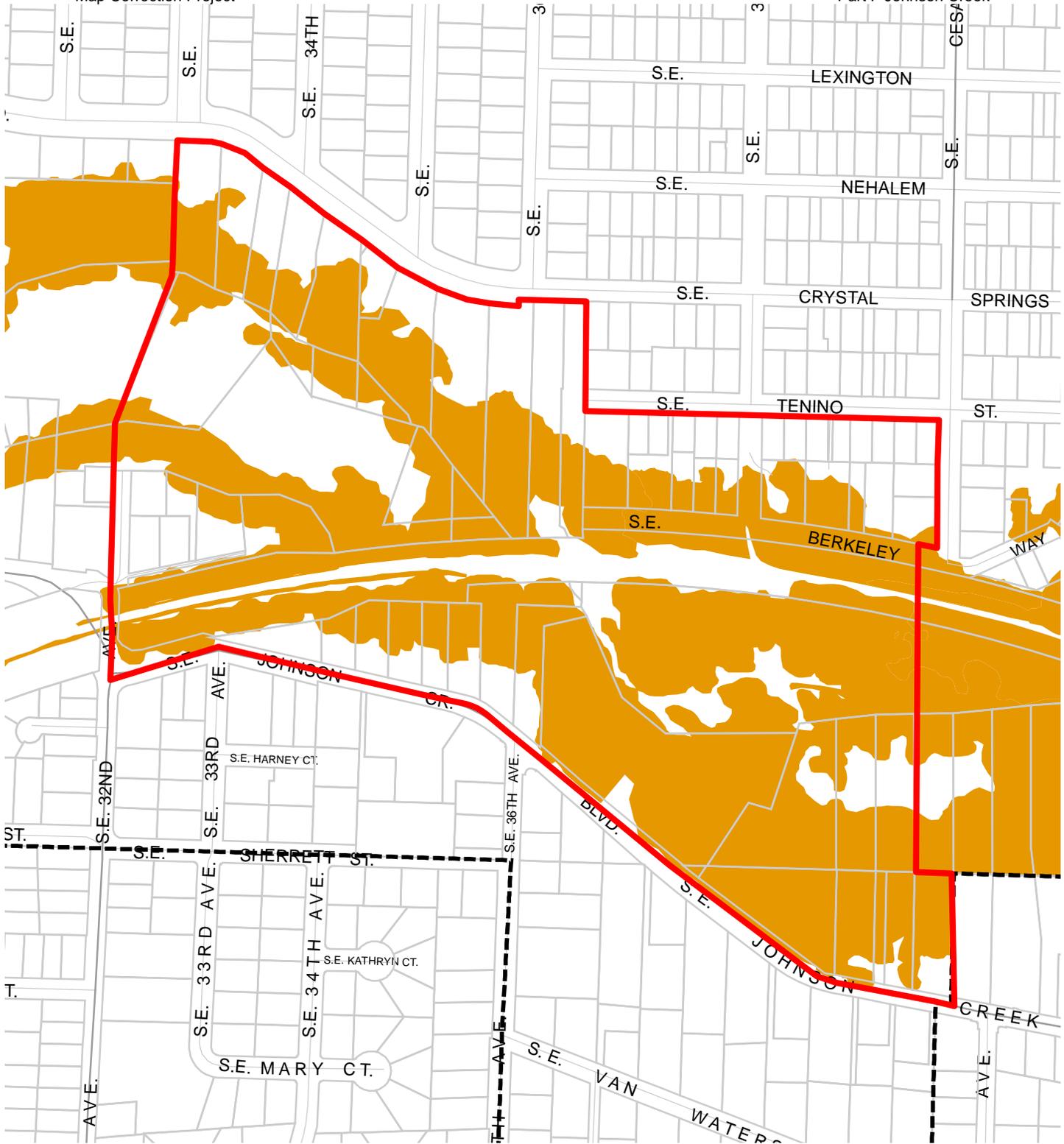
Updated: July 2021

- Resource Sites
- Urban Service Boundary
- Class I (high rank)
- Taxlots
- Class II (medium rank)
- Class III (low rank)



The information on the map was derived from digital databases. Care was taken in the creation of this map but it is provided "as is". The City of Portland ensures meaningful access to city programs, services, and activities to comply with Civil Rights Title VI and ADA Title II laws and reasonably provides: translation, interpretation, modifications, accommodations, alternative formats, auxiliary aids and services. To request these services, contact 503-823-7700, City TTY 503-823-6868, Relay Service: 711.

July 2021



Map E: Wildlife Habitat Classification

Resource Site:
JC5

Updated: July 2021

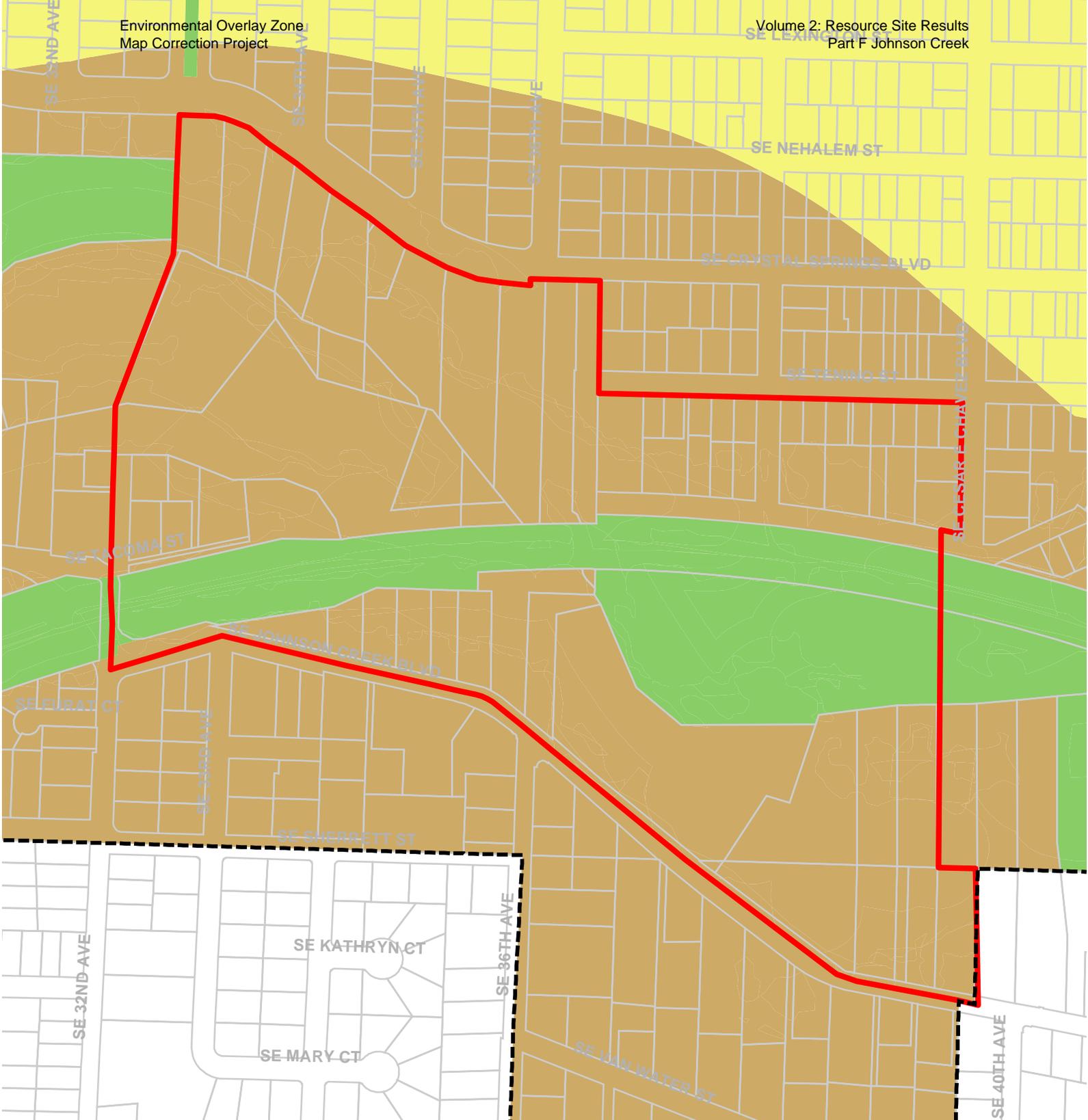


Proposed Draft - As Amended

-  Resource Sites
-  Class A (high rank)
-  Class B (medium rank)
-  Class C (low rank)
-  Urban Service Boundary
-  Taxlots



The information on the map was derived from digital databases. Care was taken in the creation of this map but it is provided "as is". The City of Portland ensures meaningful access to city programs, services, and activities to comply with Civil Rights Title VI and ADA Title II laws and reasonably provides: translation, interpretation, modifications, accommodations, alternative formats, auxiliary aids and services. To request these services, contact 503-823-7700, City TTY 503-823-6868, Relay Service: 711.
July 2021

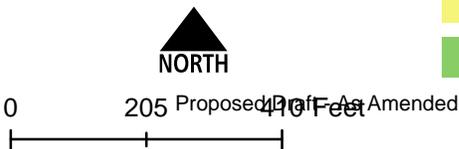


Map F: Urban Development Value (Title 13)
Resource Site: JC5

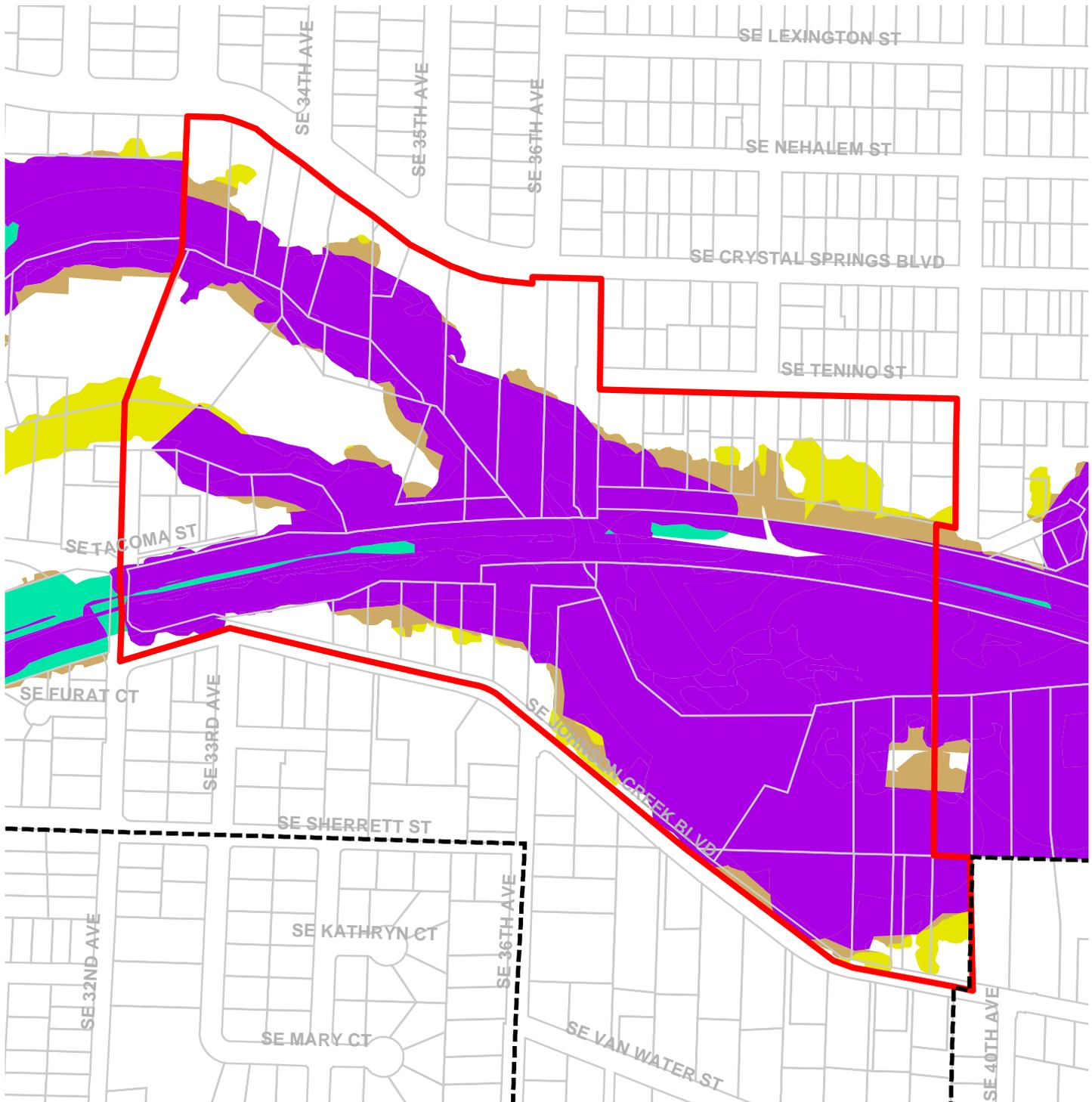
-  Urban Service Boundary
-  Resource Sites
-  High Development Value
-  Medium Development Value
-  Low Development Value
-  Parks



Updated: July 2021



The information on the map was derived from digital databases. Care was taken in the creation of this map but it is provided "as is". The City of Portland ensures meaningful access to city programs, services, and activities to comply with Civil Rights Title VI and ADA Title II laws and reasonably provides: translation, interpretation, modifications, accommodations, alternative formats, and aids and services. To request these services, contact 503-823-7700, City TTY 503-823-6868, Relay Service: 711.

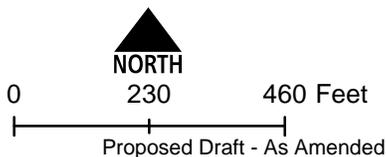


Map G: Title 13 Habitat Conservation Areas (HCA) and Goal 5 Areas

Resource Site: JC5

Updated: July 2021

- Urban Service Boundary
- Resource Sites
- HCA High Value
- HCA Moderate Value
- HCA Low Value
- Goal 5 Significant Natural Resources



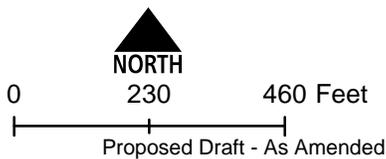
The information on the map was derived from digital databases. Care was taken in the creation of this map but it is provided "as is". The City of Portland ensures meaningful access to city programs, services, and activities to comply with Civil Rights Title VI and ADA Title II laws and reasonably provides: translation, interpretation, modifications, accommodations, alternative formats, auxiliary aids and services. To request these services, contact 503-823-7700, City TTY 503-823-6868, Relay Service: 711.



Map H: Goal 5 Resources

Resource Site: JC5

Updated: July 2021

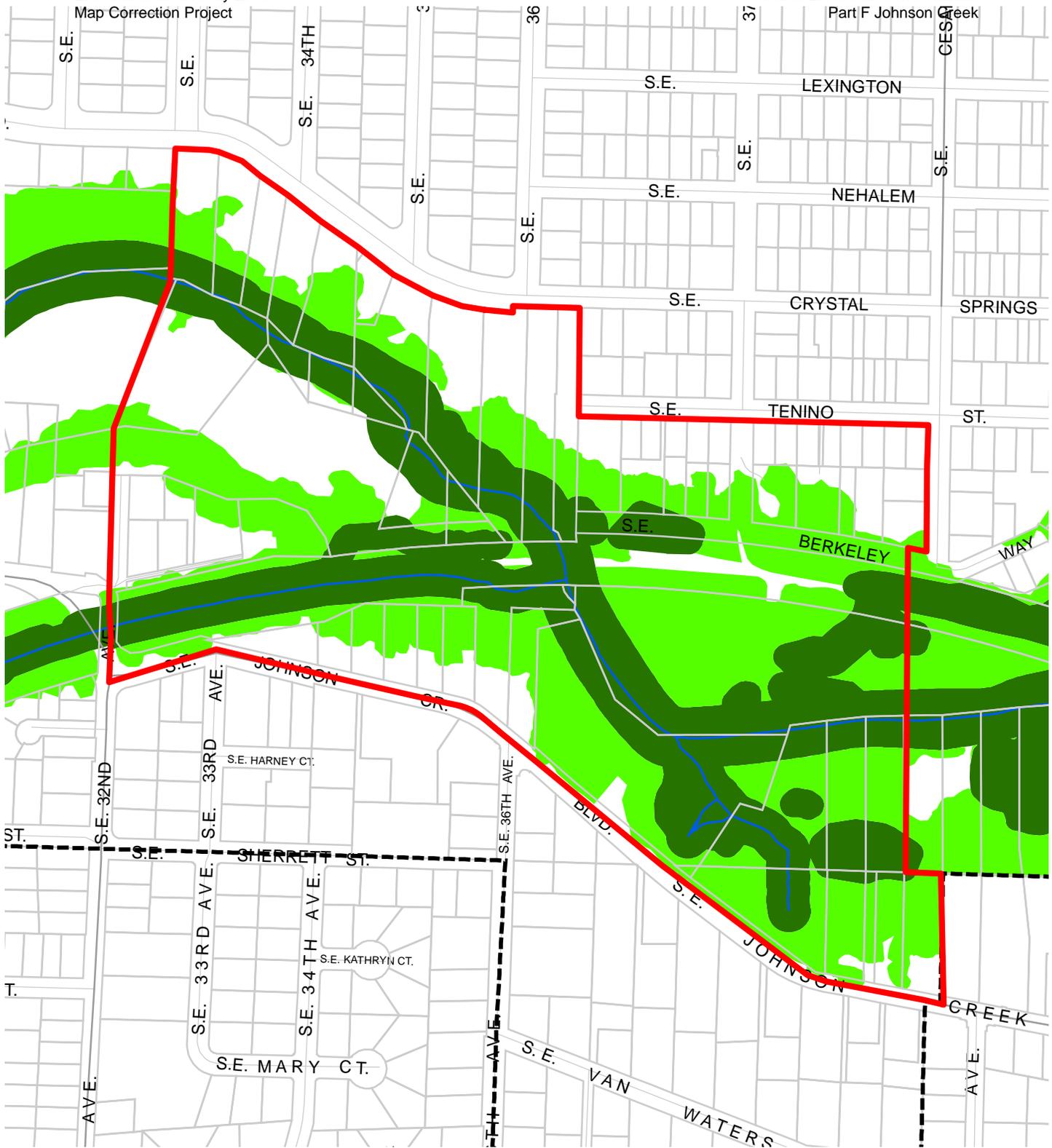


-  Urban Service Boundary
-  Resource Sites
-  Goal 5 Significant Natural Resources



The information on the map was derived from digital databases. Care was taken in the creation of this map but it is provided "as is". The City of Portland ensures meaningful access to city programs, services, and activities to comply with Civil Rights Title VI and ADA Title II laws and reasonably provides: translation, interpretation, modifications, accommodations, alternative formats, auxiliary aids and services. To request these services, contact 503-823-7700, City TTY 503-823-6868, Relay Service: 711.

July 2021

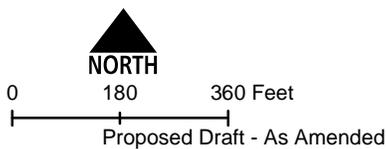


Map I: DRAFT Proposed Environmental Overlay Zones

Resource Site: JC5

Updated: July 2021

- Resource Sites
- Urban Service Boundary
- Open Stream Channel
- Piped Stream Segment
- Proposed Conservation Zone
- Proposed Protection Zone
- Taxlots



The information on the map was derived from digital databases. Care was taken in the creation of this map but it is provided "as is". The City of Portland ensures meaningful access to city programs, services, and activities to comply with Civil Rights Title VI and ADA Title II laws and reasonably provides: translation, interpretation, modifications, accommodations, alternative formats, auxiliary aids and services. To request these services, contact 503-823-7700, City TTY 503-823-6868, Relay Service: 711.
July 2021

Natural Resource Description

Within resource site JC5 the following significant natural resource features and functions are present:

Significant Riparian Corridor Features: open stream; wetland; flood area; land within 50 feet of waterbodies; forest, woodland, shrubland and herbaceous vegetation within 300 feet of waterbodies; and forest vegetation on steep slopes (>25% slope) contiguous to and within 780 feet of waterbodies.

Significant Wildlife Habitat Features: forest patches, and associated and contiguous wetlands, two acres in size or larger.

Special Habitat Areas: Tideman Johnson Natural Area (S, W, B, M, C); Johnson Creek (S, C)

Riparian Corridor Functions: microclimate and shade; stream flow moderation and water storage; bank function and sediment, pollution and nutrient control; large wood and channel dynamics; organic inputs, food web and nutrient cycling; and riparian wildlife movement corridor.

Wildlife Habitat Functions: interior area; food and water; resting, denning, nesting and rearing; movement and migration; reduction of noise, light and vibration; and habitat patches that support special status fish and wildlife species.

Table A: Quantity of Natural Resource Features in Resource Site		JC5
		Study Area
Stream (Miles)		0.8
Wetlands (acres)		2.2
Vegetated Areas >= 1/2 acre (acres)		
	Forest (acres)	24.8
	Woodland (acres)	3.0
	Shrubland (acres)	0.0
	Herbaceous (acres)	2.5
Flood Area*		
	Vegetated (acres)	5.1
	Non-vegetated (acres)	0.3
Steep Slopes (acres)**		22.8
* The flood area includes the FEMA 100-year flood plain plus the adjusted 1996 flood inundation area.		
**Slopes are derived from LiDAR. Steep slopes are areas with a slope greater than 25%.		

Resource Site JC5 includes the Johnson Creek channel and riparian zone in the vicinity of Tideman Johnson Natural Area. This site is defined by a wilderness canyon area with associated upland and adjacent wetland areas, a wildlife and fisheries travel corridor, gradual creek banks that allow access by animals, possible archaeological resources, and the Tideman Johnson Natural Area, which provides public access to nature, scenic, and educational values. Land on both sides of the canyon are developed single family residential neighborhoods on the margins of intact riparian vegetation. Running east and west through the site is the Springwater Corridor Trail, which is well used by cyclists and pedestrians for recreation and commuting.

The canyon walls are steeply sloped. The floodplain is confined to the creek corridor and a portion of Tideman Johnson Natural Area. Wetlands are found west of the Springwater Corridor Trail's crossing over Johnson Creek, in Tideman Johnson Park, and south of the creek at the base of the southern canyon slopes.

Tideman Johnson Natural Area, about a 16-acre parcel located near SE 39th Avenue, sits on the north side of Johnson Creek. The initial park site was donated to the City of Portland in 1942. For decades it remained relatively undeveloped. In 2006, BES completed a restoration project on the site that improved instream habitat for salmon, removed fish passage barriers, enhanced floodplain habitat, added flood storage to reduce local flooding, and protected a sewer pipe that had previously been exposed in Johnson Creek. The stream, wetlands and tree canopy also provide stormwater management, air cooling and fish and wildlife habitat. The natural resources in close proximity to homes provides access to nature. The natural area and trail include viewing platforms for people to enjoy views of Johnson Creek and for students to learn about the natural environment.

The natural area is dominated by native trees and understory vegetation including snow berry, notka rose, western red cedar, cottonwood, and willow. The south bank vegetation of Johnson Creek is dominated by maple, western red cedar and alder. The southern canyon wall that rises 75 to 100 feet up to Johnson Creek Boulevard is an upland forest of Douglas Fir, Western Red Cedar, and Bigleaf Maple. The slope of the north canyon wall is gentler, providing easier access by wildlife species. It rises 60 feet above the flat, terraced area that is the center of Tideman Johnson Natural Area. Springs along the north and south canyon walls and drainages along the Springwater Corridor Trail, provide a consistent source of cold water to Johnson Creek.

At the eastern end of the natural area adjacent the creek channel there is a 40-inch diameter, native black cottonwood tree. This tree is over 100 years old, and provides habitat for Great Blue Heron, raptors, woodpeckers, and owls. Introduced and invasive plants, including Irish Ivy and blackberry, are management challenges at the site.

Streamside vegetation is primarily a mix of native and invasive vegetation, including willow, cottonwood, Douglas fir, Irish and English ivy, Armenian blackberry, spirea, species of grasses, sedges and rushes, native rose species, and nettle. Riparian vegetation provides food, nesting, and cover for mammals. The channel in this reach is used by resident and migratory fish including species of salmonid listed as threatened under the Endangered Species Act. During the construction of a restoration project at Tideman Johnson Natural Area in 2006, over 20 Chinook salmon and more than 100 steelhead trout were found in this portion of the creek. In 2019, a study of Johnson Creek's potential to support salmon populations identified this area as high priority for habitat restoration and protection for coho salmon.

The site is home to a variety of wildlife species. Reptiles and amphibians use the stream, wetlands and riparian area including the rough-skinned newt. Waterfowl use the area for feeding and resting. Special status bird species observed in or adjacent to this resource site include American kestrel, bald eagle, band tailed pigeon, brown creeper, bufflehead, bushtit, downy woodpecker, great blue heron, green heron, hooded merganser, Hutton's viero, merlin, orange-crowned warbler, purple finch, Rufous hummingbird, Swainson's thrush, varied thrush, Vaux's swift, western wood-pewee, white-breasted (slender-billed) nuthatch, Wilson's warbler, and wood duck.

Coho salmon, Chinook salmon, steelhead trout, and Pacific lamprey are documented within this reach of Johnson Creek. In 2019, a study of Johnson Creek's potential to support salmon populations identified this reach of Johnson Creek as important to protect and restore habitat for coho and Chinook salmon and steelhead trout—meaning its past restoration actions have shown important benefit to habitat potential but additional improvement possibilities exist.

Table B: Quality of Natural Resource Functions in Resource Site JC5				
Resource Site (acres) = 45				
	Class 1/A	Class 2/B	Class 3/C	Total
Riparian Corridors*				
acres	20.9	7.6	3.1	31.5
percent total inventory site area	46.3%	16.8%	6.9%	69.9%
Wildlife Habitat*				
acres	0.0	27.8	0.0	27.8
percent total inventory site area	0.0%	61.6%	0.0%	61.6%
Special Habitat Areas**				
acres	23.9			
percent total inventory site area	52.9%			
Combined Total*				
acres	20.9	10.2	0.5	31.5
percent total inventory site area	46.3%	22.5%	1.1%	69.9%
* Class I riparian resources, Special Habitat Areas, and wildlife habitat include open water. ** Metro Title 13 designated all Special Habitat Areas as Class I riparian corridors. +Because riparian resources, Special Habitat Areas, and wildlife Habitat overlap, the results cannot be added together to determine the combined results.				

Stormwater runs off impervious surfaces (e.g., rooftops, driveways, parking areas, streets, etc..) rapidly. Without a place to retain the water (such as wetlands or adequate stormwater facilities), stormwater runoff results in spikes in stream levels which can cause or exacerbate flooding and increase stream erosion. In addition, when water runs off quickly, it does not have a chance to infiltrate and recharge streams or aquifers to provide water during drier periods.

The type and capacity of stormwater facilities to manage the runoff from impervious surfaces varies in the city, affecting the local rate and amount of runoff, and the amount of pollutants in the water. Much of the city was developed prior to any stormwater regulations and receives limited or no management prior to discharging to pipes and surface waters.

Table C shows the total amount of impervious area within the resource site and how much of that impervious area lacks stormwater management; the percentage of total impervious area that is not managed is called "effective impervious area." The higher the percent of effective impervious area in a watershed, the greater the negative impacts of stormwater runoff to streams. Stream science indicates that when effective impervious area reaches 10% of a watershed, negative stream impacts become significant; and at 25%, these impacts on waterways can be substantial. An additional consideration is the differences in soil conditions

and other factors that influence the ability of pervious areas to retain, infiltrate or filter pollutants from stormwater. For example, a mature forest is much more effective in managing stormwater than a manicured lawn; both areas would have a lower effective impervious surface percentage than a developed site, but they have different outcomes for stormwater management.

For Resource Area JC5, 8% of the total area is effectively impervious. This indicates a significant degree of stormwater management and/or existing natural resources that should be preserved. Areas with very low impervious cover and existing vegetation are more likely to be functioning properly to support biologic systems.

Table C. Impervious Area within Resource Site JC5			
Total area (acres)	Total impervious Area (acres)	Total unmanaged impervious area* (acres)	Percent of resource site that is effectively impervious
45	6	3.5	8%

*Total unmanaged impervious area refers to the number of acres within a resource area that receives no formal stormwater management measures to regulate flow or treat pollutants before they reach surface waters, also referred to as effective impervious area.

Metro Title 13 and Oregon Goal 5 Compliance

The following information supplements evaluation of natural resource protections presented in Volume 4 and supports compliance with Metro Title 13 and Oregon Plan Goal 5.

Title 13 Habitat Conservation Areas

Map G presents the Habitat Conservation Areas (HCA) within the Resource site JC5. Natural resources should be protected within HCA as follows:

1. *Strictly limit or limit* conflicting uses within Class I/High Rank Riparian Areas in all Urban Development Areas.
2. *Strictly limit or limit* conflicting uses within Class II/Medium Rank Riparian Areas within Moderate and Low Value Urban Development Area as well as parks and open spaces.
3. *Strictly limit or limit* conflicting uses within Class A/High or B/Medium Rank Wildlife Habitat within parks and open spaces.
4. *Allow* conflicting uses or conducted a local Goal 5 ESEE for Class III/Low Rank Riparian Areas in all Urban Development Areas.
5. *Allow* conflicting uses or conducted a local Goal 5 ESEE for Class A/High, Class B/Medium or Class C/Low Rank Wildlife Habitat in all Urban Development Area, except parks and open space.

Strictly limiting or *limiting* conflicting uses in HCA will protect and conserve existing streams and wetlands to maintain significant natural resource functions including: microclimate and shade; stream flow moderation and water storage; bank function and sediment, pollution and nutrient control; large wood and channel dynamics; organic inputs, food web and nutrient cycling; and fish and wildlife habitat. *Strictly limiting* or *limiting* conflicting uses in HCA will allow for additional urban development that is sensitive to the natural resource features and requires mitigation for unavoidable negative impacts to features and functions. The recommendation will also contribute towards meeting other regulatory requirements including the Metro Title 3, Water Quality and Flood Management; Oregon Goal 6, Air, Water and Land Resources Quality; Oregon Goal 7, Areas Subject to Natural Hazards; the Clean Water Act; and the Endangered Species Act.

Goal 5 Significant Natural Resources

Resource site JC5 contains natural resource features that are not a Title 13 HCA and are therefore subject to Statewide Planning Goal 5 OAR 660-023-0110. The General ESEE analysis, Volume 4, describes the conflicting uses and provides an overarching analysis of the economic, social, environmental and energy consequences of prohibiting, limiting or allowing the conflicting uses within areas of significant natural resources. In addition to the General ESEE analysis, the following resource site-specific consequences are considered.

The common impacts of conflicting uses in the resource site include clearing vegetation; grading activities and soil compaction; adding impervious surface; modifying streams, wetlands and flood areas; generating pollution; increasing risks of wildlife collisions at roads and trails; landscaping with non-native or invasive vegetation; building fences or other wildlife barriers; and other impacts such as noise, light, litter and pets.

Within the resource site residential uses are allowed outright or conditionally in the R10, R7 and R5 base zones. Commercial uses are allowed in the MC1 base zone. Open Space uses are allowed in the OS base zone. Development of new uses may involve vegetation clearing, grading, filing, and soil compaction, as well as the addition of paving/impervious surfaces and landscaping with non-native plants, with associated impacts on the natural resources. Basic utilities and other infrastructure are allowed in all base zones. New or upgraded utility corridors may be cleared of vegetation and may fragment wildlife habitat.

The analysis of economic, social, environmental and energy consequences provided in Volume 4 is confirmed for resource site JC5, with the following additional information that clarifies the analysis.

Strictly limiting or *limiting* conflicting uses would retain the wildlife habitat functions provided by significant natural resource features including maintaining habitat for at risk plant, fish and

wildlife species, and maintaining the stormwater management and air-cooling functions of the tree canopy. Mitigation for negative consequences of additional development in areas of Class A or Class B wildlife habitat should be required.

Natural Resources Protection Decisions

Based on the analysis presented in Volume 3, Natural Resources Inventory, Volume 4, Title 13 and Goal 5 Compliance, and the resource site-specific evaluation for JC5, the following decisions are applied to protect the significant riparian corridors and wildlife habitat:

1. Apply a protection overlay zone ('p' zone) to stream channels from top-of-bank to top-of-bank, wetlands and land within 50 feet of stream top-of-bank or 30 feet of wetlands.
2. Apply a conservation overlay zone ('c' zone) to areas of forest or woodland vegetation contiguous to but more than 50 feet from stream top-of-bank and areas of forest or woodland vegetation contiguous to but more than 30 feet from wetlands.
3. Apply a conservation overlay zone ('c' zone) to areas of shrubland or herbaceous vegetation within public parks and areas of forest, woodland, shrubland or herbaceous vegetation contiguous to but outside of public parks.
4. Allow conflicting uses within all other areas containing significant natural resources.

Resource Site No.: JC6 **Resource Site Name:** Cezar E. Chavez
Blvd. – 42nd Wetland

Previous Plan: Johnson Creek Basin Protection Plan

Previous Resource Site No.: 6

The results of the analysis found in Volume 3, Natural Resources Inventory, Volume 4, Title 13 and Goal 5 Compliance, and the resource site-specific evaluation, are presented in the following maps:

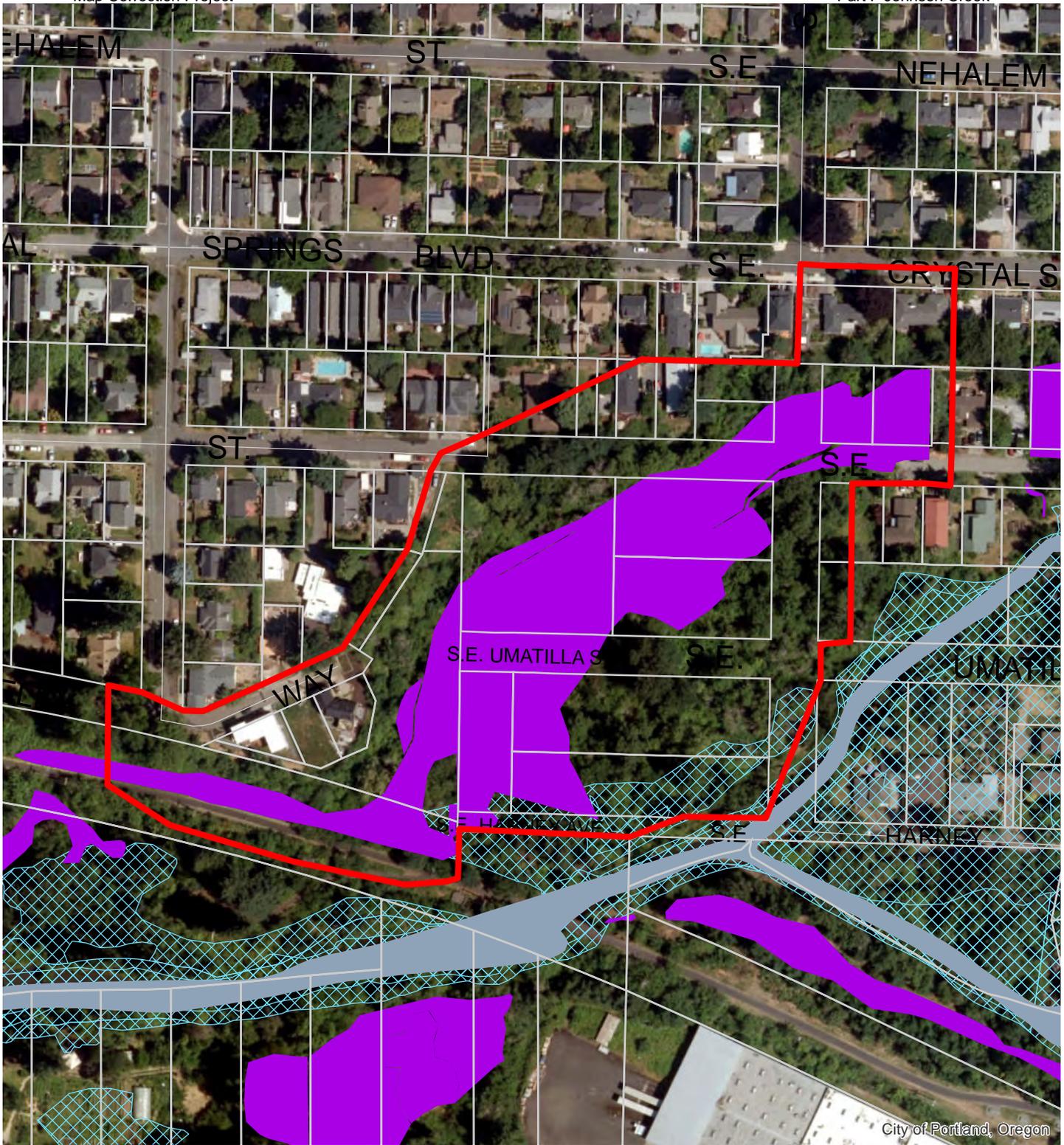
- A. Water Features – rivers, streams, wetlands and flood areas
- B. Land Features – forest, woodland, shrubland and herbaceous vegetation, steep slopes
- C. Special Habitat Areas
- D. Riparian Corridor Classifications
- E. Wildlife Habitat Classifications
- F. Urban Development Value
- G. Metro Title 13 Habitat Conservation Areas
- H. Statewide Planning Goal 5 Areas
- I. Recommended Natural Resource Protections

Following the maps, additional information about existing natural resource features and functions in the resource site is presented.

Implementation of the results is found in Volume 1, Part B, updates to zoning maps and zoning code.

Resource site JC6 includes the following:

Site (acres)	9.8
Base zone (acres)	
OS	5.8
R10	2.7
R5	1.3



City of Portland, Oregon

Map A: Water Features

Resource Site: JC6

Updated: July 2021



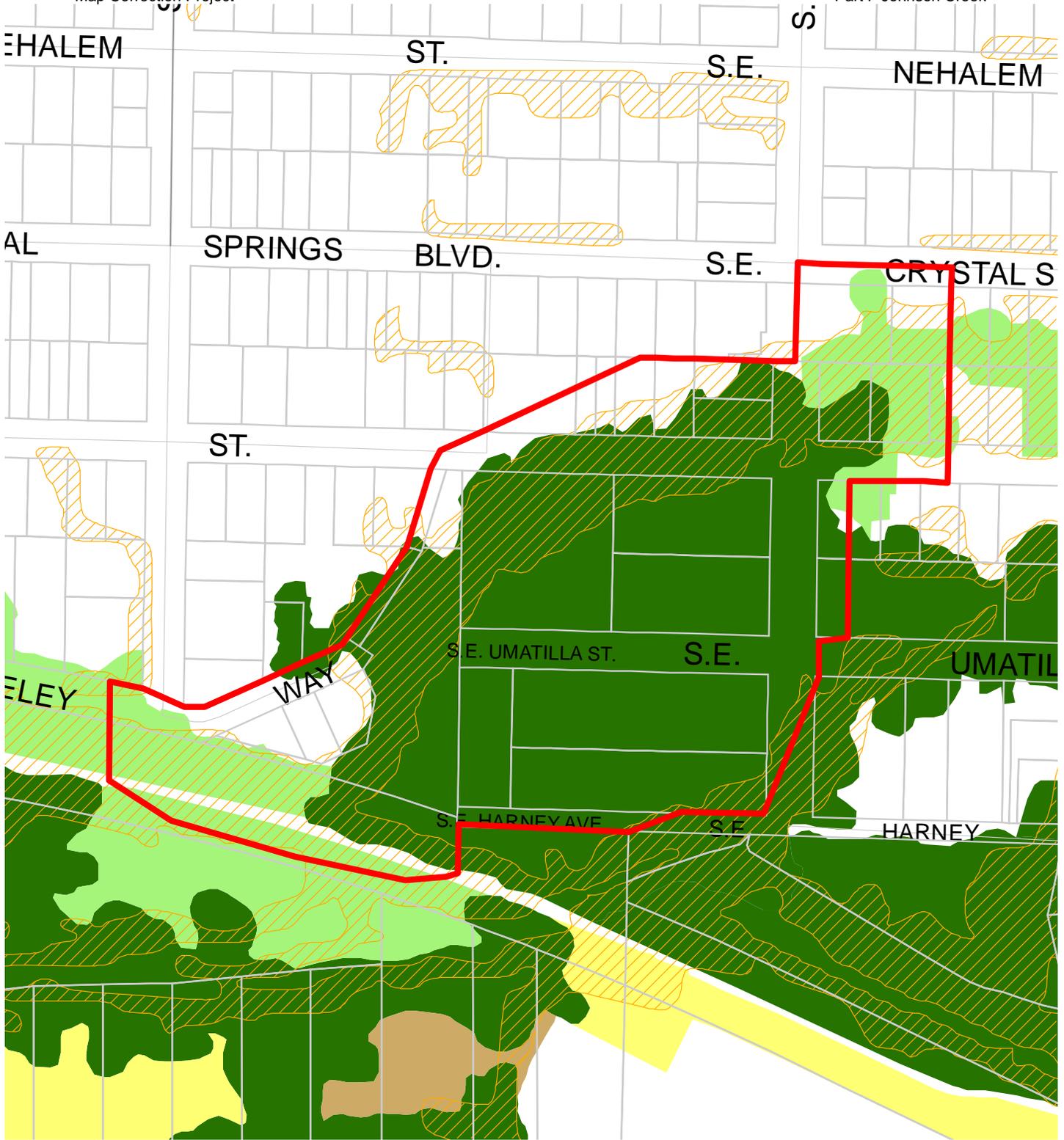
0 90 180 Feet

Proposed Draft - As Amended

- Resource Sites
- Urban Service Boundary
- Taxlots
- Wetlands
- Rivers
- Open stream channel
- Piped Stream Segment
- Flood Area



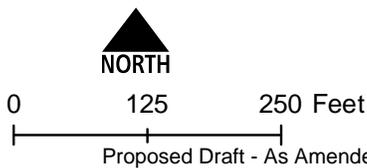
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July 2021



Map B: Vegetation and Steep Slopes

**Resource Site:
JC6**

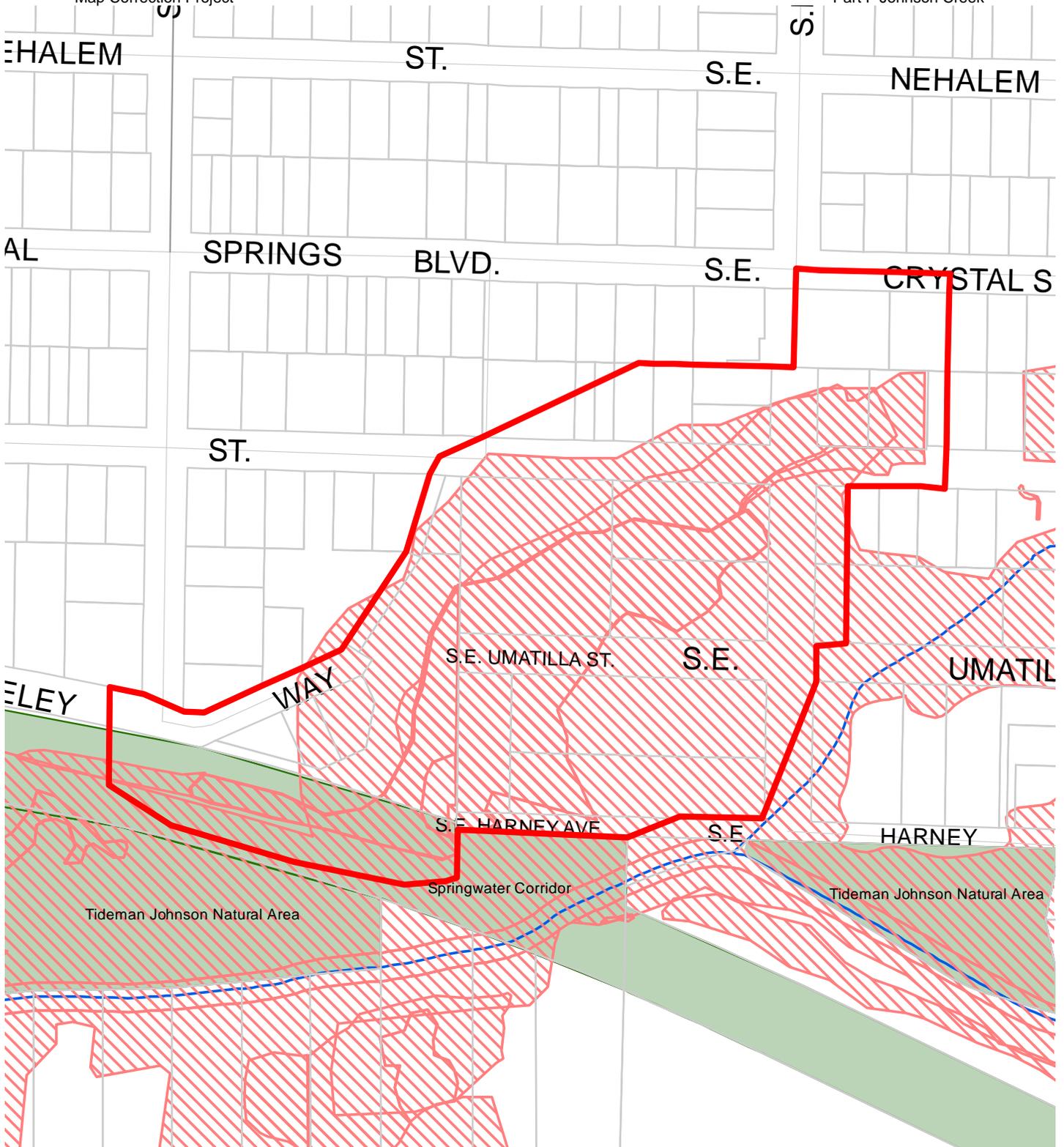
Updated: July 2021



- Resource Sites
- Urban Service Boundary
- Taxlots
- Slopes >25%
- Forest
- Woodland
- Shrubland
- Herbaceous



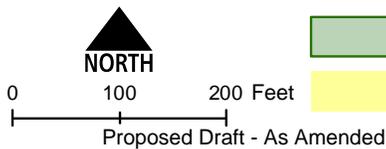
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July 2021



**Map C: Special
Habitat Areas**

**Resource Site:
JC6**

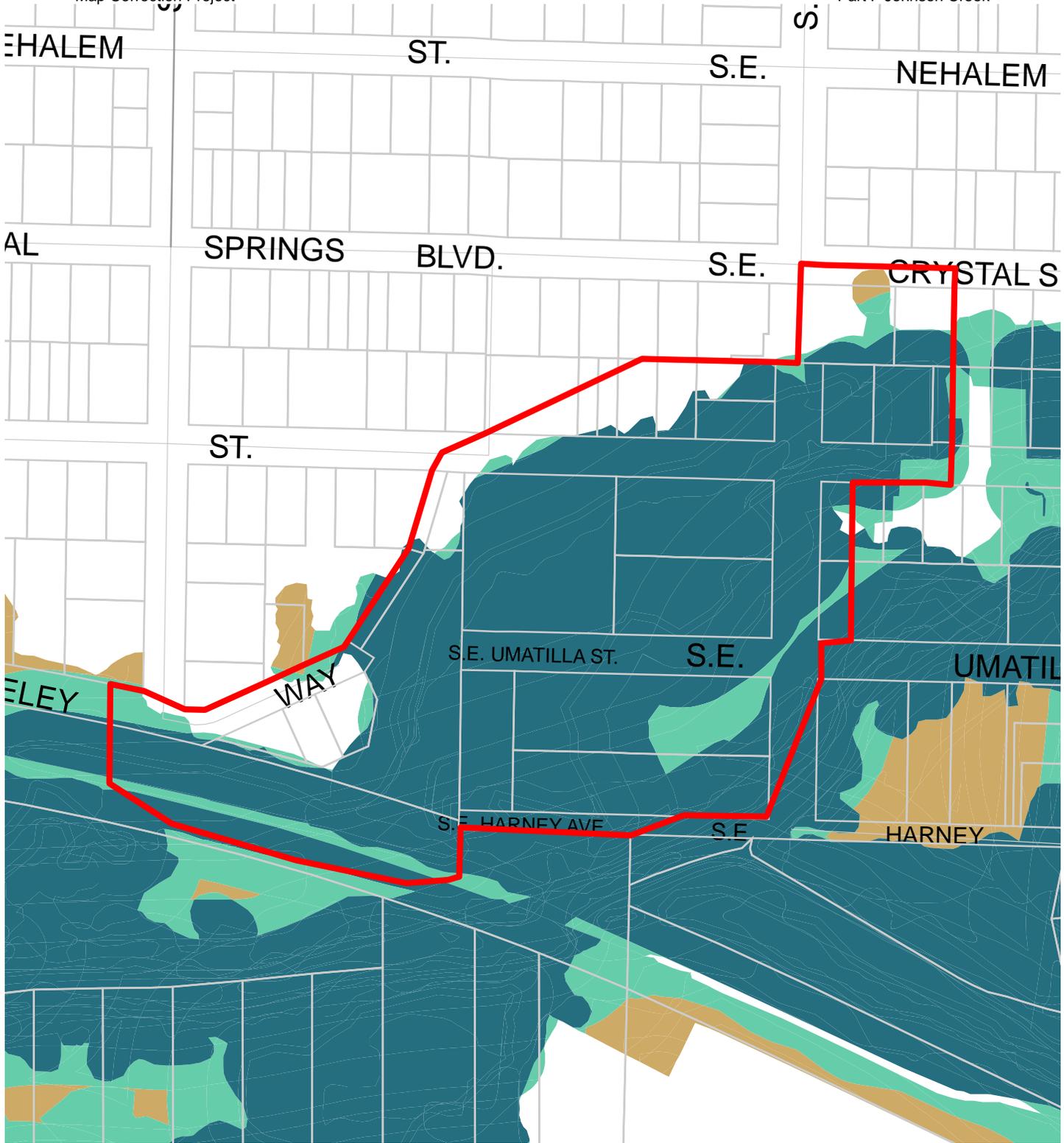
Updated: June 2021



-  Resource Sites
-  Special Habitat Areas (SHAs)
-  Open Stream Channel
-  Piped Stream Segment
-  Parks
-  Schools
-  Urban Service Boundary
-  Taxlots



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**Map D: Riparian
Corridors Habitat
Classification**

**Resource Site:
JC6**

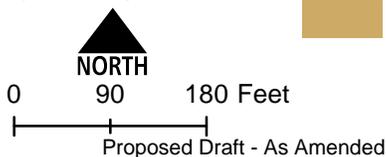
Updated: July 2021

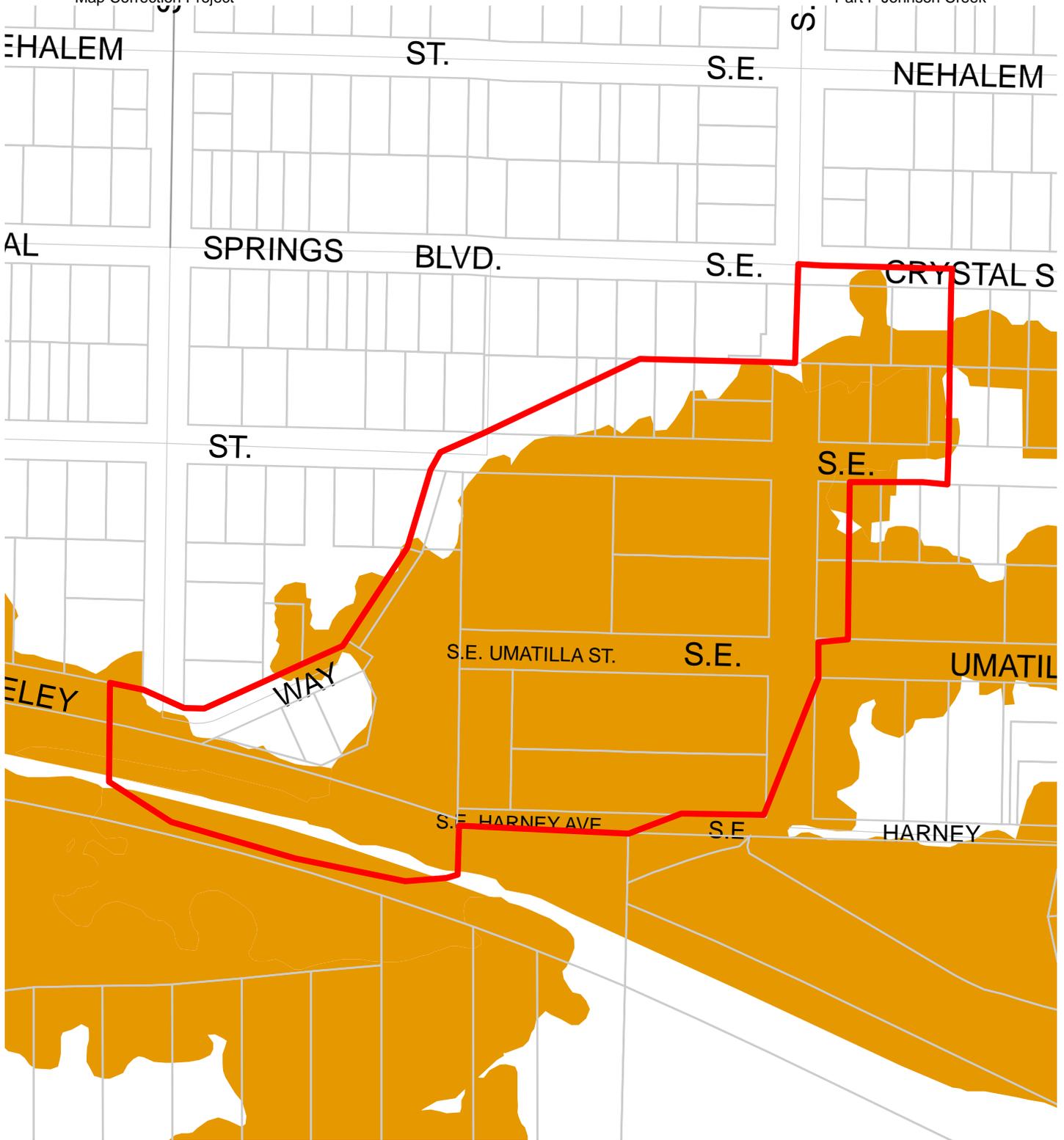
- Resource Sites
- Urban Service Boundary
- Class I (high rank)
- Taxlots
- Class II (medium rank)
- Class III (low rank)



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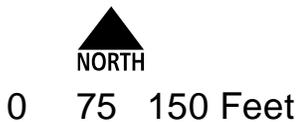
July 2021





**Map E: Wildlife
Habitat Classification**
**Resource Site:
JC6**

Updated: July 2021



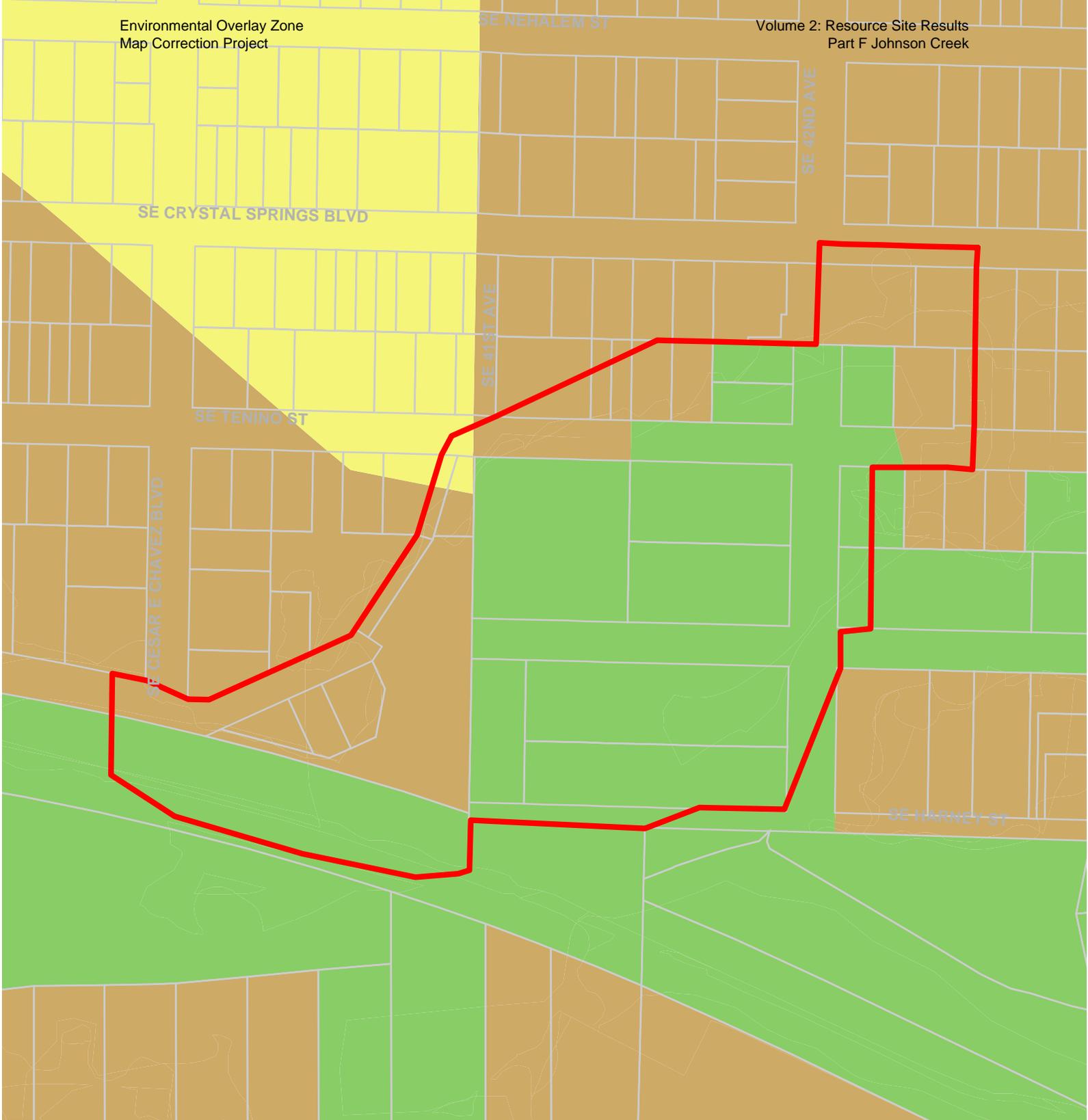
Proposed Draft - As Amended

-  Resource Sites
-  Class A (high rank)
-  Class B (medium rank)
-  Class C (low rank)
-  Urban Service Boundary
-  Taxlots



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July 2021

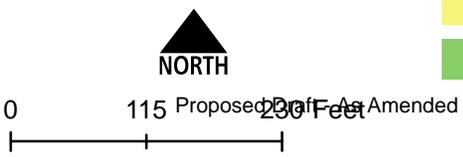


Map F: Urban Development Value (Title 13)
Resource Site: JC6

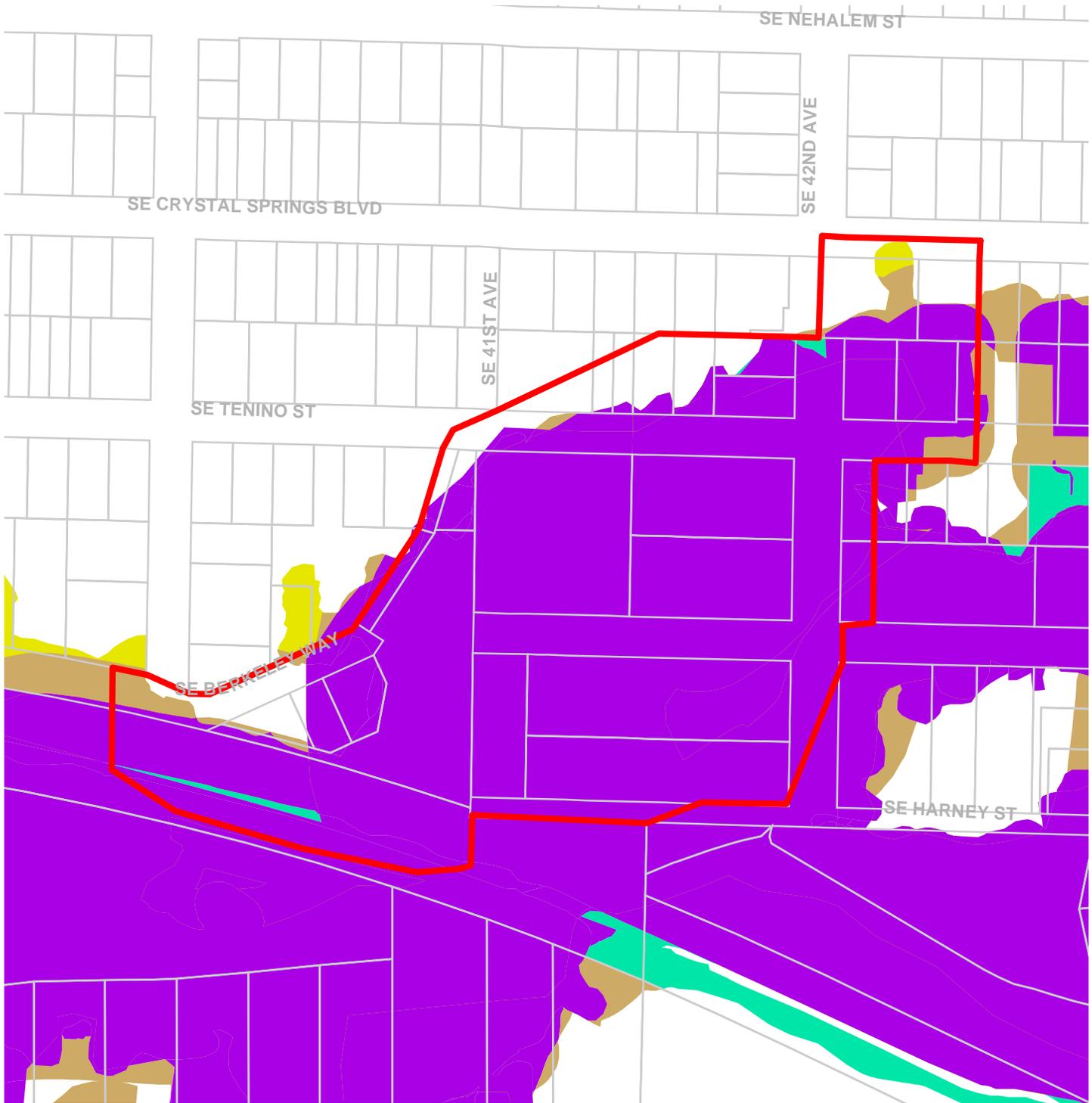
-  Urban Service Boundary
-  Resource Sites
-  High Development Value
-  Medium Development Value
-  Low Development Value
-  Parks



Updated: July 2021



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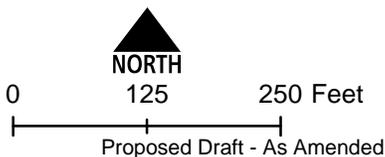


Map G: Title 13 Habitat Conservation Areas (HCA) and Goal 5 Areas

Resource Site: JC6

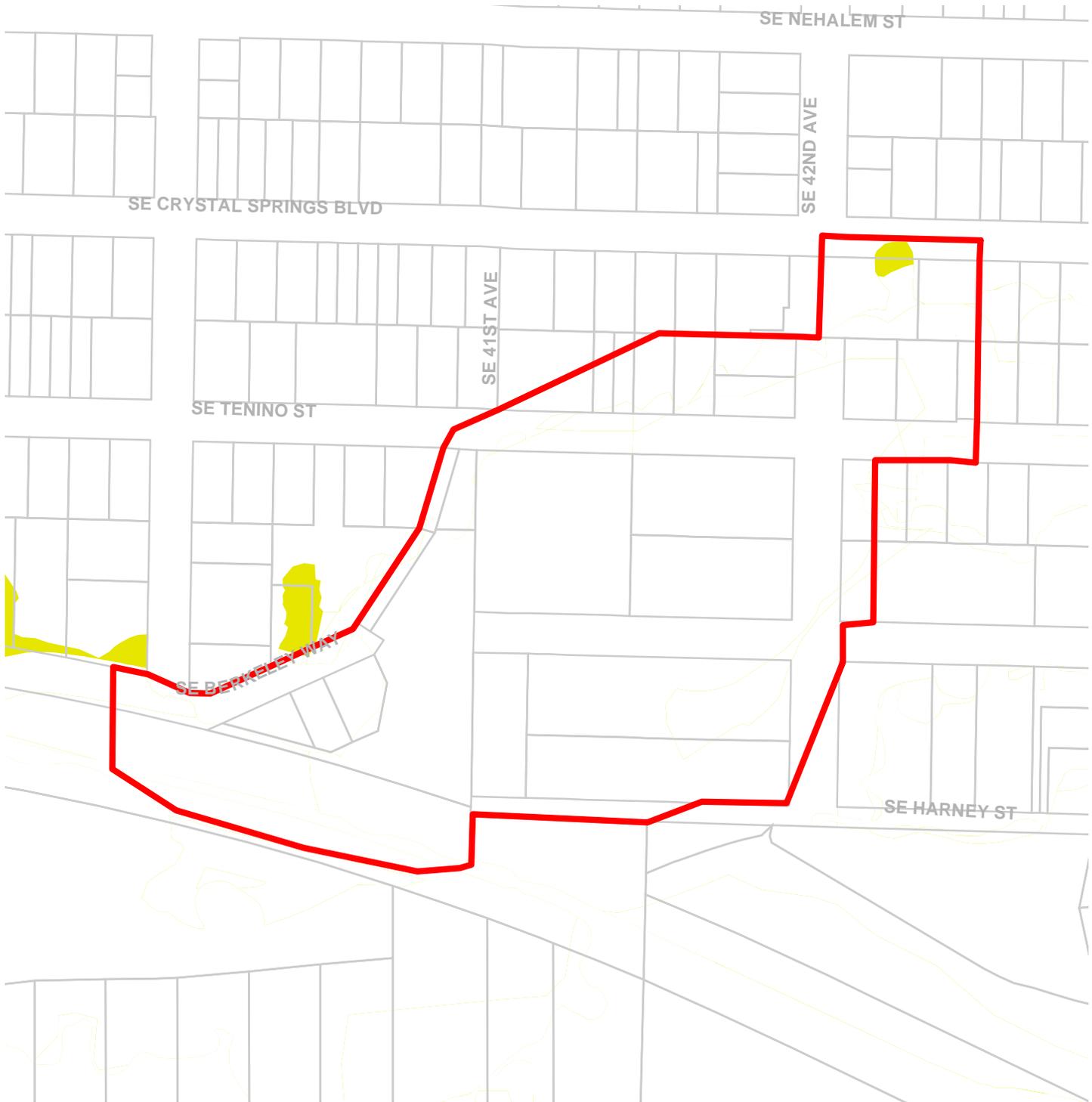
Updated: July 2021

-  Urban Service Boundary
-  Resource Sites
-  HCA High Value
-  HCA Moderate Value
-  HCA Low Value
-  Goal 5 Significant Natural Resources



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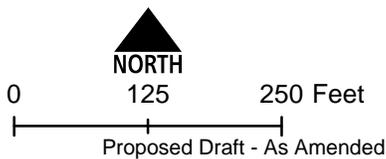
July 2021



Map H: Goal 5 Resources

Resource Site: JC6

Updated: July 2021

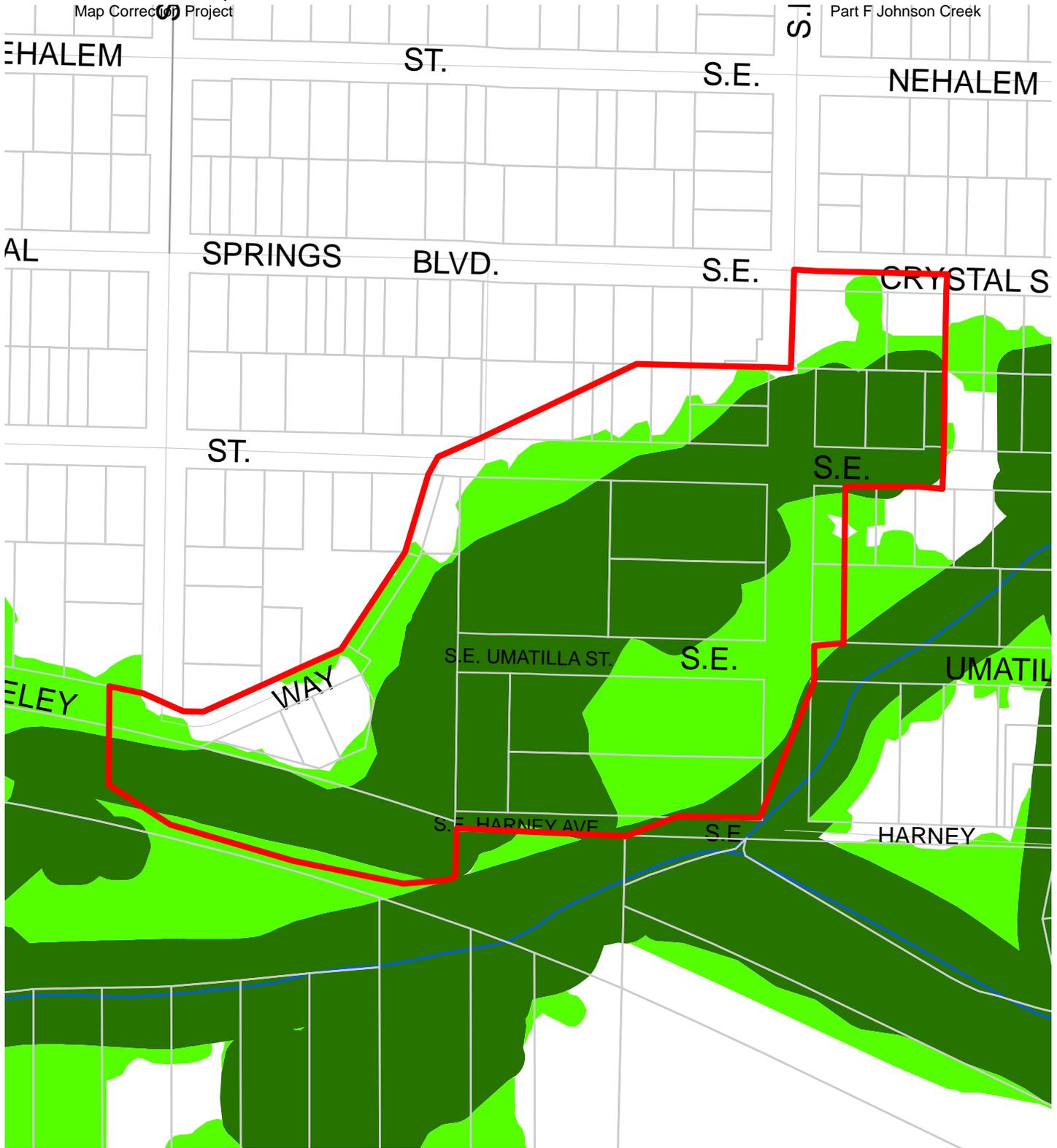


-  Urban Service Boundary
-  Resource Sites
-  Goal 5 Significant Natural Resources



The information on the map was derived from digital databases. Care was taken in the creation of this map but it is provided "as is". The City of Portland ensures meaningful access to city programs, services, and activities to comply with Civil Rights Title VI and ADA Title II laws and reasonably provides: translation, interpretation, modifications, accommodations, alternative formats, auxiliary aids and services. To request these services, contact 503-823-7700, City TTY 503-823-6868, Relay Service: 711.

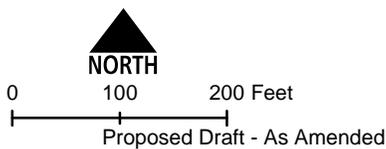
July 2021



Map I: DRAFT Proposed Environmental Overlay Zones

**Resource Site:
JC6**

Updated: July 2021



-  Resource Sites
-  Open Stream Channel
-  Piped Stream Segment
-  Proposed Conservation Zone
-  Proposed Protection Zone
-  Urban Service Boundary
-  Taxlots



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July 2021

Natural Resource Description

Within resource site JC6 the following significant natural resource features and functions are present:

Significant Riparian Corridor Features: open stream; wetland; flood area; land within 50 feet of waterbodies; forest, woodland, shrubland and herbaceous vegetation within 300 feet of waterbodies; and forest vegetation on steep slopes (>25% slope) contiguous to and within 780 feet of waterbodies.

Significant Wildlife Habitat Features: forest patches, and associated and contiguous wetlands, two acres in size or larger.

Special Habitat Areas: Tideman Johnson Natural Area (S, W, B, M, C)

Riparian Corridor Functions: microclimate and shade; stream flow moderation and water storage; bank function and sediment, pollution and nutrient control; large wood and channel dynamics; organic inputs, food web and nutrient cycling; and riparian wildlife movement corridor.

Wildlife Habitat Functions: interior area; food and water; resting, denning, nesting and rearing; movement and migration; reduction of noise, light and vibration; and habitat patches that support special status fish and wildlife species.

Table A: Quantity of Natural Resource Features in Resource Site		JC6
		Study Area
Stream (Miles)		0.0
Wetlands (acres)		3.2
Vegetated Areas >= 1/2 acre (acres)		
	Forest (acres)	6.8
	Woodland (acres)	1.4
	Shrubland (acres)	0.0
	Herbaceous (acres)	0.0
Flood Area*		
	Vegetated (acres)	0.7
	Non-vegetated (acres)	0.0
Steep Slopes (acres)**		4.1
* The flood area includes the FEMA 100-year flood plain plus the adjusted 1996 flood inundation area.		
**Slopes are derived from LiDAR. Steep slopes are areas with a slope greater than 25%.		

This site includes a forested wetland and flood area adjacent to Johnson Creek to the northeast of Tideman Johnson Natural Area. The site has slopes on the north and west sides, which separate it from the adjacent residential neighborhood. Native willow, red osier dogwood and other native plants dominate the site with some variation in the riparian area. Shrubs and trees provide good structural diversity for habitat for birds and small mammals. Wildlife interspersed with other natural areas is good. Seeps and springs emerge from the steeply slopes and drain into a wetland located between the slopes and Johnson Creek. The wetland is adjacent to Tideman Johnson Natural Area, an upland forest, and is downstream of the Johnson Creek oxbow and Errol Creek Confluence restoration site. The scarcity of wetlands along Johnson Creek makes it important. This wetland and associated upland provide a biological and hydrological link to the creek corridor. The wetland provides habitat for redwing blackbirds, common yellowthroats, and other wildlife species. It also provides stormwater retention, groundwater recharge, and water quality filtration to the adjacent Tideman Johnson Natural Area and Johnson Creek.

Special status bird species observed in or adjacent to this resource site include bald eagle, black-throated gray warbler, brown creeper, bushtit, downy woodpecker, great blue heron, green heron, hooded merganser, varied thrush, Vaux's swift, western wood-pewee, white-breasted nuthatch, Wilson's warbler, and wood duck.

Table B: Quality of Natural Resource Functions in Resource Site JC6				
Resource Site (acres) = 10				
	Class 1/A	Class 2/B	Class 3/C	Total
Riparian Corridors*				
acres	7.7	0.7	0.0	8.5
percent total inventory site area	78.9%	7.1%	0.4%	86.4%
Wildlife Habitat*				
acres	0.0	8.2	0.0	8.2
percent total inventory site area	0.0%	83.7%	0.0%	83.7%
Special Habitat Areas**				
acres	7.3			
percent total inventory site area	74.7%			
Combined Total*				
acres	7.7	0.7	0.0	8.5
percent total inventory site area	78.9%	7.5%	0.0%	86.4%
* Class I riparian resources, Special Habitat Areas, and wildlife habitat include open water. ** Metro Title 13 designated all Special Habitat Areas as Class I riparian corridors. +Because riparian resources, Special Habitat Areas, and wildlife Habitat overlap, the results cannot be added together to determine the combined results.				

Stormwater runs off impervious surfaces (e.g., rooftops, driveways, parking areas, streets, etc..) rapidly. Without a place to retain the water (such as wetlands or adequate stormwater facilities), stormwater runoff results in spikes in stream levels which can cause or exacerbate flooding and increase stream erosion. In addition, when water runs off quickly, it does not have a chance to infiltrate and recharge streams or aquifers to provide water during drier periods.

The type and capacity of stormwater facilities to manage the runoff from impervious surfaces varies in the city, affecting the local rate and amount of runoff, and the amount of pollutants in the water. Much of the city was developed prior to any stormwater regulations and receives limited or no management prior to discharging to pipes and surface waters.

Table C shows the total amount of impervious area within the resource site and how much of that impervious area lacks stormwater management; the percentage of total impervious area that is not managed is called “effective impervious area.” The higher the percent of effective impervious area in a watershed, the greater the negative impacts of stormwater runoff to streams. Stream science indicates that when effective impervious area reaches 10% of a watershed, negative stream impacts become significant; and at 25%, these impacts on waterways can be substantial. An additional consideration is the differences in soil conditions and other factors that influence the ability of pervious areas to retain, infiltrate or filter pollutants from stormwater. For example, a mature forest is much more effective in managing stormwater than a manicured lawn; both areas would have a lower effective impervious surface percentage than a developed site, but they have different outcomes for stormwater management.

For Resource Area JC6, 3% of the total area is effectively impervious. This indicates a significant degree of stormwater management and/or existing natural resources that should be preserved. Areas with very low impervious cover and existing vegetation are more likely to be functioning properly to support biologic systems.

Table C. Impervious Area within Resource Site JC6			
Total area (acres)	Total impervious Area (acres)	Total unmanaged impervious area* (acres)	Percent of resource site that is effectively impervious
10	0.4	0.3	3%

*Total unmanaged impervious area refers to the number of acres within a resource area that receives no formal stormwater management measures to regulate flow or treat pollutants before they reach surface waters, also referred to as effective impervious area.

Metro Title 13 and Oregon Goal 5 Compliance

The following information supplements evaluation of natural resource protections presented in Volume 4 and supports compliance with Metro Title 13 and Oregon Plan Goal 5.

Title 13 Habitat Conservation Areas

Map G presents the Habitat Conservation Areas (HCA) within the Resource site JC6. Natural resources should be protected within HCA as follows:

1. *Strictly limit or limit* conflicting uses within Class I/High Rank Riparian Areas in all Urban Development Areas.
2. *Strictly limit or limit* conflicting uses within Class II/Medium Rank Riparian Areas within Moderate and Low Value Urban Development Area as well as parks and open spaces.
3. *Strictly limit or limit* conflicting uses within Class A/High or B/Medium Rank Wildlife Habitat within parks and open spaces.
4. *Allow* conflicting uses or conducted a local Goal 5 ESEE for Class III/Low Rank Riparian Areas in all Urban Development Areas.
5. *Allow* conflicting uses or conducted a local Goal 5 ESEE for Class A/High, Class B/Medium or Class C/Low Rank Wildlife Habitat in all Urban Development Area, except parks and open space.

Strictly limiting or limiting conflicting uses in HCA will protect and conserve existing streams and wetlands to maintain significant natural resource functions including: microclimate and shade; stream flow moderation and water storage; bank function and sediment, pollution and nutrient control; large wood and channel dynamics; organic inputs, food web and nutrient cycling; and fish and wildlife habitat. *Strictly limiting or limiting* conflicting uses in HCA will allow for additional urban development that is sensitive to the natural resource features and requires mitigation for unavoidable negative impacts to features and functions. The recommendation will also contribute towards meeting other regulatory requirements including the Metro Title 3, Water Quality and Flood Management; Oregon Goal 6, Air, Water and Land Resources Quality; Oregon Goal 7, Areas Subject to Natural Hazards; the Clean Water Act; and the Endangered Species Act.

Goal 5 Significant Natural Resources

Resource site JC6 contains natural resource features that are not a Title 13 HCA and are therefore subject to Statewide Planning Goal 5 OAR 660-023-0110. The General ESEE analysis, Volume 4, describes the conflicting uses and provides an overarching analysis of the economic, social, environmental and energy consequences of prohibiting, limiting or allowing the conflicting uses within areas of significant natural resources. In addition to the General ESEE analysis, the following resource site-specific consequences are considered.

The common impacts of conflicting uses in the resource site include clearing vegetation; grading activities and soil compaction; adding impervious surface; modifying streams, wetlands and flood areas; generating pollution; landscaping with non-native or invasive vegetation; building fences or other wildlife barriers; and other impacts such as noise, light, litter and pets.

Within the resource site residential uses are allowed outright or conditionally in the R10 and R5 base zones. Open Space uses are allowed in the OS base zone. Development of new uses may involve vegetation clearing, grading, filing, and soil compaction, as well as the addition of impervious surfaces/paving and landscaping with non-native plants, with associated impacts on the natural resources. Basic utilities and other infrastructure are allowed in all base zones. New or upgraded utility corridors may be cleared of vegetation and may fragment wildlife habitat.

The analysis of economic, social, environmental and energy consequences provided in Volume 4 is confirmed for resource site JC6, with the following additional information that clarifies the analysis.

Strictly limiting or limiting conflicting uses would retain the wildlife habitat functions provided by significant natural resource features including maintaining habitat for at risk plant, fish and wildlife species, and maintaining the stormwater management and air-cooling functions of the tree canopy. Mitigation for negative consequences of additional development in areas of Class A or Class B wildlife habitat should be required.

Natural Resources Protection Decisions

Based on the analysis presented in Volume 3, Natural Resources Inventory, Volume 4, Title 13 and Goal 5 Compliance, and the resource site-specific evaluation for JC6, the following decisions are applied to protect the significant riparian corridors and wildlife habitat:

1. Apply a protection overlay zone ('p' zone) to stream channels from top-of-bank to top-of-bank, wetlands and land within 50 feet of stream top-of-bank or 30 feet of wetlands.
2. Apply a conservation overlay zone ('c' zone) to areas of forest or woodland vegetation contiguous to but more than 50 feet from stream top-of-bank and areas of forest or woodland vegetation contiguous to but more than 30 feet from wetlands.
3. Allow conflicting uses within all other areas containing significant natural resources.

Resource Site No.: JC7 Resource Site Name: Oxbow and Errol Creek

Previous Plan: Johnson Creek Basin Protection Plan

Previous Resource Site No.: 7

The results of the analysis found in Volume 3, Natural Resources Inventory, Volume 4, Title 13 and Goal 5 Compliance, and the resource site-specific evaluation, are presented in the following maps:

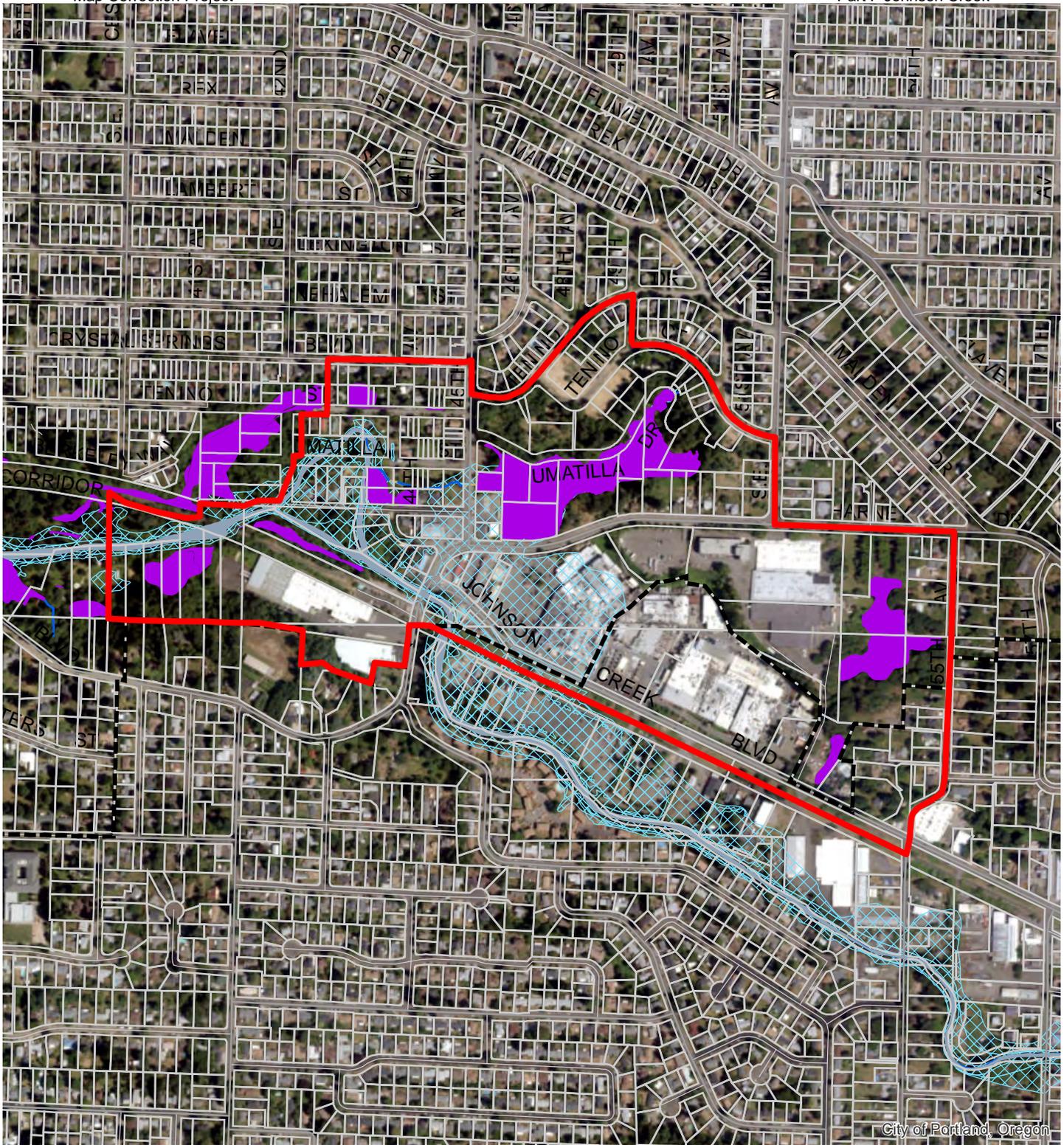
- A. Water Features – rivers, streams, wetlands and flood areas
- B. Land Features – forest, woodland, shrubland and herbaceous vegetation, steep slopes
- C. Special Habitat Areas
- D. Riparian Corridor Classifications
- E. Wildlife Habitat Classifications
- F. Urban Development Value
- G. Metro Title 13 Habitat Conservation Areas
- H. Statewide Planning Goal 5 Areas
- I. Recommended Natural Resource Protections

Following the maps, additional information about existing natural resource features and functions in the resource site is presented.

Implementation of the results is found in Volume 1, Part B, updates to zoning maps and zoning code.

Resource site JC7 includes the following:

Site (acres)	97.9
Base zone (acres)	
CE	3.4
IG1	6.3
IG2	27.1
OS	32.4
R10	2.4
R5	15.5
R7	6.5
RM1	4.4



City of Portland, Oregon

Map A: Water Features

Resource Site: JC7

Updated: July 2021



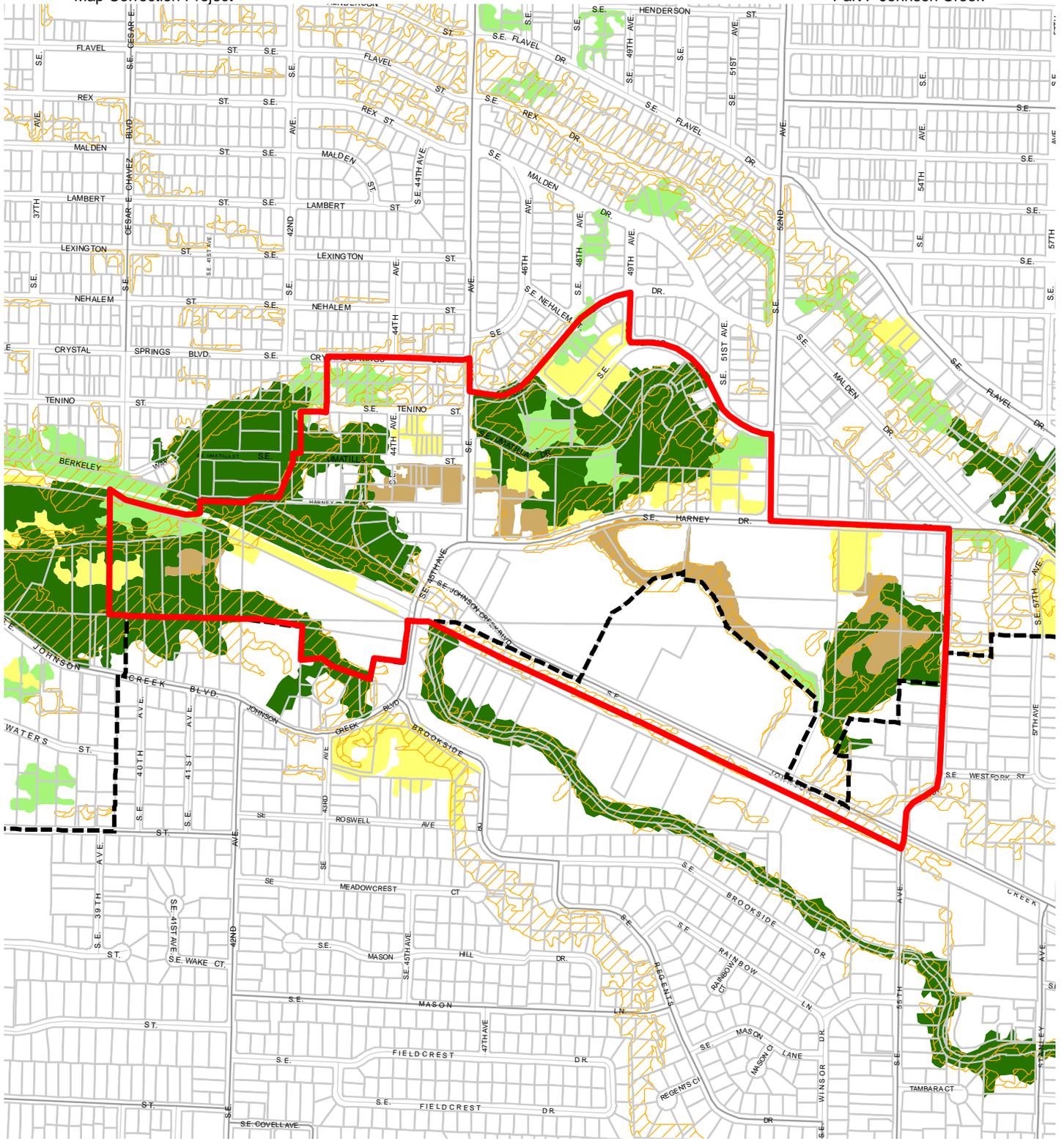
0 355 710 Feet

Proposed Draft - As Amended

- Resource Sites
- Urban Service Boundary
- Taxlots
- Wetlands
- Rivers
- Open stream channel
- Piped Stream Segment
- Flood Area



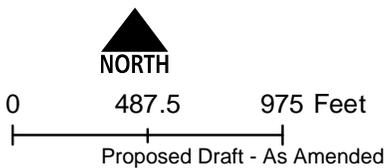
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**Map B: Vegetation and
Steep Slopes**

**Resource Site:
JC7**

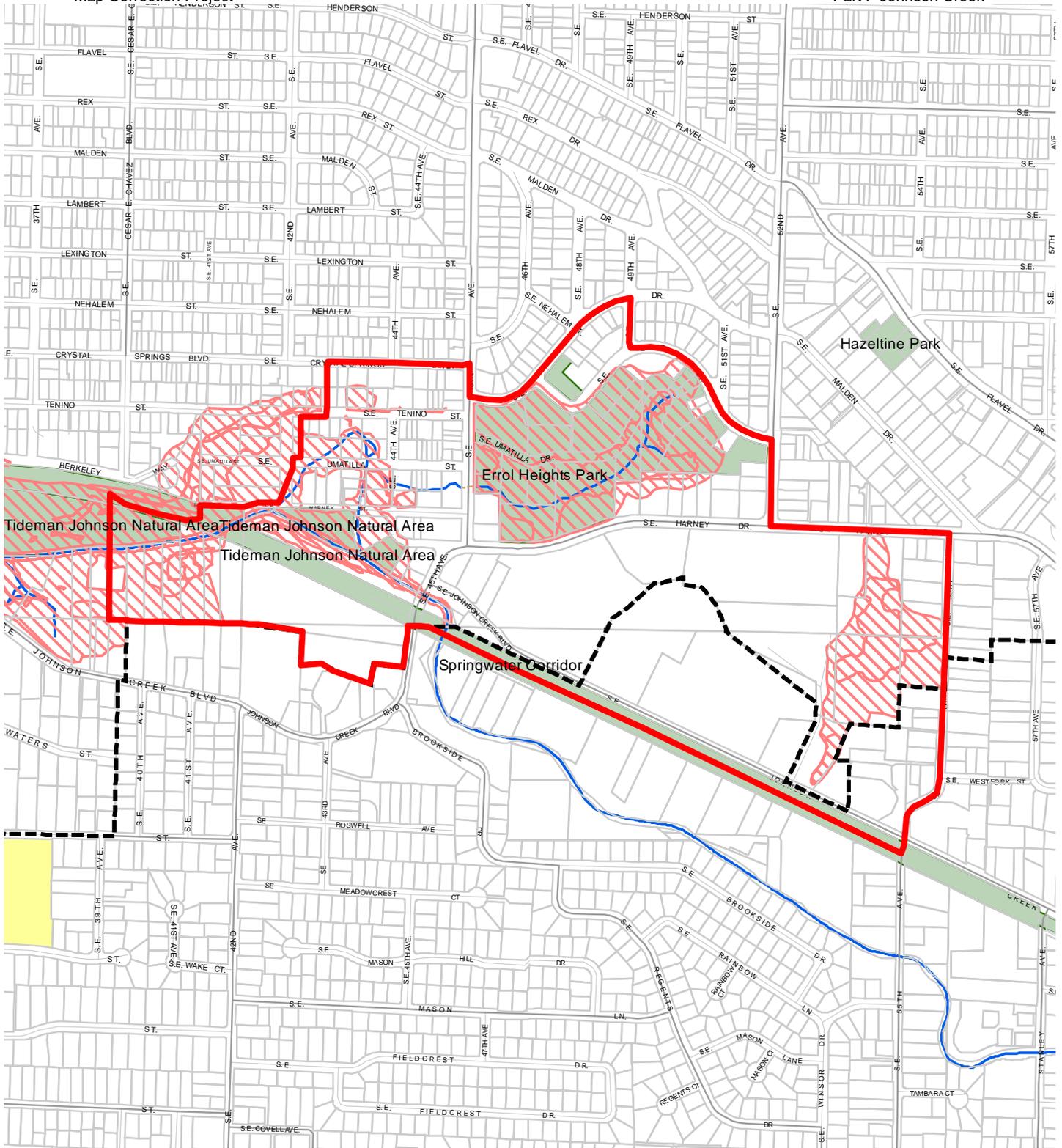
Updated: July 2021



- Resource Sites
- Urban Service Boundary
- Taxlots
- Slopes >25%
- Forest
- Woodland
- Shrubland
- Herbaceous



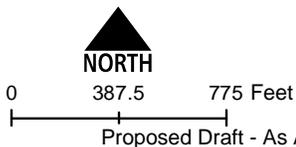
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**Map C: Special
Habitat Areas**

**Resource Site:
JC7**

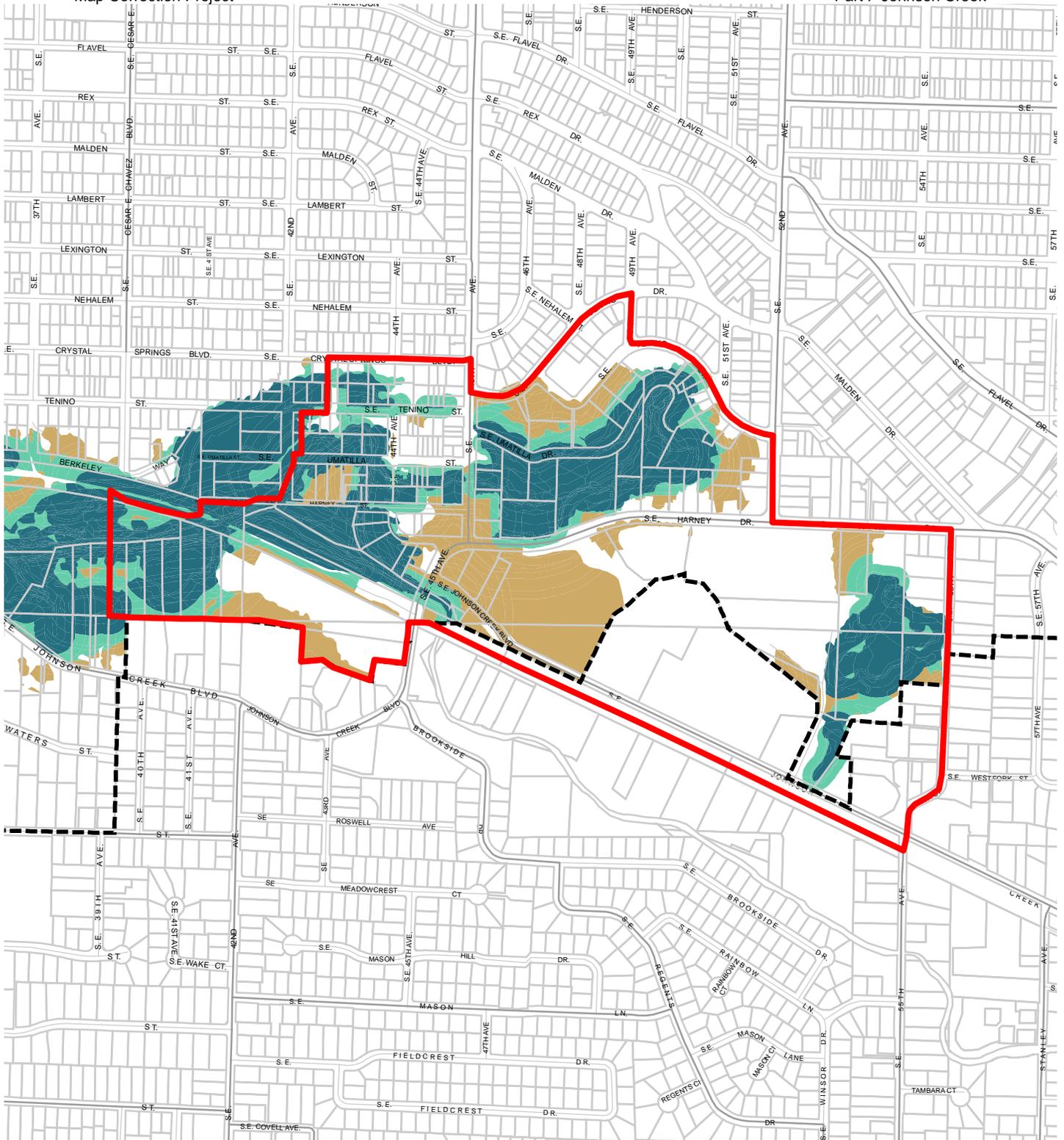
Updated: June 2021



- Resource Sites
- Special Habitat Areas (SHAs)
- Open Stream Channel
- Piped Stream Segment
- Parks
- Schools
- Urban Service Boundary
- Taxlots



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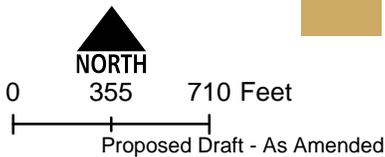


**Map D: Riparian
Corridors Habitat
Classification**

**Resource Site:
JC7**

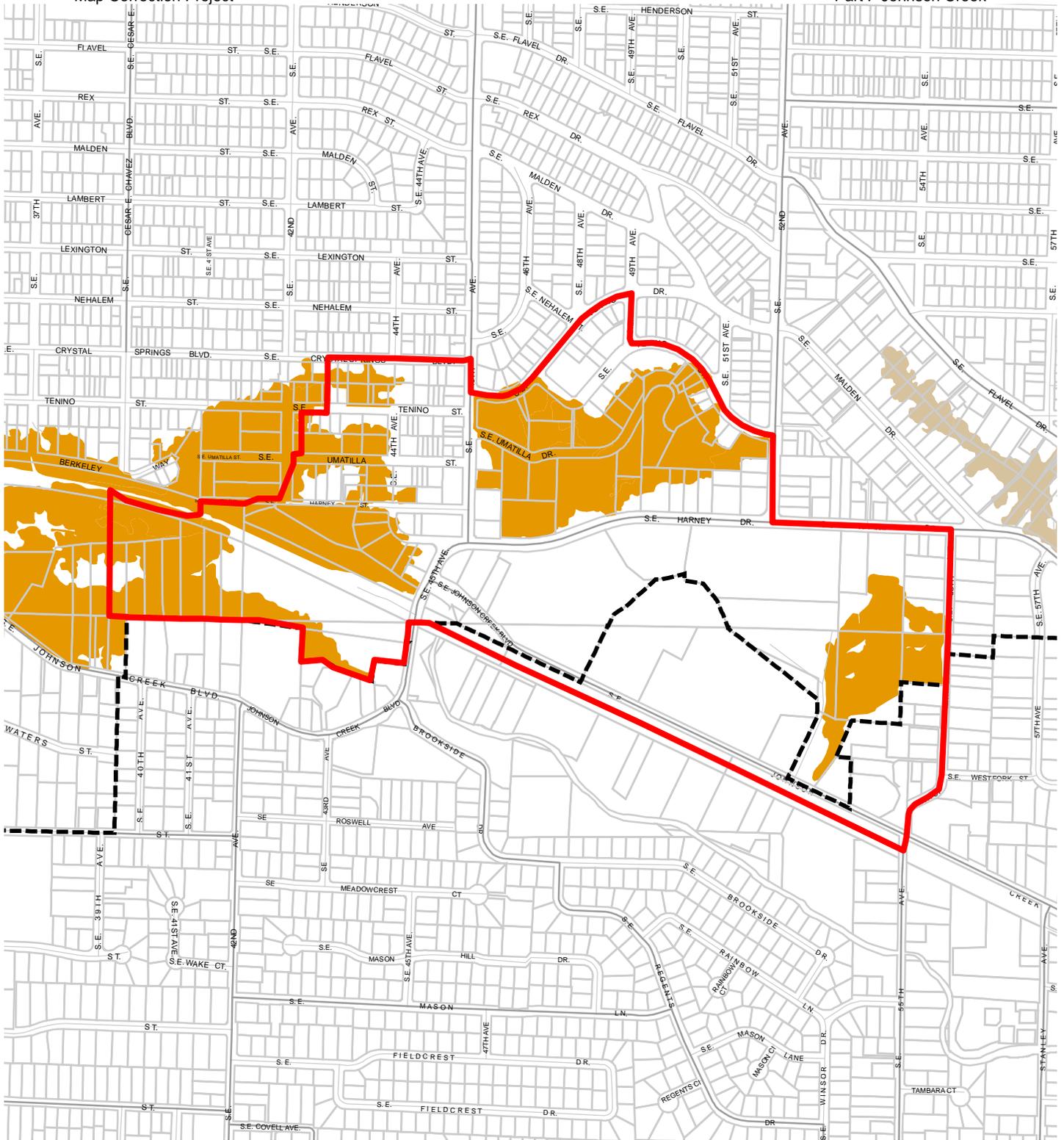
Updated: July 2021

- Resource Sites
- Urban Service Boundary
- Class I (high rank)
- Class II (medium rank)
- Class III (low rank)
- Taxlots



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**Map E: Wildlife
Habitat Classification
Resource Site:
JC7**

Updated: July 2021

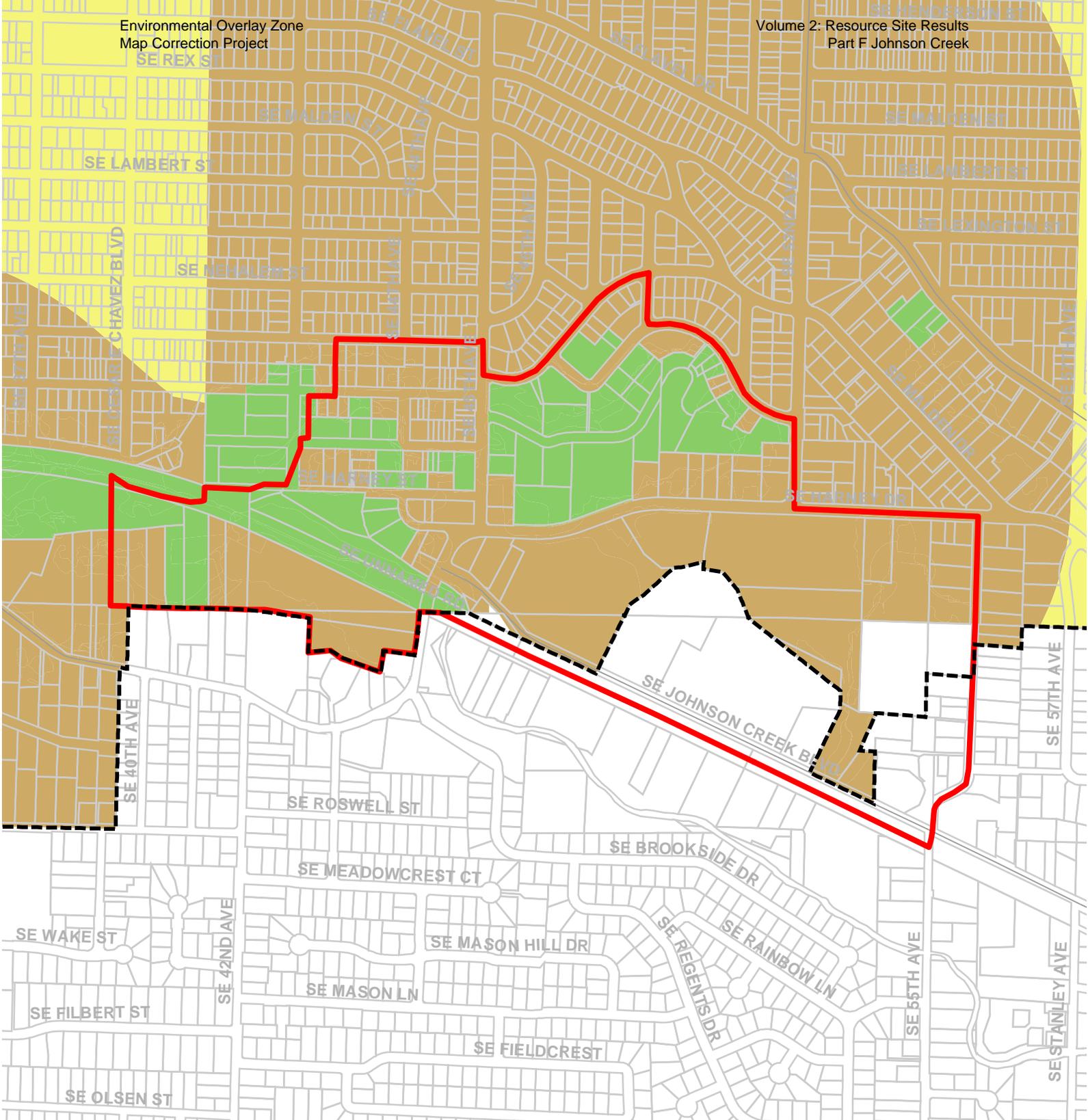


Proposed Draft - As Amended

-  Resource Sites
-  Class A (high rank)
-  Class B (medium rank)
-  Class C (low rank)
-  Urban Service Boundary
-  Taxlots



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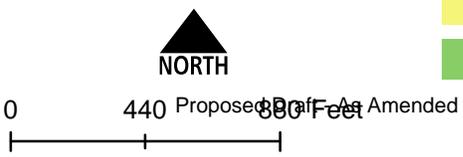


Map F: Urban Development Value (Title 13)
Resource Site: JC7

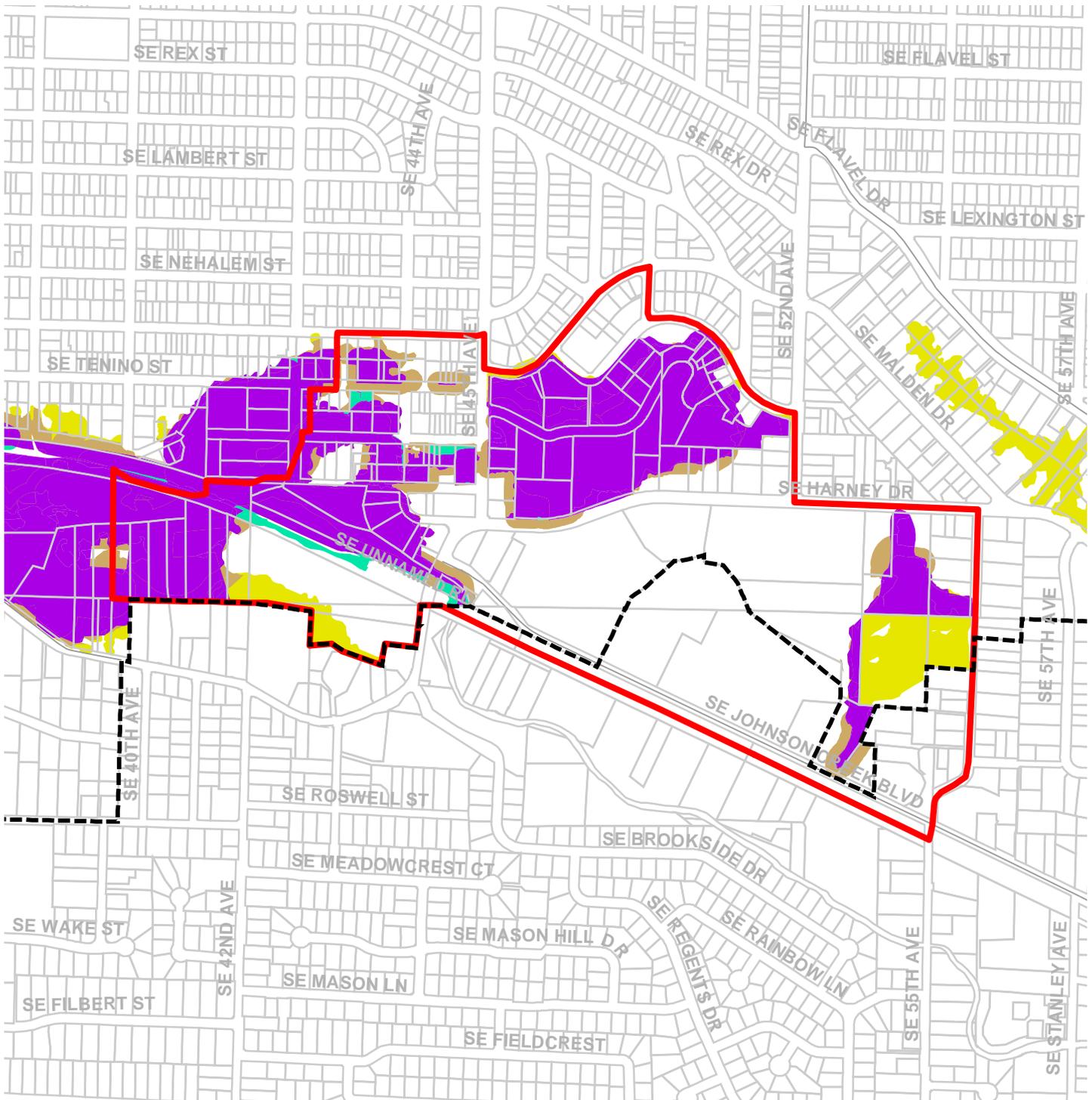
-  Urban Service Boundary
-  Resource Sites
-  High Development Value
-  Medium Development Value
-  Low Development Value
-  Parks



Updated: July 2021



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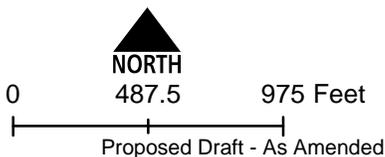


Map G: Title 13 Habitat Conservation Areas (HCA) and Goal 5 Areas

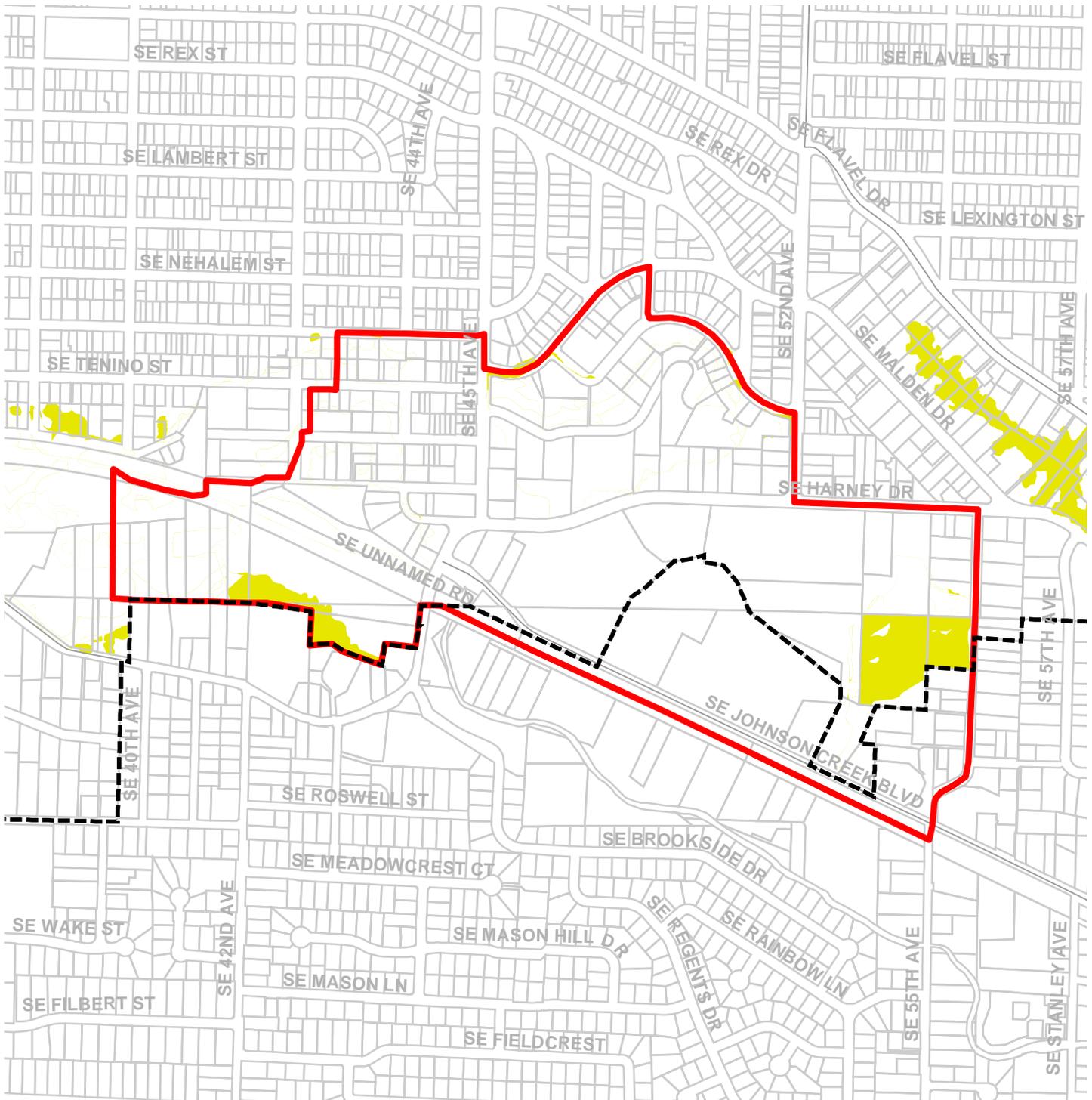
Resource Site: JC7

Updated: July 2021

-  Urban Service Boundary
-  Resource Sites
-  HCA High Value
-  HCA Moderate Value
-  HCA Low Value
-  Goal 5 Significant Natural Resources



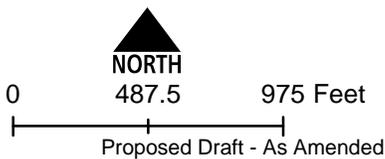
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Map H: Goal 5 Resources

Resource Site: JC7

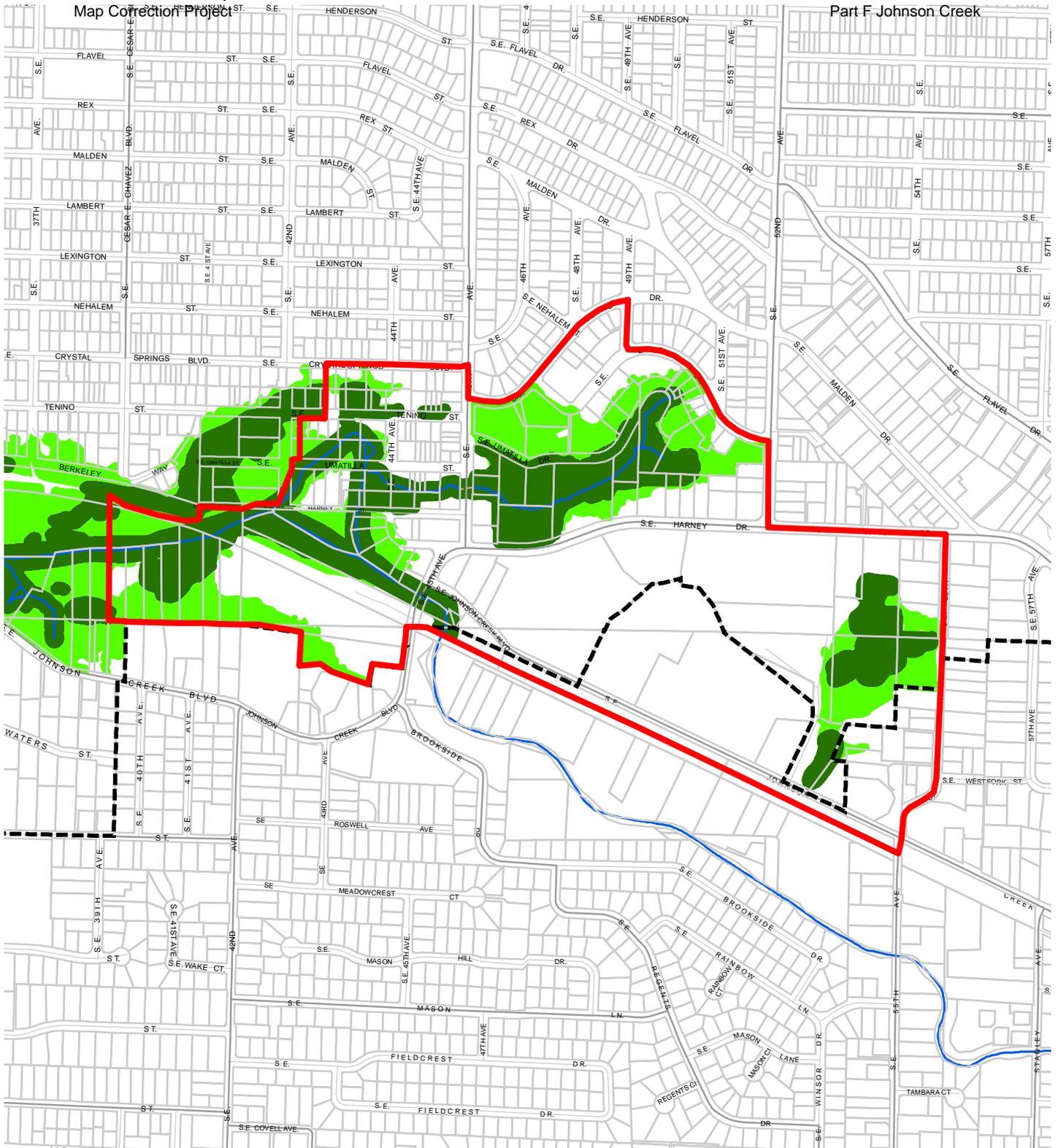
Updated: July 2021



- Urban Service Boundary
- ▭ Resource Sites
- Goal 5 Significant Natural Resources



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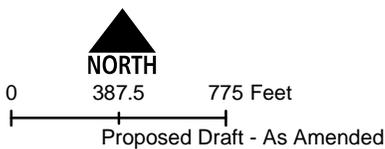


Map I: DRAFT Proposed Environmental Overlay Zones

**Resource Site:
JC7**

Updated: July 2021

- Resource Sites
- Open Stream Channel
- Urban Service Boundary
- Taxlots
- Piped Stream Segment
- Proposed Conservation Zone
- Proposed Protection Zone



The information on the map was derived from digital databases. Care was taken in the creation of this map but it is provided "as is". The City of Portland ensures meaningful access to city programs, services, and activities to comply with Civil Rights Title VI and ADA Title II laws and reasonably provides: translation, interpretation, modifications, accommodations, alternative formats, auxiliary aids and services. To request these services, contact 503-823-7700, City TTY 503-823-6868, Relay Service: 711.

Natural Resource Description

Within resource site JC7 the following significant natural resource features and functions are present:

Significant Riparian Corridor Features: open stream; wetland; flood area; land within 50 feet of waterbodies; forest, woodland, shrubland and herbaceous vegetation within 300 feet of waterbodies; and forest vegetation on steep slopes (>25% slope) contiguous to and within 780 feet of waterbodies.

Significant Wildlife Habitat Features: forest patches, and associated and contiguous wetlands, two acres in size or larger.

Special Habitat Areas: Tideman Johnson Natural Area (S, W, B, M, C); Errol Heights Wetlands (W, B, M); SE 55th and Harney Wetland (W, M, C); Johnson Creek (S, C)

Riparian Corridor Functions: microclimate and shade; stream flow moderation and water storage; bank function and sediment, pollution and nutrient control; large wood and channel dynamics; organic inputs, food web and nutrient cycling; and riparian wildlife movement corridor.

Wildlife Habitat Functions: interior area; food and water; resting, denning, nesting and rearing; movement and migration; reduction of noise, light and vibration; and habitat patches that support special status fish and wildlife species.

Table A: Quantity of Natural Resource Features in Resource Site		JC7
		Study Area
Stream (Miles)		1.0
Wetlands (acres)		9.9
Vegetated Areas >= 1/2 acre (acres)		
	Forest (acres)	29.4
	Woodland (acres)	6.0
	Shrubland (acres)	6.5
	Herbaceous (acres)	8.2
Flood Area*		
	Vegetated (acres)	9.7
	Non-vegetated (acres)	13.0
Steep Slopes (acres)**		25.3
* The flood area includes the FEMA 100-year flood plain plus the adjusted 1996 flood inundation area.		
**Slopes are derived from LiDAR. Steep slopes are areas with a slope greater than 25%.		

The resource site slopes from the higher area to the north down to Johnson Creek in the of the site. Land uses are a combination of publicly owned natural areas, low density single-family residential development and commercial and industrial development. Residential neighborhoods are located primarily to the north and west, while commercial and industrial activities are to the east and south. Southeast 45th Avenue. The site includes Errol Creek Park and Highlands, Tideman-Johnson Natural Area, the Errol Confluence Natural Area and the Springwater Corridor Trail.

Johnson Creek flows divide just west of the SE 45th Avenue bridge and converges downstream just before it flows under the Springwater Corridor Trail forming an oxbow with an island that is accessed by a small bridge at SE Harney St. Errol Creek, a spring fed tributary to Johnson Creek, has its confluence on the eastern side of the oxbow. Steep slopes separate the lowland development and natural areas from residential development to the north. Numerous springs form at the base of the escarpment then flow through pipes, ditches, drainageways or stream channels to wetlands, Errol Creek and Johnson Creek.

The resource site contains two major wetlands: Errol Wetland (between SE 52nd and 45th avenues Umatilla Street and Harney Drive) and Flavel Wetland (between SE 52nd, 55th avenues Harney Dr and Johnson Creek Blvd). Both are formed by an escarpment, the base of which is below the ground water table. As a result, numerous cold groundwater seeps feed the wetlands with a consistent, year-round source of water. Both sites have attracted beaver. At Errol Wetland, beaver have created a significant complex with numerous dams. Errol Wetland drains under SE 45th Avenue into Errol Creek. Flavel Wetland drains under s private road into a pipe running beneath the Precision Cast Parts Campus and eventually into the City's stormwater system in SE Harney Drive. Both wetlands provide significant urban habitat for beaver, coyote, amphibians, resident fish, and migratory birds. The oxbow's island also is also wetland and smaller wetlands are found in the resource site.

Vegetation at both sites is undergoing active restoration by the City and local volunteer groups. Plant communities include: skunk cabbage (*Lysichiton americanum*), water ladysthumb (*Polygonum amphibium*), small-fruited balrush (*Scirpus microcarpus*), daggerleaf rush (*Juncus ensifolius*), creeping buttercup (*Ranunculus repens*), soft rush (*Juncus effuses*), stinging nettle (*Urtica dioica*), cow parsnip (*Heracleum lanatun*), and water foxtail (*Alopecurus geniculatus*).

Johnson Creek and its long history of flooding have influenced this site. The site includes a substantial area within the 100-year floodplain, including natural areas commercial, industrial and residential development, and perennial flooding in this area is common. Development and impervious surfaces along Johnson Creek have decrease stream capacity, increased runoff and limited the capacity for local flood management or infiltration. Larger flood events generally occur from December through February, with 85 percent of the stream's runoff occurring between November and March.

In the 1930s, the WPA constructed a bypass channel at the oxbow at this section of the creek, which truncates the oxbow creating an island. The WPA also built a fish ladder and a rock-lined waterfall. The goal of the WPA work was to convey flood flows efficiently downstream. It resulted in a confined channel, which is hydrologically disconnected from adjacent floodplains and wetlands, and exacerbates flooding.

In 2009, BES completed the Errol Creek Confluence Project on this site, vacating part of SE 44th Avenue, removing fish barriers and daylighting the section of Errol Creek that once flowed underneath SE 44th Avenue, in order to improve fish passage between Johnson Creek and Errol Creek. The project moved the confluence of Johnson Creek and Errol Creek to create a new, longer, more sinuous channel in Errol Creek. Part of the old channel remains in place as a backwater channel to provide high flow refuge for fish and flood water storage from Johnson Creek.

The project created about 300 feet of new tributary habitat to increase in-stream complexity and enhanced 1.4-acres of surrounding riparian and floodplain habitat by creating wetland benches and planting native vegetation. Environmental Services installed large wood and root wads to provide floodplain structure and stabilize Errol Creek's banks and its confluence with Johnson Creek. The project also planted native trees, shrubs, and grasses on the site.

The Errol Wetlands, east of SE 45th Avenue, and an extensive upstream spring system feed cool water into Errol Creek year-round. Both the Errol Creek confluence and Errol Wetlands experience significant beaver activity that supports natural wetland functions.

The fish ladder and waterfall attract human visitation. The vegetated riparian areas provide good shading over the creek. There are a few pool habitats and the creek is relatively well shaded, regulating the water temperature, enhancing the habitat for fish, and other aquatic species. Riprapping, steep banks, and human use lessen the wildlife habitat use of this stretch of the creek.

In Johnson Creek, warm stream temperatures in the summer and high velocity stream flows in the winter make it difficult for juvenile salmon to survive. But Errol Creek's abundant, cool spring water near Johnson Creek is ideal summer and winter refuge and rearing habitat for , Chinook and coho salmon, and steelhead and cutthroat trout. Coho salmon, Chinook salmon, steelhead trout, and Pacific lamprey are documented within this reach of Johnson Creek. In 2019, a study of Johnson Creek's potential to support salmon populations identified this area as high priority for habitat restoration and protection for coho salmon.

Special status bird species observed in or adjacent to this resource site include bald eagle, black-throated gray warbler, brown creeper, bufflehead, bushtit, downy woodpecker, great blue heron,

green heron, hooded merganser, varied thrush, Vaux's swift, western wood-pewee, white-breasted nuthatch, Wilson's warbler, and wood duck.

Table B: Quality of Natural Resource Functions in Resource Site JC7				
Resource Site (acres) = 98				
	Class 1/A	Class 2/B	Class 3/C	Total
Riparian Corridors*				
acres	30.7	11.0	20.8	62.4
percent total inventory site area	31.3%	11.2%	21.2%	63.7%
Wildlife Habitat*				
acres	0.0	37.7	0.0	37.7
percent total inventory site area	0.0%	38.5%	0.0%	38.5%
Special Habitat Areas**				
acres	32.8			
percent total inventory site area	33.5%			
Combined Total*				
acres	30.7	15.7	16.2	62.5
percent total inventory site area	31.3%	16.0%	16.5%	63.8%
* Class I riparian resources, Special Habitat Areas, and wildlife habitat include open water. ** Metro Title 13 designated all Special Habitat Areas as Class I riparian corridors. +Because riparian resources, Special Habitat Areas, and wildlife Habitat overlap, the results cannot be added together to determine the combined results.				

Stormwater runs off impervious surfaces (e.g., rooftops, driveways, parking areas, streets, etc..) rapidly. Without a place to retain the water (such as wetlands or adequate stormwater facilities), stormwater runoff results in spikes in stream levels which can cause or exacerbate flooding and increase stream erosion. In addition, when water runs off quickly, it does not have a chance to infiltrate and recharge streams or aquifers to provide water during drier periods.

The type and capacity of stormwater facilities to manage the runoff from impervious surfaces varies in the city, affecting the local rate and amount of runoff, and the amount of pollutants in the water. Much of the city was developed prior to any stormwater regulations and receives limited or no management prior to discharging to pipes and surface waters.

Table C shows the total amount of impervious area within the resource site and how much of that impervious area lacks stormwater management; the percentage of total impervious area that is not managed is called "effective impervious area." The higher the percent of effective impervious area in a watershed, the greater the negative impacts of stormwater runoff to streams. Stream science indicates that when effective impervious area reaches 10% of a

watershed, negative stream impacts become significant; and at 25%, these impacts on waterways can be substantial. An additional consideration is the differences in soil conditions and other factors that influence the ability of pervious areas to retain, infiltrate or filter pollutants from stormwater. For example, a mature forest is much more effective in managing stormwater than a manicured lawn; both areas would have a lower effective impervious surface percentage than a developed site, but they have different outcomes for stormwater management.

For Resource Area JC7, 10.2% of the total area is effectively impervious.

Table C. Impervious Area within Resource Site JC7			
Total area (acres)	Total impervious Area (acres)	Total unmanaged impervious area* (acres)	Percent of resource site that is effectively impervious
126	13.5	12.9	10.2%

*Total unmanaged impervious area refers to the number of acres within a resource area that receives no formal stormwater management measures to regulate flow or treat pollutants before they reach surface waters, also referred to as effective impervious area.

Metro Title 13 and Oregon Goal 5 Compliance

The following information supplements evaluation of natural resource protections presented in Volume 4 and supports compliance with Metro Title 13 and Oregon Plan Goal 5.

Title 13 Habitat Conservation Areas

Map G presents the Habitat Conservation Areas (HCA) within the Resource site JC7. Natural resources should be protected within HCA as follows:

1. *Strictly limit* or *limit* conflicting uses within Class I/High Rank Riparian Areas in all Urban Development Areas.
2. *Strictly limit* or *limit* conflicting uses within Class II/Medium Rank Riparian Areas within Moderate and Low Value Urban Development Area as well as parks and open spaces.
3. *Strictly limit* or *limit* conflicting uses within Class A/High or B/Medium Rank Wildlife Habitat within parks and open spaces.
4. *Allow* conflicting uses or conducted a local Goal 5 ESEE for Class III/Low Rank Riparian Areas in all Urban Development Areas.
5. *Allow* conflicting uses or conducted a local Goal 5 ESEE for Class A/High, Class B/Medium or Class C/Low Rank Wildlife Habitat in all Urban Development Area, except parks and open space.

Strictly limiting or limiting conflicting uses in HCA will protect and conserve existing streams and wetlands to maintain significant natural resource functions including: microclimate and shade; stream flow moderation and water storage; bank function and sediment, pollution and nutrient control; large wood and channel dynamics; organic inputs, food web and nutrient cycling; and fish and wildlife habitat. *Strictly limiting or limiting* conflicting uses in HCA will allow for additional urban development that is sensitive to the natural resource features and requires mitigation for unavoidable negative impacts to features and functions. The recommendation will also contribute towards meeting other regulatory requirements including the Metro Title 3, Water Quality and Flood Management; Oregon Goal 6, Air, Water and Land Resources Quality; Oregon Goal 7, Areas Subject to Natural Hazards; the Clean Water Act; and the Endangered Species Act.

Goal 5 Significant Natural Resources

Resource site JC7 contains natural resource features that are not a Title 13 HCA and are therefore subject to Statewide Planning Goal 5 OAR 660-023-0110. The General ESEE analysis, Volume 4, describes the conflicting uses and provides an overarching analysis of the economic, social, environmental and energy consequences of prohibiting, limiting or allowing the conflicting uses within areas of significant natural resources. In addition to the General ESEE analysis, the following resource site-specific consequences are considered.

The common impacts of conflicting uses in the resource site include clearing vegetation; grading activities and soil compaction; adding impervious surface; modifying streams, wetlands and flood areas; generating pollution; landscaping with non-native or invasive vegetation; building fences or other wildlife barriers; and other impacts such as noise, light, litter and pets.

Within the resource site residential uses are allowed outright or conditionally in the R10, R5 and R2 base zones. Industrial uses are allowed in the IG1 base zone. Commercial uses are allowed in the CE base zone. Open Space uses are allowed in the OS base zone. Development of new uses may involve vegetation clearing, grading, filling, and soil compaction, as well as the addition of impervious surfaces and landscaping with non-native plants, with associated impacts on the natural resources. Basic utilities and other infrastructure are allowed in all base zones. New or upgraded utility corridors may be cleared of vegetation and may fragment wildlife habitat.

The analysis of economic, social, environmental and energy consequences provided in Volume 4 is confirmed for resource site JC7, with the following additional information that clarifies the analysis.

Strictly limiting or limiting conflicting uses would retain the wildlife habitat functions provided by significant natural resource features including maintaining habitat for at risk plant, fish and wildlife species, maintaining vegetation on steep slopes, and maintaining the stormwater management and air-cooling functions of the tree canopy. Mitigation for negative

consequences of additional development in areas of Class A or Class B wildlife habitat should be required.

Natural Resources Protection Decisions

Based on the analysis presented in Volume 3, Natural Resources Inventory, Volume 4, Title 13 and Goal 5 Compliance, and the resource site-specific evaluation for JC7, the following decisions are applied to protect the significant riparian corridors and wildlife habitat:

1. Apply a protection overlay zone ('p' zone) to stream channels from top-of-bank to top-of-bank, wetlands and land within 50 feet of stream top-of-bank or 30 feet of wetlands.
2. Apply a conservation overlay zone ('c' zone) to areas of forest or woodland vegetation contiguous to but more than 50 feet from stream top-of-bank, and areas of forest or woodland vegetation contiguous to but more than 30 feet from wetlands.
3. Allow conflicting uses within all other areas containing significant natural resources.

Note – The ESEE decisions only apply within the city limits or in areas where Portland has planning authority. Portions of Resource Site JC7 are outside of Portland's jurisdiction.

Note – There is no Resource Site JC8. The resource site numbering in the Ezone Map Correction Project skips from JC7 to JC9.

The original Johnson Creek Basin Protection Plan included a resource site 8; but it is located outside City of Portland's city limits and urban service boundary, where the City of Portland has no planning authority over the land and water. Therefore, the resource site is being eliminated from the Ezone Map Correction Project.

Resource Site No.: JC9 Resource Site Name: 77th – 85th Ave. Unit

Previous Plan: Johnson Creek Basin Protection Plan

Previous Resource Site No.: 9/10

The results of the analysis found in Volume 3, Natural Resources Inventory, Volume 4, Title 13 and Goal 5 Compliance, and the resource site-specific evaluation, are presented in the following maps:

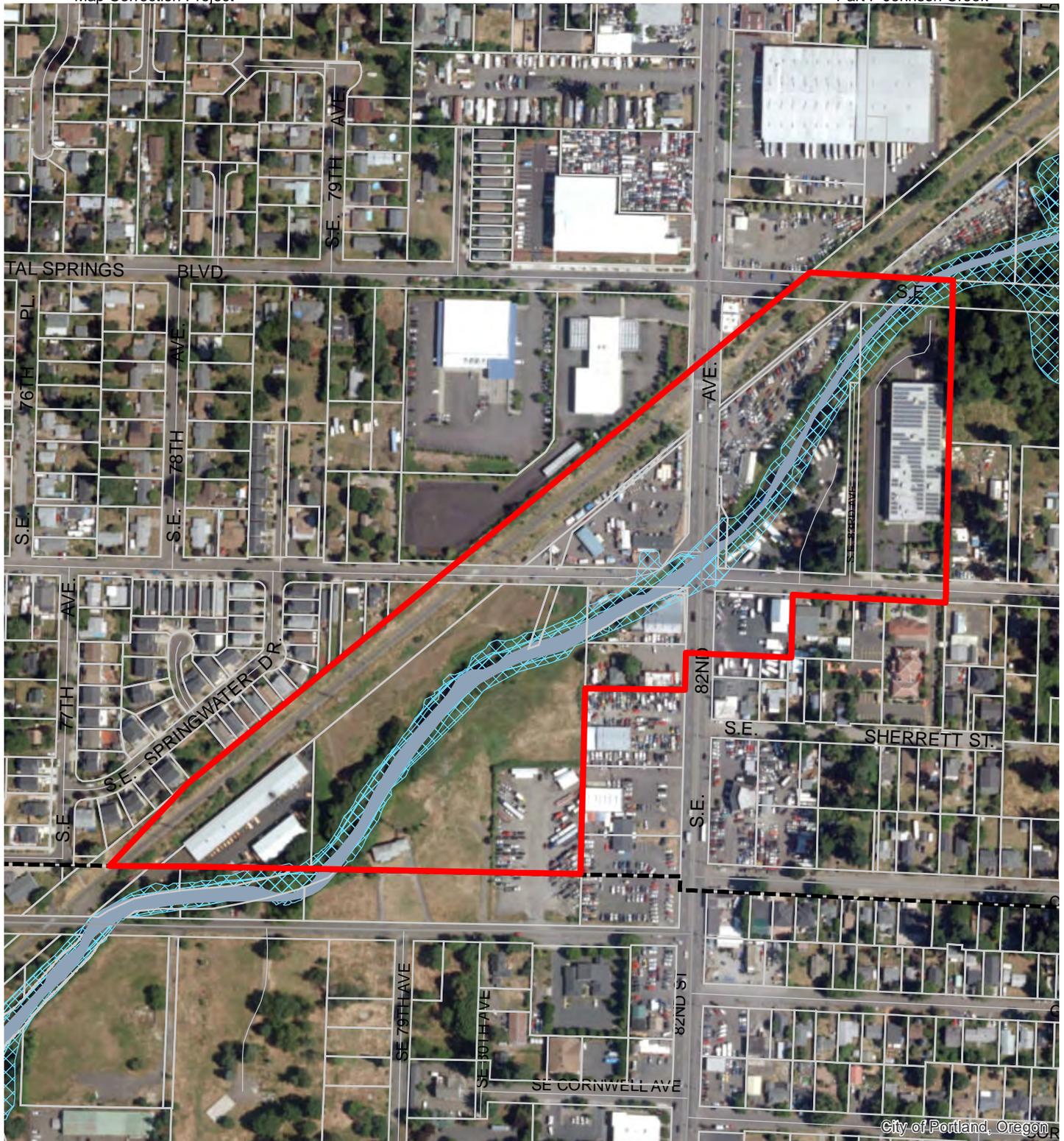
- A. Water Features – rivers, streams, wetlands and flood areas
- B. Land Features – forest, woodland, shrubland and herbaceous vegetation, steep slopes
- C. Special Habitat Areas
- D. Riparian Corridor Classifications
- E. Wildlife Habitat Classifications
- F. Urban Development Value
- G. Metro Title 13 Habitat Conservation Areas
- H. Statewide Planning Goal 5 Areas
- I. Recommended Natural Resource Protections

Following the maps, additional information about existing natural resource features and functions in the resource site is presented.

Implementation of the results is found in Volume 1, Part B, updates to zoning maps and zoning code.

Resource site JC9 includes the following:

Site (acres)	23.6
Base zones (acres)	
EG2	17.1
IG2	<1
OS	4.6
R7	<1
RM1	0.1
RMP	1.8



Map A: Water Features

Resource Site: JC9

Updated: July 2021



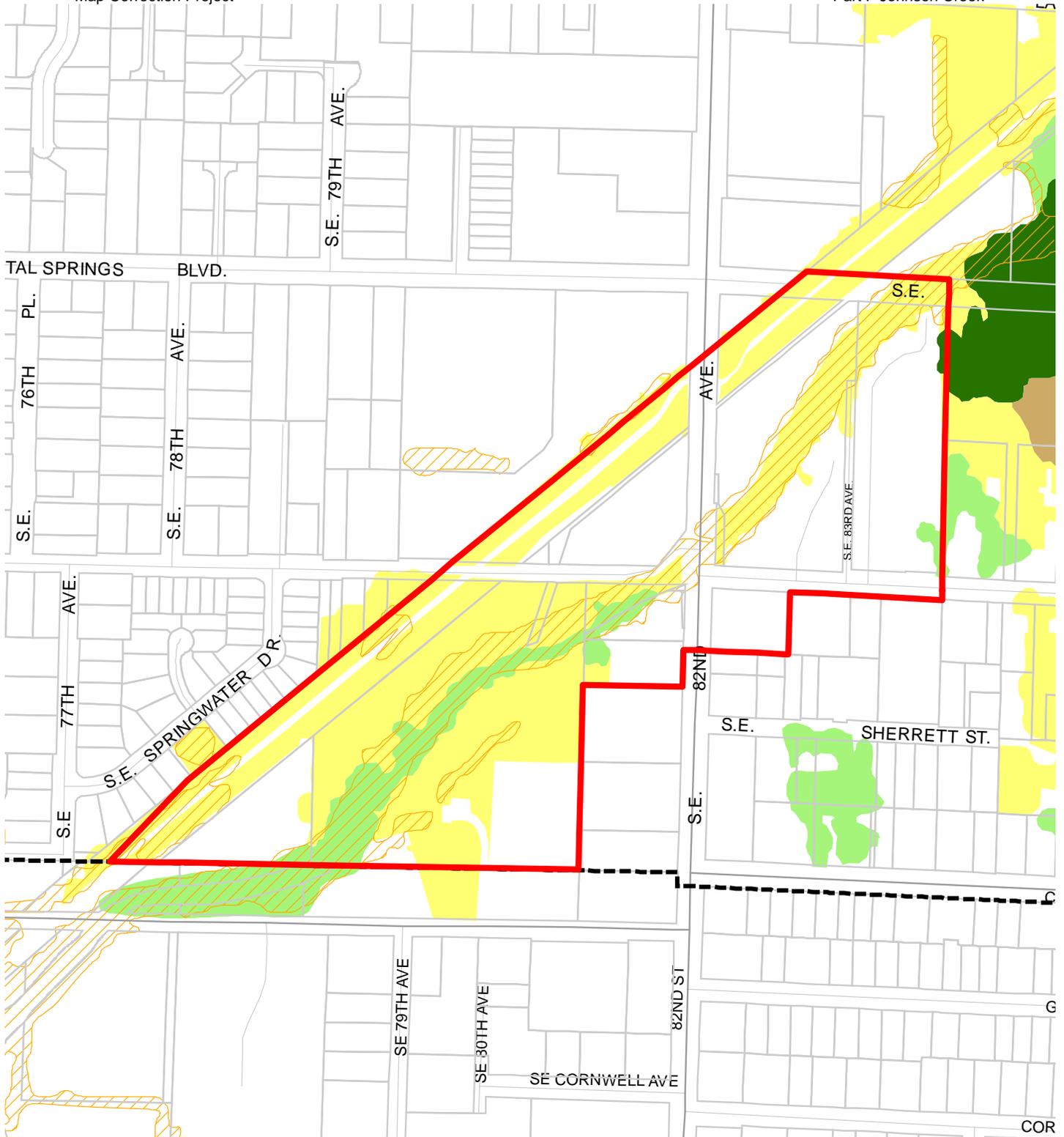
0 160 320 Feet

Proposed Draft - As Amended

- Resource Sites
- Urban Service Boundary
- Taxlots
- Wetlands
- Rivers
- Open stream channel
- Piped Stream Segment
- Flood Area



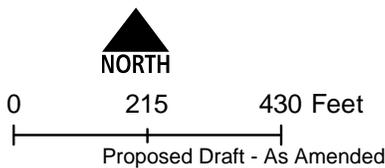
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July 2021



Map B: Vegetation and Steep Slopes

Resource Site: JC9

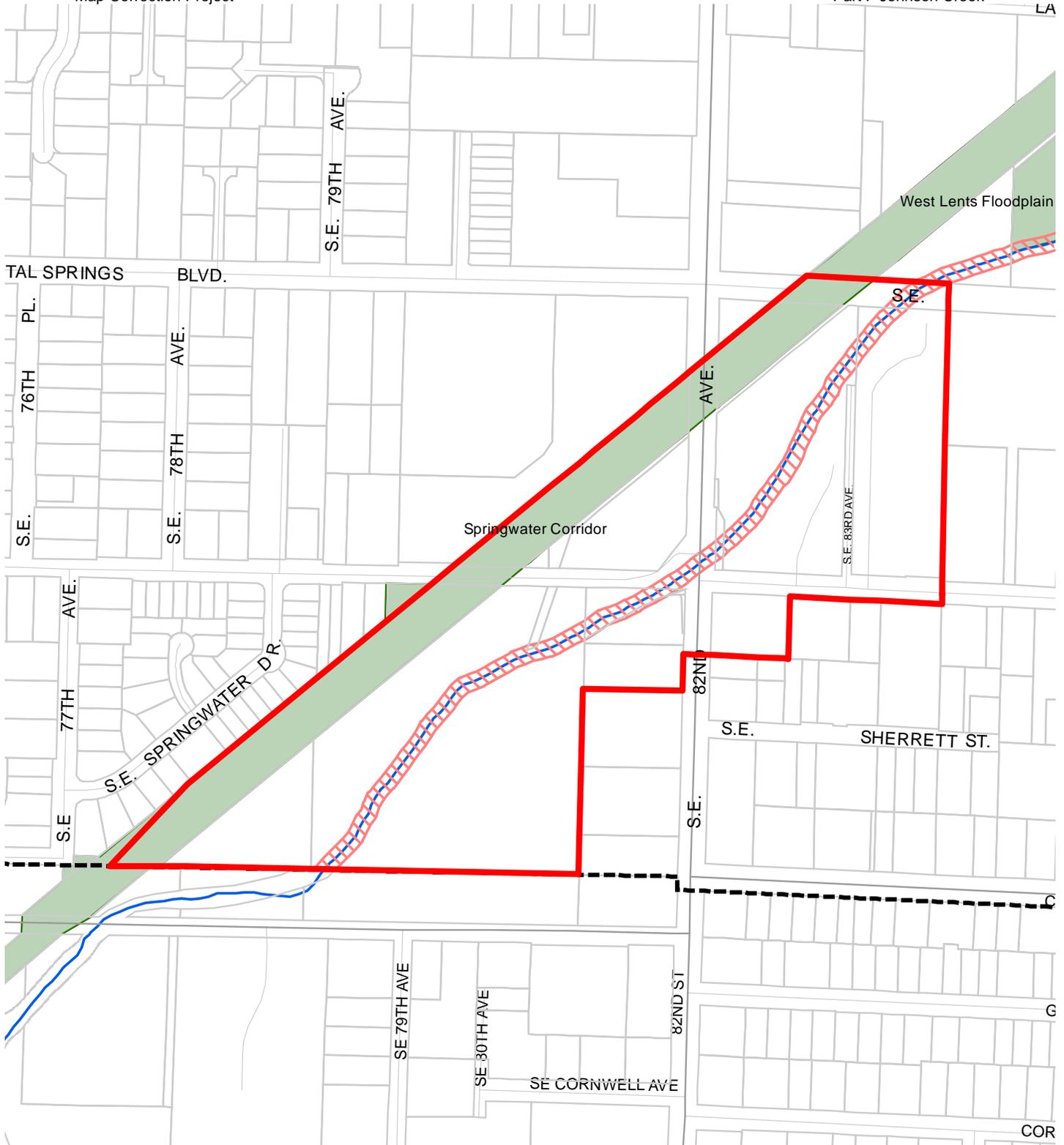
Updated: July 2021



- Resource Sites
- Urban Service Boundary
- Taxlots
- Slopes >25%
- Forest
- Woodland
- Shrubland
- Herbaceous

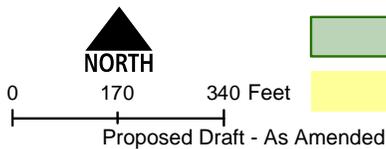


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**Map C: Special
Habitat Areas**
**Resource Site:
JC9**

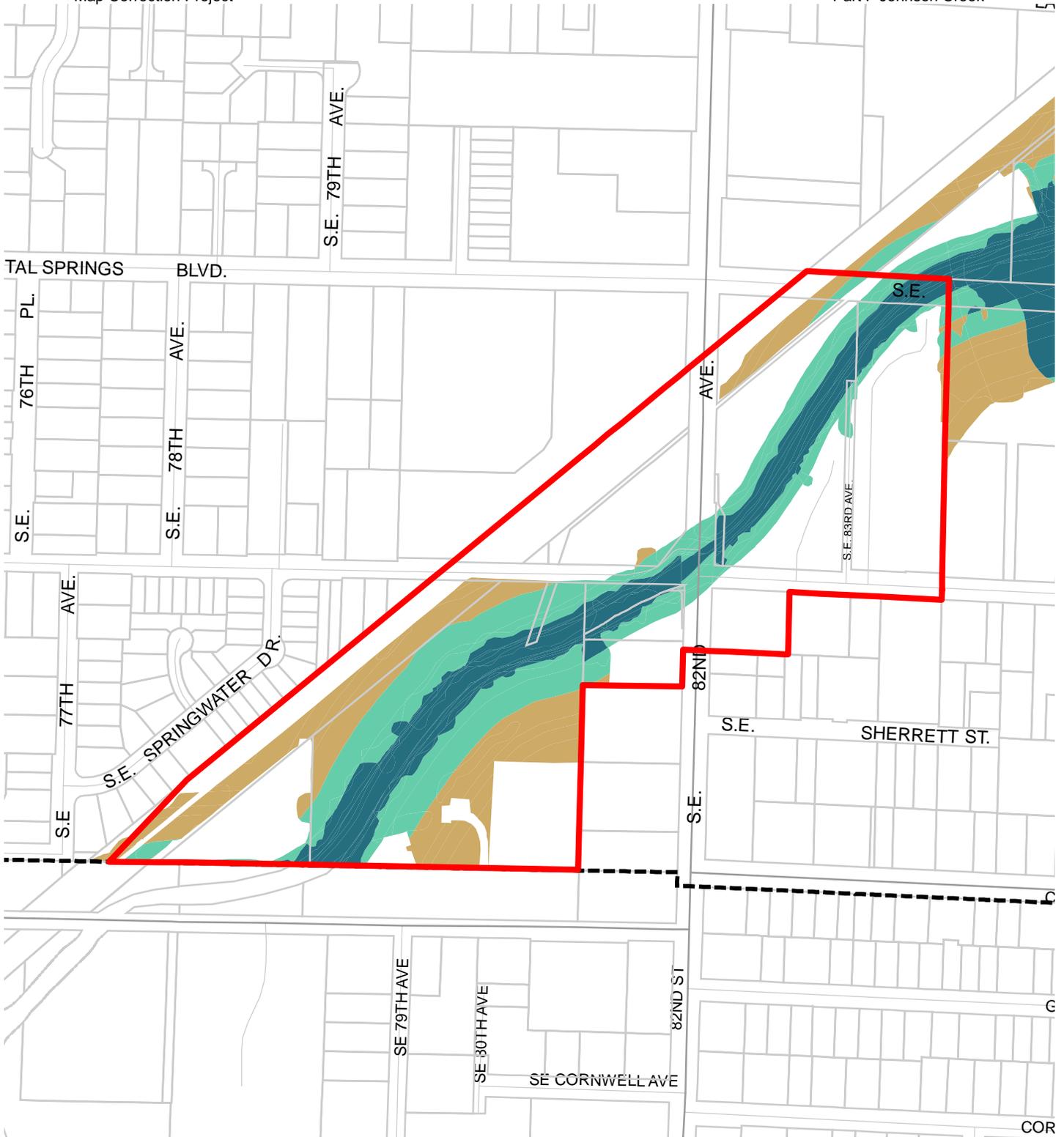
Updated: June 2021



- Resource Sites
- Special Habitat Areas (SHAs)
- Open Stream Channel
- Piped Stream Segment
- Parks
- Schools
- Urban Service Boundary
- Taxlots



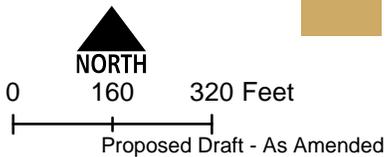
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July 2021



**Map D: Riparian
Corridors Habitat
Classification**

**Resource Site:
JC9**

Updated: July 2021

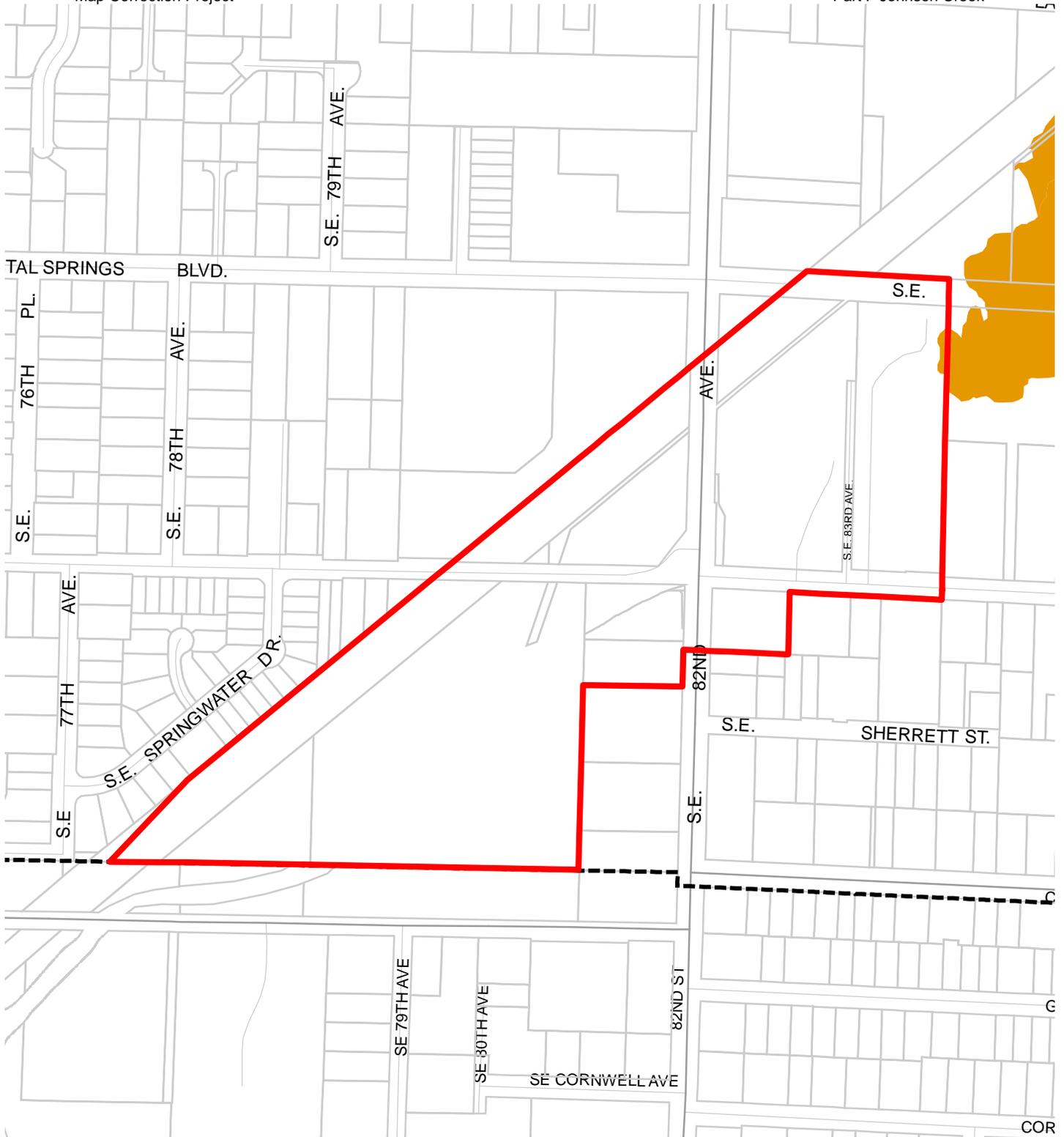


- Resource Sites
- Urban Service Boundary
- Class I (high rank)
- Taxlots
- Class II (medium rank)
- Class III (low rank)



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July 2021



**Map E: Wildlife
Habitat Classification
Resource Site:
JC9**

Updated: July 2021



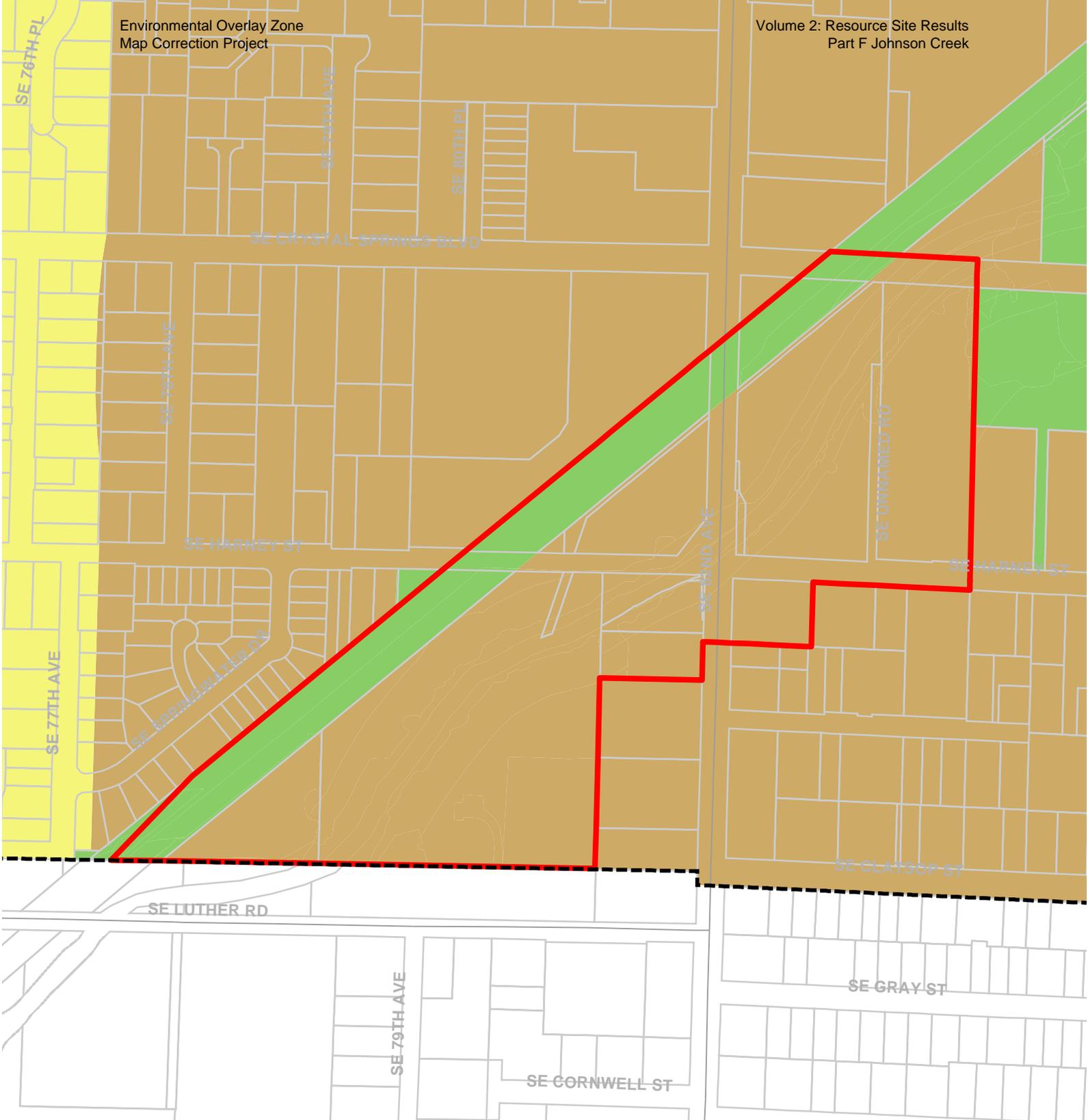
Proposed Draft - As Amended

-  Resource Sites
-  Class A (high rank)
-  Class B (medium rank)
-  Class C (low rank)
-  Urban Service Boundary
-  Taxlots



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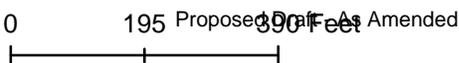


Map F: Urban Development Value (Title 13)
Resource Site: JC9

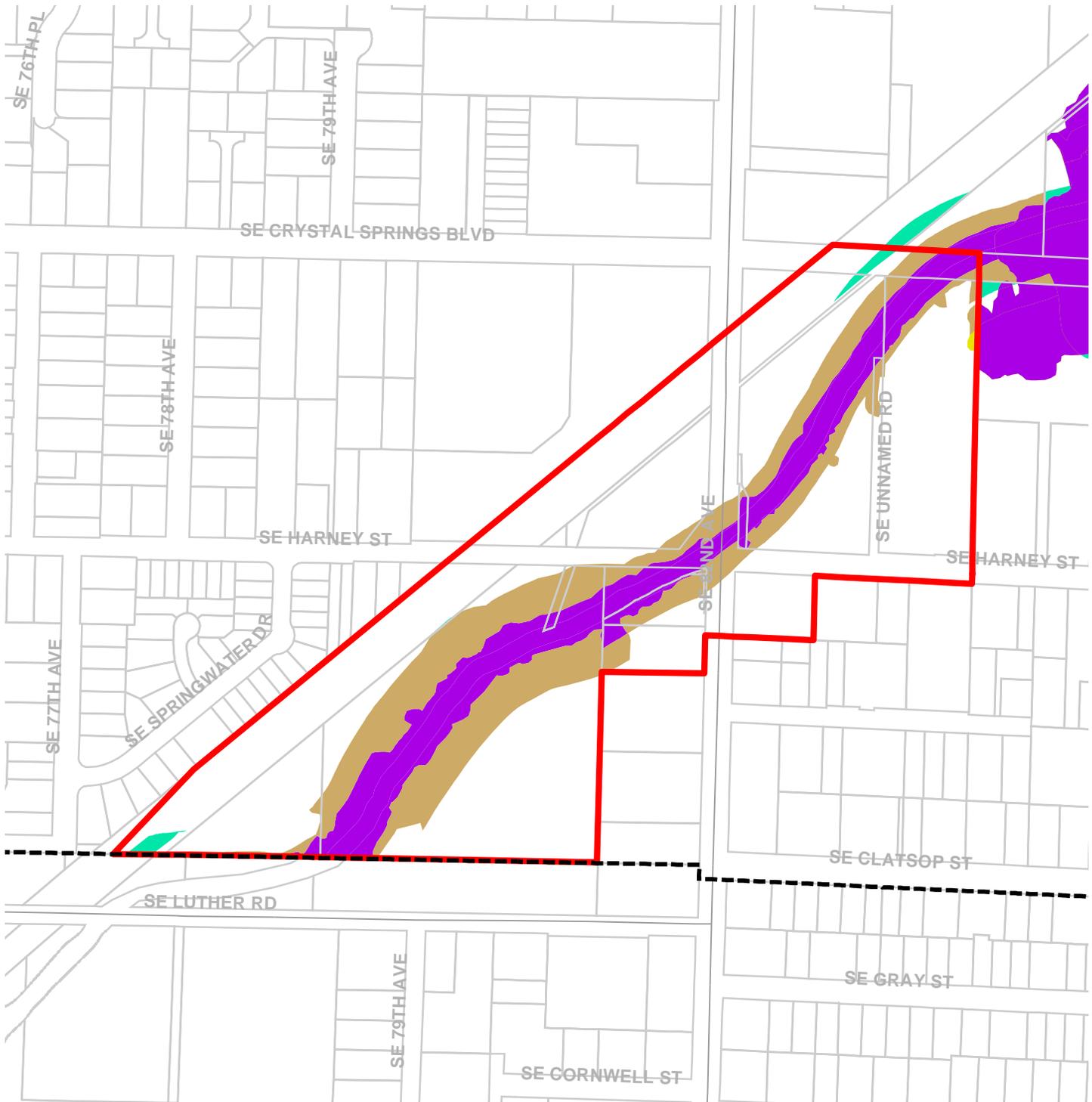
-  Urban Service Boundary
-  Resource Sites
-  High Development Value
-  Medium Development Value
-  Low Development Value
-  Parks



Updated: July 2021



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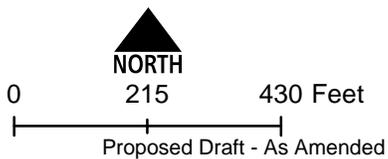


Map G: Title 13 Habitat Conservation Areas (HCA) and Goal 5 Areas

Resource Site: JC9

Updated: July 2021

-  Urban Service Boundary
-  Resource Sites
-  HCA High Value
-  HCA Moderate Value
-  HCA Low Value
-  Goal 5 Significant Natural Resources



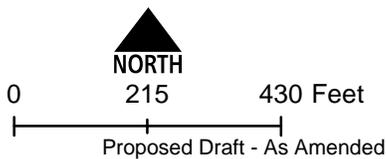
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Map H: Goal 5 Resources

Resource Site: JC9

Updated: July 2021



- Urban Service Boundary
- Resource Sites
- Goal 5 Significant Natural Resources



The information on the map was derived from digital databases. Care was taken in the creation of this map but it is provided "as is". The City of Portland ensures meaningful access to city programs, services, and activities to comply with Civil Rights Title VI and ADA Title II laws and reasonably provides: translation, interpretation, modifications, accommodations, alternative formats, auxiliary aids and services. To request these services, contact 503-823-7700, City TTY 503-823-6868, Relay Service: 711.

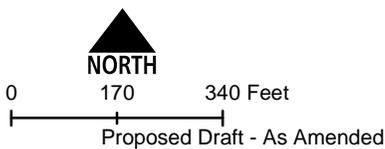
July 2021



Map I: DRAFT Proposed Environmental Overlay Zones

**Resource Site:
JC9**

Updated: July 2021



- Resource Sites
- Open Stream Channel
- Urban Service Boundary
- Taxlots
- Piped Stream Segment
- Proposed Conservation Zone
- Proposed Protection Zone



The information on the map was derived from digital databases. Care was taken in the creation of this map but it is provided "as is". The City of Portland ensures meaningful access to city programs, services, and activities to comply with Civil Rights Title VI and ADA Title II laws and reasonably provides: translation, interpretation, modifications, accommodations, alternative formats, auxiliary aids and services. To request these services, contact 503-823-7700, City TTY 503-823-6868, Relay Service: 711.
July 2021

Natural Resource Description

Within resource site JC9 the following significant natural resource features and functions are present:

Significant Riparian Corridor Features: open stream; flood area; land within 50 feet of waterbodies; forest, woodland, shrubland and herbaceous vegetation within 300 feet of waterbodies; and forest vegetation on steep slopes (>25% slope) contiguous to and within 780 feet of waterbodies.

Significant Wildlife Habitat Features: forest patches, and associated and contiguous wetlands, two acres in size or larger.

Special Habitat Areas: Johnson Creek (S, C)

Riparian Corridor Functions: microclimate and shade; stream flow moderation and water storage; bank function and sediment, pollution and nutrient control; large wood and channel dynamics; organic inputs, food web and nutrient cycling; and riparian wildlife movement corridor.

Wildlife Habitat Functions: interior area; food and water; resting, denning, nesting and rearing; movement and migration; reduction of noise, light and vibration; and habitat patches that support special status fish and wildlife species.

Table A: Quantity of Natural Resource Features in Resource Site		JC9
		Study Area
Stream (Miles)		0.4
Wetlands (acres)		0.0
Vegetated Areas >= 1/2 acre (acres)		
	Forest (acres)	0.0
	Woodland (acres)	1.5
	Shrubland (acres)	0.0
	Herbaceous (acres)	9.9
Flood Area*		
	Vegetated (acres)	2.2
	Non-vegetated (acres)	0.4
Steep Slopes (acres)**		4.9
* The flood area includes the FEMA 100-year flood plain plus the adjusted 1996 flood inundation area.		
**Slopes are derived from LiDAR. Steep slopes are areas with a slope greater than 25%.		

This stretch of Johnson Creek is immediately upstream of the Luther Road Habitat Restoration Project, in Clackamas County, which restored Johnson Creek and its floodplain along the Springwater Corridor Trail at SE 73rd Avenue and Luther Road. This site has a mix of undeveloped land, commercial, manufactured home park, industrial uses and associated parking areas. SE 82nd Avenue crosses Johnson Creek at the eastern side of the resource site. Large volumes of untreated stormwater from Interstate-205 and SE 82nd Avenue are piped to and discharged into Johnson Creek just upstream of SE 82nd Avenue. These stormwater inputs greatly impact water quality in the stream.

Within resource area JC9, Johnson Creek has a very steep, 1:1 rock-lined bank constructed by the WPA in the 1930s. The WPA work created a steep, narrow channel that impacts habitat and exacerbates flooding. Where present, the riparian, tree-covered strip is narrow, only about 10 feet wide, with some big leaf maple, ash, and willow. The primary ground cover is blackberry. There is little shading of the creek itself.

The wildlife habitat quality of this stretch of the creek is limited by the lack of vegetation and by creek-side development. In much of this reach, development comes close to the banks of the creek, limiting wildlife access to the creek. The steep banks are dominated by Himalayan blackberry and reed canary grass growth. The creek is exposed with little shade provided from the few scattered ash and big leaf maple trees. Remnants of a WPA footbridge abutment still remain in the creek.

The riparian corridor east of SE 82nd Avenue is mostly paved or gravel parking area leaving an unpaved area of less than 50-feet wide along each bank. In some areas, structures and paving abut the top of bank. The riparian vegetation is sparse and composed largely of low-structure invasive species that provide little shade cover. This section of Johnson Creek with limited shade allows direct solar radiation input into the water. Johnson Creek exceeds the water quality temperature standard developed by the state to maintain salmonid populations. Recovering native riparian canopy cover across this site would greatly benefit Johnson Creek and help address the water quality standards. In its current condition, the primary resource is the creek itself which serves as a travel corridor for fish and wildlife. The riparian corridor downstream of SE 82nd Ave. appears to be primarily pervious. Riparian tree canopy is narrow flanked by open meadow habitat. Both serve as natural resource benefits to fish and wildlife. Open meadow habitat is limited within city boundary.

Coho salmon, Chinook salmon, steelhead trout, and Pacific lamprey are documented within this reach of Johnson Creek. This resource site is part of a mainstem reach that was identified as high priority for habitat restoration and protection for Chinook and coho salmon, and steelhead trout.

Special status bird species observed in or adjacent to this resource site include bald eagle, great blue heron, green heron, and rufous hummingbird.

Table B: Quality of Natural Resource Functions in Resource Site JC9				
Resource Site (acres) = 24				
	Class 1/A	Class 2/B	Class 3/C	Total
Riparian Corridors*				
acres	3.1	4.3	3.2	10.6
percent total inventory site area	13.1%	18.2%	13.7%	45.0%
Wildlife Habitat*				
acres	0.0	0.0	0.0	0.0
percent total inventory site area	0.0%	0.2%	0.0%	0.2%
Special Habitat Areas**				
acres	1.6			
percent total inventory site area	6.7%			
Combined Total*				
acres	3.1	4.3	3.2	10.6
percent total inventory site area	13.1%	18.3%	13.7%	45.0%
* Class I riparian resources, Special Habitat Areas, and wildlife habitat include open water. ** Metro Title 13 designated all Special Habitat Areas as Class I riparian corridors. +Because riparian resources, Special Habitat Areas, and wildlife Habitat overlap, the results cannot be added together to determine the combined results.				

Stormwater runs off impervious surfaces (e.g., rooftops, driveways, parking areas, streets, etc..) rapidly. Without a place to retain the water (such as wetlands or adequate stormwater facilities), stormwater runoff results in spikes in stream levels which can cause or exacerbate flooding and increase stream erosion. In addition, when water runs off quickly, it does not have a chance to infiltrate and recharge streams or aquifers to provide water during drier periods.

The type and capacity of stormwater facilities to manage the runoff from impervious surfaces varies in the city, affecting the local rate and amount of runoff, and the amount of pollutants in the water. Much of the city was developed prior to any stormwater regulations and receives limited or no management prior to discharging to pipes and surface waters.

Table C shows the total amount of impervious area within the resource site and how much of that impervious area lacks stormwater management; the percentage of total impervious area that is not managed is called "effective impervious area." The higher the percent of effective impervious area in a watershed, the greater the negative impacts of stormwater runoff to streams. Stream science indicates that when effective impervious area reaches 10% of a

watershed, negative stream impacts become significant; and at 25%, these impacts on waterways can be substantial. An additional consideration is the differences in soil conditions and other factors that influence the ability of pervious areas to retain, infiltrate or filter pollutants from stormwater. For example, a mature forest is much more effective in managing stormwater than a manicured lawn; both areas would have a lower effective impervious surface percentage than a developed site, but they have different outcomes for stormwater management.

For Resource Area JC9, 39.8% of the total area is effectively impervious, indicating significant negative impacts are occurring due to the level of unmanaged impervious area and any additional impacts will cause further degradation.

Table C. Impervious Area within Resource Site JC9			
Total area (acres)	Total impervious Area (acres)	Total unmanaged impervious area* (acres)	Percent of resource site that is effectively impervious
23.6	11.6	9.4	39.8%

*Total unmanaged impervious area refers to the number of acres within a resource area that receives no formal stormwater management measures to regulate flow or treat pollutants before they reach surface waters, also referred to as effective impervious area.

Metro Title 13 and Oregon Goal 5 Compliance

The following information supplements evaluation of natural resource protections presented in Volume 4 and supports compliance with Metro Title 13 and Oregon Plan Goal 5.

Title 13 Habitat Conservation Areas

Map G presents the Habitat Conservation Areas (HCA) within the Resource site JC9. Natural resources should be protected within HCA as follows:

1. *Strictly limit or limit* conflicting uses within Class I/High Rank Riparian Areas in all Urban Development Areas.
2. *Strictly limit or limit* conflicting uses within Class II/Medium Rank Riparian Areas within Moderate and Low Value Urban Development Area as well as parks and open spaces.
3. *Strictly limit or limit* conflicting uses within Class A/High or B/Medium Rank Wildlife Habitat within parks and open spaces.
4. *Allow* conflicting uses or conducted a local Goal 5 ESEE for Class III/Low Rank Riparian Areas in all Urban Development Areas.

5. *Allow* conflicting uses or conducted a local Goal 5 ESEE for Class A/High, Class B/Medium or Class C/Low Rank Wildlife Habitat in all Urban Development Area, except parks and open space.

Strictly limiting or *limiting* conflicting uses in HCA will protect and conserve existing streams and wetlands to maintain significant natural resource functions including: microclimate and shade; stream flow moderation and water storage; bank function and sediment, pollution and nutrient control; large wood and channel dynamics; organic inputs, food web and nutrient cycling; and fish and wildlife habitat. *Strictly limiting* or *limiting* conflicting uses in HCA will allow for additional urban development that is sensitive to the natural resource features and requires mitigation for unavoidable negative impacts to features and functions. The recommendation will also contribute towards meeting other regulatory requirements including the Metro Title 3, Water Quality and Flood Management; Oregon Goal 6, Air, Water and Land Resources Quality; Oregon Goal 7, Areas Subject to Natural Hazards; the Clean Water Act; and the Endangered Species Act.

Goal 5 Significant Natural Resources

All of the significant natural resources within resource site JC9 are Class I or Class II riparian areas; therefore, no resource site-specific ESEE is required.

Natural Resources Protection Decisions

Based on the analysis presented in Volume 3, Natural Resources Inventory, Volume 4, Title 13 and Goal 5 Compliance, and the resource site-specific evaluation for JC9, the following decisions are applied to protect the significant riparian corridors and wildlife habitat:

1. Apply a protection overlay zone ('p' zone) to stream channels from top-of-bank to top-of-bank, wetlands and land within 50 feet of stream top-of-bank or 30 feet of wetlands.
2. Apply a conservation overlay zone ('c' zone) to land between 50 and 75 feet of streams, land between 30 and 55 feet of wetlands
3. Apply a conservation overlay zone ('c' zone) to areas of forest or woodland vegetation contiguous to but more than 75 feet from stream top-of-bank, and areas of forest or woodland vegetation contiguous to but more than 55 feet from wetlands.
4. Allow conflicting uses within all other areas containing significant natural resources.

Resource Site No.: JC10 Resource Site Name: West Lents Floodplain

Previous Plan: Johnson Creek Basin Protection Plan

Previous Resource Site No. 11/12

The results of the analysis found in Volume 3, Natural Resources Inventory, Volume 4, Title 13 and Goal 5 Compliance, and the resource site-specific evaluation, are presented in the following maps:

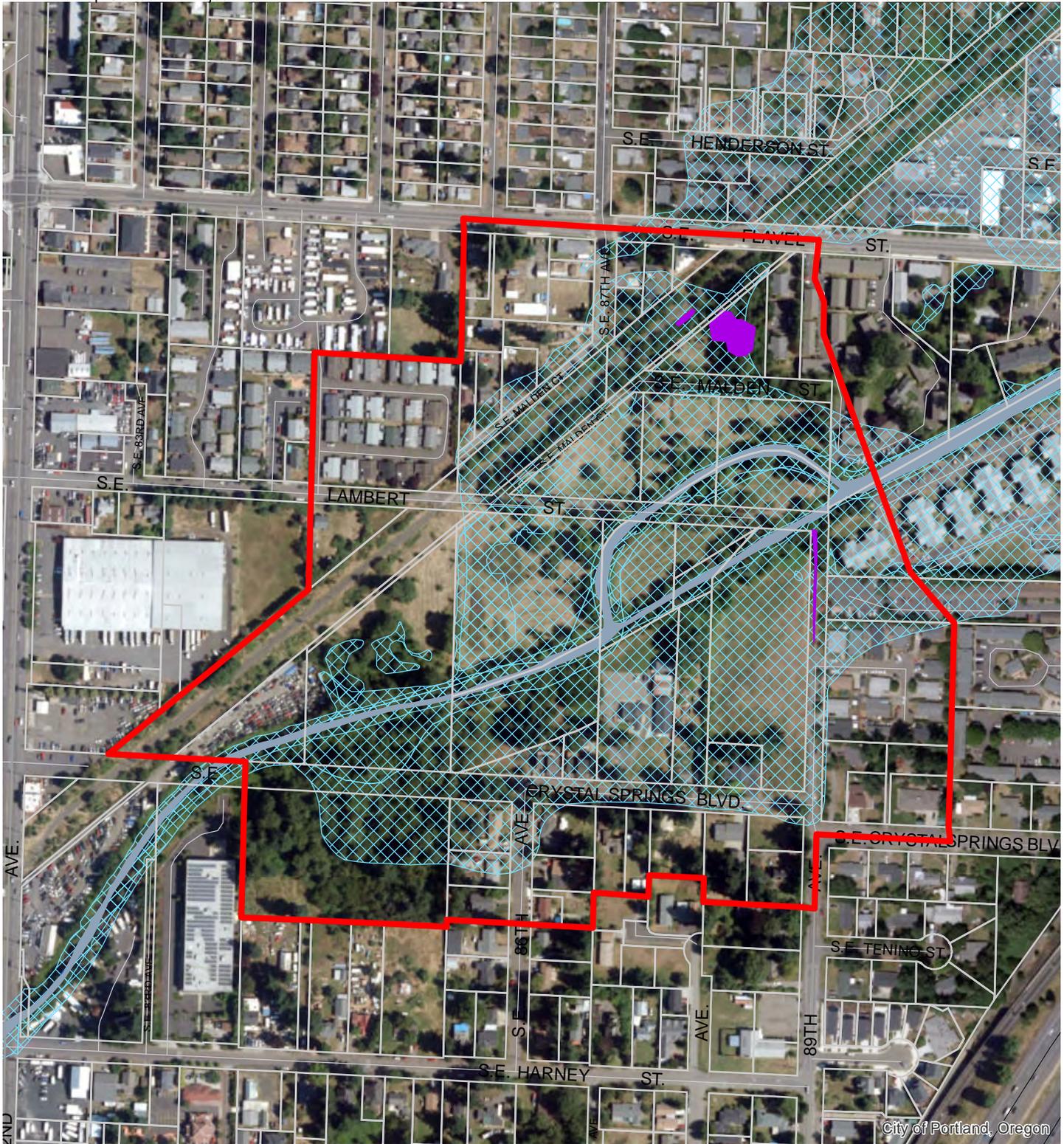
- A. Water Features – rivers, streams, wetlands and flood areas
- B. Land Features – forest, woodland, shrubland and herbaceous vegetation, steep slopes
- C. Special Habitat Areas
- D. Riparian Corridor Classifications
- E. Wildlife Habitat Classifications
- F. Urban Development Value
- G. Metro Title 13 Habitat Conservation Areas
- H. Statewide Planning Goal 5 Areas
- I. Recommended Natural Resource Protections

Following the maps, additional information about existing natural resource features and functions in the resource site is presented.

Implementation of the results is found in Volume 1, Part B, updates to zoning maps and zoning code.

Resource site JC10 includes the following:

Site (acres)	48.2
Base zones (acres)	
EG2	1.0
IG2	3.5
OS	20.6
R2.5	<1
R5	<1
R7	11.2
RM1	7.6
RMP	4.3



Map A: Water Features

Resource Site: JC10

Updated: July 2021



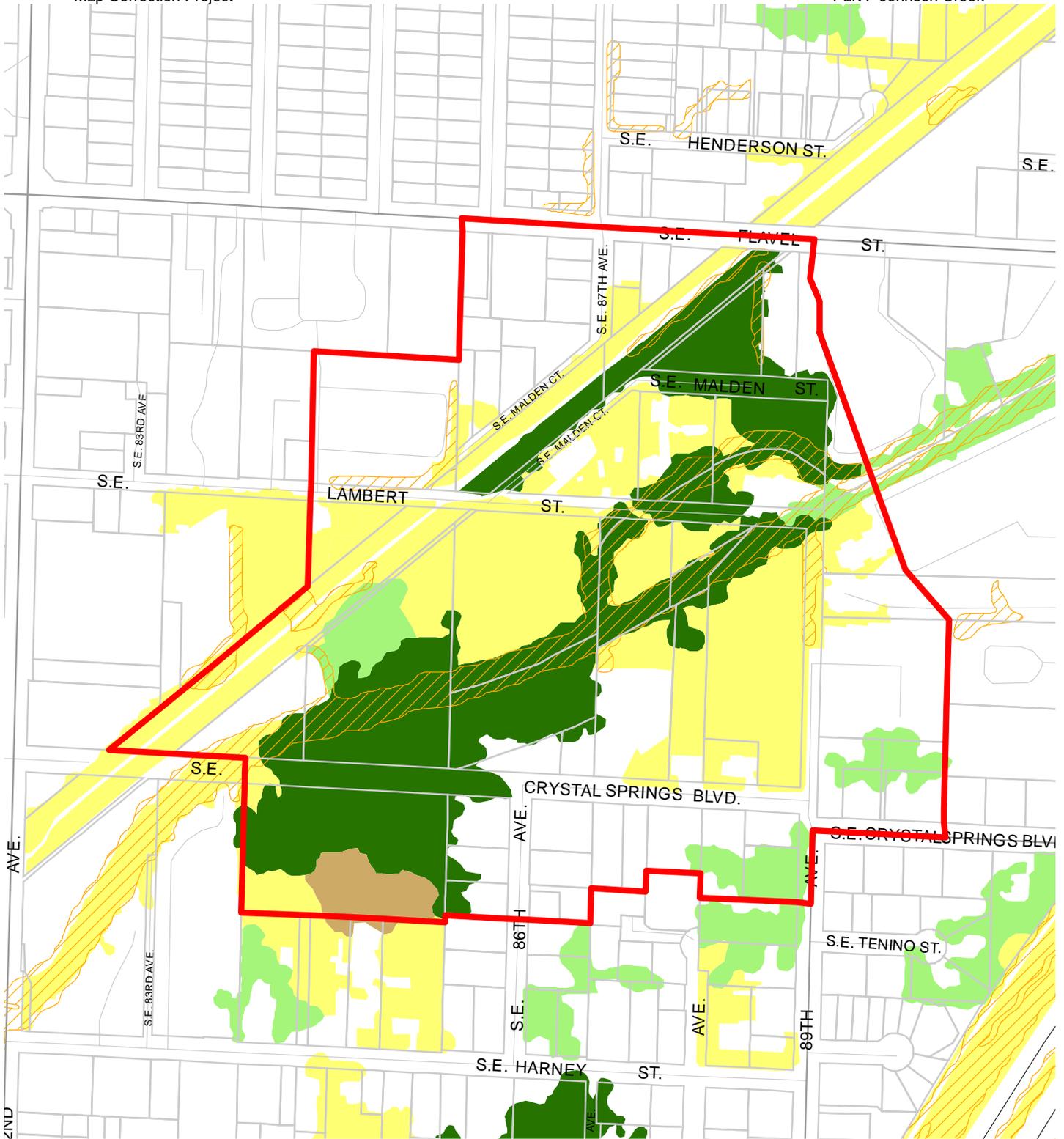
0 165 330 Feet

Proposed Draft - As Amended

- Resource Sites
- Urban Service Boundary
- Taxlots
- Wetlands
- Rivers
- Open stream channel
- Piped Stream Segment
- Flood Area



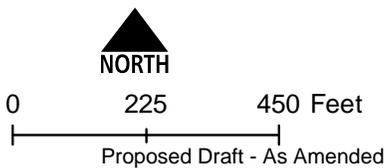
The information on the map was derived from digital databases. Care was taken in the creation of this map but it is provided "as is". The City of Portland ensures meaningful access to city programs, services, and activities to comply with Civil Rights Title VI and ADA Title II laws and reasonably provides: translation, interpretation, modifications, accommodations, alternative formats, auxiliary aids and services. To request these services, contact 503-823-7700, City TTY 503-823-6868, Relay Service: 711.
July 2021



Map B: Vegetation and Steep Slopes

Resource Site: JC10

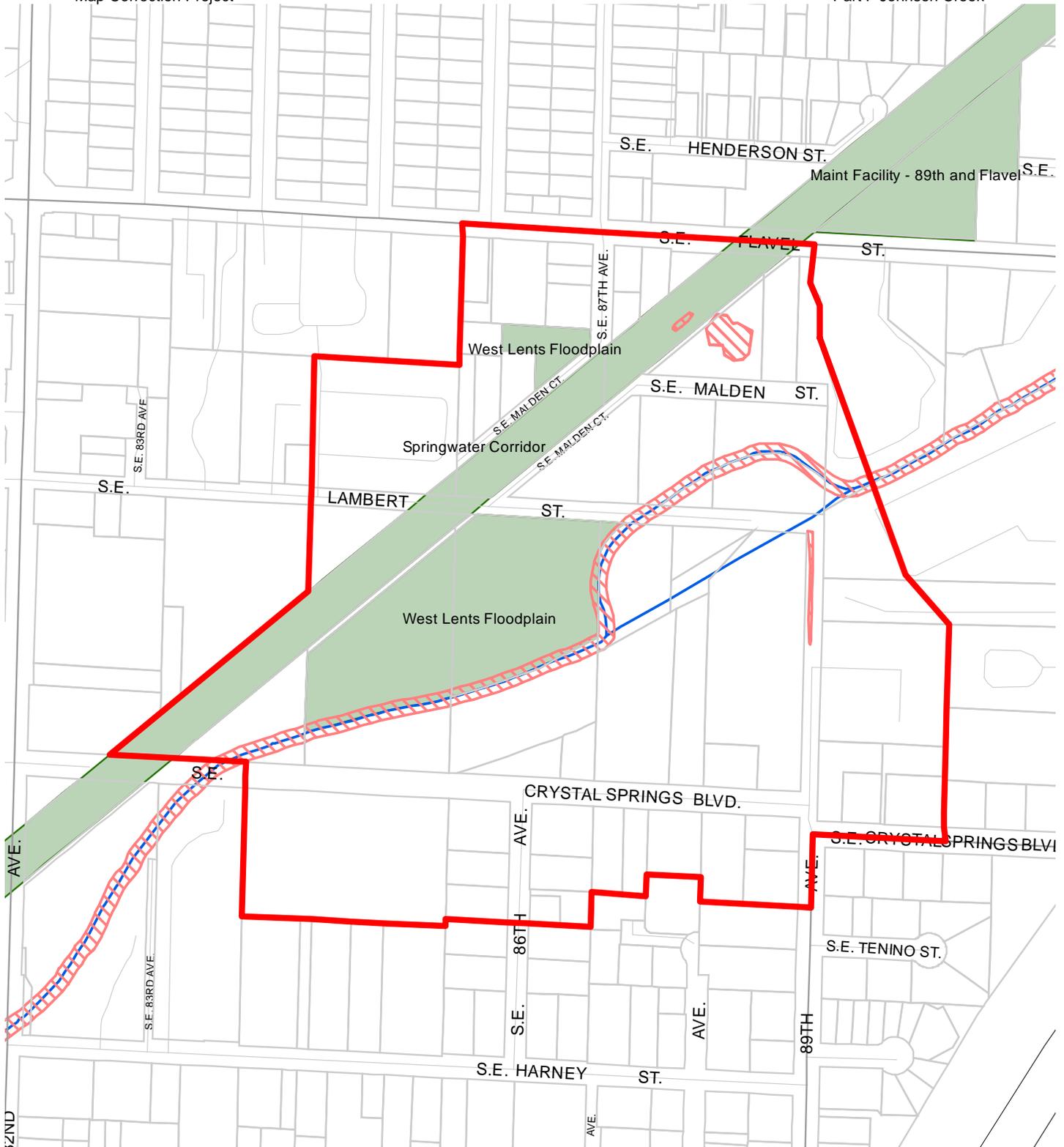
Updated: July 2021



- Resource Sites
- Urban Service Boundary
- Taxlots
- Slopes >25%
- Forest
- Woodland
- Shrubland
- Herbaceous



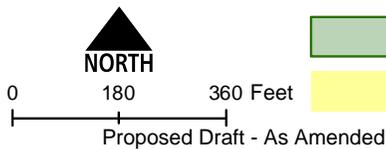
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**Map C: Special
Habitat Areas**

**Resource Site:
JC10**

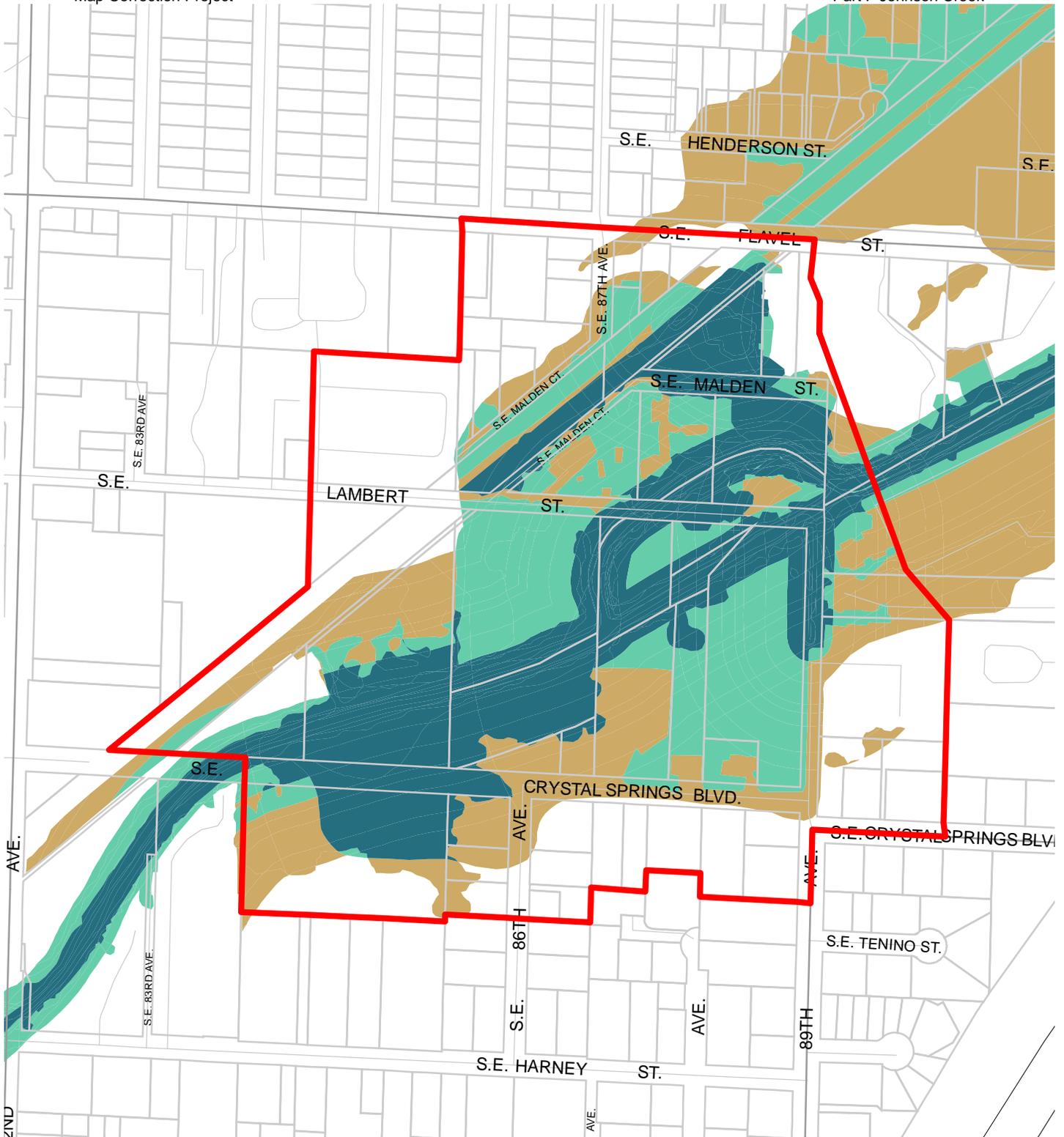
Updated: June 2021



- Resource Sites
- Urban Service Boundary
- Special Habitat Areas (SHAs)
- Taxlots
- Open Stream Channel
- Piped Stream Segment
- Parks
- Schools



The information on the map was derived from digital databases. Care was taken in the creation of this map but it is provided "as is". The City of Portland ensures meaningful access to city programs, services, and activities to comply with Civil Rights Title VI and ADA Title II laws and reasonably provides: translation, interpretation, modifications, accommodations, alternative formats, auxiliary aids and services. To request these services, contact 503-823-7700, City TTY 503-823-6868, Relay Service: 711. July 2021



**Map D: Riparian
Corridors Habitat
Classification**

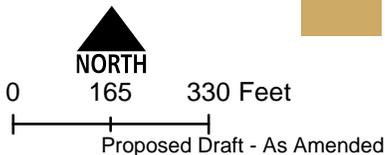
**Resource Site:
JC10**

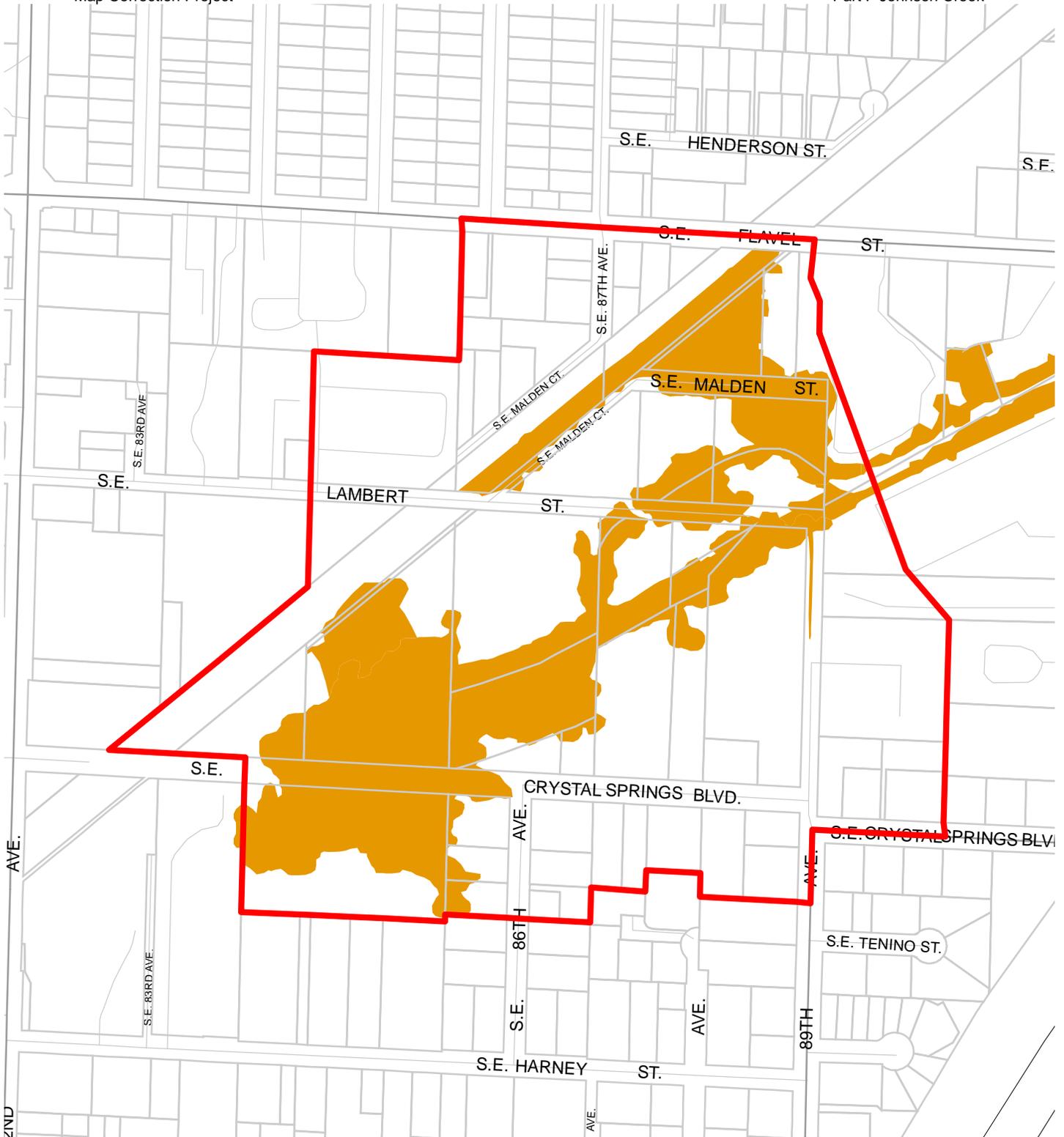
Updated: July 2021

- Resource Sites
- Urban Service Boundary
- Class I (high rank)
- Taxlots
- Class II (medium rank)
- Class III (low rank)



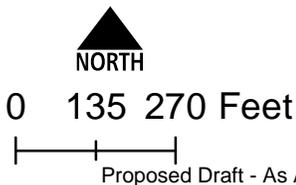
The information on the map was derived from digital databases. Care was taken in the creation of this map but it is provided "as is". The City of Portland ensures meaningful access to city programs, services, and activities to comply with Civil Rights Title VI and ADA Title II laws and reasonably provides: translation, interpretation, modifications, accommodations, alternative formats, auxiliary aids and services. To request these services, contact 503-823-7700, City TTY 503-823-6868, Relay Service: 711.





**Map E: Wildlife
Habitat Classification
Resource Site:
JC10**

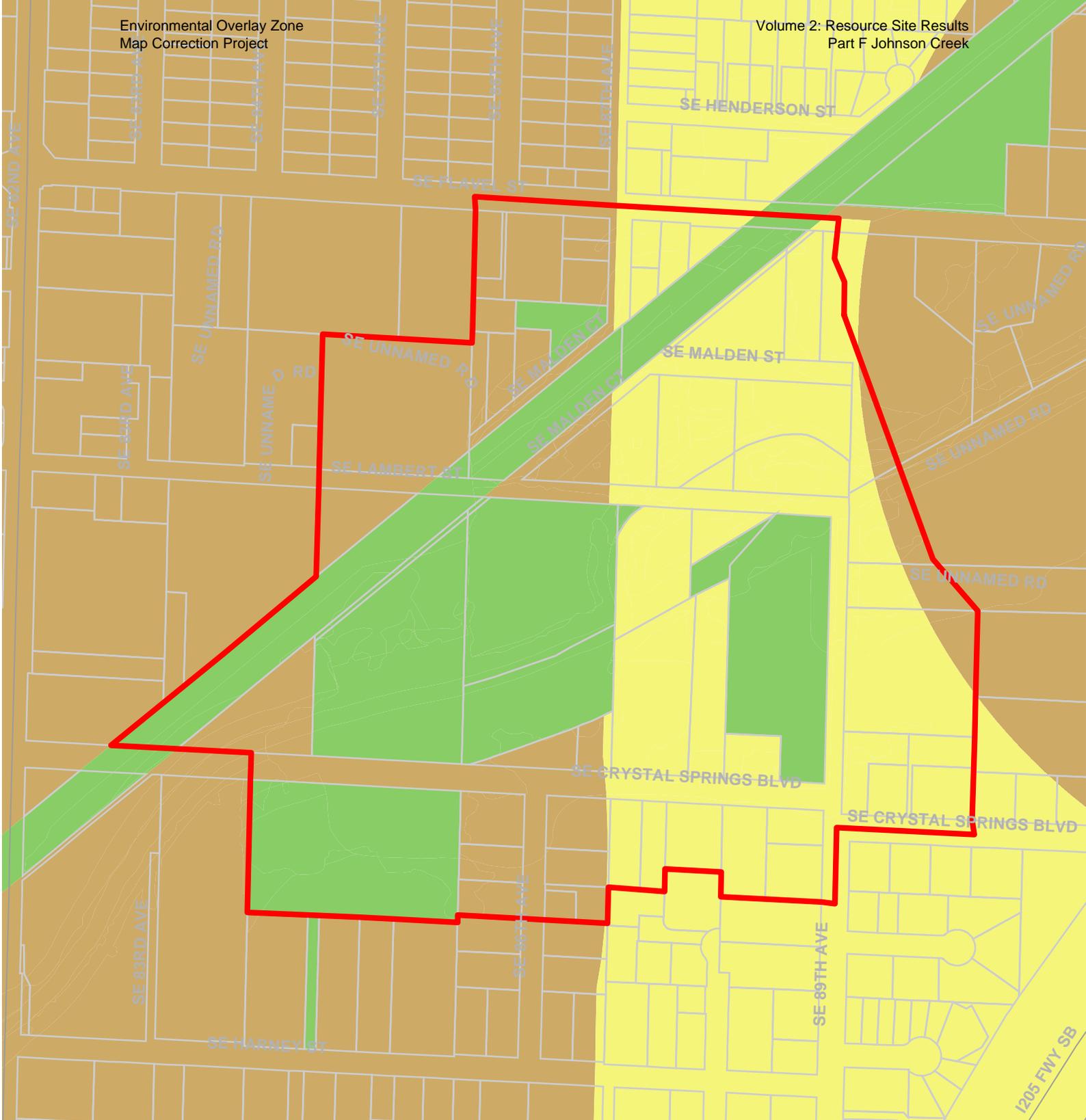
Updated: July 2021



-  Resource Sites
-  Class A (high rank)
-  Class B (medium rank)
-  Class C (low rank)
-  Urban Service Boundary
-  Taxlots



The information on the map was derived from digital databases. Care was taken in the creation of this map but it is provided "as is". The City of Portland ensures meaningful access to city programs, services, and activities to comply with Civil Rights Title VI and ADA Title II laws and reasonably provides: translation, interpretation, modifications, accommodations, alternative formats, auxiliary aids and services. To request these services, contact 503-823-7700, City TTY 503-823-6868, Relay Service: 711.
July 2021

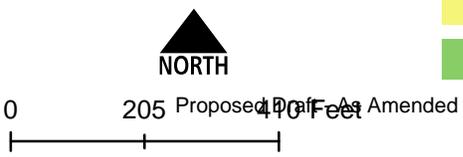


Map F: Urban Development Value (Title 13)
Resource Site: JC10

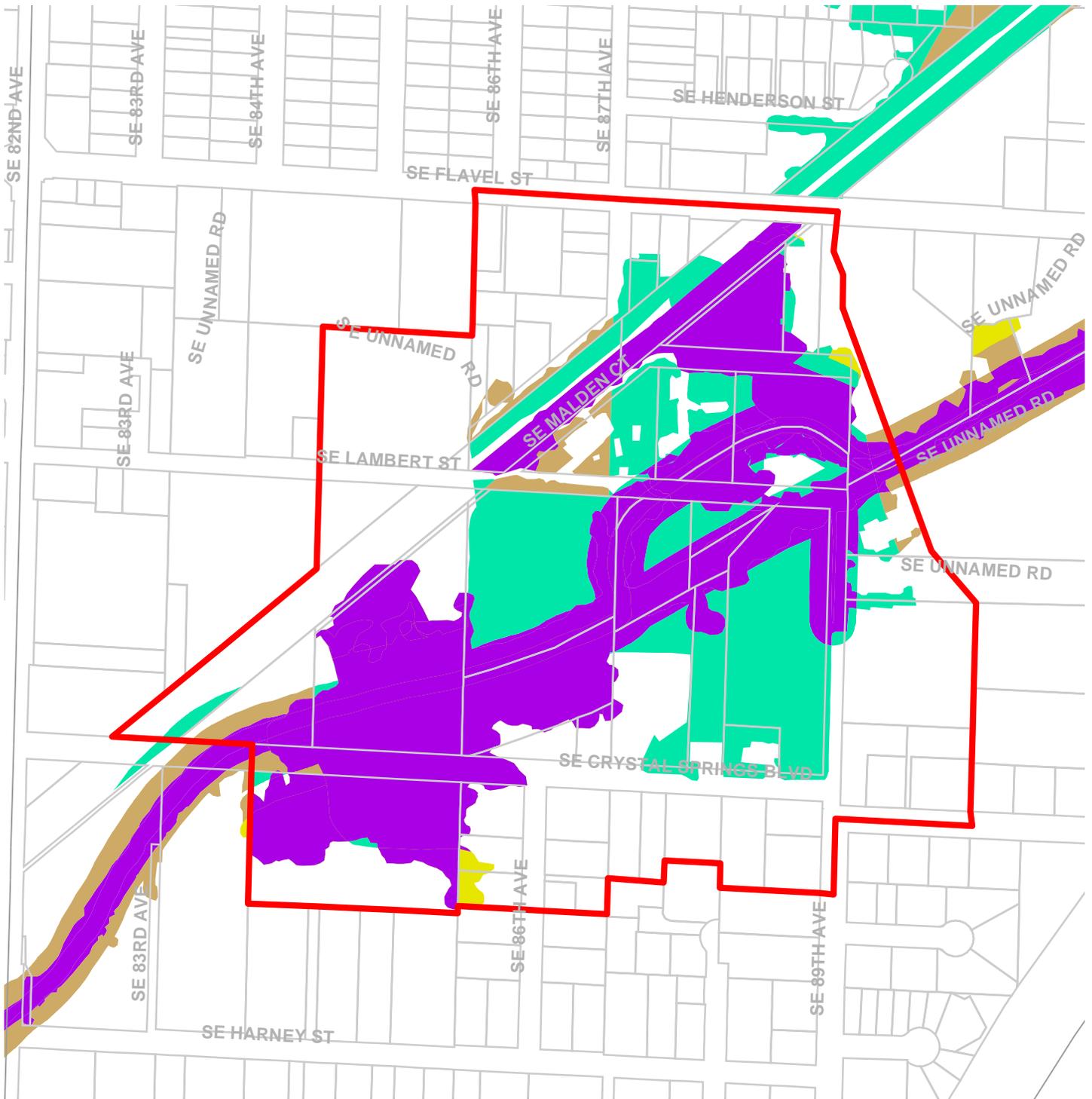
-  Urban Service Boundary
-  Resource Sites
-  High Development Value
-  Medium Development Value
-  Low Development Value
-  Parks



Updated: July 2021



The information on the map was derived from digital databases. Care was taken in the creation of this map but it is provided "as is". The City of Portland ensures meaningful access to city programs, services, and activities to comply with Civil Rights Title VI and ADA Title II laws and reasonably provides: translation, interpretation, modifications, accommodations, alternative formats, and aids and services. To request these services, contact 503-823-7700, City TTY 503-823-6868, Relay Service: 711.

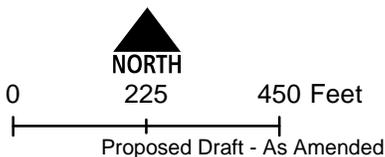


Map G: Title 13 Habitat Conservation Areas (HCA) and Goal 5 Areas

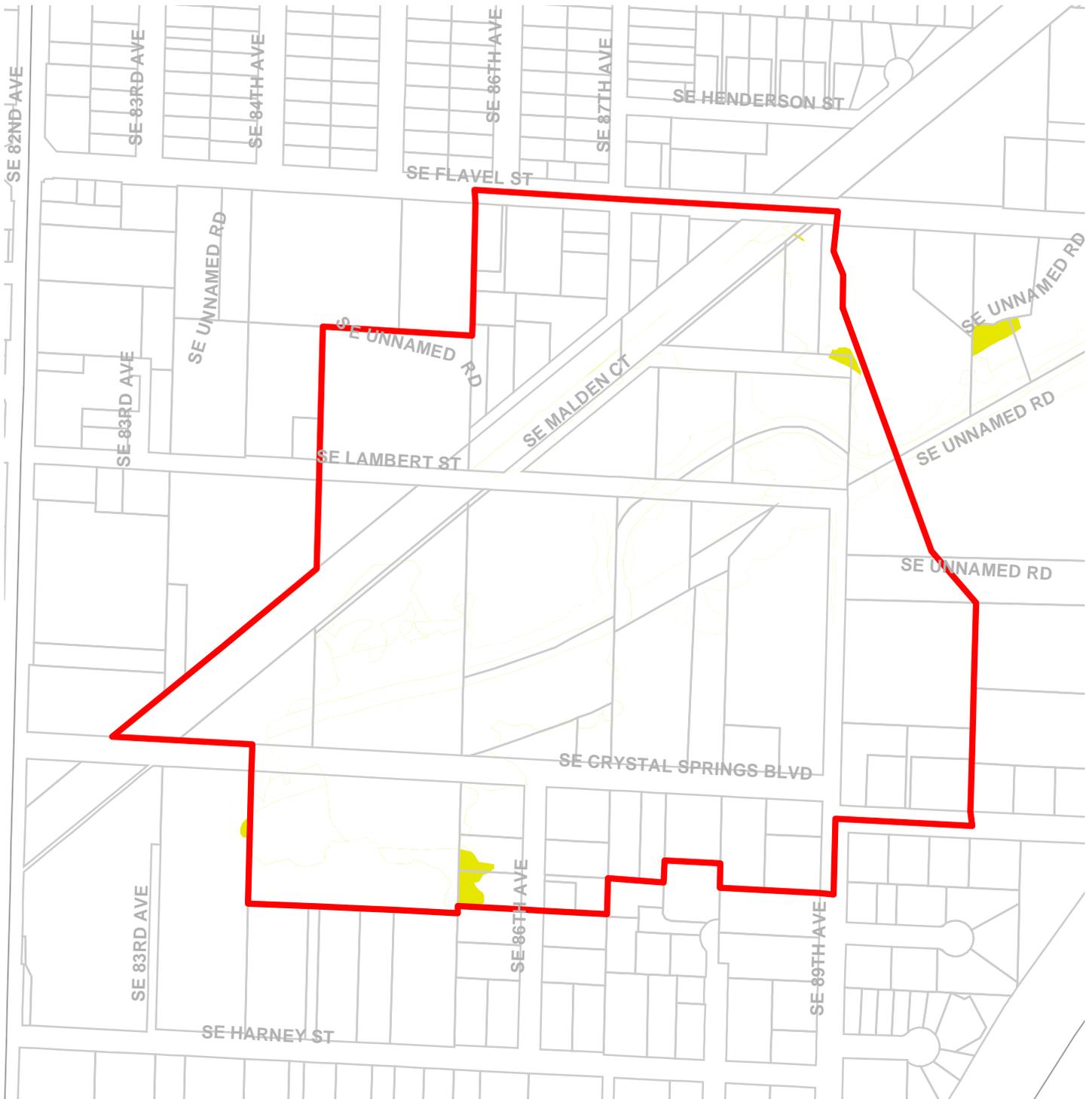
Resource Site: JC10

Updated: July 2021

-  Urban Service Boundary
-  Resource Sites
-  HCA High Value
-  HCA Moderate Value
-  HCA Low Value
-  Goal 5 Significant Natural Resources



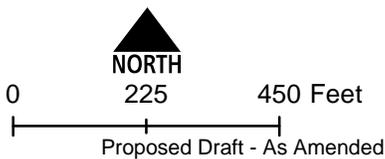
The information on the map was derived from digital databases. Care was taken in the creation of this map but it is provided "as is". The City of Portland ensures meaningful access to city programs, services, and activities to comply with Civil Rights Title VI and ADA Title II laws and reasonably provides: translation, interpretation, modifications, accommodations, alternative formats, auxiliary aids and services. To request these services, contact 503-823-7700, City TTY 503-823-6868, Relay Service: 711.



Map H: Goal 5 Resources

Resource Site: JC10

Updated: July 2021



- Urban Service Boundary
- Resource Sites
- Goal 5 Significant Natural Resources



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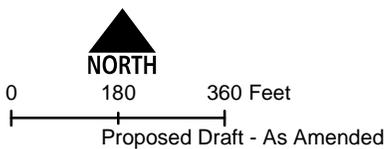


Map I: DRAFT Proposed Environmental Overlay Zones

**Resource Site:
JC10**

Updated: July 2021

-  Resource Sites
-  Open Stream Channel
-  Piped Stream Segment
-  Proposed Conservation Zone
-  Proposed Protection Zone
-  Urban Service Boundary
-  Taxlots



The information on the map was derived from digital databases. Care was taken in the creation of this map but it is provided "as is". The City of Portland ensures meaningful access to city programs, services, and activities to comply with Civil Rights Title VI and ADA Title II laws and reasonably provides: translation, interpretation, modifications, accommodations, alternative formats, auxiliary aids and services. To request these services, contact 503-823-7700, City TTY 503-823-6868, Relay Service: 711.
July 2021

Natural Resource Description

Within resource site JC10 the following significant natural resource features and functions are present:

Significant Riparian Corridor Features: open stream; wetland; flood area; land within 50 feet of waterbodies; forest, woodland, shrubland and herbaceous vegetation within 300 feet of waterbodies; and forest vegetation on steep slopes (>25% slope) contiguous to and within 780 feet of waterbodies.

Significant Wildlife Habitat Features: forest patches, and associated and contiguous wetlands, two acres in size or larger.

Special Habitat Areas: Johnson Creek (S, C); wetlands (W)

Riparian Corridor Functions: microclimate and shade; stream flow moderation and water storage; bank function and sediment, pollution and nutrient control; large wood and channel dynamics; organic inputs, food web and nutrient cycling; and riparian wildlife movement corridor.

Wildlife Habitat Functions: interior area; food and water; resting, denning, nesting and rearing; movement and migration; reduction of noise, light and vibration; and habitat patches that support special status fish and wildlife species.

Table A: Quantity of Natural Resource Features in Resource Site		JC10
		Study Area
Stream (Miles)		0.5
Wetlands (acres)		0.2
Vegetated Areas >= 1/2 acre (acres)		
	Forest (acres)	12.7
	Woodland (acres)	2.2
	Shrubland (acres)	0.8
	Herbaceous (acres)	14.2
Flood Area*		
	Vegetated (acres)	20.9
	Non-vegetated (acres)	5.8
Steep Slopes (acres)**		5.2
* The flood area includes the FEMA 100-year flood plain plus the adjusted 1996 flood inundation area.		
**Slopes are derived from LiDAR. Steep slopes are areas with a slope greater than 25%.		

The resource site is comprised of a large area of publicly owned land, surrounded by single-family development, industrial and commercial activities. The Springwater Corridor Trail crosses the site on the north. Johnson Creek passes through the middle of the site running roughly east to west. The southwest portion of the site is heavily wooded. Much of the remaining undeveloped portions of the site are grassland, meadow, and riparian habitat. Much of the site is within the floodplain.

The Johnson Creek channel in this area was partially straightened, deepened, widened, and rock-lined in the 1930s by the WPA. The WPA also added a rock-lined high-flow bypass channel to the south of an existing meander bend in the creek, which created an island. The area now owned by the City was previously low-density single-family homes. BES purchased properties in the floodplain and removed five houses in preparation of restoring floodplain habitat, reducing offsite flooding impacts, and improving water quality. Restoration work is scheduled for this site in the 2020s.

Johnson Creek and its long history of flooding have influenced soil formation at this site. Much of the site is in the 100-year floodplain of Johnson Creek, and perennial flooding is common, as indicated by the presence of Wapato soils. Urban development decreased stream capacity and increased runoff. Larger flood events generally occur from December through February, with 85 percent of the stream's runoff occurring between November and March.

The forested section of the resource site is dominated by Douglas fir, red alder, and Bigleaf maple with a shrub layer of Oregon hazelnut, vine maple, Irish Ivy and Himalayan blackberry. There is very little ground cover with large expanses of bare ground. Although the structural diversity of this forest has been decreased by the removal of much of the understory vegetation, the forest plays an important role in the Johnson Creek ecosystem by providing habitat for birds, mammals, and herptile species that require forested areas adjacent to the creek for cover, food, resting and breeding.

In this resource site, the banks of Johnson Creek are steep and vegetated by a scrub, shrub-willow and blackberry community, with upland meadows. There are sections where the riparian strip is only about 10 feet wide. The oxbow island is primarily meadow, providing potential nesting area for waterfowl. As with the rest of Johnson Creek, this section functions as a travel corridor and water source for wildlife moving up and down the creek during low-flow. This section of the creek is relatively slow-moving because the grade is less steep than the area just downstream, and thus provides an important resting opportunity for migrating species.

Coho salmon, Chinook salmon, steelhead trout, and Pacific lamprey are documented within this reach of Johnson Creek. This resource area is part of a mainstem reach (including upstream forested section and tributaries) identified as high priority for habitat protection in order to increase Chinook salmon production.

Special status bird species observed in or adjacent to this resource site include bald eagle, downy woodpecker, great blue heron, green heron, hooded merganser, rufous hummingbird, and Wilson's warbler.

Table B: Quality of Natural Resource Functions in Resource Site JC10				
Resource Site (acres) = 48				
	Class 1/A	Class 2/B	Class 3/C	Total
Riparian Corridors*				
acres	13.1	9.8	9.0	31.9
percent total inventory site area	27.3%	20.2%	18.8%	66.3%
Wildlife Habitat*				
acres	0.0	13.8	0.0	13.8
percent total inventory site area	0.0%	28.6%	0.0%	28.6%
Special Habitat Areas**				
acres	1.5			
percent total inventory site area	3.2%			
Combined Total*				
acres	13.1	11.3	7.5	31.9
percent total inventory site area	27.3%	23.5%	15.5%	66.3%
* Class I riparian resources, Special Habitat Areas, and wildlife habitat include open water. ** Metro Title 13 designated all Special Habitat Areas as Class I riparian corridors. +Because riparian resources, Special Habitat Areas, and wildlife Habitat overlap, the results cannot be added together to determine the combined results.				

Stormwater runs off impervious surfaces (e.g., rooftops, driveways, parking areas, streets, etc..) rapidly. Without a place to retain the water (such as wetlands or adequate stormwater facilities), stormwater runoff results in spikes in stream levels which can cause or exacerbate flooding and increase stream erosion. In addition, when water runs off quickly, it does not have a chance to infiltrate and recharge streams or aquifers to provide water during drier periods.

The type and capacity of stormwater facilities to manage the runoff from impervious surfaces varies in the city, affecting the local rate and amount of runoff, and the amount of pollutants in the water. Much of the city was developed prior to any stormwater regulations and receives limited or no management prior to discharging to pipes and surface waters.

Table C shows the total amount of impervious area within the resource site and how much of that impervious area lacks stormwater management; the percentage of total impervious area that is not managed is called "effective impervious area." The higher the percent of effective

impervious area in a watershed, the greater the negative impacts of stormwater runoff to streams. Stream science indicates that when effective impervious area reaches 10% of a watershed, negative stream impacts become significant; and at 25%, these impacts on waterways can be substantial. An additional consideration is the differences in soil conditions and other factors that influence the ability of pervious areas to retain, infiltrate or filter pollutants from stormwater. For example, a mature forest is much more effective in managing stormwater than a manicured lawn; both areas would have a lower effective impervious surface percentage than a developed site, but they have different outcomes for stormwater management.

For Resource Area JC10, 18.6% of the total area is effectively impervious, indicating a critical level of vulnerability, with negative impacts beginning to impact natural functions, but with some natural processes still in place and providing support to biologic systems.

Table C. Impervious Area within Resource Site JC10			
Total area (acres)	Total impervious Area (acres)	Total unmanaged impervious area* (acres)	Percent of resource site that is effectively impervious
48.2	11.7	8.9	18.6%

*Total unmanaged impervious area refers to the number of acres within a resource area that receives no formal stormwater management measures to regulate flow or treat pollutants before they reach surface waters, also referred to as effective impervious area.

Metro Title 13 and Oregon Goal 5 Compliance

The following information supplements evaluation of natural resource protections presented in Volume 4 and supports compliance with Metro Title 13 and Oregon Plan Goal 5.

Title 13 Habitat Conservation Areas

Map G presents the Habitat Conservation Areas (HCA) within the Resource site JC10. Natural resources should be protected within HCA as follows:

1. *Strictly limit* or *limit* conflicting uses within Class I/High Rank Riparian Areas in all Urban Development Areas.
2. *Strictly limit* or *limit* conflicting uses within Class II/Medium Rank Riparian Areas within Moderate and Low Value Urban Development Area as well as parks and open spaces.
3. *Strictly limit* or *limit* conflicting uses within Class A/High or B/Medium Rank Wildlife Habitat within parks and open spaces.

4. *Allow* conflicting uses or conducted a local Goal 5 ESEE for Class III/Low Rank Riparian Areas in all Urban Development Areas.
5. *Allow* conflicting uses or conducted a local Goal 5 ESEE for Class A/High, Class B/Medium or Class C/Low Rank Wildlife Habitat in all Urban Development Area, except parks and open space.

Strictly limiting or *limiting* conflicting uses in HCA will protect and conserve existing streams and wetlands to maintain significant natural resource functions including: microclimate and shade; stream flow moderation and water storage; bank function and sediment, pollution and nutrient control; large wood and channel dynamics; organic inputs, food web and nutrient cycling; and fish and wildlife habitat. *Strictly limiting* or *limiting* conflicting uses in HCA will allow for additional urban development that is sensitive to the natural resource features and requires mitigation for unavoidable negative impacts to features and functions. The recommendation will also contribute towards meeting other regulatory requirements including the Metro Title 3, Water Quality and Flood Management; Oregon Goal 6, Air, Water and Land Resources Quality; Oregon Goal 7, Areas Subject to Natural Hazards; the Clean Water Act; and the Endangered Species Act.

Goal 5 Significant Natural Resources

Resource site JC10 contains natural resource features that are not a Title 13 HCA and are therefore subject to Statewide Planning Goal 5 OAR 660-023-0110. The General ESEE analysis, Volume 4, describes the conflicting uses and provides an overarching analysis of the economic, social, environmental and energy consequences of prohibiting, limiting or allowing the conflicting uses within areas of significant natural resources. In addition to the General ESEE analysis, the following resource site-specific consequences are considered.

The common impacts of conflicting uses in the resource site include clearing vegetation; grading activities and soil compaction; adding impervious surface; modifying streams, wetlands and flood areas; generating pollution; landscaping with non-native or invasive vegetation; building fences or other wildlife barriers; and other impacts such as noise, light, litter and pets.

Within the resource site residential uses are allowed outright or conditionally in the R7, R2 and RMP base zones. Industrial uses are allowed in the IG2 base zone. Employment uses are allowed in the EG2 base zone. Open space uses are allowed in the OS base zone. Development of new uses may involve vegetation clearing, grading, filing, and soil compaction, as well as the addition of impervious surfaces and landscaping with non-native plants, with associated impacts on the natural resources. Basic utilities and other infrastructure are allowed in all base zones. New or upgraded utility corridors may be cleared of vegetation and may fragment wildlife habitat.

The analysis of economic, social, environmental and energy consequences provided in Volume 4 is confirmed for resource site JC10, with the following additional information that clarifies the analysis.

Strictly limiting or limiting conflicting uses would retain the wildlife habitat functions provided by significant natural resource features including maintaining habitat for at risk plant, fish and wildlife species, and maintaining the stormwater management and air-cooling functions of the tree canopy. Mitigation for negative consequences of additional development in areas of Class A or Class B wildlife habitat should be required.

Natural Resources Protection Decisions

Based on the analysis presented in Volume 3, Natural Resources Inventory, Volume 4, Title 13 and Goal 5 Compliance, and the resource site-specific evaluation for JC10, the following decisions are applied to protect the significant riparian corridors and wildlife habitat:

1. Apply a protection overlay zone ('p' zone) to stream channels from top-of-bank to top-of-bank, wetlands and land within 100 feet of stream top-of-bank or 30 feet of wetlands.
2. Apply a protection overlay zone ('p' zone) to areas of tax lot 1S2E21CA 2700 (R146077) where an environmental violation was recorded (CC 2008 130066).
3. Apply a protection overlay zone ('p' zone) to the island between two arms of Johnson Creek.
4. Apply a conservation overlay zone ('c' zone) to land between 100 and 125 feet of stream top-of-bank, and land between 30 and 55 feet of wetlands.
5. Apply a conservation overlay zone ('c' zone) to areas of forest or woodland vegetation contiguous to but more than 125 feet from stream top-of-bank, and areas of forest or woodland vegetation contiguous to but more than 55 feet from wetlands.
6. Apply a conservation overlay zone ('c' zone) to areas of shrubland or herbaceous vegetation within public parks and areas of forest, woodland vegetation contiguous to but outside of public parks.
7. Allow conflicting uses within all other areas containing significant natural resources.

Resource Site No.: JC11 Resource Site Name: 89th and Flavel

Previous Plan: Johnson Creek Basin Protection Plan

Previous Resource Site No.: 12/13

The results of the analysis found in Volume 3, Natural Resources Inventory, Volume 4, Title 13 and Goal 5 Compliance, and the resource site-specific evaluation, are presented in the following maps:

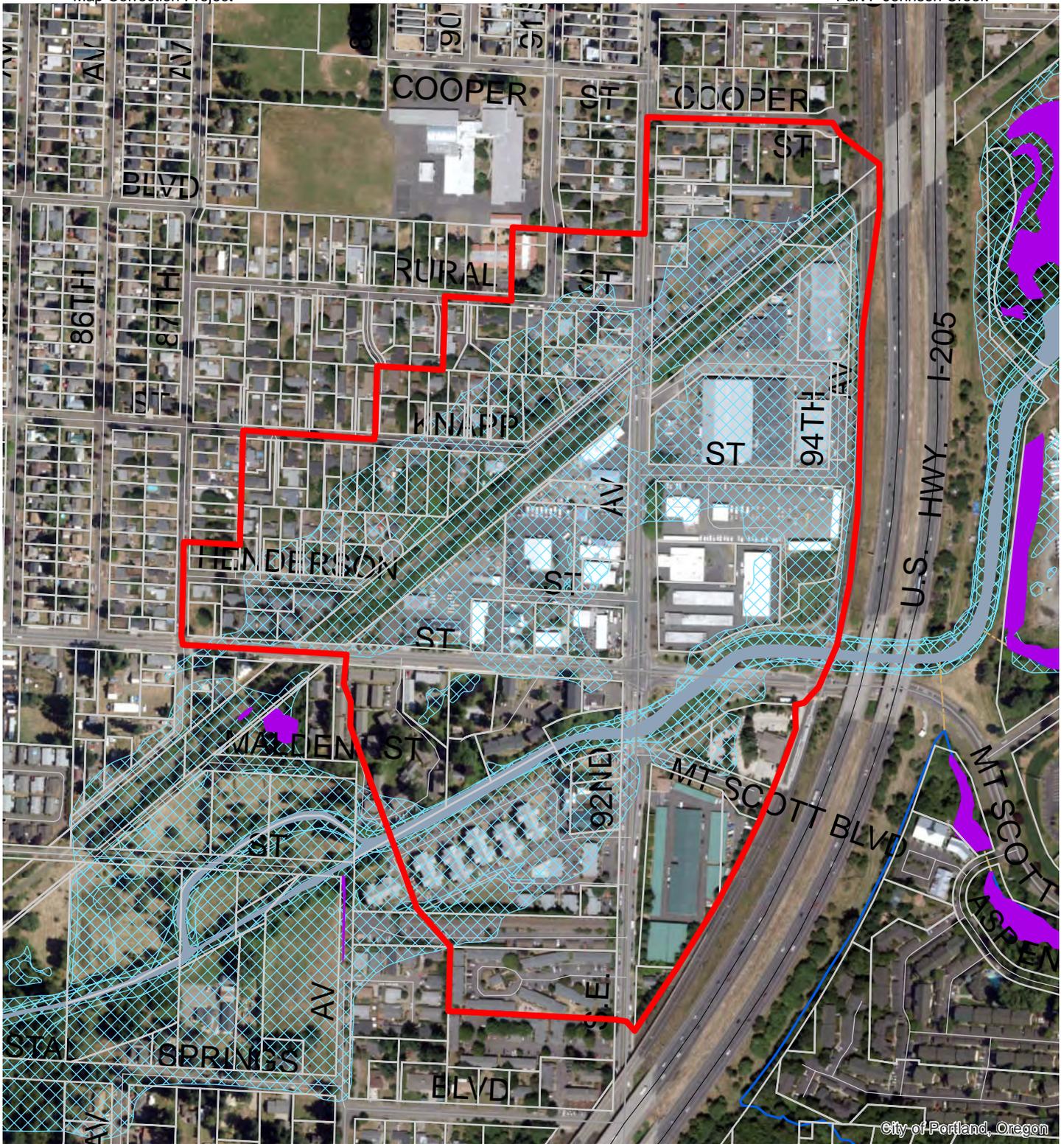
- A. Water Features – rivers, streams, wetlands and flood areas
- B. Land Features – forest, woodland, shrubland and herbaceous vegetation, steep slopes
- C. Special Habitat Areas
- D. Riparian Corridor Classifications
- E. Wildlife Habitat Classifications
- F. Urban Development Value
- G. Metro Title 13 Habitat Conservation Areas
- H. Statewide Planning Goal 5 Areas
- I. Recommended Natural Resource Protections

Following the maps, additional information about existing natural resource features and functions in the resource site is presented.

Implementation of the results is found in Volume 1, Part B, updates to zoning maps and zoning code.

Resource site JC11 includes the following:

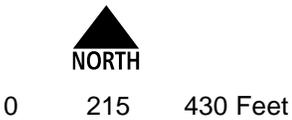
Site (acres)	77.8
Base zones (acres)	
CM1	3.8
EG2	7.7
IG2	22.2
OS	7.9
R2.5	<1
R5	14.8
RM1	21.5
RMP	<1



Map A: Water Features

Resource Site: JC11

Updated: July 2021

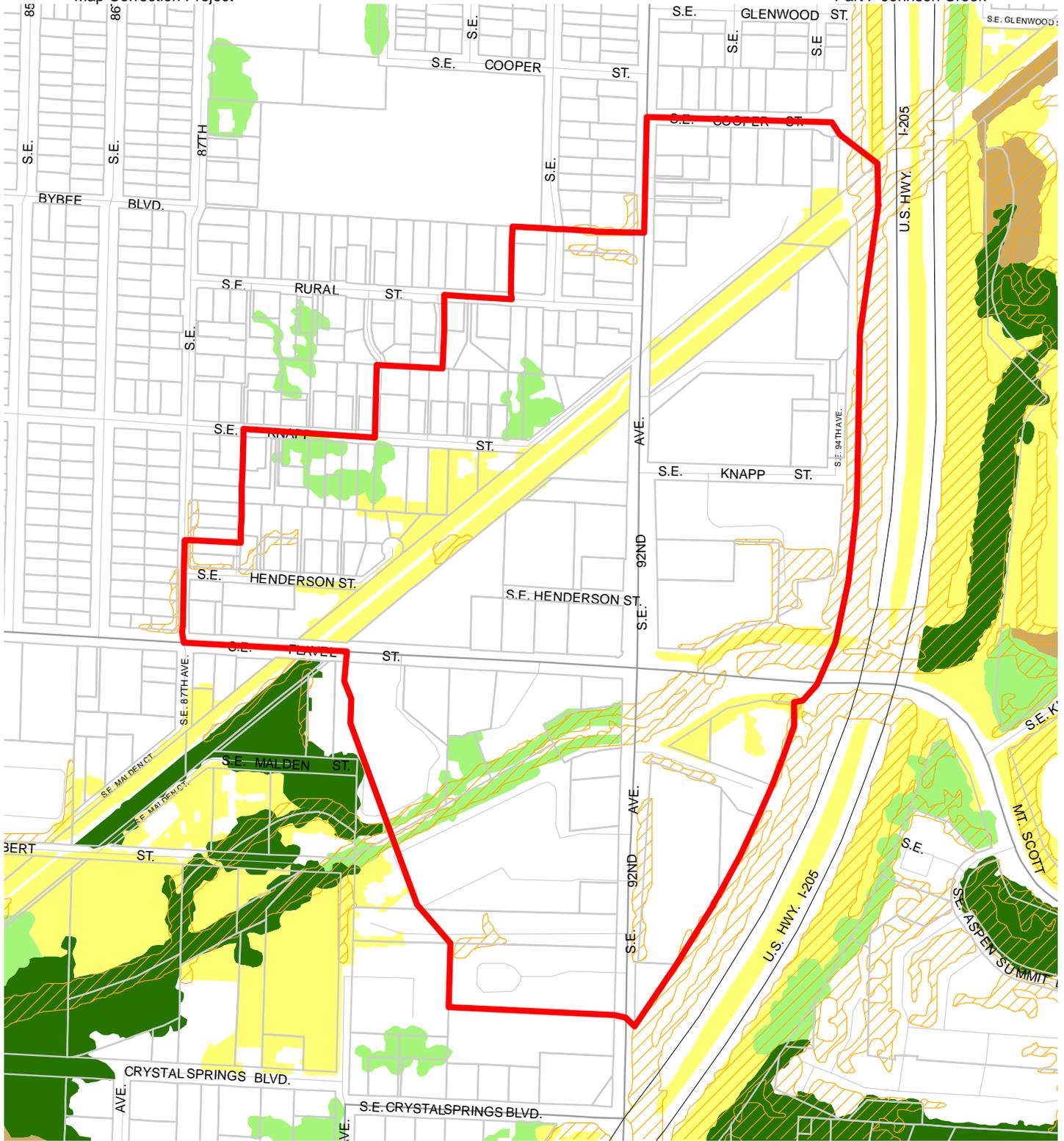


Proposed Draft - As Amended

- Resource Sites
- Urban Service Boundary
- Taxlots
- Wetlands
- Rivers
- Open stream channel
- Piped Stream Segment
- Flood Area



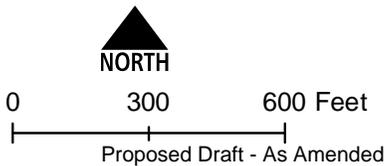
The information on the map was derived from digital databases. Care was taken in the creation of this map but it is provided "as is". The City of Portland ensures meaningful access to city programs, services, and activities to comply with Civil Rights Title VI and ADA Title II laws and reasonably provides: translation, interpretation, modifications, accommodations, alternative formats, auxiliary aids and services. To request these services, contact 503-823-7700, City TTY 503-823-6868, Relay Service: 711.
July 2021



Map B: Vegetation and Steep Slopes

Resource Site: JC11

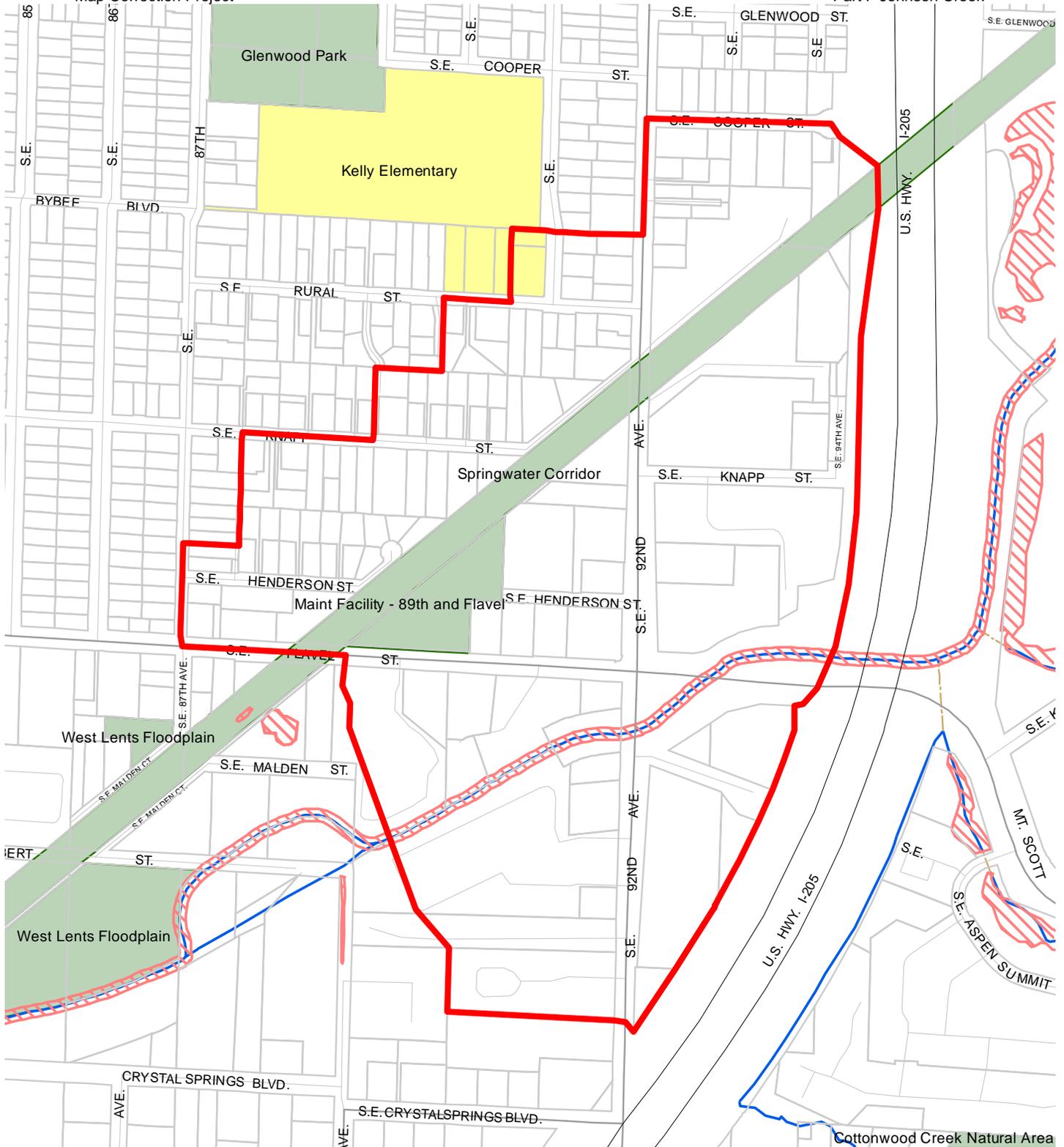
Updated: July 2021



- Resource Sites
- Urban Service Boundary
- Taxlots
- Slopes >25%
- Forest
- Woodland
- Shrubland
- Herbaceous

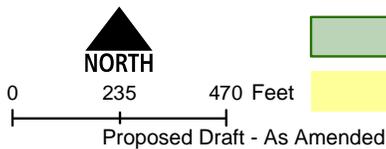


The information on the map was derived from digital databases. Care was taken in the creation of this map but it is provided "as is". The City of Portland ensures meaningful access to city programs, services, and activities to comply with Civil Rights Title VI and ADA Title II laws and reasonably provides: translation, interpretation, modifications, accommodations, alternative formats, auxiliary aids and services. To request these services, contact 503-823-7700, City TTY 503-823-6868, Relay Service: 711. July 2021



**Map C: Special
Habitat Areas**
**Resource Site:
JC11**

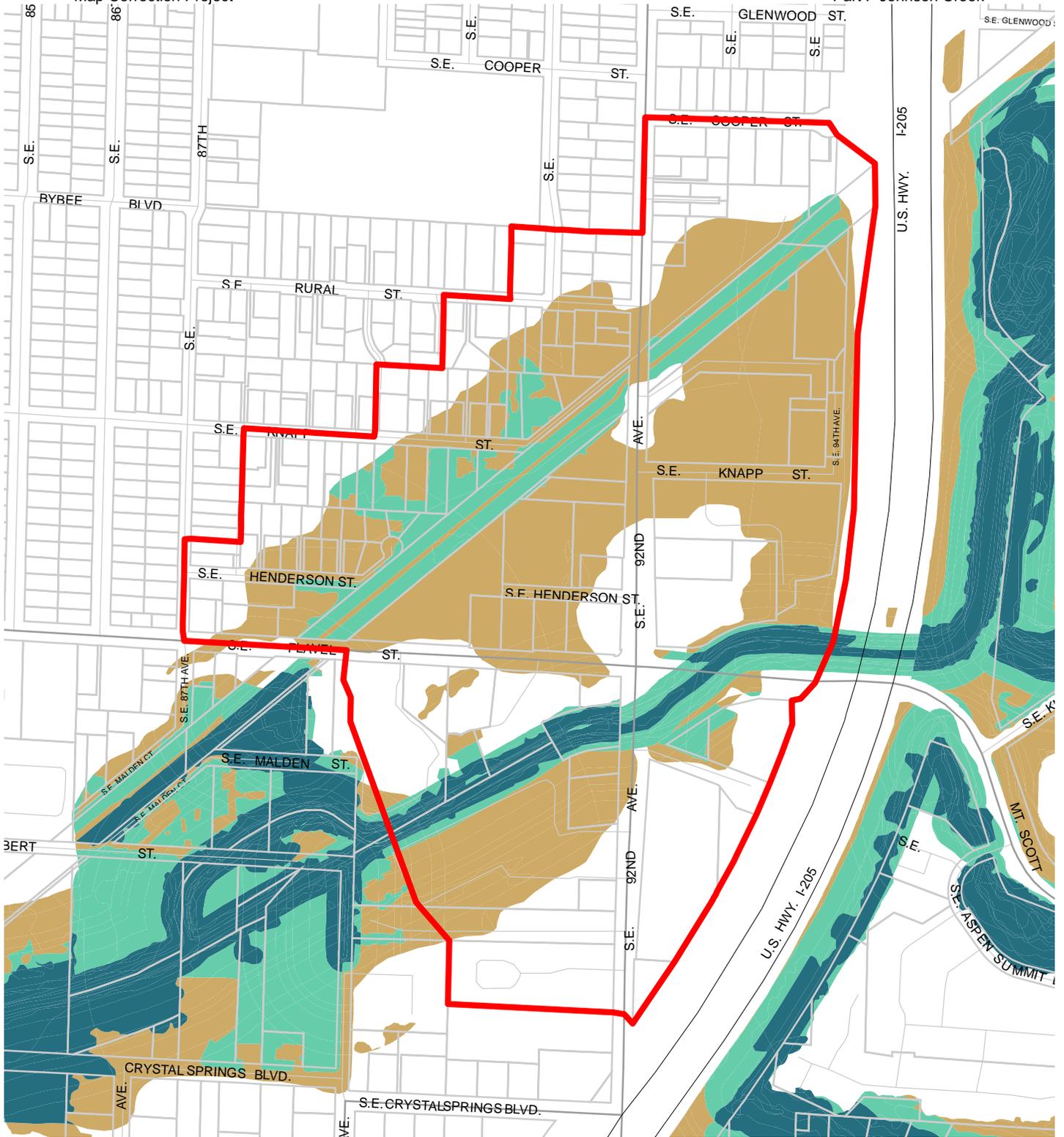
Updated: June 2021



- Resource Sites
- Urban Service Boundary
- Special Habitat Areas (SHAs)
- Taxlots
- Open Stream Channel
- Piped Stream Segment
- Parks
- Schools



The information on the map was derived from digital databases. Care was taken in the creation of this map but it is provided "as is". The City of Portland ensures meaningful access to city programs, services, and activities to comply with Civil Rights Title VI and ADA Title II laws and reasonably provides: translation, interpretation, modifications, accommodations, alternative formats, auxiliary aids and services. To request these services, contact 503-823-7700, City TTY 503-823-6868, Relay Service: 711. July 2021



**Map D: Riparian
Corridors Habitat
Classification**

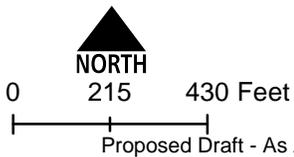
**Resource Site:
JC11**

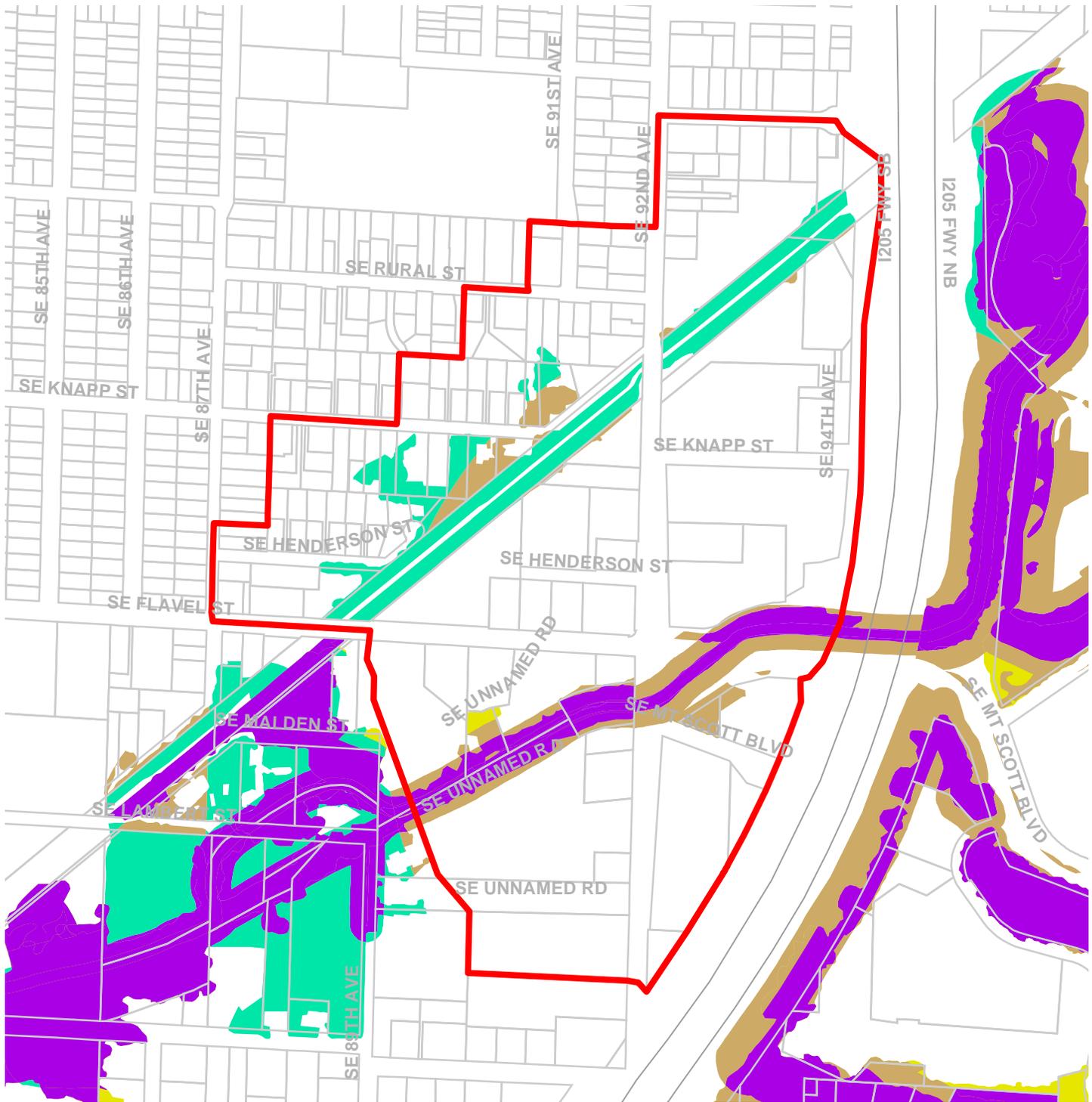
Updated: July 2021

- Resource Sites
- Urban Service Boundary
- Class I (high rank)
- Class II (medium rank)
- Class III (low rank)
- Taxlots



The information on the map was derived from digital databases. Care was taken in the creation of this map but it is provided "as is". The City of Portland ensures meaningful access to city programs, services, and activities to comply with Civil Rights Title VI and ADA Title II laws and reasonably provides: translation, interpretation, modifications, accommodations, alternative formats, auxiliary aids and services. To request these services, contact 503-823-7700, City TTY 503-823-6868, Relay Service: 711.



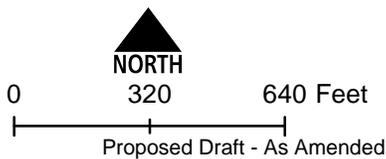


Map G: Title 13 Habitat Conservation Areas (HCA) and Goal 5 Areas

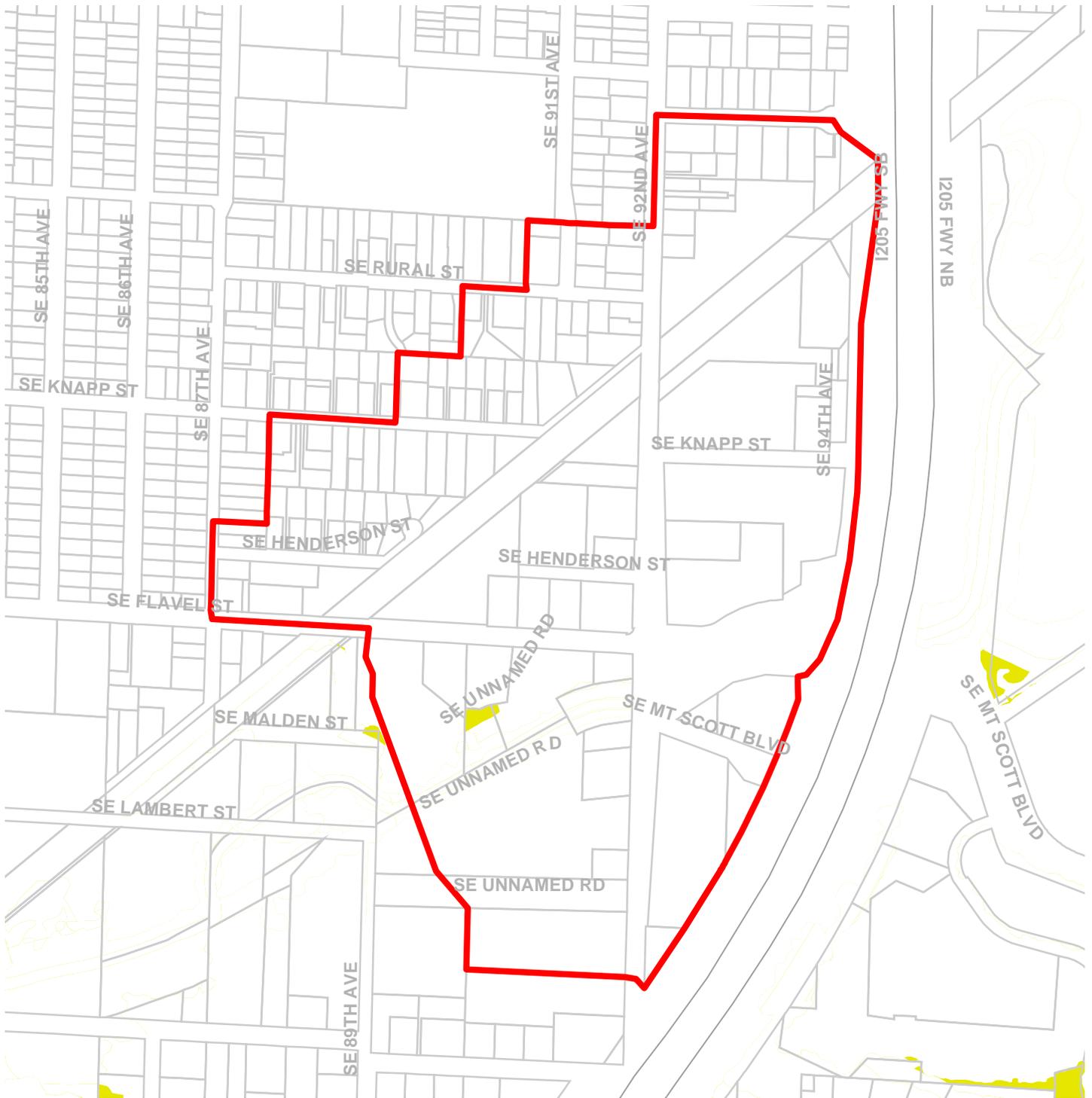
Resource Site: JC11

Updated: July 2021

-  Urban Service Boundary
-  Resource Sites
-  HCA High Value
-  HCA Moderate Value
-  HCA Low Value
-  Goal 5 Significant Natural Resources



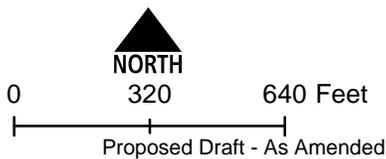
The information on the map was derived from digital databases. Care was taken in the creation of this map but it is provided "as is". The City of Portland ensures meaningful access to city programs, services, and activities to comply with Civil Rights Title VI and ADA Title II laws and reasonably provides: translation, interpretation, modifications, accommodations, alternative formats, auxiliary aids and services. To request these services, contact 503-823-7700, City TTY 503-823-6868, Relay Service: 711.



Map H: Goal 5 Resources

Resource Site: JC11

Updated: July 2021

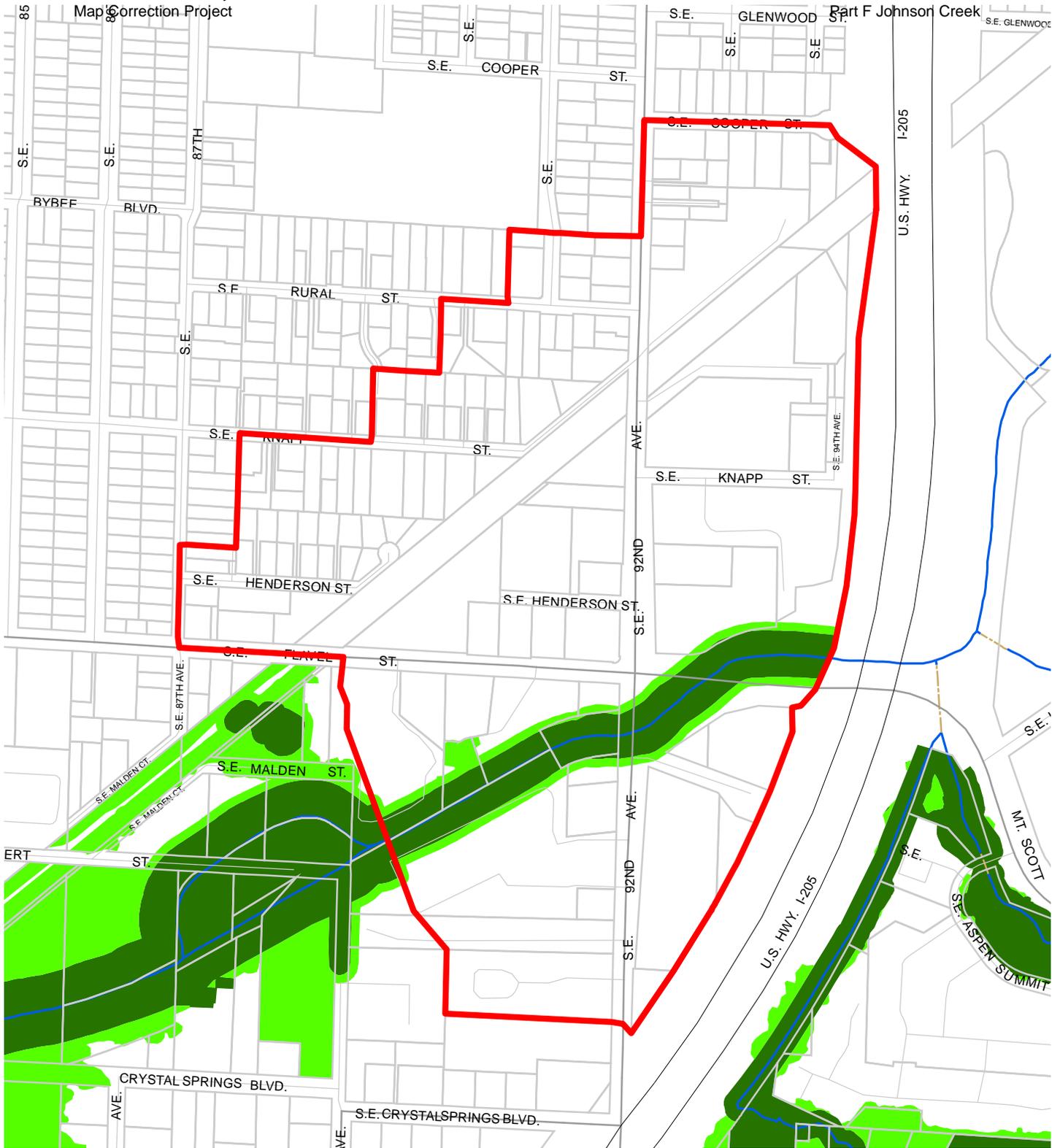


-  Urban Service Boundary
-  Resource Sites
-  Goal 5 Significant Natural Resources



The information on the map was derived from digital databases. Care was taken in the creation of this map but it is provided "as is". The City of Portland ensures meaningful access to city programs, services, and activities to comply with Civil Rights Title VI and ADA Title II laws and reasonably provides: translation, interpretation, modifications, accommodations, alternative formats, auxiliary aids and services. To request these services, contact 503-823-7700, City TTY 503-823-6868, Relay Service: 711.

July 2021

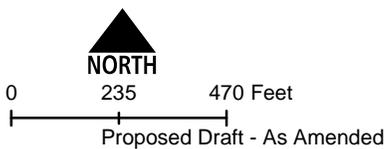


Map I: DRAFT Proposed Environmental Overlay Zones

**Resource Site:
JC11**

Updated: July 2021

- Resource Sites
- Open Stream Channel
- Urban Service Boundary
- Taxlots
- Piped Stream Segment
- Proposed Conservation Zone
- Proposed Protection Zone



The information on the map was derived from digital databases. Care was taken in the creation of this map but it is provided "as is". The City of Portland ensures meaningful access to city programs, services, and activities to comply with Civil Rights Title VI and ADA Title II laws and reasonably provides: translation, interpretation, modifications, accommodations, alternative formats, auxiliary aids and services. To request these services, contact 503-823-7700, City TTY 503-823-6868, Relay Service: 711.
July 2021

Natural Resource Description

Within resource site JC11 the following significant natural resource features and functions are present:

Significant Riparian Corridor Features: open stream; flood area; land within 50 feet of waterbodies; forest, woodland, shrubland and herbaceous vegetation within 300 feet of waterbodies; and forest vegetation on steep slopes (>25% slope) contiguous to and within 780 feet of waterbodies.

Significant Wildlife Habitat Features: forest patches, and associated and contiguous wetlands, two acres in size or larger.

Special Habitat Areas: Johnson Creek (S, C)

Riparian Corridor Functions: microclimate and shade; stream flow moderation and water storage; bank function and sediment, pollution and nutrient control; large wood and channel dynamics; organic inputs, food web and nutrient cycling; and riparian wildlife movement corridor.

Wildlife Habitat Functions: interior area; food and water; resting, denning, nesting and rearing; movement and migration; reduction of noise, light and vibration; and habitat patches that support special status fish and wildlife species.

Table A: Quantity of Natural Resource Features in Resource Site		JC11
		Study Area
Stream (Miles)		0.3
Wetlands (acres)		0.0
Vegetated Areas >= 1/2 acre (acres)		
	Forest (acres)	0.0
	Woodland (acres)	3.1
	Shrubland (acres)	0.0
	Herbaceous (acres)	6.7
Flood Area*		
	Vegetated (acres)	7.9
	Non-vegetated (acres)	35.1
Steep Slopes (acres)**		6.2
* The flood area includes the FEMA 100-year flood plain plus the adjusted 1996 flood inundation area.		
**Slopes are derived from LiDAR. Steep slopes are areas with a slope greater than 25%.		

Natural resources are confined almost entirely to the creek and bank. The site is bounded by I-205 and the MAX light rail line on the east and south, industrial activities along the north and northwest, and multifamily development to the southwest. The Springwater Corridor Trail separates a single-family neighborhood to the northwest from multifamily housing and industrial uses to the southeast.

Sections of the creek were lined with concrete during construction of I-205. Downstream of I-205, the WPA project dramatically over widened and deepened the stream, then armored the stream bed and banks. Riparian canopy cover is extremely limited primarily with single tree layers that provide little shade to this slow-moving section of stream allowing direct solar radiation input into Johnson Creek. Johnson Creek exceeds the water quality temperature standard developed by the state to maintain salmonid populations. Recovering native riparian canopy cover across this site will greatly benefit Johnson Creek and help to address water quality standards. As with the rest of Johnson Creek, this section functions as a travel corridor and water source for wildlife moving up and down the creek during low flow. Native mussel surveys in this area revealed relatively high numbers of native Oregon floaters near and under I-205.

Johnson Creek and its long history of flooding have influenced this site. Much of the site – including industrial, commercial and residential development – is in the 100-year floodplain of Johnson Creek, and perennial flooding is common. The development and impervious surfaces decrease stream capacity, increase runoff and limit the capacity for local flood management or infiltration. Larger flood events generally occur from December through February, with 85 percent of the stream's runoff occurring between November and March.

Coho salmon, Chinook salmon, steelhead trout, and Pacific lamprey are documented within this reach of Johnson Creek. In 2019, a study of Johnson Creek's potential to support salmon populations identified this reach of Johnson Creek as important both to protect and to restore for Chinook salmon —meaning its planned restoration actions in the West Lents project area are expected to have important benefit to habitat potential and that additional improvement possibilities exist. Limited factors identified for the habitat performance in this reach include high sediment loading, channel instability, and low habitat diversity. The restoration potential in this reach will also significantly benefit coho salmon and steelhead trout.

Special status bird species observed in or adjacent to this resource site include bald eagle, downy woodpecker, rufous hummingbird, and Wilson's warbler.

Table B: Quality of Natural Resource Functions in Resource Site JC11				
Resource Site (acres) = 78				
	Class 1/A	Class 2/B	Class 3/C	Total
Riparian Corridors*				
acres	2.7	8.7	33.0	44.5
percent total inventory site area	3.5%	11.2%	42.4%	57.2%
Wildlife Habitat*				
acres	0.0	1.7	0.0	1.7
percent total inventory site area	0.0%	2.1%	0.0%	2.1%
Special Habitat Areas**				
acres	1.2			
percent total inventory site area	1.6%			
Combined Total*				
acres	2.7	8.9	32.9	44.5
percent total inventory site area	3.5%	11.4%	42.3%	57.2%
* Class I riparian resources, Special Habitat Areas, and wildlife habitat include open water. ** Metro Title 13 designated all Special Habitat Areas as Class I riparian corridors. + Because riparian resources, Special Habitat Areas, and wildlife Habitat overlap, the results cannot be added together to determine the combined results.				

Stormwater runs off impervious surfaces (e.g., rooftops, driveways, parking areas, streets, etc..) rapidly. Without a place to retain the water (such as wetlands or adequate stormwater facilities), stormwater runoff results in spikes in stream levels which can cause or exacerbate flooding and increase stream erosion. In addition, when water runs off quickly, it does not have a chance to infiltrate and recharge streams or aquifers to provide water during drier periods.

The type and capacity of stormwater facilities to manage the runoff from impervious surfaces varies in the city, affecting the local rate and amount of runoff, and the amount of pollutants in the water. Much of the city was developed prior to any stormwater regulations and receives limited or no management prior to discharging to pipes and surface waters.

Table C shows the total amount of impervious area within the resource site and how much of that impervious area lacks stormwater management; the percentage of total impervious area that is not managed is called "effective impervious area." The higher the percent of effective impervious area in a watershed, the greater the negative impacts of stormwater runoff to streams. Stream science indicates that when effective impervious area reaches 10% of a watershed, negative stream impacts become significant; and at 25%, these impacts on waterways can be substantial. An additional consideration is the differences in soil conditions and other factors that influence the ability of pervious areas to retain, infiltrate or filter

pollutants from stormwater. For example, a mature forest is much more effective in managing stormwater than a manicured lawn; both areas would have a lower effective impervious surface percentage than a developed site, but they have different outcomes for stormwater management.

For Resource Area JC11, 14.4% of the total area is effectively impervious, indicating significant negative impacts are occurring due to the level of unmanaged impervious area and any additional impacts will cause further degradation.

Table C. Impervious Area within Resource Site JC11			
Total area (acres)	Total impervious Area (acres)	Total unmanaged impervious area* (acres)	Percent of resource site that is effectively impervious
77.8	23.5	11.2	14.4%

*Total unmanaged impervious area refers to the number of acres within a resource area that receives no formal stormwater management measures to regulate flow or treat pollutants before they reach surface waters, also referred to as effective impervious area.

Metro Title 13 and Oregon Goal 5 Compliance

The following information supplements evaluation of natural resource protections presented in Volume 4 and supports compliance with Metro Title 13 and Oregon Plan Goal 5.

Title 13 Habitat Conservation Areas

Map G presents the Habitat Conservation Areas (HCA) within the Resource site JC11. Natural resources should be protected within HCA as follows:

1. *Strictly limit or limit* conflicting uses within Class I/High Rank Riparian Areas in all Urban Development Areas.
2. *Strictly limit or limit* conflicting uses within Class II/Medium Rank Riparian Areas within Moderate and Low Value Urban Development Area as well as parks and open spaces.
3. *Strictly limit or limit* conflicting uses within Class A/High or B/Medium Rank Wildlife Habitat within parks and open spaces.
4. *Allow* conflicting uses or conducted a local Goal 5 ESEE for Class III/Low Rank Riparian Areas in all Urban Development Areas.
5. *Allow* conflicting uses or conducted a local Goal 5 ESEE for Class A/High, Class B/Medium or Class C/Low Rank Wildlife Habitat in all Urban Development Area, except parks and open space.

Strictly limiting or limiting conflicting uses in HCA will protect and conserve existing streams and wetlands to maintain significant natural resource functions including: microclimate and shade; stream flow moderation and water storage; bank function and sediment, pollution and nutrient control; large wood and channel dynamics; organic inputs, food web and nutrient cycling; and fish and wildlife habitat. *Strictly limiting or limiting* conflicting uses in HCA will allow for additional urban development that is sensitive to the natural resource features and requires mitigation for unavoidable negative impacts to features and functions. The recommendation will also contribute towards meeting other regulatory requirements including the Metro Title 3, Water Quality and Flood Management; Oregon Goal 6, Air, Water and Land Resources Quality; Oregon Goal 7, Areas Subject to Natural Hazards; the Clean Water Act; and the Endangered Species Act.

Goal 5 Significant Natural Resources

Resource site JC11 contains natural resource features that are not a Title 13 HCA and are therefore subject to Statewide Planning Goal 5 OAR 660-023-0110. The General ESEE analysis, Volume 4, describes the conflicting uses and provides an overarching analysis of the economic, social, environmental and energy consequences of prohibiting, limiting or allowing the conflicting uses within areas of significant natural resources. In addition to the General ESEE analysis, the following resource site-specific consequences are considered.

The common impacts of conflicting uses in the resource site include clearing vegetation; grading activities and soil compaction; adding impervious surface; modifying streams, wetlands and flood areas; generating pollution; landscaping with non-native or invasive vegetation; building fences or other wildlife barriers; and other impacts such as noise, light, litter and pets.

Within the resource site industrial uses are allowed outright or conditionally in the IG2 base zones. Employment uses are allowed in the EG2 base zone. Commercial uses are allowed in the CM1 base zone. Development of new uses may involve vegetation clearing, grading, filling, and soil compaction, as well as the addition of impervious surfaces and landscaping with non-native plants, with associated impacts on the natural resources. Basic utilities and other infrastructure are allowed in all base zones. New or upgraded utility corridors may be cleared of vegetation and may fragment wildlife habitat.

The analysis of economic, social, environmental and energy consequences provided in Volume 4 is confirmed for resource site JC11, with the following additional information that clarifies the analysis.

Strictly limiting or limiting conflicting uses would retain the wildlife habitat functions provided by significant natural resource features including maintaining habitat for at risk plant, fish and wildlife species, and maintaining the stormwater management and air-cooling functions of the

tree canopy. Mitigation for negative consequences of additional development in areas of Class A or Class B wildlife habitat should be required.

Natural Resources Protection Decisions

Based on the analysis presented in Volume 3, Natural Resources Inventory, Volume 4, Title 13 and Goal 5 Compliance, and the resource site-specific evaluation for JC11, the following decisions are applied to protect the significant riparian corridors and wildlife habitat:

1. Apply a protection overlay zone ('p' zone) to stream channels from top-of-bank to top-of-bank, wetlands and land within 50 feet of stream top-of-bank or 30 feet of wetlands.
2. Apply a conservation overlay zone ('c' zone) to land between 50 and 75 feet of stream top-of-bank and between 30 and 55 feet of wetland.
3. Apply a conservation overlay zone ('c' zone) to areas of forest or woodland vegetation contiguous to but more than 75 feet from stream top-of-bank, and areas of forest or woodland vegetation contiguous to but more than 55 feet from wetlands.
4. Allow conflicting uses within all other areas containing significant natural resources.

Note – Resource Site JC12 is outside of the scope of the Ezone Map Correction Project. The resource site numbering in the Ezone Project skips from JC11 to JC13. Resource Site JC12 was previously identified in the Johnson Creek Resource Protection Plan as Resource Site 14. JC12 is still regulated by that plan and the existing Ezone maps and resource protection decisions that were made when that plan was adopted will remain in effect.

Resource Site No.: JC13 **Resource Site Name:** Foster Floodplain

Previous Plan: Johnson Creek Basin Protection Plan

Previous Resource Site No.: 15

The results of the analysis found in Volume 3, Natural Resources Inventory, Volume 4, Title 13 and Goal 5 Compliance, and the resource site-specific evaluation, are presented in the following maps:

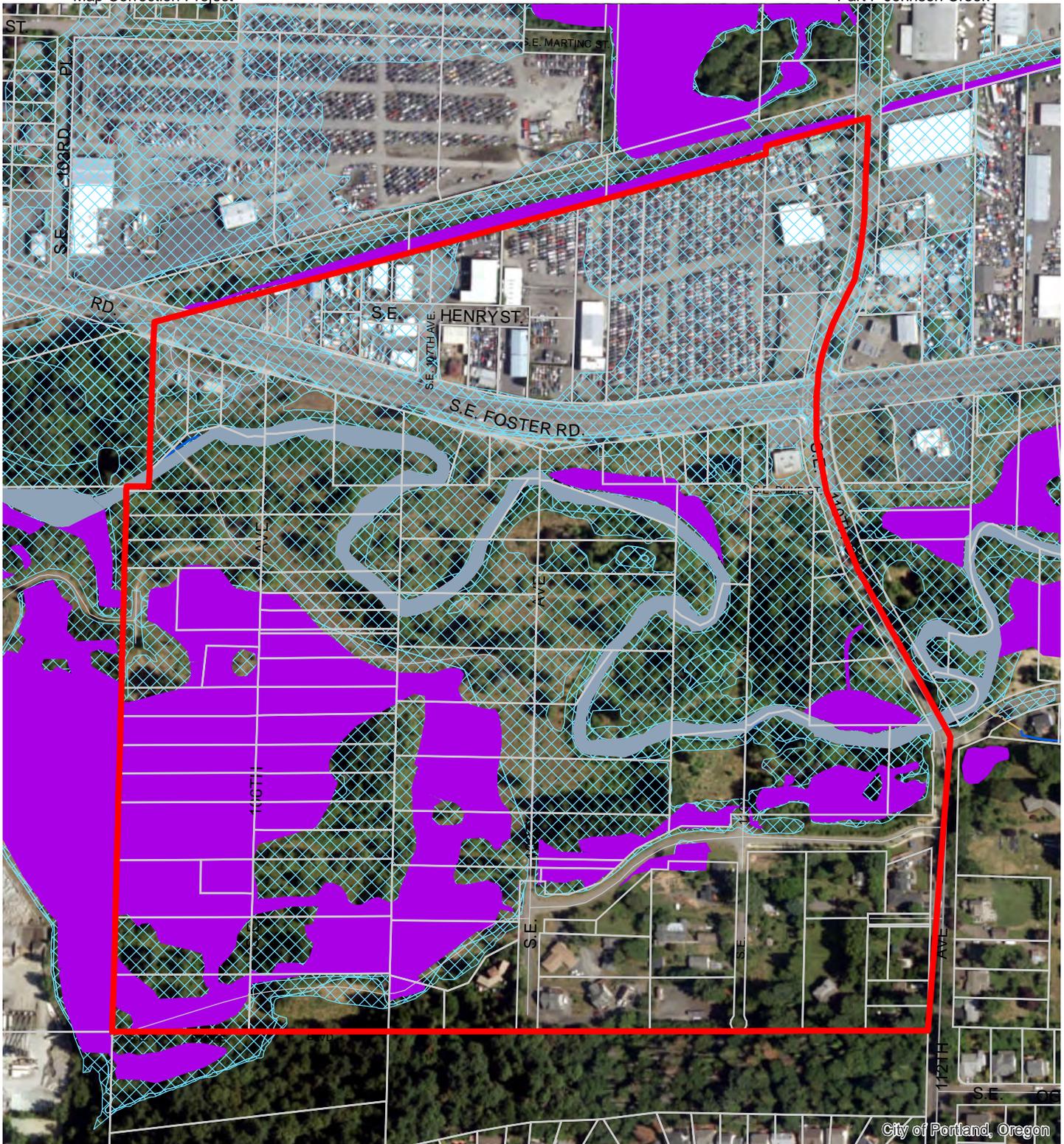
- A. Water Features – rivers, streams, wetlands and flood areas
- B. Land Features – forest, woodland, shrubland and herbaceous vegetation, steep slopes
- C. Special Habitat Areas
- D. Riparian Corridor Classifications
- E. Wildlife Habitat Classifications
- F. Urban Development Value
- G. Metro Title 13 Habitat Conservation Areas
- H. Statewide Planning Goal 5 Areas
- I. Recommended Natural Resource Protections

Following the maps, additional information about existing natural resource features and functions in the resource site is presented.

Implementation of the results is found in Volume 1, Part B, updates to zoning maps and zoning code.

Resource site JC13 includes the following:

Site (acres)	79.7
Base zones (acres)	
EG2	0.6
IG2	14.9
OS	55.1
R10	5.1
R7	4.0



City of Portland, Oregon

Map A: Water Features

Resource Site: JC13

Updated: July 2021



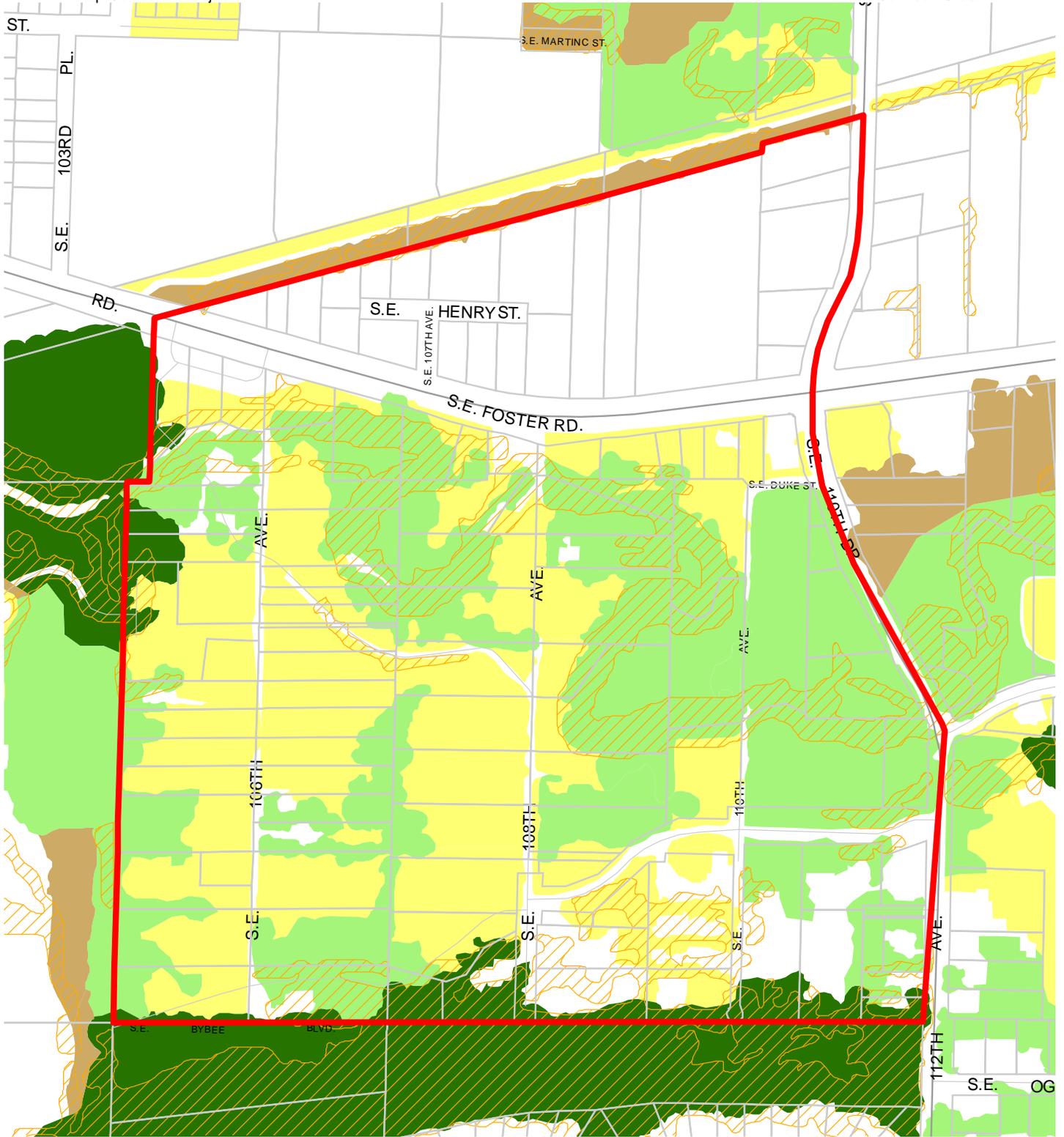
0 170 340 Feet

Proposed Draft - As Amended

- Resource Sites
- Urban Service Boundary
- Taxlots
- Wetlands
- Rivers
- Open stream channel
- Piped Stream Segment
- Flood Area



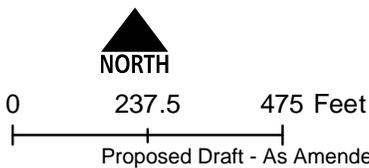
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Map B: Vegetation and Steep Slopes

**Resource Site:
JC13**

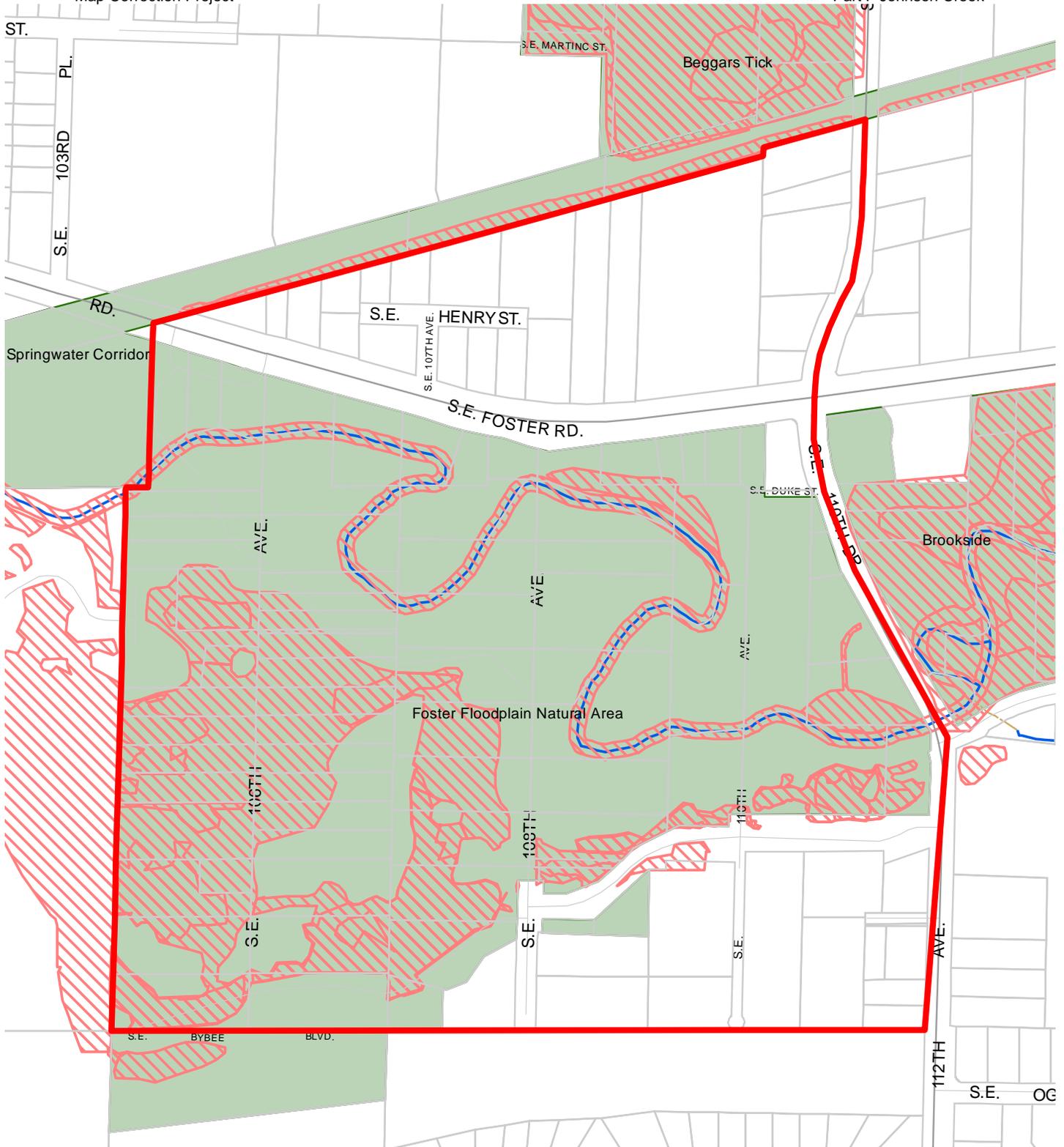
Updated: July 2021



- Resource Sites
- Urban Service Boundary
- Taxlots
- Slopes >25%
- Forest
- Woodland
- Shrubland
- Herbaceous

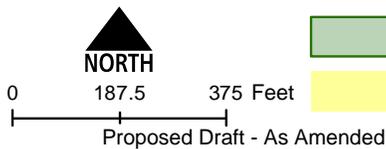


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July 2021



**Map C: Special
Habitat Areas**
**Resource Site:
JC13**

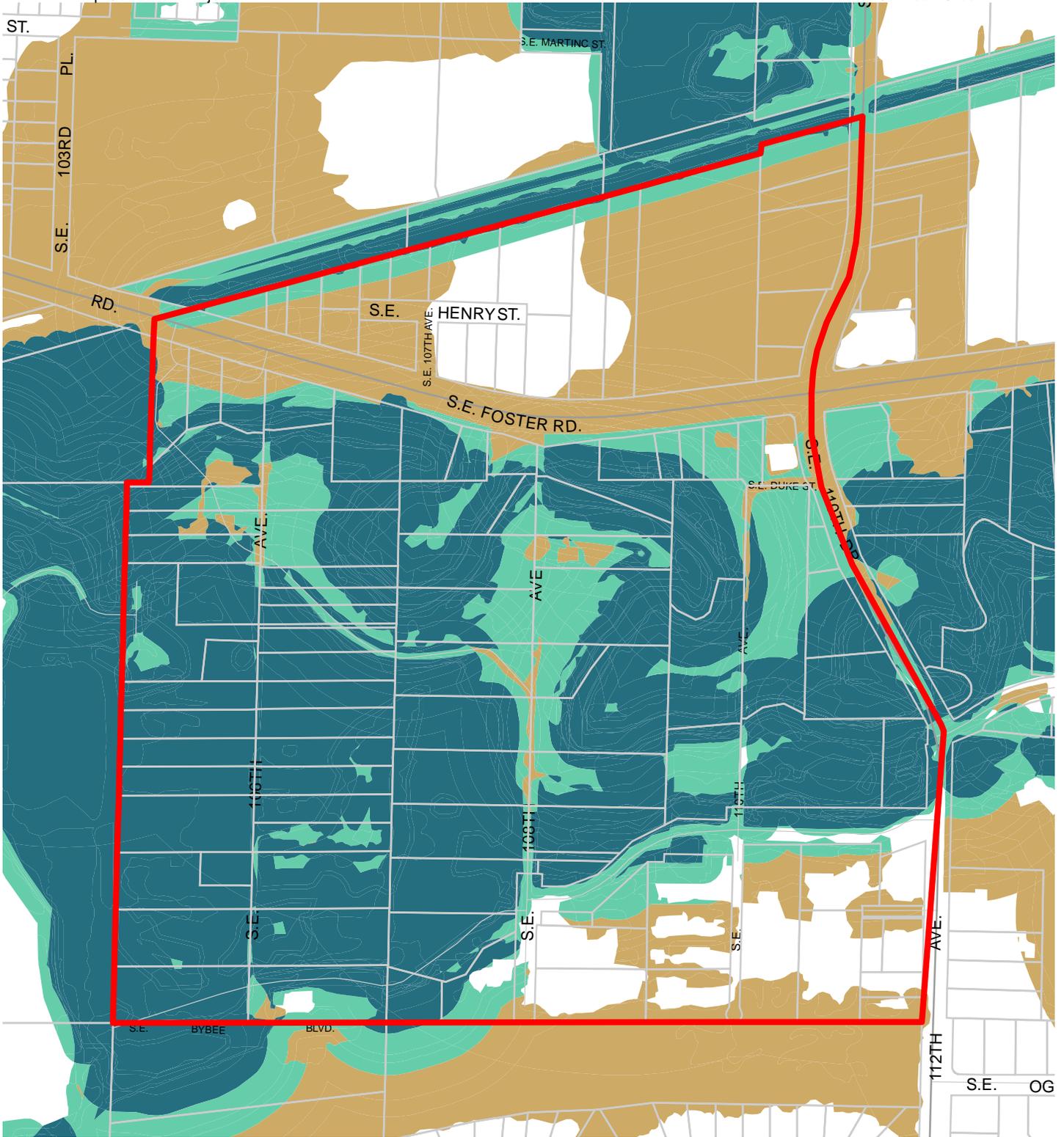
Updated: June 2021



- Resource Sites
- Special Habitat Areas (SHAs)
- Open Stream Channel
- Piped Stream Segment
- Parks
- Schools
- Urban Service Boundary
- Taxlots



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July 2021



**Map D: Riparian
Corridors Habitat
Classification**

**Resource Site:
JC13**

Updated: July 2021

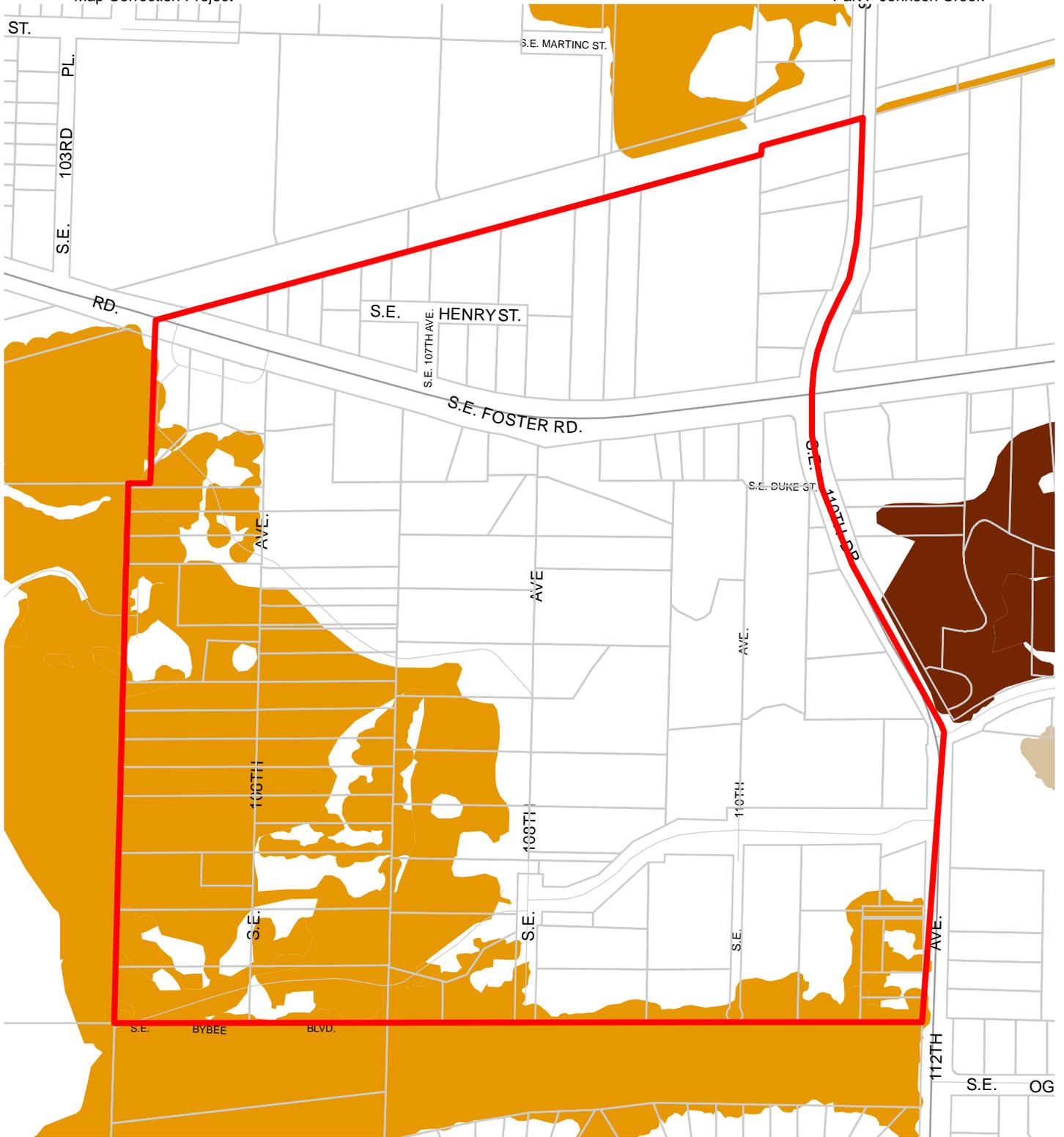
- Resource Sites
- Urban Service Boundary
- Class I (high rank)
- Taxlots
- Class II (medium rank)
- Class III (low rank)



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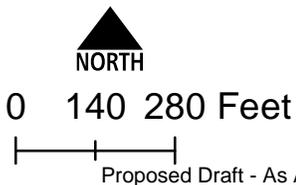
July 2021





**Map E: Wildlife
Habitat Classification**
**Resource Site:
JC13**

Updated: July 2021

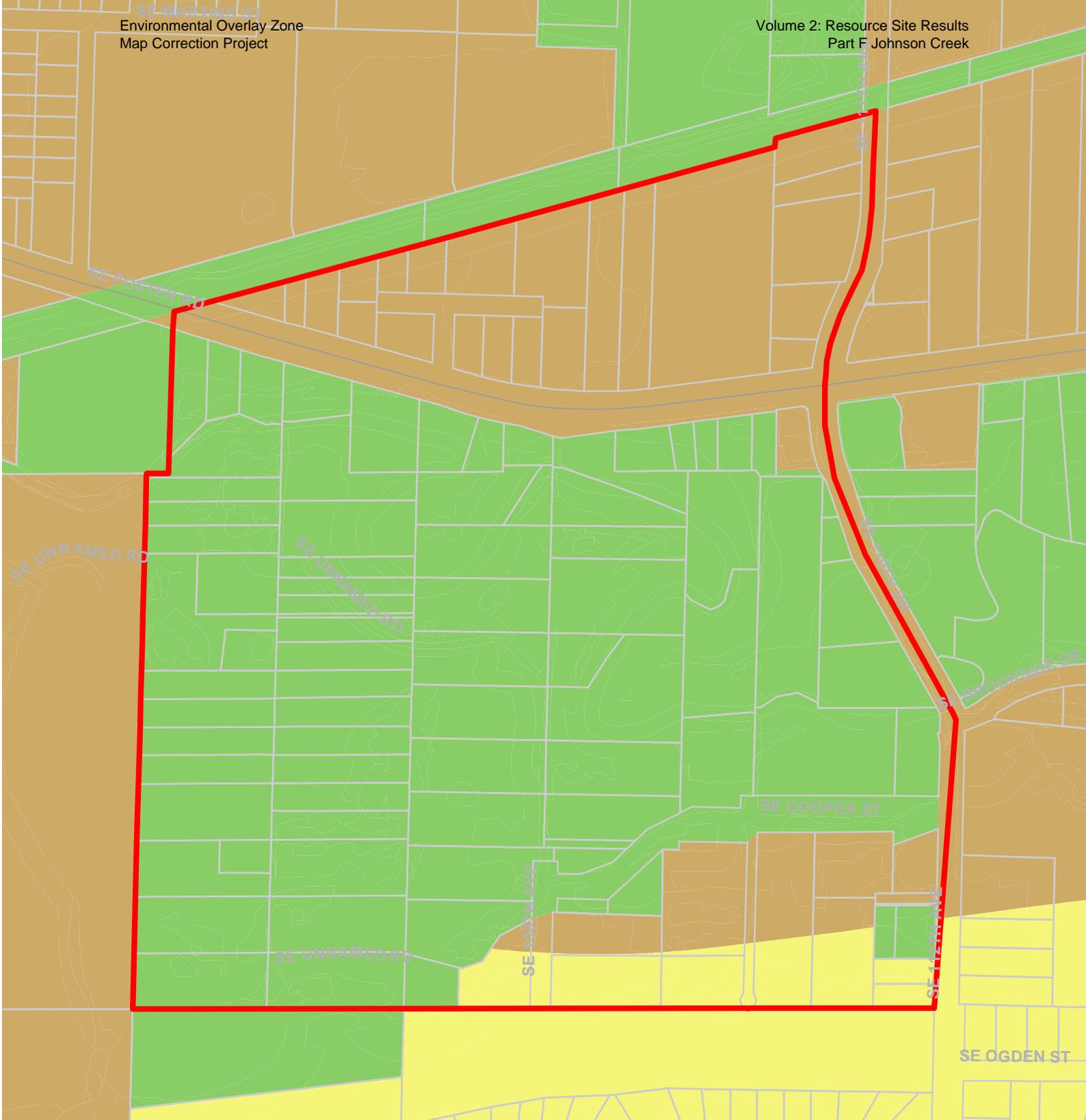


Proposed Draft - As Amended

-  Resource Sites
-  Class A (high rank)
-  Class B (medium rank)
-  Class C (low rank)
-  Urban Service Boundary
-  Taxlots



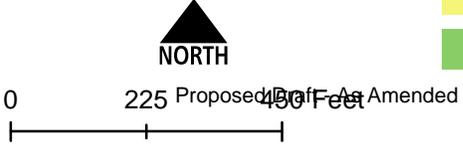
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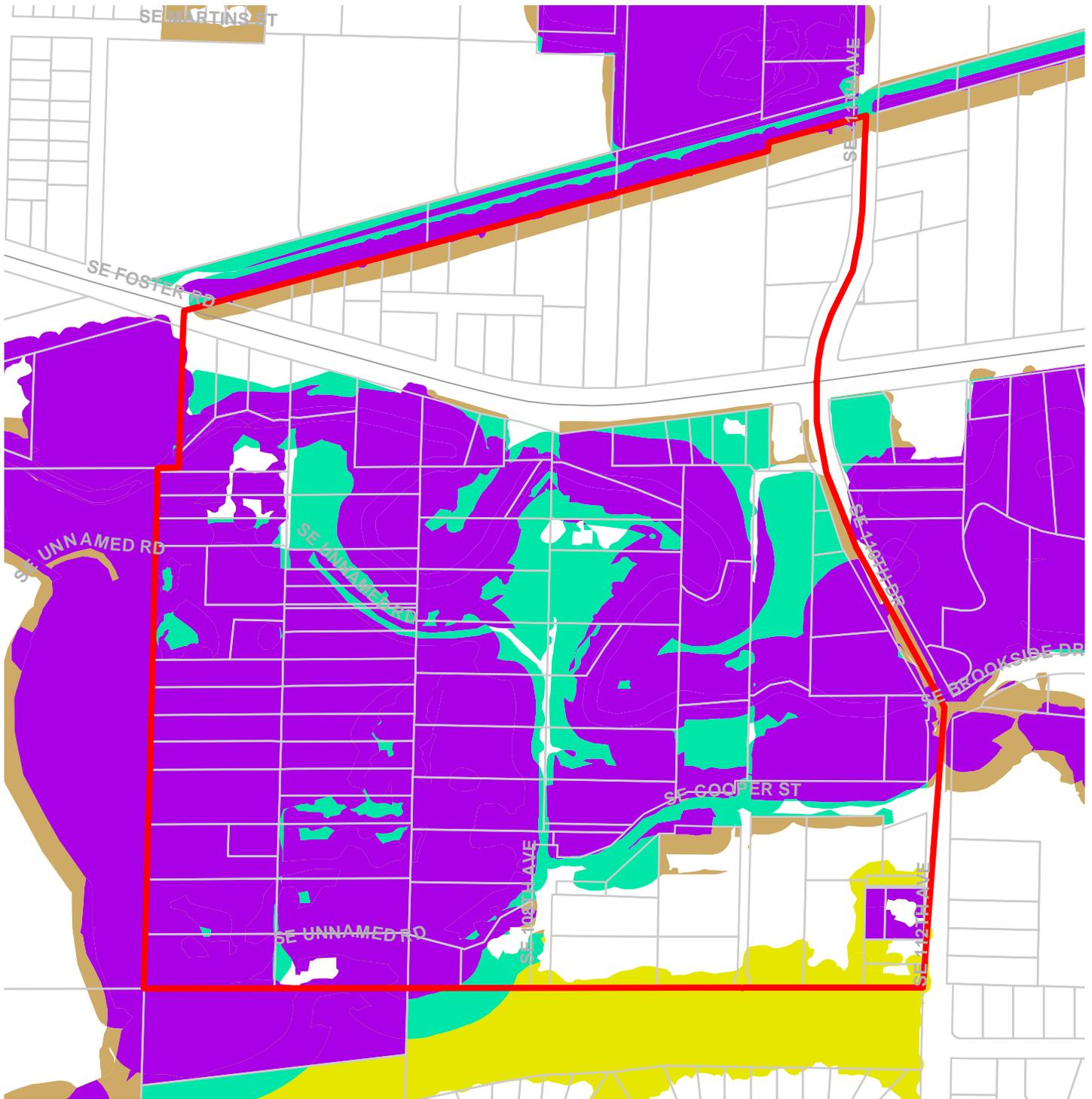
Map F: Urban Development Value (Title 13)
Resource Site: JC13

-  Urban Service Boundary
-  Resource Sites
-  High Development Value
-  Medium Development Value
-  Low Development Value
-  Parks

Updated: July 2021



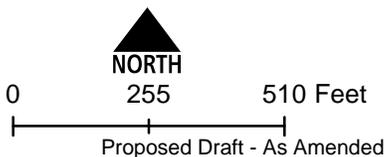
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Map G: Title 13 Habitat Conservation Areas (HCA) and Goal 5 Areas

Resource Site: JC13

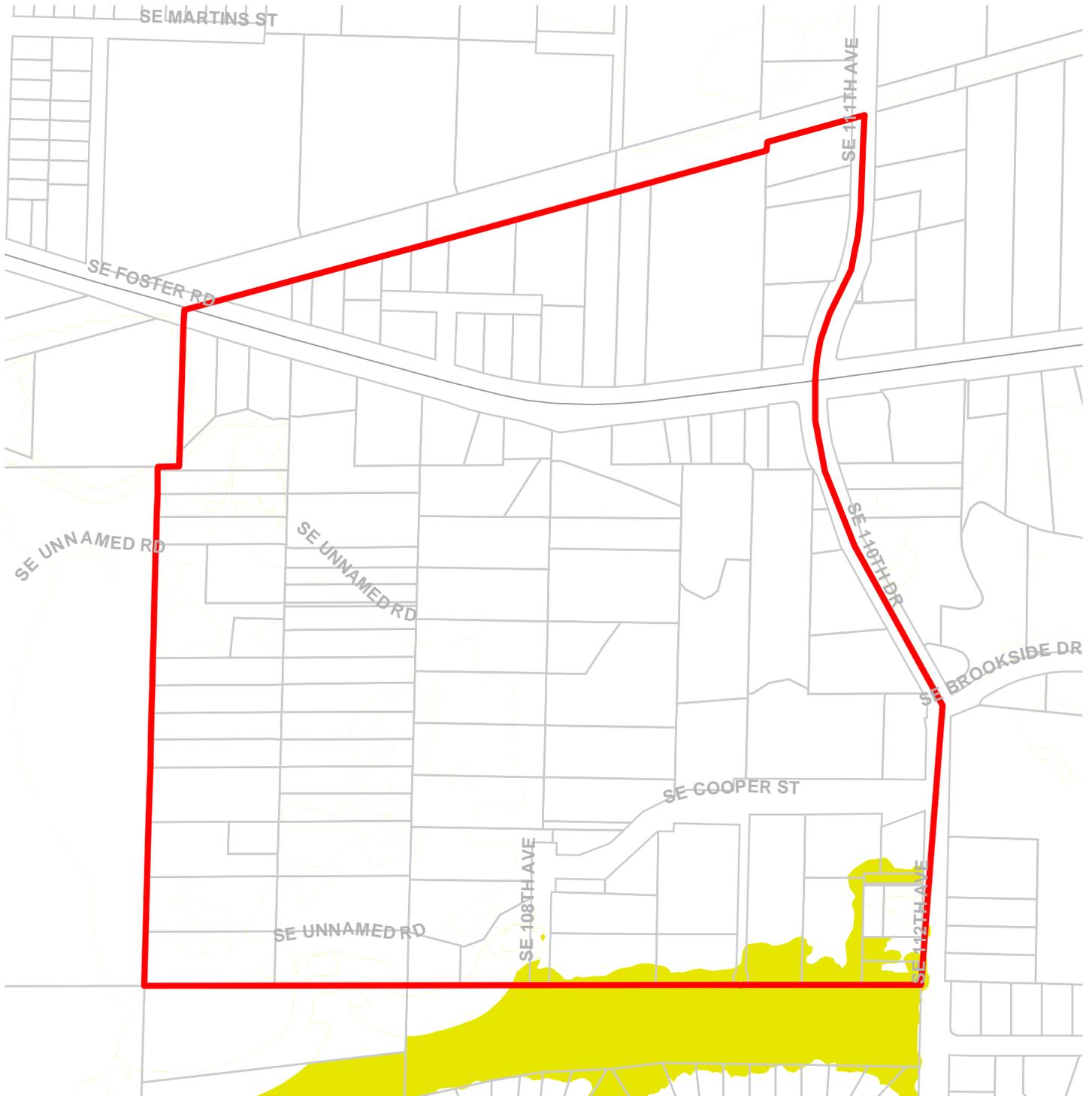
Updated: July 2021



-  Urban Service Boundary
-  Resource Sites
-  HCA High Value
-  HCA Moderate Value
-  HCA Low Value
-  Goal 5 Significant Natural Resources



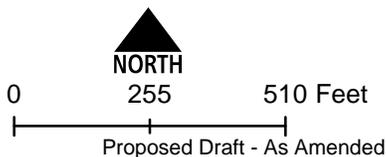
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Map H: Goal 5 Resources

Resource Site: JC13

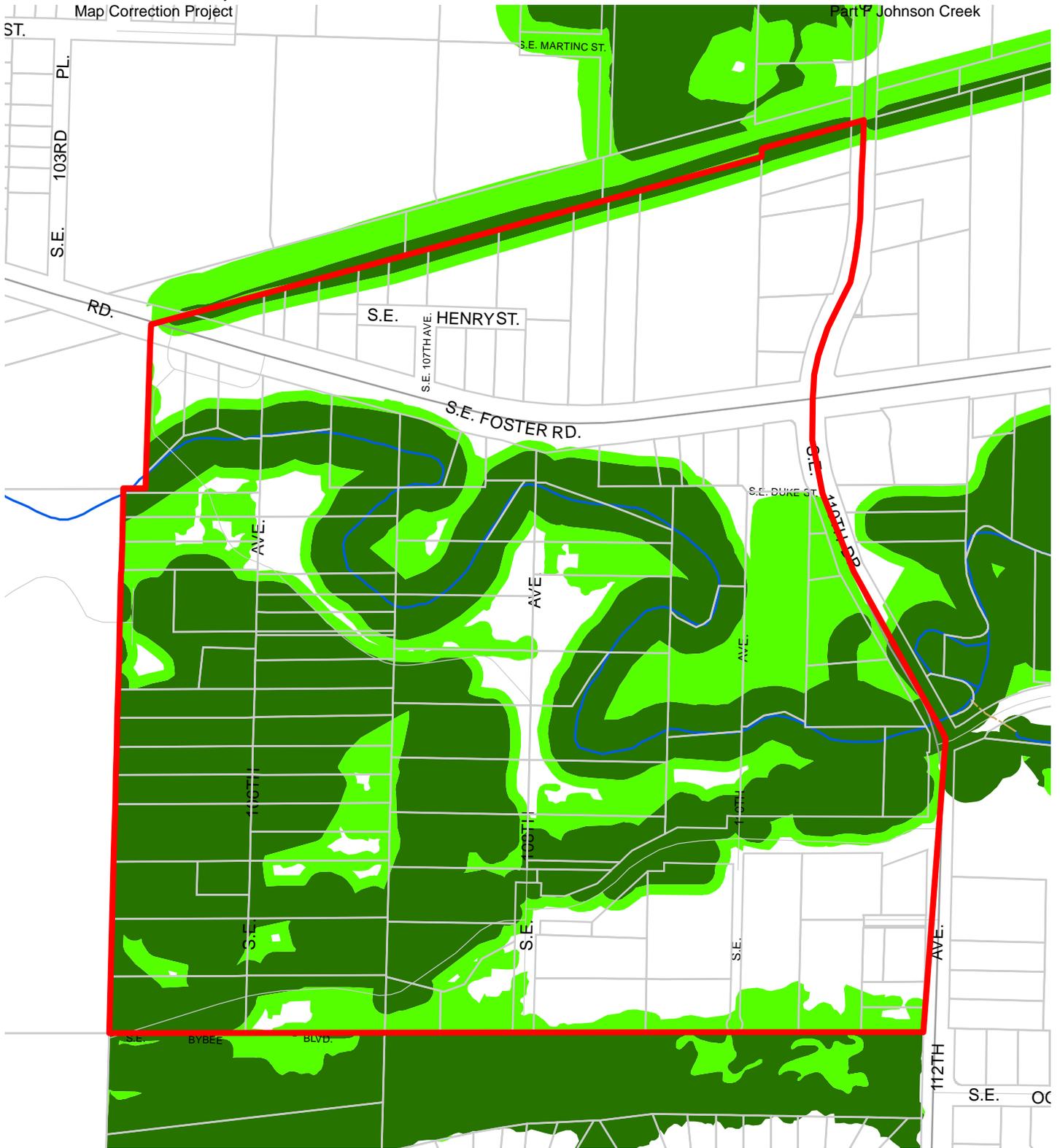
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- Urban Service Boundary
- ▭ Resource Sites
- Goal 5 Significant Natural Resources



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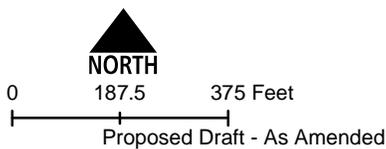


Map I: DRAFT Proposed Environmental Overlay Zones

**Resource Site:
JC13**

Updated: July 2021

- Resource Sites
- Open Stream Channel
- Piped Stream Segment
- Proposed Conservation Zone
- Proposed Protection Zone
- Urban Service Boundary
- Taxlots



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July 2021

Natural Resource Description

Within resource site JC13 the following significant natural resource features and functions are present:

Significant Riparian Corridor Features: open stream; wetland; flood area; land within 50 feet of waterbodies; forest, woodland, shrubland and herbaceous vegetation within 300 feet of waterbodies; and forest vegetation on steep slopes (>25% slope) contiguous to and within 780 feet of waterbodies.

Significant Wildlife Habitat Features: forest patches, and associated and contiguous wetlands, two acres in size or larger.

Special Habitat Areas: Johnson Creek (S, C); wetlands (W)

Riparian Corridor Functions: microclimate and shade; stream flow moderation and water storage; bank function and sediment, pollution and nutrient control; large wood and channel dynamics; organic inputs, food web and nutrient cycling; and riparian wildlife movement corridor.

Wildlife Habitat Functions: interior area; food and water; resting, denning, nesting and rearing; movement and migration; reduction of noise, light and vibration; and habitat patches that support special status fish and wildlife species.

Table A: Quantity of Natural Resource Features in Resource Site		JC13
		Study Area
Stream (Miles)		0.7
Wetlands (acres)		15.7
Vegetated Areas >= 1/2 acre (acres)		
	Forest (acres)	3.3
	Woodland (acres)	27.0
	Shrubland (acres)	0.2
	Herbaceous (acres)	24.3
Flood Area*		
	Vegetated (acres)	46.1
	Non-vegetated (acres)	16.1
Steep Slopes (acres)**		14.7
* The flood area includes the FEMA 100-year flood plain plus the adjusted 1996 flood inundation area.		
**Slopes are derived from LiDAR. Steep slopes are areas with a slope greater than 25%.		

This resource area is comprised of industrial land to the north of Foster Road and a publicly owned natural area to the south. A cluster of single-family residential properties are located at the southeast portion of the resource site. The Springwater Corridor Trail forms the northern boundary of the resource site. SE 111th Ave/Drive is the eastern boundary. The southern edge is the steeply sloped base of Mt. Scott. A paved trail runs through the site from Foster Road to Cooper Street. A parking lot located at the northwest corner of the natural area also serves as a trailhead. Stormwater runoff from Foster Road flows into stormwater facilities, then into Johnson Creek.

Johnson Creek and its long history of flooding have influenced this site. Most of the industrial property and natural area are within the 100-year floodplain and perennial flooding in this area is common. Historically, development and impervious surfaces have decrease stream capacity, increased runoff and limited the capacity for local flood management or infiltration. Recent restoration in this section seeks to improve floodplain functions and mitigate flood impacts. Larger flood events generally occur from December through February, with 85 percent of the stream's runoff occurring between November and March.

Industrial properties are primarily auto salvage yards. While these lands are fully utilized there are relatively few buildings. Soil compaction and gravel on the auto salvage storage areas may inhibit infiltration of rain or flood waters. Residential densities are low.

The Foster Floodplain Natural Area is a floodplain restoration project covering 63 acres of a former residential neighborhood. Bureau of Environmental Services completed the project in 2012 to mitigate frequent flooding on Foster Road and in the residential and industrial properties in the extensive floodplain to the north of Foster Road, improve water quality and enhance habitat for ESA-listed species and other at-risk and sensitive species found in the Johnson Creek watershed.

The project removed WPA rock lining from the creek, laid back the creek banks and added large wood and root wads in the creek channel. Plantings along the creek and in the floodplain shade the creek, provide habitat, and help settle out and filter sediments, improving water quality. Wetland enhancements benefit frogs and salamanders, and grasslands provide habitat for ground-nesting birds and small mammals. Deer, coyote, hawks and bald eagles also use the site. Most of site, including the restored floodplain south of the creek, is planted with native trees and shrubs. Mature trees and snags remain from the former neighborhood's landscaping, comprising a mix of native conifers and ornamental species. An overflow channel is engaged near the western terminus of Cooper Street during high flow, sending water into a channel, and flowing into the broad floodplain south of the creek, and then directing water back to Johnson Creek through a flow control gate at the western edge of the resource site. Stormwater management is integrated into the site design next to parking at Foster Road and along Cooper Street.

In addition to its flood mitigation, water quality and habitat values, the site serves as a natural area park for the community and a site for environmental education.

Coho salmon, Chinook salmon, steelhead trout, and Pacific lamprey are documented within this reach of Johnson Creek. In 2019, a study of Johnson Creek’s potential to support salmon populations identified this reach of Johnson Creek as important both to protect and restore habitat for coho and Chinook salmon and steelhead trout —meaning restoration actions in the Foster Floodplain project area have shown important benefit to habitat function but additional improvement possibilities exist. Habitat performance is still limited by high summer water temperatures.

Special status bird species observed in or adjacent to this resource site include American kestrel, bald eagle, band-tailed pigeon, black-throated gray warbler, brown creeper, bushtit, common yellowthroat, downy woodpecker, great blue heron, green heron, hooded merganser, merlin, Nashville warbler, northern harrier, pacific-slope flycatcher, purple finch, Swainson's thrush, Vaux's swift, western wood-pewee, willow flycatcher, white-breasted nuthatch, Wilson's warbler, and yellow warbler.

Table B: Quality of Natural Resource Functions in Resource Site JC13				
Resource Site (acres) = 80				
	Class 1/A	Class 2/B	Class 3/C	Total
Riparian Corridors*				
acres	40.9	13.8	16.7	71.3
percent total inventory site area	51.3%	17.3%	20.9%	89.5%
Wildlife Habitat*				
acres	0.0	21.3	0.0	21.3
percent total inventory site area	0.0%	26.7%	0.0%	26.7%
Special Habitat Areas**				
acres	3.2			
percent total inventory site area	4.0%			
Combined Total⁺				
acres	40.9	15.9	14.9	71.7
percent total inventory site area	51.3%	19.9%	18.7%	90.0%
* Class I riparian resources, Special Habitat Areas, and wildlife habitat include open water. ** Metro Title 13 designated all Special Habitat Areas as Class I riparian corridors. +Because riparian resources, Special Habitat Areas, and wildlife Habitat overlap, the results cannot be added together to determine the combined results.				

Stormwater runs off impervious surfaces (e.g., rooftops, driveways, parking areas, streets, etc..) rapidly. Without a place to retain the water (such as wetlands or adequate stormwater facilities), stormwater runoff results in spikes in stream levels which can cause or exacerbate flooding and increase stream erosion. In addition, when water runs off quickly, it does not have a chance to infiltrate and recharge streams or aquifers to provide water during drier periods.

The type and capacity of stormwater facilities to manage the runoff from impervious surfaces varies in the city, affecting the local rate and amount of runoff, and the amount of pollutants in the water. Much of the city was developed prior to any stormwater regulations and receives limited or no management prior to discharging to pipes and surface waters.

Table C shows the total amount of impervious area within the resource site and how much of that impervious area lacks stormwater management; the percentage of total impervious area that is not managed is called "effective impervious area." The higher the percent of effective impervious area in a watershed, the greater the negative impacts of stormwater runoff to streams. Stream science indicates that when effective impervious area reaches 10% of a watershed, negative stream impacts become significant; and at 25%, these impacts on waterways can be substantial. An additional consideration is the differences in soil conditions and other factors that influence the ability of pervious areas to retain, infiltrate or filter pollutants from stormwater. For example, a mature forest is much more effective in managing stormwater than a manicured lawn; both areas would have a lower effective impervious surface percentage than a developed site, but they have different outcomes for stormwater management.

For Resource Area JC13, 14.2% of the total area is effectively impervious, indicating a critical level of vulnerability, with negative impacts beginning to impact natural functions, but with some natural processes still in place and providing support to biologic systems.

Table C. Impervious Area within Resource Site JC13			
Total area (acres)	Total impervious Area (acres)	Total unmanaged impervious area* (acres)	Percent of resource site that is effectively impervious
79.7	22.8	11.3	14.2%

*Total unmanaged impervious area refers to the number of acres within a resource area that receives no formal stormwater management measures to regulate flow or treat pollutants before they reach surface waters, also referred to as effective impervious area.

Metro Title 13 and Oregon Goal 5 Compliance

The following information supplements evaluation of natural resource protections presented in Volume 4 and supports compliance with Metro Title 13 and Oregon Plan Goal 5.

Title 13 Habitat Conservation Areas

Map G presents the Habitat Conservation Areas (HCA) within the Resource site JC. Natural resources should be protected within HCA as follows:

1. *Strictly limit* or *limit* conflicting uses within Class I/High Rank Riparian Areas in all Urban Development Areas.
2. *Strictly limit* or *limit* conflicting uses within Class II/Medium Rank Riparian Areas within Moderate and Low Value Urban Development Area as well as parks and open spaces.
3. *Strictly limit* or *limit* conflicting uses within Class A/High or B/Medium Rank Wildlife Habitat within parks and open spaces.
4. *Allow* conflicting uses or conducted a local Goal 5 ESEE for Class III/Low Rank Riparian Areas in all Urban Development Areas.
5. *Allow* conflicting uses or conducted a local Goal 5 ESEE for Class A/High, Class B/Medium or Class C/Low Rank Wildlife Habitat in all Urban Development Area, except parks and open space.

Strictly limiting or *limiting* conflicting uses in HCA will protect and conserve existing streams and wetlands to maintain significant natural resource functions including: microclimate and shade; stream flow moderation and water storage; bank function and sediment, pollution and nutrient control; large wood and channel dynamics; organic inputs, food web and nutrient cycling; and fish and wildlife habitat. *Strictly limiting* or *limiting* conflicting uses in HCA will allow for additional urban development that is sensitive to the natural resource features and requires mitigation for unavoidable negative impacts to features and functions. The recommendation will also contribute towards meeting other regulatory requirements including the Metro Title 3, Water Quality and Flood Management; Oregon Goal 6, Air, Water and Land Resources Quality; Oregon Goal 7, Areas Subject to Natural Hazards; the Clean Water Act; and the Endangered Species Act.

Goal 5 Significant Natural Resources

Resource site JC contains natural resource features that are not a Title 13 HCA and are therefore subject to Statewide Planning Goal 5 OAR 660-023-0110. The General ESEE analysis, Volume 4, describes the conflicting uses and provides an overarching analysis of the economic, social, environmental and energy consequences of prohibiting, limiting or allowing the conflicting uses within areas of significant natural resources. In addition to the General ESEE analysis, the following resource site-specific consequences are considered.

The common impacts of conflicting uses in the resource site include clearing vegetation; grading activities and soil compaction; adding impervious surface; modifying streams, wetlands and flood areas; generating pollution; landscaping with non-native or invasive vegetation; building fences or other wildlife barriers; and other impacts such as noise, light, litter and pets.

Within the resource site residential uses are allowed outright or conditionally in the R10 and R7 base zones. Industrial uses are allowed in the IG2 base zone. Employment uses are allowed in the EG2 base zone. Open space uses are allowed in the OS base zone. Development of new uses may involve vegetation clearing, grading, filing, and soil compaction, as well as the addition of impervious surfaces and landscaping with non-native plants, with associated impacts on the natural resources. Basic utilities and other infrastructure are allowed in all base zones. New or upgraded utility corridors may be cleared of vegetation and may fragment wildlife habitat.

The analysis of economic, social, environmental and energy consequences provided in Volume 2 is confirmed for resource site JC1, with the following additional information that clarifies the analysis.

Strictly limiting or *limiting* conflicting uses would retain the wildlife habitat functions provided by significant natural resource features including maintaining habitat for at risk plant, fish and wildlife species, and maintaining the stormwater management and air-cooling functions of the tree canopy. Mitigation for negative consequences of additional development in areas of Class A or Class B wildlife habitat should be required.

Decisions

Based on the analysis presented in Volume 3, Natural Resources Inventory, Volume 4, Title 13 and Goal 5 Compliance, and the resource site-specific evaluation for JC13, the following decisions are applied to protect the significant riparian corridors and wildlife habitat:

1. Apply a protection overlay zone ('p' zone) to stream channels from top-of-bank to top-of-bank, wetlands and land within 50 feet of stream top-of-bank or 30 feet of wetlands.
2. Apply a conservation overlay zone ('c' zone) to land between 50 and 75 feet of stream top-of-bank and between 30 and 55 feet of wetland.
3. Apply a conservation overlay zone ('c' zone) to areas of forest or woodland vegetation contiguous to but more than 75 feet from stream top-of-bank, and areas of forest or woodland vegetation contiguous to but more than 55 feet from wetlands.
4. Allow conflicting uses within all other areas containing significant natural resources.

Resource Site No.: JC14 Resource Site Name: Lents Floodplain

Previous Plan: East Buttes, Terraces & Wetlands Plan

Previous Resource Site No.: 16

The results of the analysis found in Volume 3, Natural Resources Inventory, Volume 4, Title 13 and Goal 5 Compliance, and the resource site-specific evaluation, are presented in the following maps:

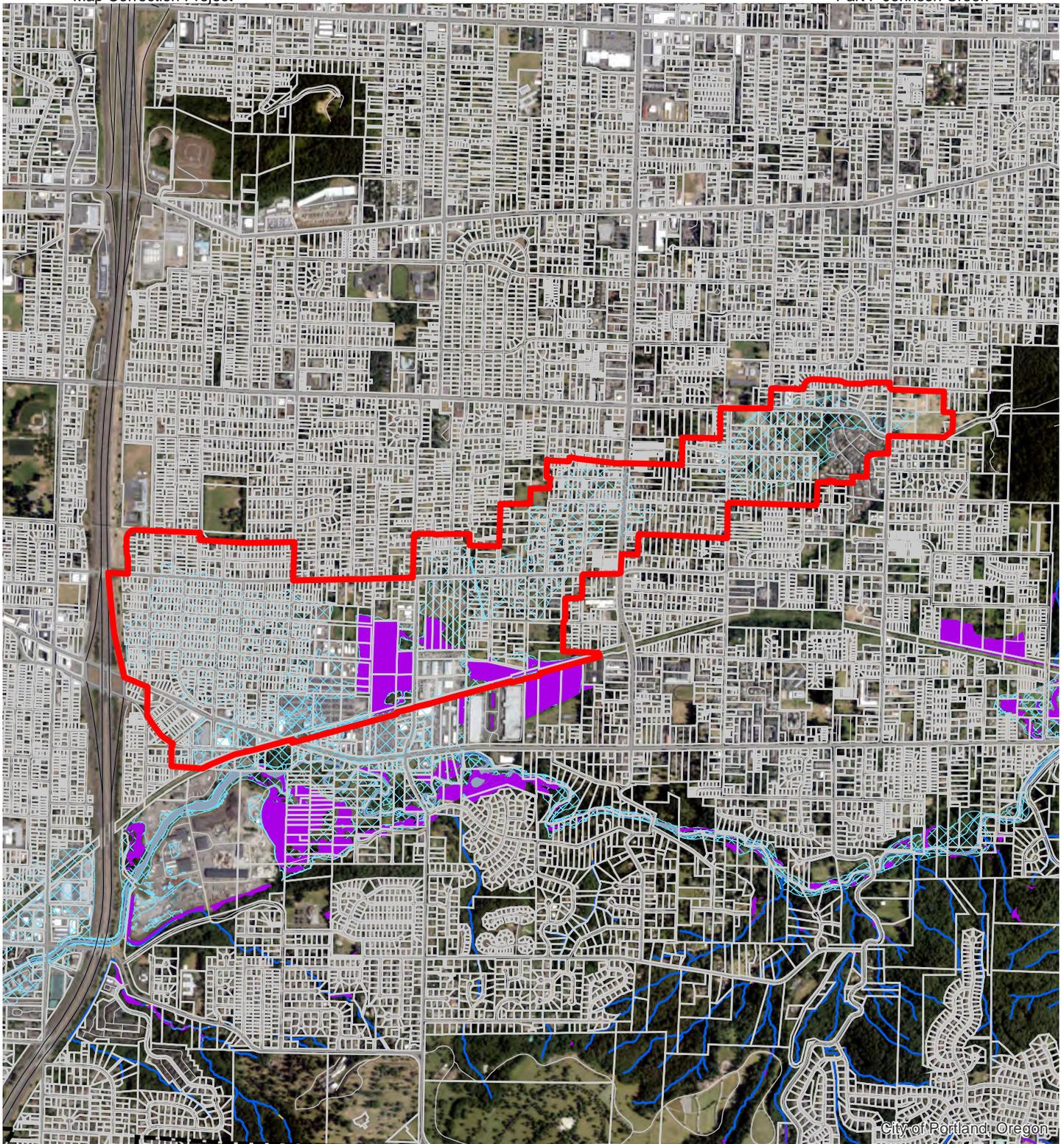
- A. Water Features – rivers, streams, wetlands and flood areas
- B. Land Features – forest, woodland, shrubland and herbaceous vegetation, steep slopes
- C. Special Habitat Areas
- D. Riparian Corridor Classifications
- E. Wildlife Habitat Classifications
- F. Urban Development Value
- G. Metro Title 13 Habitat Conservation Areas
- H. Statewide Planning Goal 5 Areas
- I. Recommended Natural Resource Protections

Following the maps, additional information about existing natural resource features and functions in the resource site is presented.

Implementation of the results is found in Volume 1, Part B, updates to zoning maps and zoning code.

Resource site JC14 includes the following:

Site (acres)	509.8
Base zones (acres)	
CM1	7.8
CM2	4.2
CM3	4.2
CR	1.1
EG1	2.9
EG2	18.2
IG1	13.5
IG2	28.1
OS	58.3
R10	86.4
R20	<1
R5	122.8
R7	99.9
RM1	25.6
RM2	18.2
RMP	18.6



City of Portland, Oregon

Map A: Water Features

Resource Site: JC14

Updated: July 2021



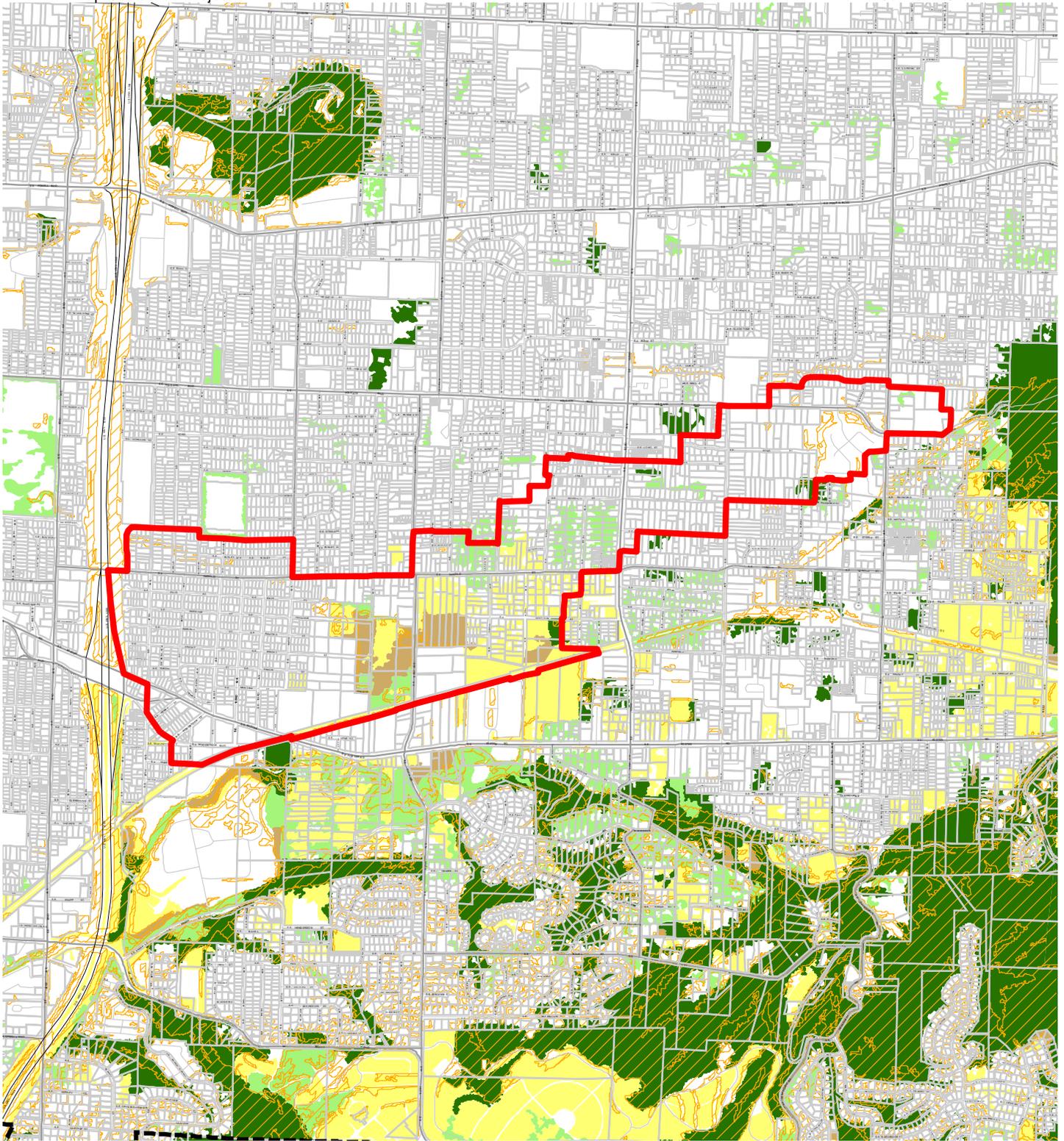
0 950 1,900 Feet

Proposed Draft - As Amended

- Resource Sites
- Urban Service Boundary
- Taxlots
- Wetlands
- Rivers
- Open stream channel
- Piped Stream Segment
- Flood Area



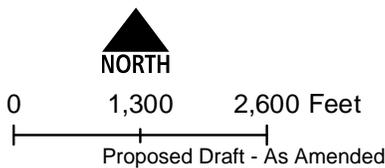
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Map B: Vegetation and Steep Slopes

Resource Site: JC14

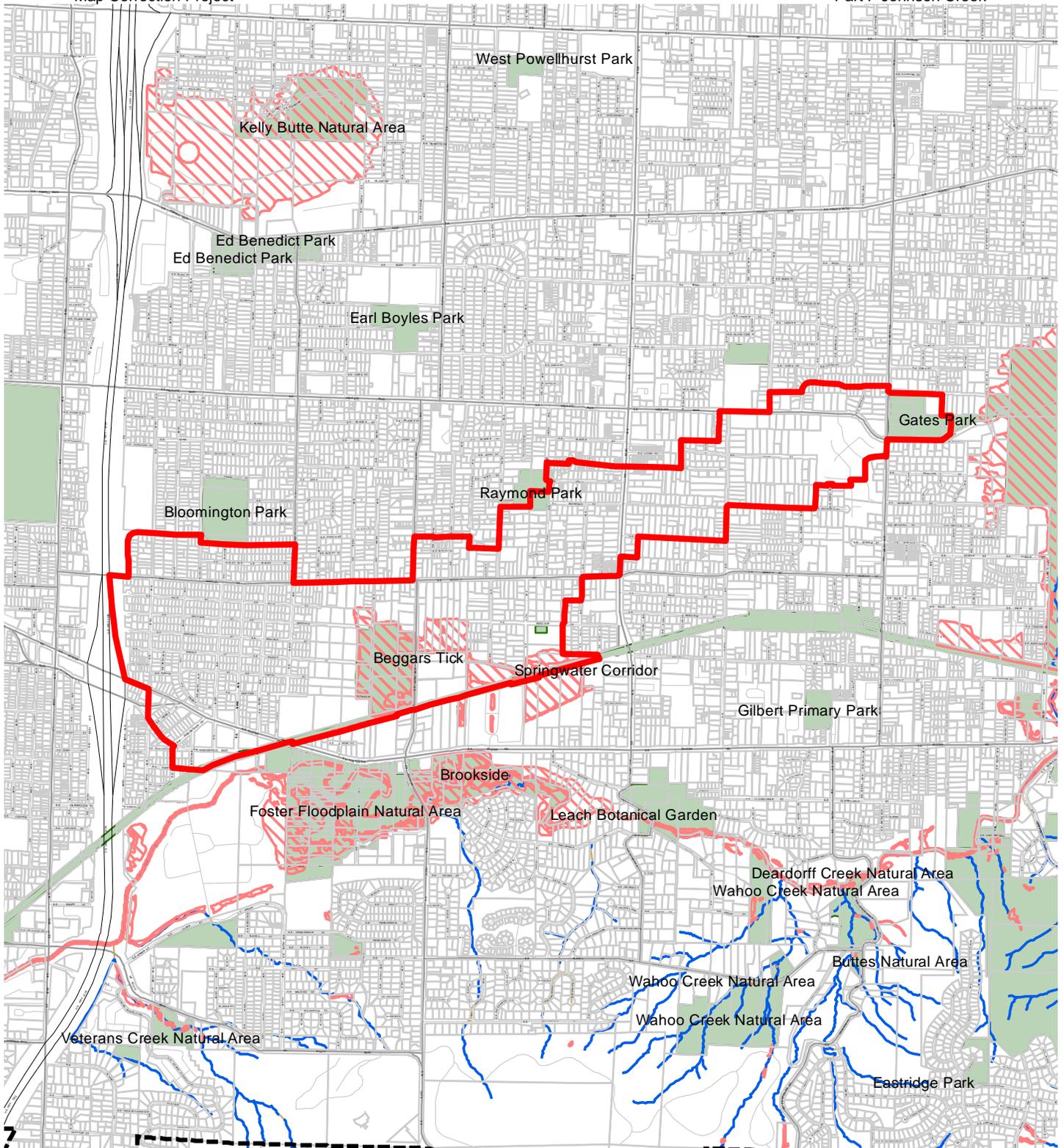
Updated: July 2021



- Resource Sites
- Urban Service Boundary
- Taxlots
- Slopes >25%
- Forest
- Woodland
- Shrubland
- Herbaceous



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**Map C: Special
Habitat Areas**

**Resource Site:
JC14**

Updated: June 2021

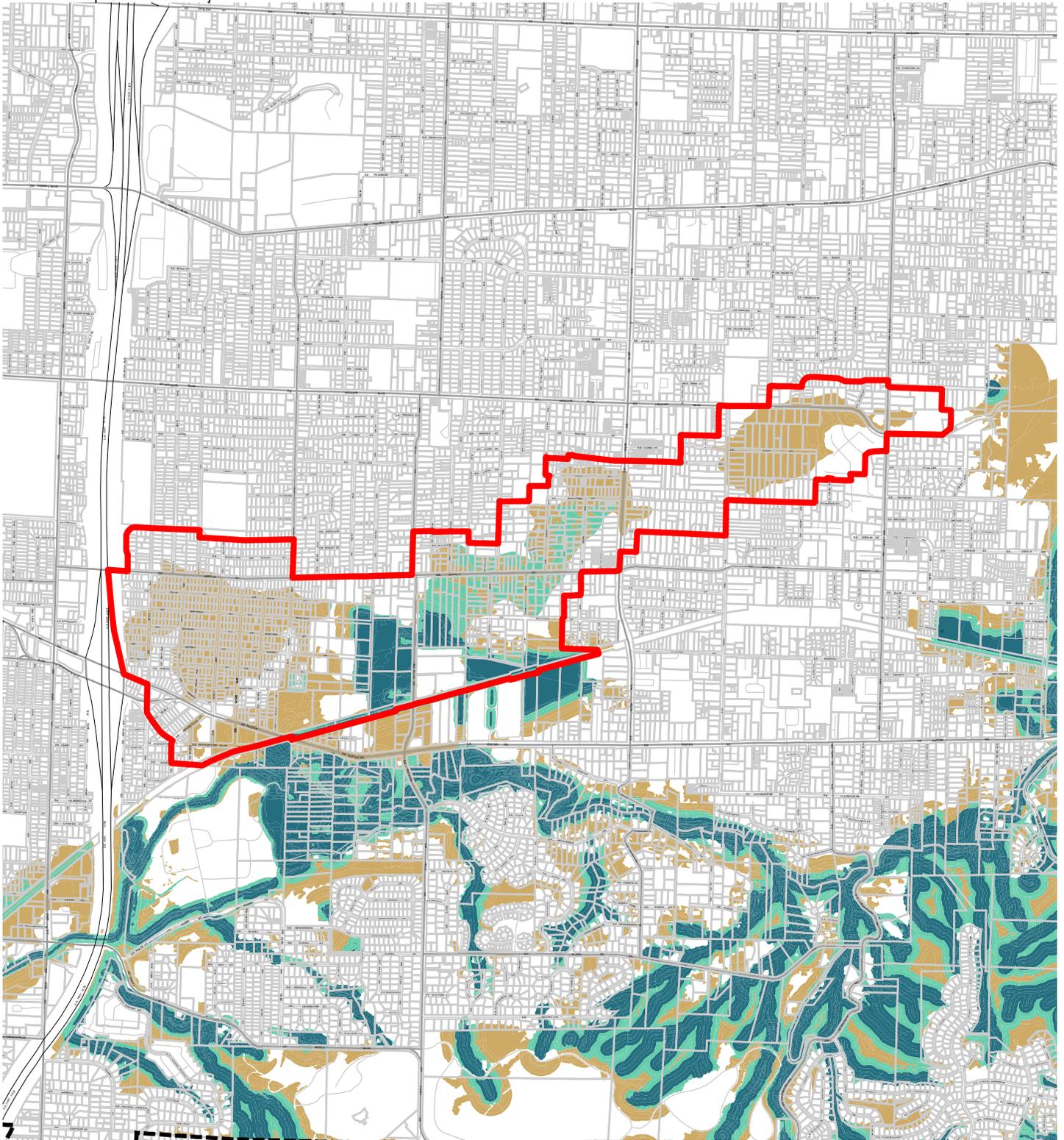


-  Resource Sites
-  Special Habitat Areas (SHAs)
-  Open Stream Channel
-  Piped Stream Segment
-  Parks

-  Urban Service Boundary
-  Taxlots



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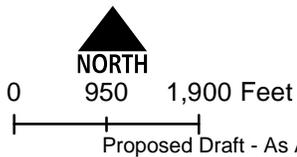


**Map D: Riparian
Corridors Habitat
Classification**

**Resource Site:
JC14**

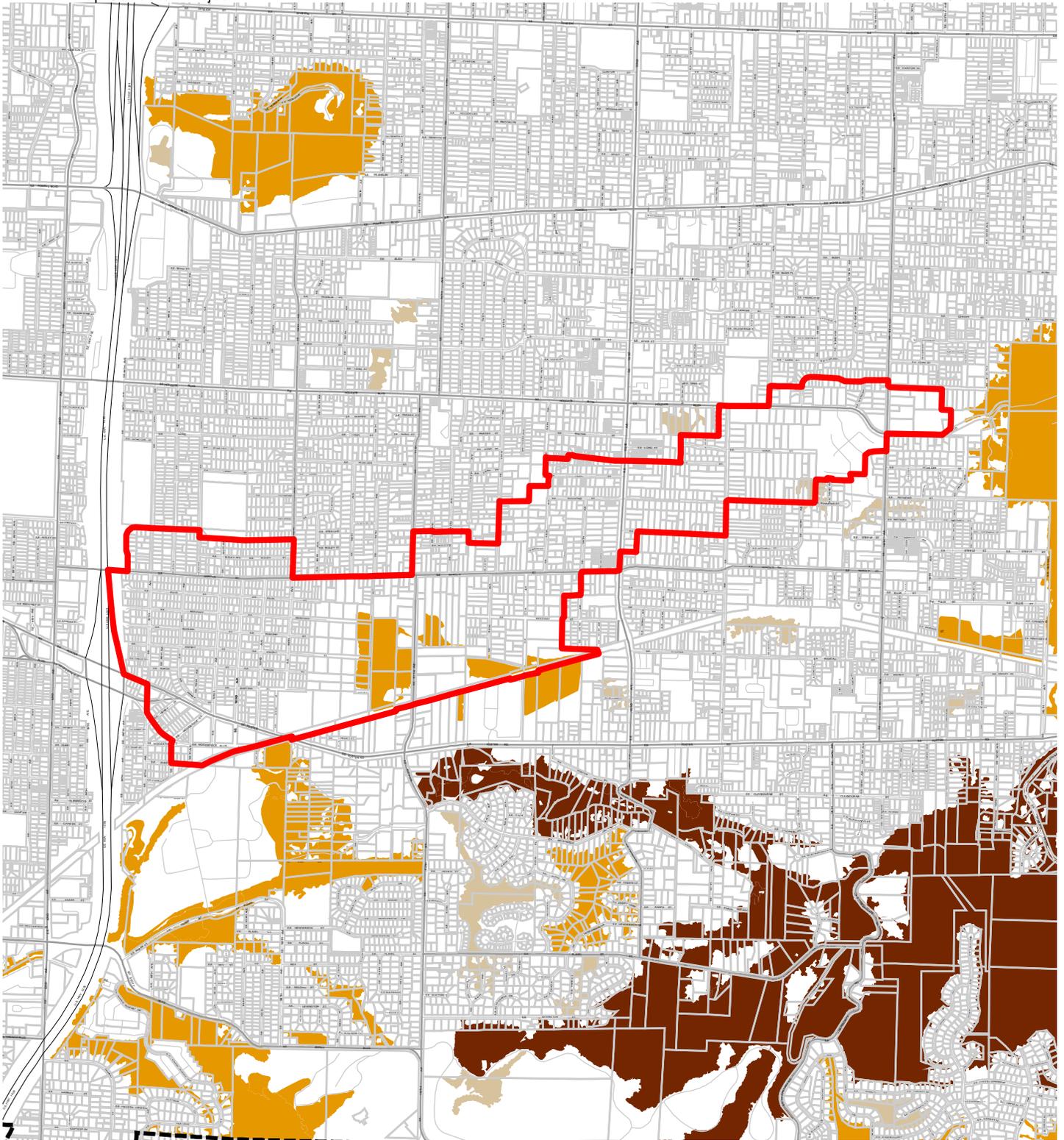
Updated: July 2021

- Resource Sites
- Urban Service Boundary
- Class I (high rank)
- Taxlots
- Class II (medium rank)
- Class III (low rank)



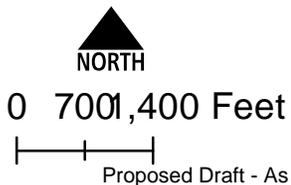
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July 2021



**Map E: Wildlife
Habitat Classification**
**Resource Site:
JC14**

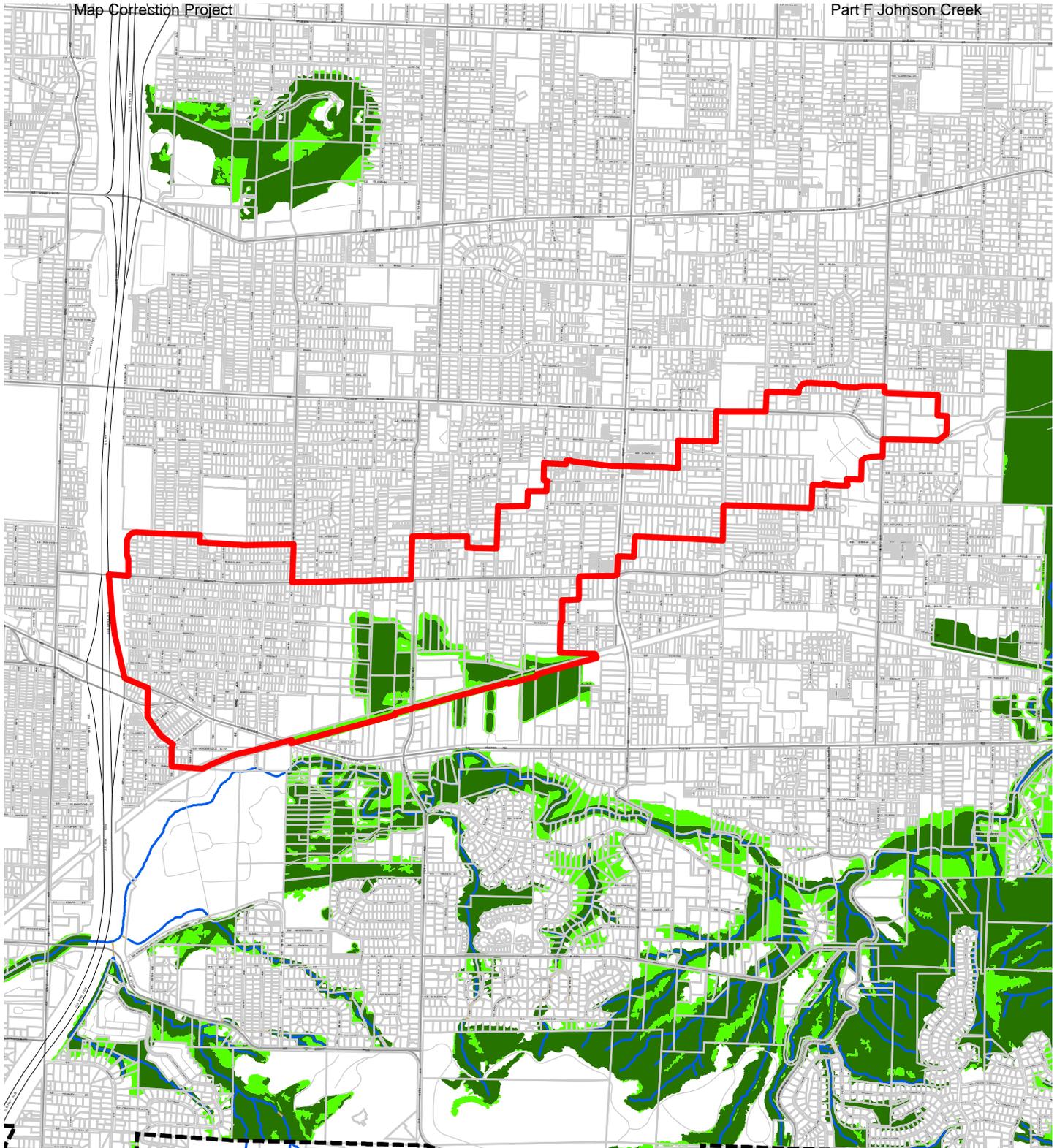
Updated: July 2021



-  Resource Sites
-  Class A (high rank)
-  Class B (medium rank)
-  Class C (low rank)
-  Urban Service Boundary
-  Taxlots



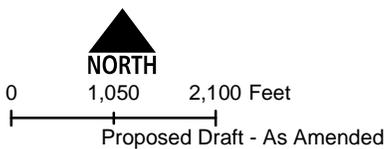
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July 2021



Map I: DRAFT Proposed Environmental Overlay Zones

Resource Site: JC14

Updated: July 2021



-  Resource Sites
-  Open Stream Channel
-  Piped Stream Segment
-  Proposed Conservation Zone
-  Proposed Protection Zone
-  Urban Service Boundary
-  Taxlots



The information on the map was derived from digital databases. Care was taken in the creation of this map but it is provided "as is". The City of Portland ensures meaningful access to city programs, services, and activities to comply with Civil Rights Title VI and ADA Title II laws and reasonably provides: translation, interpretation, modifications, accommodations, alternative formats, auxiliary aids and services. To request these services, contact 503-823-7700, City TTY 503-823-6868, Relay Service: 711.
July 2021

Natural Resource Description

Within resource site JC14 the following significant natural resource features and functions are present:

Significant Riparian Corridor Features: open stream; wetland; flood area; land within 50 feet of waterbodies; forest, woodland, shrubland and herbaceous vegetation within 300 feet of waterbodies; and forest vegetation on steep slopes (>25% slope) contiguous to and within 780 feet of waterbodies.

Significant Wildlife Habitat Features: forest patches, and associated and contiguous wetlands, two acres in size or larger.

Special Habitat Areas: Johnson Creek (S, C); wetlands (W)

Riparian Corridor Functions: microclimate and shade; stream flow moderation and water storage; bank function and sediment, pollution and nutrient control; large wood and channel dynamics; organic inputs, food web and nutrient cycling; and riparian wildlife movement corridor.

Wildlife Habitat Functions: interior area; food and water; resting, denning, nesting and rearing; movement and migration; reduction of noise, light and vibration; and habitat patches that support special status fish and wildlife species.

Table A: Quantity of Natural Resource Features in Resource Site		JC14
		Study Area
Stream (Miles)		0.0
Wetlands (acres)		27.6
Vegetated Areas >= 1/2 acre (acres)		
	Forest (acres)	3.8
	Woodland (acres)	31.1
	Shrubland (acres)	23.9
	Herbaceous (acres)	54.6
Flood Area*		
	Vegetated (acres)	70.4
	Non-vegetated (acres)	178.4
Steep Slopes (acres)**		19.0
* The flood area includes the FEMA 100-year flood plain plus the adjusted 1996 flood inundation area.		
**Slopes are derived from LiDAR. Steep slopes are areas with a slope greater than 25%.		

This site is highly developed with residential, industrial and commercial uses. Significant open space uses include Beggars Tick Marsh. The site includes publicly owned wetlands roughly along the Springwater Corridor known as the Springwater Wetland Complex. These wetlands located between of SE 111 Avenue and SE 120th Avenue are hydrologically connected to each other and Beggars Tick by a series of culverts including one under SE 111th Avenue.

Johnson Creek and its long history of flooding have influenced this site. The 100-year floodplain extends through a large area of resource site. The structures and impervious surfaces on developed properties reduce the flood retention and infiltration functions of the 100-year floodplain and perennial flooding in this area is common. Historically, development and impervious surfaces have decreased the flow capacity of Johnson Creek, increased runoff and limited the capacity for local flood management or infiltration. Larger flood events generally occur from December through February, with 85 percent of the stream's runoff occurring between November and March. Established vegetation and wetlands along the Springwater Corridor Trail provide some flow and flood mitigation, infiltration and habitat values.

Beggars Tick is a 20-acre wetland with several wetland types including open water, small pockets of year-round water, emergent, scrub-shrub, and forested wetland. Beggars Tick has a resilient native plant community (beggars tick, water smartweed and juncus species). The scrub-shrub wetland is dominated by pipers willow, and the forested wetland is dominated by ash, willow, cottonwood, native hawthorn, dogwood, and spirea. The wetlands provides resting and food for a large diversity of wintering waterfowl, as well as habitat for reptile, amphibian, and aquatic mammal species including muskrats. The surrounding vegetation provides food, cover, nest, and perching habitat for passerine, raptor, and small mammal species. This high-quality natural area serves as an island refuge for diverse wildlife species which formally occupied the surrounding urban region. The diversity and number of birds observed illustrate the importance of the marsh as a habitat for wintering species.

Wetlands of this size within the urban area are rare and provide important habitat for many songbird, waterfowl, mammal and herptile species. The diversity of the scrub/shrub and emergent wetland habitats promote greater wildlife species diversity.

The northeast portion of the floodplain is referred to informally as Holgate Lake, because it can be inundated due to high ground water. The frequency of inundation is infrequent, but flooding has occurred multiple times over the last century. This low-density residential neighborhood is lower elevation than most of the surrounding neighborhood and is on the western base of Powell Butte. High ground water in this area is considered a natural occurrence that impacts development in the area. As of 2020, flood modeling for Johnson Creek indicated that flood waters from extreme creek flooding could reach this area.

Special status bird species observed in or adjacent to this resource site include bald eagle, black-throated gray warbler, brown creeper, bufflehead, bushtit, downy woodpecker, great blue heron, green heron, hooded merganser, pacific-slope flycatcher, purple finch, rufous hummingbird, Swainson's thrush, varied thrush, Vaux's swift, western wood-pewee, white-breasted nuthatch, willow flycatcher, Nashville warbler, Wilson's warbler, and yellow warbler.

Table B: Quality of Natural Resource Functions in Resource Site JC14				
Resource Site (acres) = 510				
	Class 1/A	Class 2/B	Class 3/C	Total
Riparian Corridors*				
acres	38.4	44.9	185.6	268.9
percent total inventory site area	7.5%	8.8%	36.4%	52.7%
Wildlife Habitat*				
acres	0.0	26.7	1.5	28.2
percent total inventory site area	0.0%	5.2%	0.3%	5.5%
Special Habitat Areas**				
acres	39.1			
percent total inventory site area	7.7%			
Combined Total⁺				
acres	38.4	44.9	187.1	270.4
percent total inventory site area	7.5%	8.8%	36.7%	53.0%
* Class I riparian resources, Special Habitat Areas, and wildlife habitat include open water. ** Metro Title 13 designated all Special Habitat Areas as Class I riparian corridors. +Because riparian resources, Special Habitat Areas, and wildlife Habitat overlap, the results cannot be added together to determine the combined results.				

Stormwater runs off impervious surfaces (e.g., rooftops, driveways, parking areas, streets, etc..) rapidly. Without a place to retain the water (such as wetlands or adequate stormwater facilities), stormwater runoff results in spikes in stream levels which can cause or exacerbate flooding and increase stream erosion. In addition, when water runs off quickly, it does not have a chance to infiltrate and recharge streams or aquifers to provide water during drier periods.

The type and capacity of stormwater facilities to manage the runoff from impervious surfaces varies in the city, affecting the local rate and amount of runoff, and the amount of pollutants in the water. Much of the city was developed prior to any stormwater regulations and receives limited or no management prior to discharging to pipes and surface waters.

Table C shows the total amount of impervious area within the resource site and how much of that impervious area lacks stormwater management; the percentage of total impervious area

that is not managed is called “effective impervious area.” The higher the percent of effective impervious area in a watershed, the greater the negative impacts of stormwater runoff to streams. Stream science indicates that when effective impervious area reaches 10% of a watershed, negative stream impacts become significant; and at 25%, these impacts on waterways can be substantial. An additional consideration is the differences in soil conditions and other factors that influence the ability of pervious areas to retain, infiltrate or filter pollutants from stormwater. For example, a mature forest is much more effective in managing stormwater than a manicured lawn; both areas would have a lower effective impervious surface percentage than a developed site, but they have different outcomes for stormwater management.

For Resource Area JC14, 4% of the total area is effectively impervious. This indicates a significant degree of stormwater management and/or existing natural resources that should be preserved. Areas with very low impervious cover and existing vegetation are more likely to be functioning properly to support biologic systems. Even with a low percentage of effective impervious area, drainage in parts of this area is complicated by flat topography, high groundwater, soil conditions and nuisance flooding from Johnson Creek. This indicates the need to maintain infiltration, where possible, and preserve or enhance natural functions to mitigate impacts to private property and public infrastructure.

Table C. Impervious Area within Resource Site JC14			
Total area (acres)	Total impervious Area (acres)	Total unmanaged impervious area* (acres)	Percent of resource site that is effectively impervious
509.8	142.4	20.6	4.0%

*Total unmanaged impervious area refers to the number of acres within a resource area that receives no formal stormwater management measures to regulate flow or treat pollutants before they reach surface waters, also referred to as effective impervious area.

Metro Title 13 and Oregon Goal 5 Compliance

The following information supplements evaluation of natural resource protections presented in Volume 4 and supports compliance with Metro Title 13 and Oregon Plan Goal 5.

Title 13 Habitat Conservation Areas

Map G presents the Habitat Conservation Areas (HCA) within the Resource site JC14. Natural resources should be protected within HCA as follows:

1. *Strictly limit* or *limit* conflicting uses within Class I/High Rank Riparian Areas in all Urban Development Areas.
2. *Strictly limit* or *limit* conflicting uses within Class II/Medium Rank Riparian Areas within Moderate and Low Value Urban Development Area as well as parks and open spaces.
3. *Strictly limit* or *limit* conflicting uses within Class A/High or B/Medium Rank Wildlife Habitat within parks and open spaces.
4. *Allow* conflicting uses or conducted a local Goal 5 ESEE for Class III/Low Rank Riparian Areas in all Urban Development Areas.
5. *Allow* conflicting uses or conducted a local Goal 5 ESEE for Class A/High, Class B/Medium or Class C/Low Rank Wildlife Habitat in all Urban Development Area, except parks and open space.

Strictly limiting or *limiting* conflicting uses in HCA will protect and conserve existing streams and wetlands to maintain significant natural resource functions including: microclimate and shade; stream flow moderation and water storage; bank function and sediment, pollution and nutrient control; large wood and channel dynamics; organic inputs, food web and nutrient cycling; and fish and wildlife habitat. *Strictly limiting* or *limiting* conflicting uses in HCA will allow for additional urban development that is sensitive to the natural resource features and requires mitigation for unavoidable negative impacts to features and functions. The recommendation will also contribute towards meeting other regulatory requirements including the Metro Title 3, Water Quality and Flood Management; Oregon Goal 6, Air, Water and Land Resources Quality; Oregon Goal 7, Areas Subject to Natural Hazards; the Clean Water Act; and the Endangered Species Act.

Goal 5 Significant Natural Resources

All of the significant natural resources within resource site JC14 are designated Habitat Conservation Areas under Metro Title 13; therefore, no resource site-specific ESEE is required.

Natural Resources Protection Decisions

Based on the analysis presented in Volume 3, Natural Resources Inventory, Volume 4, Title 13 and Goal 5 Compliance, and the resource site-specific evaluation for JC14, the following decisions are applied to protect the significant riparian corridors and wildlife habitat:

1. Apply a protection overlay zone ('p' zone) to stream channels from top-of-bank to top-of-bank and wetlands.
2. Apply a conservation overlay zone ('c' zone) to land within 75 feet of stream top-of-bank or wetlands.
3. Allow conflicting uses within all other areas containing significant natural resources.

Resource Site No.: JC15 **Resource Site Name:** Brookside

Previous Plan: Johnson Creek Basin Protection Plan

Previous Resource Site No.: 17

The results of the analysis found in Volume 3, Natural Resources Inventory, Volume 4, Title 13 and Goal 5 Compliance, and the resource site-specific evaluation, are presented in the following maps:

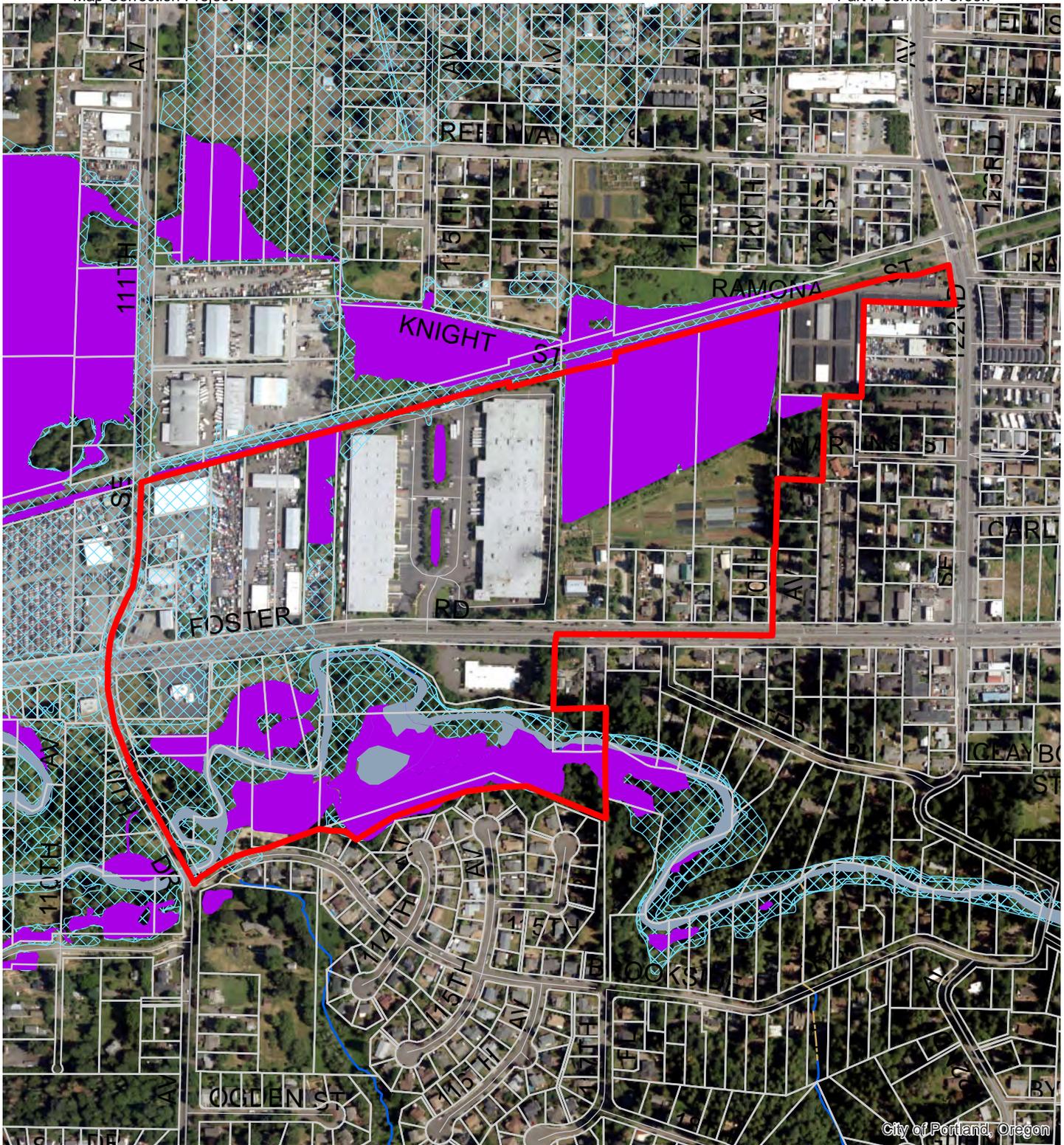
- A. Water Features – rivers, streams, wetlands and flood areas
- B. Land Features – forest, woodland, shrubland and herbaceous vegetation, steep slopes
- C. Special Habitat Areas
- D. Riparian Corridor Classifications
- E. Wildlife Habitat Classifications
- F. Urban Development Value
- G. Metro Title 13 Habitat Conservation Areas
- H. Statewide Planning Goal 5 Areas
- I. Recommended Natural Resource Protections

Following the maps, additional information about existing natural resource features and functions in the resource site is presented.

Implementation of the results is found in Volume 1, Part B, updates to zoning maps and zoning code.

Resource site JC15 includes the following:

Site (acres)	79.0
Base zones (acres)	
EG2	4.1
IG1	7.0
IG2	28.2
OS	37.0
R10	1.5
R2.5	<1
R5	<1
RM1	1.1

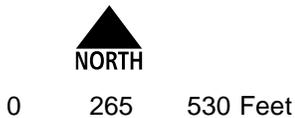


City of Portland, Oregon

Map A: Water Features

Resource Site: JC15

Updated: July 2021

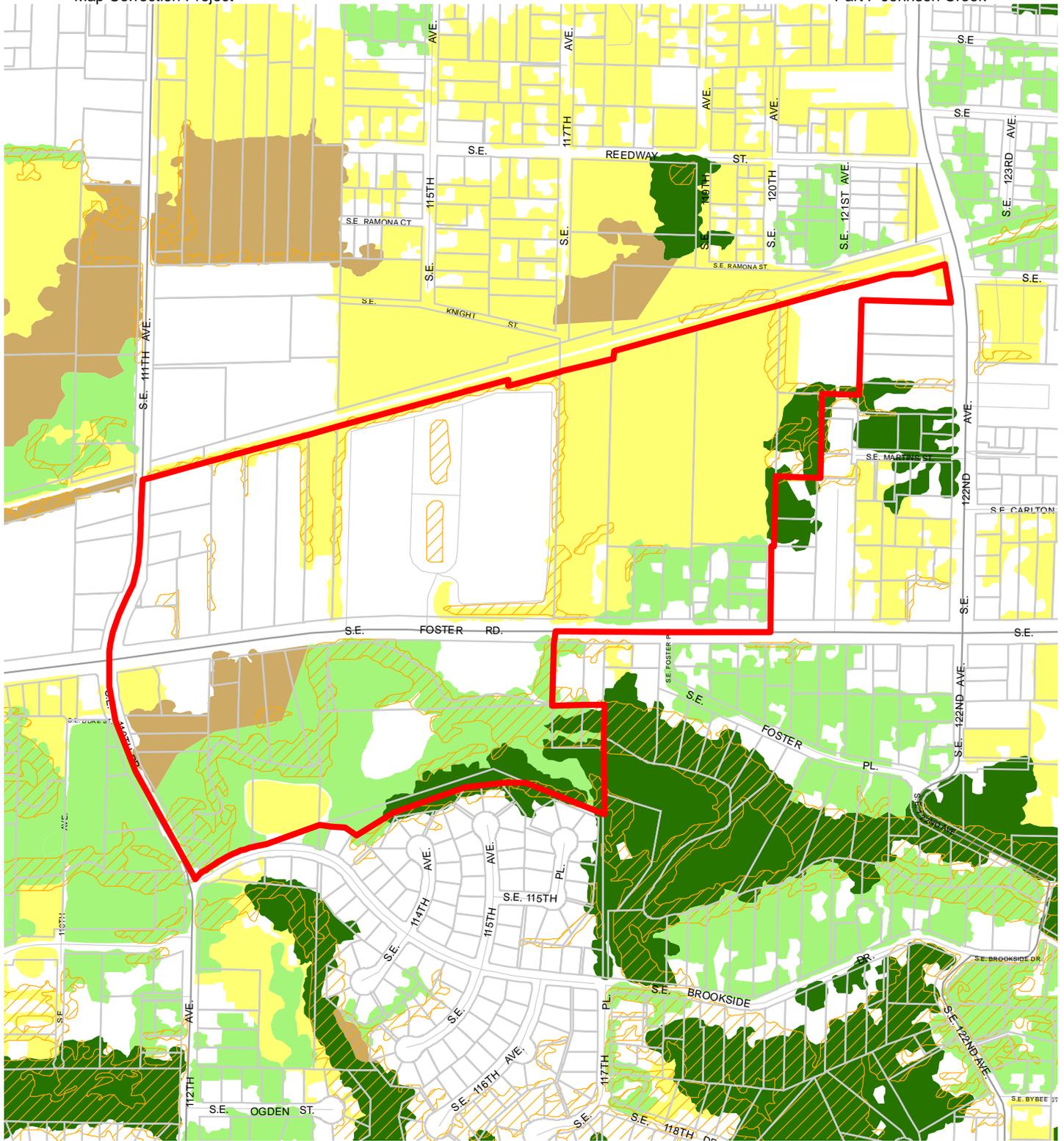


Proposed Draft - As Amended

- Resource Sites
- Urban Service Boundary
- Taxlots
- Wetlands
- Rivers
- Open stream channel
- Piped Stream Segment
- Flood Area



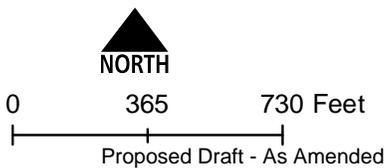
The information on the map was derived from digital databases. Care was taken in the creation of this map but it is provided "as is". The City of Portland ensures meaningful access to city programs, services, and activities to comply with Civil Rights Title VI and ADA Title II laws and reasonably provides: translation, interpretation, modifications, accommodations, alternative formats, auxiliary aids and services. To request these services, contact 503-823-7700, City TTY 503-823-6868, Relay Service: 711.
July 2021



Map B: Vegetation and Steep Slopes

Resource Site: JC15

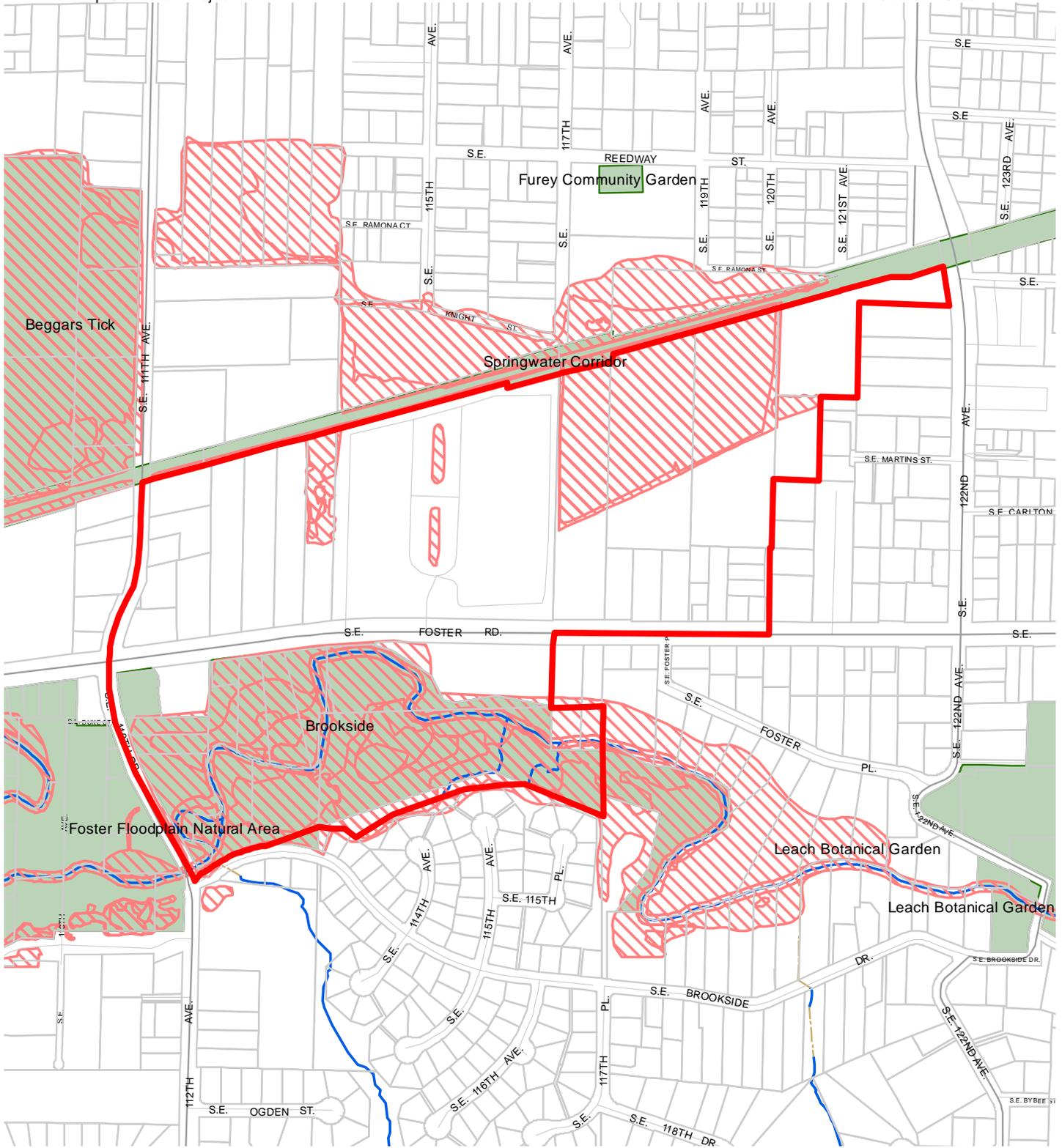
Updated: July 2021



- Resource Sites
- Urban Service Boundary
- Taxlots
- Slopes >25%
- Forest
- Woodland
- Shrubland
- Herbaceous



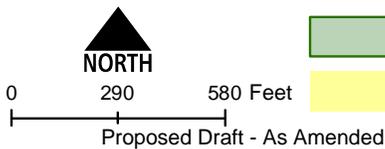
The information on the map was derived from digital databases. Care was taken in the creation of this map but it is provided "as is". The City of Portland ensures meaningful access to city programs, services, and activities to comply with Civil Rights Title VI and ADA Title II laws and reasonably provides: translation, interpretation, modifications, accommodations, alternative formats, auxiliary aids and services. To request these services, contact 503-823-7700, City TTY 503-823-6868, Relay Service: 711. July 2021



**Map C: Special
Habitat Areas**

**Resource Site:
JC15**

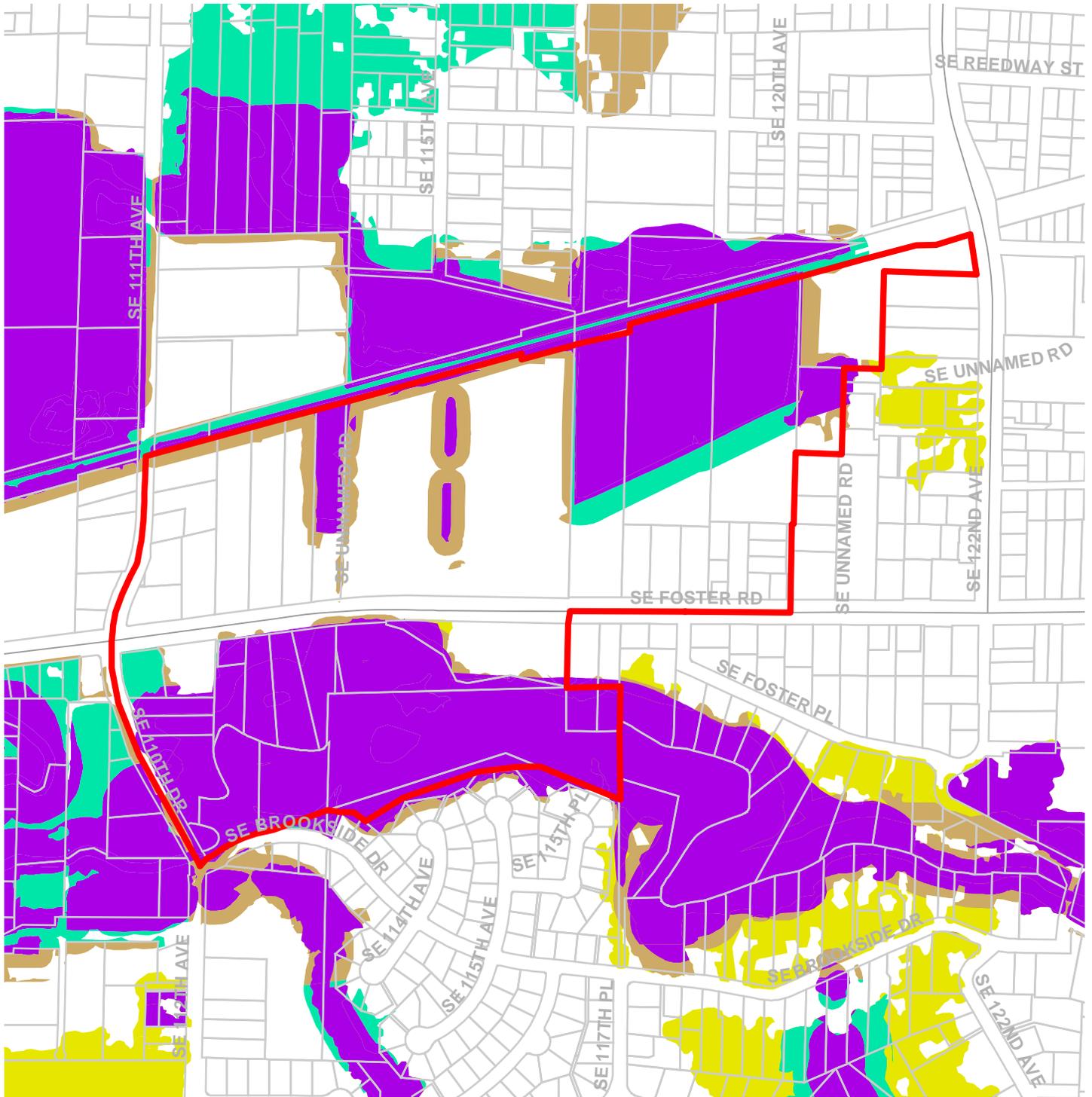
Updated: June 2021



- Resource Sites
- Special Habitat Areas (SHAs)
- Open Stream Channel
- Piped Stream Segment
- Parks
- Schools
- Urban Service Boundary
- Taxlots



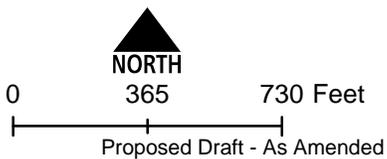
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Map G: Title 13 Habitat Conservation Areas (HCA) and Goal 5 Areas

Resource Site: JC15

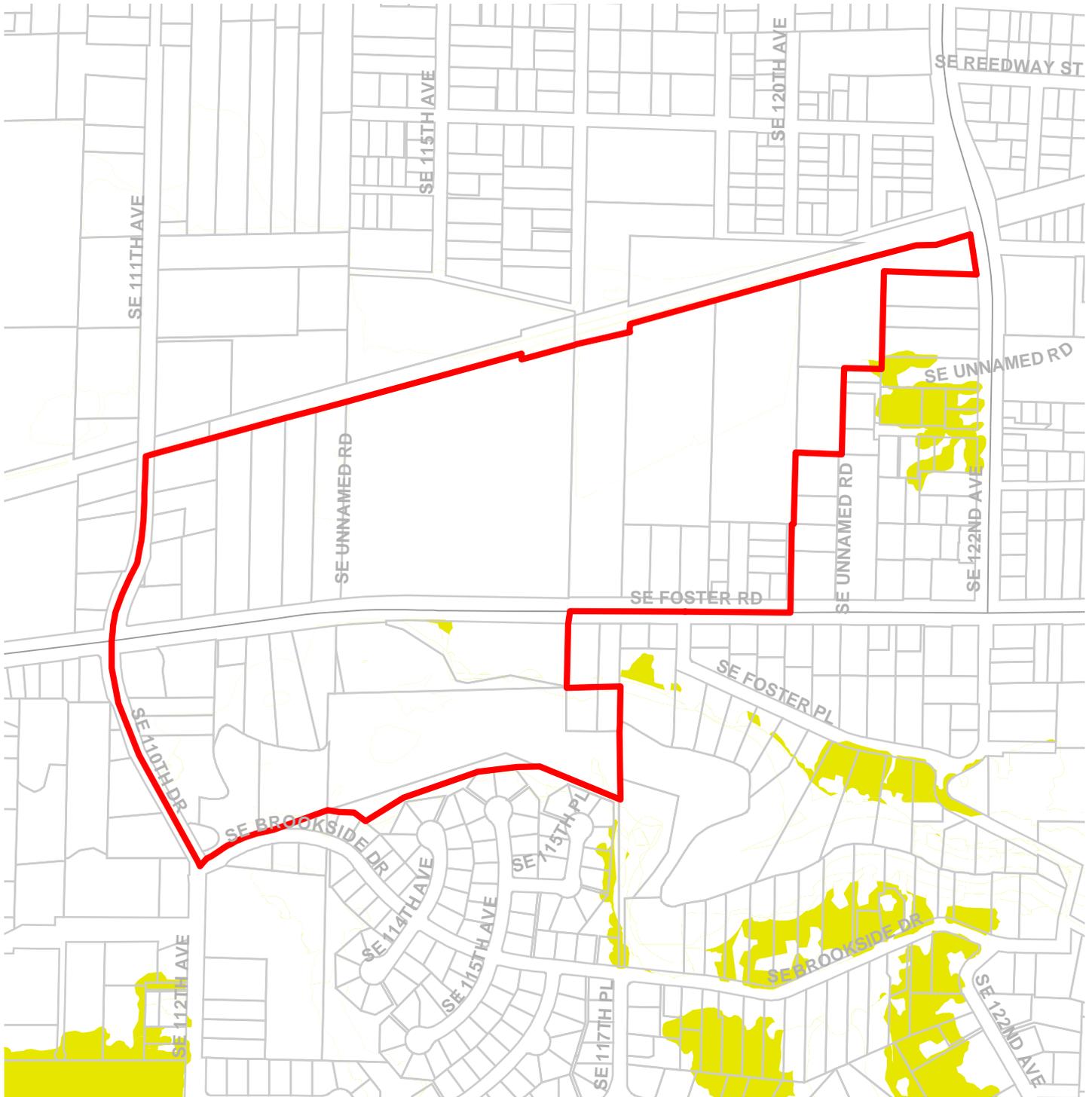
Updated: July 2021



- Urban Service Boundary
- Resource Sites
- HCA High Value
- HCA Moderate Value
- HCA Low Value
- Goal 5 Significant Natural Resources



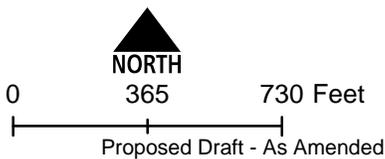
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Map H: Goal 5 Resources

Resource Site: JC15

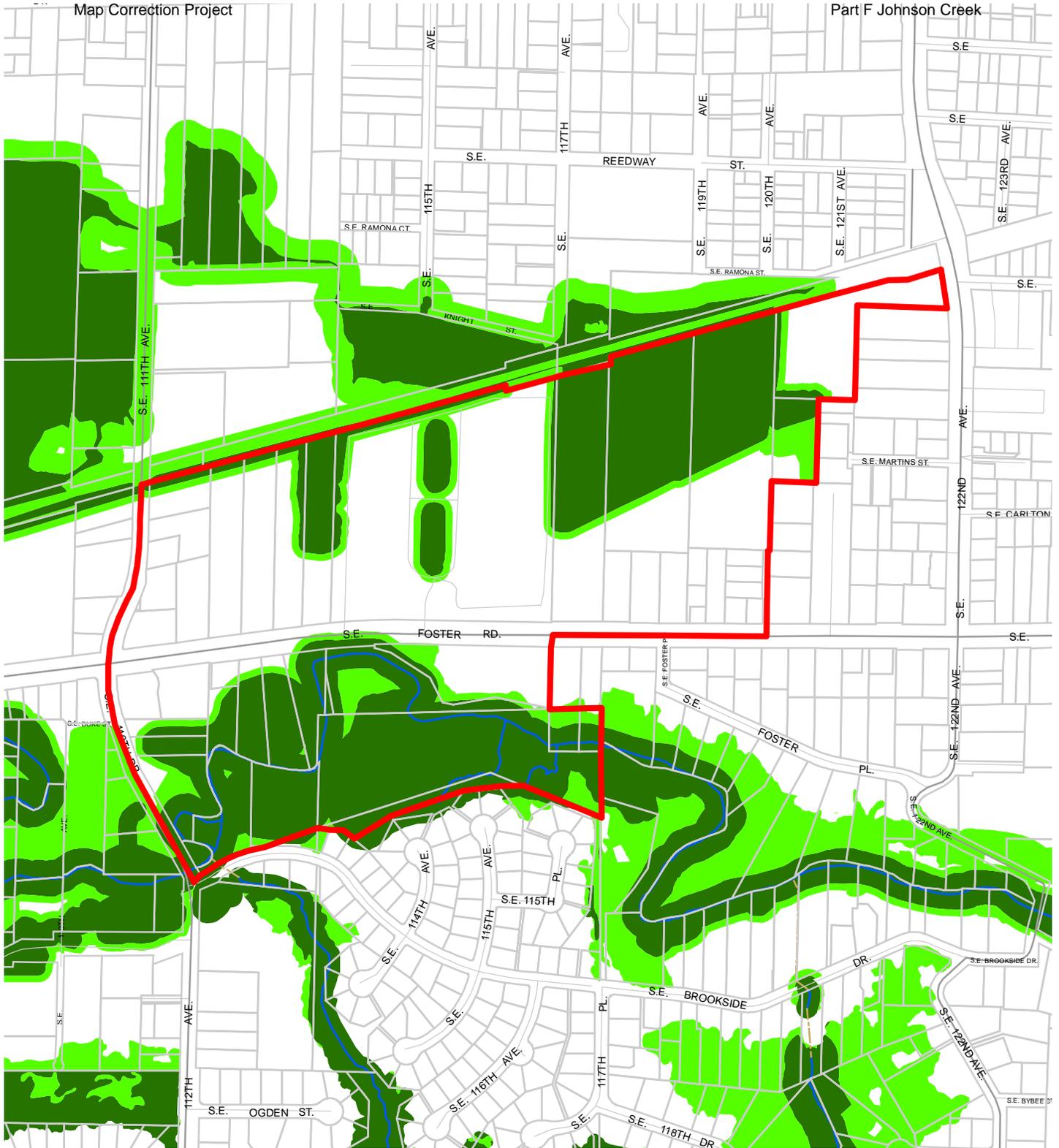
Updated: July 2021



-  Urban Service Boundary
-  Resource Sites
-  Goal 5 Significant Natural Resources



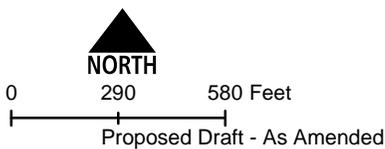
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Map I: DRAFT Proposed Environmental Overlay Zones

**Resource Site:
JC15**

Updated: July 2021



- Resource Sites
- Open Stream Channel
- Piped Stream Segment
- Proposed Conservation Zone
- Proposed Protection Zone
- Urban Service Boundary
- Taxlots



The information on the map was derived from digital databases. Care was taken in the creation of this map but it is provided "as is". The City of Portland ensures meaningful access to city programs, services, and activities to comply with Civil Rights Title VI and ADA Title II laws and reasonably provides: translation, interpretation, modifications, accommodations, alternative formats, auxiliary aids and services. To request these services, contact 503-823-7700, City TTY 503-823-6868, Relay Service: 711. July 2021

Natural Resource Description

Within resource site JC15 the following significant natural resource features and functions are present:

Significant Riparian Corridor Features: open stream; wetland; flood area; land within 50 feet of waterbodies; forest, woodland, shrubland and herbaceous vegetation within 300 feet of waterbodies; and forest vegetation on steep slopes (>25% slope) contiguous to and within 780 feet of waterbodies.

Significant Wildlife Habitat Features: forest patches, and associated and contiguous wetlands, two acres in size or larger.

Special Habitat Areas: Johnson Creek (S, C); wetlands (W)

Riparian Corridor Functions: microclimate and shade; stream flow moderation and water storage; bank function and sediment, pollution and nutrient control; large wood and channel dynamics; organic inputs, food web and nutrient cycling; and riparian wildlife movement corridor.

Wildlife Habitat Functions: interior area; food and water; resting, denning, nesting and rearing; movement and migration; reduction of noise, light and vibration; and habitat patches that support special status fish and wildlife species.

Table A: Quantity of Natural Resource Features in Resource Site		JC15
		Study Area
Stream (Miles)		0.7
Wetlands (acres)		18.5
Vegetated Areas >= 1/2 acre (acres)		
	Forest (acres)	3.7
	Woodland (acres)	15.8
	Shrubland (acres)	3.2
	Herbaceous (acres)	21.3
Flood Area*		
	Vegetated (acres)	25.4
	Non-vegetated (acres)	8.3
Steep Slopes (acres)**		11.9
* The flood area includes the FEMA 100-year flood plain plus the adjusted 1996 flood inundation area.		
**Slopes are derived from LiDAR. Steep slopes are areas with a slope greater than 25%.		

This resource area includes industrial development, public open space at Zenger Farm and Brookside Wetland Natural Area and a small cluster of residential and commercial development. It is bordered at the north by the Springwater Corridor Trail, on the west by SE 110th Drive/111th Avenue, roughly SE 120th Avenue on the east the southern edge of Brookside Wetland Natural Area at the south. Foster Road runs east and west through the middle of the resource site. Much of the resource site is within the 100-year floodplain.

There are multiple wetlands in this site. The Brookside Wetlands Natural Area site was BES's first major flood mitigation project along Johnson Creek, completed in 1997. The 14-acre restoration project included habitat enhancements, stormwater swales, and a public park. A pond constructed on the site created slow moving open shallow water that heats up in the summer. With the help of beaver damming the downstream end of the pond, it is slowly silting in, effectively disconnecting this in-line pond from Johnson Creek during the summer months. This inline pond was specifically called out in the Oregon Department of State Lands 2006 TMDL report for the Lower Willamette River as a temperature source for Johnson Creek that should be considered for retrofit in future restoration plans. In 2020 BES approved funding for this project and is currently in a design phase.

The Brookside Wetland also includes forested areas along the creek, native shrub lands and an open meadow, providing habitat for birds and small mammals. The combination of wetland, open grassland, deciduous trees, and adjacent coniferous forest supports a diversity of species. The sinuosity of the creek and gradual grades result in a floodplain that extends over two-thirds of the Brookside site.

The wetland at Zenger Farm provides cold water wetland habitat for native amphibians and other wildlife species. A nonprofit community farm is located on the publicly owned property and operates on the upland portion of the site, providing youth and community education about farming, healthy eating and the environment.

The wetlands in this resource site and Resource Site JC14 provide flood mitigation, flood conveyance, habitat, water quality functions, public access to nature, and environmental education opportunities. The complex of wetlands in both resource sites are hydrologically connected through drainages along the Springwater Corridor Trail and at other locations. A small wetland exists on private property at along SE Foster Road, adjacent to the Springwater Corridor Trail. The wetlands and the Springwater Corridor Trail also serve as a wildlife corridor between significant natural resource areas and Johnson Creek.

Frog Creek (BL4) enters Johnson Creek through a culvert under Brookside Drive at the west end of the resource site.

Coho salmon, Chinook salmon, steelhead trout, and Pacific lamprey are documented within this reach of Johnson Creek.

Special status bird species observed in or adjacent to this resource site include bald eagle, black-throated gray warbler, brown creeper, bushtit, downy woodpecker, great blue heron, green heron, hermit warbler, hooded merganser, Hutton's vireo, merlin, orange-crowned warbler, pacific-slope flycatcher, peregrine falcon, pileated woodpecker, purple finch, red crossbill, rufous hummingbird, Swainson's thrush, varied thrush, Vaux's swift, western wood-pewee, white-breasted nuthatch, and yellow warbler.

Table B: Quality of Natural Resource Functions in Resource Site JC15				
Resource Site (acres) = 79				
	Class 1/A	Class 2/B	Class 3/C	Total
Riparian Corridors*				
acres	31.2	9.5	11.8	52.4
percent total inventory site area	39.5%	12.0%	14.9%	66.4%
Wildlife Habitat*				
acres	17.9	9.9	0.1	27.9
percent total inventory site area	22.6%	12.6%	0.1%	35.3%
Special Habitat Areas**				
acres	30.3			
percent total inventory site area	38.4%			
Combined Total*				
acres	32.0	8.7	11.7	52.4
percent total inventory site area	40.6%	11.0%	14.8%	66.4%
* Class I riparian resources, Special Habitat Areas, and wildlife habitat include open water.				
** Metro Title 13 designated all Special Habitat Areas as Class I riparian corridors.				
+Because riparian resources, Special Habitat Areas, and wildlife Habitat overlap, the results cannot be added together to determine the combined results.				

Stormwater runs off impervious surfaces (e.g., rooftops, driveways, parking areas, streets, etc..) rapidly. Without a place to retain the water (such as wetlands or adequate stormwater facilities), stormwater runoff results in spikes in stream levels which can cause or exacerbate flooding and increase stream erosion. In addition, when water runs off quickly, it does not have a chance to infiltrate and recharge streams or aquifers to provide water during drier periods.

The type and capacity of stormwater facilities to manage the runoff from impervious surfaces varies in the city, affecting the local rate and amount of runoff, and the amount of pollutants in

the water. Much of the city was developed prior to any stormwater regulations and receives limited or no management prior to discharging to pipes and surface waters.

Table C shows the total amount of impervious area within the resource site and how much of that impervious area lacks stormwater management; the percentage of total impervious area that is not managed is called “effective impervious area.” The higher the percent of effective impervious area in a watershed, the greater the negative impacts of stormwater runoff to streams. Stream science indicates that when effective impervious area reaches 10% of a watershed, negative stream impacts become significant; and at 25%, these impacts on waterways can be substantial. An additional consideration is the differences in soil conditions and other factors that influence the ability of pervious areas to retain, infiltrate or filter pollutants from stormwater. For example, a mature forest is much more effective in managing stormwater than a manicured lawn; both areas would have a lower effective impervious surface percentage than a developed site, but they have different outcomes for stormwater management.

For Resource Area JC15, 5.1% of the total area is effectively impervious. This indicates a significant degree of stormwater management and/or existing natural resources that should be preserved. Areas with very low impervious cover and existing vegetation are more likely to be functioning properly to support biologic systems.

Table C. Impervious Area within Resource Site JC15			
Total area (acres)	Total impervious Area (acres)	Total unmanaged impervious area* (acres)	Percent of resource site that is effectively impervious
79.0	30.3	4.0	5.1%

*Total unmanaged impervious area refers to the number of acres within a resource area that receives no formal stormwater management measures to regulate flow or treat pollutants before they reach surface waters, also referred to as effective impervious area.

Metro Title 13 and Oregon Goal 5 Compliance

The following information supplements evaluation of natural resource protections presented in Volume 4 and supports compliance with Metro Title 13 and Oregon Plan Goal 5.

Title 13 Habitat Conservation Areas

Map G presents the Habitat Conservation Areas (HCA) within the Resource site JC15. Natural resources should be protected within HCA as follows:

1. *Strictly limit* or *limit* conflicting uses within Class I/High Rank Riparian Areas in all Urban Development Areas.
2. *Strictly limit* or *limit* conflicting uses within Class II/Medium Rank Riparian Areas within Moderate and Low Value Urban Development Area as well as parks and open spaces.
3. *Strictly limit* or *limit* conflicting uses within Class A/High or B/Medium Rank Wildlife Habitat within parks and open spaces.
4. *Allow* conflicting uses or conducted a local Goal 5 ESEE for Class III/Low Rank Riparian Areas in all Urban Development Areas.
5. *Allow* conflicting uses or conducted a local Goal 5 ESEE for Class A/High, Class B/Medium or Class C/Low Rank Wildlife Habitat in all Urban Development Area, except parks and open space.

Strictly limiting or *limiting* conflicting uses in HCA will protect and conserve existing streams and wetlands to maintain significant natural resource functions including: microclimate and shade; stream flow moderation and water storage; bank function and sediment, pollution and nutrient control; large wood and channel dynamics; organic inputs, food web and nutrient cycling; and fish and wildlife habitat. *Strictly limiting* or *limiting* conflicting uses in HCA will allow for additional urban development that is sensitive to the natural resource features and requires mitigation for unavoidable negative impacts to features and functions. The recommendation will also contribute towards meeting other regulatory requirements including the Metro Title 3, Water Quality and Flood Management; Oregon Goal 6, Air, Water and Land Resources Quality; Oregon Goal 7, Areas Subject to Natural Hazards; the Clean Water Act; and the Endangered Species Act.

Goal 5 Significant Natural Resources

Resource site JC15 contains natural resource features that are not a Title 13 HCA and are therefore subject to Statewide Planning Goal 5 OAR 660-023-0110. The General ESEE analysis, Volume 4, describes the conflicting uses and provides an overarching analysis of the economic, social, environmental and energy consequences of prohibiting, limiting or allowing the conflicting uses within areas of significant natural resources. In addition to the General ESEE analysis, the following resource site-specific consequences are considered.

The common impacts of conflicting uses in the resource site include clearing vegetation; grading activities and soil compaction; adding impervious surface; modifying streams, wetlands and flood areas; generating pollution; landscaping with non-native or invasive vegetation; building fences or other wildlife barriers; and other impacts such as noise, light, litter and pets.

Within the resource site residential uses are allowed outright or conditionally in the R10 and R2 base zones. Industrial uses area allowed in the IG1 and IG2 base zones. Employment uses area allowed in the EG2 base zone. Open space uses are allowed in the OS base zone. Development of new uses may involve vegetation clearing, grading, filing, and soil compaction, as well as the

addition of impervious surfaces and landscaping with non-native plants, with associated impacts on the natural resources. Basic utilities and other infrastructure are allowed in all base zones. New or upgraded utility corridors may be cleared of vegetation and may fragment wildlife habitat.

The analysis of economic, social, environmental and energy consequences provided in Volume 4 is confirmed for resource site JC15, with the following additional information that clarifies the analysis.

Strictly limiting or *limiting* conflicting uses would retain the wildlife habitat functions provided by significant natural resource features including maintaining habitat for at risk plant, fish and wildlife species, maintaining vegetation on steep slopes, and maintaining the stormwater management and air-cooling functions of the tree canopy. Mitigation for negative consequences of additional development in areas of Class A or Class B wildlife habitat should be required.

Natural Resources Protection Decisions

Based on the analysis presented in Volume 3, Natural Resources Inventory, Volume 4, Title 13 and Goal 5 Compliance, and the resource site-specific evaluation for JC15, the following decisions are applied to protect the significant riparian corridors and wildlife habitat:

1. Apply a protection overlay zone ('p' zone) to stream channels from top-of-bank to top-of-bank, wetlands and land within 50 feet of stream top-of-bank or 30 feet of wetlands.
2. Apply a conservation overlay zone ('c' zone) to land between 50 and 75 feet of stream top-of-bank or between 30 and 55 feet of wetland.
3. Apply a conservation overlay zone ('c' zone) to areas of forest or woodland vegetation contiguous to but more than 75 feet from stream top-of-bank, and areas of forest or woodland vegetation contiguous to but more than 55 feet from wetlands.
4. Allow conflicting uses within all other areas containing significant natural resources.

Resource Site No.: JC16 Resource Site Name: Leach Botanical Garden

Previous Plan: Johnson Creek Basin Protection Plan

Previous Resource site No.: 18

The results of the analysis found in Volume 3, Natural Resources Inventory, Volume 4, Title 13 and Goal 5 Compliance, and the resource site-specific evaluation, are presented in the following maps:

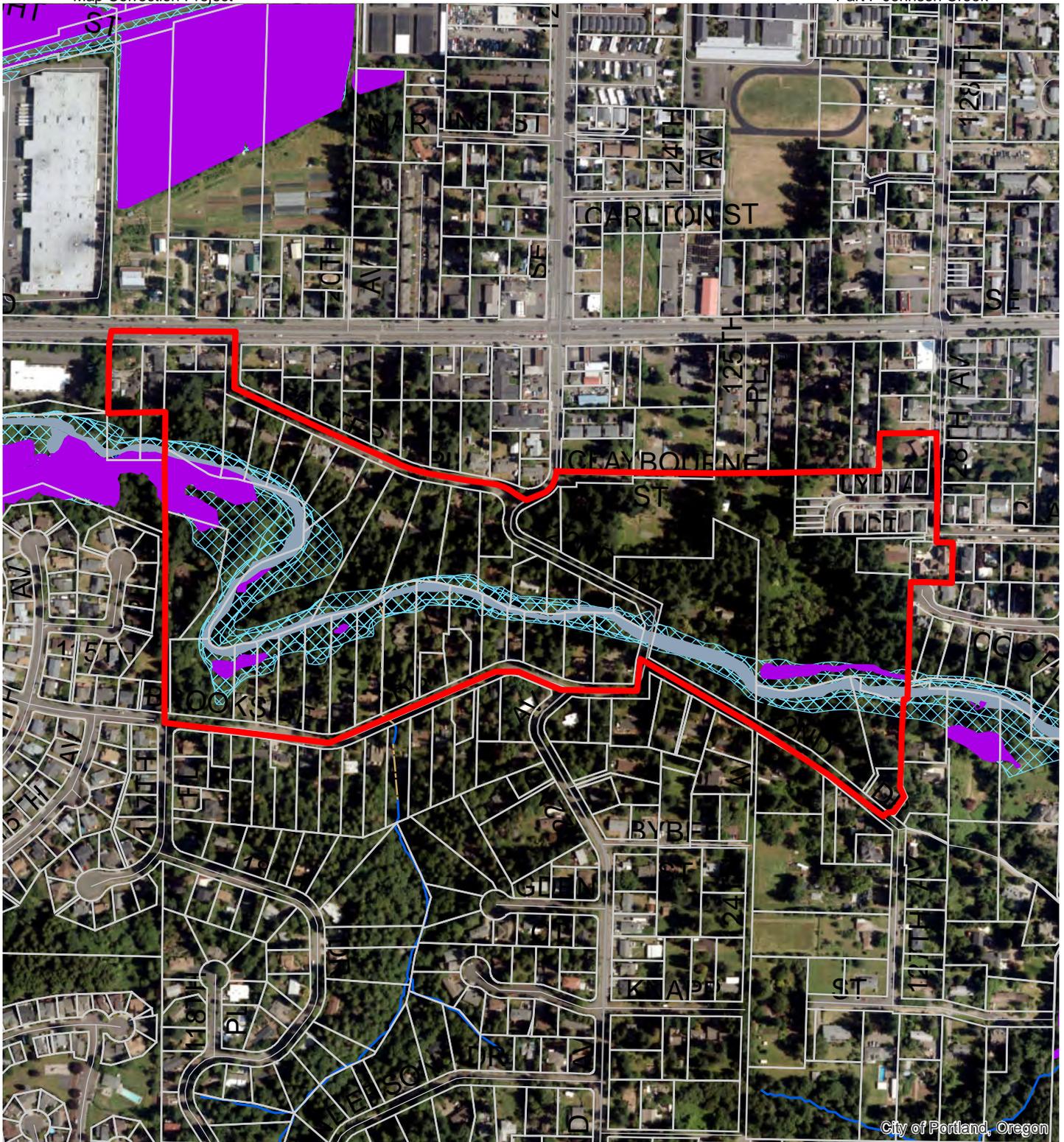
- A. Water Features – rivers, streams, wetlands and flood areas
- B. Land Features – forest, woodland, shrubland and herbaceous vegetation, steep slopes
- C. Special Habitat Areas
- D. Riparian Corridor Classifications
- E. Wildlife Habitat Classifications
- F. Urban Development Value
- G. Metro Title 13 Habitat Conservation Areas
- H. Statewide Planning Goal 5 Areas
- I. Recommended Natural Resource Protections

Following the maps, additional information about existing natural resource features and functions in the resource site is presented.

Implementation of the results is found in Volume 1, Part B, updates to zoning maps and zoning code.

Resource site JC16 includes the following:

Site (acres)	54.2
Base zones (acres)	
EG2	<1
IG1	<1
OS	17.0
R10	31.5
R5	0.9
RM1	4.7



Map A: Water Features

Resource Site: JC16

Updated: July 2021



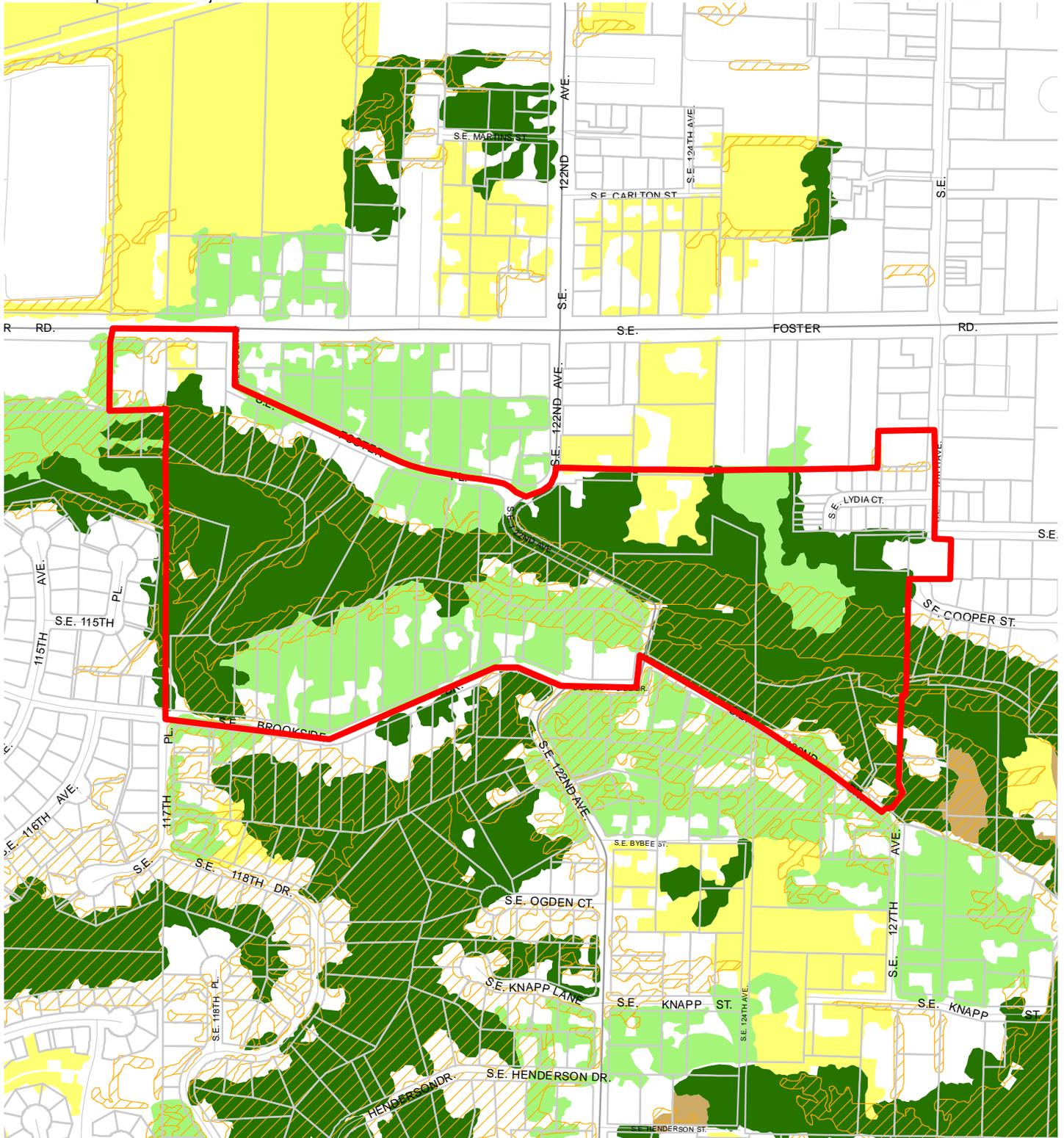
0 245 490 Feet

Proposed Draft - As Amended

- Resource Sites
- Urban Service Boundary
- Taxlots
- Wetlands
- Rivers
- Open stream channel
- Piped Stream Segment
- Flood Area



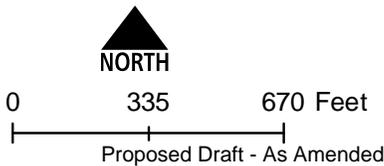
The information on the map was derived from digital databases. Care was taken in the creation of this map but it is provided "as is". The City of Portland ensures meaningful access to city programs, services, and activities to comply with Civil Rights Title VI and ADA Title II laws and reasonably provides: translation, interpretation, modifications, accommodations, alternative formats, auxiliary aids and services. To request these services, contact 503-823-7700, City TTY 503-823-6868, Relay Service: 711. July 2021



Map B: Vegetation and Steep Slopes

Resource Site: JC16

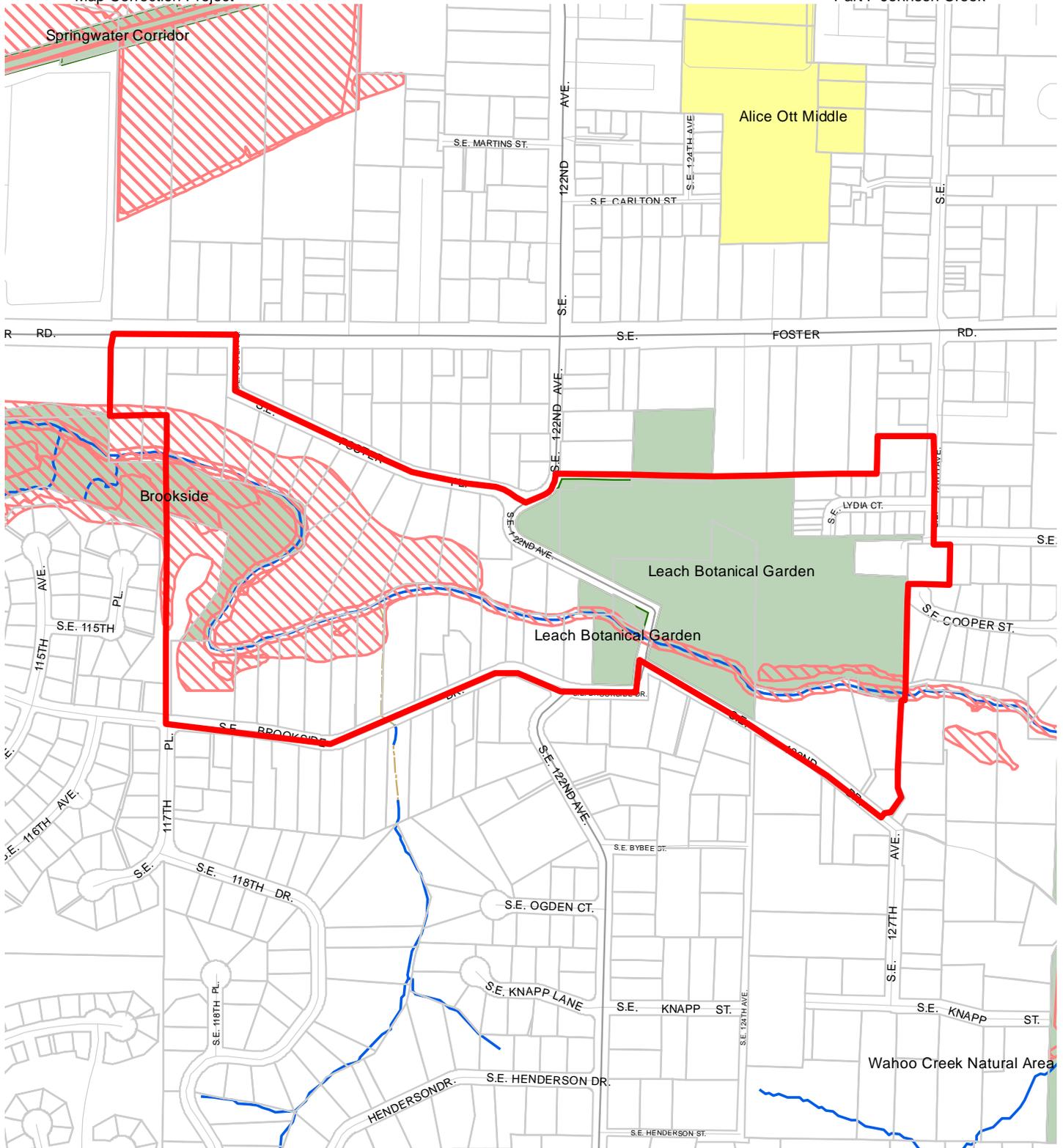
Updated: July 2021



- Resource Sites
- Urban Service Boundary
- Taxlots
- Slopes >25%
- Forest
- Woodland
- Shrubland
- Herbaceous



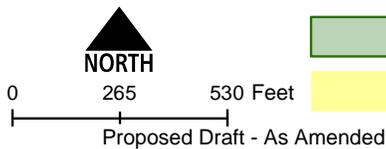
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**Map C: Special
Habitat Areas**

**Resource Site:
JC16**

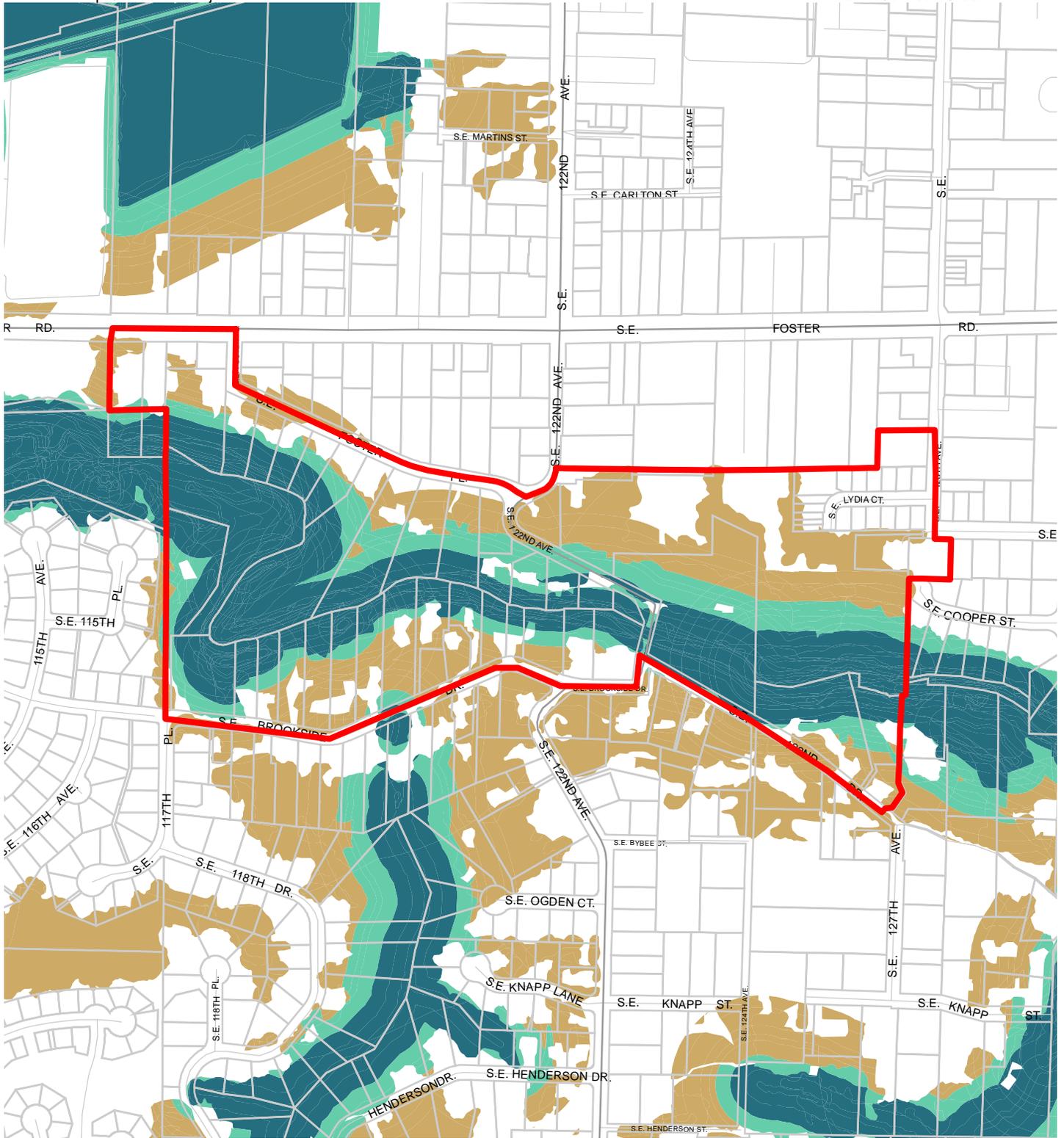
Updated: June 2021



- Resource Sites
- Special Habitat Areas (SHAs)
- Open Stream Channel
- Piped Stream Segment
- Parks
- Schools
- Urban Service Boundary
- Taxlots



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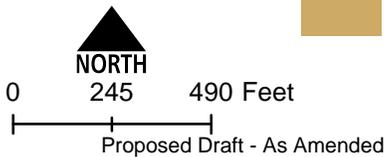


**Map D: Riparian
Corridors Habitat
Classification**

**Resource Site:
JC16**

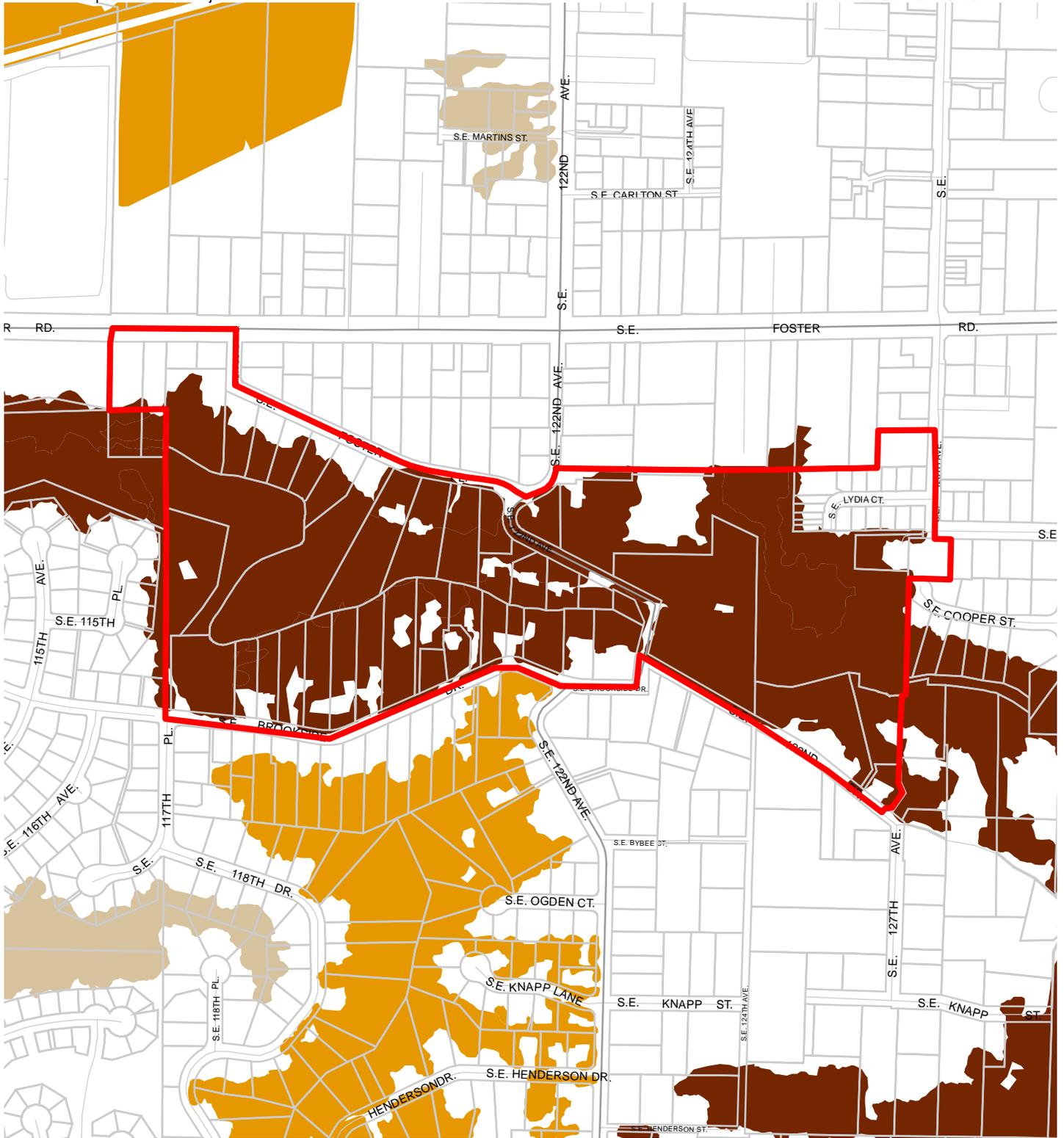
Updated: July 2021

- Resource Sites
- Urban Service Boundary
- Class I (high rank)
- Taxlots
- Class II (medium rank)
- Class III (low rank)



The information on the map was derived from digital databases. Care was taken in the creation of this map but it is provided "as is". The City of Portland ensures meaningful access to city programs, services, and activities to comply with Civil Rights Title VI and ADA Title II laws and reasonably provides: translation, interpretation, modifications, accommodations, alternative formats, auxiliary aids and services. To request these services, contact 503-823-7700, City TTY 503-823-6868, Relay Service: 711.

July 2021



**Map E: Wildlife
Habitat Classification**
Resource Site:
JC16

Updated: July 2021



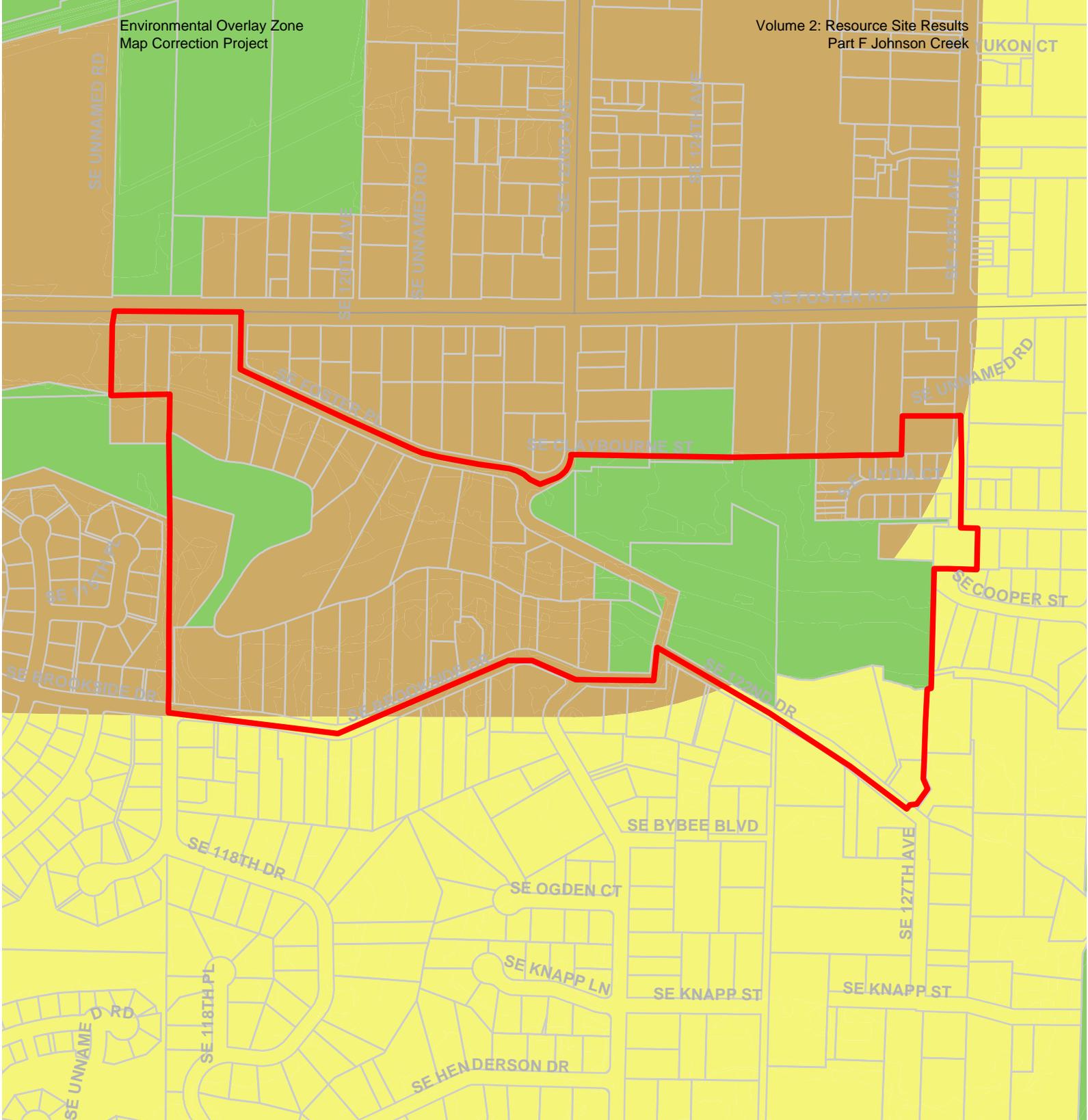
Proposed Draft - As Amended

-  Resource Sites
-  Class A (high rank)
-  Class B (medium rank)
-  Class C (low rank)
-  Urban Service Boundary
-  Taxlots



The information on the map was derived from digital databases. Care was taken in the creation of this map but it is provided "as is". The City of Portland ensures meaningful access to city programs, services, and activities to comply with Civil Rights Title VI and ADA Title II laws and reasonably provides: translation, interpretation, modifications, accommodations, alternative formats, auxiliary aids and services. To request these services, contact 503-823-7700, City TTY 503-823-6868, Relay Service: 711.

July 2021

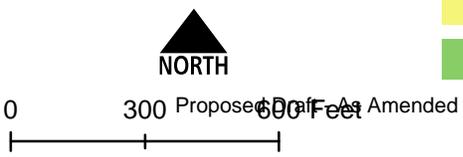


Map F: Urban Development Value (Title 13)
Resource Site: JC16

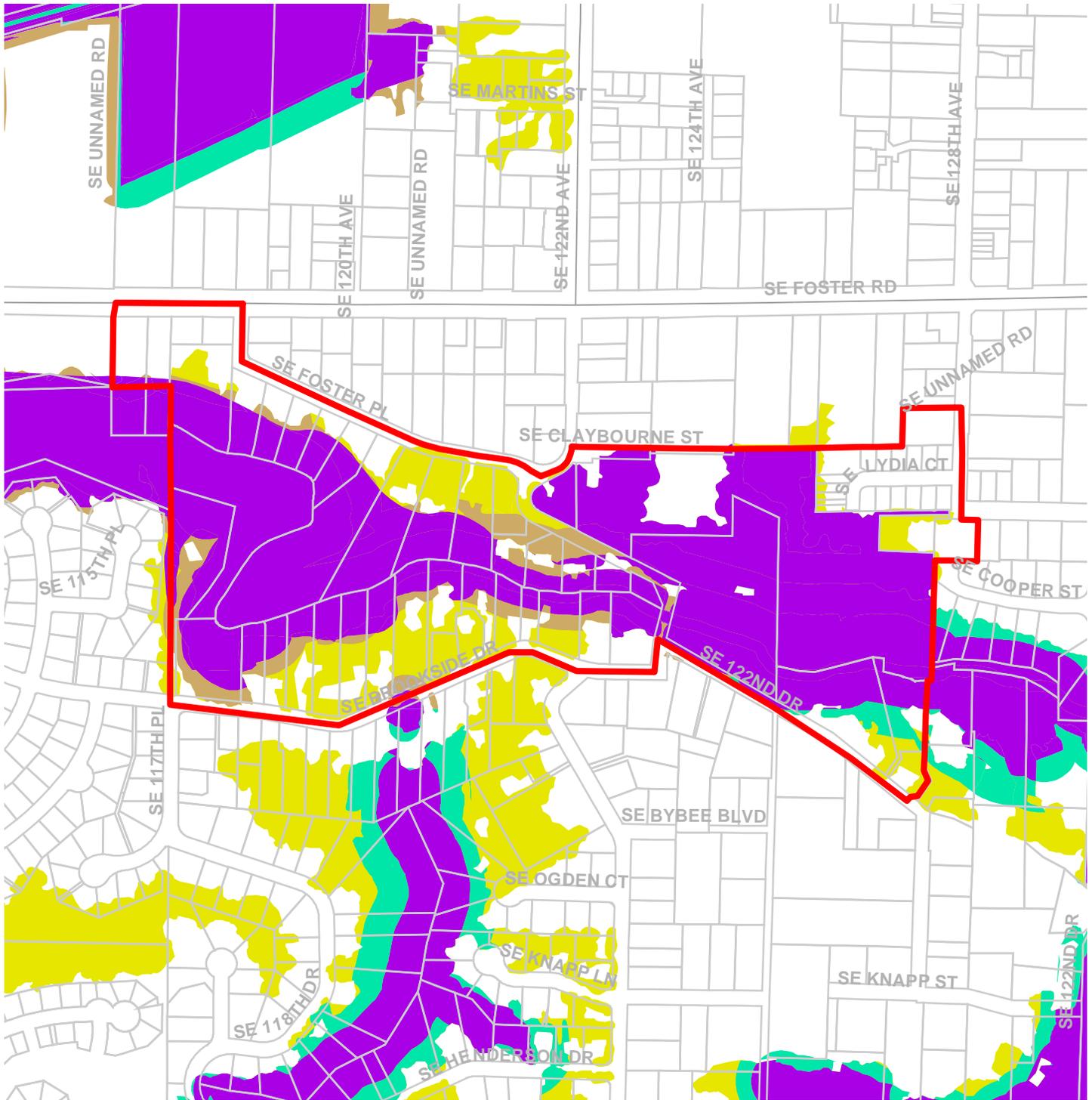
-  Urban Service Boundary
-  Resource Sites
-  High Development Value
-  Medium Development Value
-  Low Development Value
-  Parks



Updated: July 2021



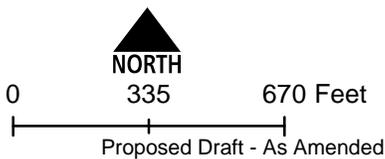
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Map G: Title 13 Habitat Conservation Areas (HCA) and Goal 5 Areas

Resource Site: JC16

Updated: July 2021

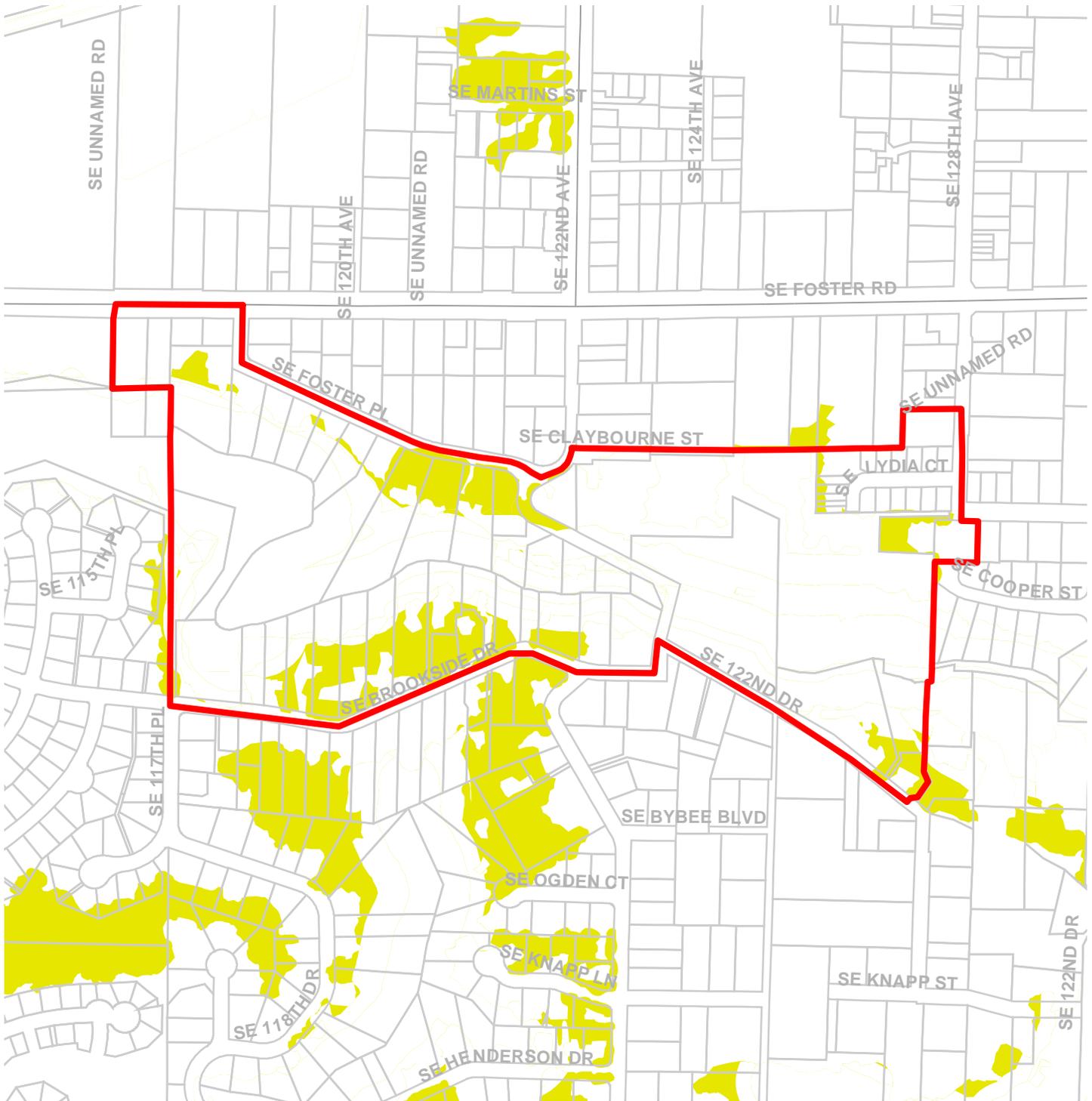


- Urban Service Boundary
- Resource Sites
- HCA High Value
- HCA Moderate Value
- HCA Low Value
- Goal 5 Significant Natural Resources



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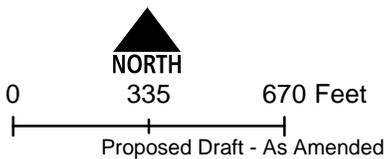
July 2021



Map H: Goal 5 Resources

Resource Site: JC16

Updated: July 2021

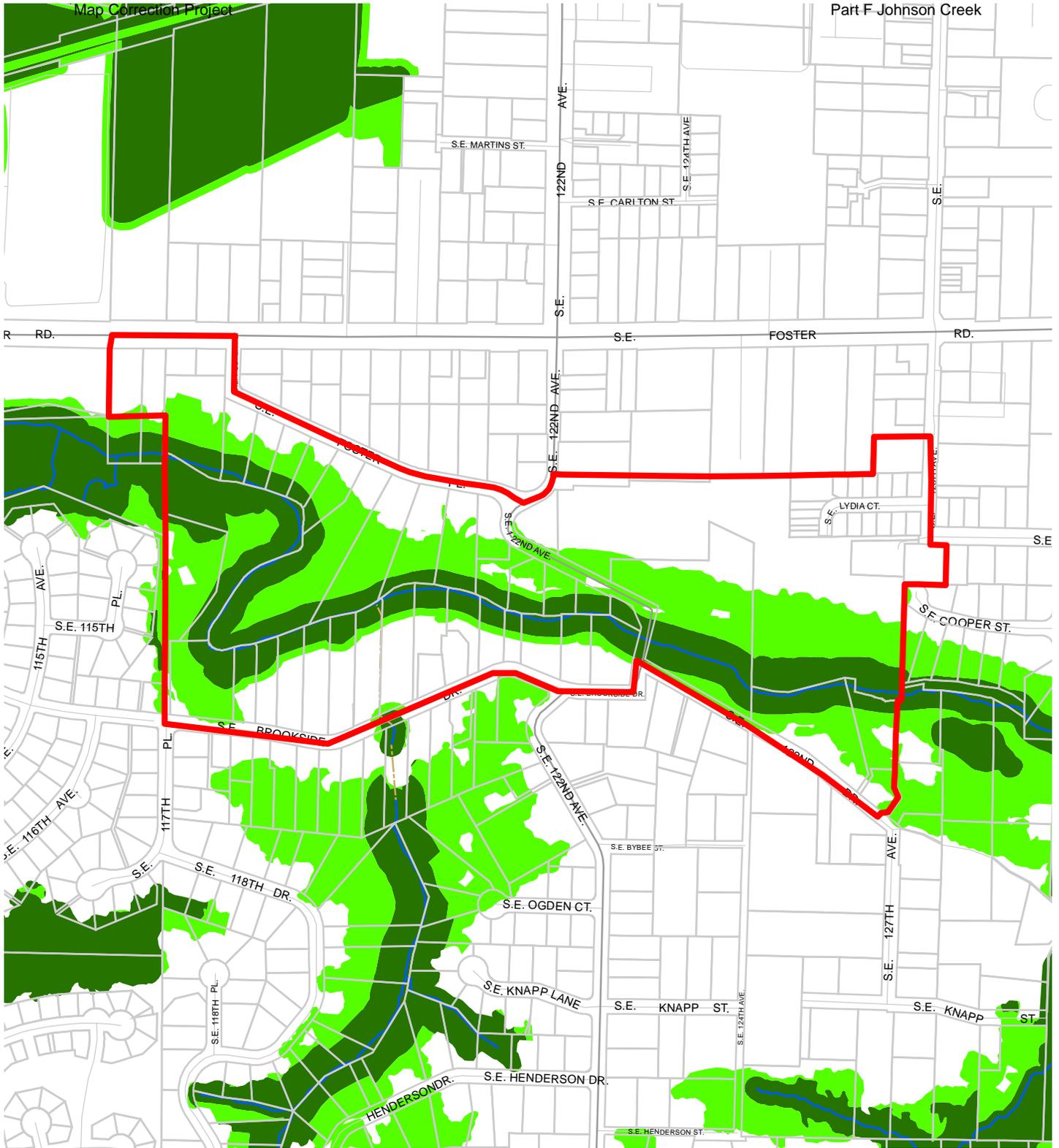


-  Urban Service Boundary
-  Resource Sites
-  Goal 5 Significant Natural Resources



The information on the map was derived from digital databases. Care was taken in the creation of this map but it is provided "as is". The City of Portland ensures meaningful access to city programs, services, and activities to comply with Civil Rights Title VI and ADA Title II laws and reasonably provides: translation, interpretation, modifications, accommodations, alternative formats, auxiliary aids and services. To request these services, contact 503-823-7700, City TTY 503-823-6868, Relay Service: 711.

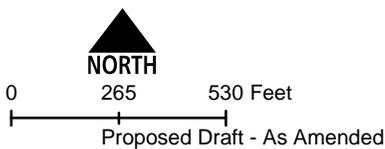
July 2021



Map I: DRAFT Proposed Environmental Overlay Zones

**Resource Site:
JC16**

Updated: July 2021



- Resource Sites
- Open Stream Channel
- Urban Service Boundary
- Taxlots
- Piped Stream Segment
- Proposed Conservation Zone
- Proposed Protection Zone



The information on the map was derived from digital databases. Care was taken in the creation of this map but it is provided "as is". The City of Portland ensures meaningful access to city programs, services, and activities to comply with Civil Rights Title VI and ADA Title II laws and reasonably provides: translation, interpretation, modifications, accommodations, alternative formats, auxiliary aids and services. To request these services, contact 503-823-7700, City TTY 503-823-6868, Relay Service: 711.
July 2021

Natural Resource Description

Within resource site JC16 the following significant natural resource features and functions are present:

Significant Riparian Corridor Features: open stream; wetland; flood area; land within 50 feet of waterbodies; forest, woodland, shrubland and herbaceous vegetation within 300 feet of waterbodies; and forest vegetation on steep slopes (>25% slope) contiguous to and within 780 feet of waterbodies.

Significant Wildlife Habitat Features: forest patches, and associated and contiguous wetlands, two acres in size or larger.

Special Habitat Areas: Johnson Creek (S, C); wetlands (W)

Riparian Corridor Functions: microclimate and shade; stream flow moderation and water storage; bank function and sediment, pollution and nutrient control; large wood and channel dynamics; organic inputs, food web and nutrient cycling; and riparian wildlife movement corridor.

Wildlife Habitat Functions: interior area; food and water; resting, denning, nesting and rearing; movement and migration; reduction of noise, light and vibration; and habitat patches that support special status fish and wildlife species.

Table A: Quantity of Natural Resource Features in Resource Site		JC16
		Study Area
Stream (Miles)		0.7
Wetlands (acres)		1.6
Vegetated Areas >= 1/2 acre (acres)		
	Forest (acres)	29.2
	Woodland (acres)	12.6
	Shrubland (acres)	0.0
	Herbaceous (acres)	1.3
Flood Area*		
	Vegetated (acres)	11.1
	Non-vegetated (acres)	0.1
Steep Slopes (acres)**		21.3
* The flood area includes the FEMA 100-year flood plain plus the adjusted 1996 flood inundation area.		
**Slopes are derived from LiDAR. Steep slopes are areas with a slope greater than 25%.		

The resource site is comprised of low-density residential development, the Leach Botanical Garden, a publicly owned garden and natural area, and Brookside Wetlands. The site is bordered by Foster Place and Clayborne Street at the north, roughly SE 128th Avenue to the east, SE 122nd Drive and Brookside Drive on the south and SE 117th Place on the west. Johnson Creek flows in a forested canyon from east to west through the site.

Creekside wetlands and riparian forests are found in the site. The dominant vegetation is a mixed forest of Douglas fir, cedar, alder, cottonwood, maple, willow, and various ornamental trees, as well as lawns and gardens. Cedar Creek, a small tributary to Johnson Creek, flows from the Boring Lava Domes (BL5), south side of this resource site, and enters Johnson Creek through a nearly 400-foot pipe. This small tributary and associated natural resources provide wildlife habitat connectivity between Johnson Creek and the East Buttes.

Moving upstream from SE 117th Avenue, Johnson Creek follows along the base of the north slope of Mt. Scott. The north canyon walls are steeply sloped, rising 70 feet up from the creek channel with 20% or higher slopes. Due to the steepness of the canyon walls, flooding is confined to a narrow area along the creek, except the floodplain broadens at a s-curve in the creek in the vicinity of SE 117th.

Wildlife connectivity exists between this resource site and nearby large forested areas such as Powell Butte to the north of the creek, the Mt. Scott and Clatsop Butte to the south, and the Leach Botanical Garden and Bundy Park (SE 142nd Avenue and SE Cooper Street). The creek channel, with large forested natural areas and parks, provides an important source of water to wildlife that use the larger forested areas and serves as a corridor providing cover and food for movements and dispersals between the areas.

Leach Botanical Garden straddles Johnson Creek and is located on the eastern half of this site area at 6704 SE 122nd Avenue. It is a historical and environmental education resource and designated as a "scenic resource" by the City. It has a Rank I status on the City of Portland's Historic Inventory and is eligible for the National Register. The colonial revival-styled home was built in 1933 by John and Lilla Leach. Mrs. Leach was a nationally known botanist with particular interest in native plants and Mr. Leach was a local pharmacist and civic leader. The property is owned by the City of Portland and operated by a non-profit organization. Environmental education programs are offered, and the creek and garden are used as outdoor classrooms.

Large residential lot sizes have allowed for the natural growth of Douglas Fir and Western Red Cedar trees to remain. The forest canopy is intact and the surrounding low density residential provides a quiet setting that is conducive to wildlife site fidelity. Natural understory areas have been replaced with lawns and landscape plants.

Coho salmon, Chinook salmon, steelhead trout, and Pacific lamprey have been documented in this reach of Johnson Creek. In 2019, a study of Johnson Creek’s potential to support salmon populations identified this reach of Johnson Creek as important to restore for chinook salmon and steelhead trout—meaning there is high habitat potential if complexity and sediment loading are addressed.

Special status bird species observed in or adjacent to this resource site include bald eagle, black-throated gray warbler, brown creeper, pacific-slope flycatcher, pacific wren, Pileated woodpecker, and Swainson's thrush.

Table B: Quality of Natural Resource Functions in Resource Site JC16				
Resource Site (acres) = 54				
	Class 1/A	Class 2/B	Class 3/C	Total
Riparian Corridors*				
acres	19.4	8.1	13.3	40.7
percent total inventory site area	35.7%	14.9%	24.5%	75.1%
Wildlife Habitat*				
acres	40.8	0.0	0.0	40.8
percent total inventory site area	75.3%	0.0%	0.0%	75.3%
Special Habitat Areas**				
acres	14.3			
percent total inventory site area	26.4%			
Combined Total*				
acres	40.9	0.1	1.3	42.2
percent total inventory site area	75.4%	0.2%	2.3%	77.9%
* Class I riparian resources, Special Habitat Areas, and wildlife habitat include open water. ** Metro Title 13 designated all Special Habitat Areas as Class I riparian corridors. +Because riparian resources, Special Habitat Areas, and wildlife Habitat overlap, the results cannot be added together to determine the combined results.				

Stormwater runs off impervious surfaces (e.g., rooftops, driveways, parking areas, streets, etc..) rapidly. Without a place to retain the water (such as wetlands or adequate stormwater facilities), stormwater runoff results in spikes in stream levels which can cause or exacerbate flooding and increase stream erosion. In addition, when water runs off quickly, it does not have a chance to infiltrate and recharge streams or aquifers to provide water during drier periods.

The type and capacity of stormwater facilities to manage the runoff from impervious surfaces varies in the city, affecting the local rate and amount of runoff, and the amount of pollutants in

the water. Much of the city was developed prior to any stormwater regulations and receives limited or no management prior to discharging to pipes and surface waters.

Table C shows the total amount of impervious area within the resource site and how much of that impervious area lacks stormwater management; the percentage of total impervious area that is not managed is called “effective impervious area.” The higher the percent of effective impervious area in a watershed, the greater the negative impacts of stormwater runoff to streams. Stream science indicates that when effective impervious area reaches 10% of a watershed, negative stream impacts become significant; and at 25%, these impacts on waterways can be substantial. An additional consideration is the differences in soil conditions and other factors that influence the ability of pervious areas to retain, infiltrate or filter pollutants from stormwater. For example, a mature forest is much more effective in managing stormwater than a manicured lawn; both areas would have a lower effective impervious surface percentage than a developed site, but they have different outcomes for stormwater management.

For Resource Area JC16, 6.2% of the total area is effectively impervious. This indicates a significant degree of stormwater management and/or existing natural resources that should be preserved. Areas with very low impervious cover and existing vegetation are more likely to be functioning properly to support biologic systems.

Table C. Impervious Area within Resource Site JC16			
Total area (acres)	Total impervious Area (acres)	Total unmanaged impervious area* (acres)	Percent of resource site that is effectively impervious
54.2	6.0	3.4	6.2%

*Total unmanaged impervious area refers to the number of acres within a resource area that receives no formal stormwater management measures to regulate flow or treat pollutants before they reach surface waters, also referred to as effective impervious area.

Metro Title 13 and Oregon Goal 5 Compliance

The following information supplements evaluation of natural resource protections presented in Volume 4 and supports compliance with Metro Title 13 and Oregon Plan Goal 5.

Title 13 Habitat Conservation Areas

Map G presents the Habitat Conservation Areas (HCA) within the Resource site JC16. Natural resources should be protected within HCA as follows:

1. *Strictly limit* or *limit* conflicting uses within Class I/High Rank Riparian Areas in all Urban Development Areas.
2. *Strictly limit* or *limit* conflicting uses within Class II/Medium Rank Riparian Areas within Moderate and Low Value Urban Development Area as well as parks and open spaces.
3. *Strictly limit* or *limit* conflicting uses within Class A/High or B/Medium Rank Wildlife Habitat within parks and open spaces.
4. *Allow* conflicting uses or conducted a local Goal 5 ESEE for Class III/Low Rank Riparian Areas in all Urban Development Areas.
5. *Allow* conflicting uses or conducted a local Goal 5 ESEE for Class A/High, Class B/Medium or Class C/Low Rank Wildlife Habitat in all Urban Development Area, except parks and open space.

Strictly limiting or *limiting* conflicting uses in HCA will protect and conserve existing streams and wetlands to maintain significant natural resource functions including: microclimate and shade; stream flow moderation and water storage; bank function and sediment, pollution and nutrient control; large wood and channel dynamics; organic inputs, food web and nutrient cycling; and fish and wildlife habitat. *Strictly limiting* or *limiting* conflicting uses in HCA will allow for additional urban development that is sensitive to the natural resource features and requires mitigation for unavoidable negative impacts to features and functions. The recommendation will also contribute towards meeting other regulatory requirements including the Metro Title 3, Water Quality and Flood Management; Oregon Goal 6, Air, Water and Land Resources Quality; Oregon Goal 7, Areas Subject to Natural Hazards; the Clean Water Act; and the Endangered Species Act.

Goal 5 Significant Natural Resources

Resource site JC16 contains natural resource features that are not a Title 13 HCA and are therefore subject to Statewide Planning Goal 5 OAR 660-023-0110. The General ESEE analysis, Volume 4, describes the conflicting uses and provides an overarching analysis of the economic, social, environmental and energy consequences of prohibiting, limiting or allowing the conflicting uses within areas of significant natural resources. In addition to the General ESEE analysis, the following resource site-specific consequences are considered.

The common impacts of conflicting uses in the resource site include clearing vegetation; grading activities and soil compaction; adding impervious surface; modifying streams, wetlands and flood areas; generating pollution; landscaping with non-native or invasive vegetation; building fences or other wildlife barriers; and other impacts such as noise, light, litter and pets.

Within the resource site residential uses are allowed outright or conditionally in the R10, R5 and R2 base zones base zones. Open space uses are allowed in the OS base zone. Development of new uses may involve vegetation clearing, grading, filing, and soil compaction, as well as the addition of impervious surfaces and landscaping with non-native plants, with associated impacts

on the natural resources. Basic utilities and other infrastructure are allowed in all base zones. New or upgraded utility corridors may be cleared of vegetation and may fragment wildlife habitat.

The analysis of economic, social, environmental and energy consequences provided in Volume 4 is confirmed for resource site JC16, with the following additional information that clarifies the analysis.

Strictly limiting or limiting conflicting uses would retain the wildlife habitat functions provided by significant natural resource features including maintaining habitat for at risk plant, fish and wildlife species, maintaining vegetation on steep slopes, and maintaining the stormwater management and air-cooling functions of the tree canopy. Mitigation for negative consequences of additional development in areas of Class A or Class B wildlife habitat should be required.

Steep slopes are susceptible to erosion and landslides. Development should be clustered away from steep slopes and trees and vegetation should be maintained to reduce the landslide risks. New or expanded development on steep slopes should be *limited*.

Natural Resources Protection Decisions

Based on the analysis presented in Volume 3, Natural Resources Inventory, Volume 4, Title 13 and Goal 5 Compliance, and the resource site-specific evaluation for JC16, the following decisions are applied to protect the significant riparian corridors and wildlife habitat:

1. Apply a protection overlay zone ('p' zone) to stream channels from top-of-bank to top-of-bank, wetlands and land within 50 feet of stream top-of-bank or 30 feet of wetlands.
2. Apply a conservation overlay zone ('c' zone) to land between 50 and 75 feet of stream top-of-bank and 30 and 55 feet of wetlands.
3. Apply a conservation overlay zone ('c' zone) to areas of forest vegetation contiguous to but more than 75 feet from stream top-of-bank or areas of forest vegetation contiguous to but more than 75 feet from stream top-of-bank and extending to 200 feet from streams or wetlands.
4. Allow conflicting uses within all other areas containing significant natural resources.

Resource Site No.: JC17 Resource Site Name: Wahoo Wash

Previous Plan: Johnson Creek Basin Protection Plan

Previous Resource Site No.: 19

The results of the analysis found in Volume 3, Natural Resources Inventory, Volume 4, Title 13 and Goal 5 Compliance, and the resource site-specific evaluation, are presented in the following maps:

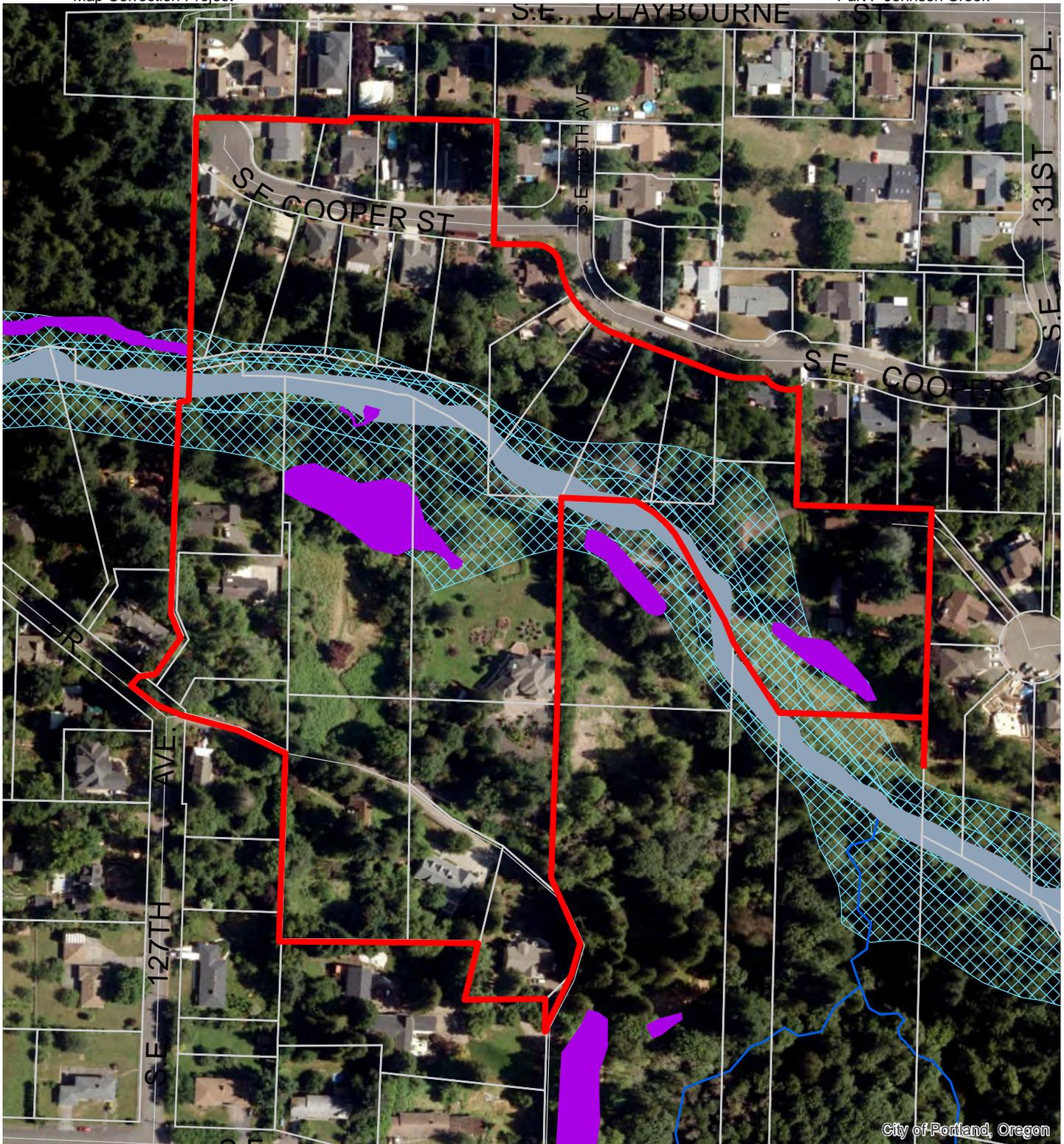
- A. Water Features – rivers, streams, wetlands and flood areas
- B. Land Features – forest, woodland, shrubland and herbaceous vegetation, steep slopes
- C. Special Habitat Areas
- D. Riparian Corridor Classifications
- E. Wildlife Habitat Classifications
- F. Urban Development Value
- G. Metro Title 13 Habitat Conservation Areas
- H. Statewide Planning Goal 5 Areas
- I. Recommended Natural Resource Protections

Following the maps, additional information about existing natural resource features and functions in the resource site is presented.

Implementation of the results is found in Volume 1, Part B, updates to zoning maps and zoning code.

Resource site JC17 includes the following:

Site (acres)	16.1
Base zones (acres)	
OS	<1
R10	16.1



Map A: Water Features

Resource Site: JC17

Updated: July 2021



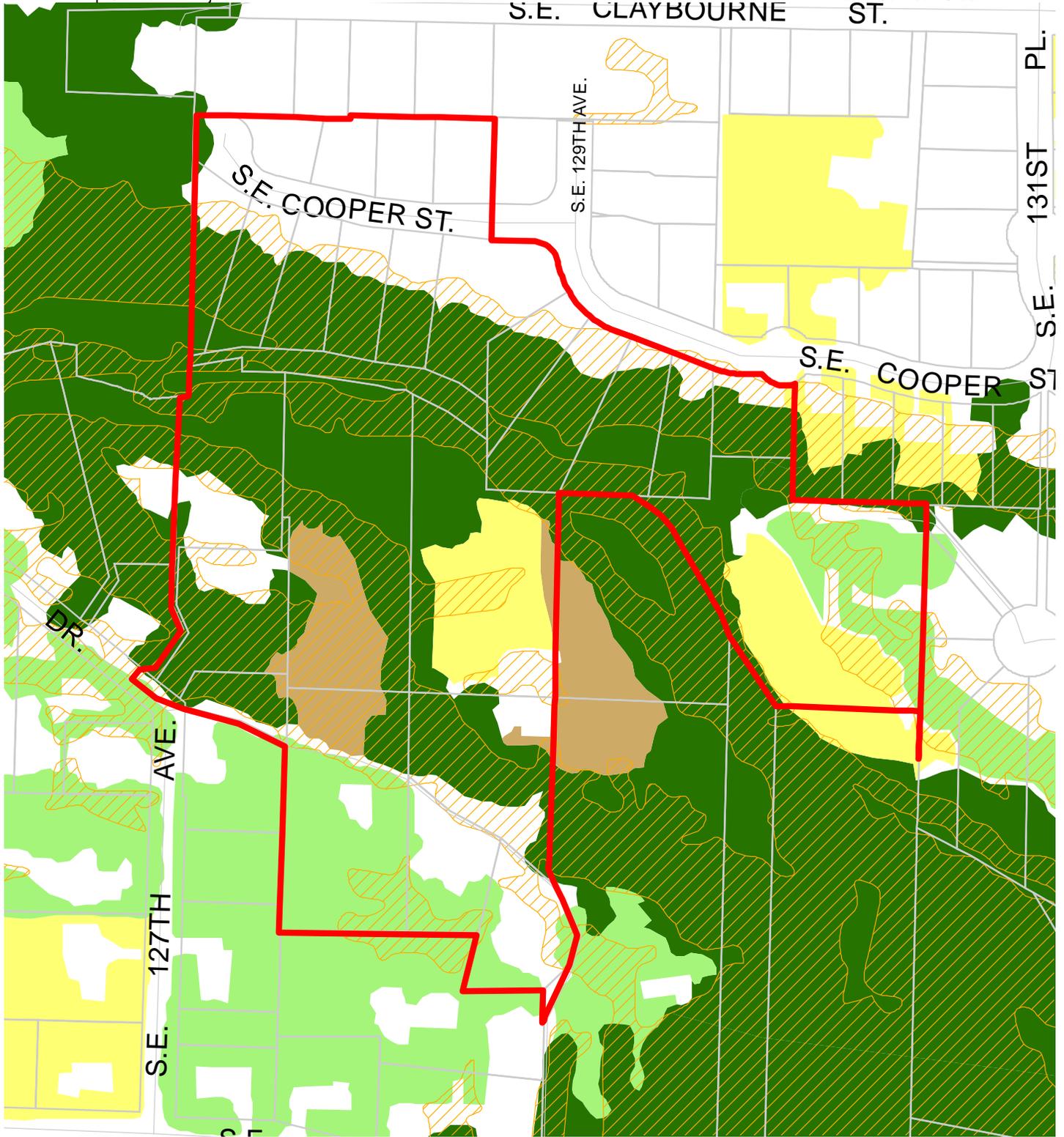
0 100 200 Feet

Proposed Draft - As Amended

- Resource Sites
- Urban Service Boundary
- Taxlots
- Wetlands
- Rivers
- Open stream channel
- Piped Stream Segment
- Flood Area



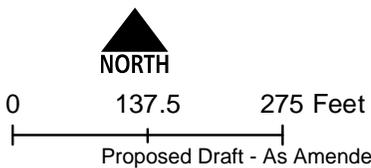
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July 2021



Map B: Vegetation and Steep Slopes

**Resource Site:
JC17**

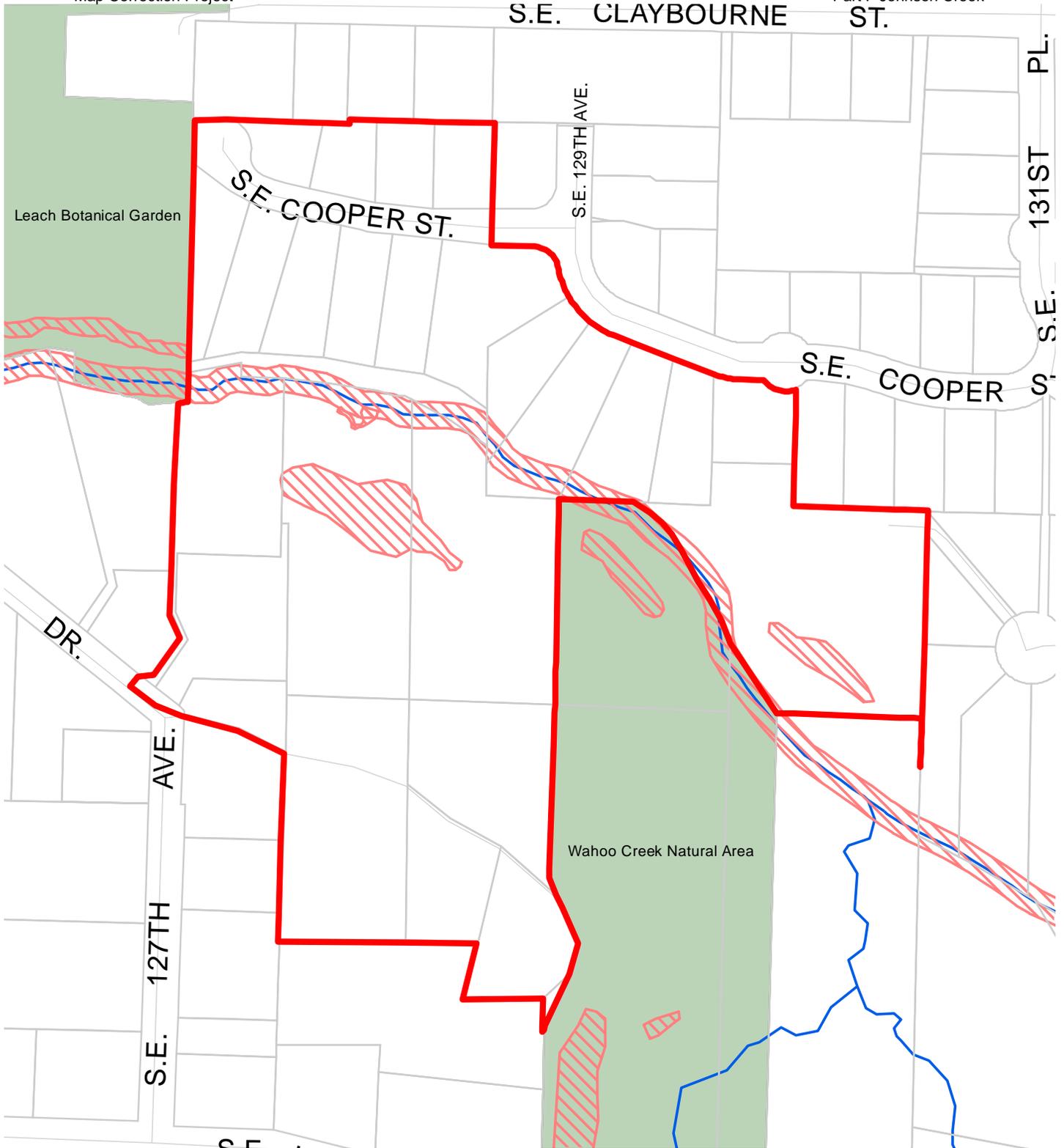
Updated: July 2021



- Resource Sites
- Urban Service Boundary
- Taxlots
- Slopes >25%
- Forest
- Woodland
- Shrubland
- Herbaceous

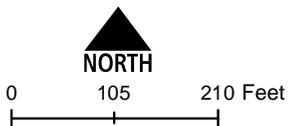


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**Map C: Special
Habitat Areas**
**Resource Site:
JC17**

Updated: June 2021

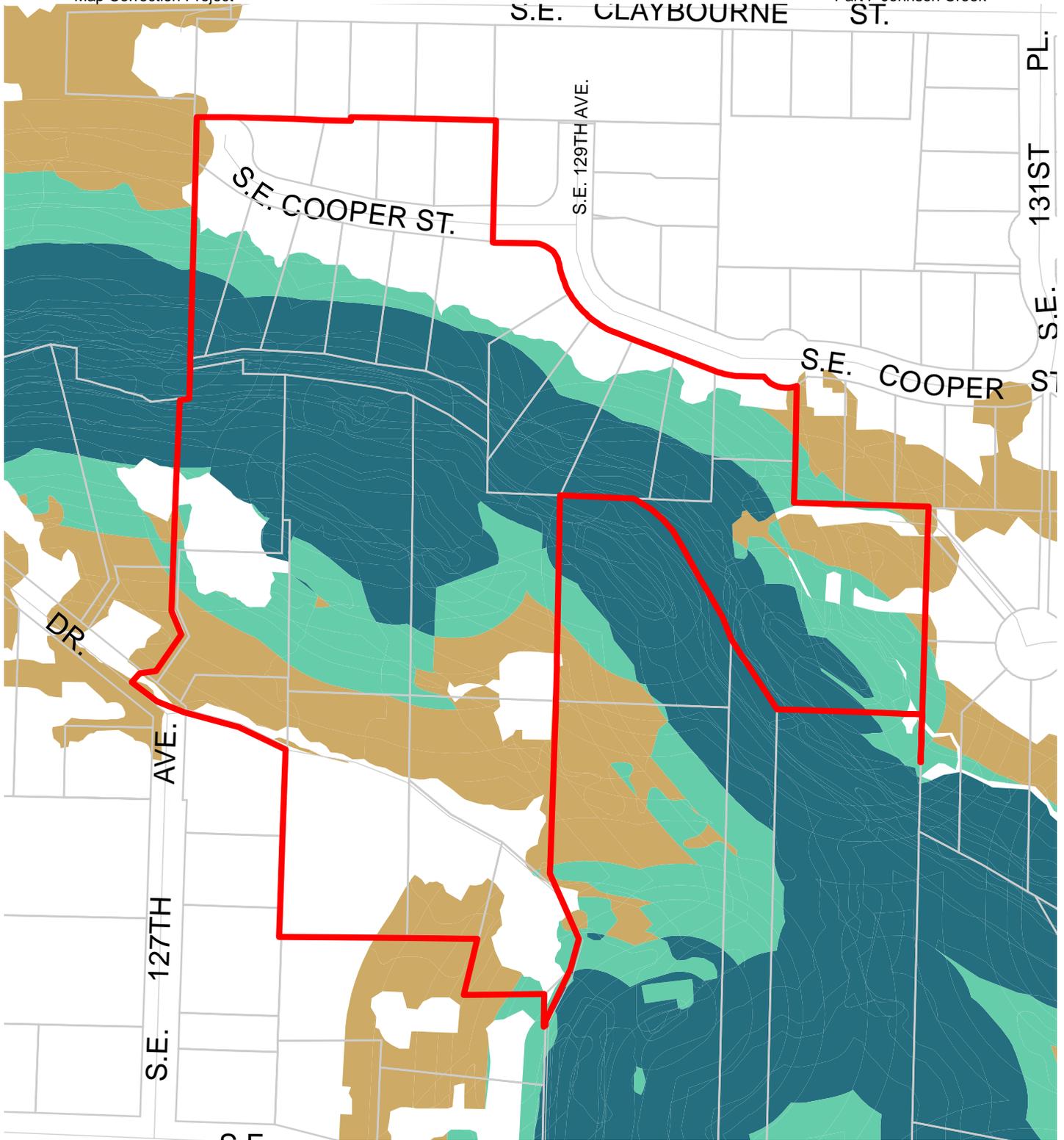


Proposed Draft - As Amended

-  Resource Sites
-  Special Habitat Areas (SHAs)
-  Open Stream Channel
-  Piped Stream Segment
-  Parks
-  Schools
-  Urban Service Boundary
-  Taxlots



The information on the map was derived from digital databases. Care was taken in the creation of this map but it is provided "as is". The City of Portland ensures meaningful access to city programs, services, and activities to comply with Civil Rights Title VI and ADA Title II laws and reasonably provides: translation, interpretation, modifications, accommodations, alternative formats, auxiliary aids and services. To request these services, contact 503-823-7700, City TTY 503-823-6868, Relay Service: 711.
July 2021

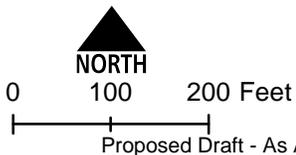


Map D: Riparian Corridors Habitat Classification

Resource Site:
JC17

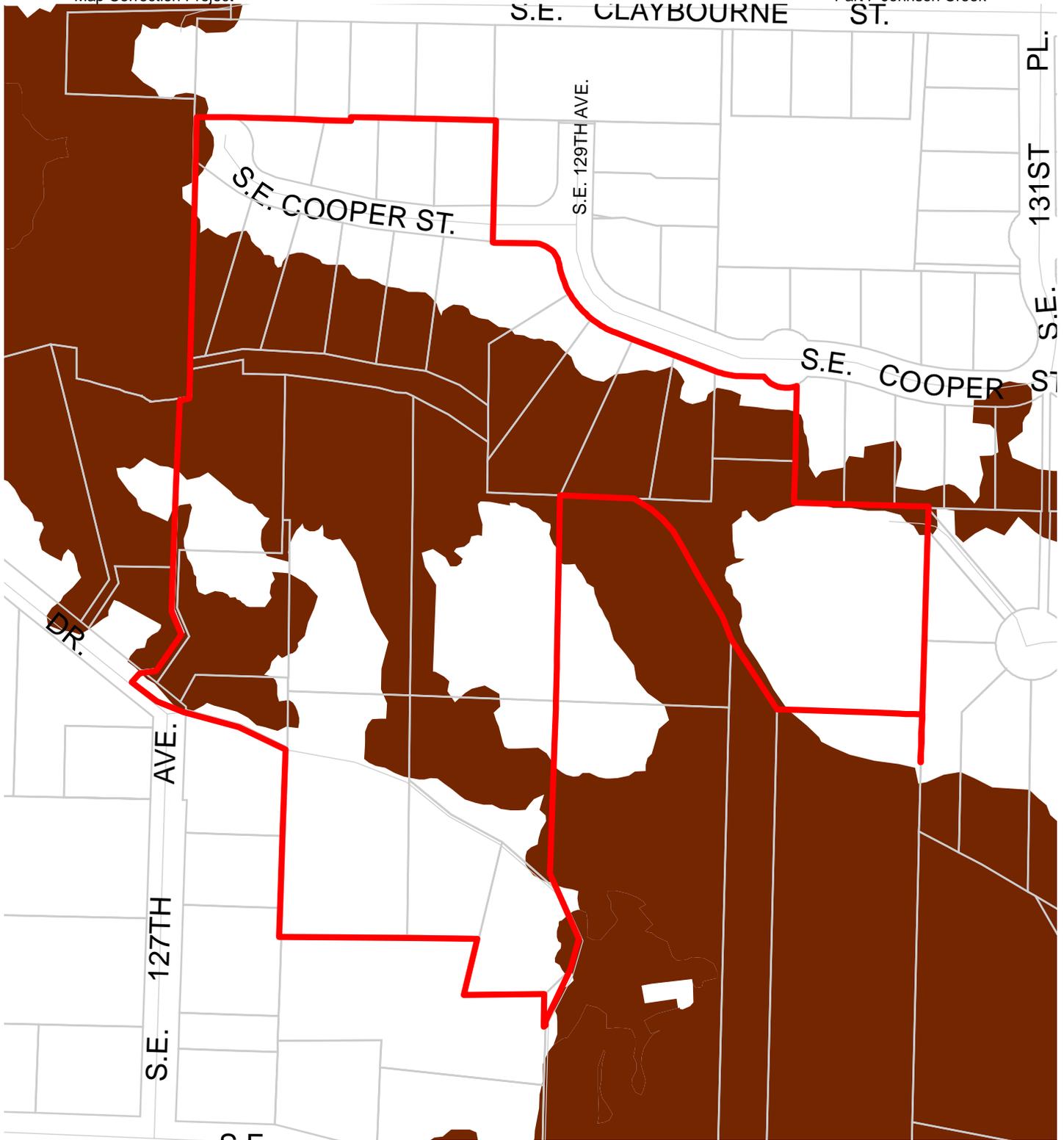
Updated: July 2021

- Resource Sites
- Urban Service Boundary
- Class I (high rank)
- Class II (medium rank)
- Class III (low rank)
- Taxlots



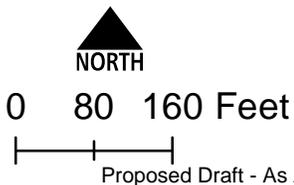
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July 2021



**Map E: Wildlife
Habitat Classification**
Resource Site:
JC17

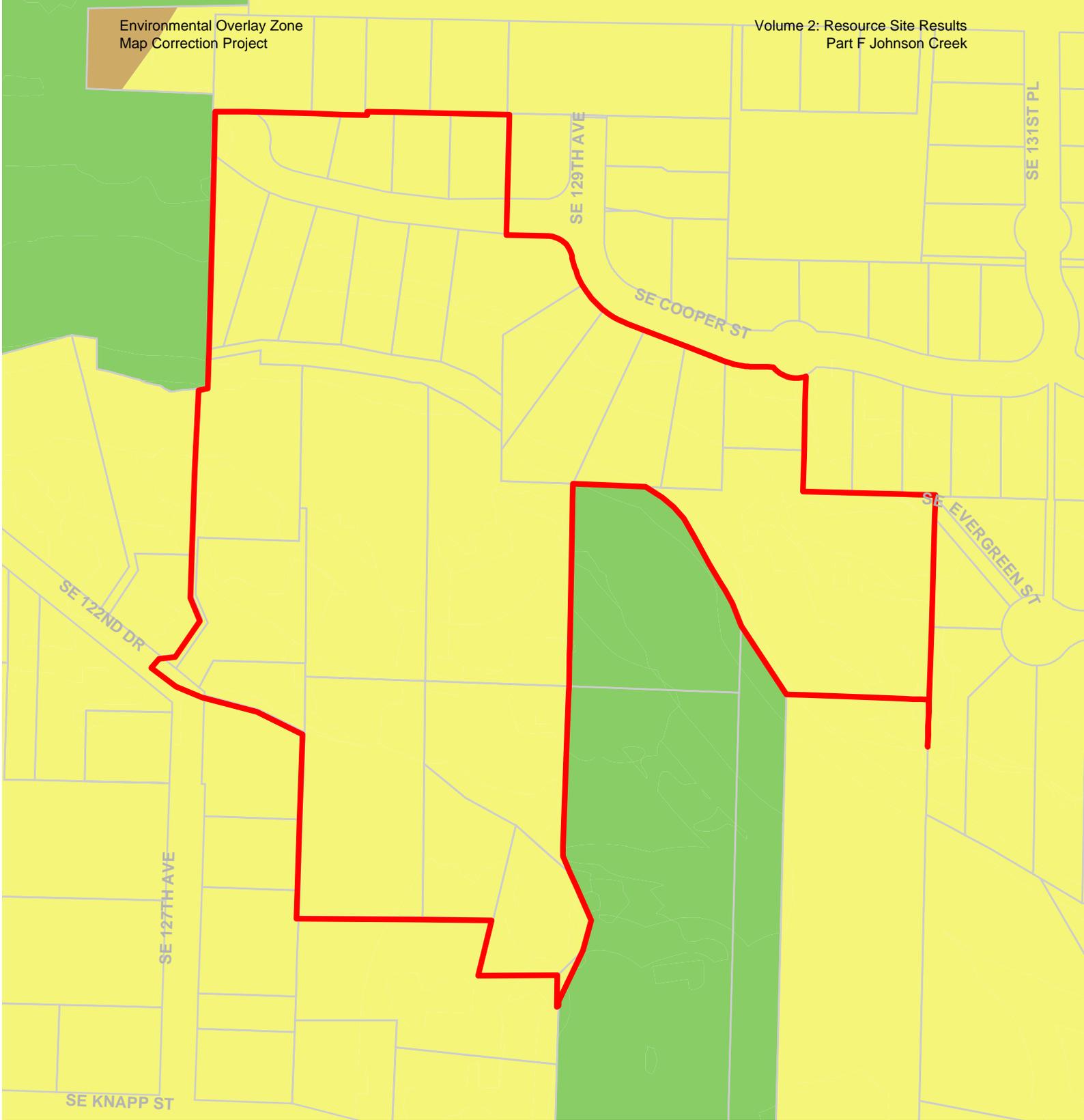
Updated: July 2021



-  Resource Sites
-  Class A (high rank)
-  Class B (medium rank)
-  Class C (low rank)
-  Urban Service Boundary
-  Taxlots



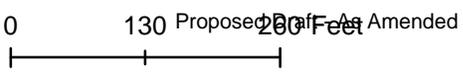
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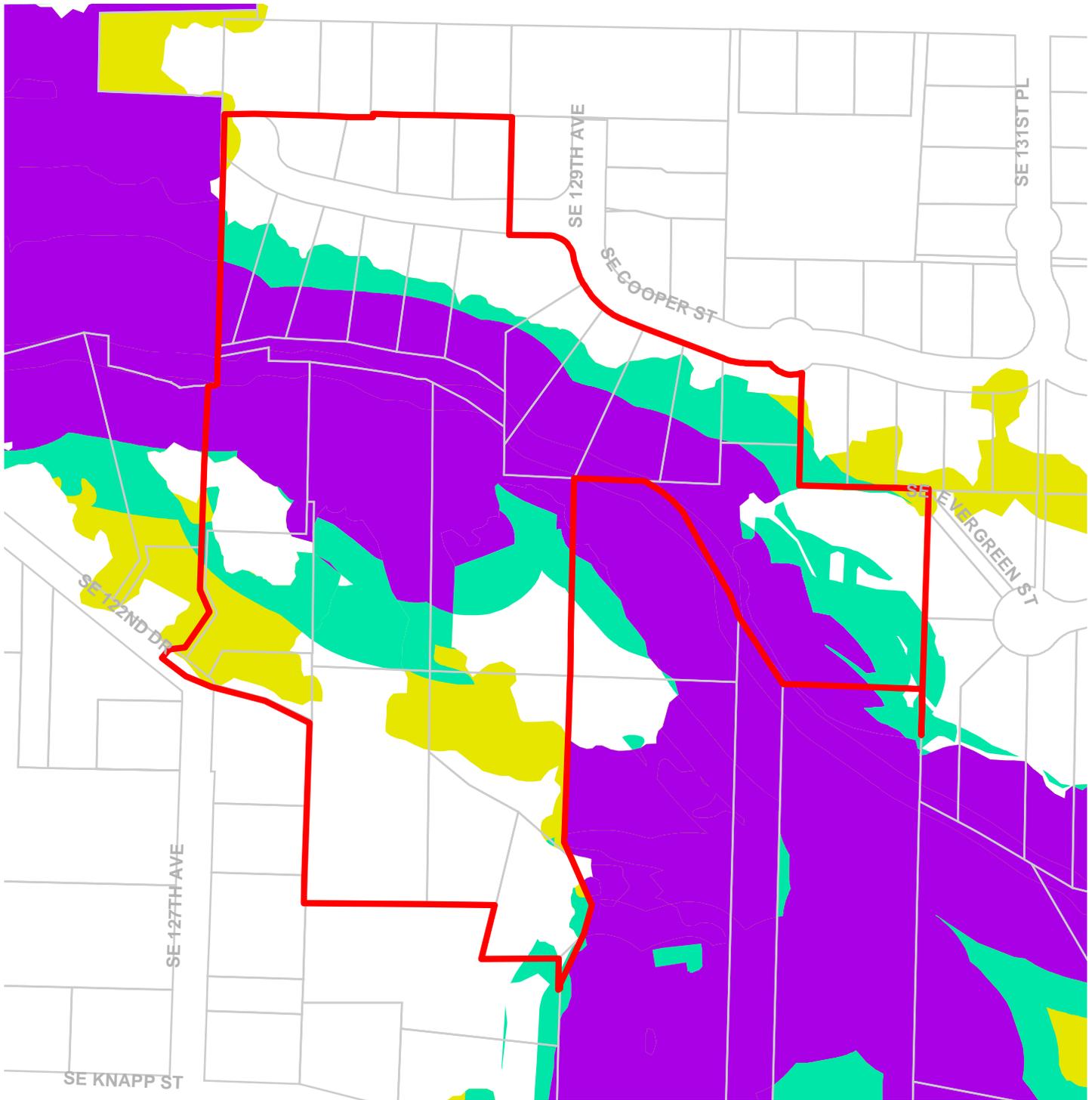
Map F: Urban Development Value (Title 13)
Resource Site: JC17

-  Urban Service Boundary
-  Resource Sites
-  High Development Value
-  Medium Development Value
-  Low Development Value
-  Parks

Updated: July 2021



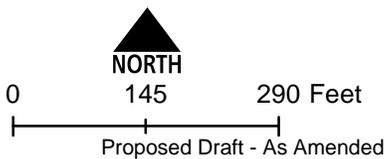
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Map G: Title 13 Habitat Conservation Areas (HCA) and Goal 5 Areas

Resource Site: JC17

Updated: July 2021

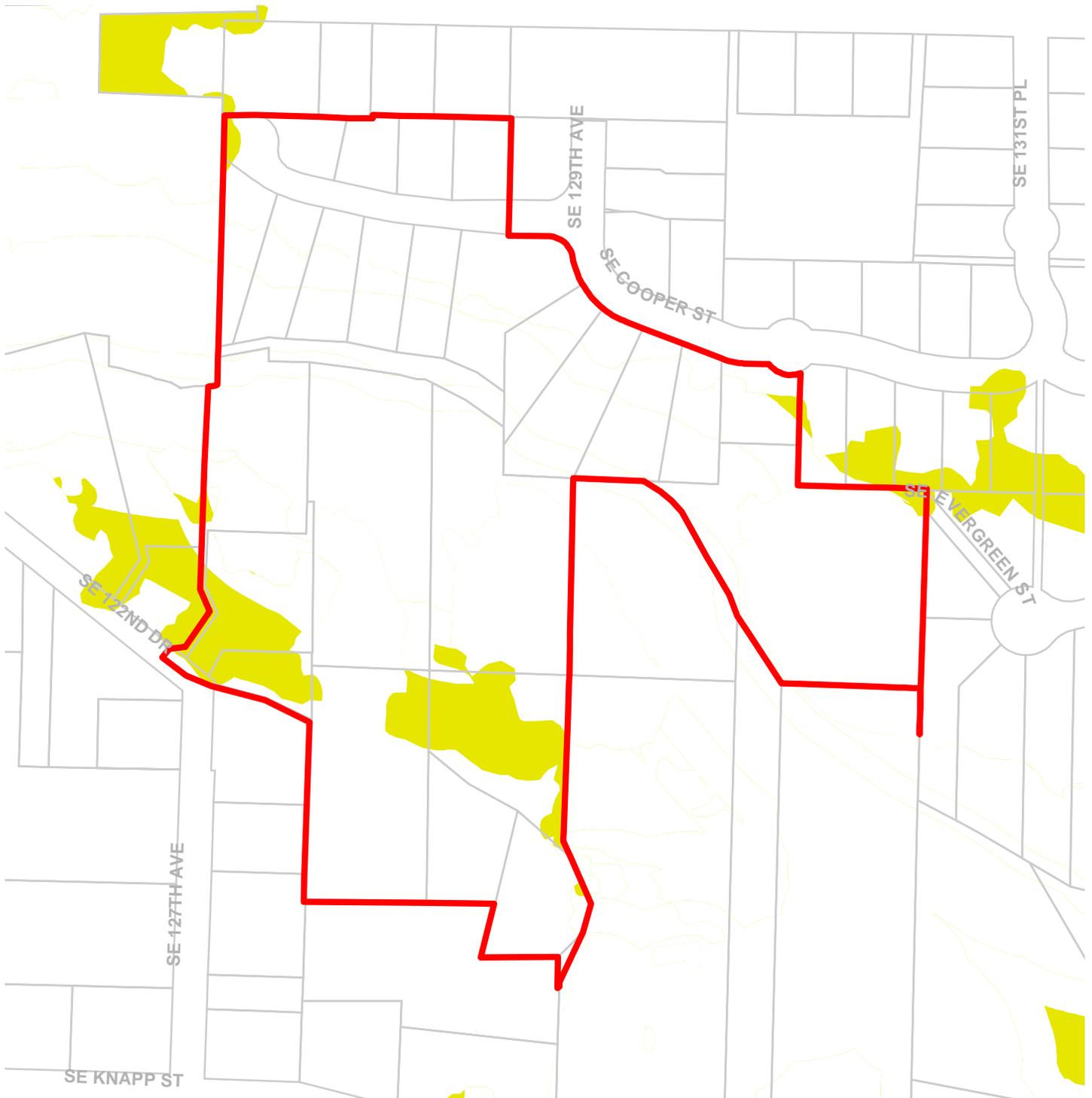


- Urban Service Boundary
- Resource Sites
- HCA High Value
- HCA Moderate Value
- HCA Low Value
- Goal 5 Significant Natural Resources



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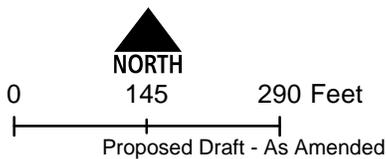
July 2021



Map H: Goal 5 Resources

Resource Site: JC17

Updated: July 2021

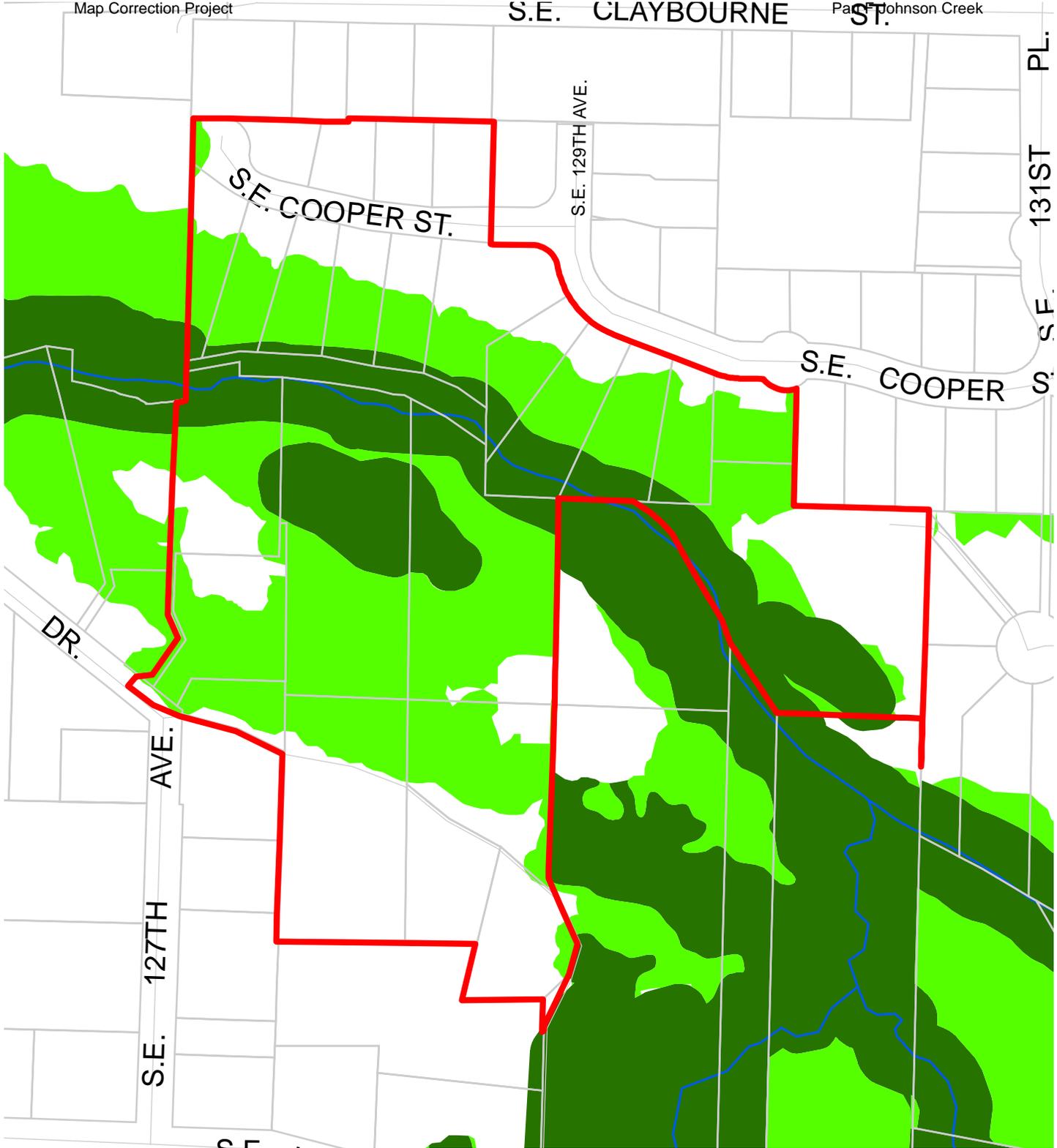


- Urban Service Boundary
- Resource Sites
- Goal 5 Significant Natural Resources



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July 2021



Map I: DRAFT Proposed Environmental Overlay Zones

Resource Site:
JC17

Updated: July 2021

-  Resource Sites
-  Open Stream Channel
-  Piped Stream Segment
-  Proposed Conservation Zone
-  Proposed Protection Zone
-  Urban Service Boundary
-  Taxlots



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July 2021

Natural Resource Description

Within resource site JC17 the following significant natural resource features and functions are present:

Significant Riparian Corridor Features: open stream; wetland; flood area; land within 50 feet of waterbodies; forest, woodland, shrubland and herbaceous vegetation within 300 feet of waterbodies; and forest vegetation on steep slopes (>25% slope) contiguous to and within 780 feet of waterbodies.

Significant Wildlife Habitat Features: forest patches, and associated and contiguous wetlands, two acres in size or larger.

Special Habitat Areas: Johnson Creek (S, C); wetlands (W)

Riparian Corridor Functions: microclimate and shade; stream flow moderation and water storage; bank function and sediment, pollution and nutrient control; large wood and channel dynamics; organic inputs, food web and nutrient cycling; and riparian wildlife movement corridor.

Wildlife Habitat Functions: interior area; food and water; resting, denning, nesting and rearing; movement and migration; reduction of noise, light and vibration; and habitat patches that support special status fish and wildlife species.

Table A: Quantity of Natural Resource Features in Resource Site		JC17
		Study Area
Stream (Miles)		0.1
Wetlands (acres)		0.5
Vegetated Areas >= 1/2 acre (acres)		
	Forest (acres)	7.5
	Woodland (acres)	1.9
	Shrubland (acres)	0.8
	Herbaceous (acres)	1.5
Flood Area*		
	Vegetated (acres)	3.7
	Non-vegetated (acres)	0.1
Steep Slopes (acres)**		8.2
* The flood area includes the FEMA 100-year flood plain plus the adjusted 1996 flood inundation area.		
**Slopes are derived from LiDAR. Steep slopes are areas with a slope greater than 25%.		

This resource site consists of low-density single-family residential land, and publicly owned natural areas. The site is bordered by SE Cooper St on the north, roughly SE 131st at the east, roughly Henderson Street on the south and Leach Botanical Garden on the west. Johnson Creek runs east to west on the northern portion of the site. Areas that have not been subdivided are largely open fields or are forested.

In this resource site, there are steeply-sloped canyon walls that rise 70 feet above the creek in some sections. The Johnson Creek floodplain follows the contours of the canyon floor. Much of the site has a mixed, deciduous/coniferous forest cover. Other open land is comprised of lawn, gardens, open meadow, or open pastureland. A small proportion of the site is developed with homes. There are no roads through the interior of this site to disrupt wildlife access to the creek. Several private properties have hillside springs which historically were used for watering livestock.

This mid-section of the Johnson Creek canyon provides wildlife connectivity to instream and upland habitats outside the resource site and the combinations of habitats that are adjacent to one another within the resource site, including riparian strip, open grassland, upland, and mixed forest. While riparian canopy cover is relatively intact in some areas of this site, in other areas the riparian canopy cover has been removed up to the banks of Johnson Creek where invasive Armenian blackberry thrives in the disturbed areas that aren't regularly mowed. Recovering native riparian canopy cover in these areas will help address Johnson Creek water quality standards.

Two tributaries to Wahoo Creek enter the site from the Boring Lava Domes Resource site BL6 and converge before entering Johnson Creek

Coho salmon, Chinook salmon, steelhead trout, Pacific and lamprey have been documented in this reach of Johnson Creek. In 2019, a study of Johnson Creek's potential to support salmon populations identified this reach of Johnson Creek as important to restore for chinook salmon and steelhead trout—meaning there is high habitat potential if complexity and sediment loading are addressed.

Special status bird species observed in or adjacent to this resource site include bald eagle, black-throated gray warbler, brown creeper, pacific-slope flycatcher, pacific wren, pileated woodpecker, and Swainson's thrush.

Table B: Quality of Natural Resource Functions in Resource Site JC17				
Resource Site (acres) = 16				
	Class 1/A	Class 2/B	Class 3/C	Total
Riparian Corridors*				
acres	5.4	3.0	2.6	10.9
percent total inventory site area	33.2%	18.6%	15.9%	67.7%
Wildlife Habitat*				
acres	7.5	0.0	0.0	7.5
percent total inventory site area	46.8%	0.0%	0.0%	46.8%
Special Habitat Areas**				
acres	0.6			
percent total inventory site area	3.8%			
Combined Total*				
acres	8.2	1.4	1.3	10.9
percent total inventory site area	51.0%	8.7%	8.0%	67.7%
* Class I riparian resources, Special Habitat Areas, and wildlife habitat include open water. ** Metro Title 13 designated all Special Habitat Areas as Class I riparian corridors. + Because riparian resources, Special Habitat Areas, and wildlife Habitat overlap, the results cannot be added together to determine the combined results.				

Stormwater runs off impervious surfaces (e.g., rooftops, driveways, parking areas, streets, etc..) rapidly. Without a place to retain the water (such as wetlands or adequate stormwater facilities), stormwater runoff results in spikes in stream levels which can cause or exacerbate flooding and increase stream erosion. In addition, when water runs off quickly, it does not have a chance to infiltrate and recharge streams or aquifers to provide water during drier periods.

The type and capacity of stormwater facilities to manage the runoff from impervious surfaces varies in the city, affecting the local rate and amount of runoff, and the amount of pollutants in the water. Much of the city was developed prior to any stormwater regulations and receives limited or no management prior to discharging to pipes and surface waters.

Table C shows the total amount of impervious area within the resource site and how much of that impervious area lacks stormwater management; the percentage of total impervious area that is not managed is called "effective impervious area." The higher the percent of effective impervious area in a watershed, the greater the negative impacts of stormwater runoff to streams. Stream science indicates that when effective impervious area reaches 10% of a watershed, negative stream impacts become significant; and at 25%, these impacts on waterways can be substantial. An additional consideration is the differences in soil conditions and other factors that influence the ability of pervious areas to retain, infiltrate or filter

pollutants from stormwater. For example, a mature forest is much more effective in managing stormwater than a manicured lawn; both areas would have a lower effective impervious surface percentage than a developed site, but they have different outcomes for stormwater management.

For Resource Area JC17, 6.8% of the total area is effectively impervious. This indicates a significant degree of stormwater management and/or existing natural resources that should be preserved. Areas with very low impervious cover and existing vegetation are more likely to be functioning properly to support biologic systems.

Table C. Impervious Area within Resource Site JC17			
Total area (acres)	Total impervious Area (acres)	Total unmanaged impervious area* (acres)	Percent of resource site that is effectively impervious
16.1	1.7	1.1	6.8%

*Total unmanaged impervious area refers to the number of acres within a resource area that receives no formal stormwater management measures to regulate flow or treat pollutants before they reach surface waters, also referred to as effective impervious area.

Metro Title 13 and Oregon Goal 5 Compliance

The following information supplements evaluation of natural resource protections presented in Volume 4 and supports compliance with Metro Title 13 and Oregon Plan Goal 5.

Title 13 Habitat Conservation Areas

Map G presents the Habitat Conservation Areas (HCA) within the Resource site JC17. Natural resources should be protected within HCA as follows:

1. *Strictly limit* or *limit* conflicting uses within Class I/High Rank Riparian Areas in all Urban Development Areas.
2. *Strictly limit* or *limit* conflicting uses within Class II/Medium Rank Riparian Areas within Moderate and Low Value Urban Development Area as well as parks and open spaces.
3. *Strictly limit* or *limit* conflicting uses within Class A/High or B/Medium Rank Wildlife Habitat within parks and open spaces.
4. *Allow* conflicting uses or conducted a local Goal 5 ESEE for Class III/Low Rank Riparian Areas in all Urban Development Areas.
5. *Allow* conflicting uses or conducted a local Goal 5 ESEE for Class A/High, Class B/Medium or Class C/Low Rank Wildlife Habitat in all Urban Development Area, except parks and open space.

Strictly limiting or limiting conflicting uses in HCA will protect and conserve existing streams and wetlands to maintain significant natural resource functions including: microclimate and shade; stream flow moderation and water storage; bank function and sediment, pollution and nutrient control; large wood and channel dynamics; organic inputs, food web and nutrient cycling; and fish and wildlife habitat. *Strictly limiting or limiting* conflicting uses in HCA will allow for additional urban development that is sensitive to the natural resource features and requires mitigation for unavoidable negative impacts to features and functions. The recommendation will also contribute towards meeting other regulatory requirements including the Metro Title 3, Water Quality and Flood Management; Oregon Goal 6, Air, Water and Land Resources Quality; Oregon Goal 7, Areas Subject to Natural Hazards; the Clean Water Act; and the Endangered Species Act.

Goal 5 Significant Natural Resources

Resource site JC17 contains natural resource features that are not a Title 13 HCA and are therefore subject to Statewide Planning Goal 5 OAR 660-023-0110. The General ESEE analysis, Volume 4, describes the conflicting uses and provides an overarching analysis of the economic, social, environmental and energy consequences of prohibiting, limiting or allowing the conflicting uses within areas of significant natural resources. In addition to the General ESEE analysis, the following resource site-specific consequences are considered.

The common impacts of conflicting uses in the resource site include clearing vegetation; grading activities and soil compaction; adding impervious surface; modifying streams, wetlands and flood areas; generating pollution; landscaping with non-native or invasive vegetation; building fences or other wildlife barriers; and other impacts such as noise, light, litter and pets.

Within the resource site residential uses are allowed outright or conditionally in the R10 base zone. Open space uses are allowed in the OS base zone. Development of new uses may involve vegetation clearing, grading, filing, and soil compaction, as well as the addition of impervious surfaces and landscaping with non-native plants, with associated impacts on the natural resources. Basic utilities and other infrastructure are allowed in all base zones. New or upgraded utility corridors may be cleared of vegetation and may fragment wildlife habitat.

The analysis of economic, social, environmental and energy consequences provided in Volume 4 is confirmed for resource site JC17, with the following additional information that clarifies the analysis.

Strictly limiting or limiting conflicting uses would retain the wildlife habitat functions provided by significant natural resource features including maintaining habitat for at risk plant, fish and wildlife species, maintaining vegetation on steep slopes, and maintaining the stormwater management and air-cooling functions of the tree canopy. Mitigation for negative

consequences of additional development in areas of Class A or Class B wildlife habitat should be required.

Steep slopes are susceptible to erosion and landslides. Development should be clustered away from steep slopes and trees and vegetation should be maintained to reduce the landslide risks. New or expanded development on steep slopes should be *limited*.

Natural Resources Protection Decisions

Based on the analysis presented in Volume 3, Natural Resources Inventory, Volume 4, Title 13 and Goal 5 Compliance, and the resource site-specific evaluation for JC17, the following decisions are applied to protect the significant riparian corridors and wildlife habitat:

1. Apply a protection overlay zone ('p' zone) to stream channels from top-of-bank to top-of-bank, wetlands, land within 40 feet of stream top-of-bank and land within 30 feet of wetlands
2. Apply a conservation overlay zone ('c' zone) to areas of forest or woodland vegetation contiguous to but more than 40 feet from stream top-of-bank or more than 30 feet from wetlands.
3. Apply a conservation overlay zone ('c' zone) to areas of forest, woodland, shrubland or herbaceous vegetation within and contiguous to public parks.
4. Allow conflicting uses within all other areas containing significant natural resources.

Resource Site No.: JC18 **Resource Site Name:** Deardorff Creek
Natural Area

Previous Plan: Johnson Creek Basin Protection Plan

Previous Resource Site No.: 20

The results of the analysis found in Volume 3, Natural Resources Inventory, Volume 4, Title 13 and Goal 5 Compliance, and the resource site-specific evaluation, are presented in the following maps:

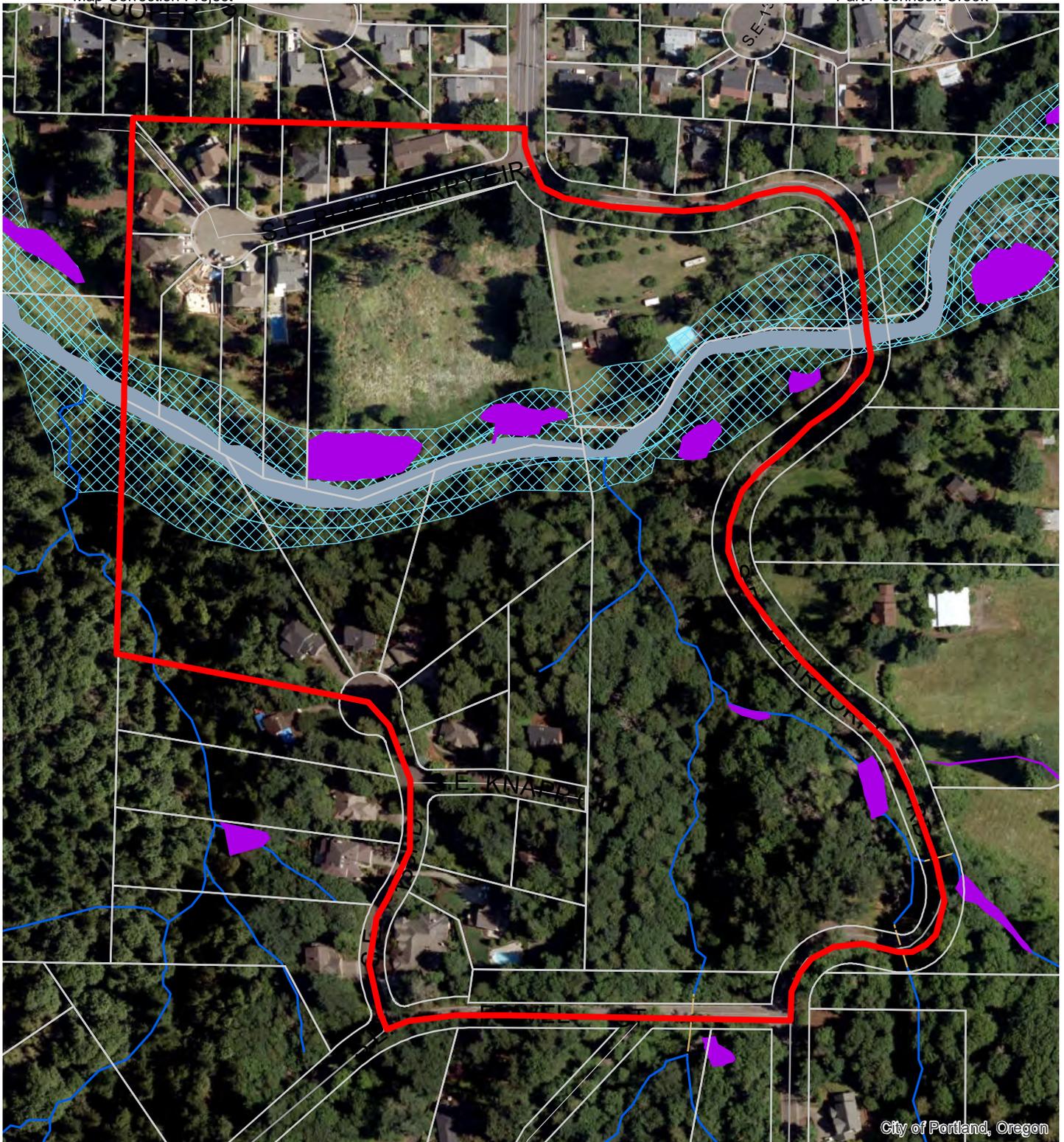
- A. Water Features – rivers, streams, wetlands and flood areas
- B. Land Features – forest, woodland, shrubland and herbaceous vegetation, steep slopes
- C. Special Habitat Areas
- D. Riparian Corridor Classifications
- E. Wildlife Habitat Classifications
- F. Urban Development Value
- G. Metro Title 13 Habitat Conservation Areas
- H. Statewide Planning Goal 5 Areas
- I. Recommended Natural Resource Protections

Following the maps, additional information about existing natural resource features and functions in the resource site is presented.

Implementation of the results is found in Volume 1, Part B, updates to zoning maps and zoning code.

Resource site JC17 includes the following:

Site (acres)	30.6
Base zones (acres)	
OS	13.7
R10	16.8
R20	0.1



City of Portland, Oregon

Map A: Water Features

Resource Site: JC18

Updated: July 2021



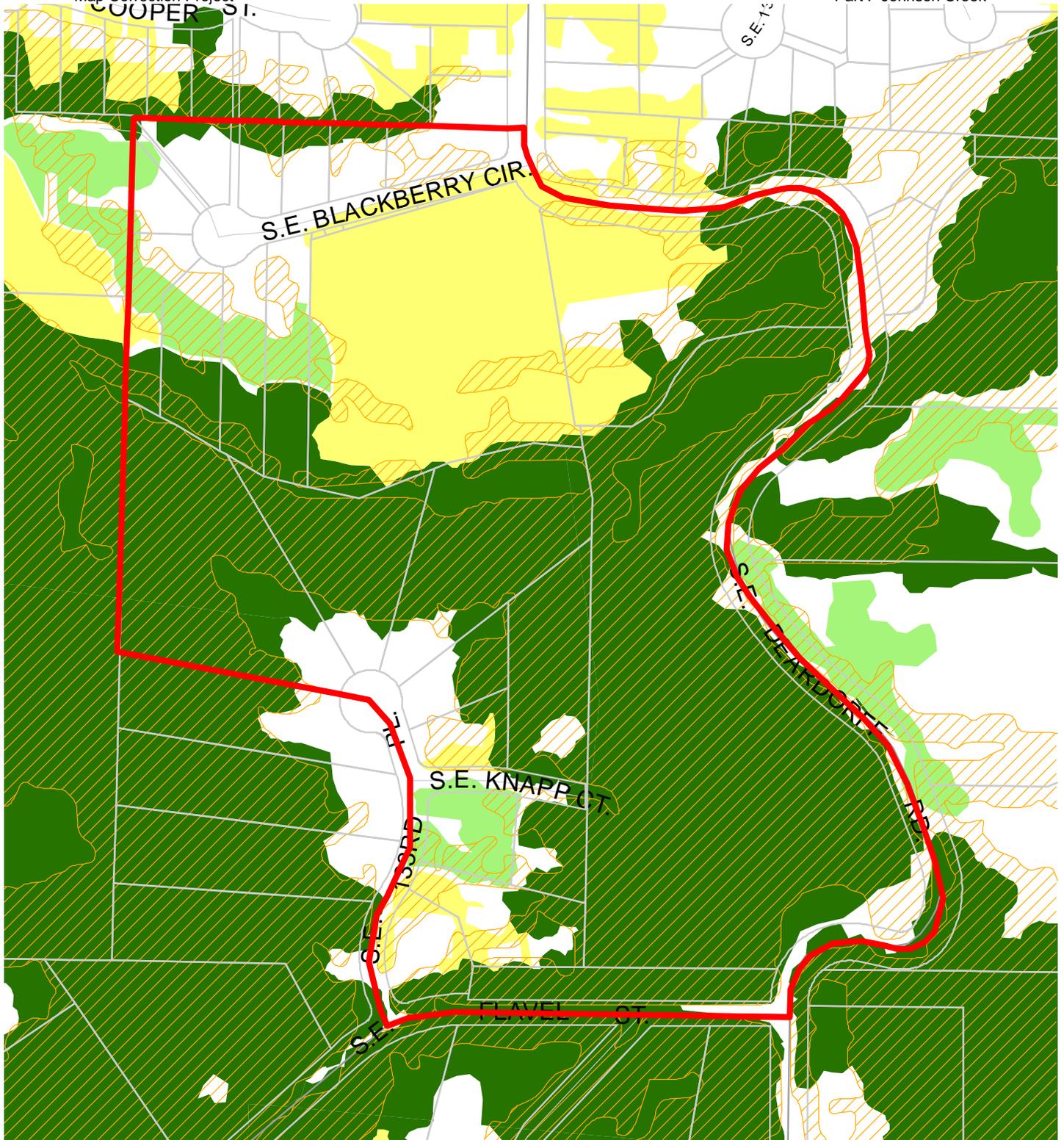
0 115 230 Feet

Proposed Draft - As Amended

- Resource Sites
- Urban Service Boundary
- Taxlots
- Wetlands
- Rivers
- Open stream channel
- Piped Stream Segment
- Flood Area



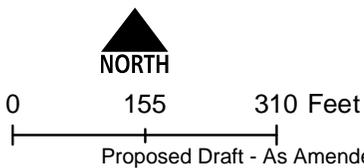
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Map B: Vegetation and Steep Slopes

**Resource Site:
JC18**

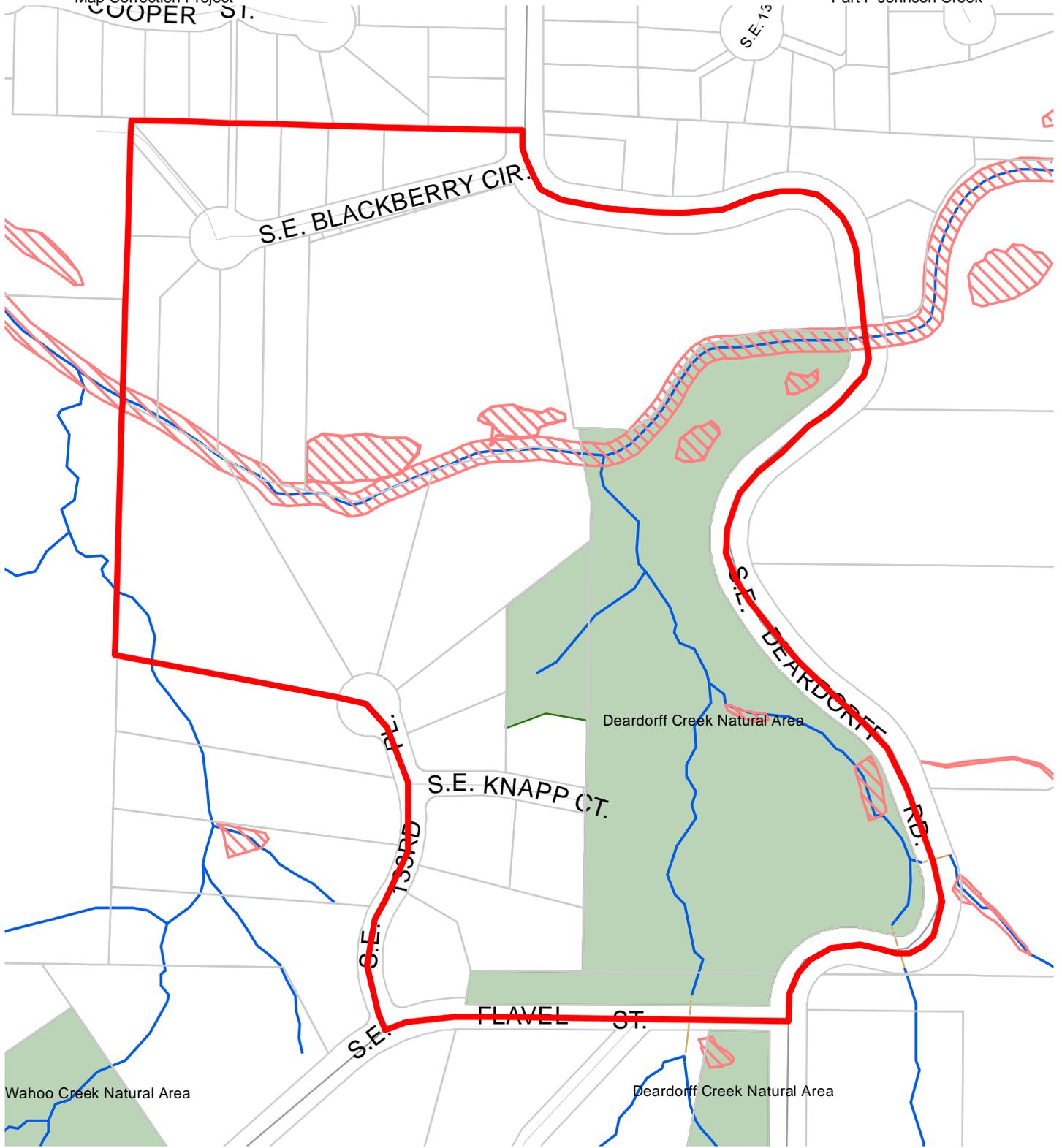
Updated: July 2021



- Resource Sites
- Urban Service Boundary
- Taxlots
- Slopes >25%
- Forest
- Woodland
- Shrubland
- Herbaceous

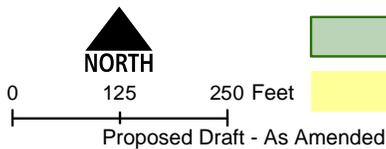


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**Map C: Special
Habitat Areas**
**Resource Site:
JC18**

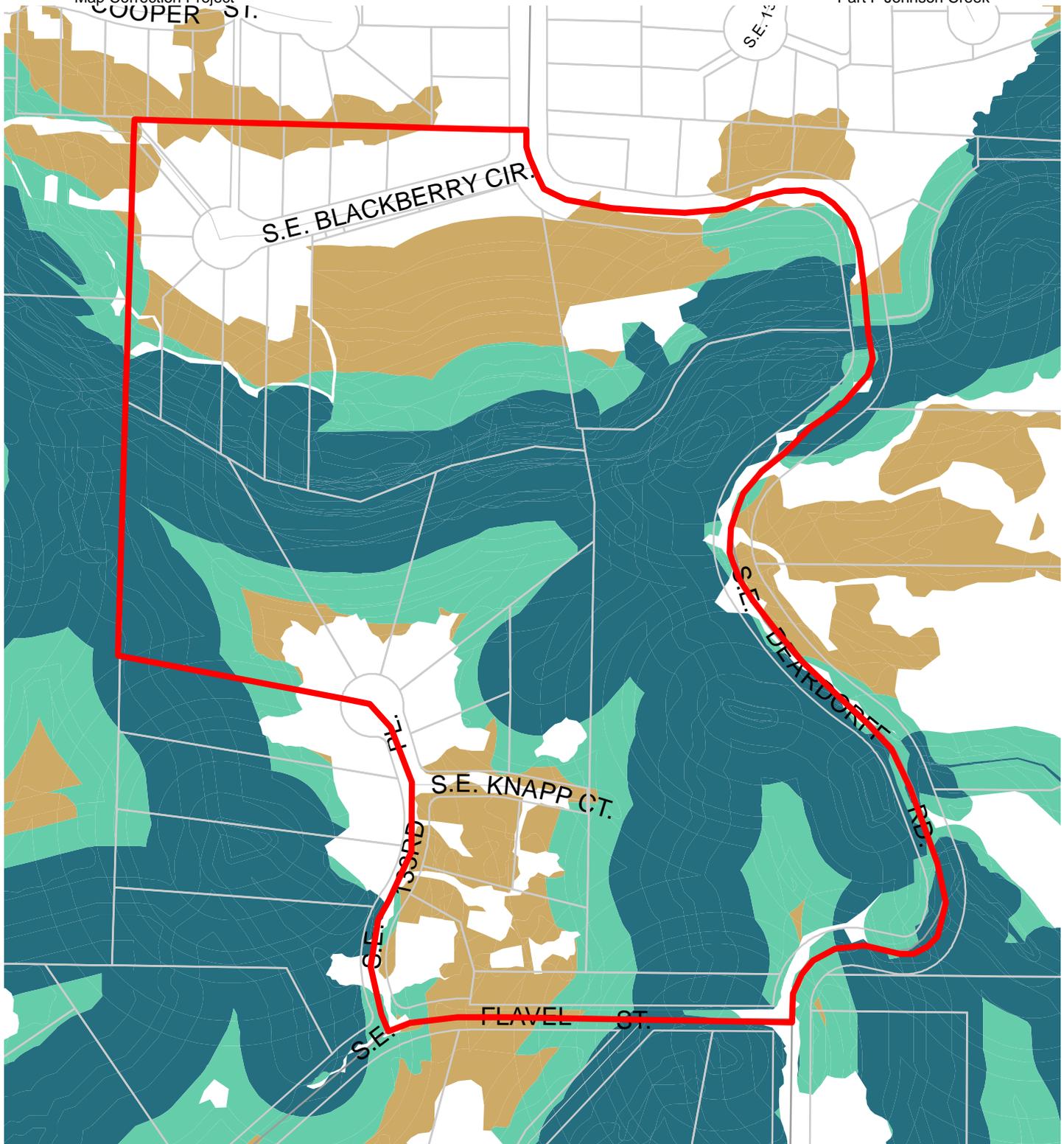
Updated: June 2021



- Resource Sites
- Special Habitat Areas (SHAs)
- Open Stream Channel
- Piped Stream Segment
- Parks
- Schools
- Urban Service Boundary
- Taxlots



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July 2021



Map D: Riparian Corridors Habitat Classification

Resource Site:
JC18

Updated: July 2021

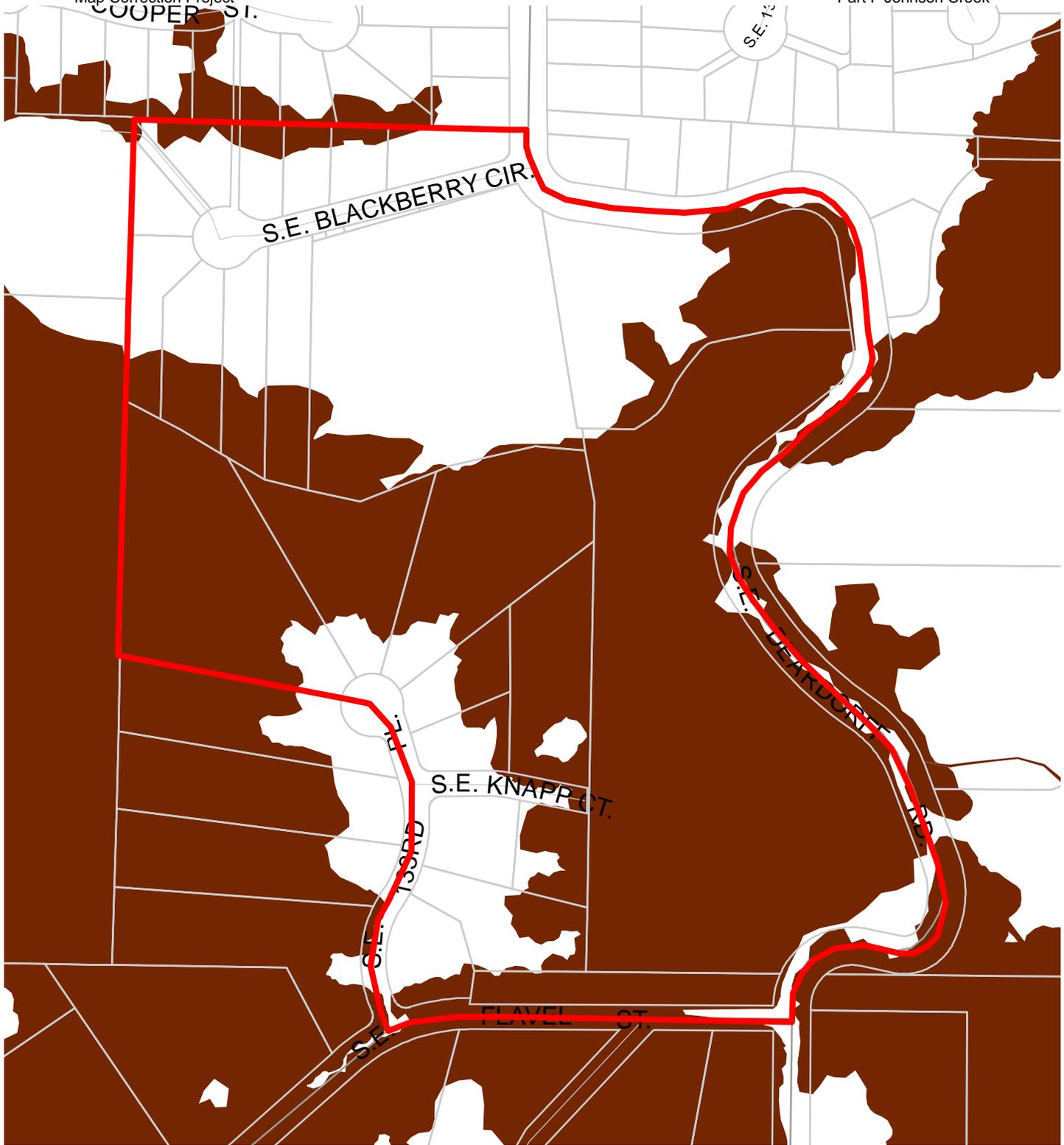
- Resource Sites
- Urban Service Boundary
- Class I (high rank)
- Taxlots
- Class II (medium rank)
- Class III (low rank)



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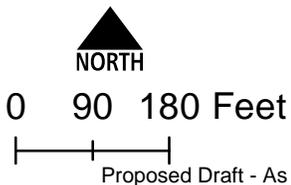
July 2021

NORTH
0 115 230 Feet
Proposed Draft - As Amended



**Map E: Wildlife
Habitat Classification**
Resource Site:
JC18

Updated: July 2021



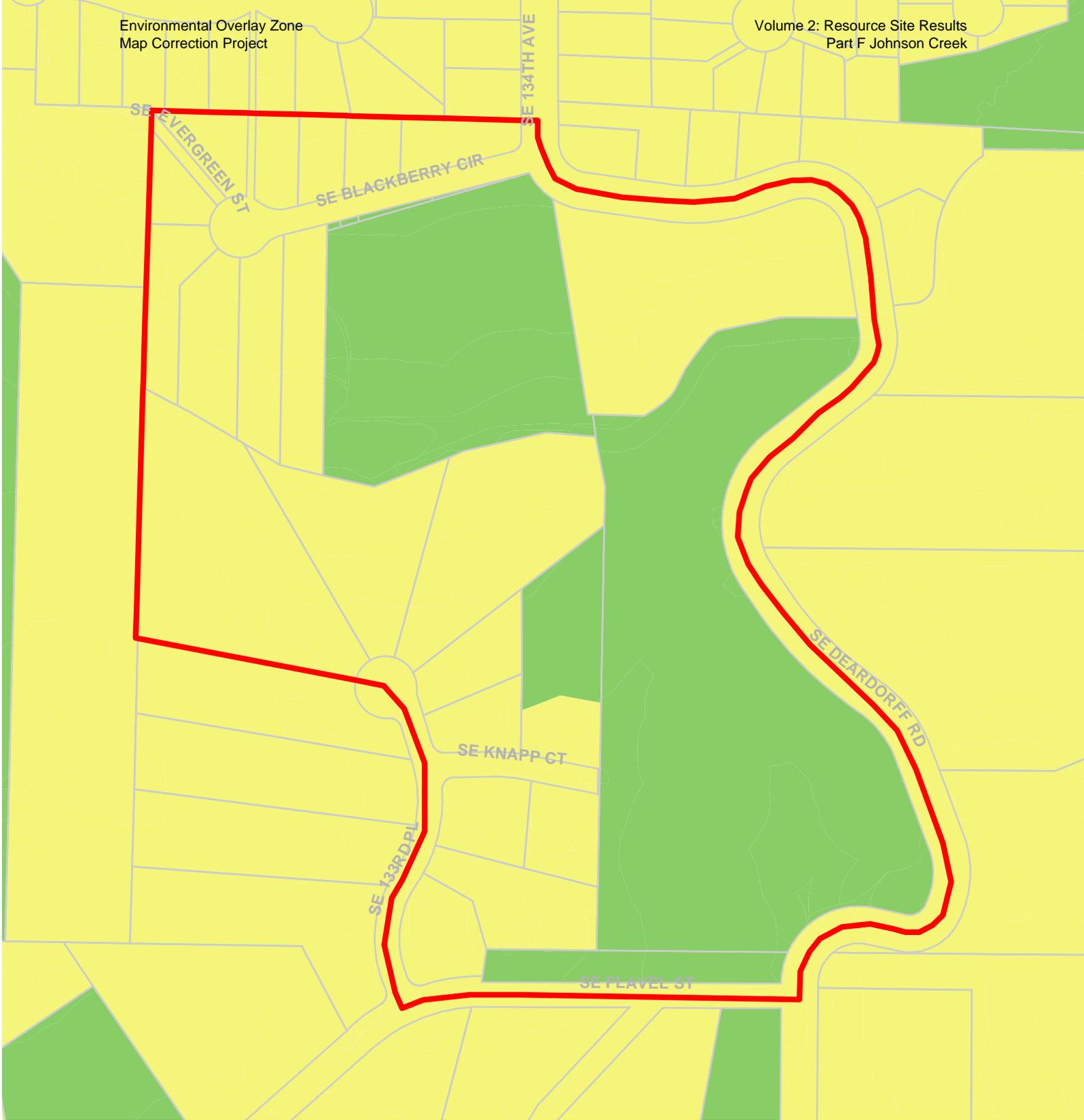
Proposed Draft - As Amended

-  Resource Sites
-  Class A (high rank)
-  Class B (medium rank)
-  Class C (low rank)
-  Urban Service Boundary
-  Taxlots



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July 2021



Map F: Urban Development Value (Title 13)
Resource Site: JC18

-  Urban Service Boundary
-  Resource Sites
-  High Development Value
-  Medium Development Value
-  Low Development Value
-  Parks

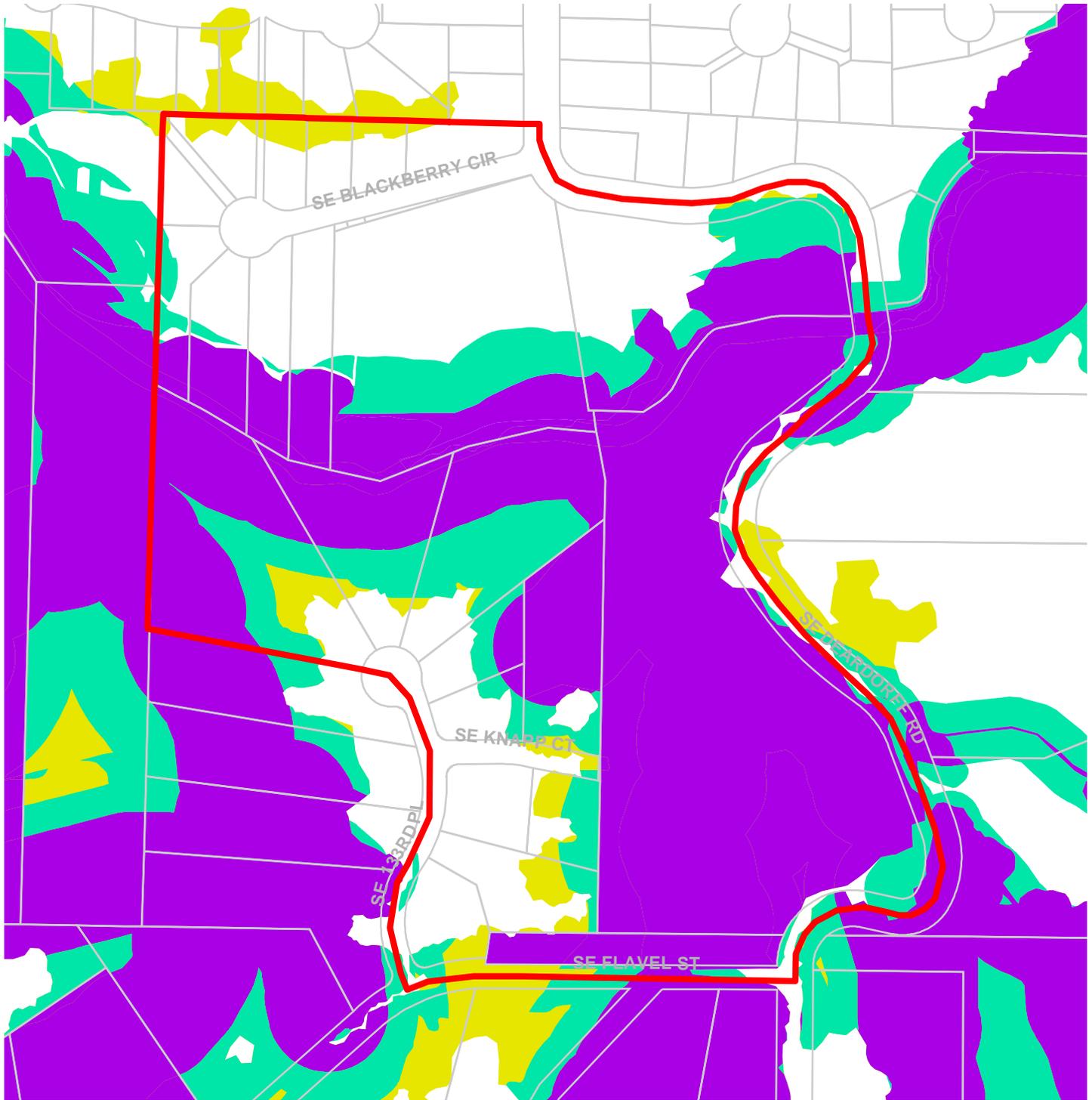


Updated: July 2021



0 150 300 Feet

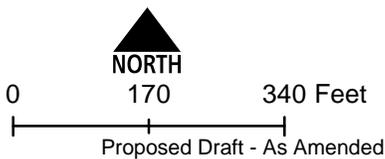
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Map G: Title 13 Habitat Conservation Areas (HCA) and Goal 5 Areas

Resource Site: JC18

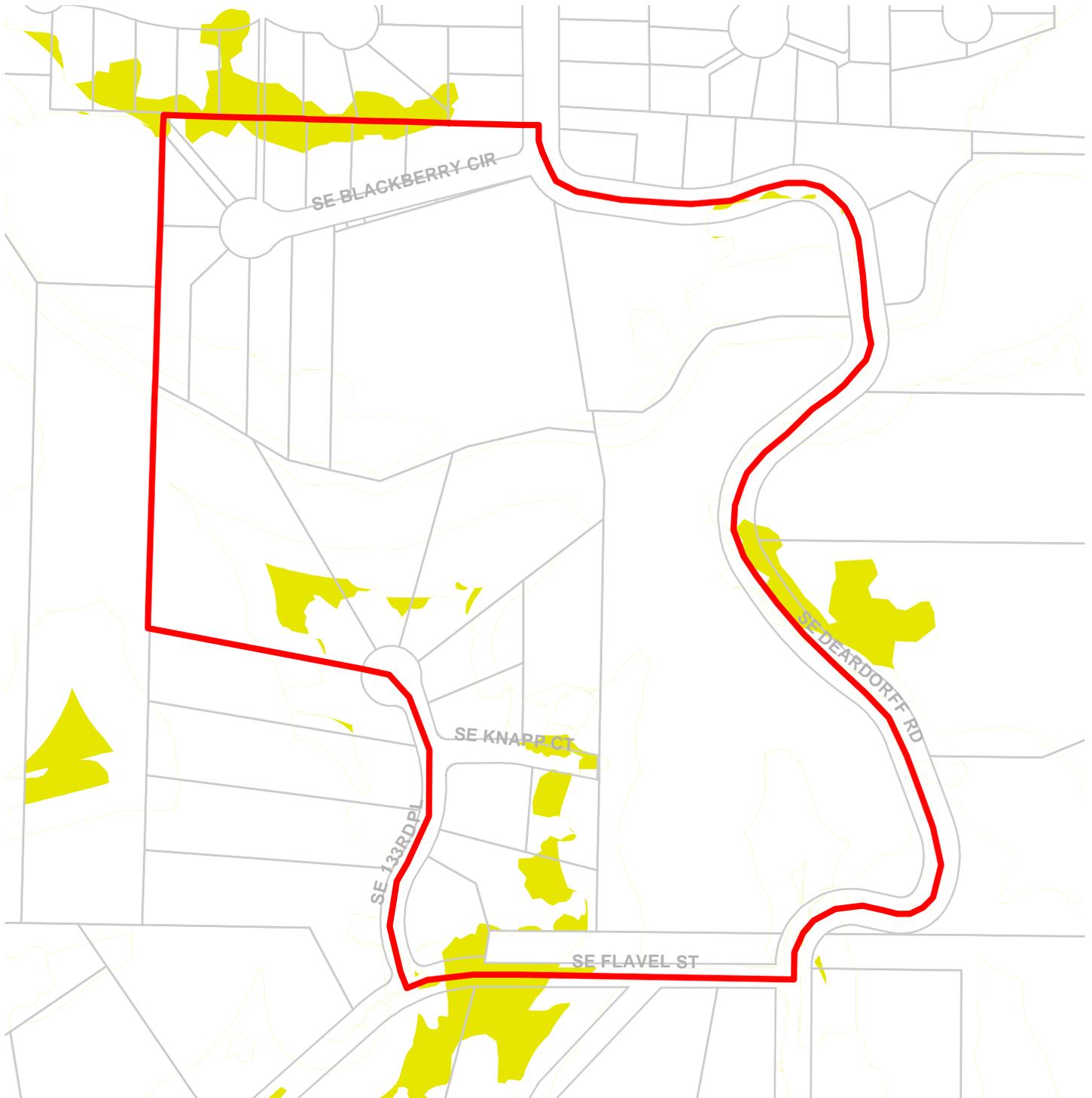
Updated: July 2021



- Urban Service Boundary
- Resource Sites
- HCA High Value
- HCA Moderate Value
- HCA Low Value
- Goal 5 Significant Natural Resources



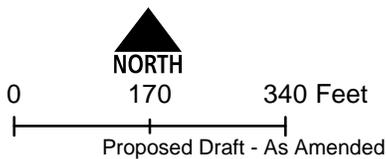
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Map H: Goal 5 Resources

Resource Site: JC18

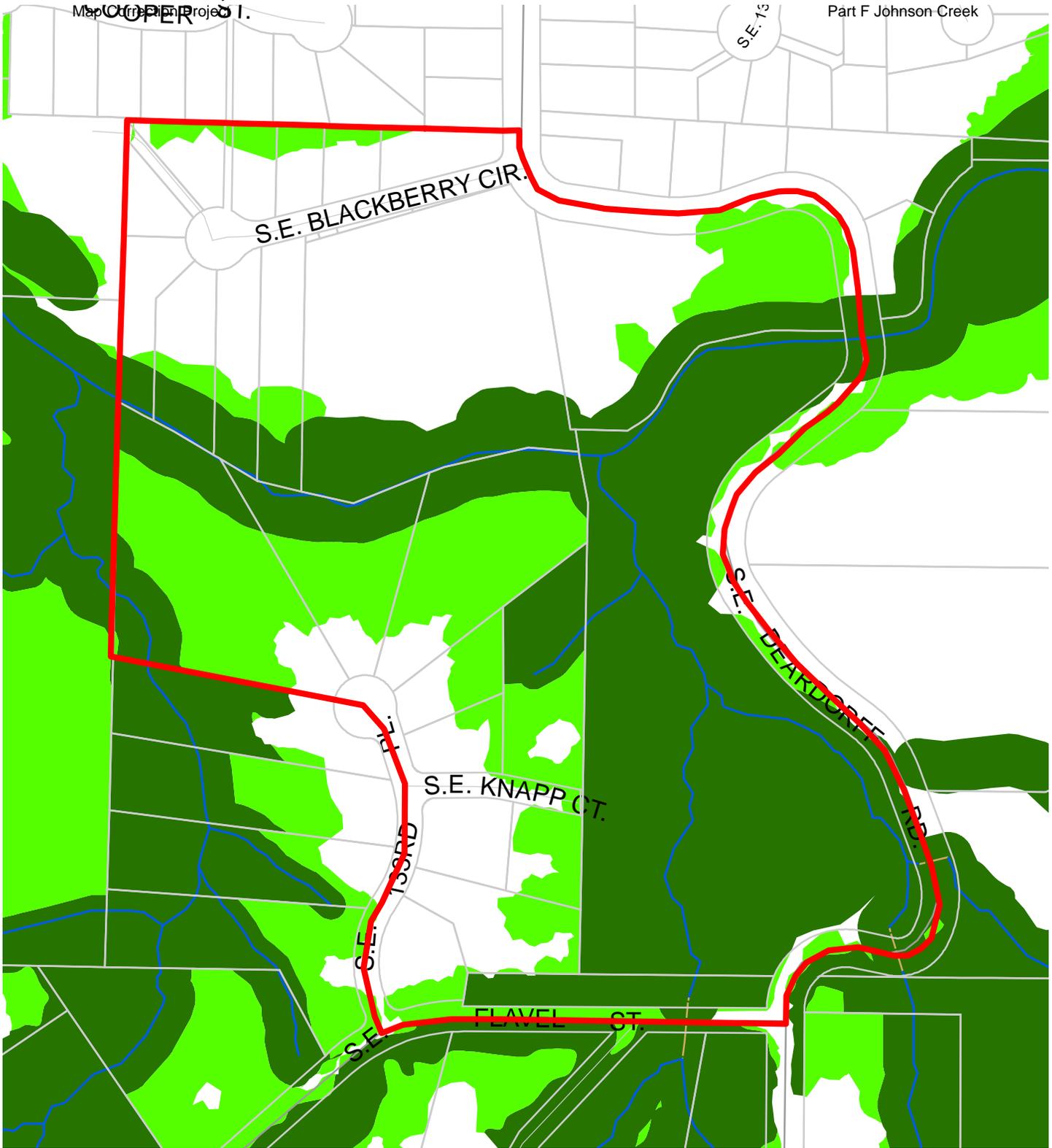
Updated: July 2021



- Urban Service Boundary
- ▭ Resource Sites
- Goal 5 Significant Natural Resources



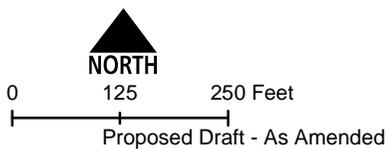
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Map I: DRAFT Proposed Environmental Overlay Zones

**Resource Site:
JC18**

Updated: July 2021



- Resource Sites
- Urban Service Boundary
- Open Stream Channel
- Taxlots
- Piped Stream Segment
- Proposed Conservation Zone
- Proposed Protection Zone



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July 2021

Natural Resource Description

Within resource site JC18 the following significant natural resource features and functions are present:

Significant Riparian Corridor Features: open stream; wetland; flood area; land within 50 feet of waterbodies; forest, woodland, shrubland and herbaceous vegetation within 300 feet of waterbodies; and forest vegetation on steep slopes (>25% slope) contiguous to and within 780 feet of waterbodies.

Significant Wildlife Habitat Features: forest patches, and associated and contiguous wetlands, two acres in size or larger.

Special Habitat Areas: Johnson Creek (S, C); wetlands (W)

Riparian Corridor Functions: microclimate and shade; stream flow moderation and water storage; bank function and sediment, pollution and nutrient control; large wood and channel dynamics; organic inputs, food web and nutrient cycling; and riparian wildlife movement corridor.

Wildlife Habitat Functions: interior area; food and water; resting, denning, nesting and rearing; movement and migration; reduction of noise, light and vibration; and habitat patches that support special status fish and wildlife species.

Table A: Quantity of Natural Resource Features in Resource Site		JC18
		Study Area
Stream (Miles)		0.6
Wetlands (acres)		0.6
Vegetated Areas >= 1/2 acre (acres)		
	Forest (acres)	18.4
	Woodland (acres)	1.3
	Shrubland (acres)	0.0
	Herbaceous (acres)	5.4
Flood Area*		
	Vegetated (acres)	5.1
	Non-vegetated (acres)	0.1
Steep Slopes (acres)**		18.4
* The flood area includes the FEMA 100-year flood plain plus the adjusted 1996 flood inundation area.		
**Slopes are derived from LiDAR. Steep slopes are areas with a slope greater than 25%.		

This site includes single family homes, and undeveloped properties and the Deardorff Creek Natural Area. Deardorff Road forms the eastern boundary, SE Flavel Street is at the south. The western edge abuts Resource Site JC17. The northern edge includes a small subdivision along SE Blackberry Circle. Johnson Creek bisects the site in an east-west direction. The 100-year floodplain is relatively narrow, following Johnson Creek.

Most of the site is forested with mixed deciduous and coniferous vegetation. Deardorff Creek enters Johnson Creek on the south side. Deardorff Creek runs through a publicly-owned parcel that runs parallel and west of Deardorff Rd. The grades are relatively steep on the both sides of Deardorff Creek, ranging from 10 to 20% and up to 35% along tributaries.

The banks of Johnson Creek in this resource area are lined with WPA armoring. The stream is incised down to - formation and bedrock and is largely disconnected from its limited floodplain except during larger flood events (<10-year recurrence). Dominant vegetation on the south side of the channel is a mixed forest of Douglas fir, western red cedar, red alder, black cottonwood, big leaf maple, and species of willow. The north side of the Johnson Creek is flanked by a narrow flat floodplain dominated by dense reed canary grass and sparse tree canopy cover connected to steep slopes that lead to developed area with various ornamental planting, lawns, and one large in-ground pool that abuts the creek. The creek is relatively well-shaded on the south side of Johnson Creek, primarily composed of native vegetation, including large Douglas firs. The resource site provides important wildlife connectivity to nearby large forested areas such as Powell Butte to the north of the creek, Clatsop Butte to the south including Wahoo, Deardorff, and Buttes Natural Areas. including

Small wetlands were delineated on publicly owned parcels on the north and south of the Johnson Creek mainstem near Deardorff Creek. Smaller, steep forested wetlands are located on the banks of Deardorff Creek.

The creek channel with large forested natural areas and parks provides an important source of water to wildlife that use the larger forested areas. It also acts as a corridor providing cover and food, and movements and dispersal between sites. Deardorff Creek is a perennial to intermittent cold-water stream with documented populations of cutthroat trout as well as steelhead trout and Chinook salmon both listed as threatened under the Endangered Species Act. Deardorff Creek provides high quality habitat and connectivity to Clatsop Butte of Boring Lava Domes (see resource site BL8).

Coho salmon, chinook salmon, steelhead trout, and Pacific lamprey have been documented in this reach of Johnson Creek. In 2019, a study of Johnson Creek's potential to support salmon populations identified this reach of Johnson Creek as important to protect and restore habitat for coho and Chinook salmon and steelhead trout —meaning planned restoration actions in the Cedar Crossing project area are expected to have important benefits to habitat potential but additional

improvement possibilities exist. Limiting factors for habitat performance identified in this reach include high sediment loading, temperature, lack of key habitat types, and low habitat diversity. The restoration potential in this reach will also significantly benefit salmon and trout.

Special status bird species observed in or adjacent to this resource site include bald eagle, black-throated gray warbler, brown creeper, pacific-slope flycatcher, pacific wren, Pileated woodpecker, and Swainson's thrush.

Table B: Quality of Natural Resource Functions in Resource Site JC18				
Resource Site (acres) = 31				
	Class 1/A	Class 2/B	Class 3/C	Total
Riparian Corridors*				
acres	13.7	5.8	5.5	24.9
percent total inventory site area	44.8%	18.9%	17.9%	81.5%
Wildlife Habitat*				
acres	18.5	0.0	0.0	18.5
percent total inventory site area	60.6%	0.0%	0.0%	60.6%
Special Habitat Areas**				
acres	1.1			
percent total inventory site area	3.6%			
Combined Total*				
acres	19.1	1.6	4.1	24.9
percent total inventory site area	62.6%	5.3%	13.6%	81.5%
* Class I riparian resources, Special Habitat Areas, and wildlife habitat include open water. ** Metro Title 13 designated all Special Habitat Areas as Class I riparian corridors. +Because riparian resources, Special Habitat Areas, and wildlife Habitat overlap, the results cannot be added together to determine the combined results.				

Stormwater runs off impervious surfaces (e.g., rooftops, driveways, parking areas, streets, etc..) rapidly. Without a place to retain the water (such as wetlands or adequate stormwater facilities), stormwater runoff results in spikes in stream levels which can cause or exacerbate flooding and increase stream erosion. In addition, when water runs off quickly, it does not have a chance to infiltrate and recharge streams or aquifers to provide water during drier periods.

The type and capacity of stormwater facilities to manage the runoff from impervious surfaces varies in the city, affecting the local rate and amount of runoff, and the amount of pollutants in the water. Much of the city was developed prior to any stormwater regulations and receives limited or no management prior to discharging to pipes and surface waters.

Table C shows the total amount of impervious area within the resource site and how much of that impervious area lacks stormwater management; the percentage of total impervious area that is not managed is called “effective impervious area.” The higher the percent of effective impervious area in a watershed, the greater the negative impacts of stormwater runoff to streams. Stream science indicates that when effective impervious area reaches 10% of a watershed, negative stream impacts become significant; and at 25%, these impacts on waterways can be substantial. An additional consideration is the differences in soil conditions and other factors that influence the ability of pervious areas to retain, infiltrate or filter pollutants from stormwater. For example, a mature forest is much more effective in managing stormwater than a manicured lawn; both areas would have a lower effective impervious surface percentage than a developed site, but they have different outcomes for stormwater management.

For Resource Area JC18, 10% of the total area is effectively impervious, indicating a critical level of vulnerability, with negative impacts beginning to impact natural functions, but with some natural processes still in place and providing support to biologic systems.

Table C. Impervious Area within Resource Site JC18			
Total area (acres)	Total impervious Area (acres)	Total unmanaged impervious area* (acres)	Percent of resource site that is effectively impervious
31	3.3	3.2	10%

*Total unmanaged impervious area refers to the number of acres within a resource area that receives no formal stormwater management measures to regulate flow or treat pollutants before they reach surface waters, also referred to as effective impervious area.

Metro Title 13 and Oregon Goal 5 Compliance

The following information supplements evaluation of natural resource protections presented in Volume 4 and supports compliance with Metro Title 13 and Oregon Plan Goal 5.

Title 13 Habitat Conservation Areas

Map G presents the Habitat Conservation Areas (HCA) within the Resource site JC18. Natural resources should be protected within HCA as follows:

1. *Strictly limit or limit* conflicting uses within Class I/High Rank Riparian Areas in all Urban Development Areas.
2. *Strictly limit or limit* conflicting uses within Class II/Medium Rank Riparian Areas within Moderate and Low Value Urban Development Area as well as parks and open spaces.

3. *Strictly limit* or *limit* conflicting uses within Class A/High or B/Medium Rank Wildlife Habitat within parks and open spaces.
4. *Allow* conflicting uses or conducted a local Goal 5 ESEE for Class III/Low Rank Riparian Areas in all Urban Development Areas.
5. *Allow* conflicting uses or conducted a local Goal 5 ESEE for Class A/High, Class B/Medium or Class C/Low Rank Wildlife Habitat in all Urban Development Area, except parks and open space.

Strictly limiting or *limiting* conflicting uses in HCA will protect and conserve existing streams and wetlands to maintain significant natural resource functions including: microclimate and shade; stream flow moderation and water storage; bank function and sediment, pollution and nutrient control; large wood and channel dynamics; organic inputs, food web and nutrient cycling; and fish and wildlife habitat. *Strictly limiting* or *limiting* conflicting uses in HCA will allow for additional urban development that is sensitive to the natural resource features and requires mitigation for unavoidable negative impacts to features and functions. The recommendation will also contribute towards meeting other regulatory requirements including the Metro Title 3, Water Quality and Flood Management; Oregon Goal 6, Air, Water and Land Resources Quality; Oregon Goal 7, Areas Subject to Natural Hazards; the Clean Water Act; and the Endangered Species Act.

Goal 5 Significant Natural Resources

Resource site JC18 contains natural resource features that are not a Title 13 HCA and are therefore subject to Statewide Planning Goal 5 OAR 660-023-0110. The General ESEE analysis, Volume 4, describes the conflicting uses and provides an overarching analysis of the economic, social, environmental and energy consequences of prohibiting, limiting or allowing the conflicting uses within areas of significant natural resources. In addition to the General ESEE analysis, the following resource site-specific consequences are considered.

The common impacts of conflicting uses in the resource site include clearing vegetation; grading activities and soil compaction; adding impervious surface; modifying streams, wetlands and flood areas; generating pollution; landscaping with non-native or invasive vegetation; building fences or other wildlife barriers; and other impacts such as noise, light, litter and pets.

Within the resource site residential uses are allowed outright or conditionally in the R10 base zones. Open space uses are allowed in the OS base zone. Development of new uses may involve vegetation clearing, grading, filing, and soil compaction, as well as the addition of impervious surfaces and landscaping with non-native plants, with associated impacts on the natural resources. Basic utilities and other infrastructure are allowed in all base zones. New or upgraded utility corridors may be cleared of vegetation and may fragment wildlife habitat.

The analysis of economic, social, environmental and energy consequences provided in Volume 4 is confirmed for resource site JC18, with the following additional information that clarifies the analysis.

Strictly limiting or limiting conflicting uses would retain the wildlife habitat functions provided by significant natural resource features including maintaining habitat for at risk plant, fish and wildlife species, maintaining vegetation on steep slopes, and maintaining the stormwater management and air-cooling functions of the tree canopy. Mitigation for negative consequences of additional development in areas of Class A or Class B wildlife habitat should be required.

Steep slopes are susceptible to erosion and landslides. Development should be clustered away from steep slopes and trees and vegetation should be maintained to reduce the landslide risks. New or expanded development on steep slopes should be *limited*.

Natural Resources Protection Decisions

Based on the analysis presented in Volume 3, Natural Resources Inventory, Volume 4, Title 13 and Goal 5 Compliance, and the resource site-specific evaluation for JC18, the following decisions are applied to protect the significant riparian corridors and wildlife habitat:

1. Apply a protection overlay zone ('p' zone) to stream channels from top-of-bank to top-of-bank, wetlands and land within 50 feet of stream top-of-bank or 30 feet of wetlands.
2. Within public parks, apply a protection overlay zone ('p' zone) to areas of forest or woodland vegetation.
3. Outside public parks, apply a conservation overlay zone ('c' zone) to areas of forest or woodland vegetation contiguous to but more than 50 feet from stream top-of-or 30 feet from wetlands.
4. Allow conflicting uses within all other areas containing significant natural resources.

Resource Site No.: JC19 **Resource Site Name:** Cedar Crossing

Previous Plan: Johnson Creek Basin Protection Plan

Previous Resource Site No.: 21

The results of the analysis found in Volume 3, Natural Resources Inventory, Volume 4, Title 13 and Goal 5 Compliance, and the resource site-specific evaluation, are presented in the following maps:

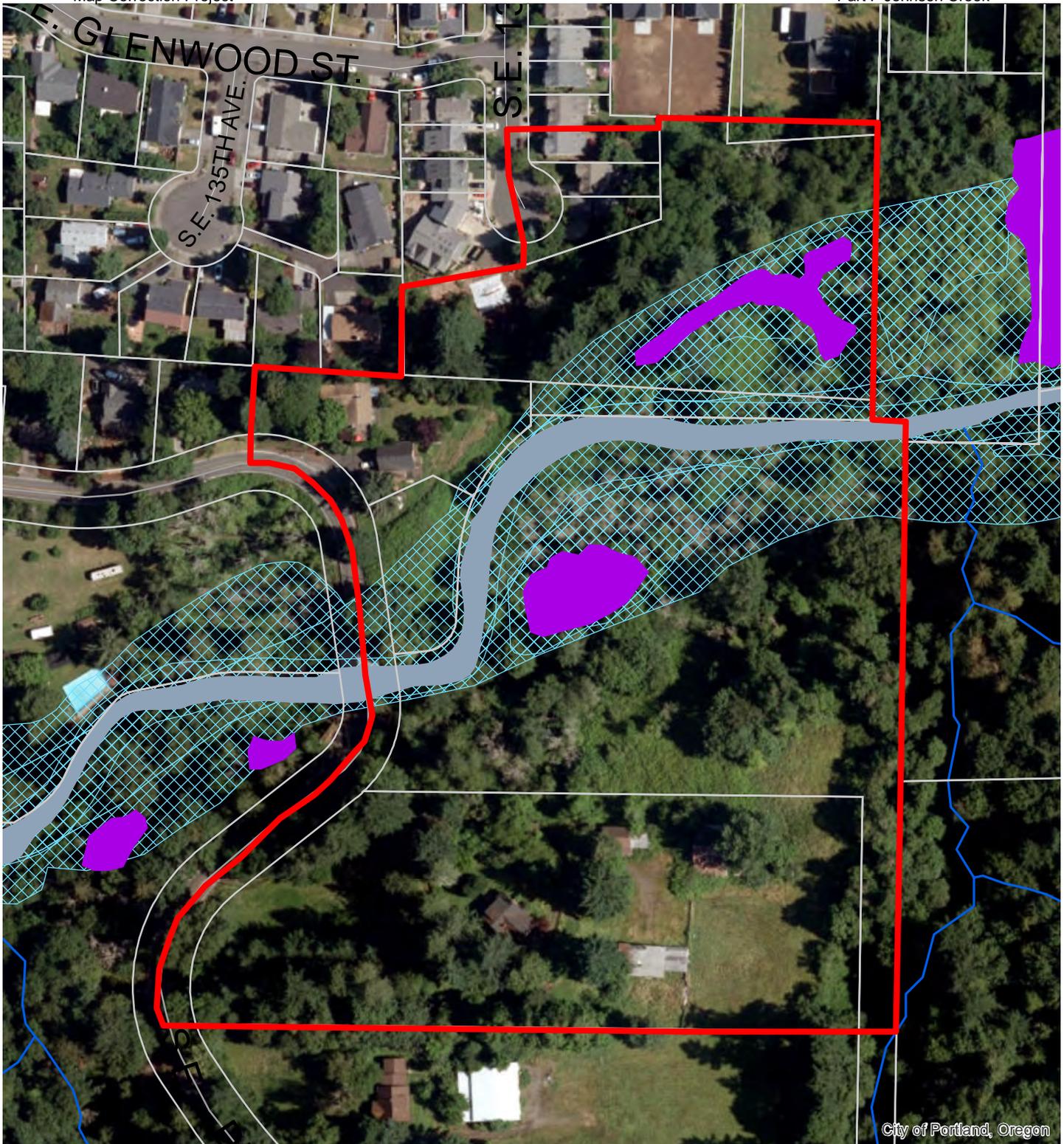
- A. Water Features – rivers, streams, wetlands and flood areas
- B. Land Features – forest, woodland, shrubland and herbaceous vegetation, steep slopes
- C. Special Habitat Areas
- D. Riparian Corridor Classifications
- E. Wildlife Habitat Classifications
- F. Urban Development Value
- G. Metro Title 13 Habitat Conservation Areas
- H. Statewide Planning Goal 5 Areas
- I. Recommended Natural Resource Protections

Following the maps, additional information about existing natural resource features and functions in the resource site is presented.

Implementation of the results is found in Volume 1, Part B, updates to zoning maps and zoning code.

Resource site JC19 includes the following:

Site (acres)	13.0
Base zones (acres)	
OS	0.2
R10	3.0
R20	8.8
R7	0.9



City of Portland, Oregon

Map A: Water Features

Resource Site: JC19

Updated: July 2021



0 75 150 Feet

Proposed Draft - As Amended

 Resource Sites

 Urban Service Boundary

 Taxlots

 Wetlands

 Rivers

 Open stream channel

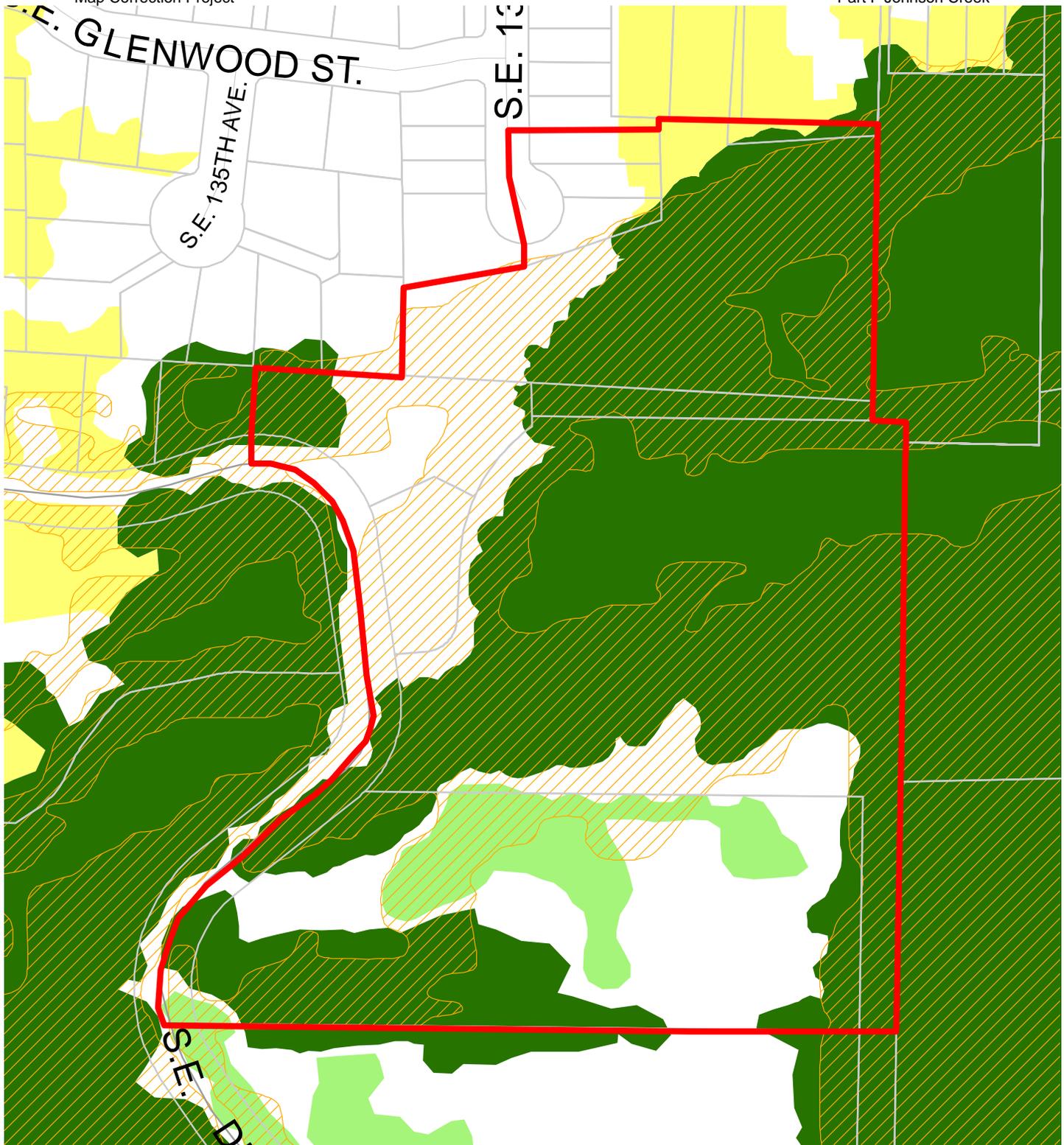
 Piped Stream Segment

 Flood Area



The information on the map was derived from digital databases. Care was taken in the creation of this map but it is provided "as is". The City of Portland ensures meaningful access to city programs, services, and activities to comply with Civil Rights Title VI and ADA Title II laws and reasonably provides: translation, interpretation, modifications, accommodations, alternative formats, auxiliary aids and services. To request these services, contact 503-823-7700, City TTY 503-823-6868, Relay Service: 711.

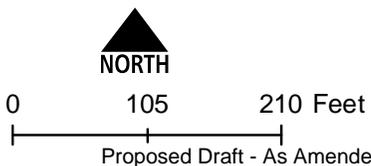
July 2021



Map B: Vegetation and Steep Slopes

**Resource Site:
JC19**

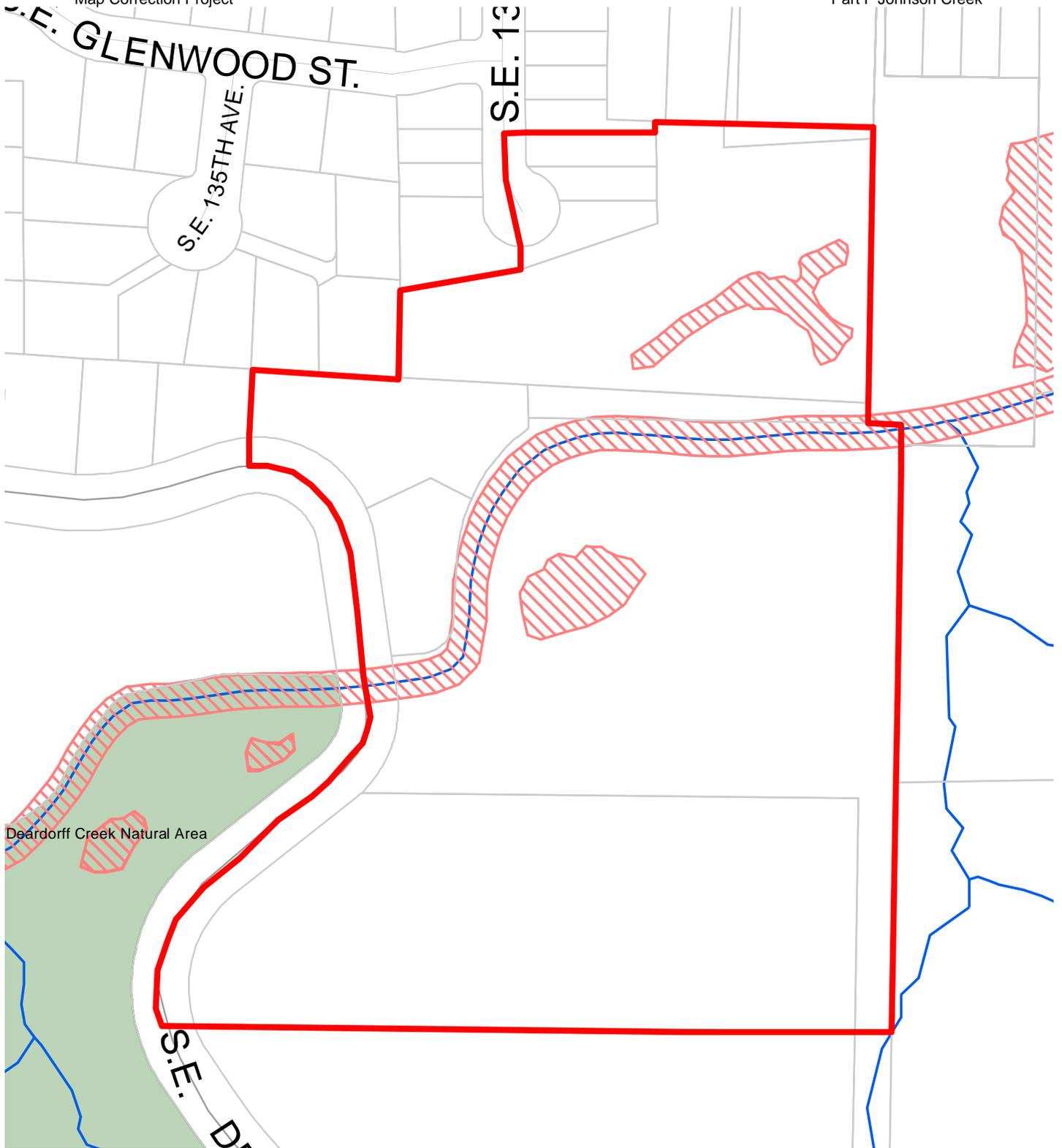
Updated: July 2021



- Resource Sites
- Urban Service Boundary
- Taxlots
- Slopes >25%
- Forest
- Woodland
- Shrubland
- Herbaceous



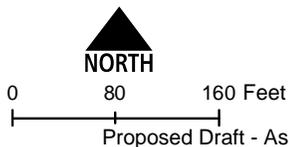
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July 2021



**Map C: Special
Habitat Areas**

**Resource Site:
JC19**

Updated: June 2021

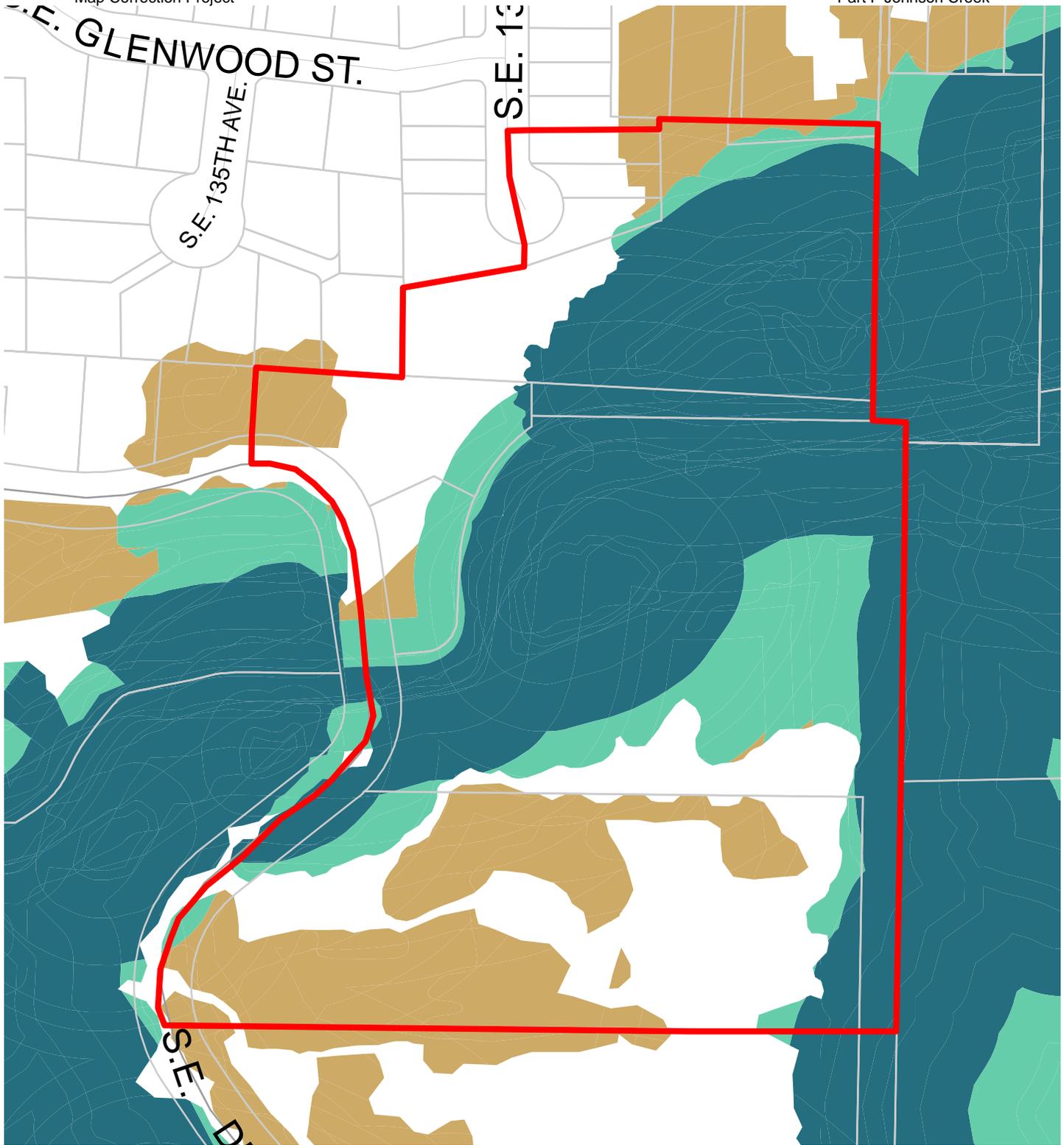


Proposed Draft - As Amended

-  Resource Sites
-  Special Habitat Areas (SHAs)
-  Open Stream Channel
-  Piped Stream Segment
-  Parks
-  Schools
-  Urban Service Boundary
-  Taxlots



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July 2021



**Map D: Riparian
Corridors Habitat
Classification**

**Resource Site:
JC19**

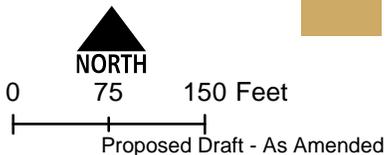
Updated: July 2021

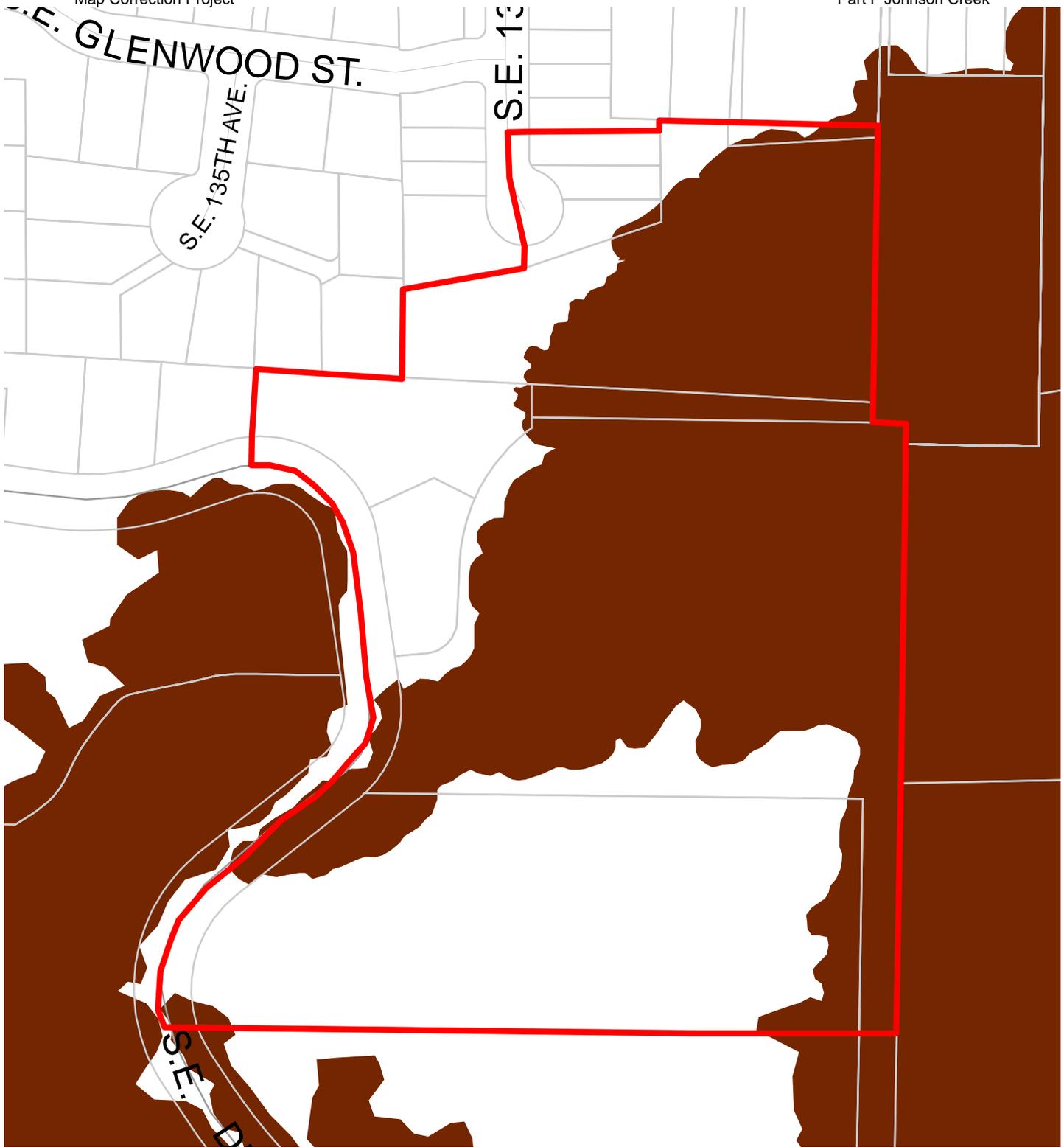
- Resource Sites
- Urban Service Boundary
- Class I (high rank)
- Taxlots
- Class II (medium rank)
- Class III (low rank)



The information on the map was derived from digital databases. Care was taken in the creation of this map but it is provided "as is". The City of Portland ensures meaningful access to city programs, services, and activities to comply with Civil Rights Title VI and ADA Title II laws and reasonably provides: translation, interpretation, modifications, accommodations, alternative formats, auxiliary aids and services. To request these services, contact 503-823-7700, City TTY 503-823-6868, Relay Service: 711.

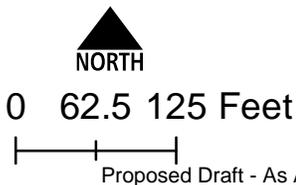
July 2021





**Map E: Wildlife
Habitat Classification**
Resource Site:
JC19

Updated: July 2021



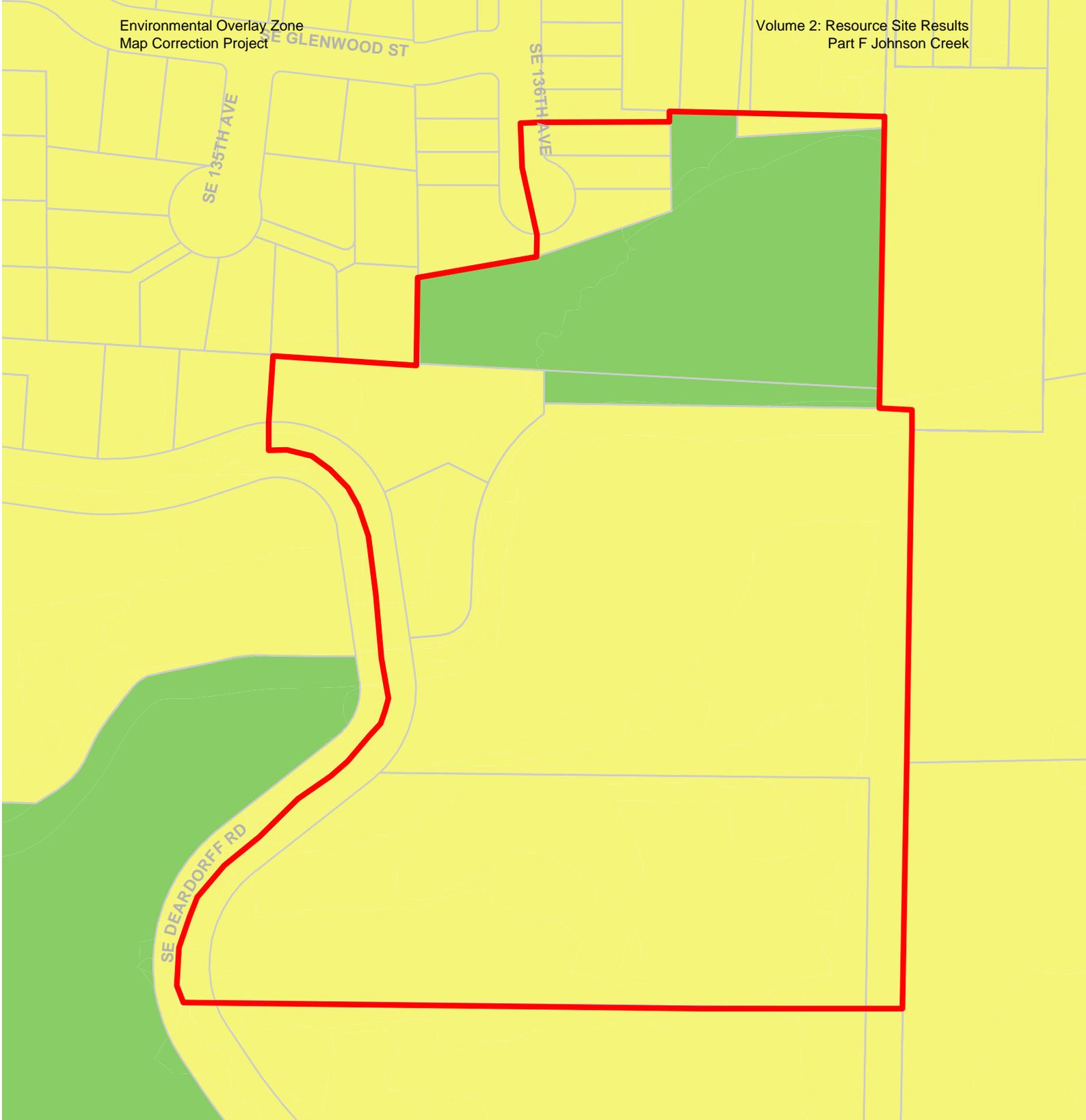
Proposed Draft - As Amended

-  Resource Sites
-  Class A (high rank)
-  Class B (medium rank)
-  Class C (low rank)
-  Urban Service Boundary
-  Taxlots



The information on the map was derived from digital databases. Care was taken in the creation of this map but it is provided "as is". The City of Portland ensures meaningful access to city programs, services, and activities to comply with Civil Rights Title VI and ADA Title II laws and reasonably provides: translation, interpretation, modifications, accommodations, alternative formats, auxiliary aids and services. To request these services, contact 503-823-7700, City TTY 503-823-6868, Relay Service: 711.

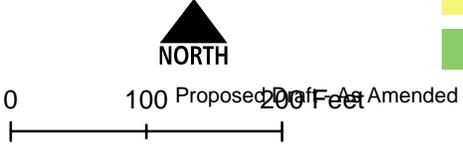
July 2021



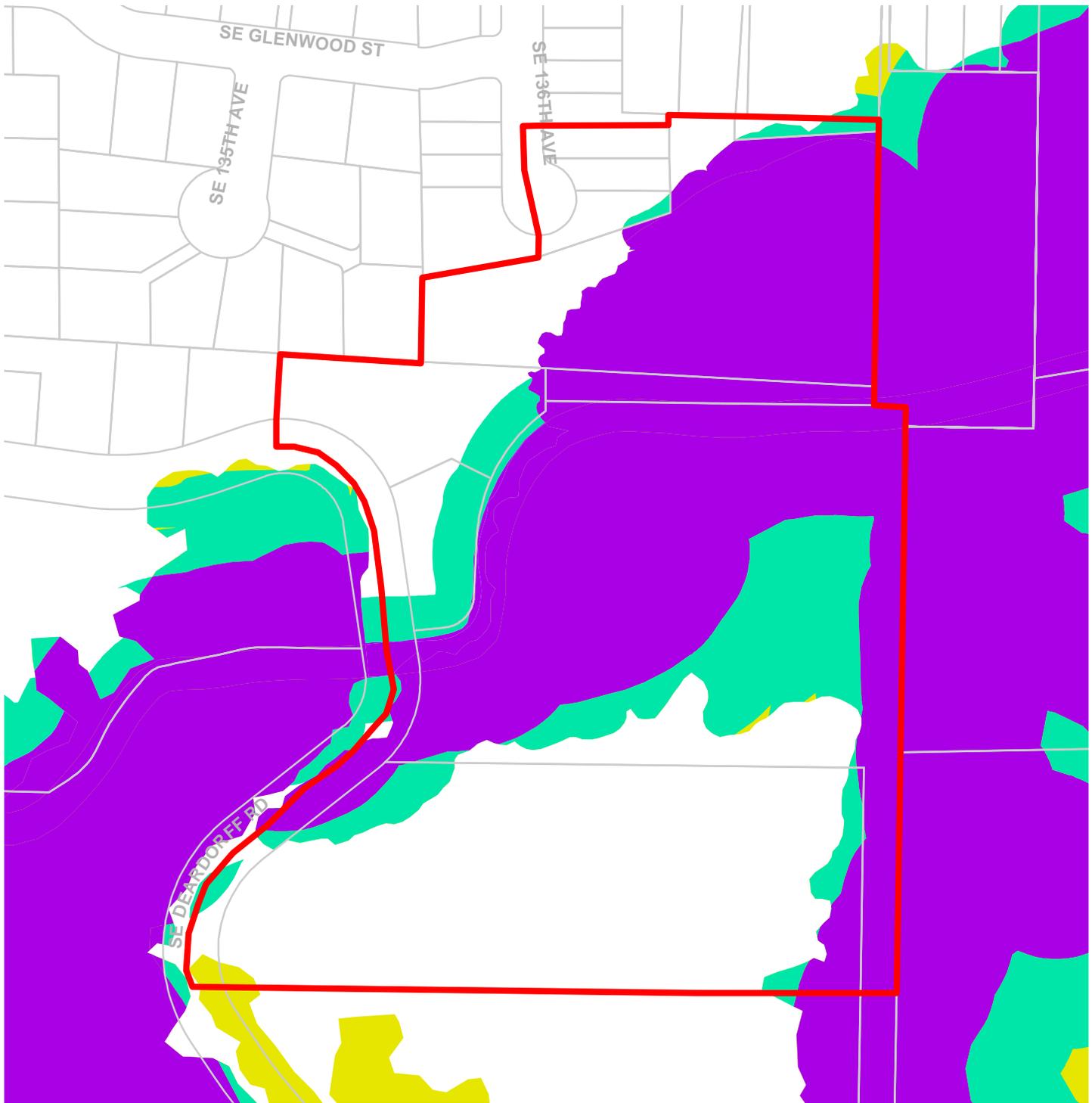
Map F: Urban Development Value (Title 13)
Resource Site: JC19

-  Urban Service Boundary
-  Resource Sites
-  High Development Value
-  Medium Development Value
-  Low Development Value
-  Parks

Updated: July 2021



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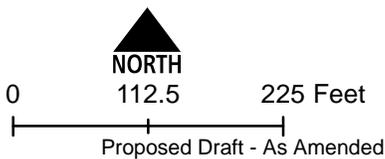


Map G: Title 13 Habitat Conservation Areas (HCA) and Goal 5 Areas

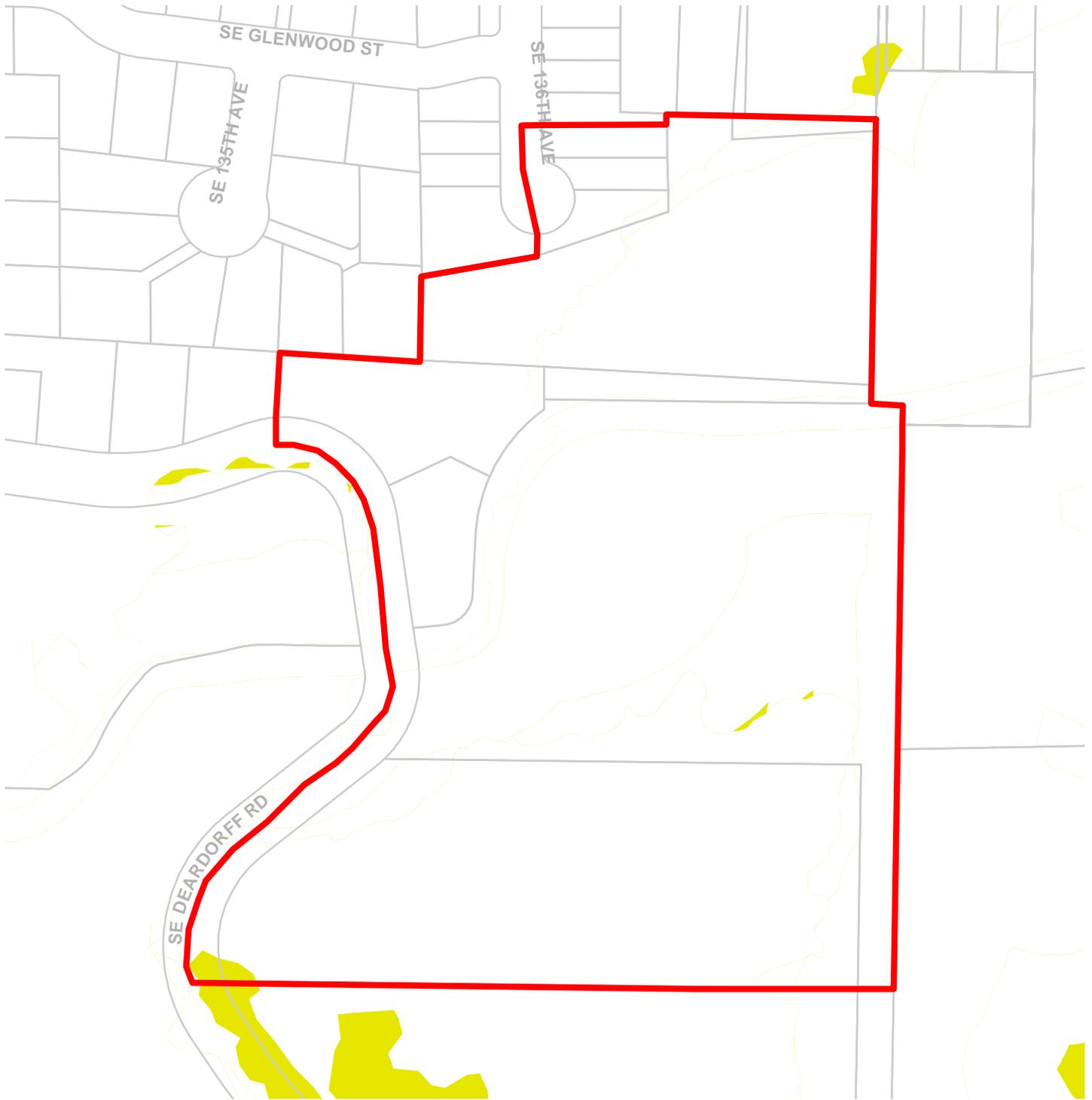
Resource Site: JC19

Updated: July 2021

-  Urban Service Boundary
-  Resource Sites
-  HCA High Value
-  HCA Moderate Value
-  HCA Low Value
-  Goal 5 Significant Natural Resources



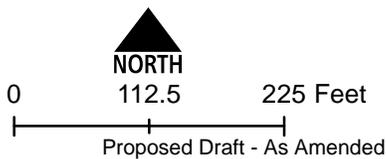
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Map H: Goal 5 Resources

Resource Site: JC19

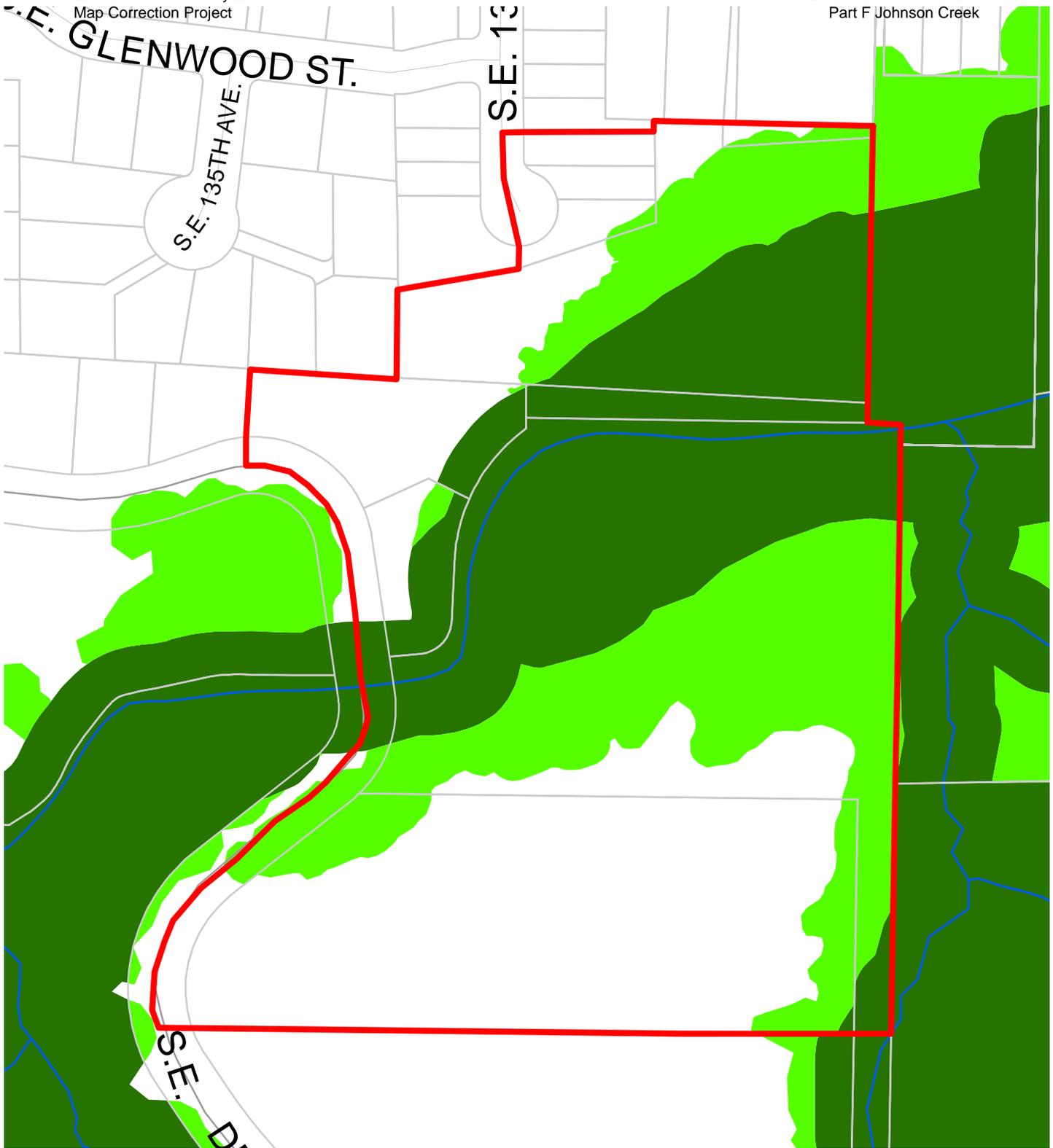
Updated: July 2021



- Urban Service Boundary
- Resource Sites
- Goal 5 Significant Natural Resources



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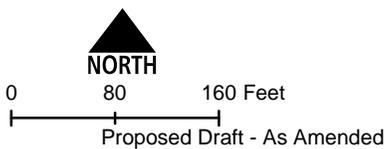


Map I: DRAFT Proposed Environmental Overlay Zones

Resource Site: JC19

Updated: July 2021

-  Resource Sites
-  Open Stream Channel
-  Piped Stream Segment
-  Proposed Conservation Zone
-  Proposed Protection Zone
-  Urban Service Boundary
-  Taxlots



The information on the map was derived from digital databases. Care was taken in the creation of this map but it is provided "as is". The City of Portland ensures meaningful access to city programs, services, and activities to comply with Civil Rights Title VI and ADA Title II laws and reasonably provides: translation, interpretation, modifications, accommodations, alternative formats, auxiliary aids and services. To request these services, contact 503-823-7700, City TTY 503-823-6868, Relay Service: 711.
July 2021

Natural Resource Description

Within resource site JC19 the following significant natural resource features and functions are present:

Significant Riparian Corridor Features: open stream; wetland; flood area; land within 50 feet of waterbodies; forest, woodland, shrubland and herbaceous vegetation within 300 feet of waterbodies; and forest vegetation on steep slopes (>25% slope) contiguous to and within 780 feet of waterbodies.

Significant Wildlife Habitat Features: forest patches, and associated and contiguous wetlands, two acres in size or larger.

Special Habitat Areas: Johnson Creek (S, C); wetlands (W)

Riparian Corridor Functions: microclimate and shade; stream flow moderation and water storage; bank function and sediment, pollution and nutrient control; large wood and channel dynamics; organic inputs, food web and nutrient cycling; and riparian wildlife movement corridor.

Wildlife Habitat Functions: interior area; food and water; resting, denning, nesting and rearing; movement and migration; reduction of noise, light and vibration; and habitat patches that support special status fish and wildlife species.

Table A: Quantity of Natural Resource Features in Resource Site		JC19
		Study Area
Stream (Miles)		0.1
Wetlands (acres)		0.4
Vegetated Areas >= 1/2 acre (acres)		
	Forest (acres)	7.9
	Woodland (acres)	0.9
	Shrubland (acres)	0.0
	Herbaceous (acres)	0.2
Flood Area*		
	Vegetated (acres)	3.0
	Non-vegetated (acres)	0.5
Steep Slopes (acres)**		7.8
* The flood area includes the FEMA 100-year flood plain plus the adjusted 1996 flood inundation area.		
**Slopes are derived from LiDAR. Steep slopes are areas with a slope greater than 25%.		

This 13-acre site is made up of residential development and publicly owned parcels. Half of the site is in a natural condition with second growth mixed deciduous/coniferous forest; the remaining portion is primarily open field located on the flatter, upland areas of Johnson Creek. Johnson Creek flows from northeast to southwest through the sites. The 100-year floodplain broadens out to a width of 400 feet at the east end of the site. Small forested wetlands are located in the floodplain on the north and south sides of Johnson Creek.

The channel banks are lined with WPA armoring. There is a large remnant side channel on the north side of the creek that was partly rock-lined and walled off from the main creek channel by the WPA. A portion of the remnant side channel, which is on private property, has standing water year-round. The dominant vegetation influencing the channel are a mixed forest of alder, Douglas-fir, western red cedar, cottonwood, maple, willow, and various ornamental trees, as well as lawns and gardens. The creek has some mature canopy cover on the south but is largely vegetated by invasive Armenian blackberry on the north side. Numerous coniferous snags stand on the south bank providing valuable wildlife habitat. This area provides high habitat connectivity to publicly owned forested buttes to the south, the large forested and open meadow habitat of Powell Butte to the north and Leach Botanical Garden and Bundy Park to the west and east respectively.

The creek channel in the resource site connects with large forested natural areas and parks in other resource sites, providing an important source of water to wildlife that use the larger forested areas and also acts as a corridor providing cover and food, and for movements and dispersals between areas.

Coho salmon, Chinook salmon, steelhead trout, and Pacific lamprey have been documented in this reach of Johnson Creek. In 2019, a study of Johnson Creek's potential to support salmon populations identified this reach of Johnson Creek as important to protect and restore habitat for coho and Chinook salmon and steelhead trout —meaning future restoration actions that address low habitat diversity, high sediment loads, high summer stream temperatures, and the lack of key habitat types will benefit all salmonids using the reach.

Special status bird species observed in or adjacent to this resource site include bald eagle, black-throated gray warbler, brown creeper, pacific-slope flycatcher, pacific wren, Pileated woodpecker, Swainson's thrush, white-breasted nuthatch, and wood duck.

Table B: Quality of Natural Resource Functions in Resource Site JC19				
Resource Site (acres) = 13				
	Class 1/A	Class 2/B	Class 3/C	Total
Riparian Corridors*				
acres	5.4	1.8	2.3	9.5
percent total inventory site area	42.0%	13.6%	17.4%	73.0%
Wildlife Habitat*				
acres	6.7	0.0	0.0	6.7
percent total inventory site area	51.7%	0.0%	0.0%	51.7%
Special Habitat Areas**				
acres	0.6			
percent total inventory site area	4.7%			
Combined Total⁺				
acres	6.8	0.4	2.2	9.5
percent total inventory site area	52.7%	3.3%	17.1%	73.0%
* Class I riparian resources, Special Habitat Areas, and wildlife habitat include open water. ** Metro Title 13 designated all Special Habitat Areas as Class I riparian corridors. + Because riparian resources, Special Habitat Areas, and wildlife Habitat overlap, the results cannot be added together to determine the combined results.				

Stormwater runs off impervious surfaces (e.g., rooftops, driveways, parking areas, streets, etc..) rapidly. Without a place to retain the water (such as wetlands or adequate stormwater facilities), stormwater runoff results in spikes in stream levels which can cause or exacerbate flooding and increase stream erosion. In addition, when water runs off quickly, it does not have a chance to infiltrate and recharge streams or aquifers to provide water during drier periods.

The type and capacity of stormwater facilities to manage the runoff from impervious surfaces varies in the city, affecting the local rate and amount of runoff, and the amount of pollutants in the water. Much of the city was developed prior to any stormwater regulations and receives limited or no management prior to discharging to pipes and surface waters.

Table C shows the total amount of impervious area within the resource site and how much of that impervious area lacks stormwater management; the percentage of total impervious area that is not managed is called "effective impervious area." The higher the percent of effective impervious area in a watershed, the greater the negative impacts of stormwater runoff to streams. Stream science indicates that when effective impervious area reaches 10% of a watershed, negative stream impacts become significant; and at 25%, these impacts on waterways can be substantial. An additional consideration is the differences in soil conditions and other factors that influence the ability of pervious areas to retain, infiltrate or filter

pollutants from stormwater. For example, a mature forest is much more effective in managing stormwater than a manicured lawn; both areas would have a lower effective impervious surface percentage than a developed site, but they have different outcomes for stormwater management.

For Resource Area JC19, 4% of the total area is effectively impervious. This indicates a significant degree of stormwater management and/or existing natural resources that should be preserved. Areas with very low impervious cover and existing vegetation are more likely to be functioning properly to support biologic systems.

Table C. Impervious Area within Resource Site JC19			
Total area (acres)	Total impervious Area (acres)	Total unmanaged impervious area* (acres)	Percent of resource site that is effectively impervious
13	0.7	0.5	4%

*Total unmanaged impervious area refers to the number of acres within a resource area that receives no formal stormwater management measures to regulate flow or treat pollutants before they reach surface waters, also referred to as effective impervious area.

Metro Title 13 and Oregon Goal 5 Compliance

The following information supplements evaluation of natural resource protections presented in Volume 4 and supports compliance with Metro Title 13 and Oregon Plan Goal 5.

Title 13 Habitat Conservation Areas

Map G presents the Habitat Conservation Areas (HCA) within the Resource site JC19. Natural resources should be protected within HCA as follows:

1. *Strictly limit* or *limit* conflicting uses within Class I/High Rank Riparian Areas in all Urban Development Areas.
2. *Strictly limit* or *limit* conflicting uses within Class II/Medium Rank Riparian Areas within Moderate and Low Value Urban Development Area as well as parks and open spaces.
3. *Strictly limit* or *limit* conflicting uses within Class A/High or B/Medium Rank Wildlife Habitat within parks and open spaces.
4. *Allow* conflicting uses or conducted a local Goal 5 ESEE for Class III/Low Rank Riparian Areas in all Urban Development Areas.
5. *Allow* conflicting uses or conducted a local Goal 5 ESEE for Class A/High, Class B/Medium or Class C/Low Rank Wildlife Habitat in all Urban Development Area, except parks and open space.

Strictly limiting or limiting conflicting uses in HCA will protect and conserve existing streams and wetlands to maintain significant natural resource functions including: microclimate and shade; stream flow moderation and water storage; bank function and sediment, pollution and nutrient control; large wood and channel dynamics; organic inputs, food web and nutrient cycling; and fish and wildlife habitat. *Strictly limiting or limiting* conflicting uses in HCA will allow for additional urban development that is sensitive to the natural resource features and requires mitigation for unavoidable negative impacts to features and functions. The recommendation will also contribute towards meeting other regulatory requirements including the Metro Title 3, Water Quality and Flood Management; Oregon Goal 6, Air, Water and Land Resources Quality; Oregon Goal 7, Areas Subject to Natural Hazards; the Clean Water Act; and the Endangered Species Act.

Goal 5 Significant Natural Resources

Resource site JC19 contains natural resource features that are not a Title 13 HCA and are therefore subject to Statewide Planning Goal 5 OAR 660-023-0110. The General ESEE analysis, Volume 4, describes the conflicting uses and provides an overarching analysis of the economic, social, environmental and energy consequences of prohibiting, limiting or allowing the conflicting uses within areas of significant natural resources. In addition to the General ESEE analysis, the following resource site-specific consequences are considered.

The common impacts of conflicting uses in the resource site include clearing vegetation; grading activities and soil compaction; adding impervious surface; modifying streams, wetlands and flood areas; generating pollution; landscaping with non-native or invasive vegetation; building fences or other wildlife barriers; and other impacts such as noise, light, litter and pets.

Within the resource site residential uses are allowed outright or conditionally in the R20, R10 and R7 base zones. Open Space uses are allowed in the OS base zone. Development of new uses may involve vegetation clearing, grading, filing, and soil compaction, as well as the addition of impervious surfaces and landscaping with non-native plants, with associated impacts on the natural resources. Basic utilities and other infrastructure are allowed in all base zones. New or upgraded utility corridors may be cleared of vegetation and may fragment wildlife habitat.

The analysis of economic, social, environmental and energy consequences provided in Volume 4 is confirmed for resource site JC19, with the following additional information that clarifies the analysis.

Strictly limiting or limiting conflicting uses would retain the wildlife habitat functions provided by significant natural resource features including maintaining habitat for at risk plant, fish and wildlife species, maintaining vegetation on steep slopes, and maintaining the stormwater management and air-cooling functions of the tree canopy. Mitigation for negative

consequences of additional development in areas of Class A or Class B wildlife habitat should be required.

Steep slopes are susceptible to erosion and landslides. Development should be clustered away from steep slopes and trees and vegetation should be maintained to reduce the landslide risks. New or expanded development on steep slopes should be *limited*.

Natural Resources Protection Decisions

Based on the analysis presented in Volume 3, Natural Resources Inventory, Volume 4, Title 13 and Goal 5 Compliance, and the resource site-specific evaluation for JC19, the following decisions are applied to protect the significant riparian corridors and wildlife habitat:

1. Apply a protection overlay zone ('p' zone) to stream channels from top-of-bank to top-of-bank and wetlands.
2. Apply a protection overlay zone ('p' zone) to areas of vegetation within the flood area and land outside of the floodplain within 50 feet of stream top-of-bank or 30 feet of wetlands.
3. Apply a conservation overlay zone ('c' zone) to areas of forest vegetation that are contiguous to but more than 50 feet of stream top-of-bank or 30 feet of wetlands.
4. Allow conflicting uses within all other areas containing significant natural resources.

Resource Site No.: JC20 **Resource Site Name:** Buttes Natural Area North

Previous Plan: Johnson Creek Basin Protection Plan

Previous Resource Site No.: 22

The results of the analysis found in Volume 3, Natural Resources Inventory, Volume 4, Title 13 and Goal 5 Compliance, and the resource site-specific evaluation, are presented in the following maps:

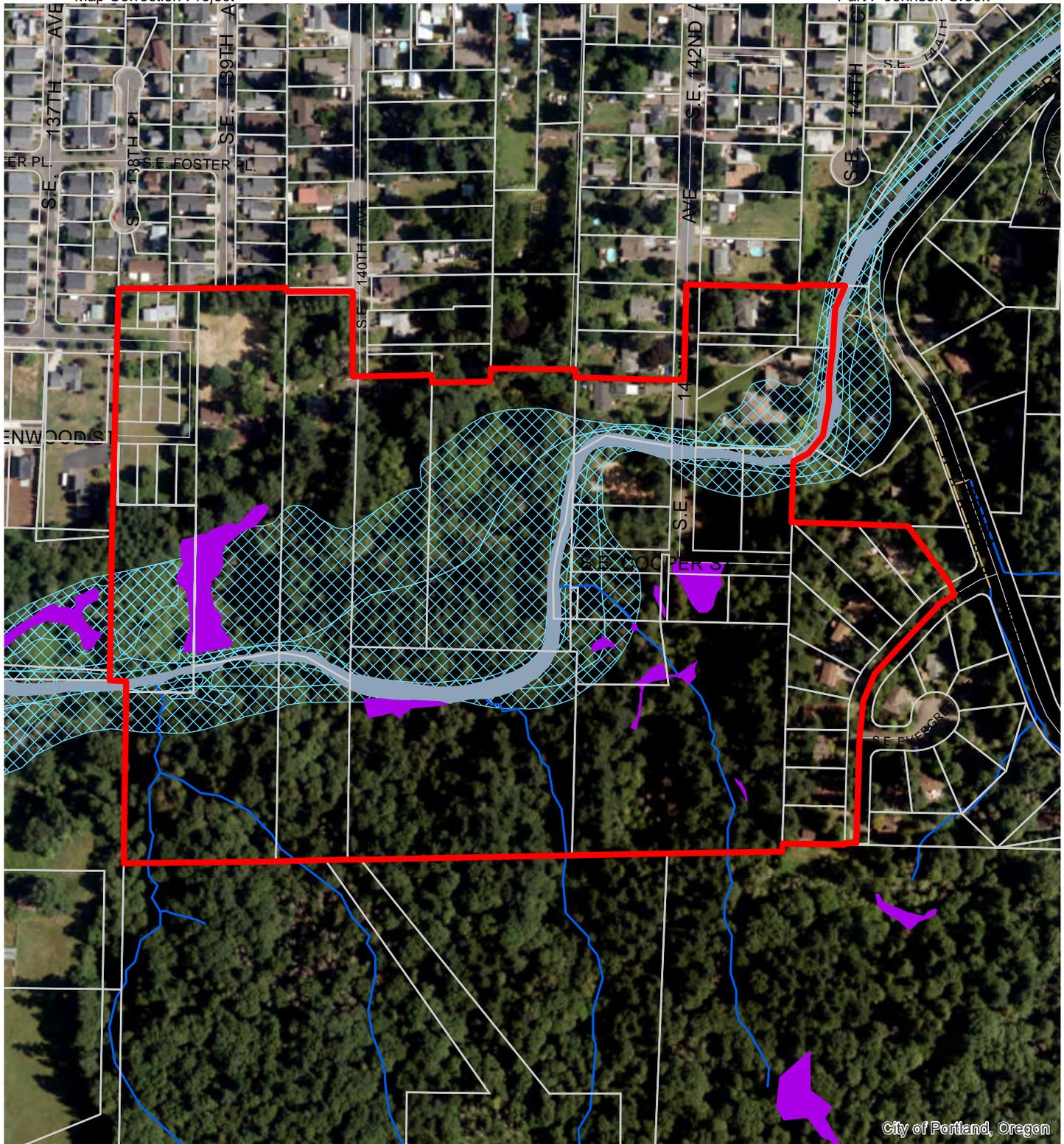
- A. Water Features – rivers, streams, wetlands and flood areas
- B. Land Features – forest, woodland, shrubland and herbaceous vegetation, steep slopes
- C. Special Habitat Areas
- D. Riparian Corridor Classifications
- E. Wildlife Habitat Classifications
- F. Urban Development Value
- G. Metro Title 13 Habitat Conservation Areas
- H. Statewide Planning Goal 5 Areas
- I. Recommended Natural Resource Protections

Following the maps, additional information about existing natural resource features and functions in the resource site is presented.

Implementation of the results is found in Volume 1, Part B, updates to zoning maps and zoning code.

Resource site JC20 includes the following:

Site (acres)	39.6
Base zones (acres)	
OS	16.7
R20	<1
R10	18.9
R5	4.0

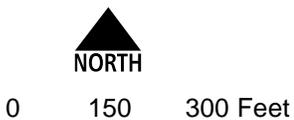


City of Portland, Oregon

Map A: Water Features

Resource Site: JC20

Updated: July 2021

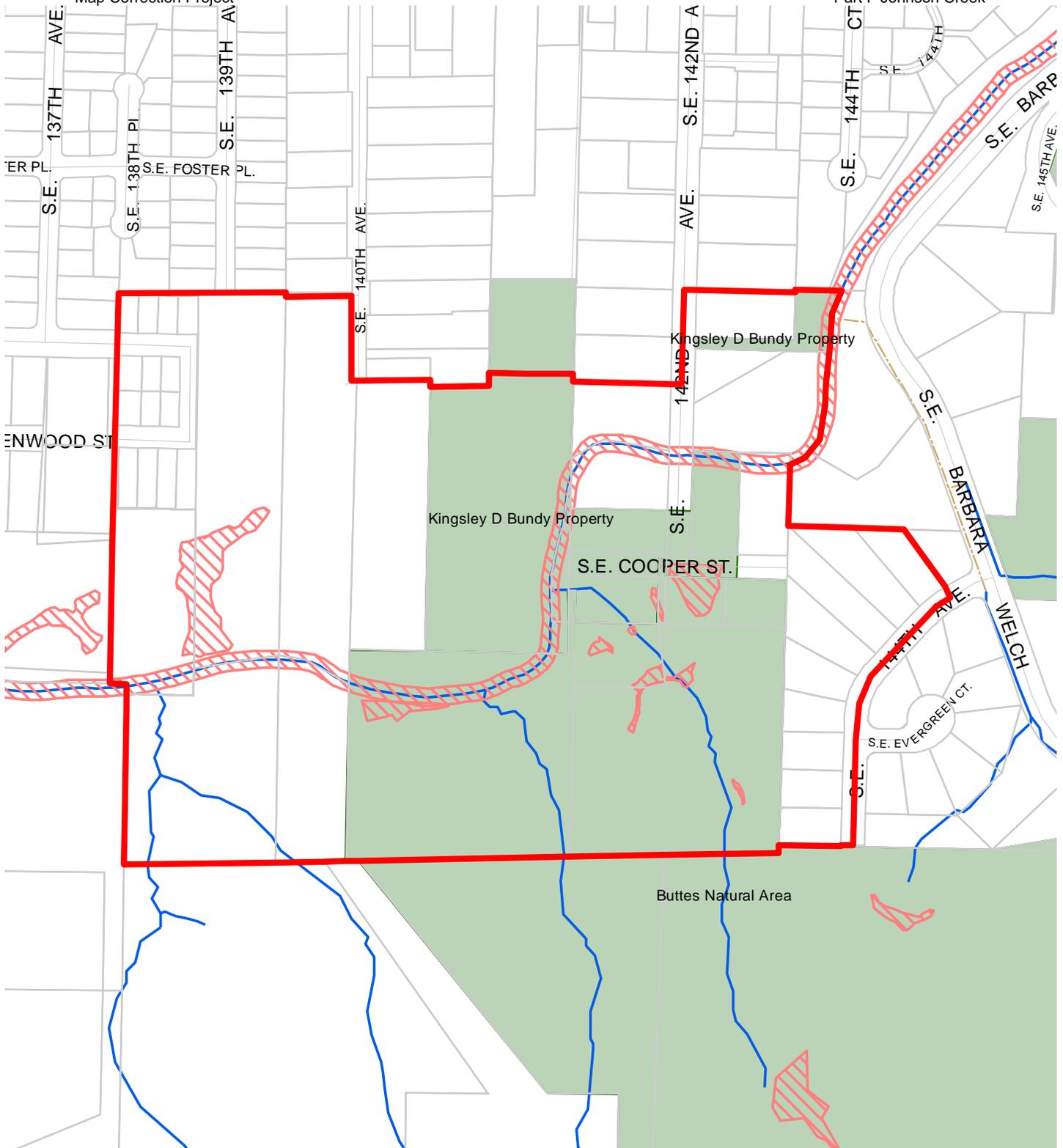


Proposed Draft - As Amended

- Resource Sites
- Urban Service Boundary
- Taxlots
- Wetlands
- Rivers
- Open stream channel
- Piped Stream Segment
- Flood Area

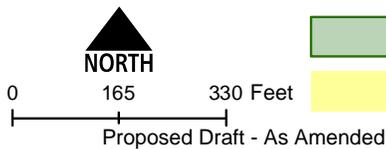


The information on the map was derived from digital databases. Care was taken in the creation of this map but it is provided "as is". The City of Portland ensures meaningful access to city programs, services, and activities to comply with Civil Rights Title VI and ADA Title II laws and reasonably provides: translation, interpretation, modifications, accommodations, alternative formats, auxiliary aids and services. To request these services, contact 503-823-7700, City TTY 503-823-6868, Relay Service: 711.
July 2021



**Map C: Special
Habitat Areas**
**Resource Site:
JC20**

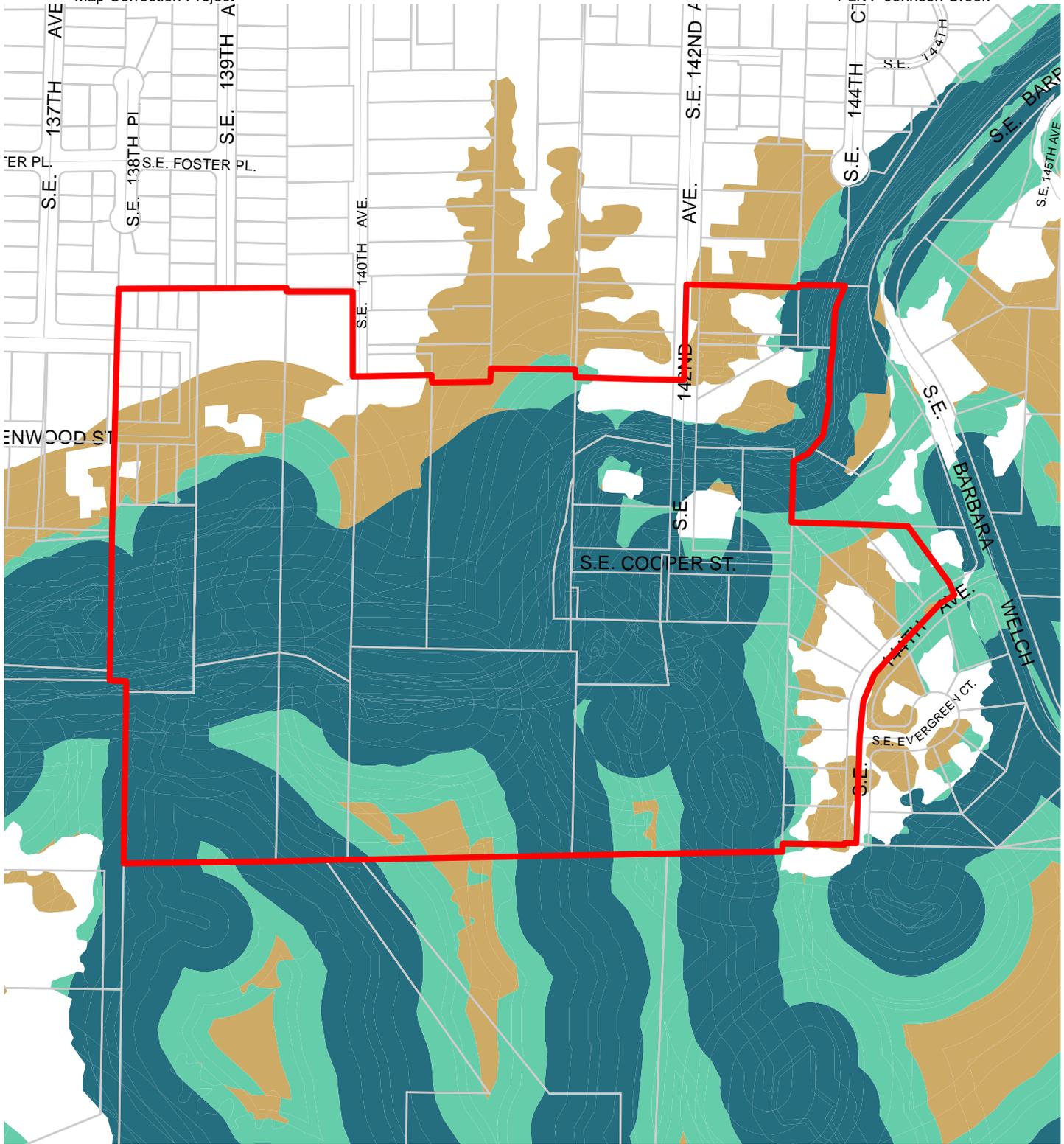
Updated: June 2021



- Resource Sites
- Special Habitat Areas (SHAs)
- Open Stream Channel
- Piped Stream Segment
- Parks
- Schools
- Taxlots
- Urban Service Boundary



The information on the map was derived from digital databases. Care was taken in the creation of this map but it is provided "as is". The City of Portland ensures meaningful access to city programs, services, and activities to comply with Civil Rights Title VI and ADA Title II laws and reasonably provides: translation, interpretation, modifications, accommodations, alternative formats, auxiliary aids and services. To request these services, contact 503-823-7700, City TTY 503-823-6868, Relay Service: 711. July 2021

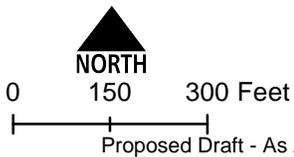


**Map D: Riparian
Corridors Habitat
Classification**

**Resource Site:
JC20**

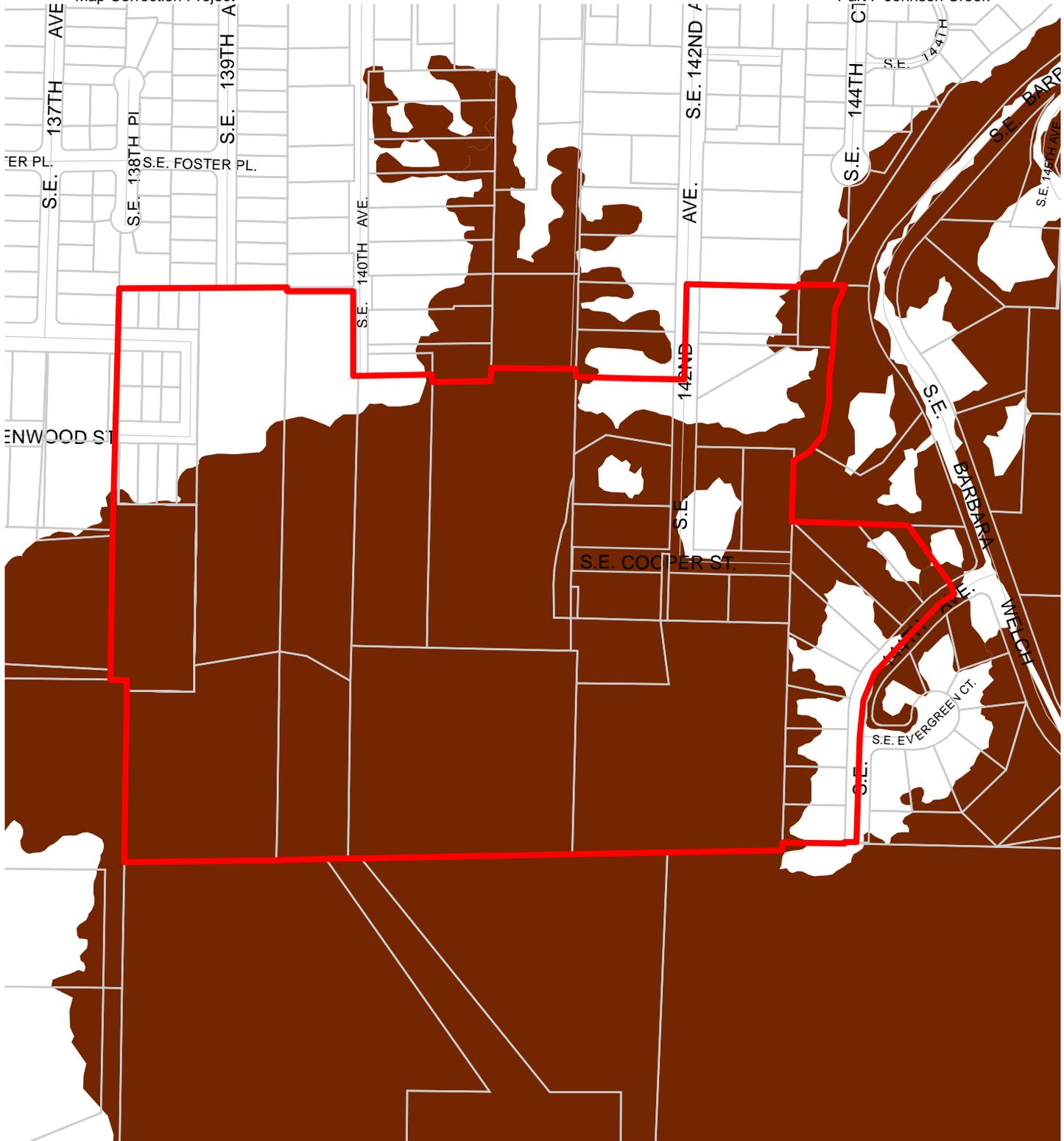
Updated: July 2021

- Resource Sites
- Urban Service Boundary
- Class I (high rank)
- Class II (medium rank)
- Class III (low rank)
- Taxlots



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July 2021



**Map E: Wildlife
Habitat Classification**
Resource Site:
JC20

Updated: July 2021



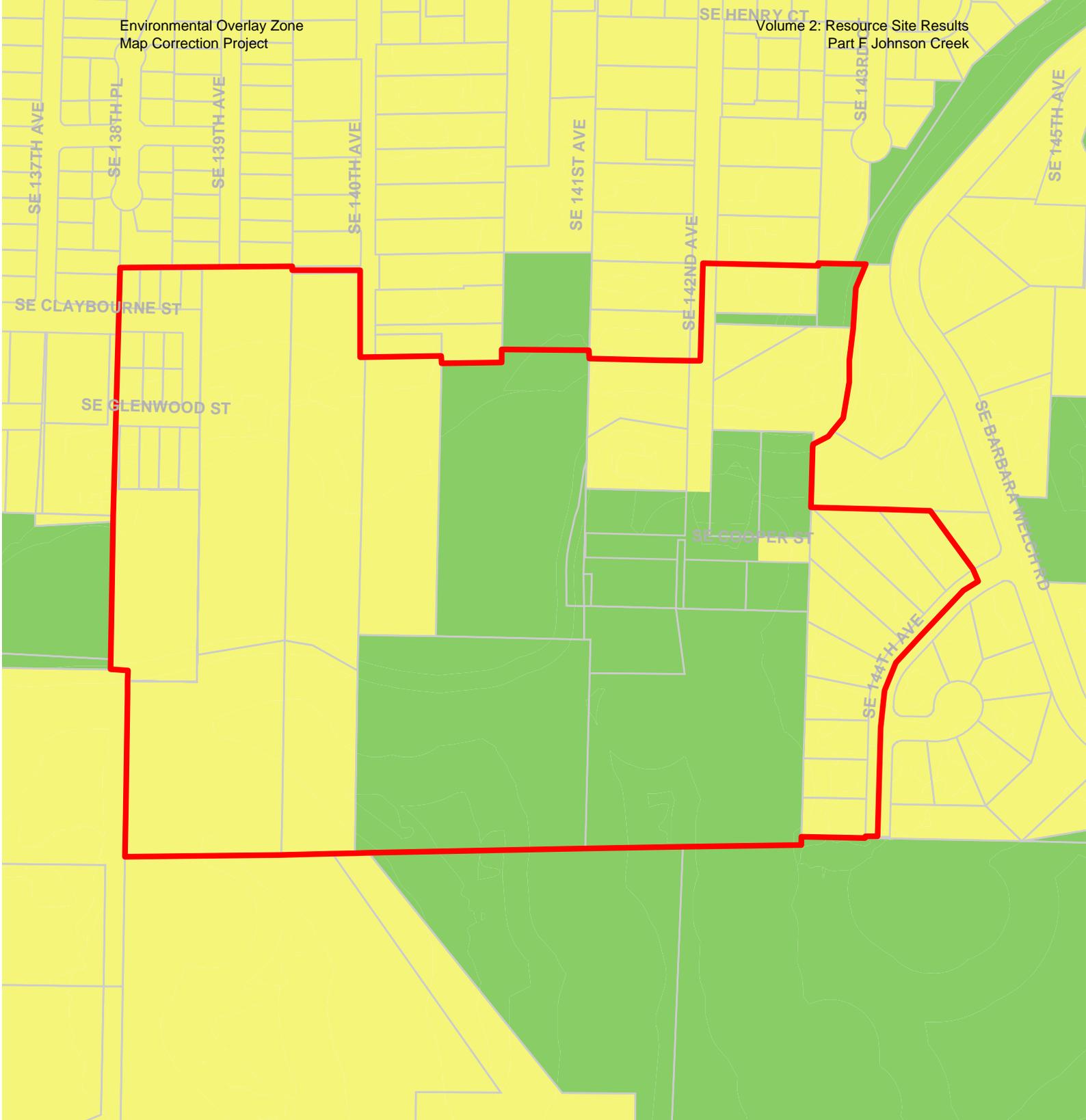
Proposed Draft - As Amended

-  Resource Sites
-  Class A (high rank)
-  Class B (medium rank)
-  Class C (low rank)
-  Urban Service Boundary
-  Taxlots



The information on the map was derived from digital databases. Care was taken in the creation of this map but it is provided "as is". The City of Portland ensures meaningful access to city programs, services, and activities to comply with Civil Rights Title VI and ADA Title II laws and reasonably provides: translation, interpretation, modifications, accommodations, alternative formats, auxiliary aids and services. To request these services, contact 503-823-7700, City TTY 503-823-6868, Relay Service: 711.

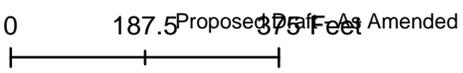
July 2021



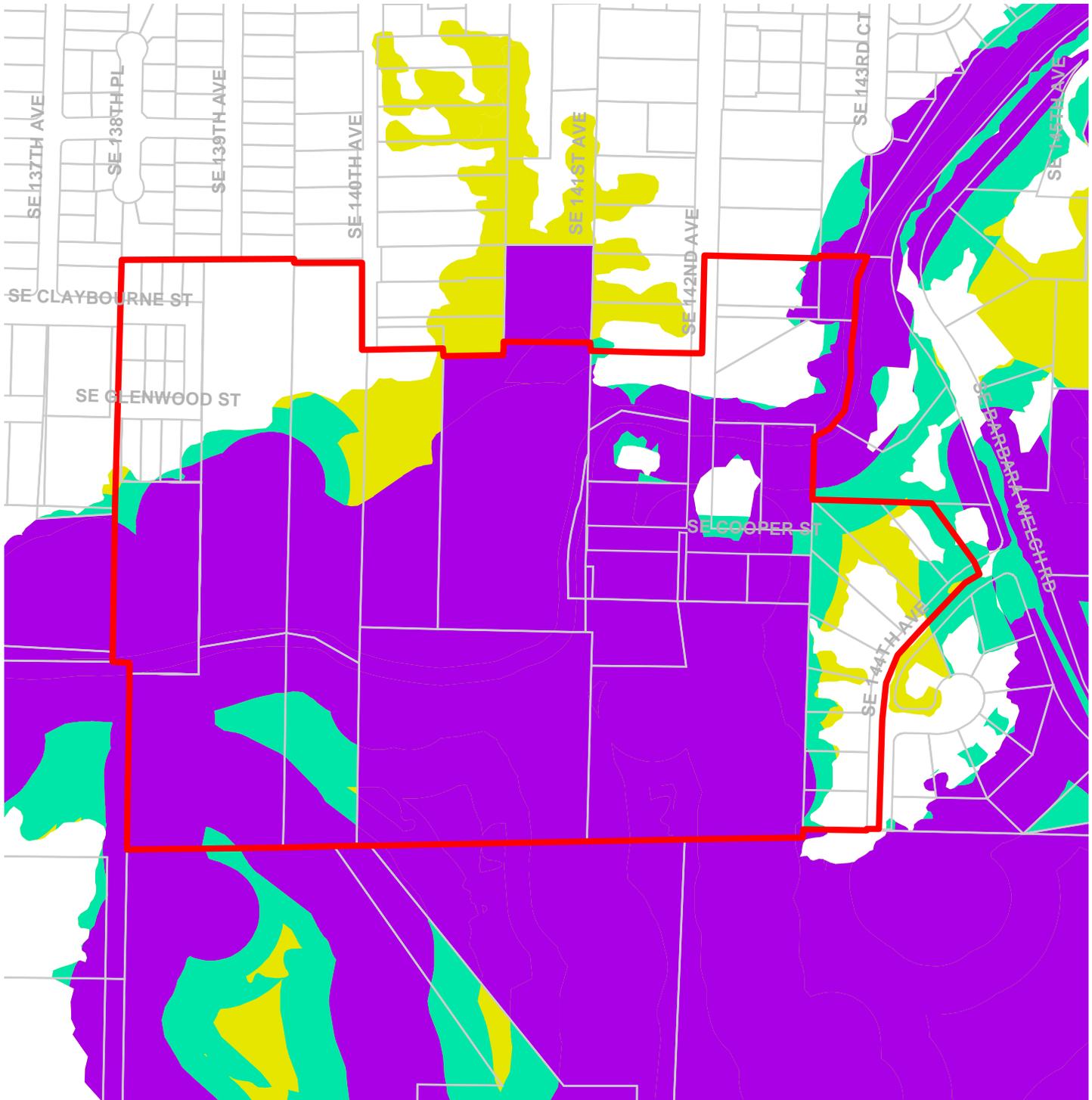
Map F: Urban Development Value (Title 13)
Resource Site: JC20

-  Urban Service Boundary
-  Resource Sites
-  High Development Value
-  Medium Development Value
-  Low Development Value
-  Parks

Updated: July 2021



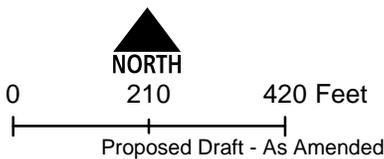
The information on the map was derived from digital databases. Care was taken in the creation of this map but it is provided "as is". The City of Portland ensures meaningful access to city programs, services, and activities to comply with Civil Rights Title VI and ADA Title II laws and reasonably provides: translation, interpretation, modifications, accommodations, alternative formats, and aids and services. To request these services, contact 503-823-7700, City TTY 503-823-6868, Relay Service: 711.



Map G: Title 13 Habitat Conservation Areas (HCA) and Goal 5 Areas

Resource Site: JC20

Updated: July 2021

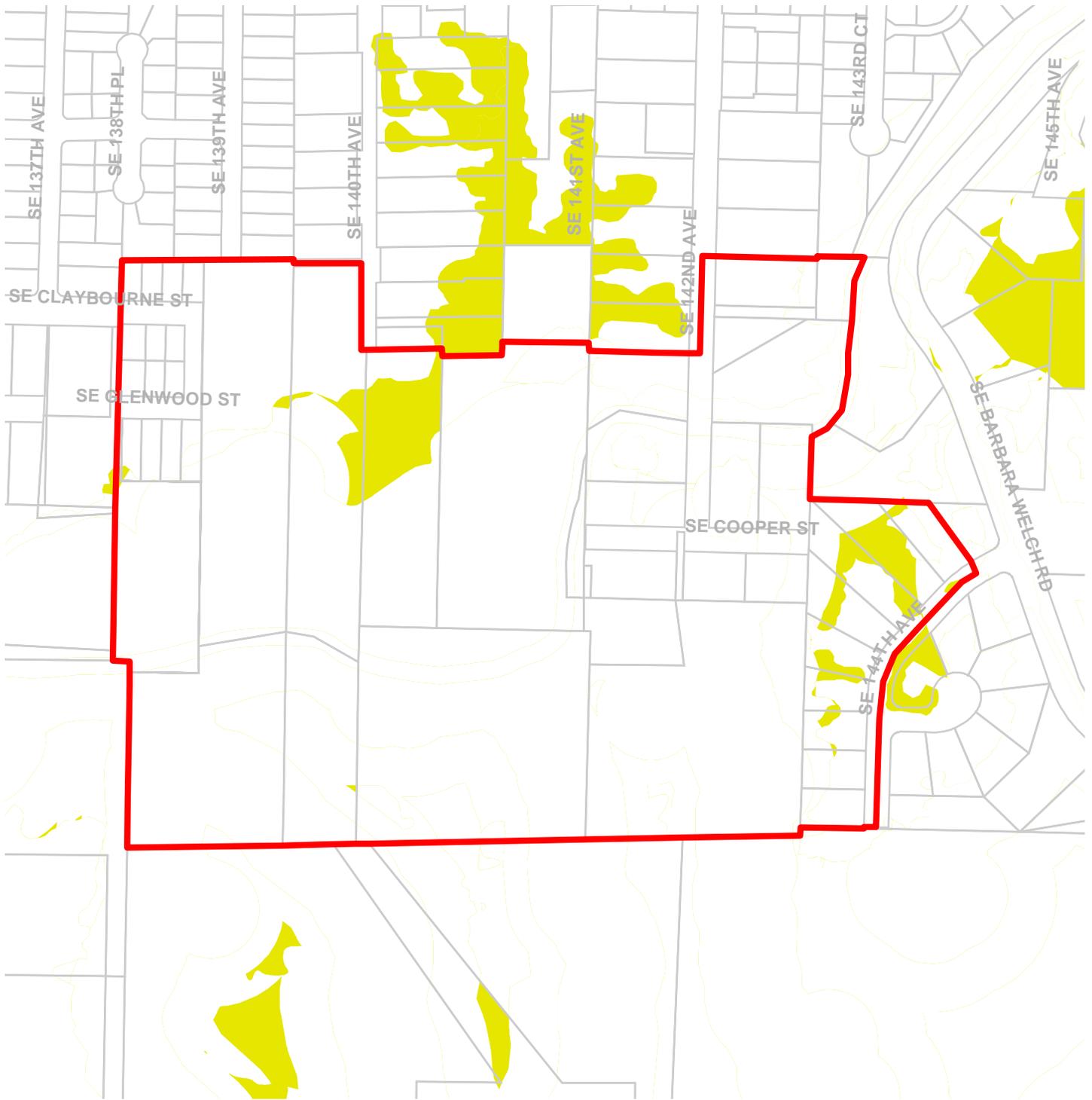


- Urban Service Boundary
- Resource Sites
- HCA High Value
- HCA Moderate Value
- HCA Low Value
- Goal 5 Significant Natural Resources



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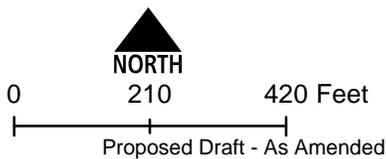
July 2021



Map H: Goal 5 Resources

Resource Site: JC20

Updated: July 2021

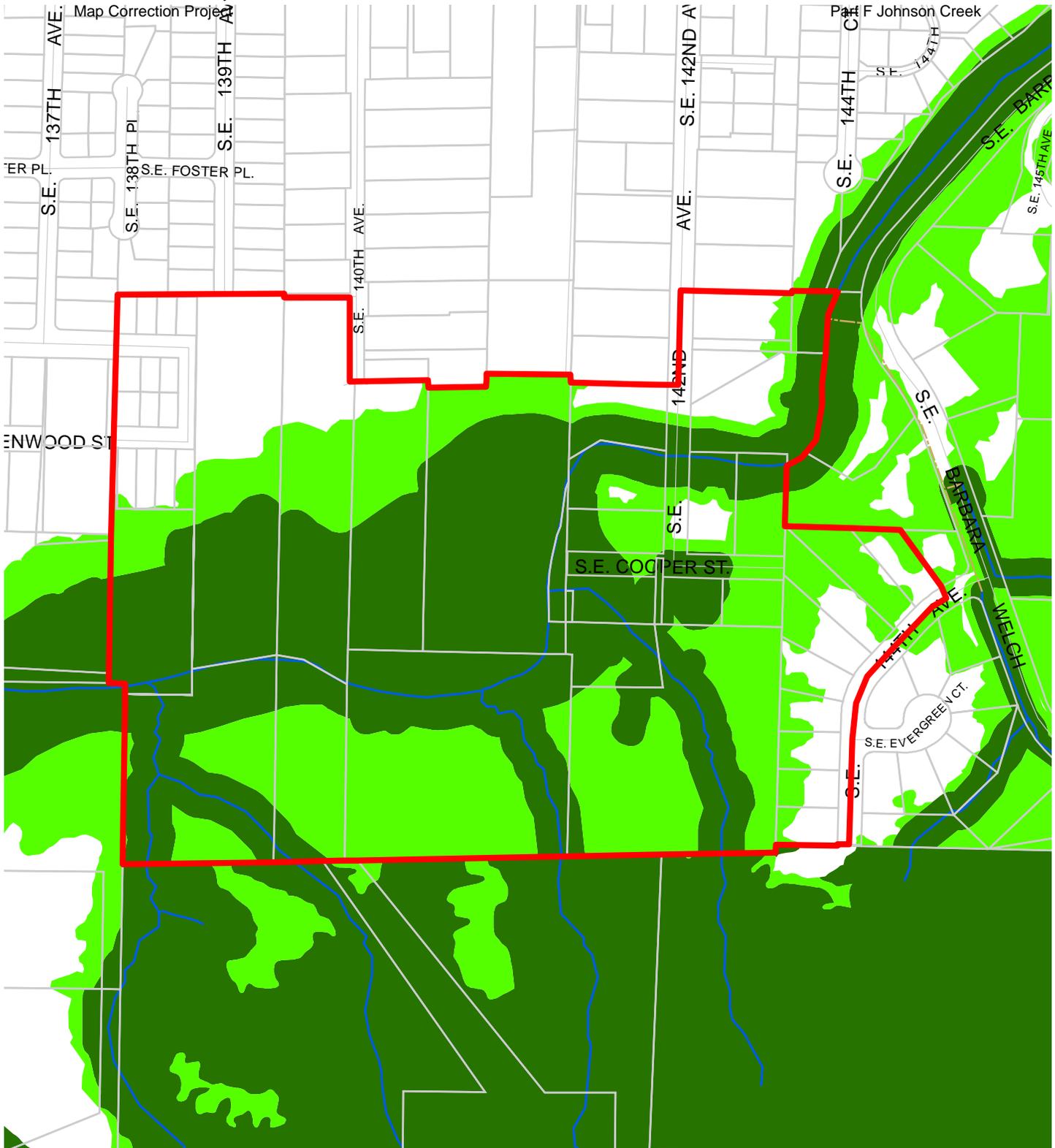


- Urban Service Boundary
- Resource Sites
- Goal 5 Significant Natural Resources



The information on the map was derived from digital databases. Care was taken in the creation of this map but it is provided "as is". The City of Portland ensures meaningful access to city programs, services, and activities to comply with Civil Rights Title VI and ADA Title II laws and reasonably provides: translation, interpretation, modifications, accommodations, alternative formats, auxiliary aids and services. To request these services, contact 503-823-7700, City TTY 503-823-6868, Relay Service: 711.

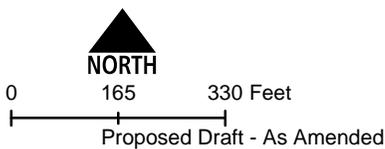
July 2021



Map I: DRAFT Proposed Environmental Overlay Zones

**Resource Site:
JC20**

Updated: July 2021



- Resource Sites
- Open Stream Channel
- Piped Stream Segment
- Proposed Conservation Zone
- Proposed Protection Zone
- Urban Service Boundary
- Taxlots



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July 2021

Natural Resource Description

Within resource site JC20 the following significant natural resource features and functions are present:

Significant Riparian Corridor Features: open stream; wetland; flood area; land within 50 feet of waterbodies; forest, woodland, shrubland and herbaceous vegetation within 300 feet of waterbodies; and forest vegetation on steep slopes (>25% slope) contiguous to and within 780 feet of waterbodies.

Significant Wildlife Habitat Features: forest patches, and associated and contiguous wetlands, two acres in size or larger.

Special Habitat Areas: Johnson Creek (S, C); wetlands (W)

Riparian Corridor Functions: microclimate and shade; stream flow moderation and water storage; bank function and sediment, pollution and nutrient control; large wood and channel dynamics; organic inputs, food web and nutrient cycling; and riparian wildlife movement corridor.

Wildlife Habitat Functions: interior area; food and water; resting, denning, nesting and rearing; movement and migration; reduction of noise, light and vibration; and habitat patches that support special status fish and wildlife species.

Table A: Quantity of Natural Resource Features in Resource Site		JC20
		Study Area
Stream (Miles)		0.8
Wetlands (acres)		0.9
Vegetated Areas >= 1/2 acre (acres)		
	Forest (acres)	31.7
	Woodland (acres)	0.5
	Shrubland (acres)	0.0
	Herbaceous (acres)	3.6
Flood Area*		
	Vegetated (acres)	12.4
	Non-vegetated (acres)	0.3
Steep Slopes (acres)**		20.2
* The flood area includes the FEMA 100-year flood plain plus the adjusted 1996 flood inundation area.		
**Slopes are derived from LiDAR. Steep slopes are areas with a slope greater than 25%.		

This resource site is comprised of undeveloped low-density residential land, Bundy Park, and the northern portion of Buttes Natural Area. Bundy Park and the Buttes Natural Area consist primarily of native riparian and upland habitat. Johnson Creek runs northeast to southwest through the site. Lowlands along Johnson Creek are covered by a broad floodplain. Other portions of the site slope steeply toward the creek.

Three small ephemeral headwater streams cross the southern portion of the site, draining small basins on Clatsop Butte (part of the Boring Lava Domes study area – see BL9). These small streams receive stormwater discharge from upstream residential properties creating flashy, highly erosive flow causing the channels to become incised and carrying sediment downslope into Johnson Creek.

This site provides high-quality riparian habitat, consistent with what was found along the Johnson Creek corridor, prior to alterations and removal of forested vegetation. Structural diversity is high, characterized by a western red cedar and Douglas fir overstory and a well-developed native shrub and herbaceous and duff layer in the understory.

The broad, low-lying floodplain on both sides of Johnson Creek consist of largely intact native vegetation with dense riparian cover. The creek then goes under SE 142nd Avenue and appears highly incised as the floodplain narrows to just beyond the banks of the creek. Small forested wetlands are located in the floodplain on both the north and south sides of Johnson Creek and adjacent to the mouth of the tributaries on the south.

Coho salmon, steelhead trout, and Pacific lamprey have been documented in this reach of Johnson Creek. In 2019, a study of Johnson Creek's potential to support salmon populations identified this reach of Johnson Creek as important to protect and restore habitat for coho and Chinook salmon and steelhead trout —meaning future restoration actions that address low habitat diversity, high sediment loads, high summer stream temperatures, and the lack of key habitat types will benefit all salmonids using the reach.

Special status bird species observed in or adjacent to this resource site include American kestrel, black-throated gray warbler, common yellowthroat, orange-crowned warbler, pacific-slope flycatcher, pileated woodpecker, purple finch, Swainson's thrush, willow flycatcher, Vaux's swift, western wood-pewee, and Wilson's warbler.

Table B: Quality of Natural Resource Functions in Resource Site JC20				
Resource Site (acres) = 40				
	Class 1/A	Class 2/B	Class 3/C	Total
Riparian Corridors*				
acres	23.6	5.7	5.1	34.3
percent total inventory site area	59.5%	14.3%	12.9%	86.8%
Wildlife Habitat*				
acres	31.4	0.0	0.0	31.4
percent total inventory site area	79.4%	0.0%	0.0%	79.4%
Special Habitat Areas**				
acres	1.7			
percent total inventory site area	4.2%			
Combined Total*				
acres	31.4	0.3	2.7	34.3
percent total inventory site area	79.4%	0.6%	6.8%	86.8%
* Class I riparian resources, Special Habitat Areas, and wildlife habitat include open water. ** Metro Title 13 designated all Special Habitat Areas as Class I riparian corridors. + Because riparian resources, Special Habitat Areas, and wildlife Habitat overlap, the results cannot be added together to determine the combined results.				

Stormwater runs off impervious surfaces (e.g., rooftops, driveways, parking areas, streets, etc..) rapidly. Without a place to retain the water (such as wetlands or adequate stormwater facilities), stormwater runoff results in spikes in stream levels which can cause or exacerbate flooding and increase stream erosion. In addition, when water runs off quickly, it does not have a chance to infiltrate and recharge streams or aquifers to provide water during drier periods.

The type and capacity of stormwater facilities to manage the runoff from impervious surfaces varies in the city, affecting the local rate and amount of runoff, and the amount of pollutants in the water. Much of the city was developed prior to any stormwater regulations and receives limited or no management prior to discharging to pipes and surface waters.

Table C shows the total amount of impervious area within the resource site and how much of that impervious area lacks stormwater management; the percentage of total impervious area that is not managed is called "effective impervious area." The higher the percent of effective impervious area in a watershed, the greater the negative impacts of stormwater runoff to streams. Stream science indicates that when effective impervious area reaches 10% of a watershed, negative stream impacts become significant; and at 25%, these impacts on waterways can be substantial. An additional consideration is the differences in soil conditions and other factors that influence the ability of pervious areas to retain, infiltrate or filter

pollutants from stormwater. For example, a mature forest is much more effective in managing stormwater than a manicured lawn; both areas would have a lower effective impervious surface percentage than a developed site, but they have different outcomes for stormwater management.

For Resource Area JC20, 4% of the total area is effectively. This indicates a significant degree of stormwater management and/or existing natural resources that should be preserved. Areas with very low impervious cover and existing vegetation are more likely to be functioning properly to support biologic systems.

Table C. Impervious Area within Resource Site JC20			
Total area (acres)	Total impervious Area (acres)	Total unmanaged impervious area* (acres)	Percent of resource site that is effectively impervious
40	1.6	1.5	4%

*Total unmanaged impervious area refers to the number of acres within a resource area that receives no formal stormwater management measures to regulate flow or treat pollutants before they reach surface waters, also referred to as effective impervious area.

Metro Title 13 and Oregon Goal 5 Compliance

The following information supplements evaluation of natural resource protections presented in Volume 4 and supports compliance with Metro Title 13 and Oregon Plan Goal 5.

Title 13 Habitat Conservation Areas

Map G presents the Habitat Conservation Areas (HCA) within the Resource site JC20. Natural resources should be protected within HCA as follows:

1. *Strictly limit* or *limit* conflicting uses within Class I/High Rank Riparian Areas in all Urban Development Areas.
2. *Strictly limit* or *limit* conflicting uses within Class II/Medium Rank Riparian Areas within Moderate and Low Value Urban Development Area as well as parks and open spaces.
3. *Strictly limit* or *limit* conflicting uses within Class A/High or B/Medium Rank Wildlife Habitat within parks and open spaces.
4. *Allow* conflicting uses or conducted a local Goal 5 ESEE for Class III/Low Rank Riparian Areas in all Urban Development Areas.
5. *Allow* conflicting uses or conducted a local Goal 5 ESEE for Class A/High, Class B/Medium or Class C/Low Rank Wildlife Habitat in all Urban Development Area, except parks and open space.

Strictly limiting or limiting conflicting uses in HCA will protect and conserve existing streams and wetlands to maintain significant natural resource functions including: microclimate and shade; stream flow moderation and water storage; bank function and sediment, pollution and nutrient control; large wood and channel dynamics; organic inputs, food web and nutrient cycling; and fish and wildlife habitat. *Strictly limiting or limiting* conflicting uses in HCA will allow for additional urban development that is sensitive to the natural resource features and requires mitigation for unavoidable negative impacts to features and functions. The recommendation will also contribute towards meeting other regulatory requirements including the Metro Title 3, Water Quality and Flood Management; Oregon Goal 6, Air, Water and Land Resources Quality; Oregon Goal 7, Areas Subject to Natural Hazards; the Clean Water Act; and the Endangered Species Act.

Goal 5 Significant Natural Resources

Resource site JC20 contains natural resource features that are not a Title 13 HCA and are therefore subject to Statewide Planning Goal 5 OAR 660-023-0110. The General ESEE analysis, Volume 4, describes the conflicting uses and provides an overarching analysis of the economic, social, environmental and energy consequences of prohibiting, limiting or allowing the conflicting uses within areas of significant natural resources. In addition to the General ESEE analysis, the following resource site-specific consequences are considered.

The common impacts of conflicting uses in the resource site include clearing vegetation; grading activities and soil compaction; adding impervious surface; modifying streams, wetlands and flood areas; generating pollution; landscaping with non-native or invasive vegetation; building fences or other wildlife barriers; and other impacts such as noise, light, litter and pets.

Within the resource site residential uses are allowed outright or conditionally in the R10 and R5 base zones. Open space uses are allowed in the OS base zone. Development of new uses may involve vegetation clearing, grading, filing, and soil compaction, as well as the addition of impervious surfaces and landscaping with non-native plants, with associated impacts on the natural resources. Basic utilities and other infrastructure are allowed in all base zones. New or upgraded utility corridors may be cleared of vegetation and may fragment wildlife habitat.

The analysis of economic, social, environmental and energy consequences provided in Volume 4 is confirmed for resource site JC20, with the following additional information that clarifies the analysis.

Strictly limiting or limiting conflicting uses would retain the wildlife habitat functions provided by significant natural resource features including maintaining habitat for at risk plant, fish and wildlife species, maintaining vegetation on steep slopes, and maintaining the stormwater management and air-cooling functions of the tree canopy. Mitigation for negative

consequences of additional development in areas of Class A or Class B wildlife habitat should be required.

Natural Resources Protection Decisions

Based on the analysis presented in Volume 3, Natural Resources Inventory, Volume 4, Title 13 and Goal 5 Compliance, and the resource site-specific evaluation for JC20, the following decisions are applied to protect the significant riparian corridors and wildlife habitat:

1. Apply a protection overlay zone ('p' zone) to stream channels from top-of-bank to top-of-bank and wetlands.
2. Apply a protection overlay zone ('p' zone) to areas of vegetation within the flood area and land outside of the floodplain within 50 feet of stream top-of-bank or 30 feet of wetlands.
3. Apply a conservation overlay zone ('c' zone) to areas of forest vegetation that are contiguous to but more than 50 feet of stream top-of-bank or 30 feet of wetlands.
4. Apply a conservation overlay zone ('c' zone) to land that is between 50 and 75 feet of the top-of-bank of streams and land that is between 30 and 55 feet of wetlands.
5. Allow conflicting uses within all other areas containing significant natural resources.

Resource Site No.: JC21 Resource Site Name: Lower Barbara Welch

Previous Plan: Johnson Creek Basin Protection Plan

Previous Resource Site No.: 23

The results of the analysis found in Volume 3, Natural Resources Inventory, Volume 4, Title 13 and Goal 5 Compliance, and the resource site-specific evaluation, are presented in the following maps:

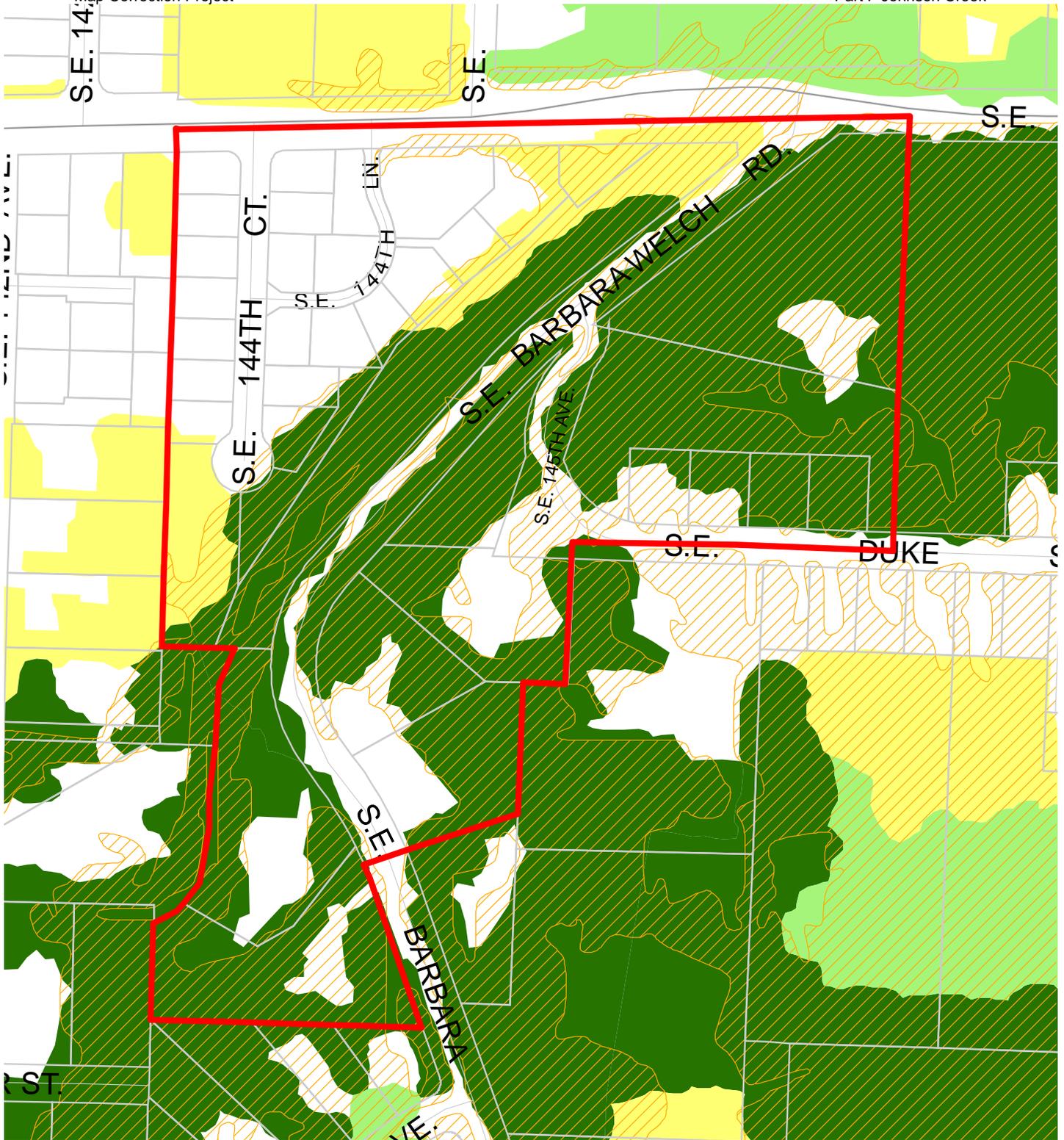
- A. Water Features – rivers, streams, wetlands and flood areas
- B. Land Features – forest, woodland, shrubland and herbaceous vegetation, steep slopes
- C. Special Habitat Areas
- D. Riparian Corridor Classifications
- E. Wildlife Habitat Classifications
- F. Urban Development Value
- G. Metro Title 13 Habitat Conservation Areas
- H. Statewide Planning Goal 5 Areas
- I. Recommended Natural Resource Protections

Following the maps, additional information about existing natural resource features and functions in the resource site is presented.

Implementation of the results is found in Volume 1, Part B, updates to zoning maps and zoning code.

Resource site JC21 includes the following:

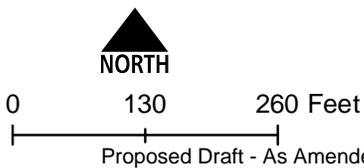
Site (acres)	18.5
Base zones (acres)	
OS	1.7
R10	0.9
R20	9.1
R5	6.7



Map B: Vegetation and Steep Slopes

**Resource Site:
JC21**

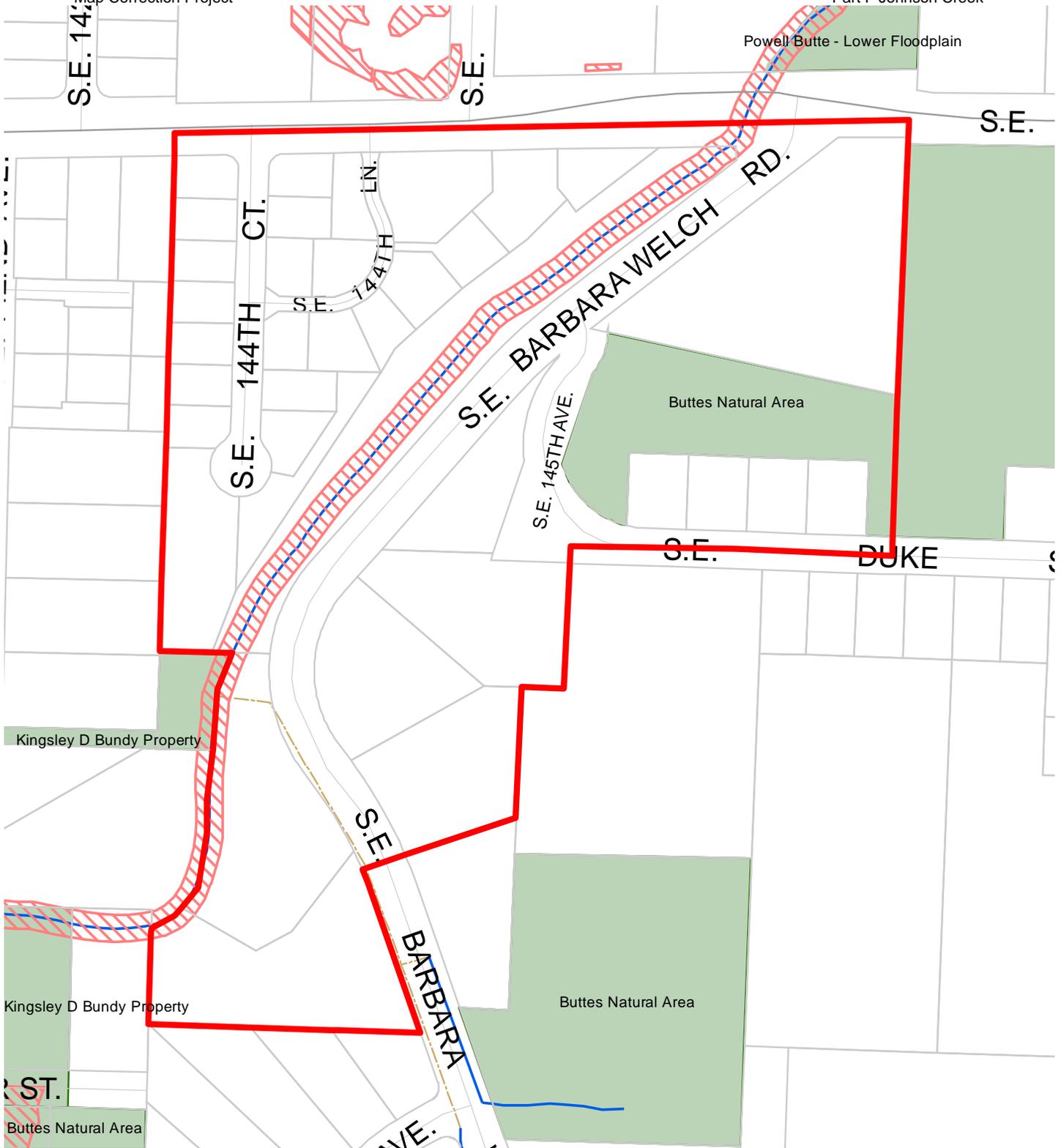
Updated: July 2021



- Resource Sites
- Urban Service Boundary
- Taxlots
- Slopes >25%
- Forest
- Woodland
- Shrubland
- Herbaceous

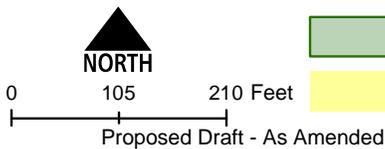


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July 2021



**Map C: Special
Habitat Areas**
**Resource Site:
JC21**

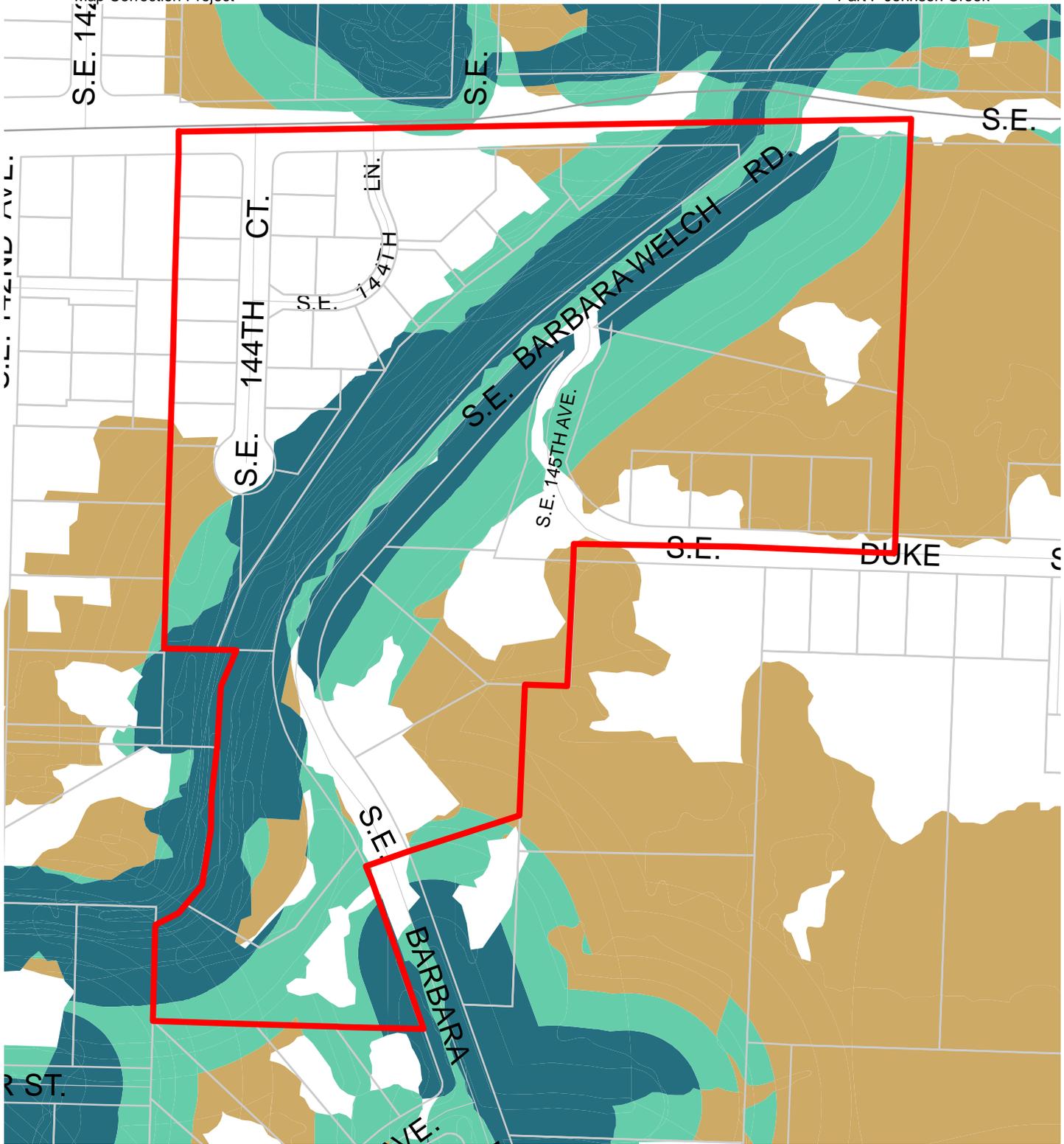
Updated: June 2021



-  Resource Sites
-  Special Habitat Areas (SHAs)
-  Open Stream Channel
-  Piped Stream Segment
-  Parks
-  Schools
-  Urban Service Boundary
-  Taxlots



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**Map D: Riparian
Corridors Habitat
Classification**

**Resource Site:
JC21**

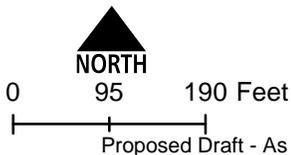
Updated: July 2021

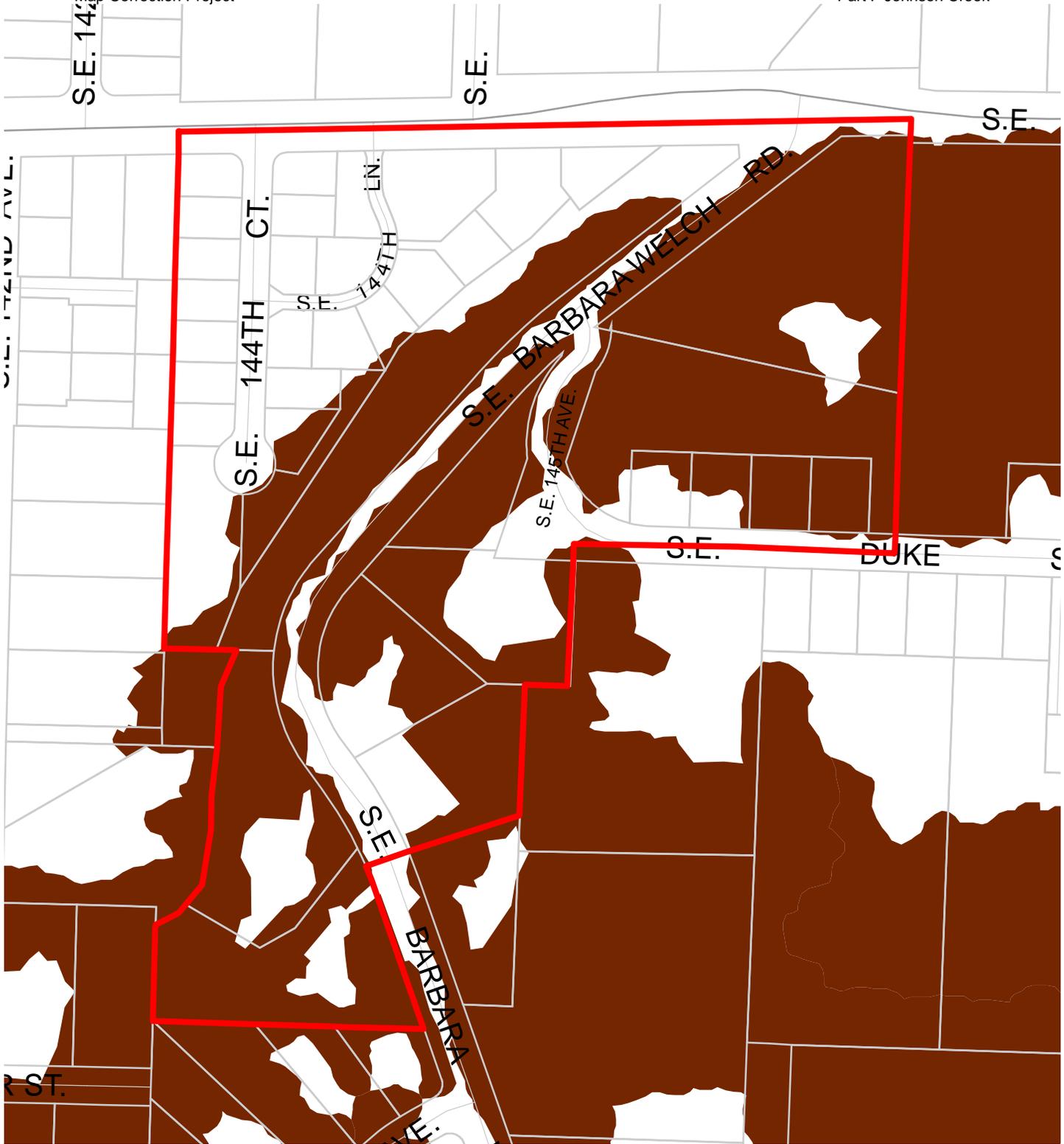
- Resource Sites
- Urban Service Boundary
- Class I (high rank)
- Taxlots
- Class II (medium rank)
- Class III (low rank)



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July 2021





**Map E: Wildlife
Habitat Classification**
**Resource Site:
JC21**

Updated: July 2021



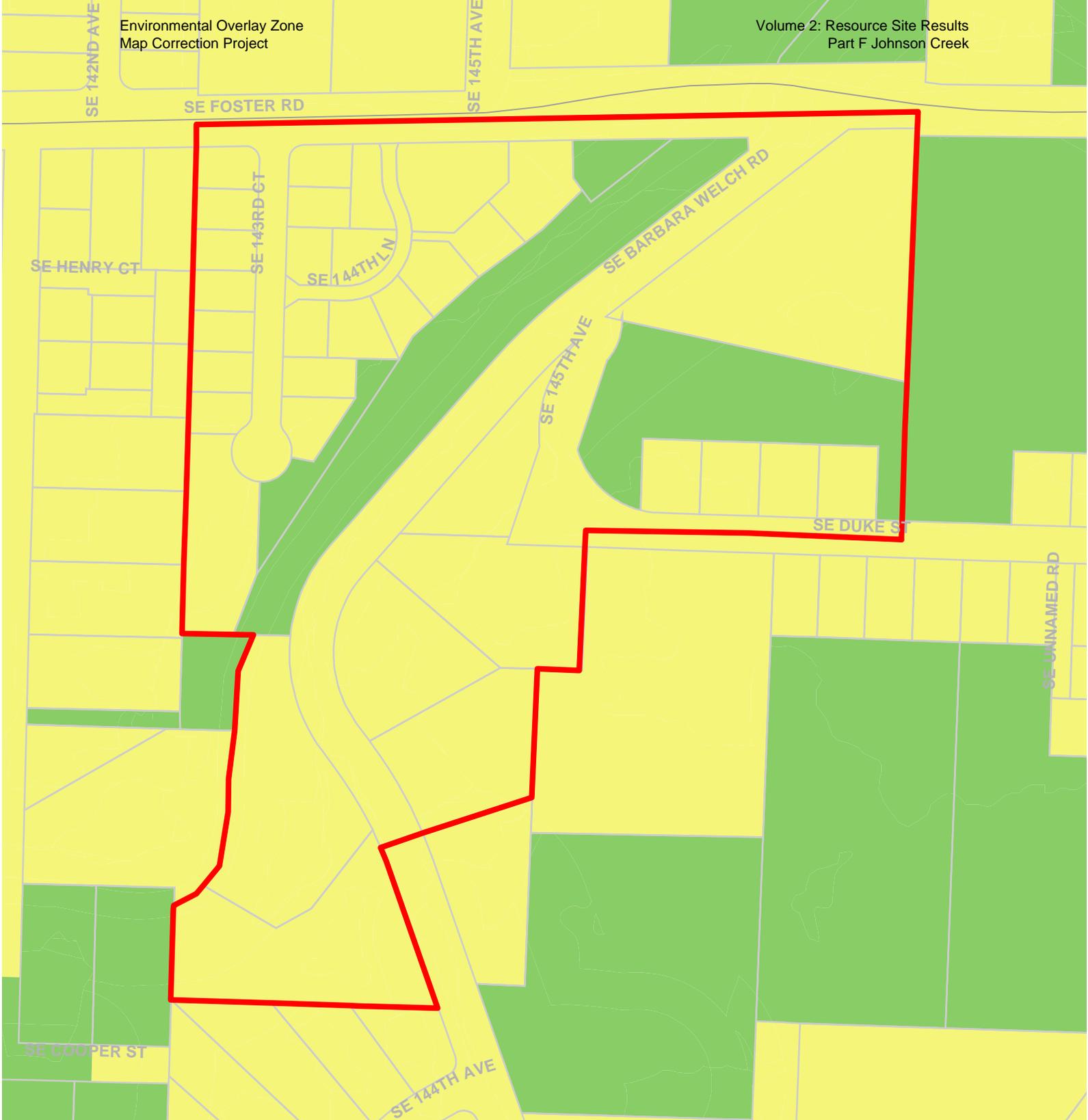
Proposed Draft - As Amended

-  Resource Sites
-  Class A (high rank)
-  Class B (medium rank)
-  Class C (low rank)
-  Urban Service Boundary
-  Taxlots



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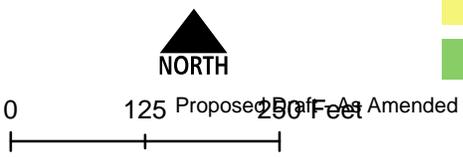
July 2021



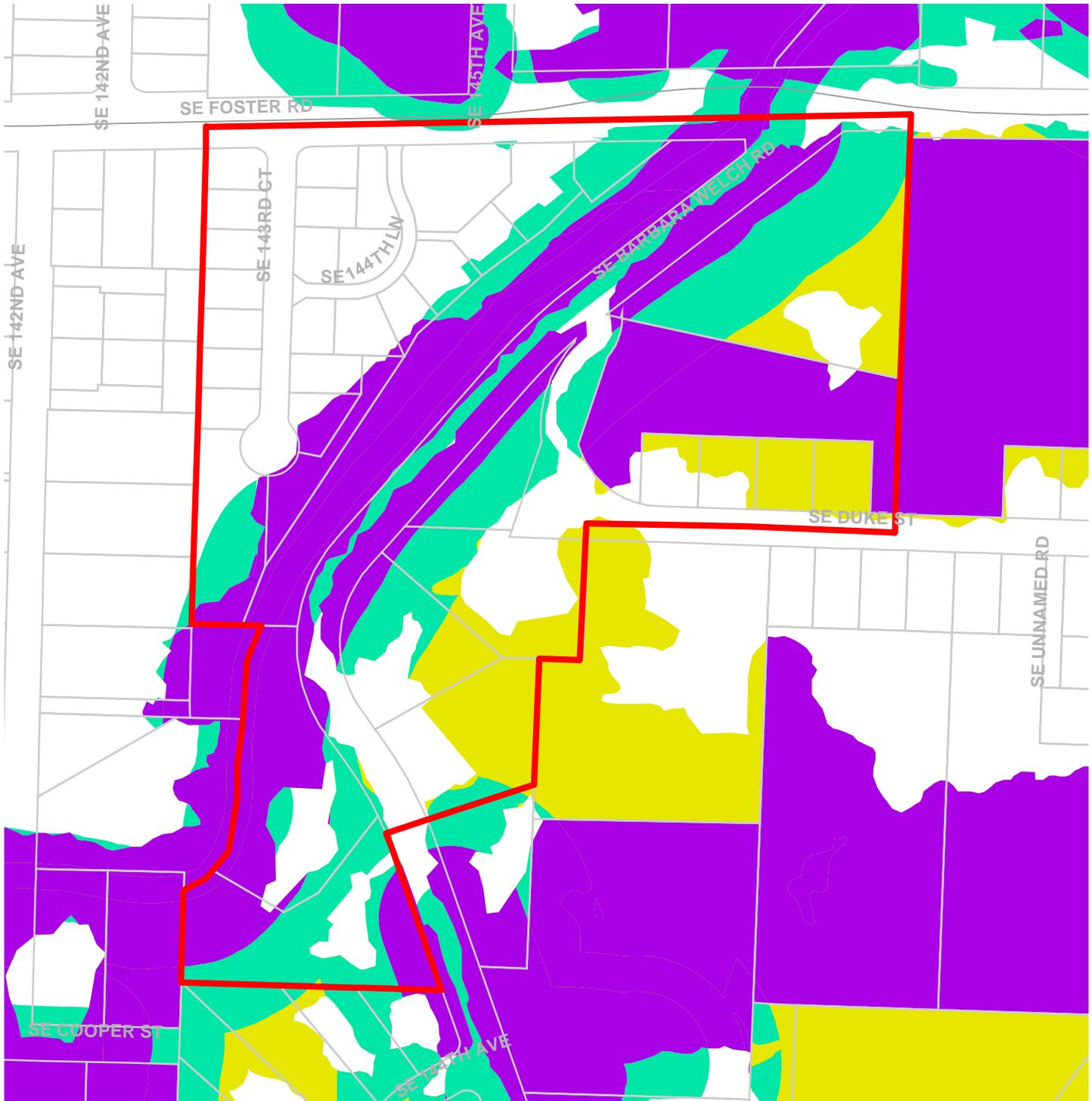
Map F: Urban Development Value (Title 13)
Resource Site: JC21

-  Urban Service Boundary
-  Resource Sites
-  High Development Value
-  Medium Development Value
-  Low Development Value
-  Parks

Updated: July 2021



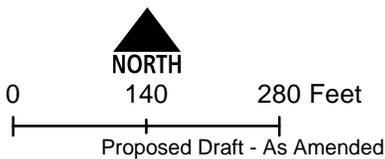
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Map G: Title 13 Habitat Conservation Areas (HCA) and Goal 5 Areas

Resource Site: JC21

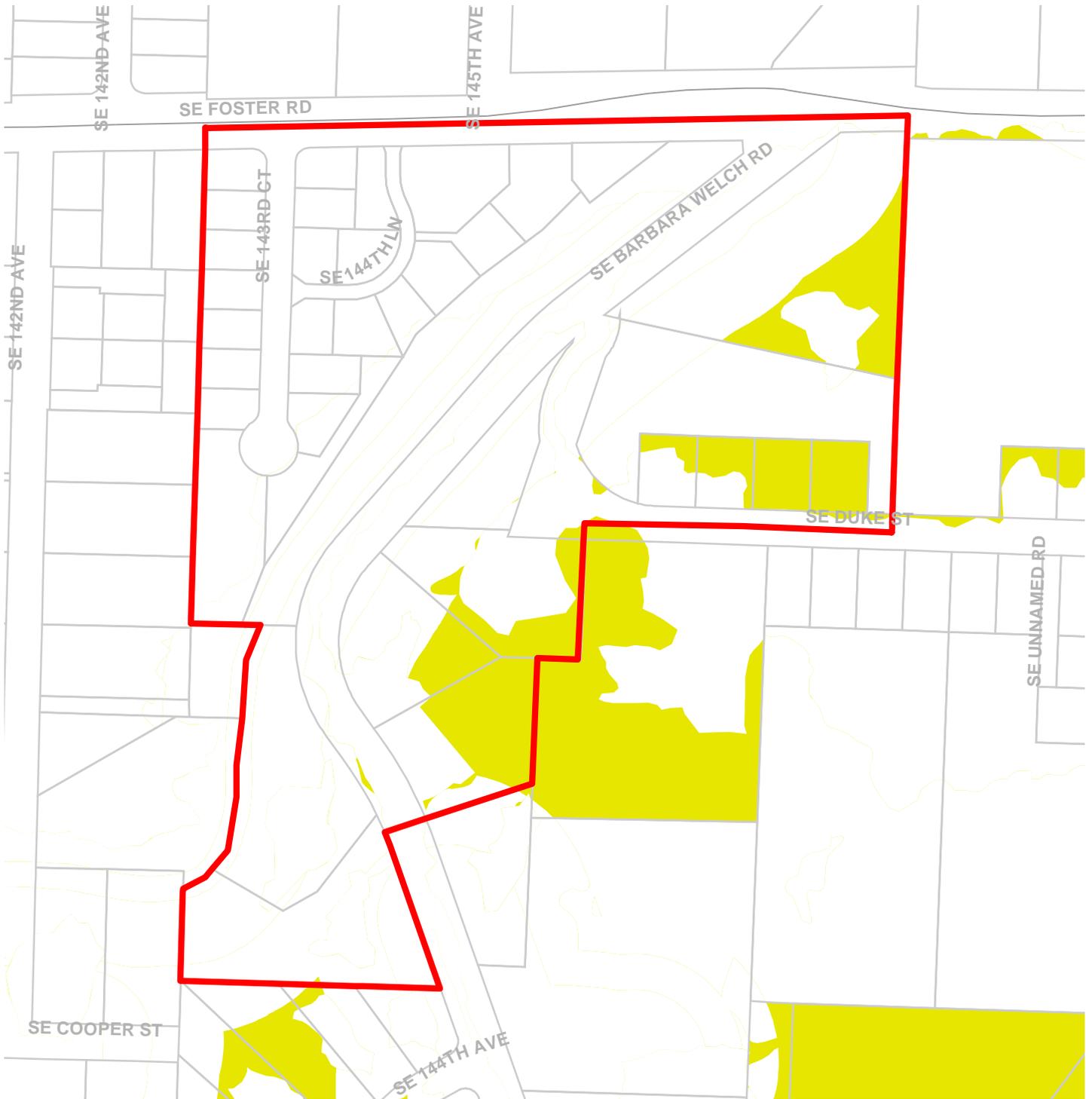
Updated: July 2021



- Urban Service Boundary
- Resource Sites
- HCA High Value
- HCA Moderate Value
- HCA Low Value
- Goal 5 Significant Natural Resources



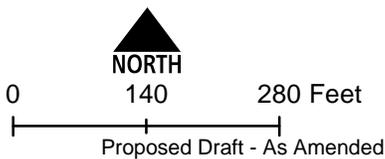
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Map H: Goal 5 Resources

Resource Site: JC21

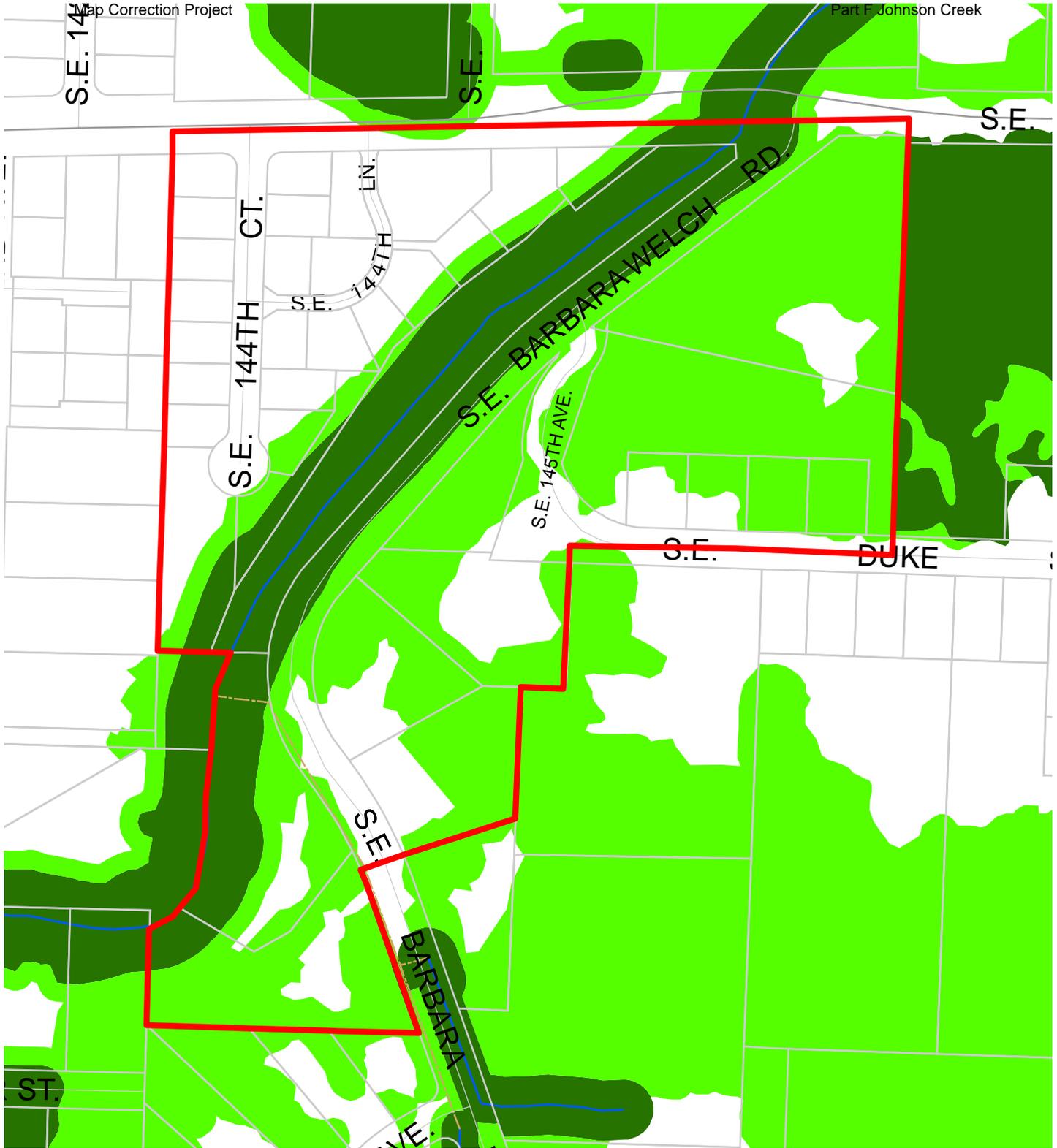
Updated: July 2021



-  Urban Service Boundary
-  Resource Sites
-  Goal 5 Significant Natural Resources



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Map I: DRAFT Proposed Environmental Overlay Zones

Resource Site:
JC21

Updated: July 2021

- Resource Sites
- Urban Service Boundary
- Open Stream Channel
- Piped Stream Segment
- Proposed Conservation Zone
- Proposed Protection Zone
- Taxlots



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July 2021

Natural Resource Description

Within resource site JC21 the following significant natural resource features and functions are present:

Significant Riparian Corridor Features: open stream; flood area; land within 50 feet of waterbodies; forest, woodland, shrubland and herbaceous vegetation within 300 feet of waterbodies; and forest vegetation on steep slopes (>25% slope) contiguous to and within 780 feet of waterbodies.

Significant Wildlife Habitat Features: forest patches, and associated and contiguous wetlands, two acres in size or larger.

Special Habitat Areas: Johnson Creek (S, C); wetlands (W)

Riparian Corridor Functions: microclimate and shade; stream flow moderation and water storage; bank function and sediment, pollution and nutrient control; large wood and channel dynamics; organic inputs, food web and nutrient cycling; and riparian wildlife movement corridor.

Wildlife Habitat Functions: interior area; food and water; resting, denning, nesting and rearing; movement and migration; reduction of noise, light and vibration; and habitat patches that support special status fish and wildlife species.

Table A: Quantity of Natural Resource Features in Resource Site		JC21
		Study Area
Stream (Miles)		0.2
Wetlands (acres)		0.0
Vegetated Areas >= 1/2 acre (acres)		
	Forest (acres)	10.4
	Woodland (acres)	0.0
	Shrubland (acres)	0.0
	Herbaceous (acres)	1.4
Flood Area*		
	Vegetated (acres)	2.4
	Non-vegetated (acres)	0.3
Steep Slopes (acres)**		11.8
* The flood area includes the FEMA 100-year flood plain plus the adjusted 1996 flood inundation area.		
**Slopes are derived from LiDAR. Steep slopes are areas with a slope greater than 25%.		

This resource site is comprised of low- and moderate-density single-family development and a portion of a publicly owned natural area. This section of Johnson Creek appears to be altered from its historical alignment to allow for the construction of SE Barbara Welch Road and SE Foster Road. Barbara Welch Road runs along the southeast bank of Johnson Creek in the location that was once Barbara Welch Creek. Development on the northwest runs up to the bank providing only narrow remaining 20-foot-wide strips for riparian vegetation above the top of bank. The creek banks are steep, high, and the floodplain is confined just above top of bank. The site is steeply-sloped at the base of Clatsop Butte (also within the Boring Lava Domes study area – see BL11).

Revegetation efforts have improved the limited riparian vegetative composition with young alder, willow, Western red cedar, and bigleaf maple. Invasive Armenian blackberry dominates the understory. The creek runs north to south through this site making the shading creek from southern exposure more important. Large, dense riparian canopy cover will be necessary to meet temperature standards for the creek. The roads and buildings immediately adjacent to both sides of the creek may cause increase runoff and exacerbate erosion issues.

Natural resource value and habitat function in this portion of the creek is limited, due to adjacent land uses which have negatively modified the creek habitat by removing vegetation, creating steep banks, and confining high flows to the channel, creating incision and wiping out instream habitat. Recreating the floodplain, aggrading the stream channel, and recovering native riparian canopy cover in these areas will help improve habitat function and help meet Johnson Creek water quality standards. This section of the creek functions with as the only travel corridor for wildlife well as a connector to the adjacent upland sites (see Boring Lava Domes study, including BL11) when stream flow is low enough for safe passage.

Coho salmon, steelhead trout, and Pacific lamprey have been documented in this reach of Johnson Creek. In 2019, a study of Johnson Creek's potential to support salmon populations identified this reach of Johnson Creek as important to protect and restore habitat for coho and chinook salmon and steelhead trout —meaning future restoration actions that address low habitat diversity, high sediment loads, high summer stream temperatures, and the lack of key habitat types, will benefit all salmonids using the reach.

Special status bird species observed in or adjacent to this resource site include bald eagle, black-throated gray warbler, brown creeper, pacific-slope flycatcher, pacific wren, Pileated woodpecker, Swainson's thrush, and white-breasted nuthatch.

Table B: Quality of Natural Resource Functions in Resource Site JC21				
Resource Site (acres) = 18				
	Class 1/A	Class 2/B	Class 3/C	Total
Riparian Corridors*				
acres	4.7	4.2	3.5	12.5
percent total inventory site area	25.7%	22.9%	19.2%	67.8%
Wildlife Habitat*				
acres	10.4	0.0	0.0	10.4
percent total inventory site area	56.5%	0.0%	0.0%	56.5%
Special Habitat Areas**				
acres	1.0			
percent total inventory site area	5.4%			
Combined Total*				
acres	10.8	1.3	0.5	12.5
percent total inventory site area	58.2%	6.9%	2.7%	67.8%
* Class I riparian resources, Special Habitat Areas, and wildlife habitat include open water. ** Metro Title 13 designated all Special Habitat Areas as Class I riparian corridors. + Because riparian resources, Special Habitat Areas, and wildlife Habitat overlap, the results cannot be added together to determine the combined results.				

Stormwater runs off impervious surfaces (e.g., rooftops, driveways, parking areas, streets, etc..) rapidly. Without a place to retain the water (such as wetlands or adequate stormwater facilities), stormwater runoff results in spikes in stream levels which can cause or exacerbate flooding and increase stream erosion. In addition, when water runs off quickly, it does not have a chance to infiltrate and recharge streams or aquifers to provide water during drier periods.

The type and capacity of stormwater facilities to manage the runoff from impervious surfaces varies in the city, affecting the local rate and amount of runoff, and the amount of pollutants in the water. Much of the city was developed prior to any stormwater regulations and receives limited or no management prior to discharging to pipes and surface waters.

Table C shows the total amount of impervious area within the resource site and how much of that impervious area lacks stormwater management; the percentage of total impervious area that is not managed is called "effective impervious area." The higher the percent of effective impervious area in a watershed, the greater the negative impacts of stormwater runoff to streams. Stream science indicates that when effective impervious area reaches 10% of a watershed, negative stream impacts become significant; and at 25%, these impacts on waterways can be substantial. An additional consideration is the differences in soil conditions and other factors that influence the ability of pervious areas to retain, infiltrate or filter

pollutants from stormwater. For example, a mature forest is much more effective in managing stormwater than a manicured lawn; both areas would have a lower effective impervious surface percentage than a developed site, but they have different outcomes for stormwater management.

For Resource Area JC21, 10% of the total area is effectively impervious. This indicates a significant degree of stormwater management and/or existing natural resources that should be preserved. Areas with very low impervious cover and existing vegetation are more likely to be functioning properly to support biologic systems.

Table C. Impervious Area within Resource Site JC21			
Total area (acres)	Total impervious Area (acres)	Total unmanaged impervious area* (acres)	Percent of resource site that is effectively impervious
19	3.4	1.8	10%

*Total unmanaged impervious area refers to the number of acres within a resource area that receives no formal stormwater management measures to regulate flow or treat pollutants before they reach surface waters, also referred to as effective impervious area.

Metro Title 13 and Oregon Goal 5 Compliance

The following information supplements evaluation of natural resource protections presented in Volume 4 and supports compliance with Metro Title 13 and Oregon Plan Goal 5.

Title 13 Habitat Conservation Areas

Map G presents the Habitat Conservation Areas (HCA) within the Resource site JC21. Natural resources should be protected within HCA as follows:

1. *Strictly limit* or *limit* conflicting uses within Class I/High Rank Riparian Areas in all Urban Development Areas.
2. *Strictly limit* or *limit* conflicting uses within Class II/Medium Rank Riparian Areas within Moderate and Low Value Urban Development Area as well as parks and open spaces.
3. *Strictly limit* or *limit* conflicting uses within Class A/High or B/Medium Rank Wildlife Habitat within parks and open spaces.
4. *Allow* conflicting uses or conducted a local Goal 5 ESEE for Class III/Low Rank Riparian Areas in all Urban Development Areas.
5. *Allow* conflicting uses or conducted a local Goal 5 ESEE for Class A/High, Class B/Medium or Class C/Low Rank Wildlife Habitat in all Urban Development Area, expect parks and open space.

Strictly limiting or limiting conflicting uses in HCA will protect and conserve existing streams and wetlands to maintain significant natural resource functions including: microclimate and shade; stream flow moderation and water storage; bank function and sediment, pollution and nutrient control; large wood and channel dynamics; organic inputs, food web and nutrient cycling; and fish and wildlife habitat. *Strictly limiting or limiting* conflicting uses in HCA will allow for additional urban development that is sensitive to the natural resource features and requires mitigation for unavoidable negative impacts to features and functions. The recommendation will also contribute towards meeting other regulatory requirements including the Metro Title 3, Water Quality and Flood Management; Oregon Goal 6, Air, Water and Land Resources Quality; Oregon Goal 7, Areas Subject to Natural Hazards; the Clean Water Act; and the Endangered Species Act.

Goal 5 Significant Natural Resources

Resource site JC21 contains natural resource features that are not a Title 13 HCA and are therefore subject to Statewide Planning Goal 5 OAR 660-023-0110. The General ESEE analysis, Volume 4, describes the conflicting uses and provides an overarching analysis of the economic, social, environmental and energy consequences of prohibiting, limiting or allowing the conflicting uses within areas of significant natural resources. In addition to the General ESEE analysis, the following resource site-specific consequences are considered.

The common impacts of conflicting uses in the resource site include clearing vegetation; grading activities and soil compaction; adding impervious surface; modifying streams, wetlands and flood areas; generating pollution; landscaping with non-native or invasive vegetation; building fences or other wildlife barriers; and other impacts such as noise, light, litter and pets.

Within the resource site, residential uses are allowed outright or conditionally in the R20, R10 and R5 base zones. Open space uses are allowed in the OS base zone. Development of new uses may involve vegetation clearing, grading, filing, and soil compaction, as well as the addition of impervious surfaces and landscaping with non-native plants, with associated impacts on the natural resources. Basic utilities and other infrastructure are allowed in all base zones. New or upgraded utility corridors may be cleared of vegetation and may fragment wildlife habitat.

The analysis of economic, social, environmental and energy consequences provided in Volume 4 is confirmed for resource site JC21, with the following additional information that clarifies the analysis.

Strictly limiting or limiting conflicting uses would retain the wildlife habitat functions provided by significant natural resource features including maintaining habitat for at risk plant, fish and wildlife species, maintaining vegetation on steep slopes, and maintaining the stormwater management and air-cooling functions of the tree canopy. Mitigation for negative

consequences of additional development in areas of Class A or Class B wildlife habitat should be required.

Natural Resources Protection Decisions

Based on the analysis presented in Volume 3, Natural Resources Inventory, Volume 4, Title 13 and Goal 5 Compliance, and the resource site-specific evaluation for JC21, the following decisions are applied to protect the significant riparian corridors and wildlife habitat:

1. Apply a protection overlay zone ('p' zone) to stream channels from top-of-bank to top-of-bank and wetlands.
2. Apply a protection overlay zone ('p' zone) to areas of vegetation within the flood area and land outside of the floodplain within 50 feet of stream top-of-bank or 30 feet of wetlands.
3. Apply a conservation overlay zone ('c' zone) to land between 50 and 75 feet of stream top-of-bank and to land between 30 and 55 feet of wetlands.
4. Apply a conservation overlay zone ('c' zone) to areas of forest or woodland vegetation contiguous to but more than 75 feet from stream top-of-bank.
5. Allow conflicting uses within all other areas containing significant natural resources.

Resource Site No.: JC22 **Resource Site Name:** Powell Butte
Floodplain West

Previous Plan: Johnson Creek Basin Protection Plan

Previous Resource Site No.: 24

The results of the analysis found in Volume 3, Natural Resources Inventory, Volume 4, Title 13 and Goal 5 Compliance, and the resource site-specific evaluation, are presented in the following maps:

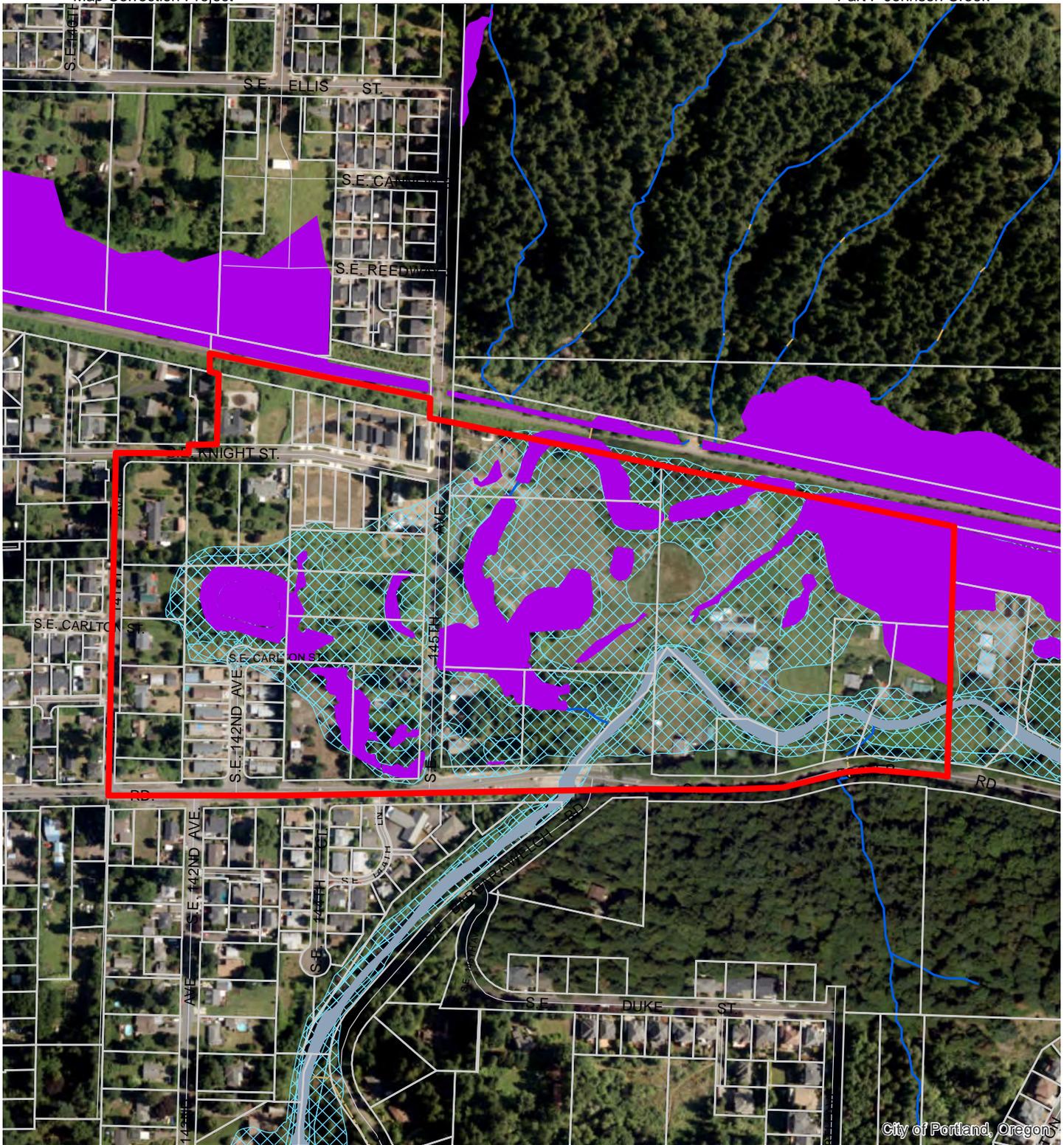
- A. Water Features – rivers, streams, wetlands and flood areas
- B. Land Features – forest, woodland, shrubland and herbaceous vegetation, steep slopes
- C. Special Habitat Areas
- D. Riparian Corridor Classifications
- E. Wildlife Habitat Classifications
- F. Urban Development Value
- G. Metro Title 13 Habitat Conservation Areas
- H. Statewide Planning Goal 5 Areas
- I. Recommended Natural Resource Protections

Following the maps, additional information about existing natural resource features and functions in the resource site is presented.

Implementation of the results is found in Volume 1, Part B, updates to zoning maps and zoning code.

Resource site JC22 includes the following:

Site (acres)	47.8
Base zones (acres)	
OS	7.0
R20	26.5
R5	14.3



City of Portland, Oregon

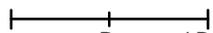
Map A: Water Features

Resource Site: JC22

Updated: July 2021



0 195 390 Feet

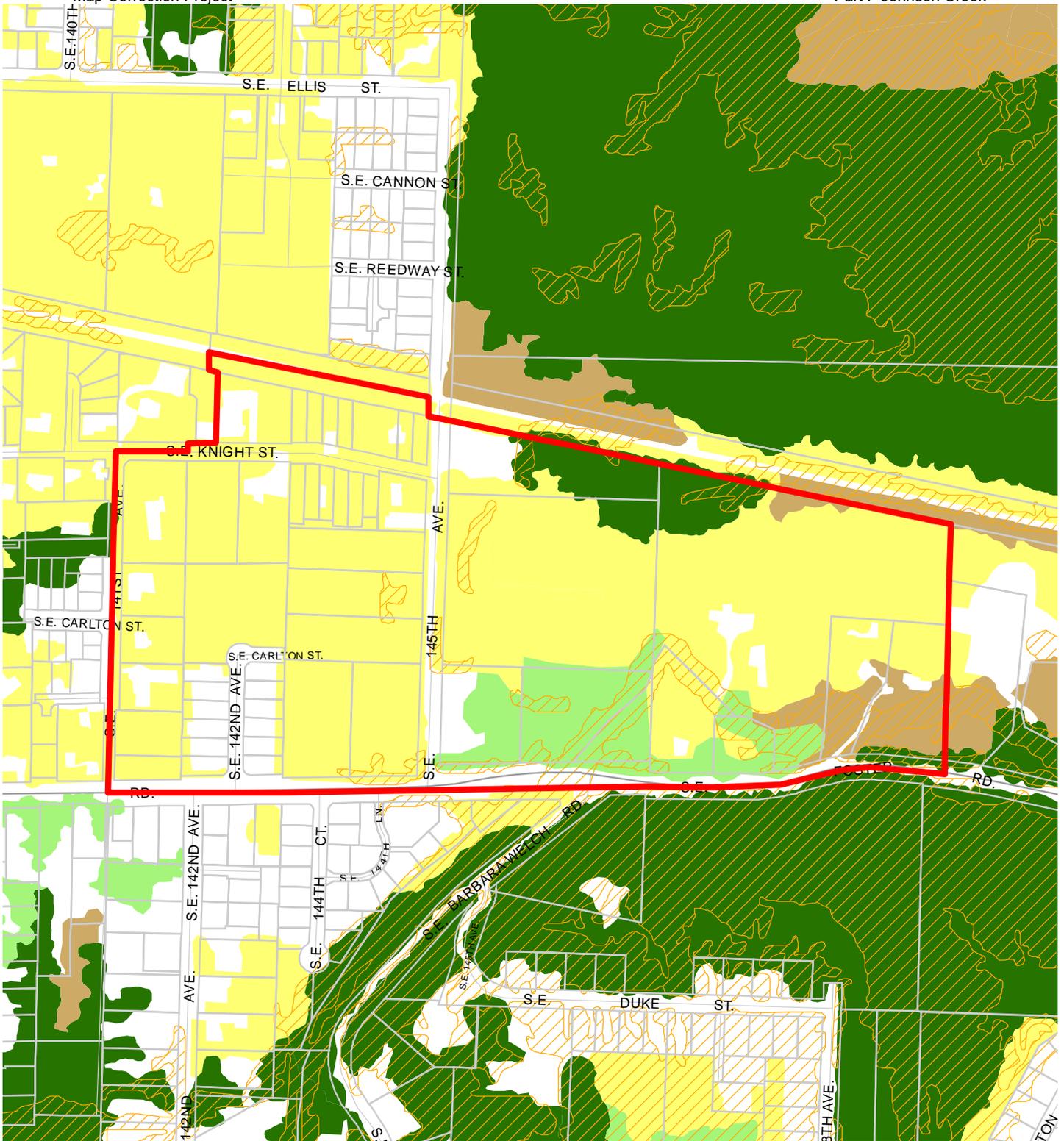


Proposed Draft - As Amended

- Resource Sites
- Urban Service Boundary
- Taxlots
- Wetlands
- Rivers
- Open stream channel
- Piped Stream Segment
- Flood Area



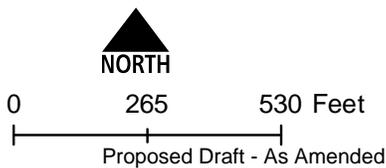
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July 2021



Map B: Vegetation and Steep Slopes

**Resource Site:
JC22**

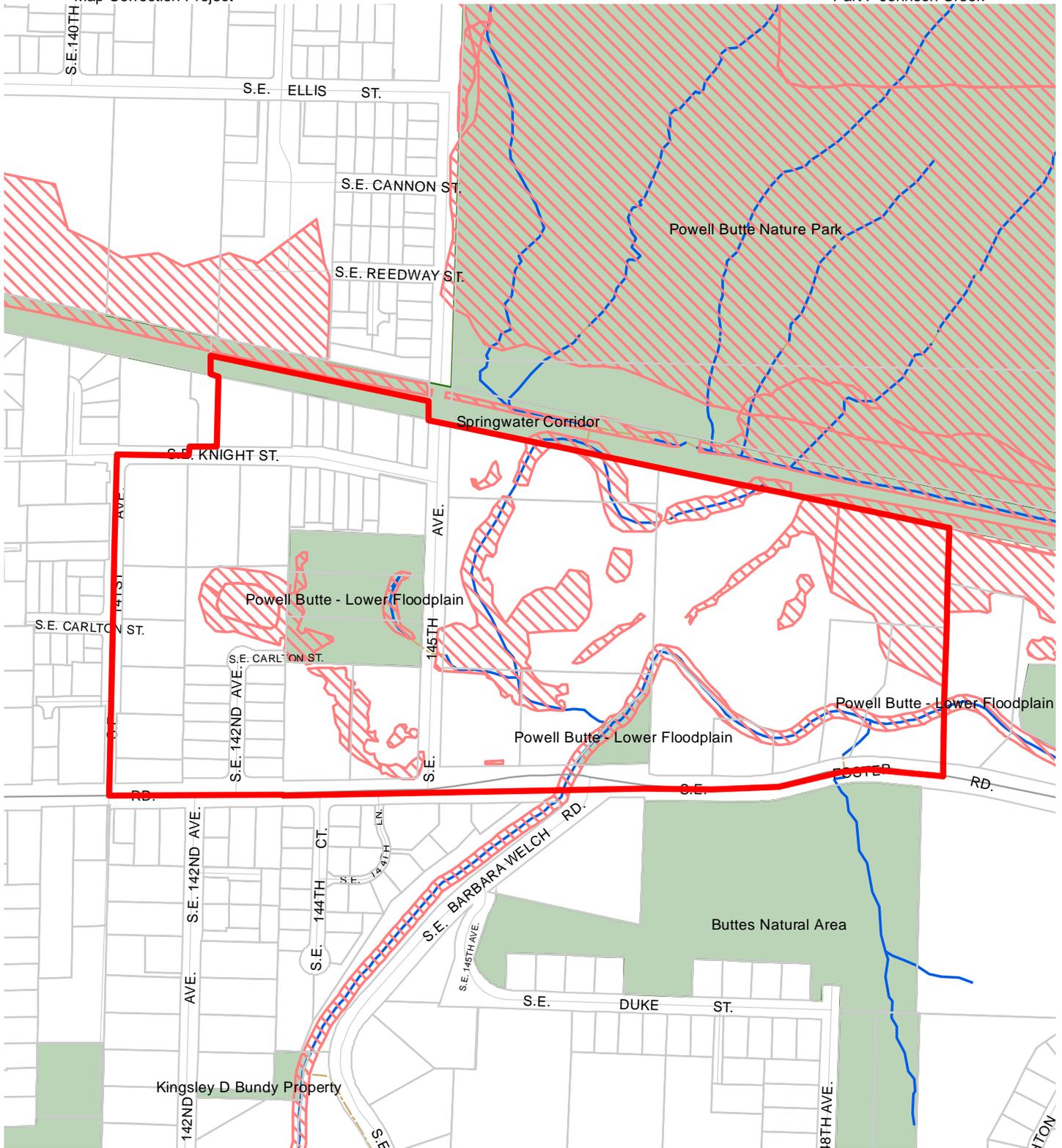
Updated: July 2021



- Resource Sites
- Urban Service Boundary
- Taxlots
- Slopes >25%
- Forest
- Woodland
- Shrubland
- Herbaceous



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July 2021



**Map C: Special
Habitat Areas**

**Resource Site:
JC22**

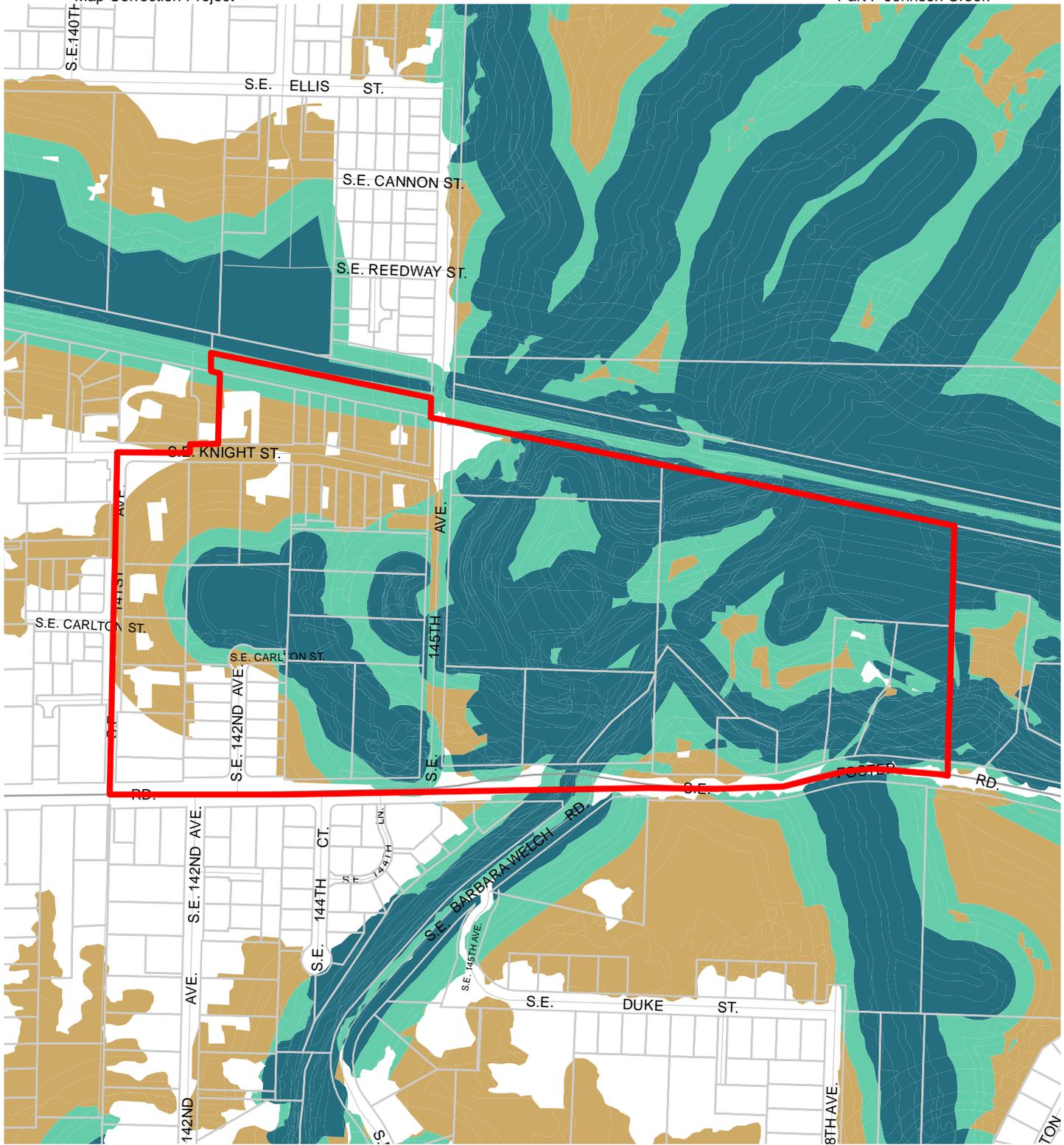
Updated: June 2021



- Resource Sites
- Urban Service Boundary
- Special Habitat Areas (SHAs)
- Taxlots
- Open Stream Channel
- Piped Stream Segment
- Parks
- Schools



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**Map D: Riparian
Corridors Habitat
Classification**

**Resource Site:
JC22**

Updated: July 2021



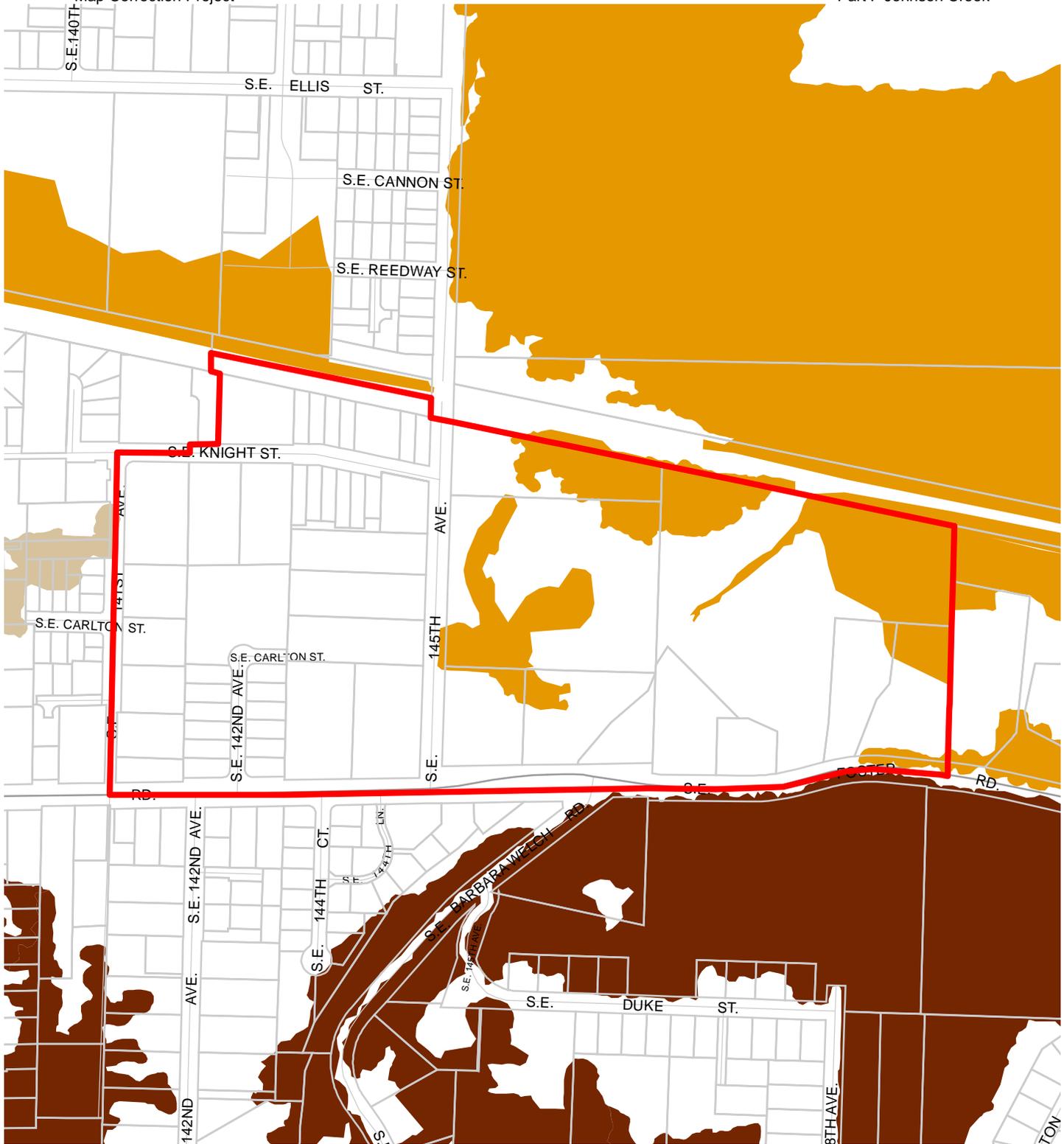
Proposed Draft - As Amended

- Resource Sites
- Urban Service Boundary
- Class I (high rank)
- Class II (medium rank)
- Class III (low rank)
- Taxlots



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July 2021



**Map E: Wildlife
Habitat Classification**
Resource Site:
JC22

Updated: July 2021



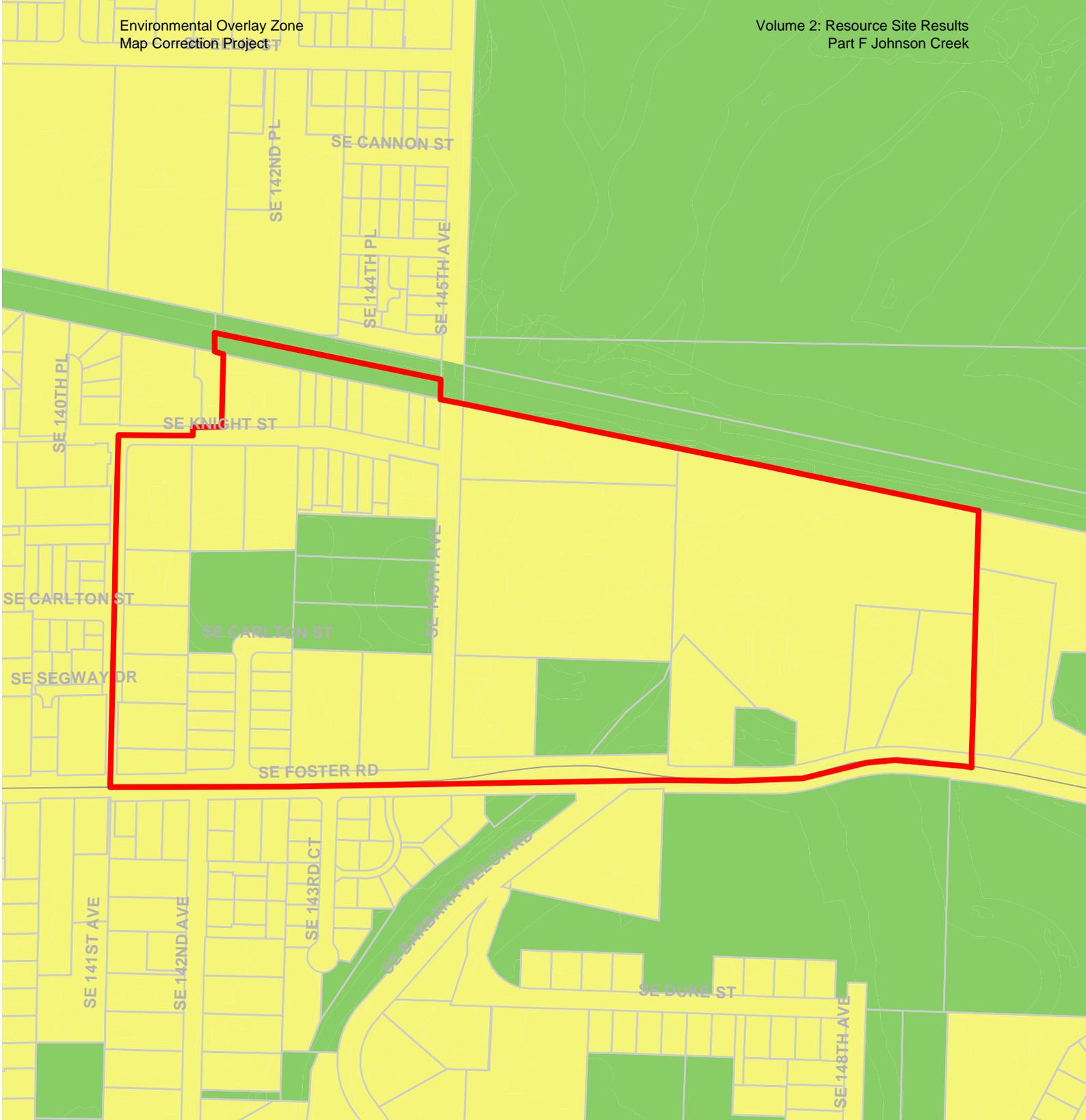
Proposed Draft - As Amended

-  Resource Sites
-  Class A (high rank)
-  Class B (medium rank)
-  Class C (low rank)
-  Urban Service Boundary
-  Taxlots



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July 2021

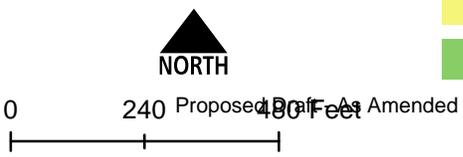


Map F: Urban Development Value (Title 13)
Resource Site: JC22

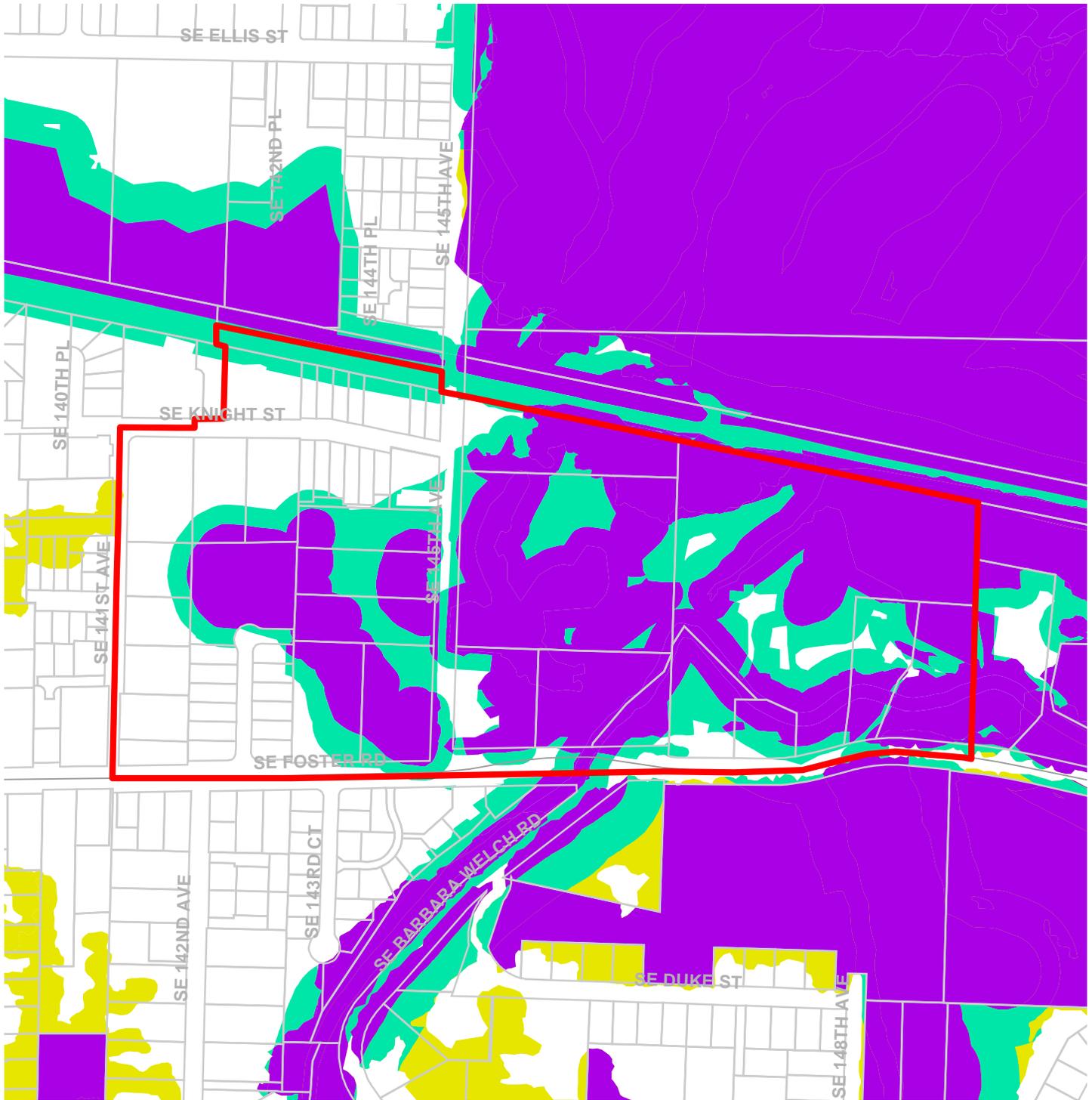
-  Urban Service Boundary
-  Resource Sites
-  High Development Value
-  Medium Development Value
-  Low Development Value
-  Parks



Updated: July 2021



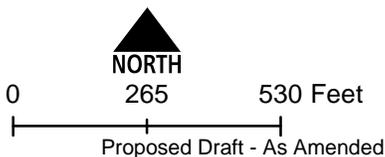
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Map G: Title 13 Habitat Conservation Areas (HCA) and Goal 5 Areas

Resource Site: JC22

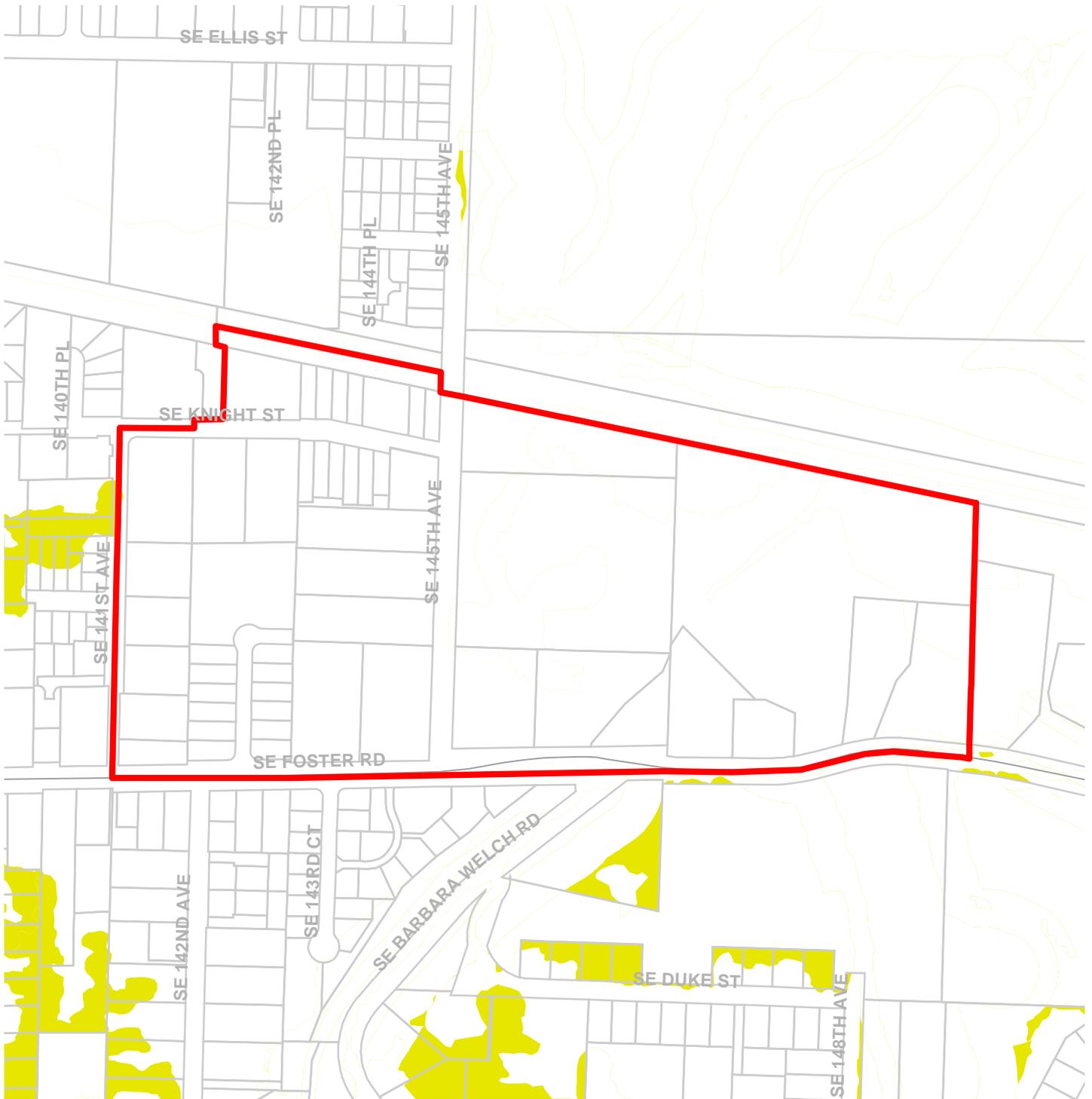
Updated: July 2021



-  Urban Service Boundary
-  Resource Sites
-  HCA High Value
-  HCA Moderate Value
-  HCA Low Value
-  Goal 5 Significant Natural Resources



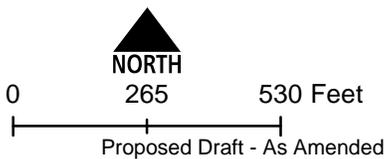
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Map H: Goal 5 Resources

Resource Site: JC22

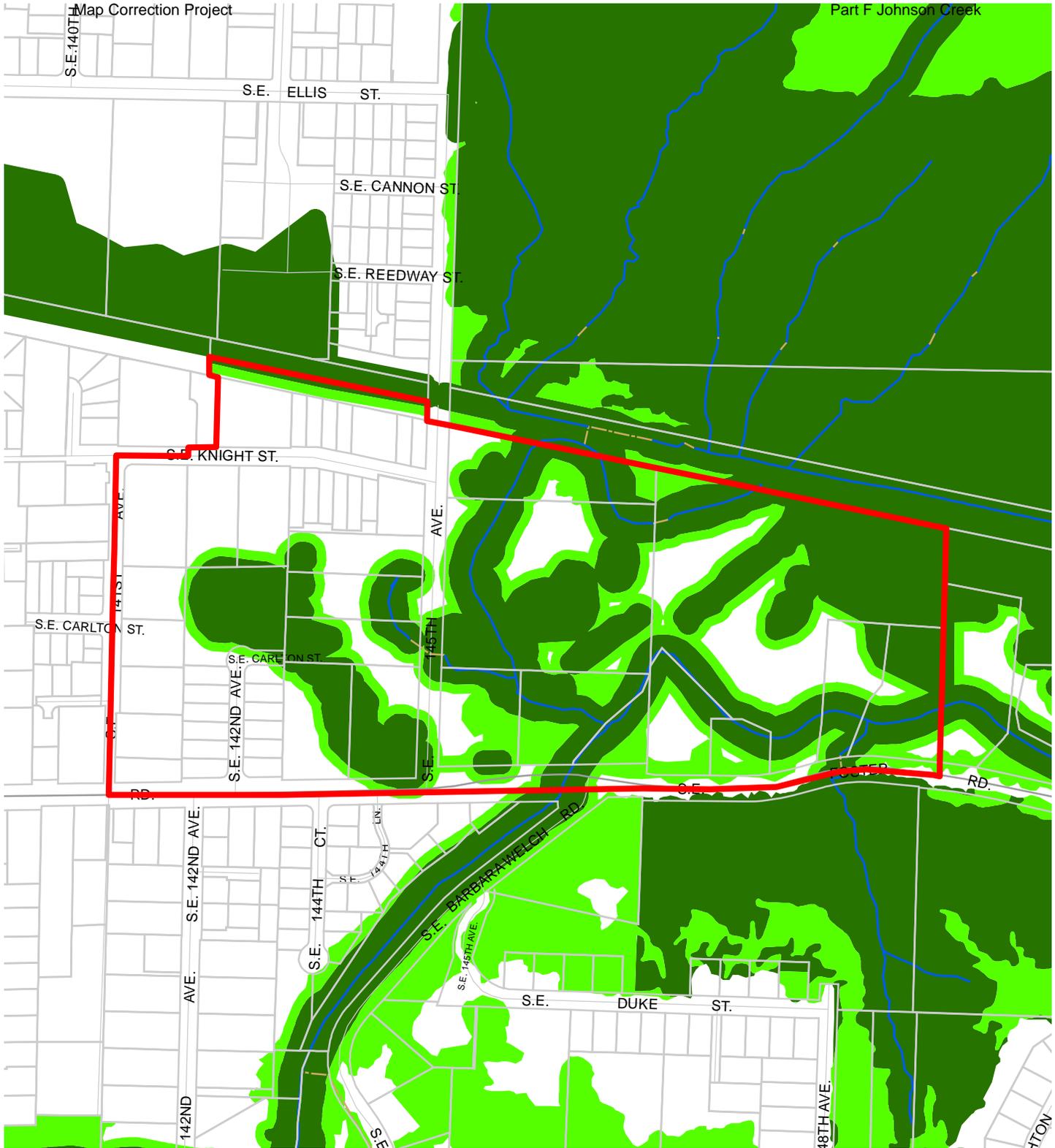
Updated: July 2021



-  Urban Service Boundary
-  Resource Sites
-  Goal 5 Significant Natural Resources



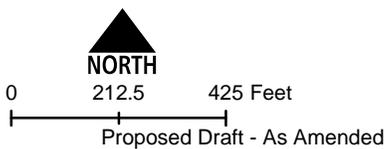
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Map I: DRAFT Proposed Environmental Overlay Zones

**Resource Site:
JC22**

Updated: July 2021



- Resource Sites
- Urban Service Boundary
- Open Stream Channel
- Taxlots
- Piped Stream Segment
- Proposed Conservation Zone
- Proposed Protection Zone



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Natural Resource Description

Within resource site JC22 the following significant natural resource features and functions are present:

Significant Riparian Corridor Features: open stream; wetland; flood area; land within 50 feet of waterbodies; forest, woodland, shrubland and herbaceous vegetation within 300 feet of waterbodies; and forest vegetation on steep slopes (>25% slope) contiguous to and within 780 feet of waterbodies.

Significant Wildlife Habitat Features: forest patches, and associated and contiguous wetlands, two acres in size or larger.

Special Habitat Areas: Johnson Creek (S, C); wetlands (W)

Riparian Corridor Functions: microclimate and shade; stream flow moderation and water storage; bank function and sediment, pollution and nutrient control; large wood and channel dynamics; organic inputs, food web and nutrient cycling; and riparian wildlife movement corridor.

Wildlife Habitat Functions: interior area; food and water; resting, denning, nesting and rearing; movement and migration; reduction of noise, light and vibration; and habitat patches that support special status fish and wildlife species.

Table A: Quantity of Natural Resource Features in Resource Site		JC22
		Study Area
Stream (Miles)		0.7
Wetlands (acres)		8.2
Vegetated Areas >= 1/2 acre (acres)		
	Forest (acres)	2.5
	Woodland (acres)	4.3
	Shrubland (acres)	1.9
	Herbaceous (acres)	32.1
Flood Area*		
	Vegetated (acres)	27.3
	Non-vegetated (acres)	1.9
Steep Slopes (acres)**		4.8
* The flood area includes the FEMA 100-year flood plain plus the adjusted 1996 flood inundation area.		
**Slopes are derived from LiDAR. Steep slopes are areas with a slope greater than 25%.		

This resource site is a mosaic of publicly owned natural areas, small farms, pastureland, and forests in a flat, floodplain portion of a valley that runs between Powell Butte and Clatsop Butte. Foster Road forms the southern boundary of this site. The Springwater Corridor Trail is the boundary to the north. Johnson Creek runs east to west through this site; tributaries drain to the creek from both buttes.

Johnson Creek and its long history of flooding have influenced this site. Perennial flooding in this area is common. Larger flood events generally occur from December through February, with 85 percent of the stream's runoff occurring between November and March.

Patches of young-to-medium-aged forests, shrub land, open meadow, and wetland habitat provide food, cover, perch, and nest sites for passerines, woodpeckers, raptors, mammals, reptiles and amphibians. Some properties along this stretch have manicured lawns to the edge of the creek channel, with steep WPA rock-lined channel. This treatment of the creek and creek edge limits wildlife access to and use of the creek. The floodplain is much broader in this resource site than found in the downstream JC21 site. The site's close proximity to Powell Butte and Clatsop Butte provides connections to a diversity of habitat types.

The riparian vegetation is vast in this area relative to the more developed sections along Johnson Creek but the riparian canopy cover in this site is limited and provides little shading to Johnson Creek. Herbaceous vegetation, likely field grasses cover the riparian area from just above top of bank. Armenian blackberry is dense between top of bank and ordinary high water. Forested canopy is primarily concentrated on the south slope of SE Foster Road.

Trees provide some habitat for bird and mammal species at this site but are not as dense as can be found just upstream (JC24). Herbaceous wetland habitat adjacent to the creek with forested habitat to the north, east and south provide habitat necessary for a variety of species that rely on multiple habitat features throughout their life-stage.

Despite the low density of development, human use of this area is high with a mixture of roads, houses, fences, power lines, the Springwater Corridor Trail, publicly owned natural areas, pasturelands and bridges across Johnson Creek to serve properties fronting on SE Foster Road. The Springwater Corridor Trail disrupts hydrologic connectivity between streams draining down Powell Butte and Johnson Creek.

Much of the resource site is covered with floodplain wetlands. The wetlands have been highly disturbed. Frequent mowing, historic grazing, and invasive plant species limits habitat function in these wetlands. This area provides high restoration opportunity.

Coho salmon, steelhead trout, and Pacific lamprey have been documented in this reach of Johnson Creek. Special status bird species observed in or adjacent to this resource site include American kestrel, bald eagle, black-throated gray warbler, brown creeper, bushtit, chipping sparrow, common yellowthroat, downy woodpecker, great blue heron, green heron, hooded merganser, house wren, loggerhead shrike, merlin, Nashville warbler, northern harrier, olive-sided flycatcher, orange-crowned warbler, pacific-slope flycatcher, peregrine falcon, pileated woodpecker, purple finch, purple martin, red-eyed vireo, rufous hummingbird, short-eared owl, Swainson's thrush, Vaux's swift, vesper sparrow, white-breasted nuthatch, willow flycatcher, wood duck, yellow warbler, and yellow-breasted chat.

Table B: Quality of Natural Resource Functions in Resource Site JC22				
Resource Site (acres) = 48				
	Class 1/A	Class 2/B	Class 3/C	Total
Riparian Corridors*				
acres	23.6	10.5	8.1	42.2
percent total inventory site area	49.4%	22.0%	16.9%	88.3%
Wildlife Habitat*				
acres	0.0	7.5	0.0	7.6
percent total inventory site area	0.0%	15.8%	0.0%	15.8%
Special Habitat Areas**				
acres	1.1			
percent total inventory site area	2.4%			
Combined Total*				
acres	23.6	10.5	8.1	42.2
percent total inventory site area	49.4%	22.0%	16.9%	88.3%
* Class I riparian resources, Special Habitat Areas, and wildlife habitat include open water. ** Metro Title 13 designated all Special Habitat Areas as Class I riparian corridors. +Because riparian resources, Special Habitat Areas, and wildlife Habitat overlap, the results cannot be added together to determine the combined results.				

Stormwater runs off impervious surfaces (e.g., rooftops, driveways, parking areas, streets, etc..) rapidly. Without a place to retain the water (such as wetlands or adequate stormwater facilities), stormwater runoff results in spikes in stream levels which can cause or exacerbate flooding and increase stream erosion. In addition, when water runs off quickly, it does not have a chance to infiltrate and recharge streams or aquifers to provide water during drier periods.

The type and capacity of stormwater facilities to manage the runoff from impervious surfaces varies in the city, affecting the local rate and amount of runoff, and the amount of pollutants in

the water. Much of the city was developed prior to any stormwater regulations and receives limited or no management prior to discharging to pipes and surface waters.

Table C shows the total amount of impervious area within the resource site and how much of that impervious area lacks stormwater management; the percentage of total impervious area that is not managed is called “effective impervious area.” The higher the percent of effective impervious area in a watershed, the greater the negative impacts of stormwater runoff to streams. Stream science indicates that when effective impervious area reaches 10% of a watershed, negative stream impacts become significant; and at 25%, these impacts on waterways can be substantial. An additional consideration is the differences in soil conditions and other factors that influence the ability of pervious areas to retain, infiltrate or filter pollutants from stormwater. For example, a mature forest is much more effective in managing stormwater than a manicured lawn; both areas would have a lower effective impervious surface percentage than a developed site, but they have different outcomes for stormwater management.

For Resource Area JC22, 3.8% of the total area is effectively impervious. This indicates a significant degree of stormwater management and/or existing natural resources that should be preserved. Areas with very low impervious cover and existing vegetation are more likely to be functioning properly to support biologic systems.

Total area (acres)	Total impervious Area (acres)	Total unmanaged impervious area* (acres)	Percent of resource site that is effectively impervious
47.8	3.2	1.8	3.8%

*Total unmanaged impervious area refers to the number of acres within a resource area that receives no formal stormwater management measures to regulate flow or treat pollutants before they reach surface waters, also referred to as effective impervious area.

Metro Title 13 and Oregon Goal 5 Compliance

The following information supplements evaluation of natural resource protections presented in Volume 4 and supports compliance with Metro Title 13 and Oregon Plan Goal 5.

Title 13 Habitat Conservation Areas

Map G presents the Habitat Conservation Areas (HCA) within the Resource site JC22. Natural resources should be protected within HCA as follows:

1. *Strictly limit* or *limit* conflicting uses within Class I/High Rank Riparian Areas in all Urban Development Areas.

2. *Strictly limit* or *limit* conflicting uses within Class II/Medium Rank Riparian Areas within Moderate and Low Value Urban Development Area as well as parks and open spaces.
3. *Strictly limit* or *limit* conflicting uses within Class A/High or B/Medium Rank Wildlife Habitat within parks and open spaces.
4. *Allow* conflicting uses or conducted a local Goal 5 ESEE for Class III/Low Rank Riparian Areas in all Urban Development Areas.
5. *Allow* conflicting uses or conducted a local Goal 5 ESEE for Class A/High, Class B/Medium or Class C/Low Rank Wildlife Habitat in all Urban Development Area, except parks and open space.

Strictly limiting or *limiting* conflicting uses in HCA will protect and conserve existing streams and wetlands to maintain significant natural resource functions including: microclimate and shade; stream flow moderation and water storage; bank function and sediment, pollution and nutrient control; large wood and channel dynamics; organic inputs, food web and nutrient cycling; and fish and wildlife habitat. *Strictly limiting* or *limiting* conflicting uses in HCA will allow for additional urban development that is sensitive to the natural resource features and requires mitigation for unavoidable negative impacts to features and functions. The recommendation will also contribute towards meeting other regulatory requirements including the Metro Title 3, Water Quality and Flood Management; Oregon Goal 6, Air, Water and Land Resources Quality; Oregon Goal 7, Areas Subject to Natural Hazards; the Clean Water Act; and the Endangered Species Act.

Goal 5 Significant Natural Resources

All of the significant natural resources within resource site JC22 are designated Habitat Conservation Areas under Metro Title 13; therefore, no resource site-specific ESEE is required.

Natural Resources Protection Decisions

Based on the analysis presented in Volume 3, Natural Resources Inventory, Volume 4, Title 13 and Goal 5 Compliance, and the resource site-specific evaluation for JC22, the following decisions are applied to protect the significant riparian corridors and wildlife habitat:

1. Apply a protection overlay zone ('p' zone) to stream channels from top-of-bank to top-of-bank and wetlands.
2. Apply a protection overlay zone ('p' zone) to areas of vegetation within the flood area and land outside of the floodplain within 40 feet of stream top-of-bank or 30 feet of wetlands.
3. Apply a conservation overlay zone ('c' zone) to land between 40 and 65 feet of stream top-of-bank and between 30 and 55 feet of wetland.
4. Apply a conservation overlay zone ('c' zone) to areas of forest or woodland vegetation contiguous to but more than 65 feet from stream top-of-bank or 55 feet from wetlands.
5. Allow conflicting uses within all other areas containing significant natural resources.

Resource Site No.: JC23 **Resource Site Name:** Powell Butte

Previous Plan: Johnson Creek Basin Protection Plan

Previous Resource Site No.: 29

The results of the analysis found in Volume 3, Natural Resources Inventory, Volume 4, Title 13 and Goal 5 Compliance, and the resource site-specific evaluation, are presented in the following maps:

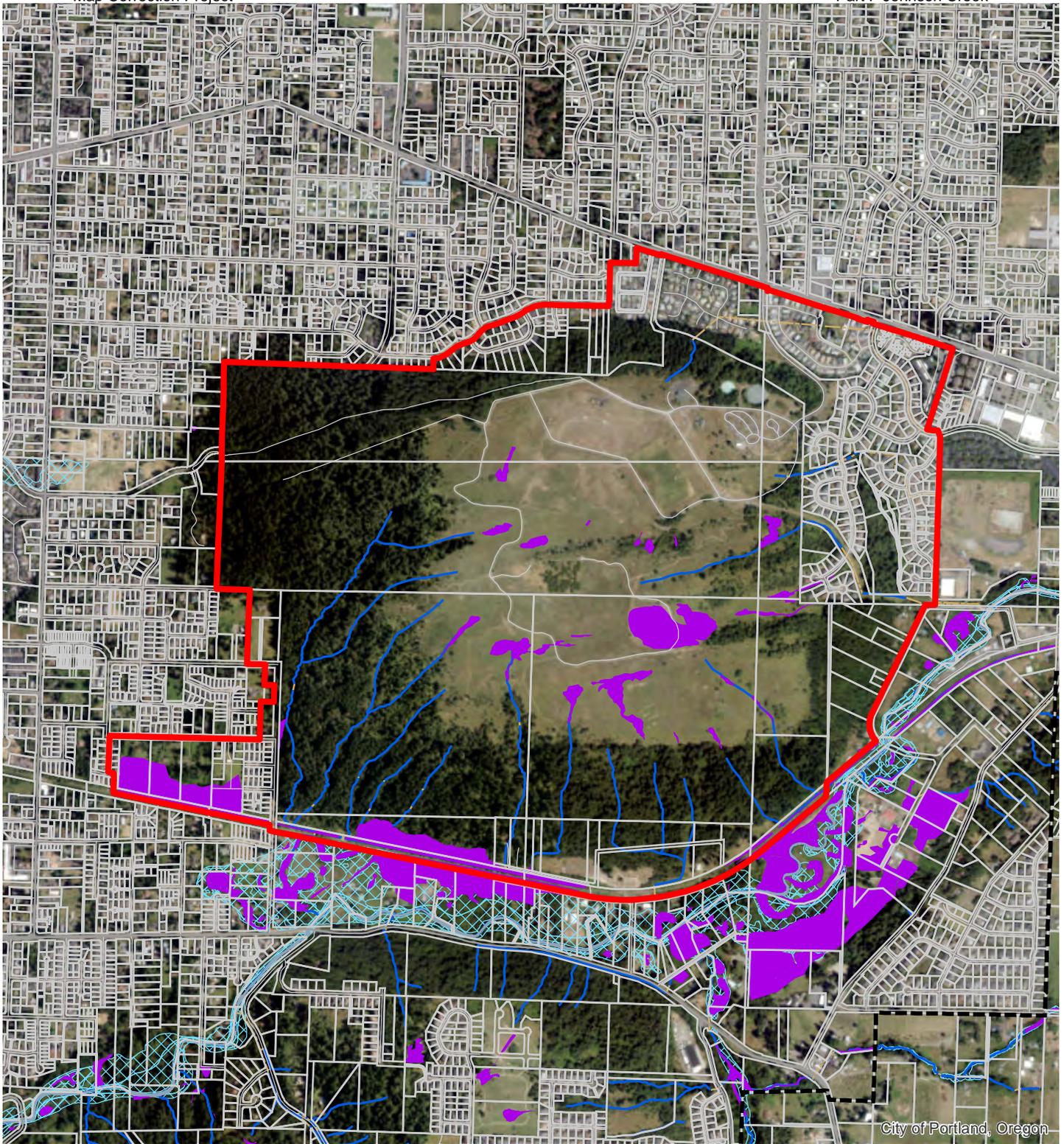
- A. Water Features – rivers, streams, wetlands and flood areas
- B. Land Features – forest, woodland, shrubland and herbaceous vegetation, steep slopes
- C. Special Habitat Areas
- D. Riparian Corridor Classifications
- E. Wildlife Habitat Classifications
- F. Urban Development Value
- G. Metro Title 13 Habitat Conservation Areas
- H. Statewide Planning Goal 5 Areas
- I. Recommended Natural Resource Protections

Following the maps, additional information about existing natural resource features and functions in the resource site is presented.

Implementation of the results is found in Volume 1, Part B, updates to zoning maps and zoning code.

Resource site JC23 includes the following:

Site (acres)	800.7
Base zones (acres)	
OS	607.6
R10	78.6
R20	9.5
R5	23.4
R7	32.8
RM1	10.4
RMP	38.5



City of Portland, Oregon

Map A: Water Features

**Resource Site:
JC23**

Updated: July 2021



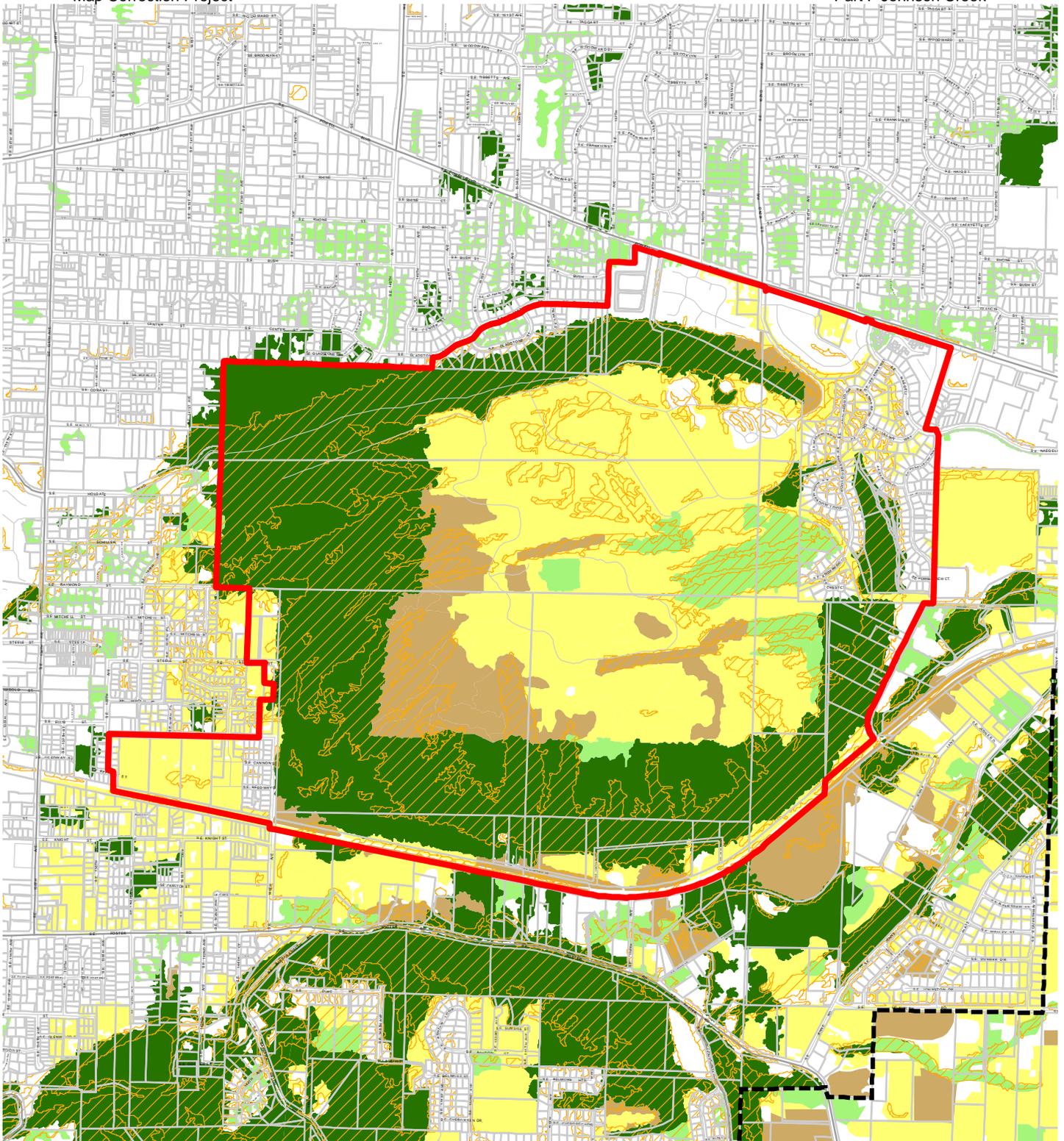
0 650 1,300 Feet

Proposed Draft - As Amended

- Resource Sites
- Urban Service Boundary
- Taxlots
- Wetlands
- Rivers
- Open stream channel
- Piped Stream Segment
- Flood Area



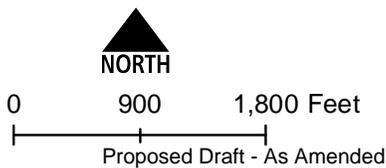
The information on the map was derived from digital databases. Care was taken in the creation of this map but it is provided "as is". The City of Portland ensures meaningful access to city programs, services, and activities to comply with Civil Rights Title VI and ADA Title II laws and reasonably provides: translation, interpretation, modifications, accommodations, alternative formats, auxiliary aids and services. To request these services, contact 503-823-7700, City TTY 503-823-6868, Relay Service: 711.
July 2021



Map B: Vegetation and Steep Slopes

Resource Site: JC23

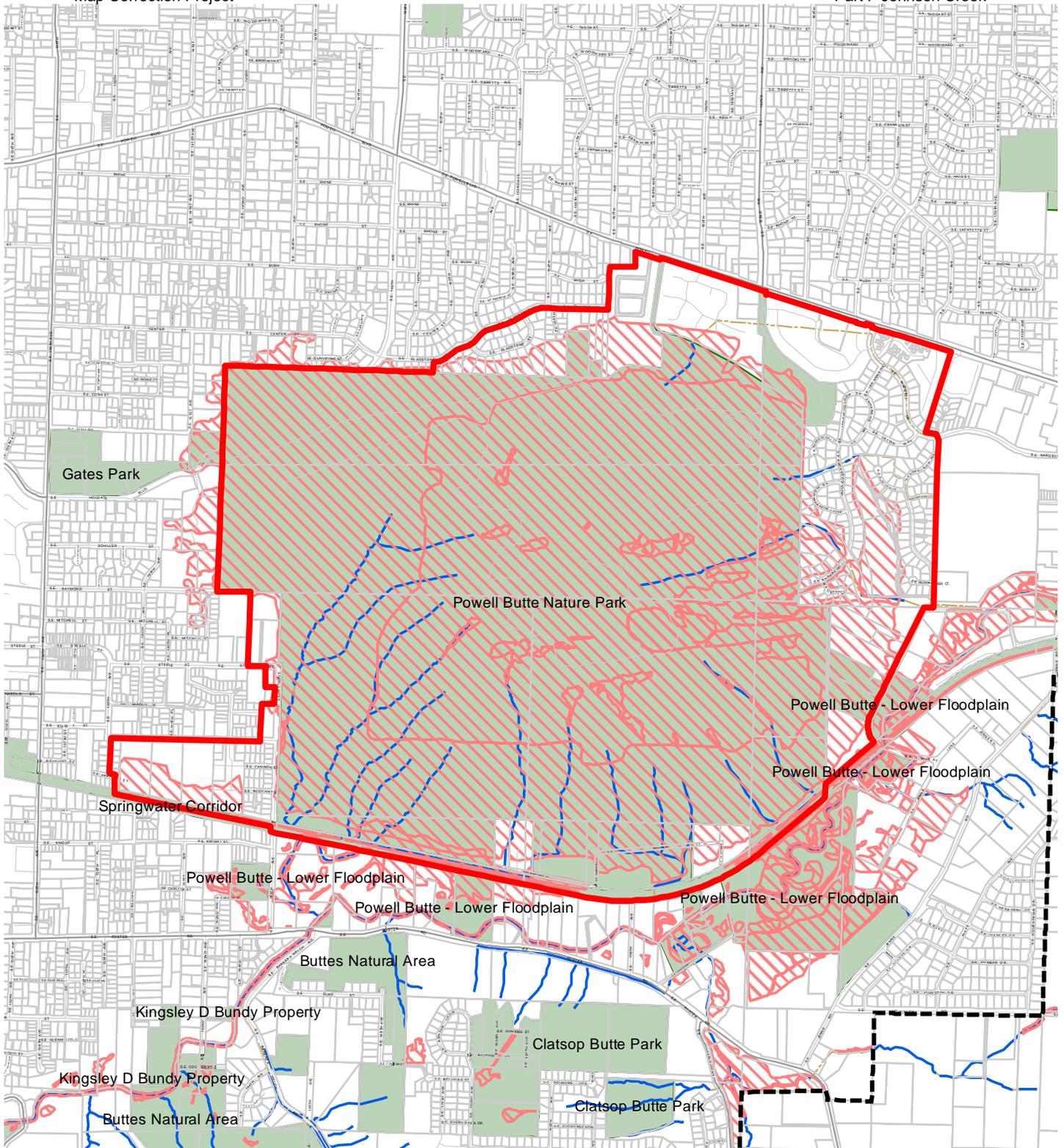
Updated: July 2021



- Resource Sites
- Urban Service Boundary
- Taxlots
- Slopes >25%
- Forest
- Woodland
- Shrubland
- Herbaceous



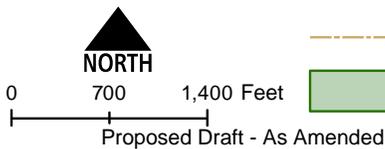
The information on the map was derived from digital databases. Care was taken in the creation of this map but it is provided "as is". The City of Portland ensures meaningful access to city programs, services, and activities to comply with Civil Rights Title VI and ADA Title II laws and reasonably provides: translation, interpretation, modifications, accommodations, alternative formats, auxiliary aids and services. To request these services, contact 503-823-7700, City TTY 503-823-6868, Relay Service: 711. July 2021



**Map C: Special
Habitat Areas**

**Resource Site:
JC23**

Updated: June 2021



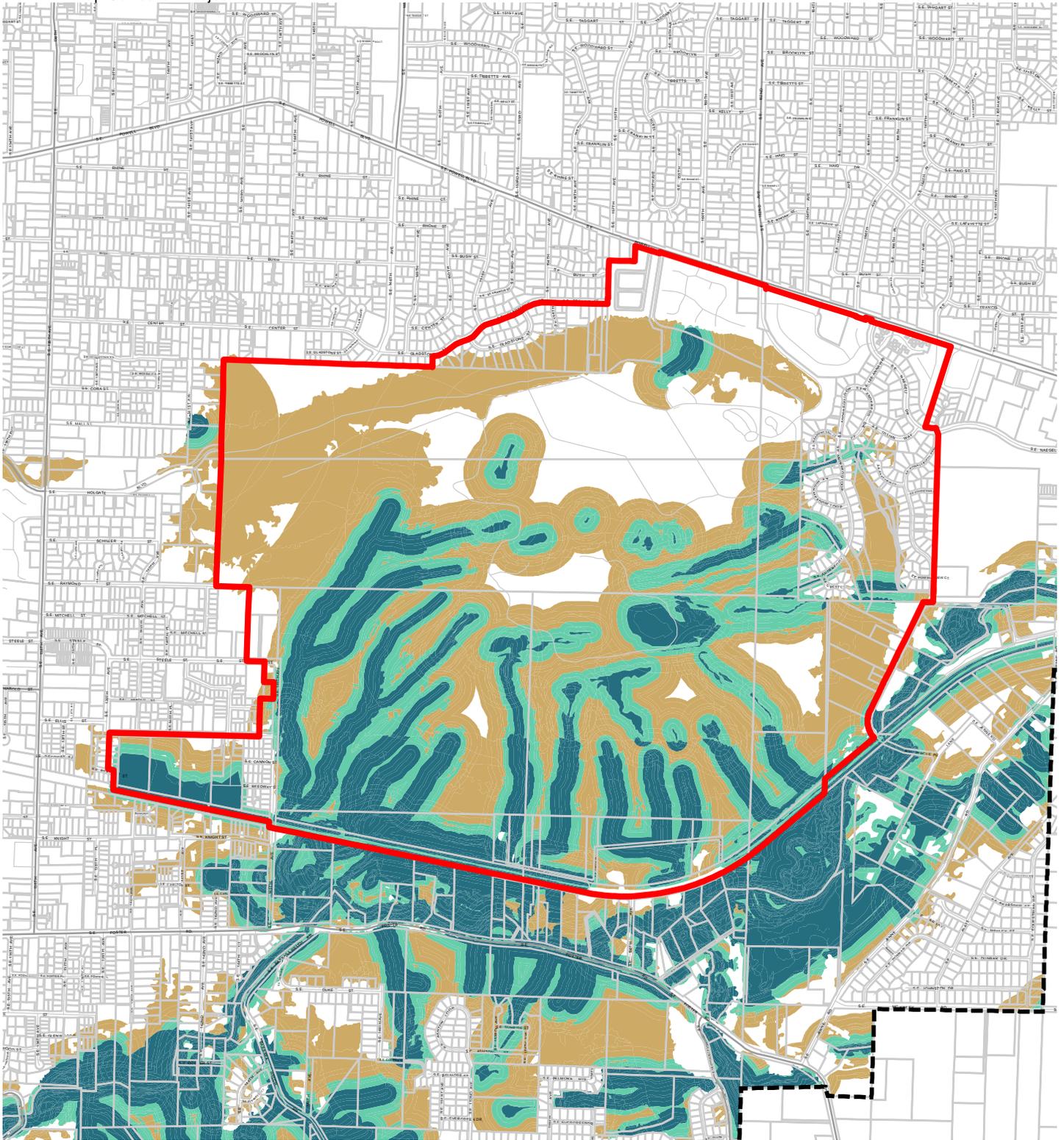
-  Resource Sites
-  Special Habitat Areas (SHAs)
-  Open Stream Channel
-  Piped Stream Segment
-  Parks

 Urban Service Boundary

 Taxlots



The information on the map was derived from digital databases. Care was taken in the creation of this map but it is provided "as is". The City of Portland ensures meaningful access to city programs, services, and activities to comply with Civil Rights Title VI and ADA Title II laws and reasonably provides: translation, interpretation, modifications, accommodations, alternative formats, auxiliary aids and services. To request these services, contact 503-823-7700, City TTY 503-823-6868, Relay Service: 711. July 2021

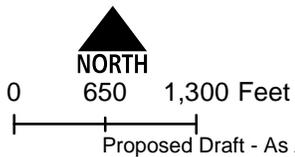


**Map D: Riparian
Corridors Habitat
Classification**

**Resource Site:
JC23**

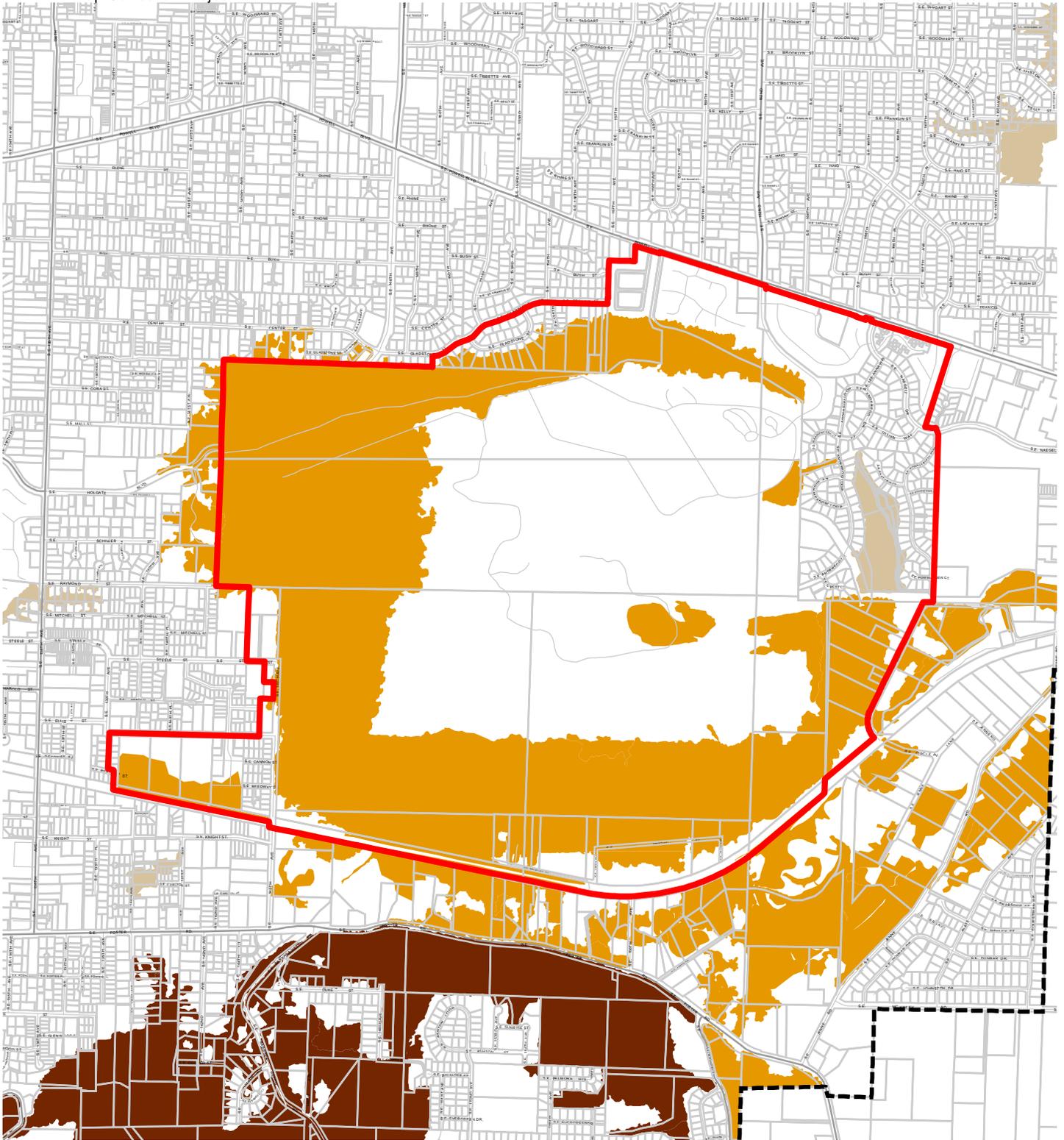
Updated: July 2021

- Resource Sites
- Urban Service Boundary
- Class I (high rank)
- Taxlots
- Class II (medium rank)
- Class III (low rank)



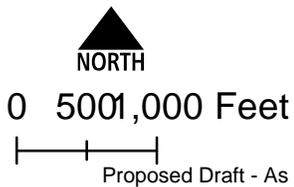
The information on the map was derived from digital databases. Care was taken in the creation of this map but it is provided "as is". The City of Portland ensures meaningful access to city programs, services, and activities to comply with Civil Rights Title VI and ADA Title II laws and reasonably provides: translation, interpretation, modifications, accommodations, alternative formats, auxiliary aids and services. To request these services, contact 503-823-7700, City TTY 503-823-6868, Relay Service: 711.

July 2021



**Map E: Wildlife
Habitat Classification**
**Resource Site:
JC23**

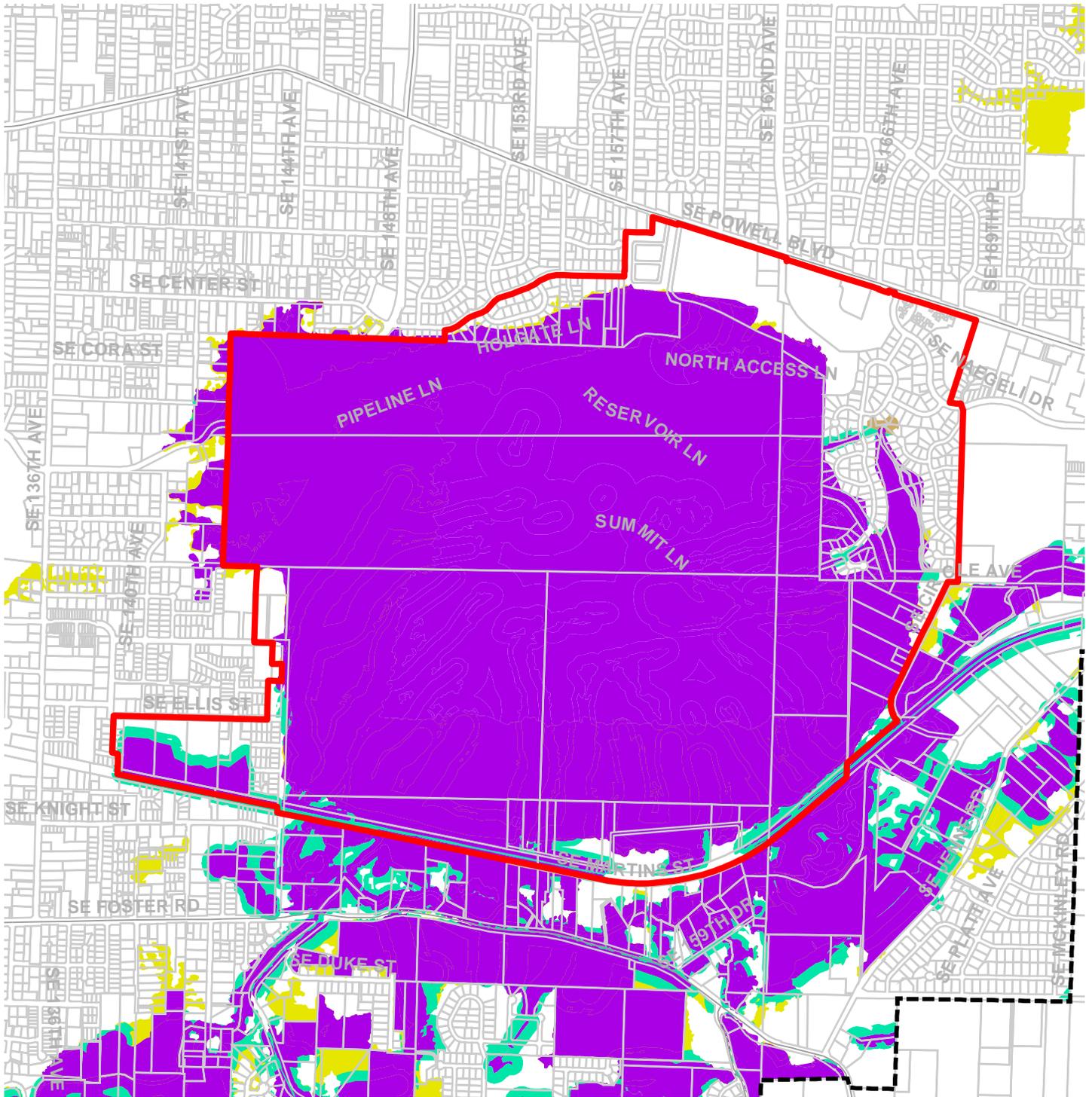
Updated: July 2021



-  Resource Sites
-  Class A (high rank)
-  Class B (medium rank)
-  Class C (low rank)
-  Urban Service Boundary
-  Taxlots

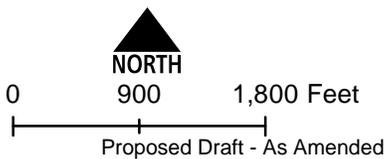


The information on the map was derived from digital databases. Care was taken in the creation of this map but it is provided "as is". The City of Portland ensures meaningful access to city programs, services, and activities to comply with Civil Rights Title VI and ADA Title II laws and reasonably provides: translation, interpretation, modifications, accommodations, alternative formats, auxiliary aids and services. To request these services, contact 503-823-7700, City TTY 503-823-6868, Relay Service: 711.
July 2021



Map G: Title 13 Habitat Conservation Areas (HCA) and Goal 5 Areas

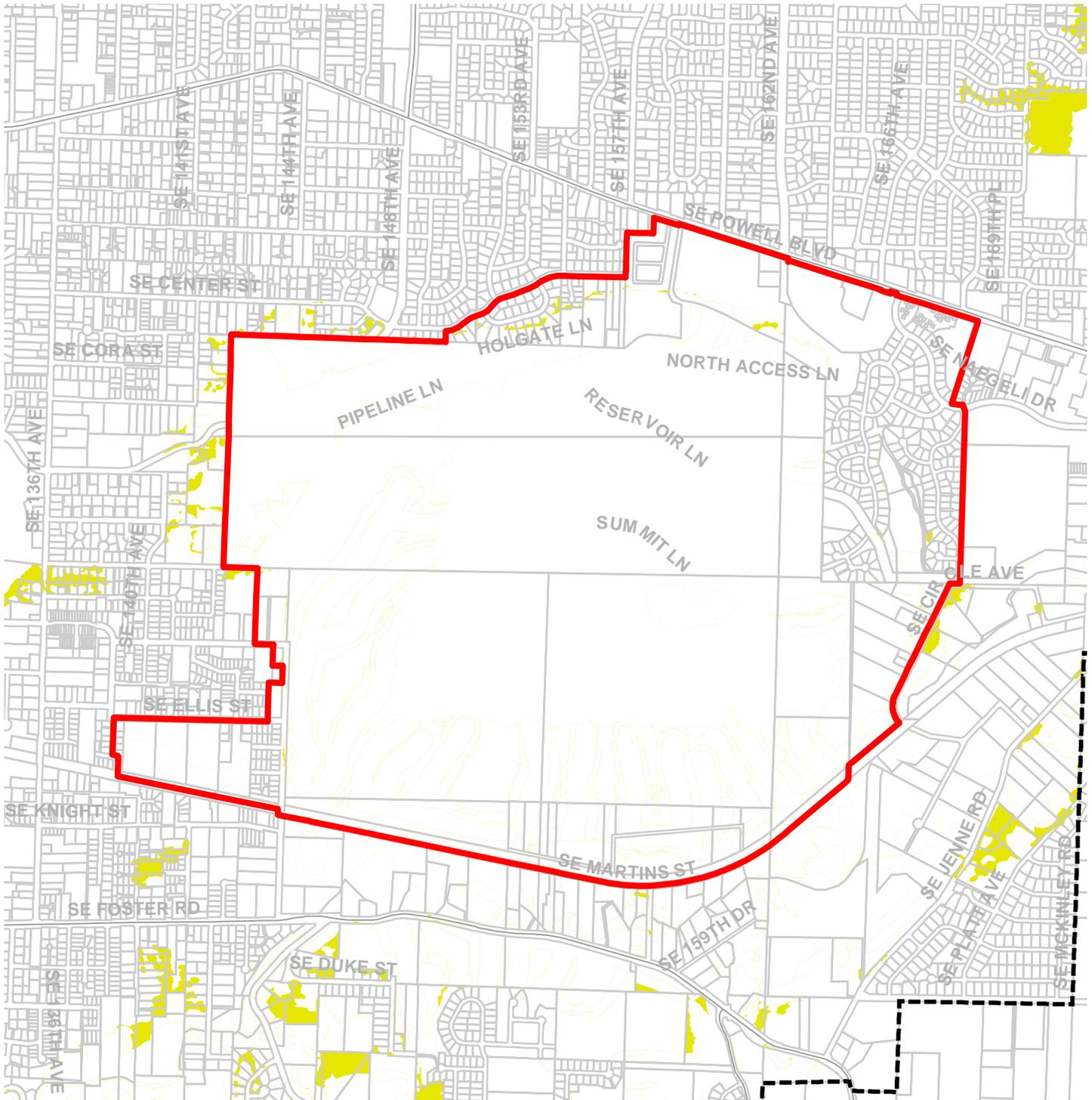
Resource Site: JC23
Updated: July 2021



- Urban Service Boundary
- Resource Sites
- HCA High Value
- HCA Moderate Value
- HCA Low Value
- Goal 5 Significant Natural Resources



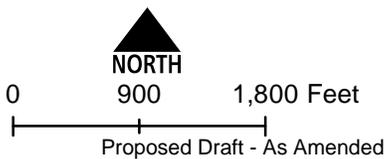
The information on the map was derived from digital databases. Care was taken in the creation of this map but it is provided "as is". The City of Portland ensures meaningful access to city programs, services, and activities to comply with Civil Rights Title VI and ADA Title II laws and reasonably provides: translation, interpretation, modifications, accommodations, alternative formats, auxiliary aids and services. To request these services, contact 503-823-7700, City TTY 503-823-6868, Relay Service: 711.



Map H: Goal 5 Resources

Resource Site: JC23

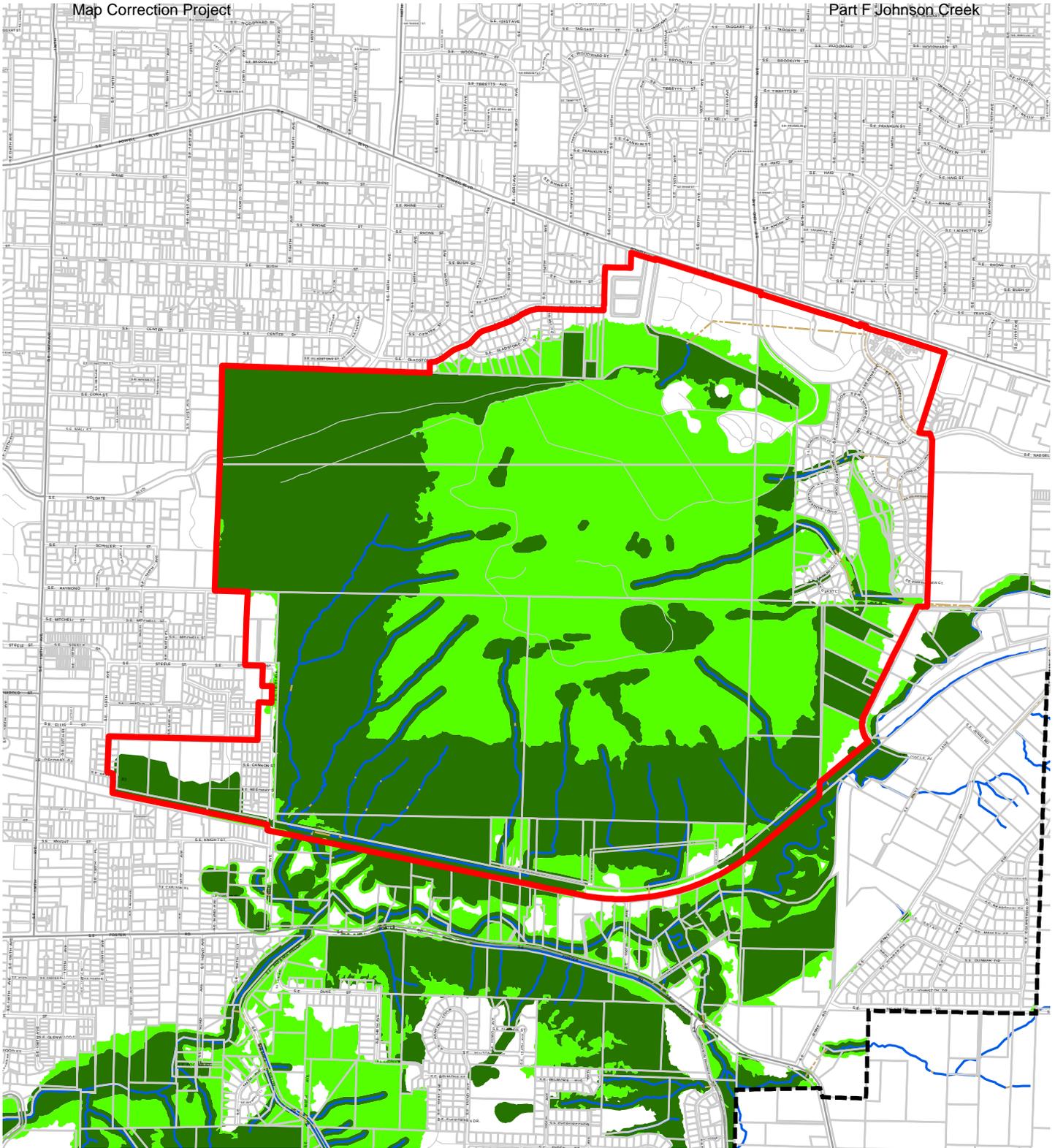
Updated: July 2021



- Urban Service Boundary
- Resource Sites
- Goal 5 Significant Natural Resources



The information on the map was derived from digital databases. Care was taken in the creation of this map but it is provided "as is". The City of Portland ensures meaningful access to city programs, services, and activities to comply with Civil Rights Title VI and ADA Title II laws and reasonably provides: translation, interpretation, modifications, accommodations, alternative formats, auxiliary aids and services. To request these services, contact 503-823-7700, City TTY 503-823-6868, Relay Service: 711.

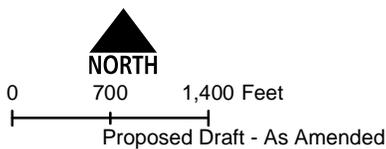


Map I: DRAFT Proposed Environmental Overlay Zones

**Resource Site:
JC23**

Updated: July 2021

- Resource Sites
- Open Stream Channel
- Piped Stream Segment
- Proposed Conservation Zone
- Proposed Protection Zone
- Urban Service Boundary
- Taxlots



The information on the map was derived from digital databases. Care was taken in the creation of this map but it is provided "as is". The City of Portland ensures meaningful access to city programs, services, and activities to comply with Civil Rights Title VI and ADA Title II laws and reasonably provides: translation, interpretation, modifications, accommodations, alternative formats, auxiliary aids and services. To request these services, contact 503-823-7700, City TTY 503-823-6868, Relay Service: 711. July 2021

Natural Resource Description

Within resource site JC23 the following significant natural resource features and functions are present:

Significant Riparian Corridor Features: open stream; wetland; flood area; land within 50 feet of waterbodies; forest, woodland, shrubland and herbaceous vegetation within 300 feet of waterbodies; and forest vegetation on steep slopes (>25% slope) contiguous to and within 780 feet of waterbodies.

Significant Wildlife Habitat Features: forest patches, and associated and contiguous wetlands, two acres in size or larger.

Special Habitat Areas: Johnson Creek (S, C); wetlands (W)

Riparian Corridor Functions: microclimate and shade; stream flow moderation and water storage; bank function and sediment, pollution and nutrient control; large wood and channel dynamics; organic inputs, food web and nutrient cycling; and riparian wildlife movement corridor.

Wildlife Habitat Functions: interior area; food and water; resting, denning, nesting and rearing; movement and migration; reduction of noise, light and vibration; and habitat patches that support special status fish and wildlife species.

Table A: Quantity of Natural Resource Features in Resource Site		JC23
		Study Area
Stream (Miles)		6.1
Wetlands (acres)		33.0
Vegetated Areas >= 1/2 acre (acres)		
	Forest (acres)	329.1
	Woodland (acres)	36.1
	Shrubland (acres)	76.4
	Herbaceous (acres)	260.1
Flood Area*		
	Vegetated (acres)	0.9
	Non-vegetated (acres)	0.0
Steep Slopes (acres)**		329.1
* The flood area includes the FEMA 100-year flood plain plus the adjusted 1996 flood inundation area.		
**Slopes are derived from LiDAR. Steep slopes are areas with a slope greater than 25%.		

This site is Powell Butte, one of many buttes in the Johnson Creek Watershed that are part of the Boring Lava Domes. Residential development is located along the foothills to the north, west, and south, with relatively low-density residential development on the east side. Powell Butte Natural Area comprises the majority of the site. The property is owned by Portland Water Bureau and includes underground reservoirs. Portland Parks & Recreation manages the site as a natural area with numerous trails through a variety of habitats.

This is one of the more unique uplands in southeast Portland. This butte consists of primarily two major habitat types: an open grassland interspersed with wetlands at the top of the butte surrounded by a steeply sloped forests with multiple headwater streams that flow down the southern, western, and eastern slopes.

The forest consists of mature deciduous trees (maple, alder) and 60-80 year-old conifers (Douglas fir). Snags are common and there is some downed dead wood from windthrow. The grassland is an abandoned, pasture with some invading hawthorn trees. There are vernal ponds within this grassland that provide habitat for pond-breeding amphibians.

Powell Butte provides very important wildlife habitat within the Johnson Creek watershed and the Portland metropolitan area. There are very few upland meadows left in the metropolitan area. The large size and combination of upland meadow, forest, and adjacency to Johnson Creek is rare and provides habitat for a large diversity of bird, large and small mammal, amphibian, insect and reptile species. Powell Butte is designated a Special Habitat for migratory birds and grassland-associated species.

This combination of forest and grassland provides potential for good quality habitat. The forest provides foraging, perching, roosting, and nesting habitat for hawks, falcons, owls, and bats. The grassland provides nesting habitat for birds such as meadowlarks and sparrows. The grass and thatch provide high quality habitat for small mammals. The grassland/forest ecotone provides a valuable edge effect to wildlife, potentially supporting greater densities than other habitat types. Pond breeding amphibians utilize the ponds in the open meadow for breeding and through the egg and larval stages while the surrounding forest provides habitat require during adult life stages. Studies have shown that five native pond-breeding amphibian species utilize these ponds with high densities of egg-masses (Guderyahn, 2019).

Forested wetland situated along Johnson Creek corridor and at the base of Powell Butte provides excellent connectivity as well as nesting forage and cover habitat for birds, amphibians and small mammals.

Special status bird species observed in or adjacent to this resource site include American kestrel, bald eagle, band-tailed pigeon, black-throated gray warbler, brown creeper, bufflehead,

Bullock's oriole, bushtit, chipping sparrow, common yellowthroat, downy woodpecker, great blue heron, green heron, hermit warbler, hooded merganser, house wren, loggerhead shrike, merlin, Nashville warbler, northern harrier, olive-sided flycatcher, orange-crowned warbler, pacific-slope flycatcher, pacific wren, peregrine falcon, pileated woodpecker, purple finch, purple martin, red-eyed vireo, rufous hummingbird, short-eared owl, streaked horned lark, Swainson's thrush, Vaux's swift, vesper sparrow, western bluebird, western meadowlark, western wood-pewee, white-breasted nuthatch, willow flycatcher, Wilson's warbler, wood duck, yellow warbler, and yellow-breasted chat. Vesper sparrow was sighted by Metro staff on June 22, 2020.

Table B: Quality of Natural Resource Functions in Resource Site JC23				
Resource Site (acres) = 801				
	Class 1/A	Class 2/B	Class 3/C	Total
Riparian Corridors*				
acres	143.3	153.7	290.6	587.6
percent total inventory site area	17.9%	19.2%	36.3%	73.4%
Wildlife Habitat*				
acres	0.0	347.4	10.1	357.5
percent total inventory site area	0.0%	43.4%	1.3%	44.7%
Special Habitat Areas**				
acres	636.8			
percent total inventory site area	79.5%			
Combined Total*				
acres	143.3	331.2	130.2	604.7
percent total inventory site area	17.9%	41.4%	16.3%	75.5%
* Class I riparian resources, Special Habitat Areas, and wildlife habitat include open water. ** Metro Title 13 designated all Special Habitat Areas as Class I riparian corridors. +Because riparian resources, Special Habitat Areas, and wildlife Habitat overlap, the results cannot be added together to determine the combined results.				

Stormwater runs off impervious surfaces (e.g., rooftops, driveways, parking areas, streets, etc..) rapidly. Without a place to retain the water (such as wetlands or adequate stormwater facilities), stormwater runoff results in spikes in stream levels which can cause or exacerbate flooding and increase stream erosion. In addition, when water runs off quickly, it does not have a chance to infiltrate and recharge streams or aquifers to provide water during drier periods.

The type and capacity of stormwater facilities to manage the runoff from impervious surfaces varies in the city, affecting the local rate and amount of runoff, and the amount of pollutants in the water. Much of the city was developed prior to any stormwater regulations and receives limited or no management prior to discharging to pipes and surface waters.

Table C shows the total amount of impervious area within the resource site and how much of that impervious area lacks stormwater management; the percentage of total impervious area that is not managed is called “effective impervious area.” The higher the percent of effective impervious area in a watershed, the greater the negative impacts of stormwater runoff to streams. Stream science indicates that when effective impervious area reaches 10% of a watershed, negative stream impacts become significant; and at 25%, these impacts on waterways can be substantial. An additional consideration is the differences in soil conditions and other factors that influence the ability of pervious areas to retain, infiltrate or filter pollutants from stormwater. For example, a mature forest is much more effective in managing stormwater than a manicured lawn; both areas would have a lower effective impervious surface percentage than a developed site, but they have different outcomes for stormwater management.

For Resource Area JC23, 2% of the total area is effectively impervious. This indicates a significant degree of stormwater management and/or existing natural resources that should be preserved. Areas with very low impervious cover and existing vegetation are more likely to be functioning properly to support biologic systems.

Table C. Impervious Area within Resource Site JC23			
Total area (acres)	Total impervious Area (acres)	Total unmanaged impervious area* (acres)	Percent of resource site that is effectively impervious
801	47	18	2%

*Total unmanaged impervious area refers to the number of acres within a resource area that receives no formal stormwater management measures to regulate flow or treat pollutants before they reach surface waters, also referred to as effective impervious area.

Metro Title 13 and Oregon Goal 5 Compliance

The following information supplements evaluation of natural resource protections presented in Volume 4 and supports compliance with Metro Title 13 and Oregon Plan Goal 5.

Title 13 Habitat Conservation Areas

Map G presents the Habitat Conservation Areas (HCA) within the Resource site JC23. Natural resources should be protected within HCA as follows:

1. *Strictly limit or limit* conflicting uses within Class I/High Rank Riparian Areas in all Urban Development Areas.

2. *Strictly limit* or *limit* conflicting uses within Class II/Medium Rank Riparian Areas within Moderate and Low Value Urban Development Area as well as parks and open spaces.
3. *Strictly limit* or *limit* conflicting uses within Class A/High or B/Medium Rank Wildlife Habitat within parks and open spaces.
4. *Allow* conflicting uses or conducted a local Goal 5 ESEE for Class III/Low Rank Riparian Areas in all Urban Development Areas.
5. *Allow* conflicting uses or conducted a local Goal 5 ESEE for Class A/High, Class B/Medium or Class C/Low Rank Wildlife Habitat in all Urban Development Area, except parks and open space.

Strictly limiting or *limiting* conflicting uses in HCA will protect and conserve existing streams and wetlands to maintain significant natural resource functions including: microclimate and shade; stream flow moderation and water storage; bank function and sediment, pollution and nutrient control; large wood and channel dynamics; organic inputs, food web and nutrient cycling; and fish and wildlife habitat. *Strictly limiting* or *limiting* conflicting uses in HCA will allow for additional urban development that is sensitive to the natural resource features and requires mitigation for unavoidable negative impacts to features and functions. The recommendation will also contribute towards meeting other regulatory requirements including the Metro Title 3, Water Quality and Flood Management; Oregon Goal 6, Air, Water and Land Resources Quality; Oregon Goal 7, Areas Subject to Natural Hazards; the Clean Water Act; and the Endangered Species Act.

Goal 5 Significant Natural Resources

All of the significant natural resources within resource site JC23 are designated Habitat Conservation Areas under Metro Title 13; therefore, no resource site-specific ESEE is required.

Natural Resources Protection Decisions

Based on the analysis presented in Volume 3, Natural Resources Inventory, Volume 4, Title 13 and Goal 5 Compliance, and the resource site-specific evaluation for JC23, the following decisions are applied to protect the significant riparian corridors and wildlife habitat:

1. Apply a protection overlay zone ('p' zone) to stream channels from top-of-bank to top-of-bank, wetlands and land within 50 feet of stream top-of-bank or 30 feet of wetlands.
2. Within Powell Butte Nature Park, apply a protection overlay zone ('p' zone) to areas of forest vegetation.
3. Within Powell Butte Nature Park, apply a conservation overlay zone ('c' zone) to areas of woodland, shrubland or herbaceous vegetation.
4. Outside Powell Butte Nature Park, apply a conservation overlay zone ('c' zone) to areas of forest vegetation that are contiguous to but more than 50 feet from stream top-of-bank or 30 feet from wetlands.
5. Allow conflicting uses within all other areas containing significant natural resources.

Resource Site No.: JC24 **Resource Site Name:** Mid Powell Butte Floodplain

Previous Plan: Johnson Creek Basin Protection Plan

Previous Resource Site No.: 25

The results of the analysis found in Volume 3, Natural Resources Inventory, Volume 4, Title 13 and Goal 5 Compliance, and the resource site-specific evaluation, are presented in the following maps:

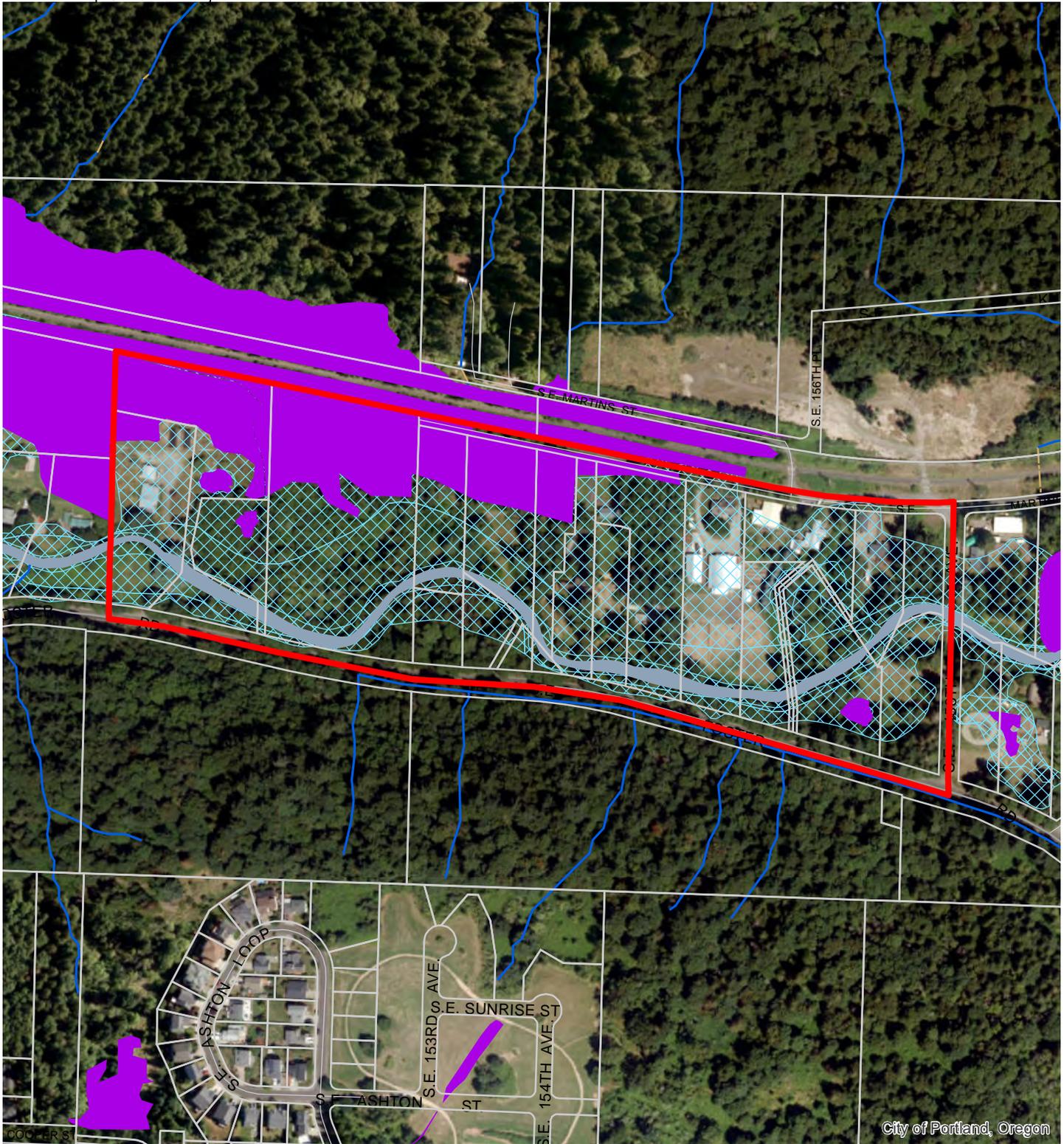
- A. Water Features – rivers, streams, wetlands and flood areas
- B. Land Features – forest, woodland, shrubland and herbaceous vegetation, steep slopes
- C. Special Habitat Areas
- D. Riparian Corridor Classifications
- E. Wildlife Habitat Classifications
- F. Urban Development Value
- G. Metro Title 13 Habitat Conservation Areas
- H. Statewide Planning Goal 5 Areas
- I. Recommended Natural Resource Protections

Following the maps, additional information about existing natural resource features and functions in the resource site is presented.

Implementation of the results is found in Volume 1, Part B, updates to zoning maps and zoning code.

Resource site JC24 includes the following:

Site (acres)	31.9
Base zones (acres)	
OS	16.7
R10	<1
R20	15.2

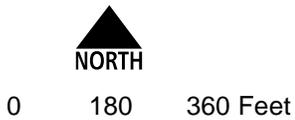


City of Portland, Oregon

Map A: Water Features

Resource Site: JC24

Updated: July 2021

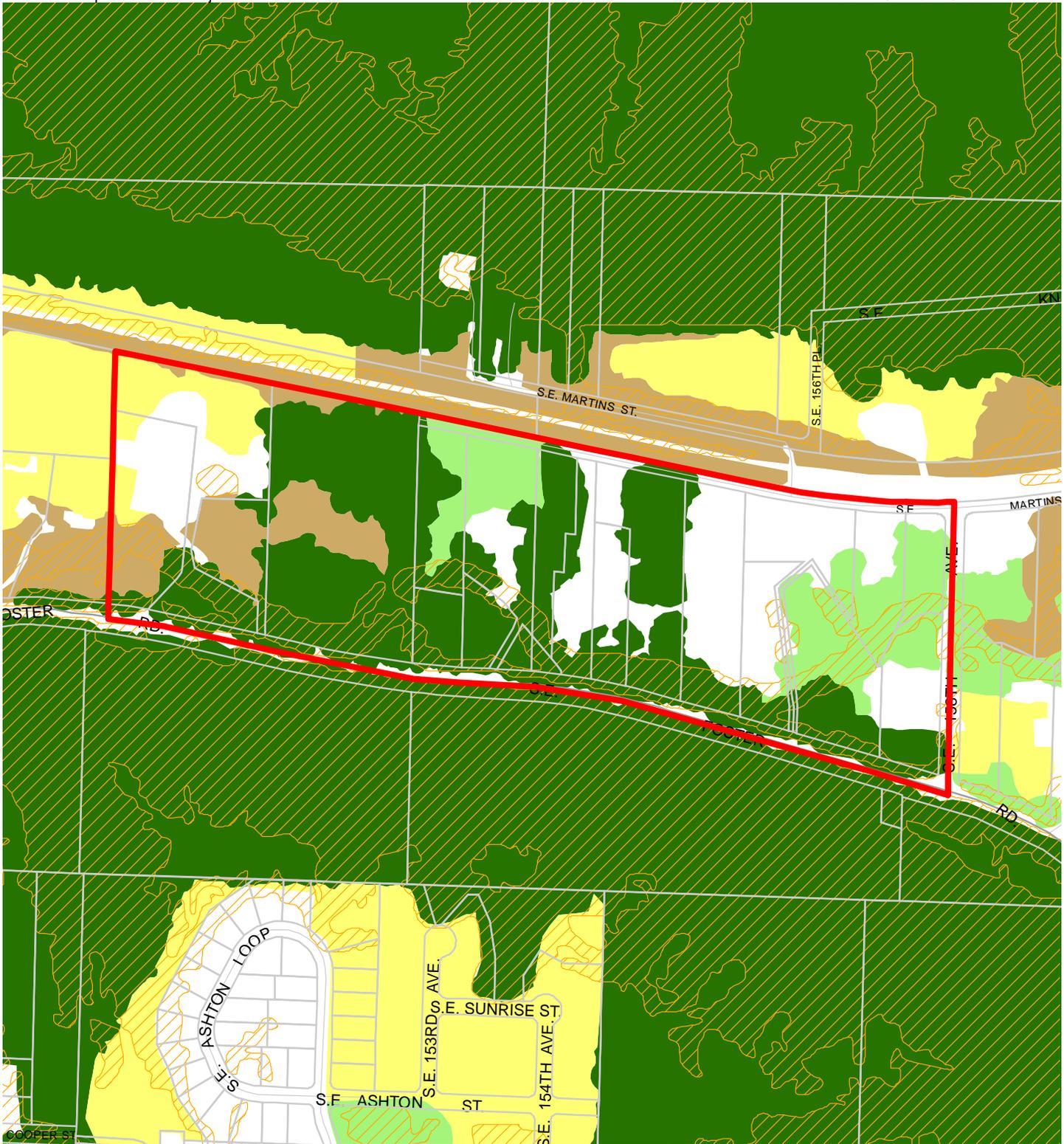


Proposed Draft - As Amended

- Resource Sites
- Urban Service Boundary
- Taxlots
- Wetlands
- Rivers
- Open stream channel
- Piped Stream Segment
- Flood Area



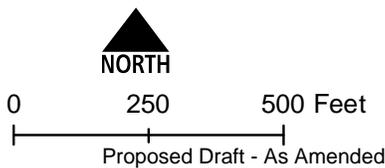
The information on the map was derived from digital databases. Care was taken in the creation of this map but it is provided "as is". The City of Portland ensures meaningful access to city programs, services, and activities to comply with Civil Rights Title VI and ADA Title II laws and reasonably provides: translation, interpretation, modifications, accommodations, alternative formats, auxiliary aids and services. To request these services, contact 503-823-7700, City TTY 503-823-6868, Relay Service: 711.
July 2021



Map B: Vegetation and Steep Slopes

Resource Site: JC24

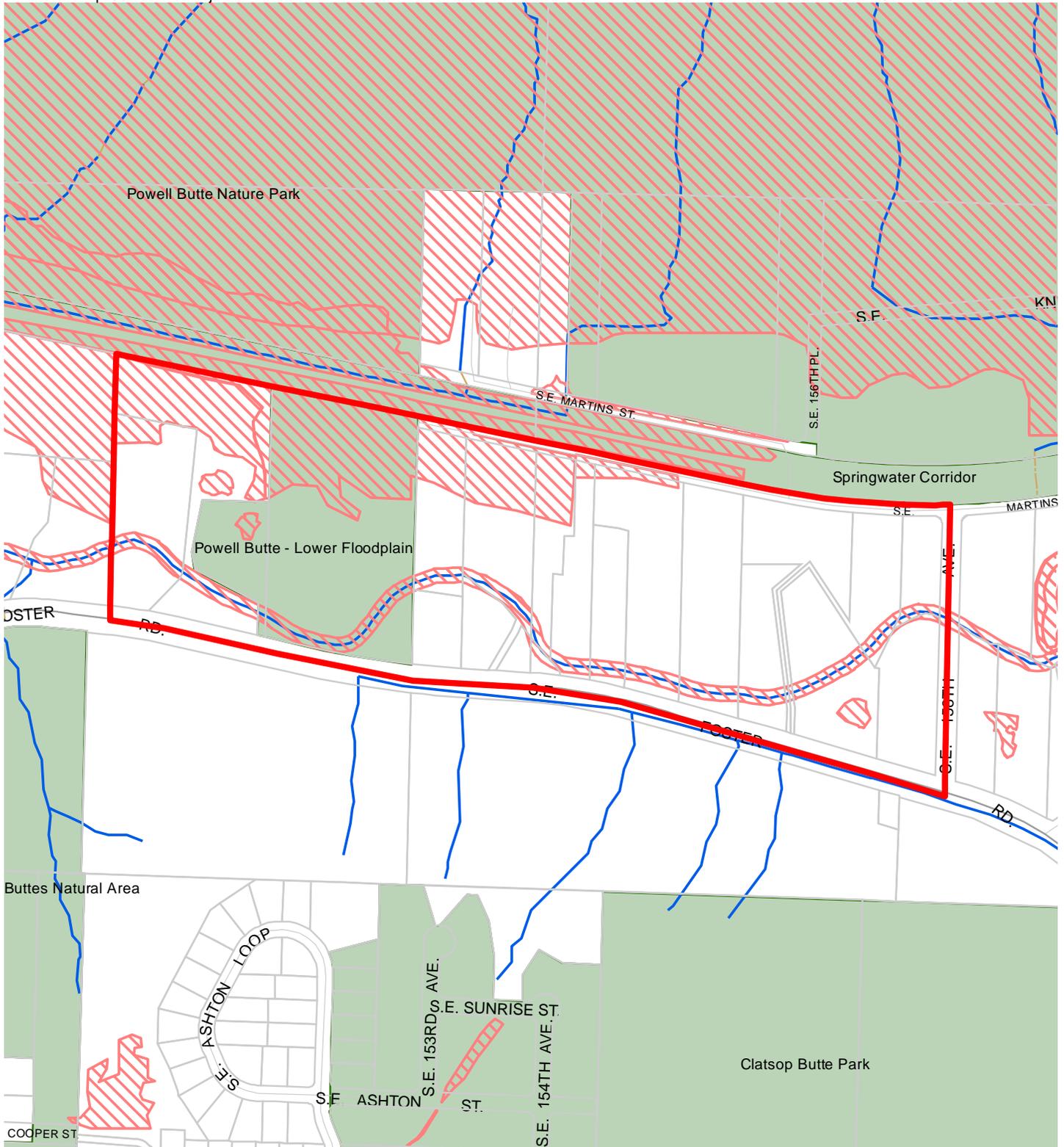
Updated: July 2021



- Resource Sites
- Urban Service Boundary
- Taxlots
- Slopes >25%
- Forest
- Woodland
- Shrubland
- Herbaceous

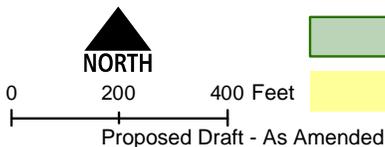


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**Map C: Special
Habitat Areas**
**Resource Site:
JC24**

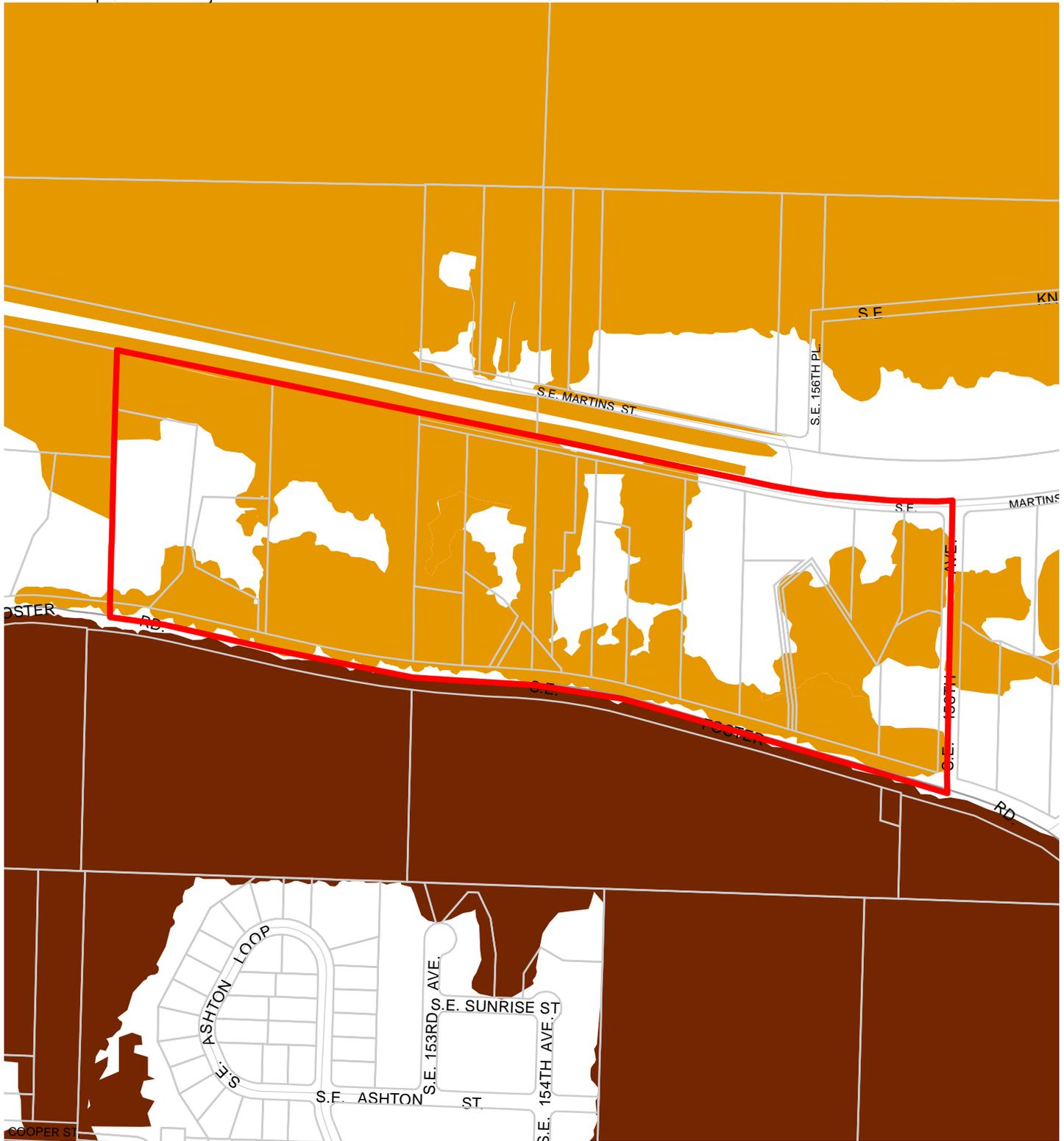
Updated: June 2021



- Resource Sites
- Special Habitat Areas (SHAs)
- Open Stream Channel
- Piped Stream Segment
- Parks
- Schools
- Urban Service Boundary
- Taxlots

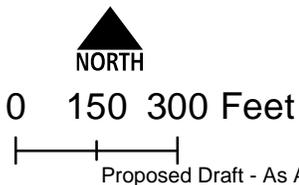


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**Map E: Wildlife
Habitat Classification**
Resource Site:
JC24

Updated: July 2021



-  Resource Sites
-  Class A (high rank)
-  Class B (medium rank)
-  Class C (low rank)
-  Urban Service Boundary
-  Taxlots



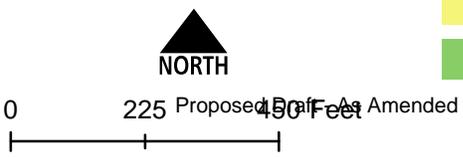
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July 2021



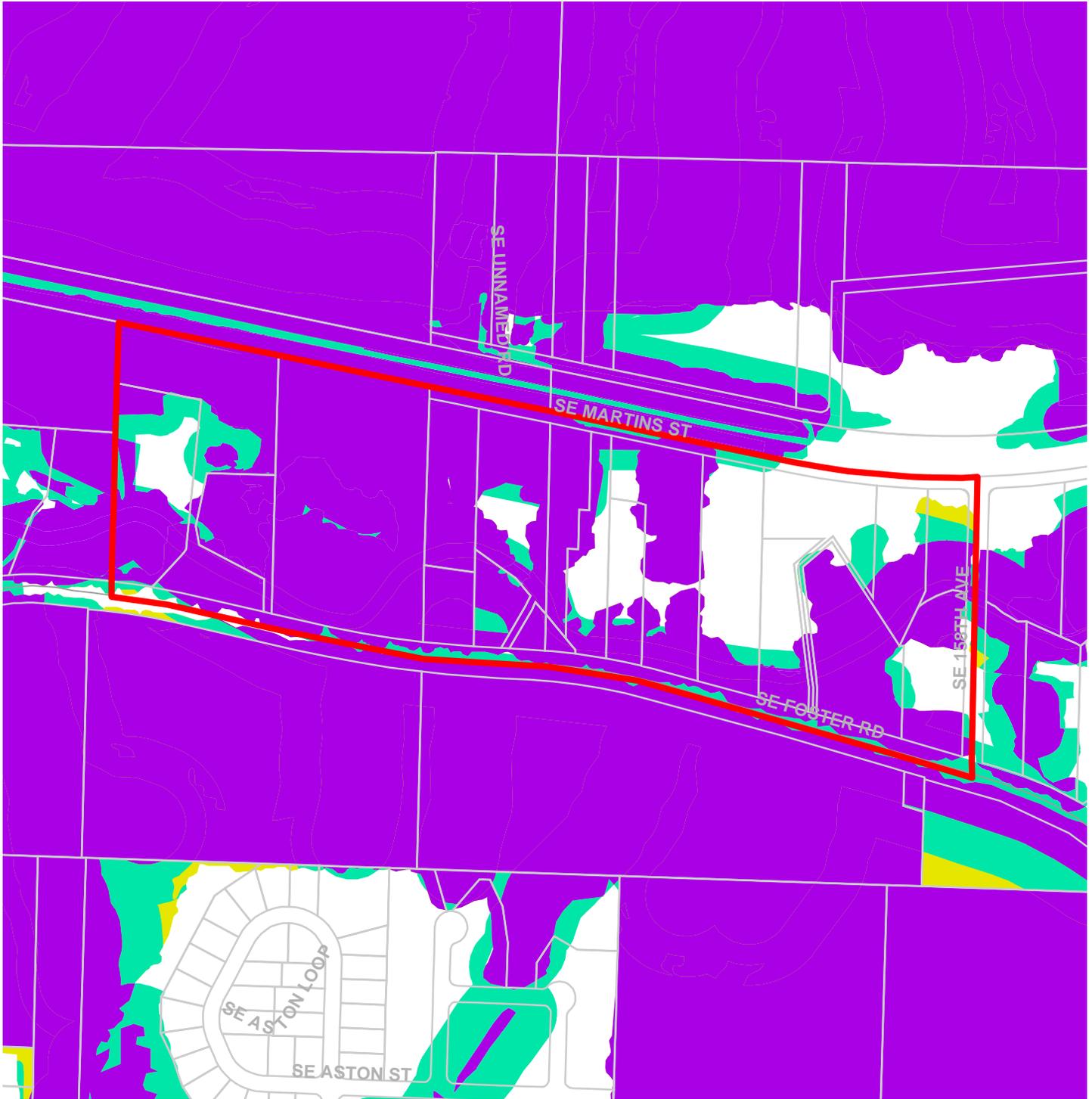
Map F: Urban Development Value (Title 13)
Resource Site: JC24

-  Urban Service Boundary
-  Resource Sites
-  High Development Value
-  Medium Development Value
-  Low Development Value
-  Parks

Updated: July 2021



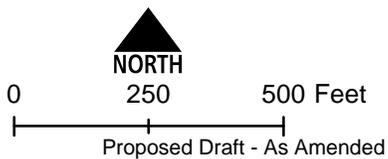
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Map G: Title 13 Habitat Conservation Areas (HCA) and Goal 5 Areas

Resource Site: JC24

Updated: July 2021



-  Urban Service Boundary
-  Resource Sites
-  HCA High Value
-  HCA Moderate Value
-  HCA Low Value
-  Goal 5 Significant Natural Resources



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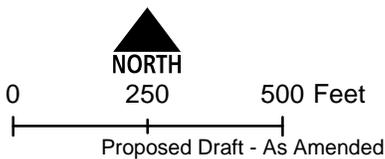
July 2021



Map H: Goal 5 Resources

Resource Site: JC24

Updated: July 2021



- Urban Service Boundary
- Resource Sites
- Goal 5 Significant Natural Resources



The information on the map was derived from digital databases. Care was taken in the creation of this map but it is provided "as is". The City of Portland ensures meaningful access to city programs, services, and activities to comply with Civil Rights Title VI and ADA Title II laws and reasonably provides: translation, interpretation, modifications, accommodations, alternative formats, auxiliary aids and services. To request these services, contact 503-823-7700, City TTY 503-823-6868, Relay Service: 711.

July 2021

Natural Resource Description

Within resource site JC24 the following significant natural resource features and functions are present:

Significant Riparian Corridor Features: open stream; wetland; flood area; land within 50 feet of waterbodies; forest, woodland, shrubland and herbaceous vegetation within 300 feet of waterbodies; and forest vegetation on steep slopes (>25% slope) contiguous to and within 780 feet of waterbodies.

Significant Wildlife Habitat Features: forest patches, and associated and contiguous wetlands, two acres in size or larger.

Special Habitat Areas: Johnson Creek (S, C); wetlands (W)

Riparian Corridor Functions: microclimate and shade; stream flow moderation and water storage; bank function and sediment, pollution and nutrient control; large wood and channel dynamics; organic inputs, food web and nutrient cycling; and riparian wildlife movement corridor.

Wildlife Habitat Functions: interior area; food and water; resting, denning, nesting and rearing; movement and migration; reduction of noise, light and vibration; and habitat patches that support special status fish and wildlife species.

Table A: Quantity of Natural Resource Features in Resource Site		JC24
		Study Area
Stream (Miles)		0.5
Wetlands (acres)		5.8
Vegetated Areas >= 1/2 acre (acres)		
	Forest (acres)	14.3
	Woodland (acres)	4.2
	Shrubland (acres)	2.5
	Herbaceous (acres)	1.3
Flood Area*		
	Vegetated (acres)	18.7
	Non-vegetated (acres)	7.7
Steep Slopes (acres)**		6.0
* The flood area includes the FEMA 100-year flood plain plus the adjusted 1996 flood inundation area.		
**Slopes are derived from LiDAR. Steep slopes are areas with a slope greater than 25%.		

This resource site is immediately east of resource site JC22. It is bordered on the north by the Springwater Corridor Trail, on the east by SE 158th Avenue, Foster Road on the south and privately-owned property is at its western boundary. Johnson Creek runs east to west through this site. It is comprised of low-density residences (or small farms) and publicly owned natural areas.

Johnson Creek and its long history of flooding have influenced this site. Nearly the entire site is within the 100-year floodplain. Perennial flooding in this area is common. Larger flood events generally occur from December through February, with 85 percent of the stream's runoff occurring between November and March.

There is a large wetland that covers much of the western half of the site; smaller wetlands are also found on the site. North of Johnson Creek has large pastures, especially on the northeast portion of the site. Other parts of the site are forest, forested wetlands, or woodlands, which provide food, cover, perch, and nest sites for birds, small mammals and amphibians. The site's close proximity to Powell Butte and Clatsop Butte provides connections to a diversity of habitat types.

The creek is WPA rock-lined in this area. Where the riparian zone is cultivated and grazed, the riparian zone provides poor habitat for wildlife and little sediment and erosion control for the bank. Other portions of the creek within this stretch are well shaded, keeping the water temperature cooler and better habitat for fish and aquatic species, particularly the steelhead trout, Pacific lamprey, and coho salmon that use this reach.

In 2019, a study of Johnson Creek's potential to support salmon populations identified this reach of Johnson Creek as important to protect and restore habitat for coho and chinook salmon and steelhead trout —meaning future restoration actions that address low habitat diversity, high sediment loads, high summer stream temperatures, and the lack of key habitat types will benefit all salmonids using the reach.

Special status bird species observed in or adjacent to this resource site include American kestrel, bald eagle, black-throated gray warbler, brown creeper, bufflehead, bushtit, chipping sparrow, common yellowthroat, downy woodpecker, great blue heron, green heron, hooded merganser, house wren, loggerhead shrike, merlin, Nashville warbler, northern harrier, olive-sided flycatcher, orange-crowned warbler, pacific-slope flycatcher, peregrine falcon, pileated woodpecker, purple finch, purple martin, red-eyed vireo, rufous hummingbird, short-eared owl, Swainson's thrush, Vaux's swift, vesper sparrow, white-breasted nuthatch, willow flycatcher, Wilson's warbler, wood duck, yellow warbler, and yellow-breasted chat.

Table B: Quality of Natural Resource Functions in Resource Site JC24				
Resource Site (acres) = 32				
	Class 1/A	Class 2/B	Class 3/C	Total
Riparian Corridors*				
acres	21.5	3.6	5.7	30.8
percent total inventory site area	67.4%	11.4%	17.9%	96.6%
Wildlife Habitat*				
acres	0.0	20.6	0.0	20.6
percent total inventory site area	0.1%	64.6%	0.0%	64.7%
Special Habitat Areas**				
acres	2.0			
percent total inventory site area	6.3%			
Combined Total*				
acres	21.5	3.8	5.5	30.8
percent total inventory site area	67.4%	11.9%	17.3%	96.6%
* Class I riparian resources, Special Habitat Areas, and wildlife habitat include open water. ** Metro Title 13 designated all Special Habitat Areas as Class I riparian corridors. + Because riparian resources, Special Habitat Areas, and wildlife Habitat overlap, the results cannot be added together to determine the combined results.				

Stormwater runs off impervious surfaces (e.g., rooftops, driveways, parking areas, streets, etc..) rapidly. Without a place to retain the water (such as wetlands or adequate stormwater facilities), stormwater runoff results in spikes in stream levels which can cause or exacerbate flooding and increase stream erosion. In addition, when water runs off quickly, it does not have a chance to infiltrate and recharge streams or aquifers to provide water during drier periods.

The type and capacity of stormwater facilities to manage the runoff from impervious surfaces varies in the city, affecting the local rate and amount of runoff, and the amount of pollutants in the water. Much of the city was developed prior to any stormwater regulations and receives limited or no management prior to discharging to pipes and surface waters.

Table C shows the total amount of impervious area within the resource site and how much of that impervious area lacks stormwater management; the percentage of total impervious area that is not managed is called "effective impervious area." The higher the percent of effective impervious area in a watershed, the greater the negative impacts of stormwater runoff to streams. Stream science indicates that when effective impervious area reaches 10% of a watershed, negative stream impacts become significant; and at 25%, these impacts on waterways can be substantial. An additional consideration is the differences in soil conditions and other factors that influence the ability of pervious areas to retain, infiltrate or filter

pollutants from stormwater. For example, a mature forest is much more effective in managing stormwater than a manicured lawn; both areas would have a lower effective impervious surface percentage than a developed site, but they have different outcomes for stormwater management.

For Resource Area JC24, 7% of the total area is effectively impervious. This indicates a significant degree of stormwater management and/or existing natural resources that should be preserved. Areas with very low impervious cover and existing vegetation are more likely to be functioning properly to support biologic systems.

Table C. Impervious Area within Resource Site JC24			
Total area (acres)	Total impervious Area (acres)	Total unmanaged impervious area* (acres)	Percent of resource site that is effectively impervious
32	2.8	2.3	7%

*Total unmanaged impervious area refers to the number of acres within a resource area that receives no formal stormwater management measures to regulate flow or treat pollutants before they reach surface waters, also referred to as effective impervious area.

Metro Title 13 and Oregon Goal 5 Compliance

The following information supplements evaluation of natural resource protections presented in Volume 4 and supports compliance with Metro Title 13 and Oregon Plan Goal 5.

Title 13 Habitat Conservation Areas

Map G presents the Habitat Conservation Areas (HCA) within the Resource site JC24. Natural resources should be protected within HCA as follows:

1. *Strictly limit* or *limit* conflicting uses within Class I/High Rank Riparian Areas in all Urban Development Areas.
2. *Strictly limit* or *limit* conflicting uses within Class II/Medium Rank Riparian Areas within Moderate and Low Value Urban Development Area as well as parks and open spaces.
3. *Strictly limit* or *limit* conflicting uses within Class A/High or B/Medium Rank Wildlife Habitat within parks and open spaces.
4. *Allow* conflicting uses or conducted a local Goal 5 ESEE for Class III/Low Rank Riparian Areas in all Urban Development Areas.
5. *Allow* conflicting uses or conducted a local Goal 5 ESEE for Class A/High, Class B/Medium or Class C/Low Rank Wildlife Habitat in all Urban Development Area, except parks and open space.

Strictly limiting or limiting conflicting uses in HCA will protect and conserve existing streams and wetlands to maintain significant natural resource functions including: microclimate and shade; stream flow moderation and water storage; bank function and sediment, pollution and nutrient control; large wood and channel dynamics; organic inputs, food web and nutrient cycling; and fish and wildlife habitat. *Strictly limiting or limiting* conflicting uses in HCA will allow for additional urban development that is sensitive to the natural resource features and requires mitigation for unavoidable negative impacts to features and functions. The recommendation will also contribute towards meeting other regulatory requirements including the Metro Title 3, Water Quality and Flood Management; Oregon Goal 6, Air, Water and Land Resources Quality; Oregon Goal 7, Areas Subject to Natural Hazards; the Clean Water Act; and the Endangered Species Act.

Goal 5 Significant Natural Resources

Resource site JC24 contains natural resource features that are not a Title 13 HCA and are therefore subject to Statewide Planning Goal 5 OAR 660-023-0110. The General ESEE analysis, Volume 4, describes the conflicting uses and provides an overarching analysis of the economic, social, environmental and energy consequences of prohibiting, limiting or allowing the conflicting uses within areas of significant natural resources. In addition to the General ESEE analysis, the following resource site-specific consequences are considered.

The common impacts of conflicting uses in the resource site include clearing vegetation; grading activities and soil compaction; adding impervious surface; modifying streams, wetlands and flood areas; generating pollution; landscaping with non-native or invasive vegetation; building fences or other wildlife barriers; and other impacts such as noise, light, litter and pets.

Within the resource site residential uses are allowed outright or conditionally in the R20 base zones. Open space uses area allowed in the OS base zone. Development of new uses may involve vegetation clearing, grading, filing, and soil compaction, as well as the addition of impervious surfaces and landscaping with non-native plants, with associated impacts on the natural resources. Basic utilities and other infrastructure are allowed in all base zones. New or upgraded utility corridors may be cleared of vegetation and may fragment wildlife habitat.

The analysis of economic, social, environmental and energy consequences provided in Volume 4 is confirmed for resource site JC24, with the following additional information that clarifies the analysis.

Strictly limiting or limiting conflicting uses would retain the wildlife habitat functions provided by significant natural resource features including maintaining habitat for at risk plant, fish and wildlife species, maintaining vegetation on steep slopes, and maintaining the stormwater management and air-cooling functions of the tree canopy. Mitigation for negative

consequences of additional development in areas of Class A or Class B wildlife habitat should be required.

Natural Resources Protection Decisions

Based on the analysis presented in Volume 3, Natural Resources Inventory, Volume 4, Title 13 and Goal 5 Compliance, and the resource site-specific evaluation for JC24, the following decisions are applied to protect the significant riparian corridors and wildlife habitat:

1. Apply a protection overlay zone ('p' zone) to stream channels from top-of-bank to top-of-bank, wetlands and land within 40 feet of stream top-of-bank or 30 feet of wetlands.
2. Apply a conservation overlay zone ('c' zone) to land between 40 and 65 feet of stream top-of-bank and between 30 and 55 feet of wetland.
3. Apply a conservation overlay zone ('c' zone) to areas of forest or woodland contiguous to but more than 65 feet from stream top-of-bank or 55 feet from wetlands.
4. Allow conflicting uses within all other areas containing significant natural resources.

Resource Site No.: JC25 **Resource Site Name:** Powell Butte
Floodplain East

Previous Plan: Johnson Creek Basin Protection Plan

Previous Resource Site No.: 26

The results of the analysis found in Volume 3, Natural Resources Inventory, Volume 4, Title 13 and Goal 5 Compliance, and the resource site-specific evaluation, are presented in the following maps:

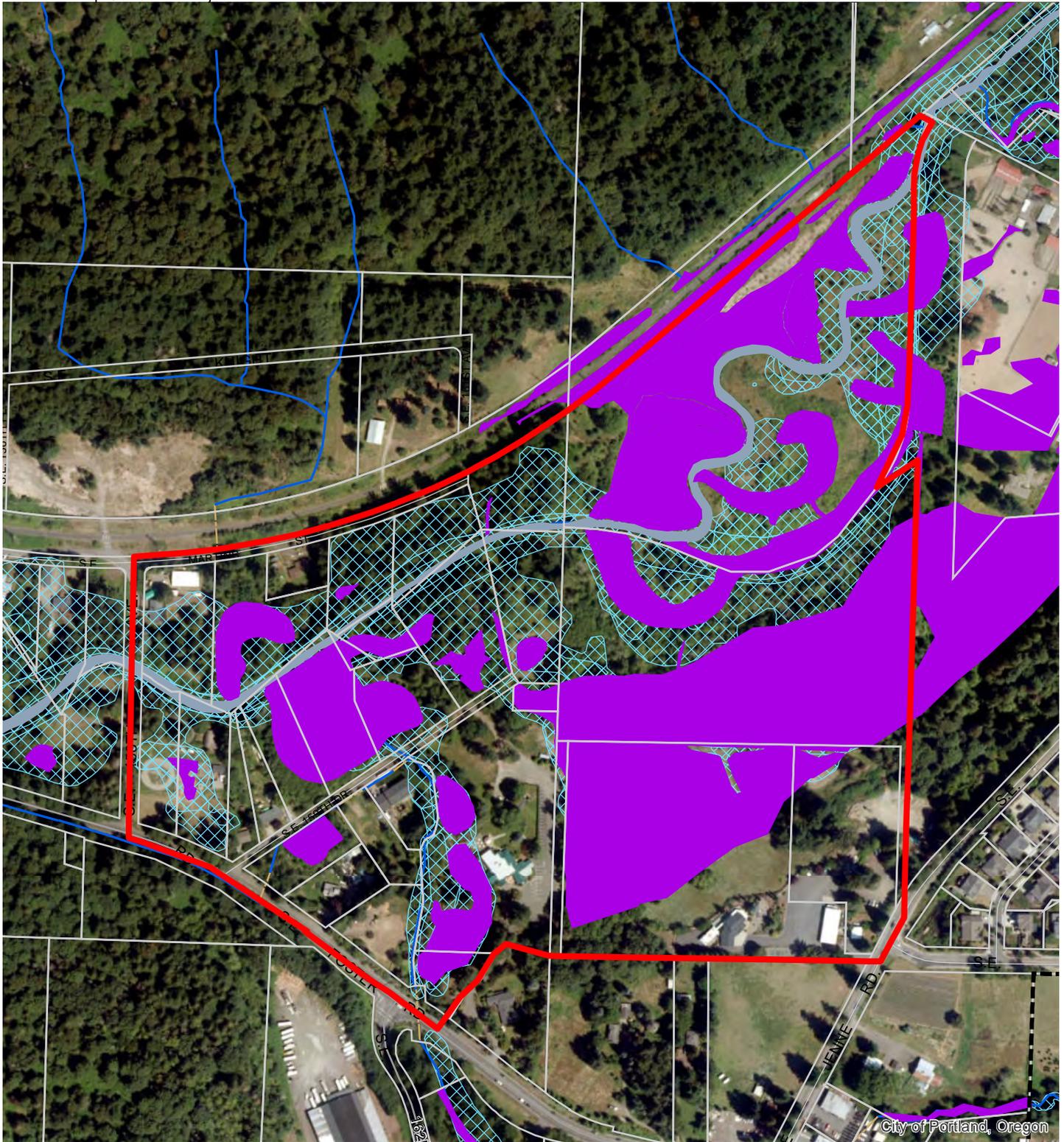
- A. Water Features – rivers, streams, wetlands and flood areas
- B. Land Features – forest, woodland, shrubland and herbaceous vegetation, steep slopes
- C. Special Habitat Areas
- D. Riparian Corridor Classifications
- E. Wildlife Habitat Classifications
- F. Urban Development Value
- G. Metro Title 13 Habitat Conservation Areas
- H. Statewide Planning Goal 5 Areas
- I. Recommended Natural Resource Protections

Following the maps, additional information about existing natural resource features and functions in the resource site is presented.

Implementation of the results is found in Volume 1, Part B, updates to zoning maps and zoning code.

Resource site JC25 includes the following:

Site (acres)	66.8
Base zones (acres)	
OS	39.5
R10	11.4
R20	15.9



Map A: Water Features

Resource Site: JC25

Updated: July 2021



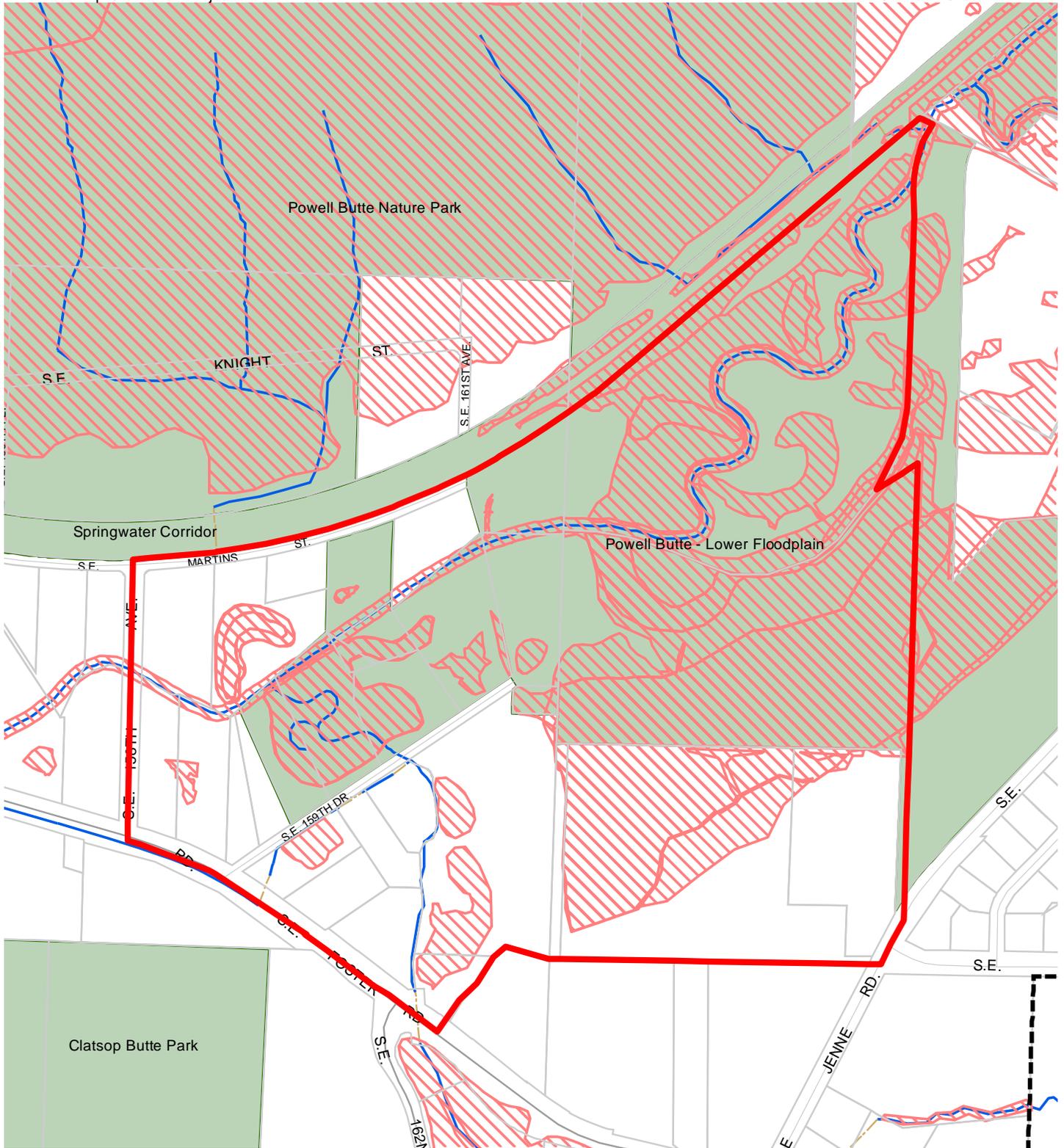
0 190 380 Feet

Proposed Draft - As Amended

- Resource Sites
- Urban Service Boundary
- Taxlots
- Wetlands
- Rivers
- Open stream channel
- Piped Stream Segment
- Flood Area

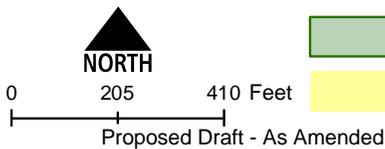


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July 2021



**Map C: Special
Habitat Areas**
**Resource Site:
JC25**

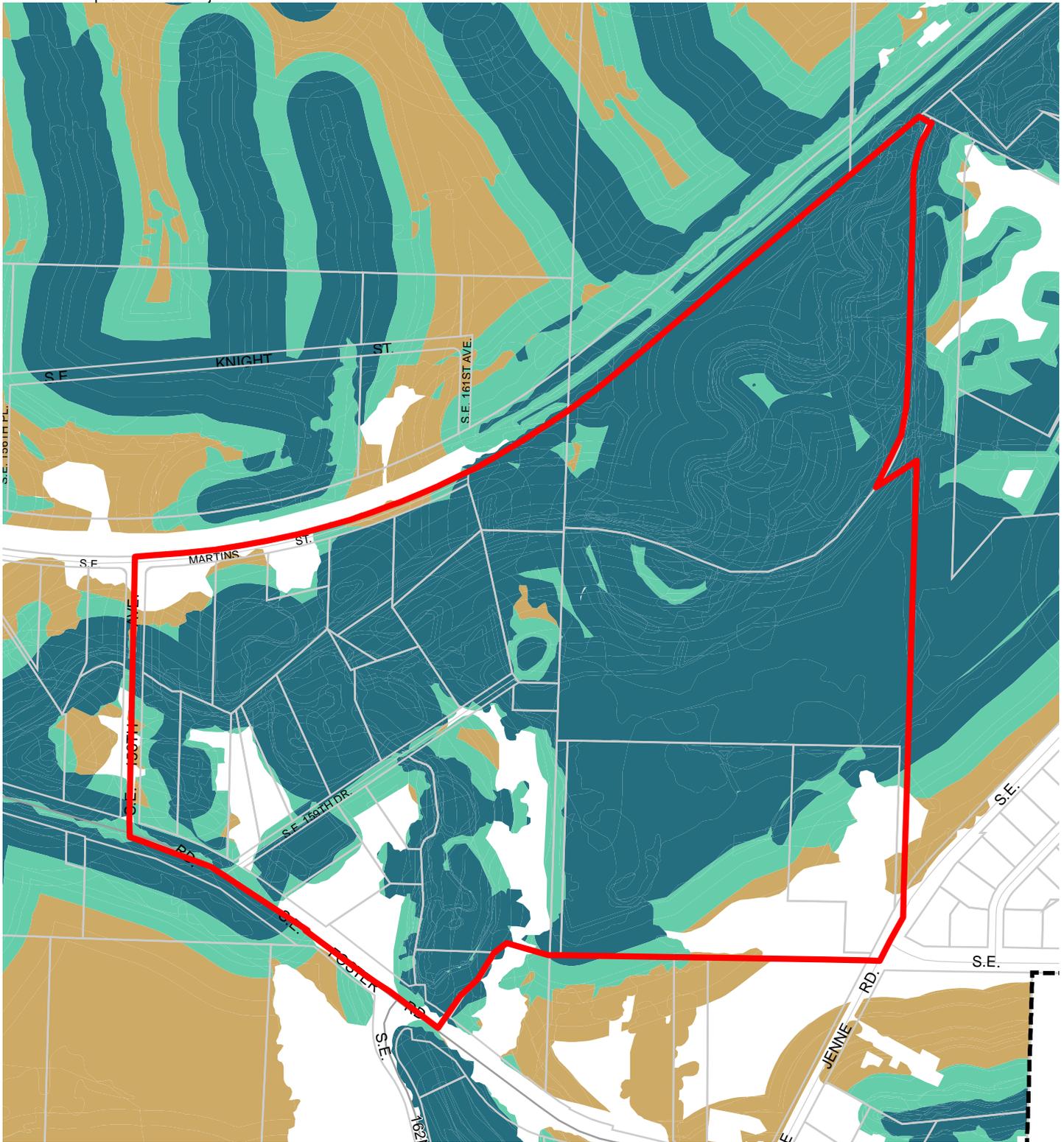
Updated: June 2021



- Resource Sites
- Special Habitat Areas (SHAs)
- Open Stream Channel
- Piped Stream Segment
- Parks
- Schools
- Urban Service Boundary
- Taxlots



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**Map D: Riparian
Corridors Habitat
Classification**

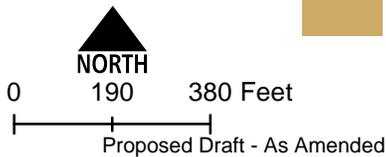
**Resource Site:
JC25**

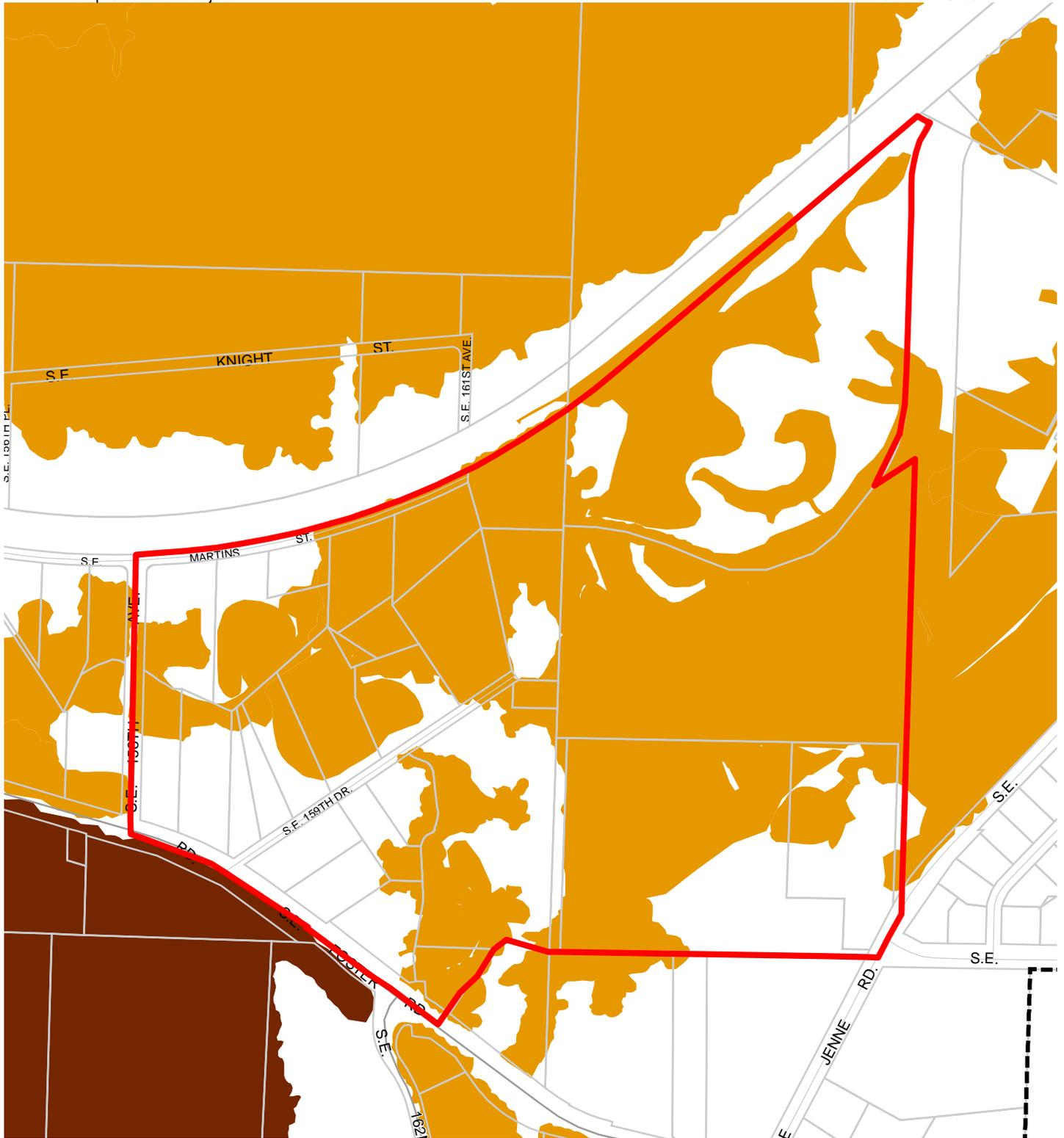
Updated: July 2021

- Resource Sites
- Urban Service Boundary
- Class I (high rank)
- Taxlots
- Class II (medium rank)
- Class III (low rank)



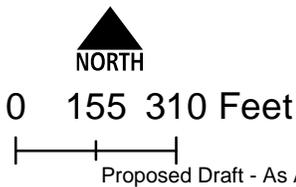
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**Map E: Wildlife
Habitat Classification**
**Resource Site:
JC25**

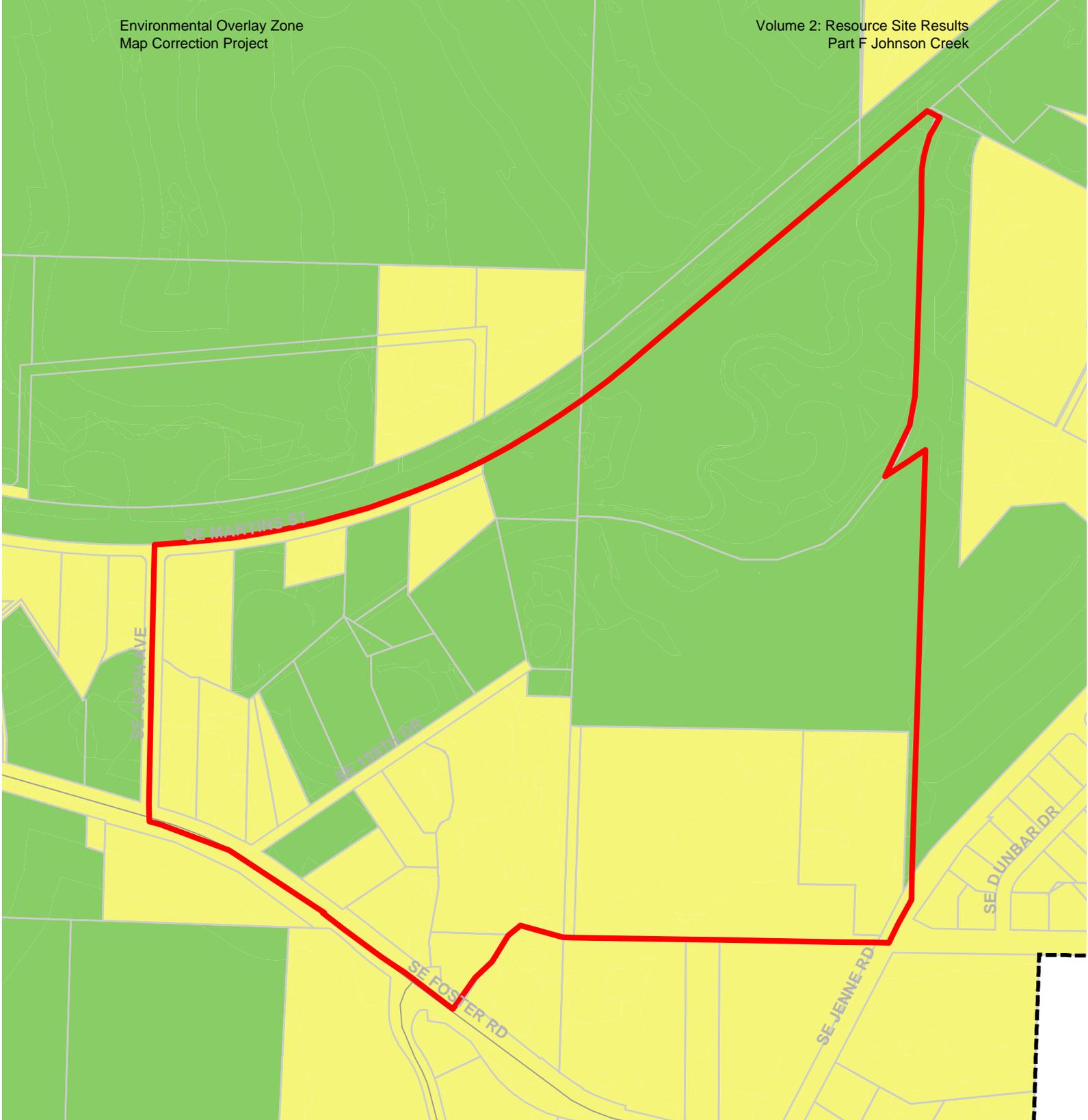
Updated: July 2021



-  Resource Sites
-  Class A (high rank)
-  Class B (medium rank)
-  Class C (low rank)
-  Urban Service Boundary
-  Taxlots



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July 2021

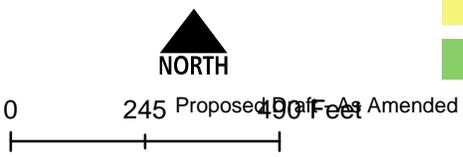


Map F: Urban Development Value (Title 13)
Resource Site: JC25

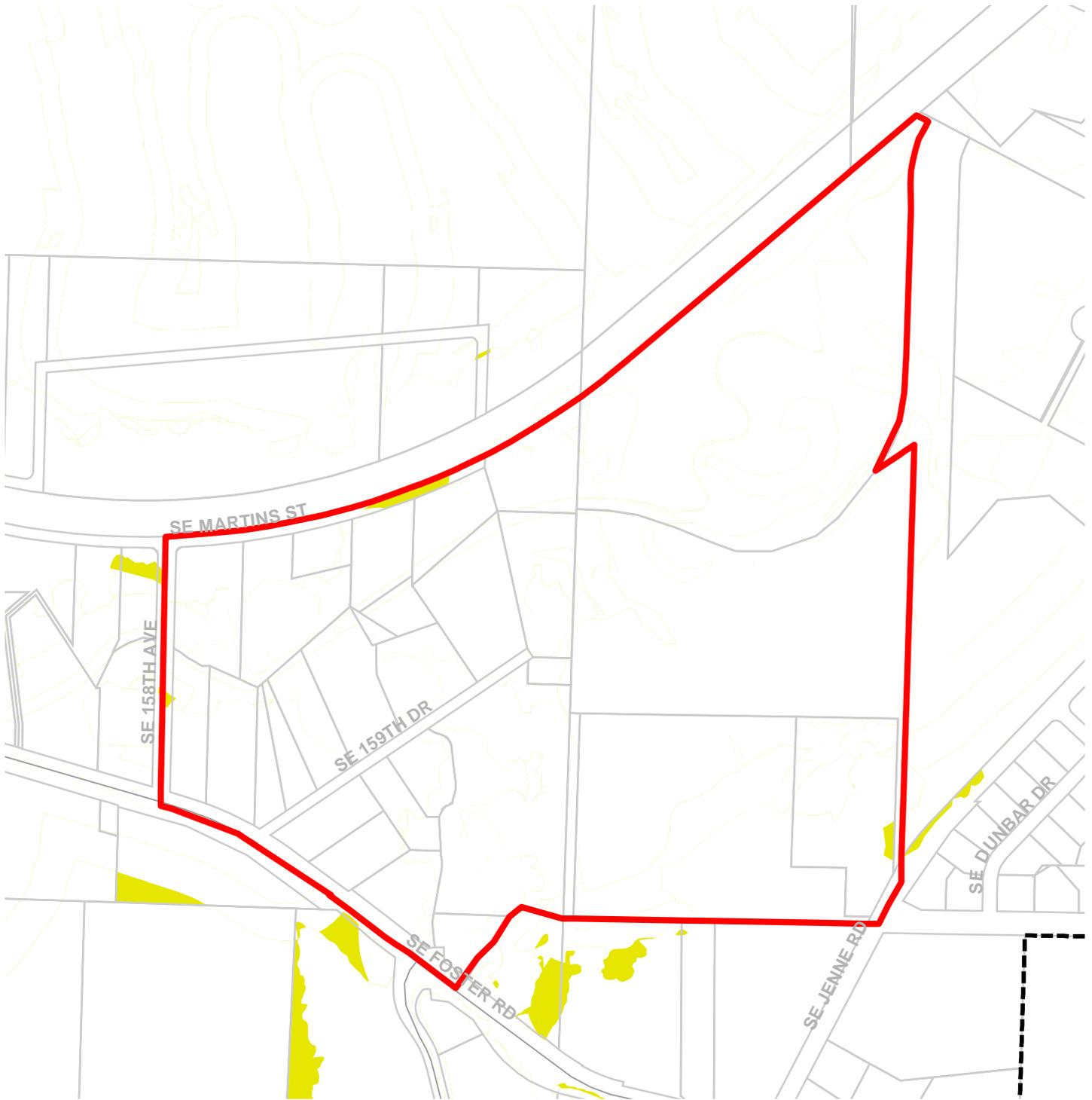
-  Urban Service Boundary
-  Resource Sites
-  High Development Value
-  Medium Development Value
-  Low Development Value
-  Parks



Updated: July 2021



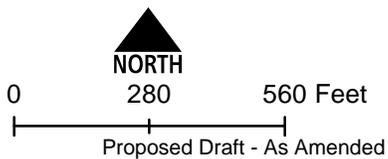
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Map H: Goal 5 Resources

Resource Site: JC25

Updated: July 2021

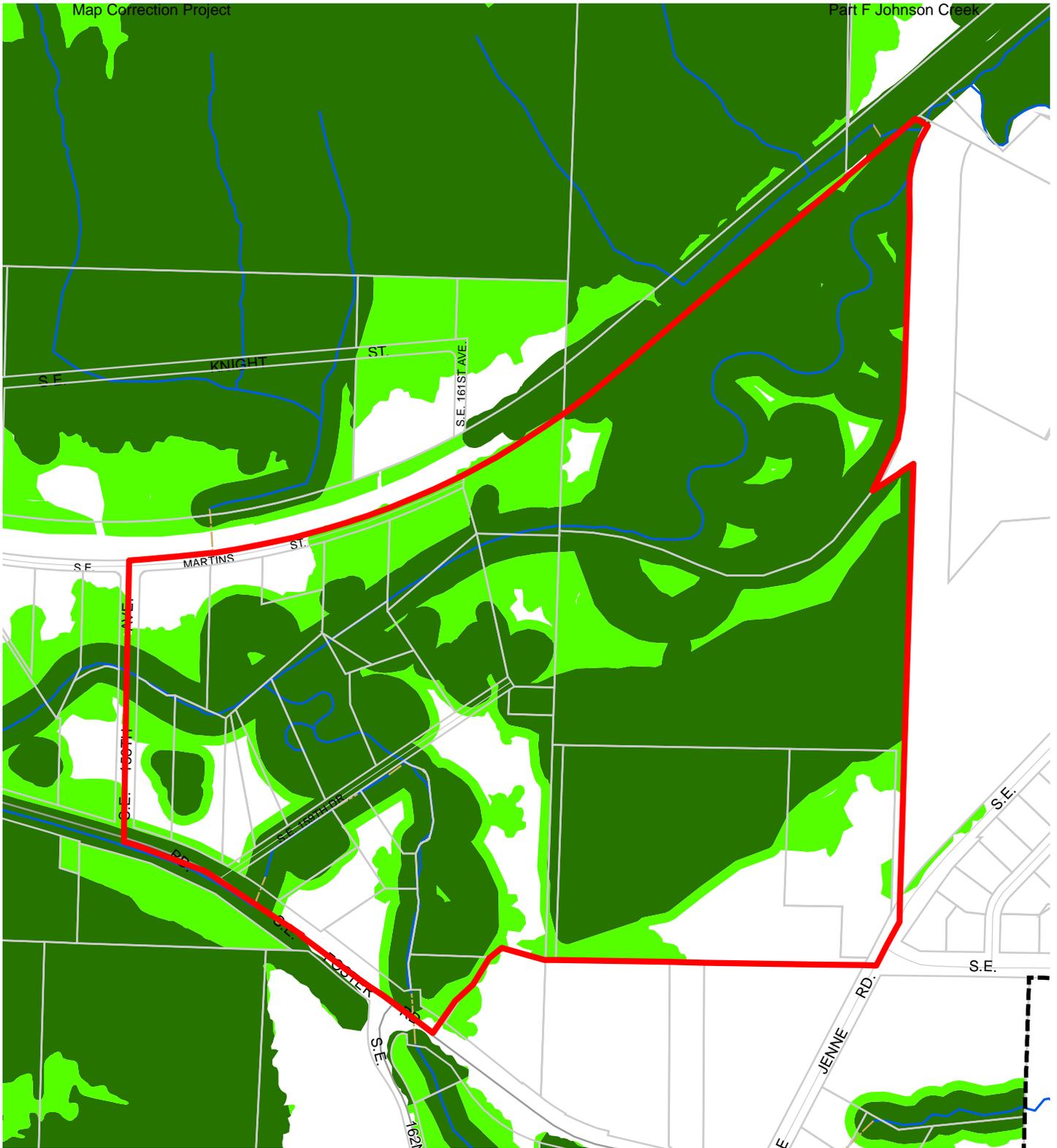


- Urban Service Boundary
- Resource Sites
- Goal 5 Significant Natural Resources



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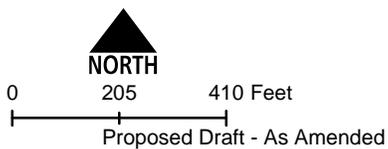
July 2021



Map I: DRAFT Proposed Environmental Overlay Zones

Resource Site: JC25

Updated: July 2021



- Resource Sites
- Open Stream Channel
- Piped Stream Segment
- Proposed Conservation Zone
- Proposed Protection Zone
- Urban Service Boundary
- Taxlots



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July 2021

Natural Resource Description

Within resource site JC25 the following significant natural resource features and functions are present:

Significant Riparian Corridor Features: open stream; wetland; flood area; land within 50 feet of waterbodies; forest, woodland, shrubland and herbaceous vegetation within 300 feet of waterbodies; and forest vegetation on steep slopes (>25% slope) contiguous to and within 780 feet of waterbodies.

Significant Wildlife Habitat Features: forest patches, and associated and contiguous wetlands, two acres in size or larger.

Special Habitat Areas: Johnson Creek (S, C); wetlands (W)

Riparian Corridor Functions: microclimate and shade; stream flow moderation and water storage; bank function and sediment, pollution and nutrient control; large wood and channel dynamics; organic inputs, food web and nutrient cycling; and riparian wildlife movement corridor.

Wildlife Habitat Functions: interior area; food and water; resting, denning, nesting and rearing; movement and migration; reduction of noise, light and vibration; and habitat patches that support special status fish and wildlife species.

Table A: Quantity of Natural Resource Features in Resource Site		JC25
		Study Area
Stream (Miles)		1.0
Wetlands (acres)		24.9
Vegetated Areas >= 1/2 acre (acres)		
	Forest (acres)	24.6
	Woodland (acres)	4.1
	Shrubland (acres)	18.3
	Herbaceous (acres)	6.9
Flood Area*		
	Vegetated (acres)	29.4
	Non-vegetated (acres)	2.3
Steep Slopes (acres)**		13.7
* The flood area includes the FEMA 100-year flood plain plus the adjusted 1996 flood inundation area.		
**Slopes are derived from LiDAR. Steep slopes are areas with a slope greater than 25%.		

This resource site is at the eastern end of the valley between Powell Butte and Clatsop Butte. The site is bordered by the Springwater Corridor Trail on the north, SE 158th Avenue on the west, Foster Road to Jenne Road on the south. The eastern boundary of the resource site follows the eastern edge of the Schweitzer Natural Area (part of the Lower Powell Butte Floodplain). Johnson Creek flows from northeast to southwest through the site. The confluence of Kelley Creek, a major tributary of Johnson Creek, is at the western site of the resource site.

Much of the site is publicly owned natural areas. It also includes low-density residential properties with pasture lands. A large event facility is located on the southeast corner of the site, which includes an impoundment for Kelley Creek that creates a landscaped pond on the site. The 100-year floodplain covers significant portions of the site. Wetlands are found extensively throughout the site.

Johnson Creek and its long history of flooding have influenced this site. Much of the site is within the 100-year floodplain and perennial flooding in this area is common. Development and impervious surfaces along Johnson Creek have decrease stream capacity, increased runoff and limited the capacity for local flood management or infiltration. Larger flood events generally occur from December through February, with 85 percent of the stream's runoff occurring between November and March.

The Schweitzer Natural Area, a floodplain restoration project completed by BES in 2007 reconfigured and recountoured Johnson Creek and restored 22 acres of former pastureland to floodplain and wetland habitat. The project moved the creek from the straightened, rock-lined channel created by the WPA and created a new, more sinuous channel, with more natural meanders and backwater areas. Large wood and root wads were added to the creek, instream enhancements include riffles and pools to improve conditions for ESA-listed salmonids and other native aquatic species. During project construction, 1,400 fish were rescued from the site; all but 30 fish (2 species) were native fish. The natural area can be viewed from a public overlook from the Springwater Corridor Trail.

The site was excavated to add flood storage and to create floodplain and wetland habitat. The site is extensively inundated during high flows in Johnson Creek, however, the FEMA floodplain (Special Flood Hazard Area) has not been updated, as of 2020, to reflect the new flood extents on the property. Because of this, the City of Portland's floodplain map differs from actual conditions on the site.

The Kelley Creek Confluence project was completed by BES in 2004. The six-acre project at the confluence of Kelley and Johnson Creeks restored natural floodplain functions, increased flood storage, improved water quality and enhanced instream and upland habitat functions. The project included removing fill and creating meanders in Kelley Creek. The reconfigured creek

added 200 feet of cold-water spawning and rearing habitat for salmonids. Backwater channels were added on both Johnson and Kelley creeks to provide wetland habitat, high-flow refuge for fish, and floodwater storage.

Several types of wetland cover much of the landscape in this resource area including emergent, scrub-shrub and forested wetlands. All five native species of pond-breeding amphibians have been found breeding in across this site in wetlands and backwater channels (Guderyahn, 2019). Wetlands on the southeast portion of the site are on privately-owned property.

Private development in the area is low-density residential and small farms, as well as a large event facility. Pasturelands are heavily grazed and impoundments are found in at least two locations on Kelley Creek, creating impacts on water temperature in the tributary. Forest, forested wetland and woodland habitats are found in the site, especially along Johnson Creek and Kelley Creek. The site provides critical habitat connectivity along the Johnson Creek system and with the adjacent Powell Butte and Clatsop Butte.

Coho salmon, steelhead trout, and Pacific lamprey have been documented in this reach of Johnson Creek. In 2019, a study of Johnson Creek's potential to support salmon populations identified this reach of Johnson Creek as to protect habitat for coho and Chinook salmon and steelhead trout —meaning that past habitat restoration work has provided great benefits to all salmonids using the reach, and protection from future degradation is warranted.

Special status bird species observed in or adjacent to this resource site include American kestrel, bald eagle, black-throated gray warbler, brown creeper, bufflehead, bushtit, chipping sparrow, common yellowthroat, downy woodpecker, great blue heron, green heron, hooded merganser, house wren, loggerhead shrike, merlin, Nashville warbler, northern harrier, olive-sided flycatcher, orange-crowned warbler, pacific-slope flycatcher, peregrine falcon, pileated woodpecker, purple finch, purple martin, red-eyed vireo, rufous hummingbird, short-eared owl, Swainson's thrush, Vaux's swift, vesper sparrow, white-breasted nuthatch, willow flycatcher, Wilson's warbler, wood duck, yellow warbler, and yellow-breasted chat.

Table B: Quality of Natural Resource Functions in Resource Site JC25				
Resource Site (acres) = 67				
	Class 1/A	Class 2/B	Class 3/C	Total
Riparian Corridors*				
acres	50.1	7.0	1.4	58.5
percent total inventory site area	75.0%	10.4%	2.1%	87.6%
Wildlife Habitat*				
acres	0.0	42.0	0.0	42.0
percent total inventory site area	0.0%	62.9%	0.0%	62.9%
Special Habitat Areas**				
acres	17.6			
percent total inventory site area	26.3%			
Combined Total*				
acres	50.1	7.3	1.1	58.5
percent total inventory site area	75.0%	10.9%	1.7%	87.6%
* Class I riparian resources, Special Habitat Areas, and wildlife habitat include open water. ** Metro Title 13 designated all Special Habitat Areas as Class I riparian corridors. +Because riparian resources, Special Habitat Areas, and wildlife Habitat overlap, the results cannot be added together to determine the combined results.				

Stormwater runs off impervious surfaces (e.g., rooftops, driveways, parking areas, streets, etc..) rapidly. Without a place to retain the water (such as wetlands or adequate stormwater facilities), stormwater runoff results in spikes in stream levels which can cause or exacerbate flooding and increase stream erosion. In addition, when water runs off quickly, it does not have a chance to infiltrate and recharge streams or aquifers to provide water during drier periods.

The type and capacity of stormwater facilities to manage the runoff from impervious surfaces varies in the city, affecting the local rate and amount of runoff, and the amount of pollutants in the water. Much of the city was developed prior to any stormwater regulations and receives limited or no management prior to discharging to pipes and surface waters.

Table C shows the total amount of impervious area within the resource site and how much of that impervious area lacks stormwater management; the percentage of total impervious area that is not managed is called "effective impervious area." The higher the percent of effective impervious area in a watershed, the greater the negative impacts of stormwater runoff to streams. Stream science indicates that when effective impervious area reaches 10% of a watershed, negative stream impacts become significant; and at 25%, these impacts on waterways can be substantial. An additional consideration is the differences in soil conditions

and other factors that influence the ability of pervious areas to retain, infiltrate or filter pollutants from stormwater. For example, a mature forest is much more effective in managing stormwater than a manicured lawn; both areas would have a lower effective impervious surface percentage than a developed site, but they have different outcomes for stormwater management.

For Resource Area JC25, 3% of the total area is effectively impervious. This indicates a significant degree of stormwater management and/or existing natural resources that should be preserved. Areas with very low impervious cover and existing vegetation are more likely to be functioning properly to support biologic systems.

Table C. Impervious Area within Resource Site JC25			
Total area (acres)	Total impervious Area (acres)	Total unmanaged impervious area* (acres)	Percent of resource site that is effectively impervious
67	3.1	2.2	3%

*Total unmanaged impervious area refers to the number of acres within a resource area that receives no formal stormwater management measures to regulate flow or treat pollutants before they reach surface waters, also referred to as effective impervious area.

Metro Title 13 and Oregon Goal 5 Compliance

The following information supplements evaluation of natural resource protections presented in Volume 4 and supports compliance with Metro Title 13 and Oregon Plan Goal 5.

Title 13 Habitat Conservation Areas

Map G presents the Habitat Conservation Areas (HCA) within the Resource site JC25. Natural resources should be protected within HCA as follows:

1. *Strictly limit* or *limit* conflicting uses within Class I/High Rank Riparian Areas in all Urban Development Areas.
2. *Strictly limit* or *limit* conflicting uses within Class II/Medium Rank Riparian Areas within Moderate and Low Value Urban Development Area as well as parks and open spaces.
3. *Strictly limit* or *limit* conflicting uses within Class A/High or B/Medium Rank Wildlife Habitat within parks and open spaces.
4. *Allow* conflicting uses or conducted a local Goal 5 ESEE for Class III/Low Rank Riparian Areas in all Urban Development Areas.

5. *Allow* conflicting uses or conducted a local Goal 5 ESEE for Class A/High, Class B/Medium or Class C/Low Rank Wildlife Habitat in all Urban Development Area, except parks and open space.

Strictly limiting or *limiting* conflicting uses in HCA will protect and conserve existing streams and wetlands to maintain significant natural resource functions including: microclimate and shade; stream flow moderation and water storage; bank function and sediment, pollution and nutrient control; large wood and channel dynamics; organic inputs, food web and nutrient cycling; and fish and wildlife habitat. *Strictly limiting* or *limiting* conflicting uses in HCA will allow for additional urban development that is sensitive to the natural resource features and requires mitigation for unavoidable negative impacts to features and functions. The recommendation will also contribute towards meeting other regulatory requirements including the Metro Title 3, Water Quality and Flood Management; Oregon Goal 6, Air, Water and Land Resources Quality; Oregon Goal 7, Areas Subject to Natural Hazards; the Clean Water Act; and the Endangered Species Act.

Goal 5 Significant Natural Resources

Resource site JC25 contains natural resource features that are not a Title 13 HCA and are therefore subject to Statewide Planning Goal 5 OAR 660-023-0110. The General ESEE analysis, Volume 4, describes the conflicting uses and provides an overarching analysis of the economic, social, environmental and energy consequences of prohibiting, limiting or allowing the conflicting uses within areas of significant natural resources. In addition to the General ESEE analysis, the following resource site-specific consequences are considered.

The common impacts of conflicting uses in the resource site include clearing vegetation; grading activities and soil compaction; adding impervious surface; modifying streams, wetlands and flood areas; generating pollution; landscaping with non-native or invasive vegetation; building fences or other wildlife barriers; and other impacts such as noise, light, litter and pets.

Within the resource site residential uses are allowed outright or conditionally in the R20 and R10 base zones. Open space uses are allowed in the OS base zone. Development of new uses may involve vegetation clearing, grading, filing, and soil compaction, as well as the addition of impervious surfaces and landscaping with non-native plants, with associated impacts on the natural resources. Basic utilities and other infrastructure are allowed in all base zones. New or upgraded utility corridors may be cleared of vegetation and may fragment wildlife habitat.

The analysis of economic, social, environmental and energy consequences provided in Volume 4 is confirmed for resource site JC25, with the following additional information that clarifies the analysis.

Strictly limiting or limiting conflicting uses would retain the wildlife habitat functions provided by significant natural resource features including maintaining habitat for at risk plant, fish and wildlife species, maintaining vegetation on steep slopes, and maintaining the stormwater management and air-cooling functions of the tree canopy. Mitigation for negative consequences of additional development in areas of Class A or Class B wildlife habitat should be required.

Natural Resources Protection Decisions

Based on the analysis presented in Volume 3, Natural Resources Inventory, Volume 4, Title 13 and Goal 5 Compliance, and the resource site-specific evaluation for JC25, the following decisions are applied to protect the significant riparian corridors and wildlife habitat:

1. Apply a protection overlay zone ('p' zone) to stream channels from top-of-bank to top-of-bank and wetlands,
2. Apply a protection overlay zone ('p' zone) to vegetation within the flood area and to land within 50 feet of stream top-of-bank or 30 feet of wetlands.
3. Apply a conservation overlay zone ('c' zone) to land between 50 and 75 feet of stream top-of-bank and 30 and 55 feet of wetland.
4. Apply a conservation overlay zone ('c' zone) to areas of forest or woodland vegetation contiguous to but more than 75 feet from stream top-of-bank or 55 feet from wetlands.
5. Allow conflicting uses within all other areas containing significant natural resources.

Resource Site No.: JC26 Resource Site Name: Jenne & McKinley

Previous Plan: Johnson Creek Basin Protection Plan

Previous Resource Site No.: 27

The results of the analysis found in Volume 3, Natural Resources Inventory, Volume 4, Title 13 and Goal 5 Compliance, and the resource site-specific evaluation, are presented in the following maps:

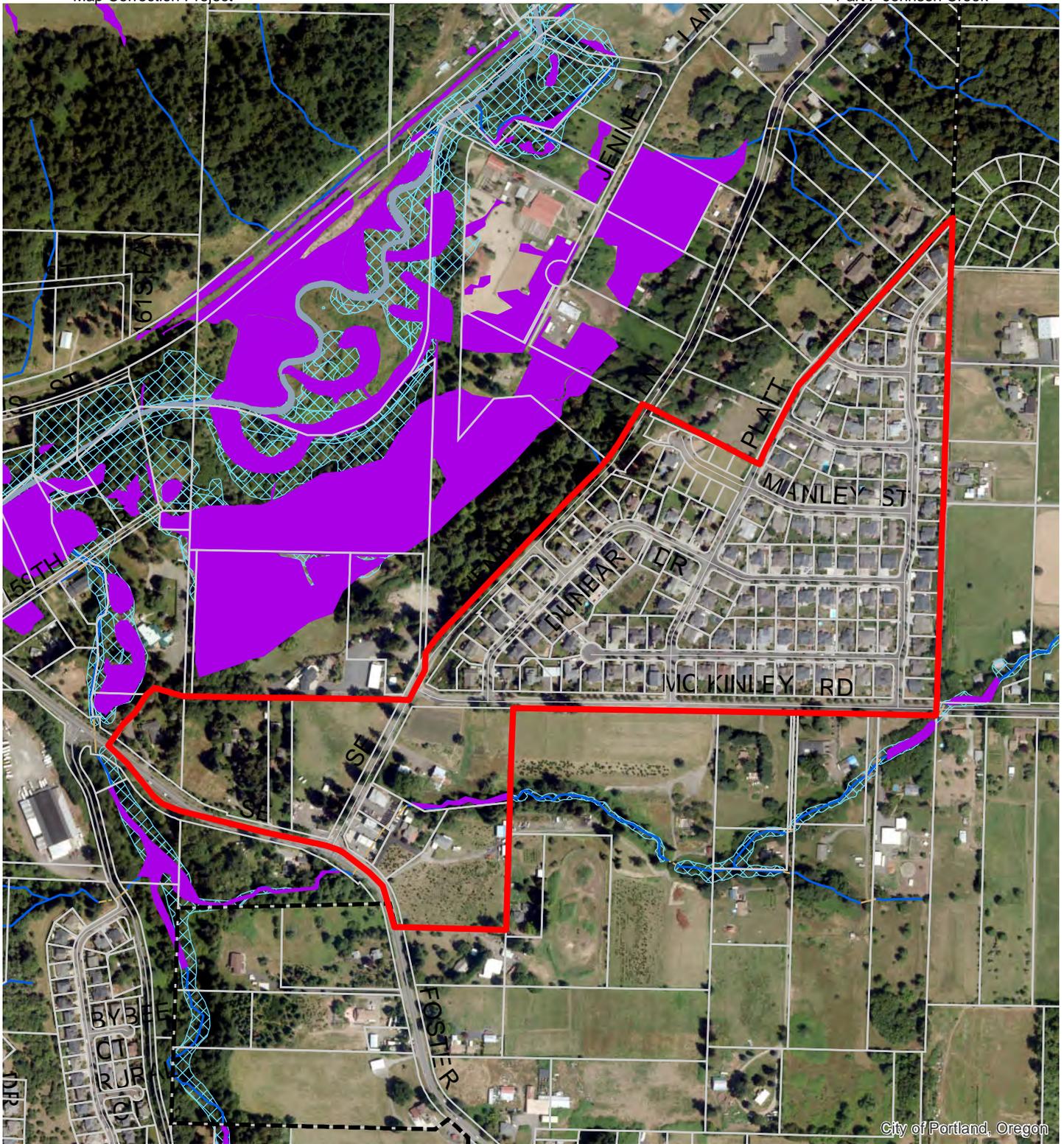
- A. Water Features – rivers, streams, wetlands and flood areas
- B. Land Features – forest, woodland, shrubland and herbaceous vegetation, steep slopes
- C. Special Habitat Areas
- D. Riparian Corridor Classifications
- E. Wildlife Habitat Classifications
- F. Urban Development Value
- G. Metro Title 13 Habitat Conservation Areas
- H. Statewide Planning Goal 5 Areas
- I. Recommended Natural Resource Protections

Following the maps, additional information about existing natural resource features and functions in the resource site is presented.

Implementation of the results is found in Volume 1, Part B, updates to zoning maps and zoning code.

Resource site JC26 includes the following:

Site (acres)	69.6
Base zones (acres)	
CE	2.0
R10	67.6
R20	<1
RF	<1



City of Portland, Oregon

Map A: Water Features

Resource Site: JC26

Updated: July 2021



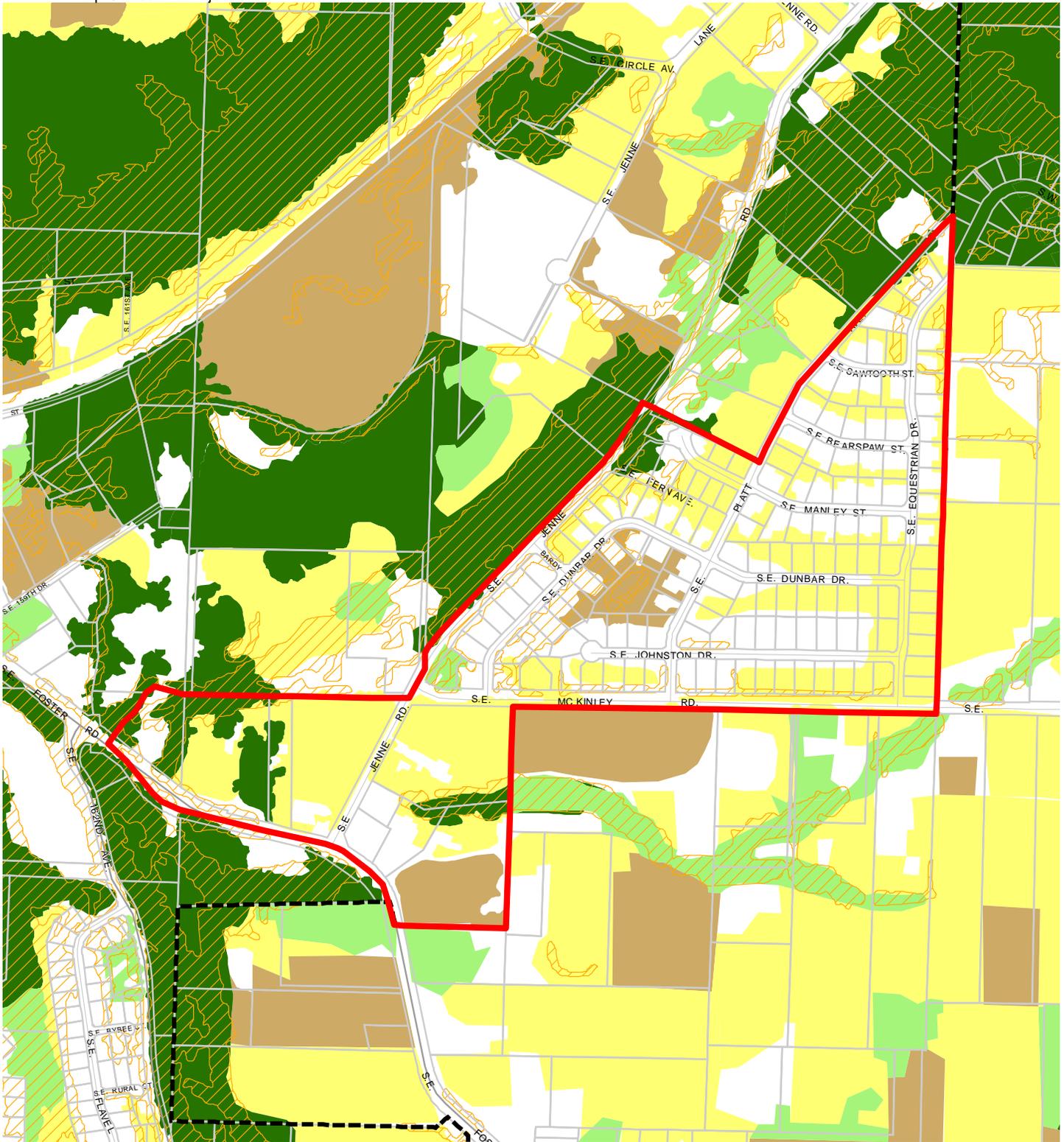
0 280 560 Feet

Proposed Draft - As Amended

- Resource Sites
- Urban Service Boundary
- Taxlots
- Wetlands
- Rivers
- Open stream channel
- Piped Stream Segment
- Flood Area



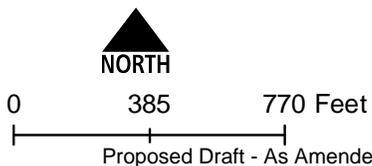
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July 2021



Map B: Vegetation and Steep Slopes

Resource Site: JC26

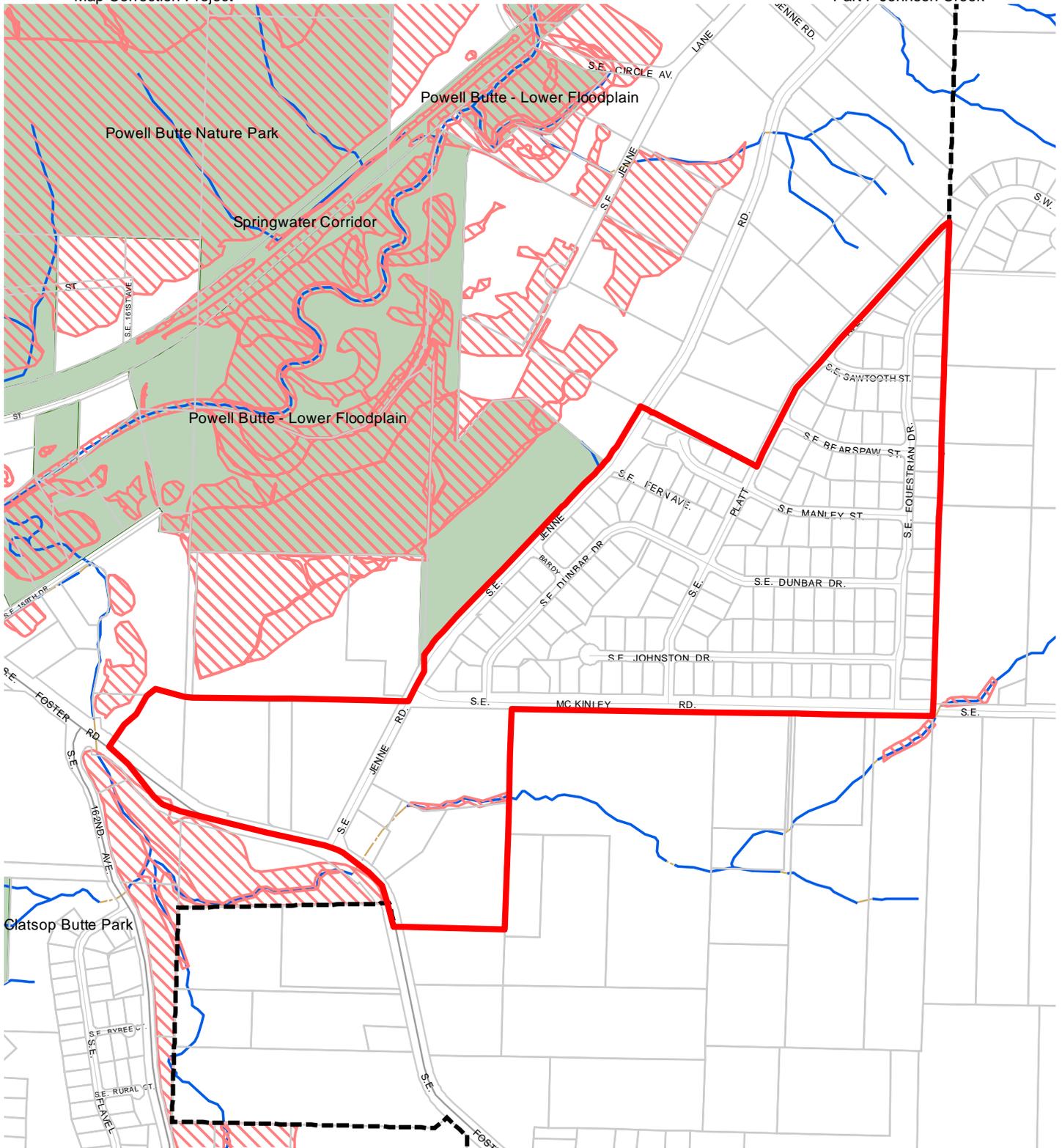
Updated: July 2021



- Resource Sites
- Urban Service Boundary
- Taxlots
- Slopes >25%
- Forest
- Woodland
- Shrubland
- Herbaceous



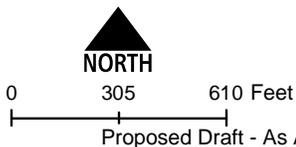
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**Map C: Special
Habitat Areas**

**Resource Site:
JC26**

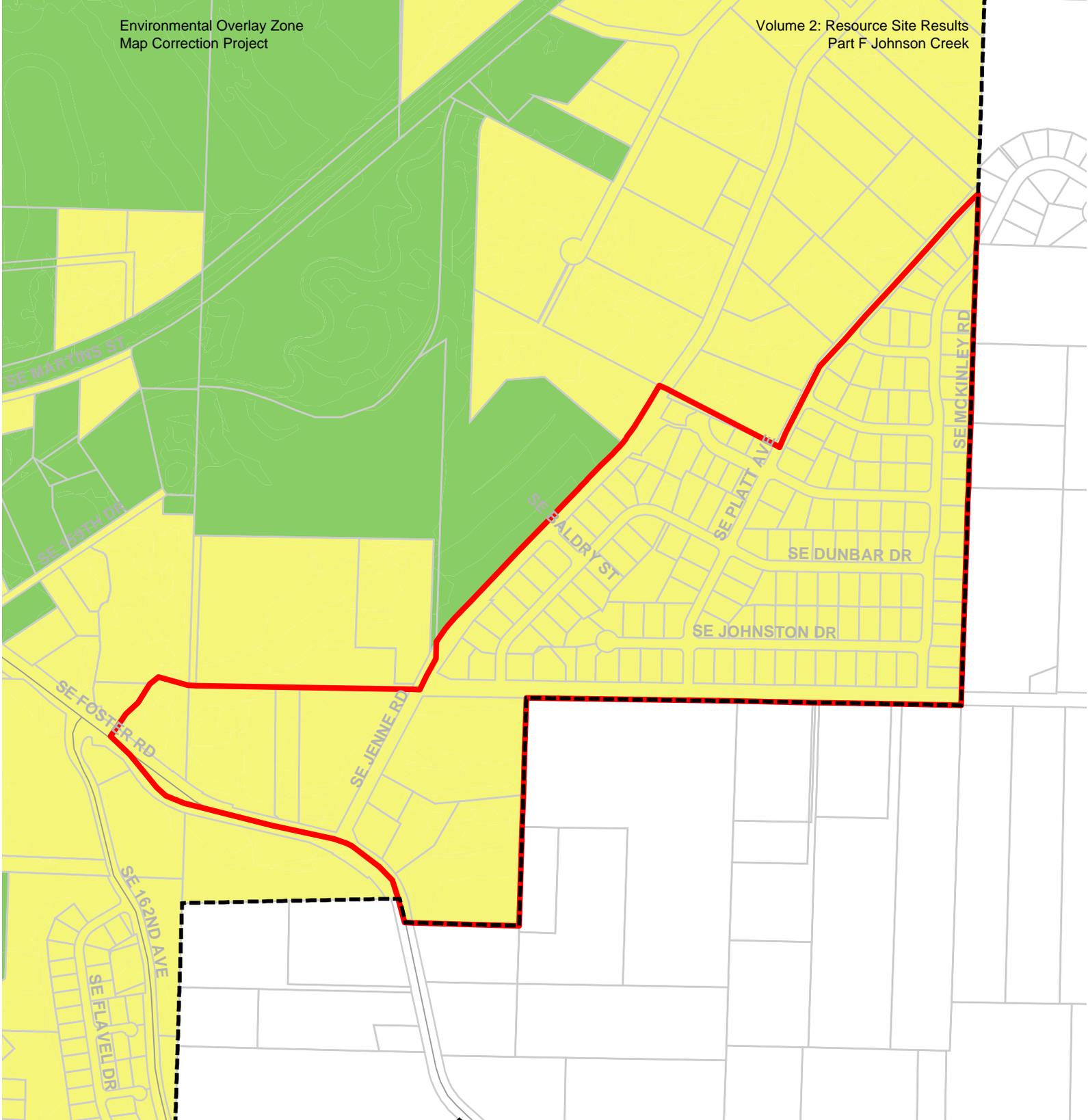
Updated: June 2021



-  Resource Sites
-  Special Habitat Areas (SHAs)
-  Open Stream Channel
-  Piped Stream Segment
-  Parks
-  Schools
-  Urban Service Boundary
-  Taxlots



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July 2021

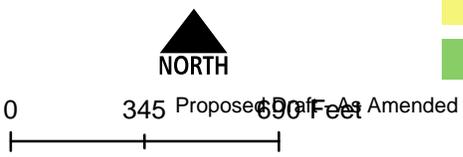


Map F: Urban Development Value (Title 13)
Resource Site: JC26

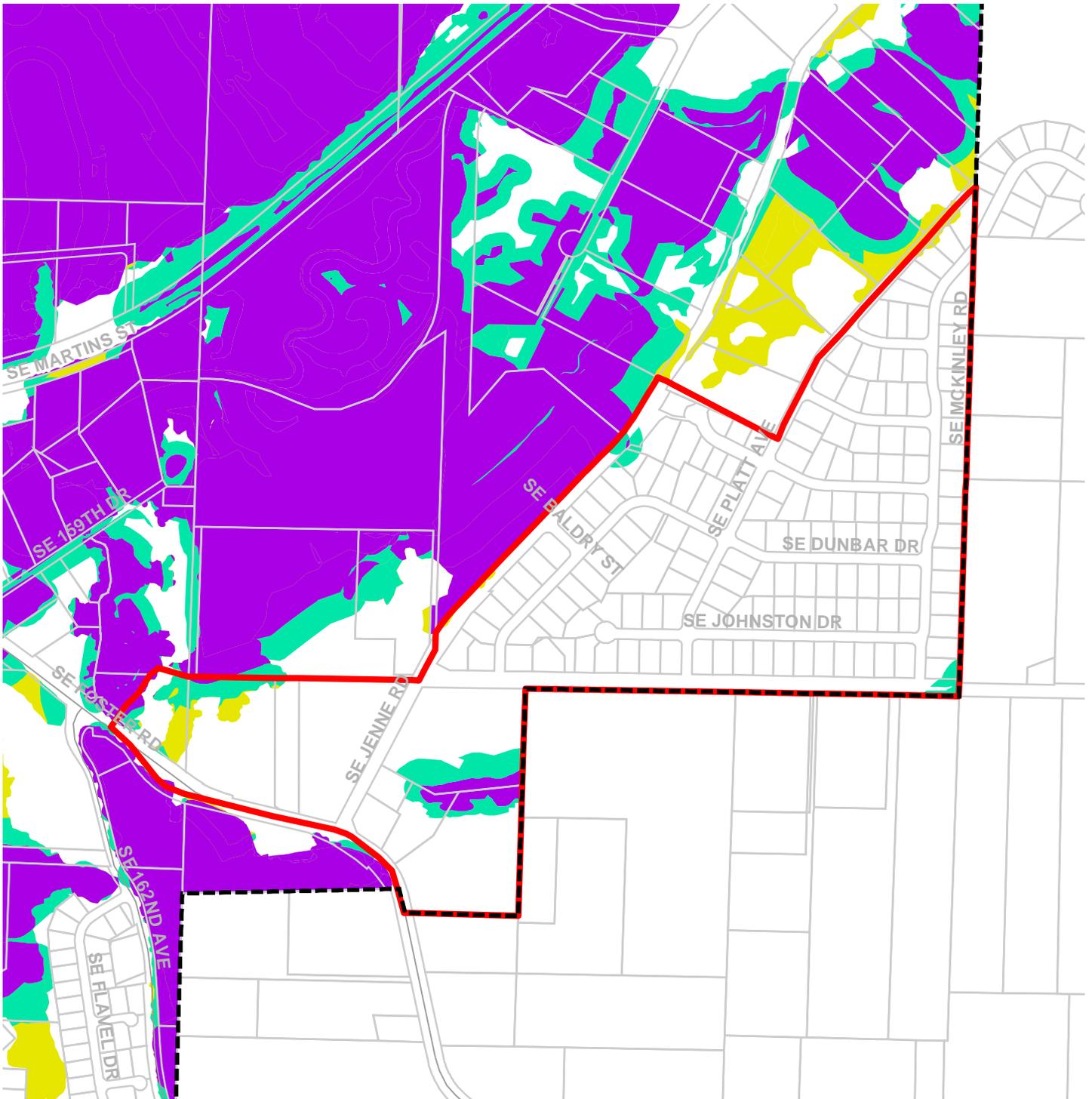
-  Urban Service Boundary
-  Resource Sites
-  High Development Value
-  Medium Development Value
-  Low Development Value
-  Parks



Updated: July 2021



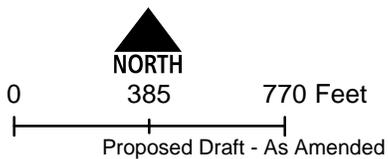
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Map G: Title 13 Habitat Conservation Areas (HCA) and Goal 5 Areas

Resource Site: JC26

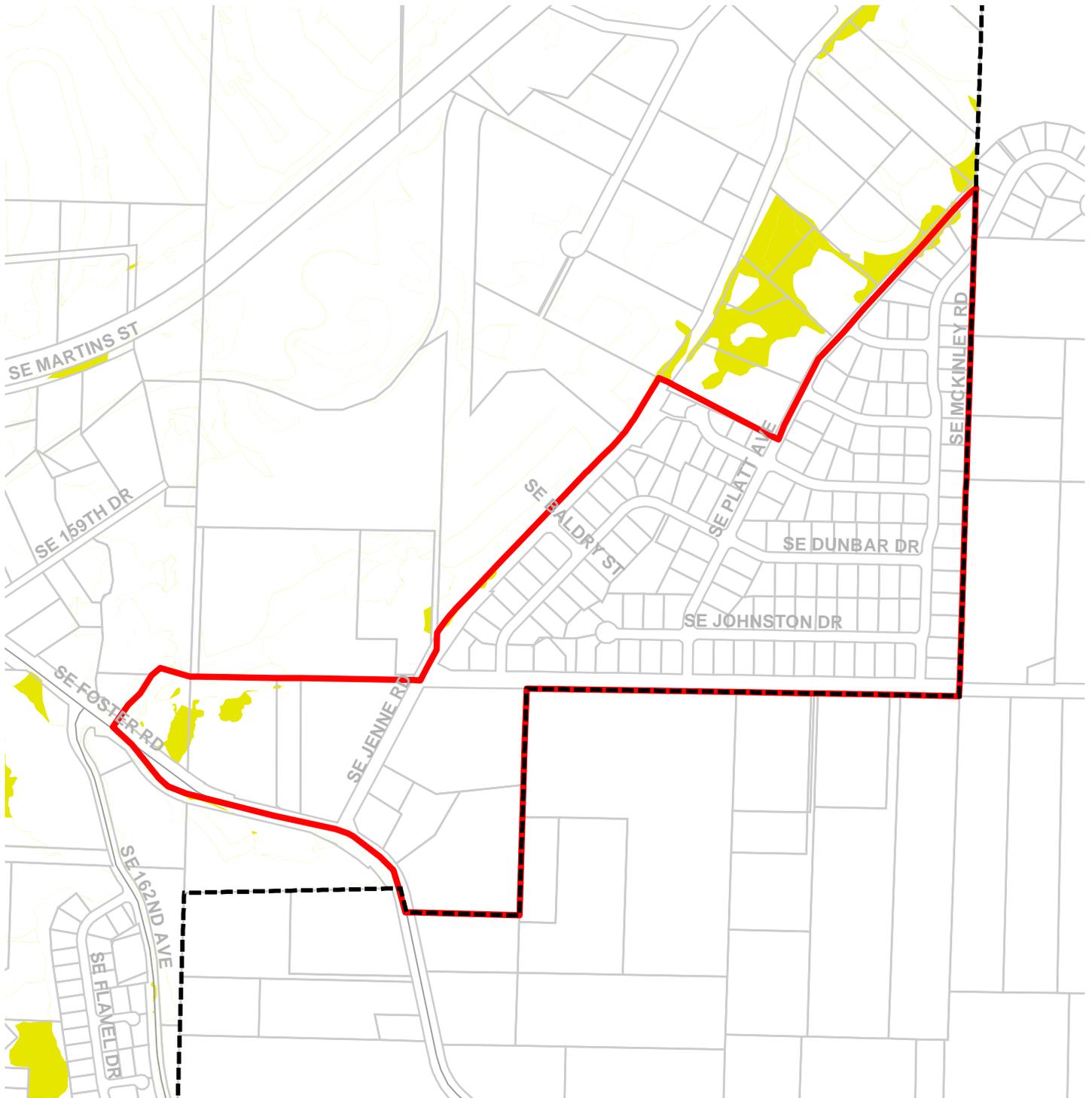
Updated: July 2021



- Urban Service Boundary
- ▭ Resource Sites
- ▭ HCA High Value
- ▭ HCA Moderate Value
- ▭ HCA Low Value
- ▭ Goal 5 Significant Natural Resources



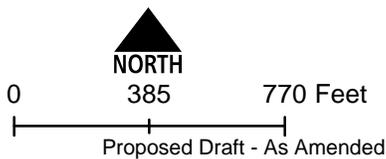
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Map H: Goal 5 Resources

Resource Site: JC26

Updated: July 2021

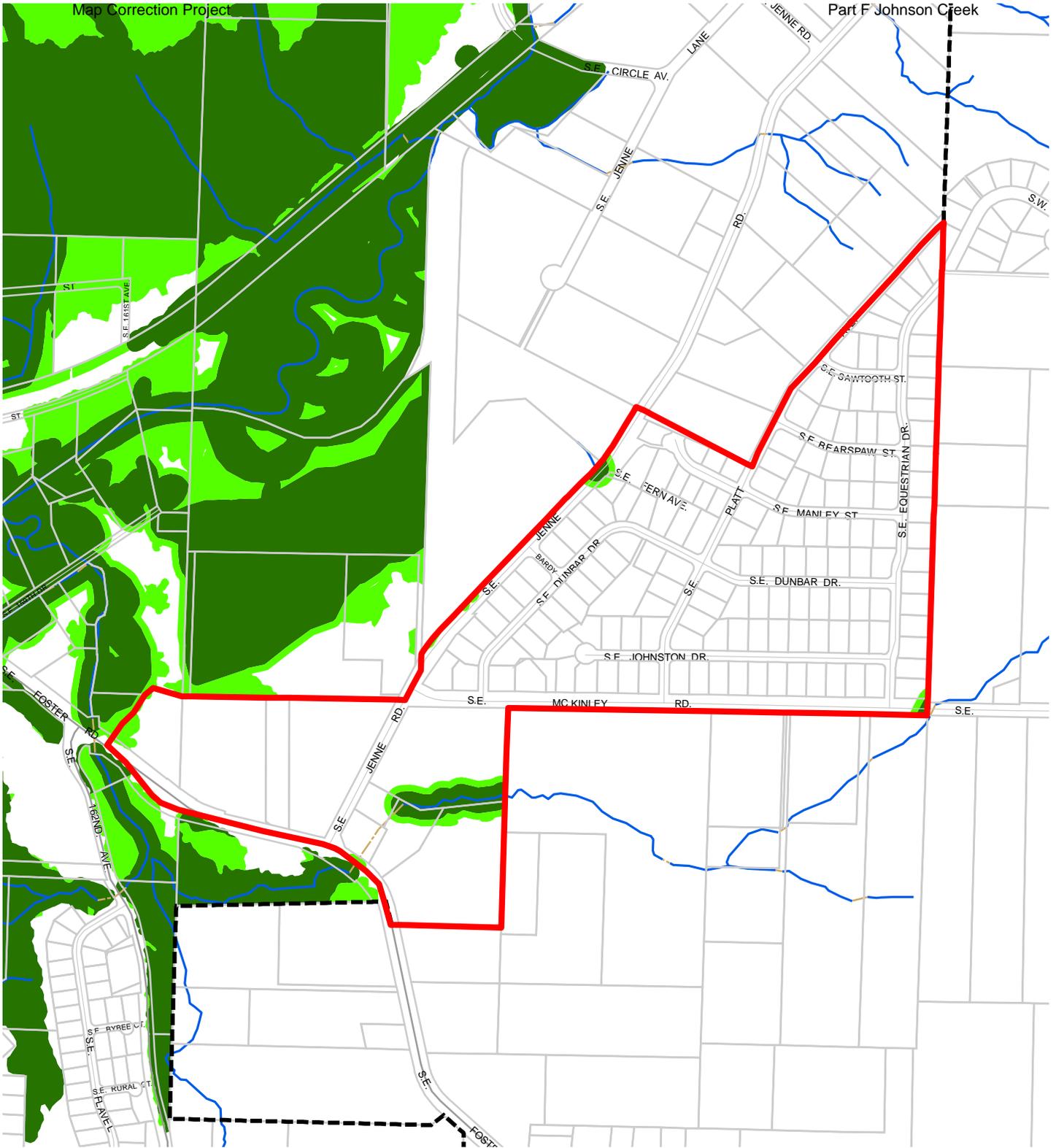


- Urban Service Boundary
- Resource Sites
- Goal 5 Significant Natural Resources



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July 2021

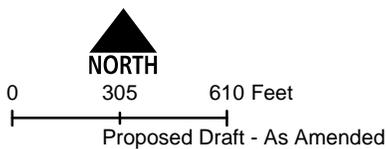


Map I: DRAFT Proposed Environmental Overlay Zones

**Resource Site:
JC26**

Updated: July 2021

-  Resource Sites
-  Open Stream Channel
-  Urban Service Boundary
-  Piped Stream Segment
-  Proposed Conservation Zone
-  Proposed Protection Zone
-  Taxlots



The information on the map was derived from digital databases. Care was taken in the creation of this map but it is provided "as is". The City of Portland ensures meaningful access to city programs, services, and activities to comply with Civil Rights Title VI and ADA Title II laws and reasonably provides: translation, interpretation, modifications, accommodations, alternative formats, auxiliary aids and services. To request these services, contact 503-823-7700, City TTY 503-823-6868, Relay Service: 711.
July 2021

Natural Resource Description

Within resource site JC26 the following significant natural resource features and functions are present:

Significant Riparian Corridor Features: open stream; land within 50 feet of waterbodies; forest, woodland, shrubland and herbaceous vegetation within 300 feet of waterbodies; and forest vegetation on steep slopes (>25% slope) contiguous to and within 780 feet of waterbodies.

Significant Wildlife Habitat Features: forest patches, and associated and contiguous wetlands, two acres in size or larger.

Special Habitat Areas: Johnson Creek (S, C)

Riparian Corridor Functions: microclimate and shade; stream flow moderation and water storage; bank function and sediment, pollution and nutrient control; large wood and channel dynamics; organic inputs, food web and nutrient cycling; and riparian wildlife movement corridor.

Wildlife Habitat Functions: interior area; food and water; resting, denning, nesting and rearing; movement and migration; reduction of noise, light and vibration; and habitat patches that support special status fish and wildlife species.

Table A: Quantity of Natural Resource Features in Resource Site		JC26
		Study Area
Stream (Miles)		0.1
Wetlands (acres)		0.2
Vegetated Areas >= 1/2 acre (acres)		
	Forest (acres)	4.7
	Woodland (acres)	0.4
	Shrubland (acres)	4.3
	Herbaceous (acres)	27.9
Flood Area*		
	Vegetated (acres)	0.0
	Non-vegetated (acres)	0.0
Steep Slopes (acres)**		9.1
* The flood area includes the FEMA 100-year flood plain plus the adjusted 1996 flood inundation area.		
**Slopes are derived from LiDAR. Steep slopes are areas with a slope greater than 25%.		

The site is roughly bounded by Resource Site JC25, Jenne Road, McKinley Road, along the southeastern City of Portland city limits. The majority of this site has been developed with single-dwelling residential uses with a few larger parcels in pastureland or farming. A small commercial hub is located at the corner of Foster Road and Jenne Road.

There is a small section of Jenne Creek in the lower portion of the site. The upper portion of the creek flows through farmland outside the City of Portland before it enters this resource site, is piped west under a gas station, then drains to Kelley Creek, a large tributary to Johnson Creek. There is a thin area of riparian canopy cover surrounded by shrub and herbaceous vegetation. The site has a history of agricultural uses with open pasture. There is a pond located at the western edge of the site, possibly fed by a drainage or water right from Kelley Creek.

Special status bird species observed in or adjacent to this resource site include bald eagle, black-throated gray warbler, bushtit, downy woodpecker, Swainson's thrush, Vaux's swift, western wood pewee, and Wilson's warbler.

Table B: Quality of Natural Resource Functions in Resource Site JC26				
Resource Site (acres) = 70				
	Class 1/A	Class 2/B	Class 3/C	Total
Riparian Corridors*				
acres	1.0	2.6	12.1	15.7
percent total inventory site area	1.5%	3.8%	17.4%	22.6%
Wildlife Habitat*				
acres	0.0	2.0	0.0	2.0
percent total inventory site area	0.0%	2.8%	0.0%	2.8%
Special Habitat Areas**				
acres	0.0			
percent total inventory site area	0.0%			
Combined Total*				
acres	1.0	3.6	11.1	15.7
percent total inventory site area	1.5%	5.1%	16.0%	22.6%
* Class I riparian resources, Special Habitat Areas, and wildlife habitat include open water. ** Metro Title 13 designated all Special Habitat Areas as Class I riparian corridors. + Because riparian resources, Special Habitat Areas, and wildlife Habitat overlap, the results cannot be added together to determine the combined results.				

Stormwater runs off impervious surfaces (e.g., rooftops, driveways, parking areas, streets, etc..) rapidly. Without a place to retain the water (such as wetlands or adequate stormwater facilities), stormwater runoff results in spikes in stream levels which can cause or exacerbate flooding and

increase stream erosion. In addition, when water runs off quickly, it does not have a chance to infiltrate and recharge streams or aquifers to provide water during drier periods.

The type and capacity of stormwater facilities to manage the runoff from impervious surfaces varies in the city, affecting the local rate and amount of runoff, and the amount of pollutants in the water. Much of the city was developed prior to any stormwater regulations and receives limited or no management prior to discharging to pipes and surface waters.

Table C shows the total amount of impervious area within the resource site and how much of that impervious area lacks stormwater management; the percentage of total impervious area that is not managed is called “effective impervious area.” The higher the percent of effective impervious area in a watershed, the greater the negative impacts of stormwater runoff to streams. Stream science indicates that when effective impervious area reaches 10% of a watershed, negative stream impacts become significant; and at 25%, these impacts on waterways can be substantial. An additional consideration is the differences in soil conditions and other factors that influence the ability of pervious areas to retain, infiltrate or filter pollutants from stormwater. For example, a mature forest is much more effective in managing stormwater than a manicured lawn; both areas would have a lower effective impervious surface percentage than a developed site, but they have different outcomes for stormwater management.

For Resource Area JC26, 1% of the total area is effectively impervious. This indicates a significant degree of stormwater management and/or existing natural resources that should be preserved. Areas with very low impervious cover and existing vegetation are more likely to be functioning properly to support biologic systems.

Table C. Impervious Area within Resource Site JC26			
Total area (acres)	Total impervious Area (acres)	Total unmanaged impervious area* (acres)	Percent of resource site that is effectively impervious
70	20	0.8	1%

*Total unmanaged impervious area refers to the number of acres within a resource area that receives no formal stormwater management measures to regulate flow or treat pollutants before they reach surface waters, also referred to as effective impervious area.

Metro Title 13 and Oregon Goal 5 Compliance

The following information supplements evaluation of natural resource protections presented in Volume 4 and supports compliance with Metro Title 13 and Oregon Plan Goal 5.

Title 13 Habitat Conservation Areas

Map G presents the Habitat Conservation Areas (HCA) within the Resource site JC26. Natural resources should be protected within HCA as follows:

1. *Strictly limit* or *limit* conflicting uses within Class I/High Rank Riparian Areas in all Urban Development Areas.
2. *Strictly limit* or *limit* conflicting uses within Class II/Medium Rank Riparian Areas within Moderate and Low Value Urban Development Area as well as parks and open spaces.
3. *Strictly limit* or *limit* conflicting uses within Class A/High or B/Medium Rank Wildlife Habitat within parks and open spaces.
4. *Allow* conflicting uses or conducted a local Goal 5 ESEE for Class III/Low Rank Riparian Areas in all Urban Development Areas.
5. *Allow* conflicting uses or conducted a local Goal 5 ESEE for Class A/High, Class B/Medium or Class C/Low Rank Wildlife Habitat in all Urban Development Area, except parks and open space.

Strictly limiting or *limiting* conflicting uses in HCA will protect and conserve existing streams and wetlands to maintain significant natural resource functions including: microclimate and shade; stream flow moderation and water storage; bank function and sediment, pollution and nutrient control; large wood and channel dynamics; organic inputs, food web and nutrient cycling; and fish and wildlife habitat. *Strictly limiting* or *limiting* conflicting uses in HCA will allow for additional urban development that is sensitive to the natural resource features and requires mitigation for unavoidable negative impacts to features and functions. The recommendation will also contribute towards meeting other regulatory requirements including the Metro Title 3, Water Quality and Flood Management; Oregon Goal 6, Air, Water and Land Resources Quality; Oregon Goal 7, Areas Subject to Natural Hazards; the Clean Water Act; and the Endangered Species Act.

Goal 5 Significant Natural Resources

Resource site JC26 contains natural resource features that are not a Title 13 HCA and are therefore subject to Statewide Planning Goal 5 OAR 660-023-0110. The General ESEE analysis, Volume 4, describes the conflicting uses and provides an overarching analysis of the economic, social, environmental and energy consequences of prohibiting, limiting or allowing the conflicting uses within areas of significant natural resources. In addition to the General ESEE analysis, the following resource site-specific consequences are considered.

The common impacts of conflicting uses in the resource site include clearing vegetation; grading activities and soil compaction; adding impervious surface; modifying streams, wetlands and flood areas; generating pollution; landscaping with non-native or invasive vegetation; building fences or other wildlife barriers; and other impacts such as noise, light, litter and pets.

Within the resource site residential uses are allowed outright or conditionally in the R10 base zones. Commercial uses are allowed in the CE base zone. Development of new uses may involve vegetation clearing, grading, filing, and soil compaction, as well as the addition of impervious surfaces and landscaping with non-native plants, with associated impacts on the natural resources. Basic utilities and other infrastructure are allowed in all base zones. New or upgraded utility corridors may be cleared of vegetation and may fragment wildlife habitat.

The analysis of economic, social, environmental and energy consequences provided in Volume 4 is confirmed for resource site JC26, with the following additional information that clarifies the analysis.

Strictly limiting or limiting conflicting uses would retain the wildlife habitat functions provided by significant natural resource features including maintaining habitat for at risk plant, fish and wildlife species, maintaining vegetation on steep slopes, and maintaining the stormwater management and air-cooling functions of the tree canopy. Mitigation for negative consequences of additional development in areas of Class A or Class B wildlife habitat should be required.

Natural Resources Protection Decisions

Based on the analysis presented in Volume 3, Natural Resources Inventory, Volume 4, Title 13 and Goal 5 Compliance, and the resource site-specific evaluation for JC26, the following decisions are applied to protect the significant riparian corridors and wildlife habitat:

1. Apply a protection overlay zone ('p' zone) to stream channels from top-of-bank to top-of-bank, wetlands and land within 50 feet of stream top-of-bank or 30 feet of wetlands.
2. Apply a conservation overlay zone ('c' zone) to land between 50 and 75 feet of stream top-of-bank or 30 and 55 feet of wetland.
3. Apply a conservation overlay zone ('c' zone) to areas of forest or woodland vegetation contiguous to but more than 75 feet from stream top-of-bank, and areas of forest or woodland vegetation contiguous to but more than 55 feet from wetlands.
4. Allow conflicting uses within all other areas containing significant natural resources.

Resource Site No.: JC27 Resource Site Name: Circle Avenue Wetlands

Previous Plan: Multnomah County Urban Land

Previous Resource Site No.: 28

The results of the analysis found in Volume 3, Natural Resources Inventory, Volume 4, Title 13 and Goal 5 Compliance, and the resource site-specific evaluation, are presented in the following maps:

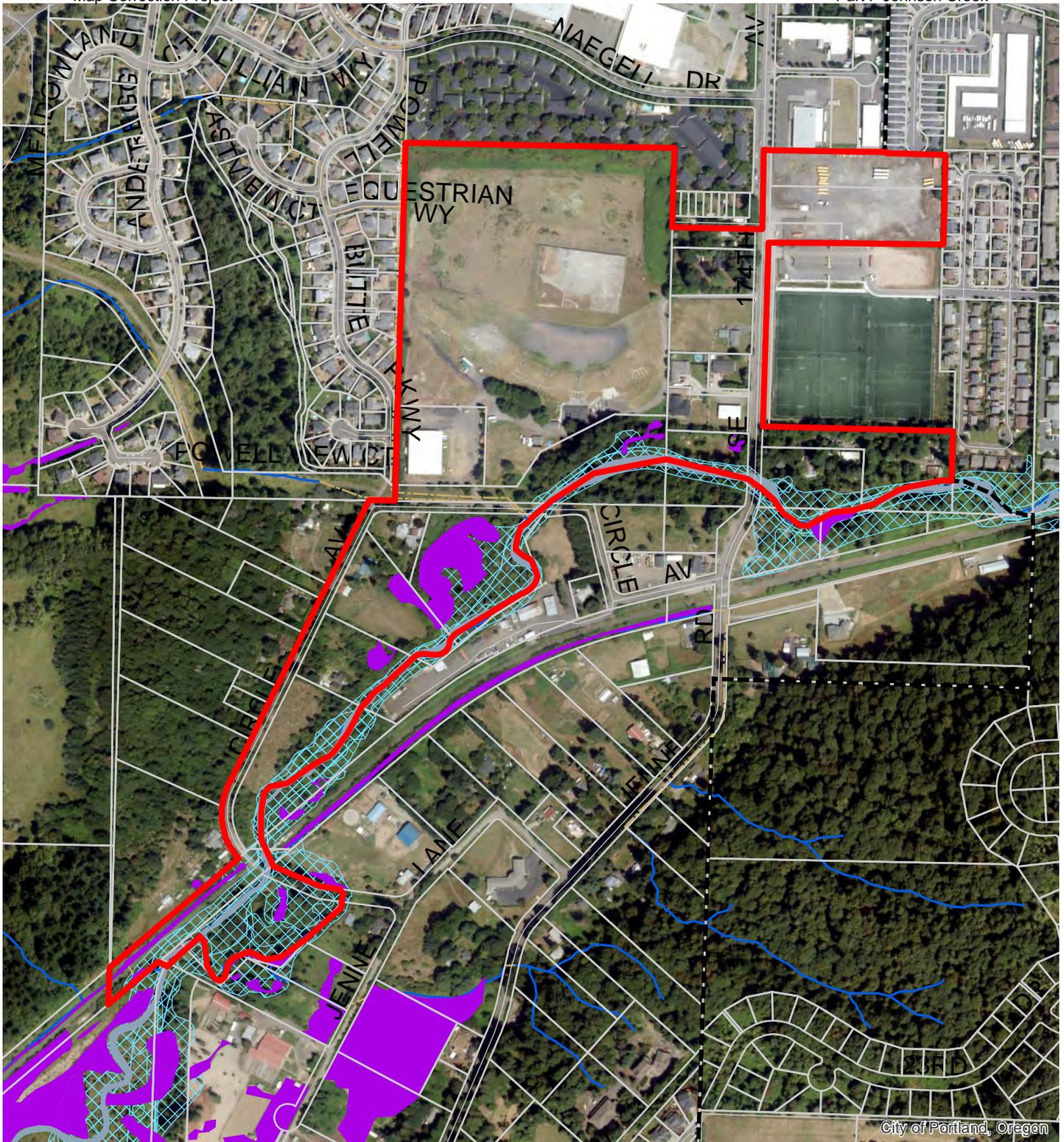
- A. Water Features – rivers, streams, wetlands and flood areas
- B. Land Features – forest, woodland, shrubland and herbaceous vegetation, steep slopes
- C. Special Habitat Areas
- D. Riparian Corridor Classifications
- E. Wildlife Habitat Classifications
- F. Urban Development Value
- G. Metro Title 13 Habitat Conservation Areas
- H. Statewide Planning Goal 5 Areas
- I. Recommended Natural Resource Protections

Following the maps, additional information about existing natural resource features and functions in the resource site is presented.

Implementation of the results is found in Volume 1, Part B, updates to zoning maps and zoning code.

Resource site JC27 includes the following:

Site (acres)	63.2
Base zones (acres)	
EG2	9.6
OS	7.4
R10	0.3
R20	0.3
R5	45.2
R7	0.2
RF	0.1
RM1	<1



City of Portland, Oregon

Map A: Water Features

**Resource Site:
JC27**

Updated: July 2021



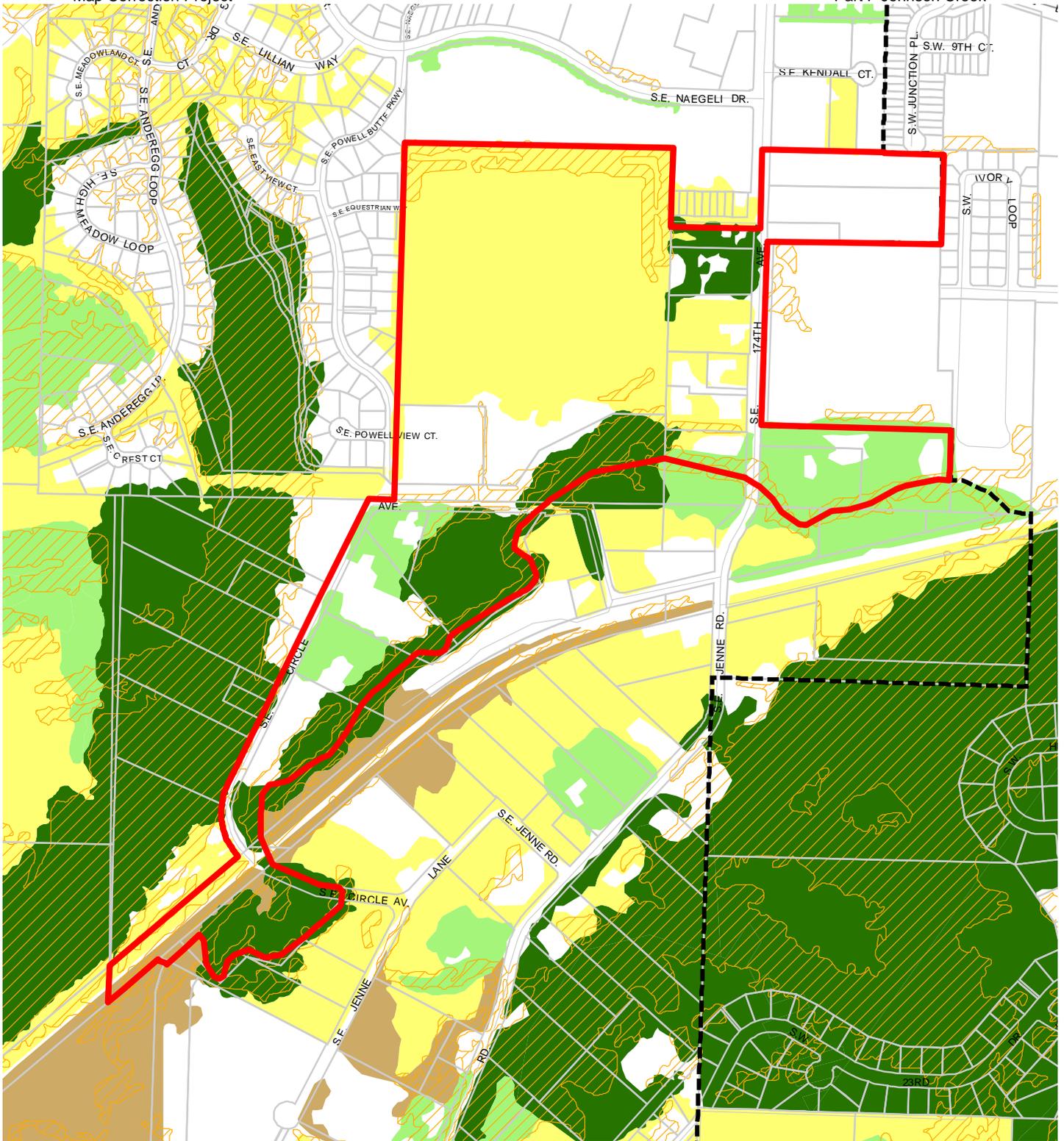
0 265 530 Feet

Proposed Draft - As Amended

- Resource Sites
- Urban Service Boundary
- Taxlots
- Wetlands
- Rivers
- Open stream channel
- Piped Stream Segment
- Flood Area



The information on the map was derived from digital databases. Care was taken in the creation of this map but it is provided "as is". The City of Portland ensures meaningful access to city programs, services, and activities to comply with Civil Rights Title VI and ADA Title II laws and reasonably provides: translation, interpretation, modifications, accommodations, alternative formats, auxiliary aids and services. To request these services, contact 503-823-7700, City TTY 503-823-6868, Relay Service: 711.
July 2021



Map B: Vegetation and Steep Slopes

**Resource Site:
JC27**

Updated: July 2021



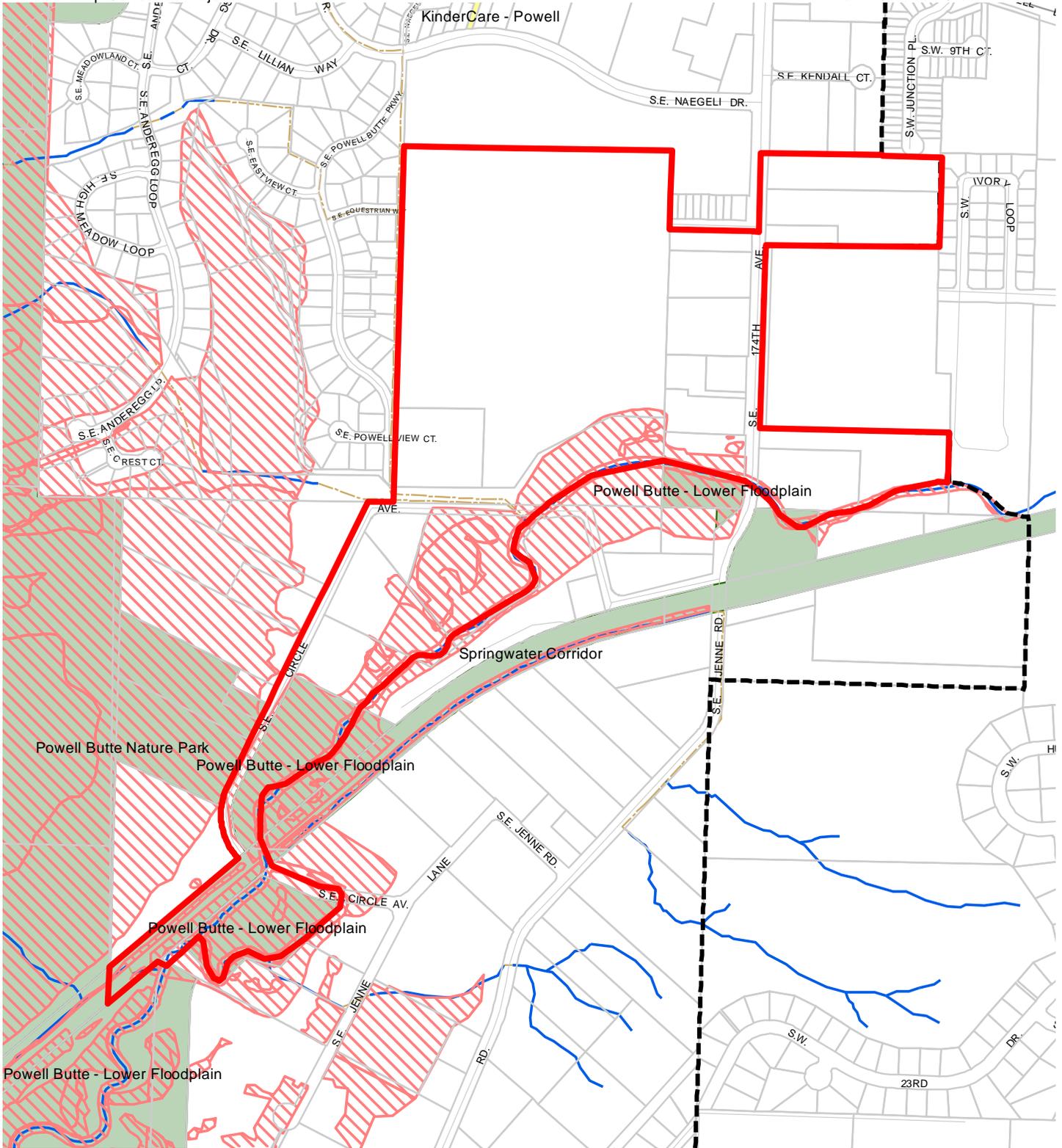
0 365 730 Feet

Proposed Draft - As Amended

- Resource Sites
- Urban Service Boundary
- Taxlots
- Slopes >25%
- Forest
- Woodland
- Shrubland
- Herbaceous



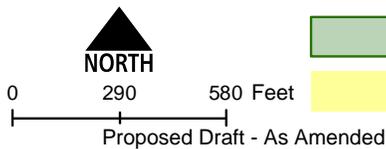
The information on the map was derived from digital databases. Care was taken in the creation of this map but it is provided "as is". The City of Portland ensures meaningful access to city programs, services, and activities to comply with Civil Rights Title VI and ADA Title II laws and reasonably provides: translation, interpretation, modifications, accommodations, alternative formats, auxiliary aids and services. To request these services, contact 503-823-7700, City TTY 503-823-6868, Relay Service: 711. July 2021



**Map C: Special
Habitat Areas**

**Resource Site:
JC27**

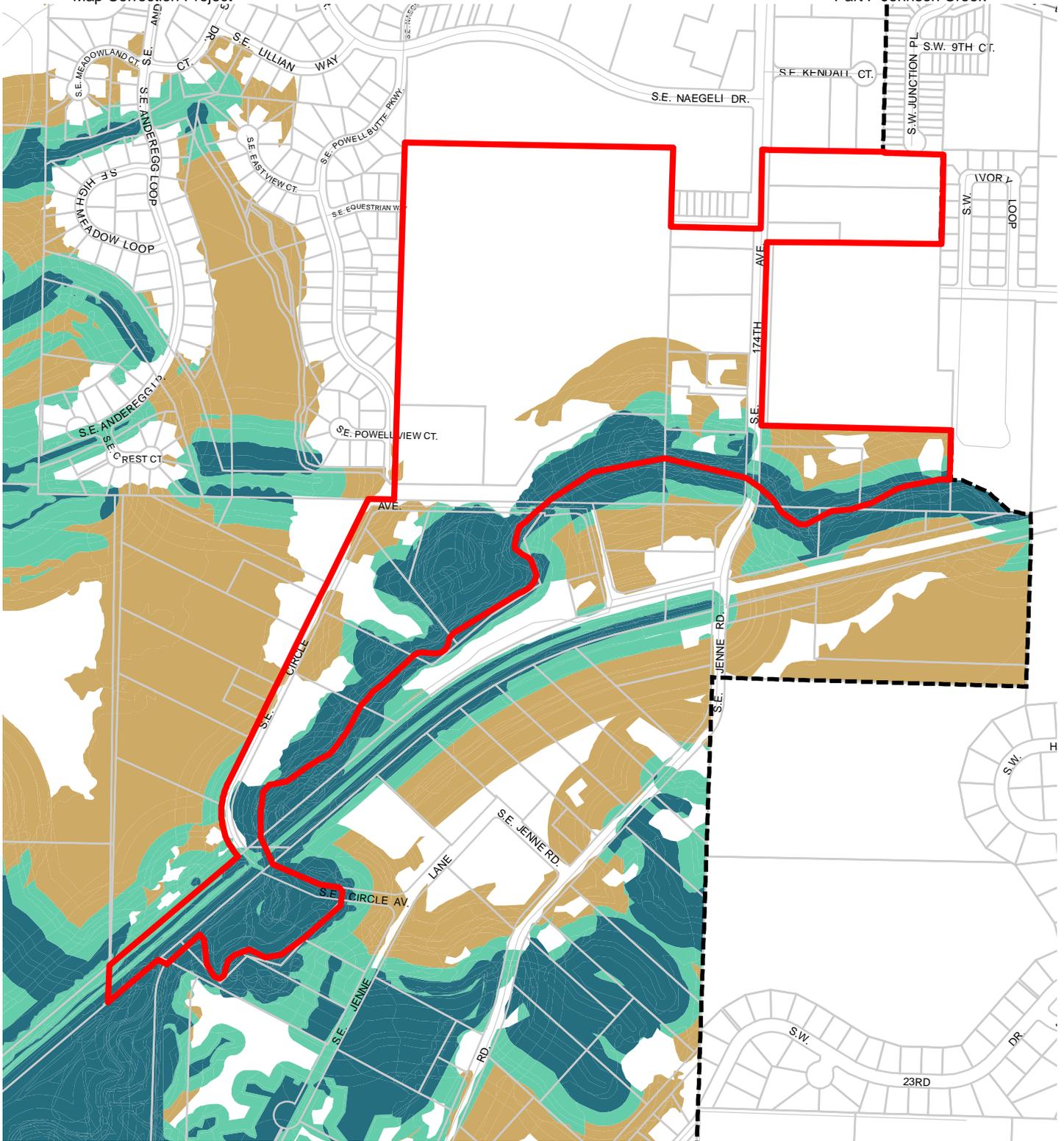
Updated: June 2021



- Resource Sites
- Special Habitat Areas (SHAs)
- Open Stream Channel
- Piped Stream Segment
- Parks
- Schools
- Urban Service Boundary
- Taxlots



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**Map D: Riparian
Corridors Habitat
Classification**

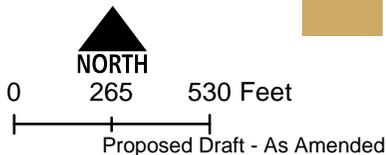
**Resource Site:
JC27**

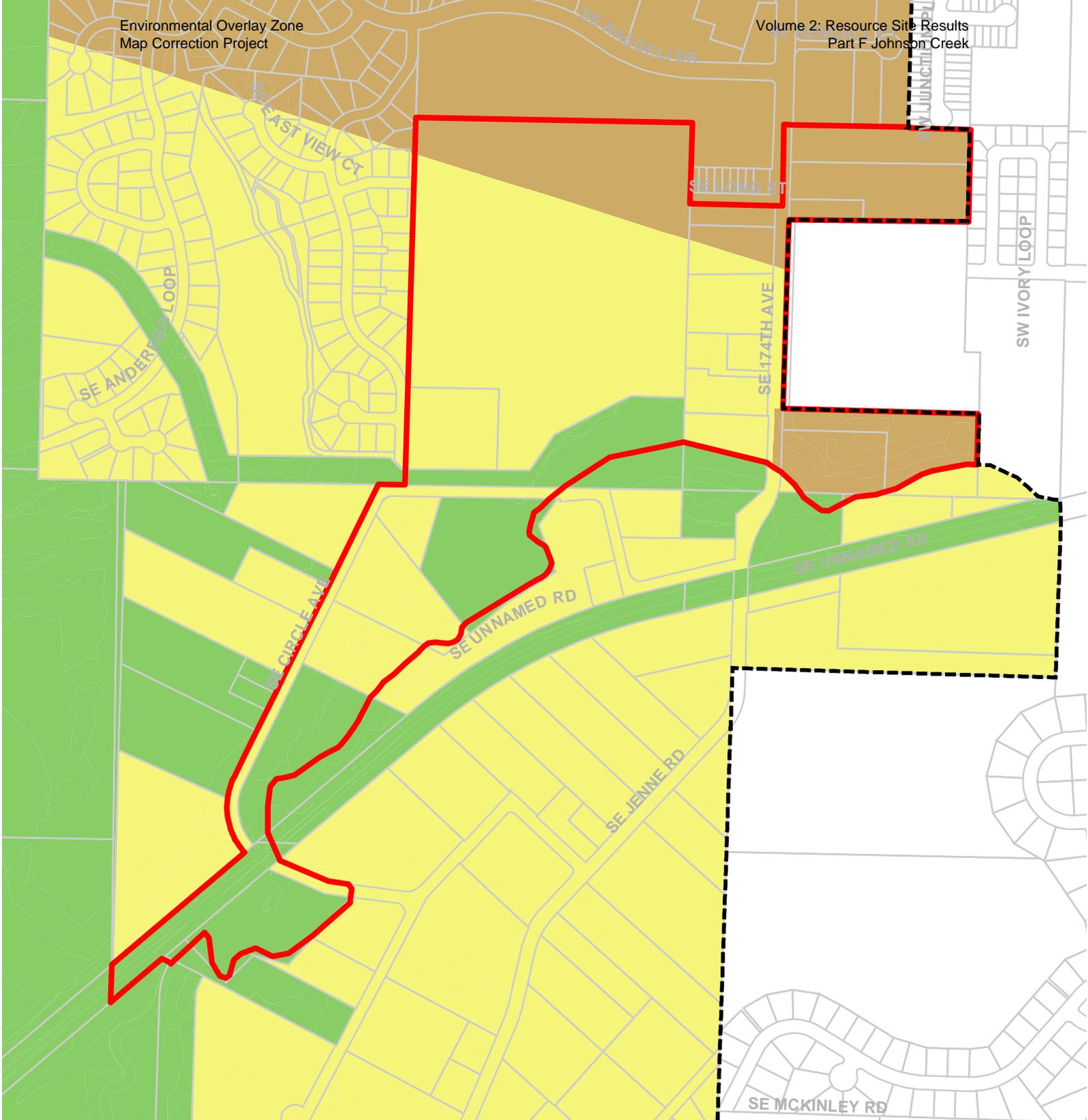
Updated: July 2021

- Resource Sites
- Urban Service Boundary
- Class I (high rank)
- Class II (medium rank)
- Class III (low rank)
- Taxlots



The information on the map was derived from digital databases. Care was taken in the creation of this map but it is provided "as is". The City of Portland ensures meaningful access to city programs, services, and activities to comply with Civil Rights Title VI and ADA Title II laws and reasonably provides: translation, interpretation, modifications, accommodations, alternative formats, auxiliary aids and services. To request these services, contact 503-823-7700, City TTY 503-823-6868, Relay Service: 711.



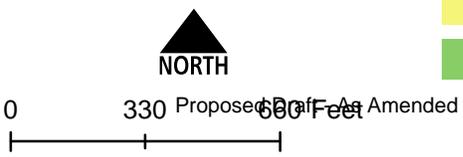


Map F: Urban Development Value (Title 13)
Resource Site: JC27

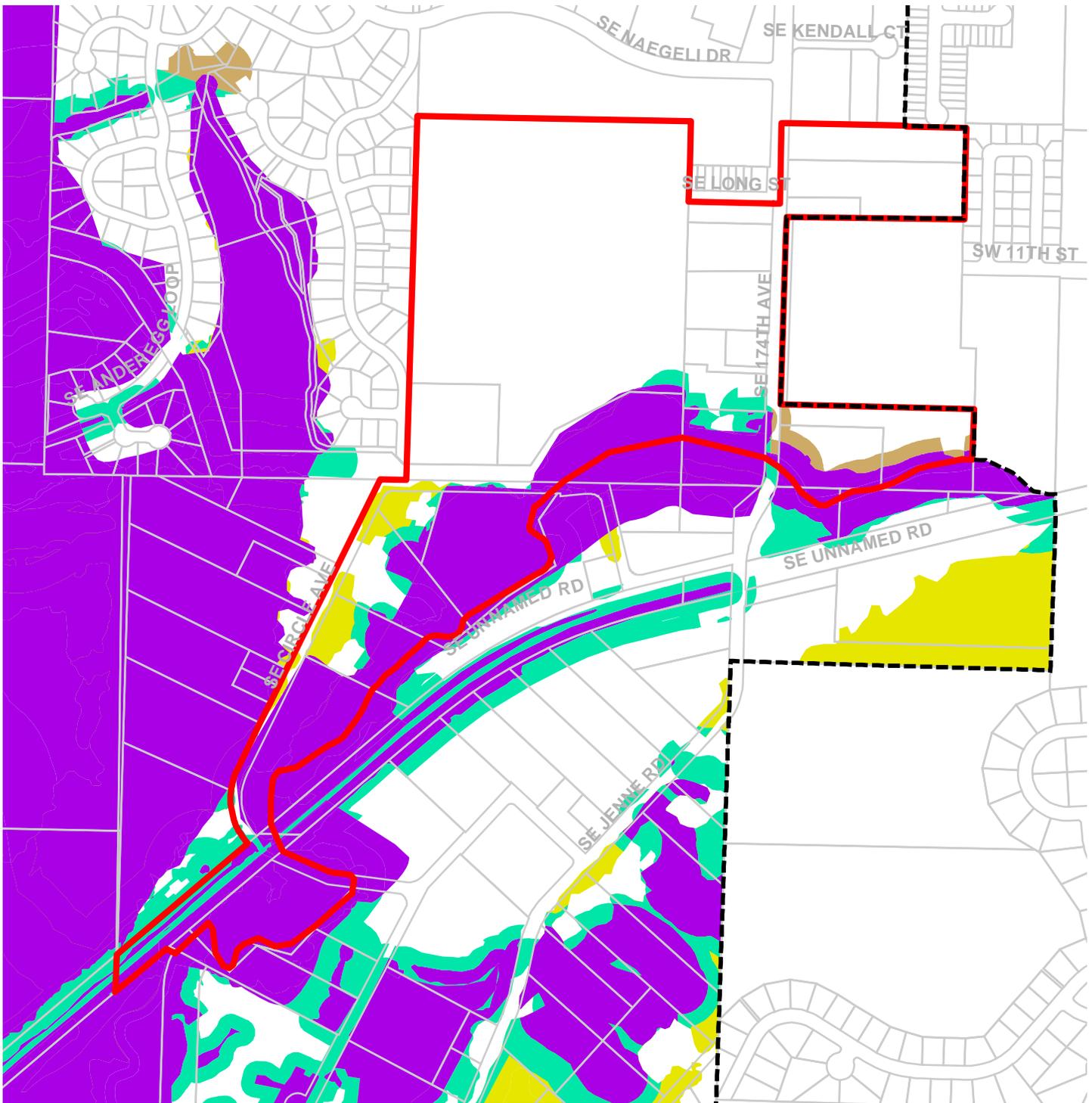
-  Urban Service Boundary
-  Resource Sites
-  High Development Value
-  Medium Development Value
-  Low Development Value
-  Parks



Updated: July 2021



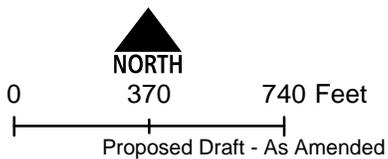
The information on the map was derived from digital databases. Care was taken in the creation of this map but it is provided "as is". The City of Portland ensures meaningful access to city programs, services, and activities to comply with Civil Rights Title VI and ADA Title II laws and reasonably provides: translation, interpretation, modifications, accommodations, alternative formats, and aids and services. To request these services, contact 503-823-7700, City TTY 503-823-6868, Relay Service: 711.



Map G: Title 13 Habitat Conservation Areas (HCA) and Goal 5 Areas

Resource Site: JC27

Updated: July 2021

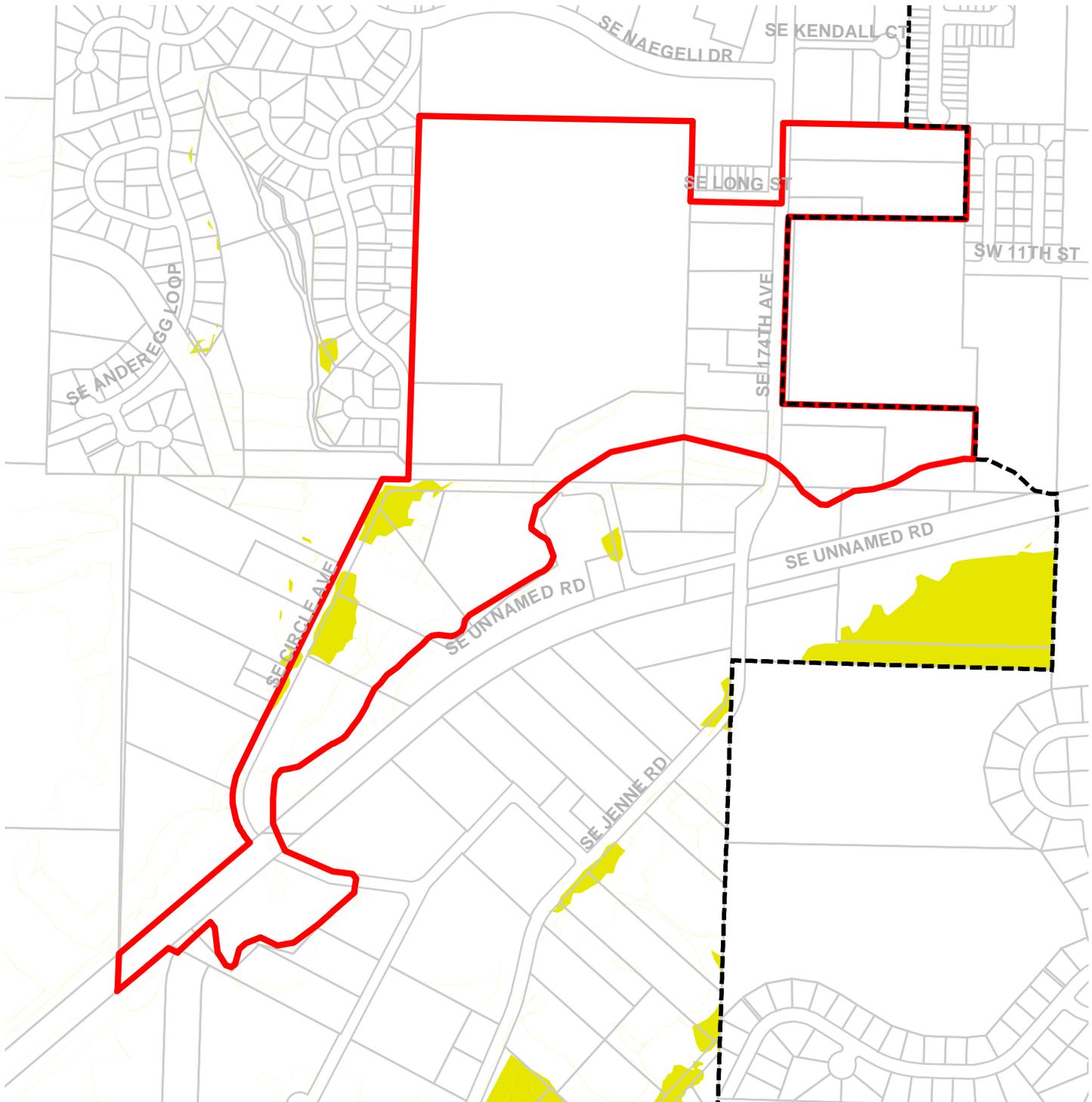


- Urban Service Boundary
- Resource Sites
- HCA High Value
- HCA Moderate Value
- HCA Low Value
- Goal 5 Significant Natural Resources



The information on the map was derived from digital databases. Care was taken in the creation of this map but it is provided "as is". The City of Portland ensures meaningful access to city programs, services, and activities to comply with Civil Rights Title VI and ADA Title II laws and reasonably provides: translation, interpretation, modifications, accommodations, alternative formats, auxiliary aids and services. To request these services, contact 503-823-7700, City TTY 503-823-6868, Relay Service: 711.

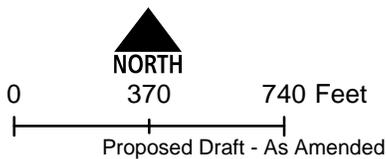
July 2021



Map H: Goal 5 Resources

Resource Site: JC27

Updated: July 2021

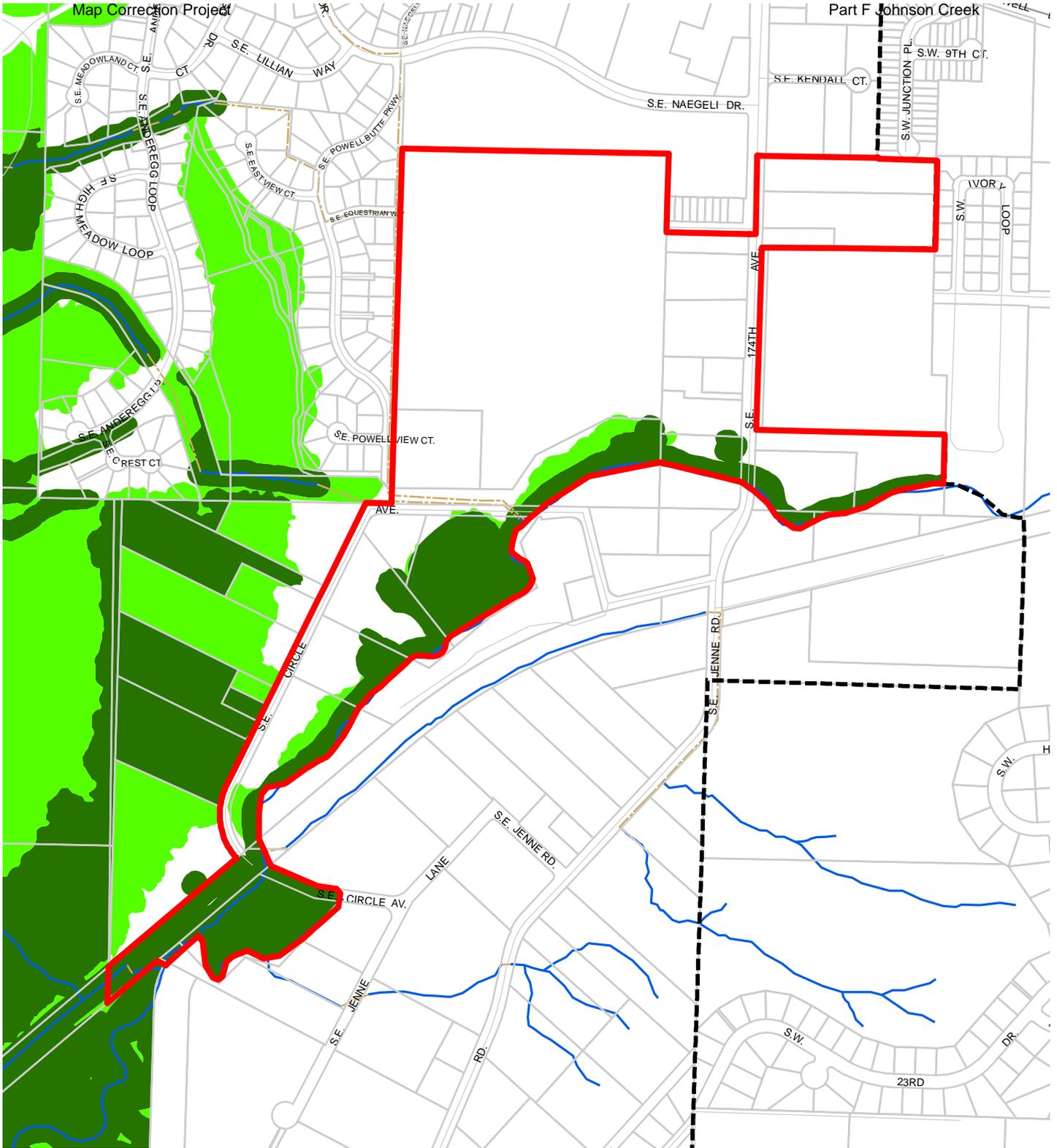


-  Urban Service Boundary
-  Resource Sites
-  Goal 5 Significant Natural Resources



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July 2021

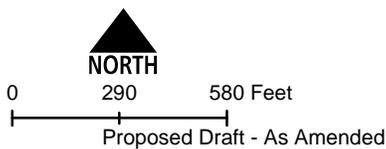


Map I: DRAFT Proposed Environmental Overlay Zones

Resource Site: JC27

Updated: July 2021

- Resource Sites
- Open Stream Channel
- Urban Service Boundary
- Taxlots
- Piped Stream Segment
- Proposed Conservation Zone
- Proposed Protection Zone



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Natural Resources Inventory

Within resource site JC27 the following significant natural resource features and functions are present:

Significant Riparian Corridor Features: open stream; wetland; flood area; land within 50 feet of waterbodies; forest, woodland, shrubland and herbaceous vegetation within 300 feet of waterbodies; and forest vegetation on steep slopes (>25% slope) contiguous to and within 780 feet of waterbodies.

Significant Wildlife Habitat Features: forest patches, and associated and contiguous wetlands, two acres in size or larger.

Special Habitat Areas: Johnson Creek (S, C); wetlands (W)

Riparian Corridor Functions: microclimate and shade; stream flow moderation and water storage; bank function and sediment, pollution and nutrient control; large wood and channel dynamics; organic inputs, food web and nutrient cycling; and riparian wildlife movement corridor.

Wildlife Habitat Functions: interior area; food and water; resting, denning, nesting and rearing; movement and migration; reduction of noise, light and vibration; and habitat patches that support special status fish and wildlife species.

Table A: Quantity of Natural Resource Features in Resource Site		JC27
		Study Area
Stream (Miles)		0.6
Wetlands (acres)		2.3
Vegetated Areas >= 1/2 acre (acres)		
	Forest (acres)	12.1
	Woodland (acres)	7.0
	Shrubland (acres)	0.9
	Herbaceous (acres)	25.6
Flood Area*		
	Vegetated (acres)	8.5
	Non-vegetated (acres)	0.2
Steep Slopes (acres)**		11.5
* The flood area includes the FEMA 100-year flood plain plus the adjusted 1996 flood inundation area.		
**Slopes are derived from LiDAR. Steep slopes are areas with a slope greater than 25%.		

This resource site is at the eastern end of the Portland portion of Johnson Creek. It sits east of Powell Butte and north of Johnson Creek, roughly south of Naegeli Drive and straddles SE 174th Avenue on the east. Unincorporated portions of Pleasant Valley are to the east of the site. Land uses include single-family residential development, lower-density residential development, an outdoor shooting range and publicly owned natural areas. This site is located along the Johnson Creek lowlands, wedged between Powell Butte and Jenne Butte. The floodplain follows the creek through most of the site except where it covers a large wetland. The wetlands in this resource area provide habitat for native populations of pond-breeding amphibians.

The site's forest exhibits characteristics common to the Willamette River Valley and upland habitats. Douglas fir, western red cedar, snowberry and sword fern characterize the forest plant community. The forest is composed of 60- to over 100-year old second growth in a mid-seral, conifer topping hardwood stage of succession. When shade-tolerant plants such as cedars begin to establish themselves, as they have here, the forest is in the understory re-initiation stage. The riparian community along Johnson Creek and the remnant oxbow includes red alder, Oregon ash, and Sitka and Pacific willows.

Two wetland plant communities occur at this site. A locally rare cedar/skunk cabbage wetland, approximately 1,000 square feet in size, is located within the forest north of Johnson Creek and near 174th Avenue. This forested wetland receives water from a spring along the eastern boundary and it drains to Johnson Creek. Other wetland species include Pacific willow, red-osier dogwood, salmonberry and water parsley. The Oregon Natural Heritage Program (ONHP) considers this community a priority plant community.

Another wetland community occurs along the remnant oxbow in the western part of the site. Sitka willow and reed canary grass characterize this emergent and scrub-shrub community. The invasive canary grass has choked out many of the native sedges and rushes, and only a few native emergent plants remain. Nevertheless, the wetland continues to provide important functional values, including flood storage, groundwater recharge, and breeding/rearing habitat for amphibians.

In addition to reed canarygrass, several other non-native pest species are present at this site. Armenian blackberry, Irish and English ivy, European hawthorn, yellow iris and periwinkle have begun to establish themselves and compete with the native flora. Removal of these species combined with new tree plantings along the more exposed banks of Johnson Creek will be an important element of future management and enhancement programs.

The Johnson Creek riparian corridor, which at this site includes several off-channel wetlands, provides important forage, cover and nesting habitat for a variety of bird, mammal, amphibian and fish species. The mosaic of aquatic and terrestrial habitats at this site supports a variety of

plants and animals common to both environments. The Johnson Creek riparian corridor at this site provides sheltered migratory routes for fish, birds, amphibians and mammals. Its proximity to the high-quality forest habitats at Powell and Jenne Buttes also make the site an attractive corridor between streamside and upland habitats.

Coho salmon, steelhead trout, and Pacific lamprey have been documented in this reach of Johnson Creek. Though the fish community in Johnson Creek is numerically dominated by redbase shiners, reticulate sculpin and speckled dace, the presence of limited salmonid populations is an indication that the Johnson Creek ecosystem continues to function for endangered fish. In 2019, a study of Johnson Creek's potential to support salmon populations identified this area as a high priority for habitat restoration for steelhead trout, a high priority for protection to increase coho salmon and steelhead trout production.

Red-legged frog, Pacific tree frog along with several salamander species found in this area are sensitive amphibians that rely on the moist, wooded areas of the site with their cool water of good quality. The remnant oxbow of Johnson Creek provides breeding and rearing habitat for red-legged frog, a federal species of concern and state sensitive species. The large pond provides sufficient hydrology and vegetative cover to serve as breeding habitat for the red-legged frogs and four other pond-breeding amphibians. Adult amphibians are terrestrial and forage in upland forests. Local residents report that red-legged frogs travel between aquatic and terrestrial habitats around the site, including frequent crossings of Circle Avenue. These crossings occur at two locations: one near the western part of the site where the frogs move between the creek and a nearby wetlands, the other to the east where movement appears to be to and from Powell Butte

Several beneficial reptiles also use the site, including western fence lizard and garter snakes (forest and edge areas) and turtles (ponds). While the main channel of Johnson Creek is generally devoid of downed logs and woody debris, these habitat features are more common in and around the site's wetlands where most of the amphibians and reptiles reside.

The riparian forest at the site provides primary habitat for several cavity nesters. Tree cavities formed through decay or by woodpeckers provide nesting and resting areas for raccoon, squirrels, bats, woodpeckers, wood ducks and other bird species. Twigs, leaves and bark are used for nest building and insulation. The shrub layer is important feeding and nesting area for warblers, grosbeaks and other birds. The ground cover--grasses and forbs--provide habitat for thrushes, towhees, voles, mice and other ground foragers. Herons and kingfishers feed along Johnson Creek, using the trees along the creek as perch sites. Forest hawks, such as the sharp-shinned hawk, are likely to forage within the site. Waterfowl use the creek, wetlands and aquatic vegetation at the site. Considering the urbanized nature of much of the surrounding area, these resources are critical for both resident and migratory wildlife.

Special status bird species observed in or adjacent to this resource site include bald eagle, black-throated gray warbler, brown creeper, bushtit, downy woodpecker, great blue heron, pacific-slope flycatcher, peregrine falcon, pileated woodpecker, rufous hummingbird, and yellow warbler.

Johnson Creek and its long history of flooding have influenced soil formation at this site. The southern quarter of the site is in the 100-year floodplain of Johnson Creek, and perennial flooding is common, as indicated by the presence of Wapato soils. Urban development has served to decrease stream capacity and increase runoff, and consequently the 100-year floodplain has increased in size. Larger flood events generally occur from December through February, with 85 percent of the stream's runoff occurring between November and March.

The southwest corner of the site has poorly drained Wapato silt loams, a hydric soil associated with wetlands, formed from recent alluvium. It is subject to a seasonal high water table and overflow from Johnson Creek.

Table B: Quality of Natural Resource Functions in Resource Site JC27				
Resource Site (acres) = 63				
	Class 1/A	Class 2/B	Class 3/C	Total
Riparian Corridors*				
acres	14.0	4.0	6.1	24.1
percent total inventory site area	22.2%	6.3%	9.7%	38.3%
Wildlife Habitat*				
acres	0.0	13.9	0.0	13.9
percent total inventory site area	0.0%	22.1%	0.0%	22.1%
Special Habitat Areas**				
acres	14.5			
percent total inventory site area	23.0%			
Combined Total*				
acres	14.0	5.6	4.5	24.1
percent total inventory site area	22.2%	9.0%	7.1%	38.3%
* Class I riparian resources, Special Habitat Areas, and wildlife habitat include open water. ** Metro Title 13 designated all Special Habitat Areas as Class I riparian corridors. + Because riparian resources, Special Habitat Areas, and wildlife Habitat overlap, the results cannot be added together to determine the combined results.				

Stormwater runs off impervious surfaces (e.g., rooftops, driveways, parking areas, streets, etc..) rapidly. Without a place to retain the water (such as wetlands or adequate stormwater facilities), stormwater runoff results in spikes in stream levels which can cause or exacerbate flooding and

increase stream erosion. In addition, when water runs off quickly, it does not have a chance to infiltrate and recharge streams or aquifers to provide water during drier periods.

The type and capacity of stormwater facilities to manage the runoff from impervious surfaces varies in the city, affecting the local rate and amount of runoff, and the amount of pollutants in the water. Much of the city was developed prior to any stormwater regulations and receives limited or no management prior to discharging to pipes and surface waters.

Table C shows the total amount of impervious area within the resource site and how much of that impervious area lacks stormwater management; the percentage of total impervious area that is not managed is called “effective impervious area.” The higher the percent of effective impervious area in a watershed, the greater the negative impacts of stormwater runoff to streams. Stream science indicates that when effective impervious area reaches 10% of a watershed, negative stream impacts become significant; and at 25%, these impacts on waterways can be substantial. An additional consideration is the differences in soil conditions and other factors that influence the ability of pervious areas to retain, infiltrate or filter pollutants from stormwater. For example, a mature forest is much more effective in managing stormwater than a manicured lawn; both areas would have a lower effective impervious surface percentage than a developed site, but they have different outcomes for stormwater management.

For Resource Area JC27, 1.5% of the total area is effectively impervious. This indicates a significant degree of stormwater management and/or existing natural resources that should be preserved. Areas with very low impervious cover and existing vegetation are more likely to be functioning properly to support biologic systems.

Table C. Impervious Area within Resource Site JC27			
Total area (acres)	Total impervious Area (acres)	Total unmanaged impervious area* (acres)	Percent of resource site that is effectively impervious
58	2	1	1.5%

*Total unmanaged impervious area refers to the number of acres within a resource area that receives no formal stormwater management measures to regulate flow or treat pollutants before they reach surface waters, also referred to as effective impervious area.

Metro Title 13 and Oregon Goal 5 Compliance

The following information supplements evaluation of natural resource protections presented in Volume 4 and supports compliance with Metro Title 13 and Oregon Plan Goal 5.

Title 13 Habitat Conservation Areas

Map G presents the Habitat Conservation Areas (HCA) within the Resource site JC27. Natural resources should be protected within HCA as follows:

1. *Strictly limit or limit* conflicting uses within Class I/High Rank Riparian Areas in all Urban Development Areas.
2. *Strictly limit or limit* conflicting uses within Class II/Medium Rank Riparian Areas within Moderate and Low Value Urban Development Area as well as parks and open spaces.
3. *Strictly limit or limit* conflicting uses within Class A/High or B/Medium Rank Wildlife Habitat within parks and open spaces.
4. *Allow* conflicting uses or conducted a local Goal 5 ESEE for Class III/Low Rank Riparian Areas in all Urban Development Areas.
5. *Allow* conflicting uses or conducted a local Goal 5 ESEE for Class A/High, Class B/Medium or Class C/Low Rank Wildlife Habitat in all Urban Development Area, except parks and open space.

Strictly limiting or limiting conflicting uses in HCA will protect and conserve existing streams and wetlands to maintain significant natural resource functions including: microclimate and shade; stream flow moderation and water storage; bank function and sediment, pollution and nutrient control; large wood and channel dynamics; organic inputs, food web and nutrient cycling; and fish and wildlife habitat. *Strictly limiting or limiting* conflicting uses in HCA will allow for additional urban development that is sensitive to the natural resource features and requires mitigation for unavoidable negative impacts to features and functions. The recommendation will also contribute towards meeting other regulatory requirements including the Metro Title 3, Water Quality and Flood Management; Oregon Goal 6, Air, Water and Land Resources Quality; Oregon Goal 7, Areas Subject to Natural Hazards; the Clean Water Act; and the Endangered Species Act.

Goal 5 Significant Natural Resources

Resource site JC27 contains natural resource features that are not a Title 13 HCA and are therefore subject to Statewide Planning Goal 5 OAR 660-023-0110. The General ESEE analysis, Volume 4, describes the conflicting uses and provides an overarching analysis of the economic, social, environmental and energy consequences of prohibiting, limiting or allowing the conflicting uses within areas of significant natural resources. In addition to the General ESEE analysis, the following resource site-specific consequences are considered.

The common impacts of conflicting uses in the resource site include clearing vegetation; grading activities and soil compaction; adding impervious surface; modifying streams, wetlands and flood areas; generating pollution; landscaping with non-native or invasive vegetation; building fences or other wildlife barriers; and other impacts such as noise, light, litter and pets.

Within the resource site residential uses are allowed outright or conditionally in the R7 and R5 base zones. Employment uses are allowed in the EG2 base zone. Open space uses are allowed in the OS base zone. Development of new uses may involve vegetation clearing, grading, filing, and soil compaction, as well as the addition of impervious surfaces and landscaping with non-native plants, with associated impacts on the natural resources. Basic utilities and other infrastructure are allowed in all base zones. New or upgraded utility corridors may be cleared of vegetation and may fragment wildlife habitat.

The analysis of economic, social, environmental and energy consequences provided in Volume 4 is confirmed for resource site JC27, with the following additional information that clarifies the analysis.

Strictly limiting or *limiting* conflicting uses would retain the wildlife habitat functions provided by significant natural resource features including maintaining habitat for at risk plant, fish and wildlife species, maintaining vegetation on steep slopes, and maintaining the stormwater management and air-cooling functions of the tree canopy. Mitigation for negative consequences of additional development in areas of Class A or Class B wildlife habitat should be required.

Natural Resources Protection Decisions

Based on the analysis presented in Volume 3, Natural Resources Inventory, Volume 4, Title 13 and Goal 5 Compliance, and the resource site-specific evaluation for JC27, the following decisions are applied to protect the significant riparian corridors and wildlife habitat:

1. Apply a protection overlay zone ('p' zone) to stream channels from top-of-bank to top-of-bank and wetlands,
2. Apply a protection overlay zone ('p' zone) to vegetation within the flood area and to land within 50 feet of stream top-of-bank or 30 feet of wetlands.
3. Apply a conservation overlay zone ('c' zone) to areas of forest and woodland vegetation that are contiguous to streams but greater than 50 feet from the top-of-bank or 30 feet from wetlands.
4. Allow conflicting uses within all other areas containing significant natural resources.

The *Environmental Overlay Zone Map Correction Project* plan documents:

Volume 1A – Project Report, Summary of Results and Implementation

The purpose of the Project Report is to document the overall project approach and methodology, summarize public engagement, and provide an at-a-glance summary of the results by resource site.

Volume 1B – Zoning Code and Map Amendments

Amendments to zoning code chapter 33.430, Environmental Zones, as well as other zoning code chapters, and the official zoning maps showing the existing and proposed conservation, protection and scenic overlay zones.

Volume 2 – Resource Site Inventory and ESEE Decisions

For the geographies listed below, each document presents an inventory of natural resource features and functions, a site-specific Economic, Social, Environmental and Energy Analysis (if applicable) and the decisions regarding which natural resource should be protected.

Part A1 – Forest Park and Northwest District, Resource Sites 1 – 20

Part A2 – Forest Park and Northwest District, Resource Sites 21 – 41

Part B – Skyline West

Part C – Tryon Creek and Southwest Hills East

Part D – Fanno Creek

Part E – East Buttes and Terraces

Part F – Johnson Creek

Part G – Boring Lava Domes

Volume 3 – Natural Resources Inventory

A summary of the approach and methodology used to produce the citywide Natural Resources Inventory. The results of the inventory are presented in Volume 2, Part A – G.

Volume 4 – Compliance Report

Compliance with Metro Urban Growth Management Plan Title 13 for Habitat Conservation Areas and Oregon State Planning Goal 5 for significant natural resources that are not a Habitat Conservation Area. The results, recommendations and implementation are reported in Volume 2, Part A – G, and Volume 1, Part B.

Volume 5 – Appendices