Preliminary Stormwater Site Plan

PREPARED FOR:

McGranahan Architects
Contact: Mr. Andy Hartung
2111 Pacific Avenue, Suite 100
Tacoma, WA 98402

PROJECT:

Pierce College Puyallup - Master Plan
Puyallup, WA
2190297.10

PREPARED BY:

Andrew Coito-Poile
Project Engineer

REVIEWED BY:

William J. Fierst, PE
Principal

DATE:

July 2021
Revised January 2022

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01/27/2022

I hereby state that this Preliminary Storm Drainage Report for the Pierce College Puyallup - Master Plan project has been prepared by me or under my supervision and meets the standard of care and expertise that is usual and customary in this community for professional engineers. I understand that City of Puyallup does not and will not assume liability for the sufficiency, suitability, or performance of drainage facilities prepared by me.

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1.0 Project Overview

This Preliminary Stormwater Site Plan (SSP) describes the existing and future proposed stormwater basins and facilities at the Pierce College Puyallup Campus (PCPC). Full drainage reports meeting City of Puyallup standards will be provided with the site development permit application for each project. This report accompanies the PCPC Master Plan that describes future growth of the campus through 2031. PCPC is bounded by 39th Avenue SE to the south, Wildwood Park Drive to the north and east, and Bradley Lake and commercial properties to the west in Puyallup, Washington. The total site area is approximately 122.3 acres and is situated on eight separate parcels.

PCPC was originally developed in the 1990s, with additional buildings constructed in the mid to late 2000s. PCPC consists of eight existing buildings, one portable, several parking lots, and an access drive loop that is routed around the perimeter of the developed portion of the site. In the next ten years, PCPC proposes six new buildings, three building additions, concrete paving, asphalt paving, landscaping, sports fields, utilities, and general grading of the site. Refer to Appendices A-4.0 and A-4.1 for Developed Conditions Maps for more information. Refer to Appendix B-1 for the location of proposed improvements, including parking lot locations and the parking lot numbering convention. Aboveground and belowground facilities are proposed for stormwater flow control for all proposed impervious surfaces. Flow control facilities include detention ponds and underground detention tanks. Bioretention facilities will be used upstream of the proposed flow control facilities for stormwater quality treatment for pollution generating impervious surfaces (PGIS).

This Preliminary SSP describes the stormwater facilities proposed for future projects, as outlined in the PCPC Master Plan. This report is intended to show how future projects will meet the requirements of the Department of Ecology (DOE) 2014 *Stormwater Management Manual for Western Washington (SWMMWW)*.

There is a Concomitant Agreement that covers the Pierce College site that was recorded on May 30, 1986. The agreement between Beim and James Properties and City of Puyallup was established pursuant to a rezoning of the site from “RS” (Residential Single-Family District) to “I” (Industrial District). The rezone was intended ensure that the construction of the Puyallup Science Park would be compatible with adjacent residential land uses. On August 5, 1987, an amendment to the Concomitant Agreement was recorded that stipulated a third storm pond would be constructed in the southeastern portion of the site to mitigate regional storm drainage issues and that Pierce County would unblock a culvert under 39th Avenue East. On May 5, 2003, the Concomitant Agreement was amended to include Pierce College as a landowner and land use within the area covered under the agreement. Additional transportation mitigation measures were included within the agreement, including the requirement to add an access westerly through the campus to the 5th/7th Connector. Other portions of the Concomitant Agreement related to vegetated buffers were largely kept intact.

1.1 Existing Conditions

The 122.30-acre site is currently partially developed and located on the north side of 39th Avenue SE. The site consists of several buildings, parking lots, detention ponds, forested area, wetlands, and an access drive loop that is routed around the perimeter of the developed portion of the site. Eight existing buildings are located onsite, including the Administration Building (ADM), the Arts and Allied Health Building (AAH), the College Center Building (CTC), the Health Education Center (HEP), the Library Sciences Building (LSC), the Maintenance Building (Maint.), and the 911 Emergency Building (911). Refer to Appendices A-2.0 and A-2.1 for the Existing Conditions Maps for more information.

PCPC is bounded by 39th Avenue SE to the south, Wildwood Park Drive to the north and east, and Bradley Lake and commercial properties to the west in Puyallup, Washington. A main entrance driveway to the site is located on the south side of the property along 39th Avenue SE. An additional driveway connection to the site is located at the northwest of the site and connects to 7th Street SE. All adjacent properties are downgradient of the site and do not appear to discharge stormwater onto the proposed site.

The site straddles two drainage basins, as outlined by the City of Puyallup Drainage Basin Map (see Appendix A-6). The basin delineation line runs approximately north/south down the middle of the site. The west side of the site is in the State Highway Basin and the east side of the site is in the Pothole Basin. PCPC has ten sub-basins within the site, ranging in size from approximately 4 acres to 31 acres. Several of the sub-basins are tributary to wetlands located on the site, whereas other sub-basins have outfalls that allow stormwater to leave the site.

1.1.1 Critical Areas

The site contains five wetlands onsite, per the City of Puyallup GIS Critical Areas Map (see Appendix A-7 for more information). College maps indicate eleven wetlands are located onsite (see Appendices A-2.0 and A-2.1 for more information).

1.1.2 Site Soils

Soils at the site are mapped by the Natural Resources Conservation Service (NRCS) as predominantly gravelly sandy loam underlain by glacial till. Refer to Appendix A-8 for the NRCS Soils Map.

Based on geotechnical reports for previous projects, the site is underlain by glacial till. Infiltration is assumed to be infeasible across the site for the purpose of this report. However, further geotechnical explorations will be required at the time of each project to further understand soil conditions at the respective location to evaluate if infiltration is feasible.

1.2 Proposed Conditions

The redevelopment projects propose several new buildings and building additions over the next ten years. PCPC proposes six new buildings, three building additions, six new parking lots, concrete paving, asphalt paving, landscaping, sports fields, utilities, and general grading of the site. Refer to Appendices A-4.0 and A-4.1 for the Developed Conditions Maps for more information. Aboveground and belowground facilities are proposed for stormwater flow control for all proposed impervious surfaces. Flow control facilities include detention ponds and underground detention tanks. Bioretention facilities will be used upstream of the proposed flow control facilities for stormwater quality treatment for PGIS.

2.0 Minimum Requirements

The projects are considered redevelopment and are subject to Minimum Requirements (MRs) 1 through 9 because they propose more than 5,000 square feet of new and replaced hard surfaces, and they exceed 50 percent of the existing site improvement value. Below is a discussion of how the project meets each of the requirements.

2.1 MR 1: Preparation of Stormwater Site Plans

This Preliminary SSP satisfies this requirement. A Final SSP and final civil plans will be provided with future individual site development permit packages.

2.2 MR 2: Construction Stormwater Pollution Prevention

A Construction Stormwater Pollution Prevention Plan (CSWPPP) will be included with future individual site development permit packages.

2.3 MR 3: Source Control of Pollution

Each project will comply with all source control requirements of the 2014 *SWMMWW*.

2.4 MR 4: Preservation of Natural Drainage Systems and Outfalls

The site is currently developed, with several sub-basins located throughout. Several of the sub-basins, including Basins 1 through 7, discharge stormwater to onsite wetlands that are located at low points with no apparent outfalls leaving the site. Several sub-basins, including Basins 6 and 9 located to the northwest of the site, discharge to the Bradley Lake overflow ditch. Basins 8 and 10 discharge to wetlands that appear to eventually overflow and outfall to the northern boundary of the site, where they are collected via perforated pipes and routed north along 13th Street SE. Refer to Appendices A-3.0 and A-3.1 for the location of sub-basins and natural drainage systems onsite.

All proposed improvements will maintain onsite natural drainage courses. Stormwater from proposed improvements will outfall to the same locations within their respective sub-basins.

2.5 MR 5: Onsite Stormwater Management

As outlined in *SWMMWW* Figure I-2.4.2*,* the project results in over 5,000 square feet of new plus replaced hard surfaces. Therefore, the project is subject to MRs 1 through 9 and List 2, as outlined in *SWMMWW* Section I-3.4.5.

Per *SWMMWW* Figure I-2.5.1, the project is subject to List 2 for considering feasibility of onsite stormwater management Best Management Practices (BMPs). List 2 feasibility follows:

Lawn and Landscaped Areas:

- BMP T5.13: Post Construction Soil Quality and Depth – The project will meet this requirement.

Roofs:

- BMP T5.30: Full Dispersion – Full dispersion is feasible for projects that have adequate native vegetation adjacent to the project site to provide full dispersion. Dispersion areas shall be protected in perpetuity.
- BMP T5.10A Downspout Full Infiltration – Full downspout infiltration is infeasible because the project has underlying soils that are not suitable for infiltration.
- BMP T7.30: Bioretention – Bioretention facilities are infeasible because the project has underlying soils that are not suitable for infiltration. However, bioretention facilities are proposed for the purpose of stormwater quality.
- BMP T5.10: Downspout Dispersion Systems - Downspout dispersion may be feasible for projects that have adequate native vegetation adjacent to the project site to provide full dispersion.
- BMP T5.10C Perforated Stub-Out Connections – Perforated stub-out connections are infeasible because the project has underlying soils that are not suitable for infiltration.

Other Hard Surfaces:

- BMP T5.30: Full Dispersion – Full dispersion is feasible for projects that have adequate native vegetation adjacent to the project site to provide full dispersion.
- BMP T5.15: Permeable Pavement – Permeable pavement is infeasible because the project has underlying soils that are not suitable for infiltration.
- BMP T7.30: Bioretention – Bioretention facilities are infeasible because the project has underlying soils that are not suitable for infiltration. However, bioretention facilities are proposed for the purpose of stormwater quality.
- BMP T5.12: Sheet Flow Dispersion – Sheet flow dispersion may be feasible for projects that have adequate native vegetation adjacent to the project site to provide full dispersion.
- BMP T5.11: Concentrated Flow Dispersion – Concentrated flow dispersion may be feasible for projects that have adequate native vegetation adjacent to the project site to provide full dispersion.

2.6 MR 6: Runoff Treatment

Several of the proposed improvements include PGIS. All proposed improvements that include PGIS will provide runoff treatment via BMP T7.30 Bioretention. Refer to Appendices A-4.0 and A-4.1 for the location of proposed bioretention facilities.

2.7 MR 7: Flow Control

Flow control systems are proposed for all future improvements, except Parking Lot 5, which will use full dispersion. Future projects that have flow control facilities will use either aboveground detention ponds or subgrade detention tanks. All flow control systems have been estimated using King County's Pond Volume spreadsheet. A factor of safety of 1.2 has been added to all flow control facilities to better match the volumes produced by the continuous model, WWHM. Refer to Appendix B for flow control calculations for each future development. Refer to Appendices A-4.0 and A-4.1 for more information and the location of proposed flow control facilities.

2.8 MR 8: Wetlands Protection

The site contains five wetlands onsite, per the City of Puyallup GIS Critical Areas Map (see Appendix A-7 for more information). College maps indicate 11 wetlands are located onsite (see Appendices A-2.0 and A-2.1 for more information). All existing wetland buffers will be maintained and the existing wetlands will not be impacted. All proposed projects will maintain the onsite wetland hydrology and will be evaluated for compliance with MR8. Hydroperiod calculations will be performed for all projects that change tributary area or surface type to a wetland to ensure existing hydrology is maintained.

2.9 MR 9: Operations and Maintenance

An Operations and Maintenance Manual will be provided with future individual site development permit packages.

3.0 Offsite Analysis

The site is currently developed, with several sub-basins located throughout. Several sub-basins including Basins 1 through 7, discharge stormwater to onsite wetlands that are located at low points with no apparent outfalls leaving the site. Several sub-basins, including Basins 6 and 9 located to the northwest of the site, discharge to the Bradley Lake overflow ditch. Basins 8 and 10

discharge to wetlands that appear to eventually overflow and outfall to the northern boundary of the site, where they are collected via perforated pipes and routed north along 13th Street SE. Refer to Appendices A-3.0 and A-3.1 for the location of sub-basins and natural drainage systems onsite.

Flow control facilities are proposed for all future improvements. Impacts to offsite drainage courses and conveyance systems are not anticipated.

4.0 Permanent Stormwater Control Plan

4.1 Existing Site Hydrology

The site is currently developed with an onsite stormwater conveyance system and several aboveground detention ponds. Stormwater from developed areas is conveyed to treatment systems or directly to detention ponds before discharging to an onsite wetland or outfall. Refer to Appendices A-3.0 and A-3.1 for more information on existing sub-basin delineation, stormwater routing, and location of onsite detention ponds.

Basin 1 includes the LSC Building, the CTC Building, the northeast parking lot, and the west parking lot. It is centrally located within the site and is approximately 33.54 acres. Stormwater is collected and conveyed via catch basins and pipes or open ditches to a large detention pond. The detention pond is located at the east side of the site at the bottom of a slope, downgradient for the developed site. Stormwater ultimately outfalls to a wetland that is located at the southeast corner of the site within Basin 2. No known outfalls exist for the wetland.

Basin 2 includes the southwest parking lot. It is located at the southeast corner of the site and is approximately 21.30 acres. Stormwater is collected and conveyed via catch basins to the east side of the perimeter drive lane before it outfalls down the slope via a flow spreader. Stormwater ultimately collects at a wetland that is located within the basin. No known outfalls exist for the wetland.

Basin 3 includes a small, forested area located at the northeast corner of the site and is approximately 2.89 acres. A small portion of stormwater bypasses the college perimeter access drive via a catch basin before it is ultimately collected at a wetland that is located within the basin. No known outfalls exist for the wetland.

Basin 4 includes the AAH Building and surrounding impervious surfaces. It is centrally located within the site and is approximately 9.92 acres. Stormwater is collected and conveyed via catch basins and pipes to a detention pond. The detention pond is located northwest of the AAH Building. Stormwater ultimately outfalls to a wetland that is located west of the HEP Building. No known outfalls exist for the wetland.

Basin 5 includes the southwest parking lot and the ADM Building. It is located at the southwest corner of the site and is approximately 14.05 acres. Stormwater is collected and conveyed via catch basins and pipes directly to a wetland located at the southwest corner of the site. Stormwater ultimately continues south, where it is routed through a culvert that passes under 39th Avenue SE.

Basin 6 includes a small forested area located at the northwest corner of the main site, as well as the northwest driveway. Basin 6 is approximately 6.78 acres. Stormwater is collected and conveyed via catch basins and pipes to a detention pond. The detention pond is located at the far northwest corner of the site. Stormwater is discharged from the detention pond where it outfalls to the Bradley Lake overflow ditch.

Basin 7 includes a small forested area located at the north side of the site and is approximately 4.04 acres. Stormwater travels over land before it is ultimately collected at a wetland that is located within the basin. No known outfalls exist for the wetland.

Basin 8 includes a forested area located at the north side of the site and is approximately 13.39 acres. Stormwater travels over land before it is ultimately collected at a wetland that is located within the basin. Basin 8 discharges to a wetland that appears to eventually overflow and outfall to the northern boundary of the site, where it is collected via perforated pipes and routed north along 13th Street SE.

Basin 9 includes a forested area located at the north side of the site and south of the northwest driveway. Basin 9 is approximately 7.33 acres. Stormwater travels over land before it ultimately outfalls to the Bradley Lake overflow ditch.

Basin 10 includes a forested area located at the north side of the site and is approximately 10.27 acres. Stormwater travels over land before it is ultimately collected at a wetland that is located within the basin. Basin 10 discharges to a wetland that appears to eventually overflow and outfall to the northern boundary of the site, where it is collected via perforated pipes and routed north along 13th Street SE.

4.2 Developed Site Hydrology

All proposed improvements will maintain onsite natural drainage courses, as outlined in Section 4.1. Stormwater from proposed improvements will outfall to the same locations within their respective sub-basins. Stormwater flows from future developed areas will be properly managed and will meet all the requirements set forth in the *SWMMWW*. Proposed developed hydrology will not further impact downstream drainage courses.

4.3 Flow Control System

Flow control systems are proposed for all future improvements except Parking Lot 5, which will use full dispersion. Future projects that have flow control facilities will use either aboveground detention ponds or subgrade detention tanks. All flow control systems have been estimated using King County's Pond Volume spreadsheet. Full flow control calculations will be provided with the storm drainage report associated with each site development permit. Refer to Appendix B for flow control calculations for each future development. Refer to Appendices A-4.0 and A-4.1 for more information and the location of proposed flow control facilities.

Below is a short summary of each development project proposed over the next ten years and their associated stormwater improvements.

Athletic Fields, Associated Parking Lot, and Buildings – This project includes two synthetic turf fields, several small buildings, and a parking lot. The project is located at the northwest corner of the site. The synthetic fields have been modeled as 50 percent impervious surface (PGIS) for the purpose of stormwater modeling. Detention ponds are proposed for flow control and bioretention facilities are proposed for water quality treatment. This project includes improvements within Basins 8 and 10. The proposed improvements will include multiple stormwater facilities to delineate stormwater flows within each basin. Stormwater will outfall to two separate wetlands via flow spreaders. All proposed improvements will maintain onsite natural drainage courses, as outlined in Section 4.1.

STEM Building – This project includes a new classroom building located at the north side of the site. A detention pond is proposed for flow control. No new PGIS is proposed for the project; therefore, bioretention facilities are not included. This project includes improvements within Basin 1. Stormwater will outfall to an existing stormwater conveyance system that outfalls to an

existing detention pond. The existing detention pond outfalls to an existing wetland located at the southeast corner of the site. All proposed improvements will maintain onsite natural drainage courses, as outlined in Section 4.1.

Storage Building – This project includes a new storage building located at the north side of the site. A detention pond is proposed for flow control. No new PGIS is proposed for the project; therefore, bioretention facilities are not included. This project includes improvements within Basin 4. Stormwater will outfall to a wetland via a flow spreader. All proposed improvements will maintain onsite natural drainage courses, as outlined in Section 4.1.

Parking Lot 1 – This project includes a new parking lot located at the north side of the site. Detention ponds are proposed for flow control and bioretention facilities are proposed for water quality treatment. This project includes improvements within Basin 6. Stormwater will outfall to an existing stormwater conveyance system that outfalls to an existing detention pond. The existing detention pond outfalls to the Bradley Lake overflow ditch located at the northwest corner of the site. All proposed improvements will maintain onsite natural drainage courses, as outlined in Section 4.1.

Parking Lot 2 – This project includes a new parking structure located at the south side of the site. A detention pond is proposed for flow control. No new PGIS is proposed for the project because the parking structure will be enclosed; therefore, bioretention facilities are not included. This project includes improvements within Basin 4. Stormwater will outfall to a wetland via a flow spreader. All proposed improvements will maintain onsite natural drainage courses, as outlined in Section 4.1.

Parking Lot 3 – This project includes a new parking lot. Detention pipes are proposed for flow control and bioretention facilities are proposed for water quality treatment. This project includes improvements within Basin 1. Stormwater will outfall to an existing stormwater conveyance system that outfalls to an existing detention pond. The existing detention pond outfalls to an existing wetland located at the southeast corner of the site. All proposed improvements will maintain onsite natural drainage courses, as outlined in Section 4.1.

Parking Lot 4 – This project includes a new parking lot located at the south side of the site. Detention pipes are proposed for flow control and bioretention facilities are proposed for water quality treatment. This project includes improvements within Basin 2. Stormwater will ultimately outfall to an existing wetland located at the southeast corner of the site via a flow spreader. All proposed improvements will maintain onsite natural drainage courses, as outlined in Section 4.1.

Parking Lot 5 – This project includes a new parking lot located at the southeast corner of the site. Full dispersion is proposed for flow control and bioretention facilities are proposed for water quality treatment. This project includes improvements within Basin 2. A flow control trade is proposed for this project. Stormwater will be collected from areas that are outside the project limits in exchange for areas within the project limits that cannot be collected due to topography. Surface flows will not bypass from one basin to another because all areas are within the same basin. Stormwater will ultimately outfall to an existing wetland located at the southeast corner of the site via a flow spreader. All proposed improvements will maintain onsite natural drainage courses, as outlined in Section 4.1.

Parking Lot 6 – This project includes a new perimeter row of parking stalls located at the east side of the site. Detention pipes are proposed for flow control and bioretention facilities are proposed for water quality treatment. This project includes improvements within Basin 1. Stormwater will outfall to an existing stormwater conveyance system that outfalls to an existing detention pond. The existing detention pond outfalls to an existing wetland located at the southeast corner of the site. All proposed improvements will maintain onsite natural drainage courses, as outlined in Section 4.1.

Parking Lot 7 – This project includes a new parking lot located at the north side of the site. Detention ponds are proposed for flow control, and bioretention facilities are proposed for water quality treatment. This project includes improvements within Basin 3. Stormwater will outfall to an existing stormwater conveyance system that outfalls to an existing wetland located at the north end of the site. The existing detention pond outfalls to the Bradley Lake overflow ditch located at the northwest corner of the site. All proposed improvements will maintain onsite natural drainage courses, as outlined in Section 4.1.

A summary of the impervious area for each future development and the corresponding detention facility size is provided below.

	Impervious Surface Area (AC)	**Detention Facility Volume (CF)**	**Detention Facility Type**	**Bioretention Facility Area (SF)**
Athletic Fields, Associated Parking Lot, and Buildings	3.12	66,230	Pond	4,867
STEM Building	0.92	19,529	Pond	-------
Storage Building	0.08	1,698	Pond	-------
Parking Lot 1	1.18	25,049	Pond	1,841
Parking Lot 2	1.65	35,026	Pipe	-------
Parking Lot 3	0.60	12,737	Pipe	936
Parking Lot 4	0.75	15,921	Pipe	1,279
Parking Lot 5	0.14	N/A - Dispersion	N/A - Dispersion	218
Parking Lot 6	0.31	6,581	Pipe	484
Parking Lot 7	0.95	20,166	Pond	1,482
Total	**9.70**	**202,937**	-------	**11,107**

4.4 Water Quality System

Several of the proposed improvements include PGIS. All proposed improvements that include PGIS will provide runoff treatment via BMP T7.30 Bioretention. Refer to Appendices A-4.0 and A-4.1 for the location of proposed bioretention facilities. Bioretention facilities will use perforated pipe underdrains. Stormwater will be treated by the bioretention facilities before being conveyed to the downstream flow control facilities.

Based on previous experience where bioretention facilities were sized using WWHM, an estimated ratio for bioretention treatment surface area was developed. Full flow water quality calculations will be provided with the storm drainage report associated with each site development permit. Refer to Appendix B for sizing calculations for each proposed future project.

4.5 Conveyance System Analysis and Design

Conveyance system analysis and design will be included with future individual site development permit packages.

5.0 Construction Stormwater Pollution Prevention Plan

A Construction Stormwater Pollution Prevention Plan (CSWPPP) will be included under a separate cover with future individual site development permit packages.

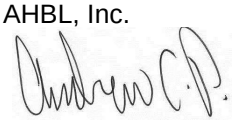
6.0 Special Reports and Studies

No special reports or studies are included with this Preliminary SSP. However, this report accompanies the PCPC Master Plan, which includes a Wetland Report by Grette Associates dated November 13, 2006.

7.0 Conclusion

This analysis is based on data and records either supplied to or obtained by AHBL. These documents are referenced within the text of the analysis. The analysis has been prepared using procedures and practices within the standard accepted practices of the industry. We conclude that this project, as proposed, will not create any new problems within the existing downstream drainage system. This project will not noticeably aggravate any existing downstream problems due to either water quality or quantity.

AHBL, Inc.



Andrew Coito-Poile
Project Engineer

ACP/lsk

July 2021
Revised January 2022

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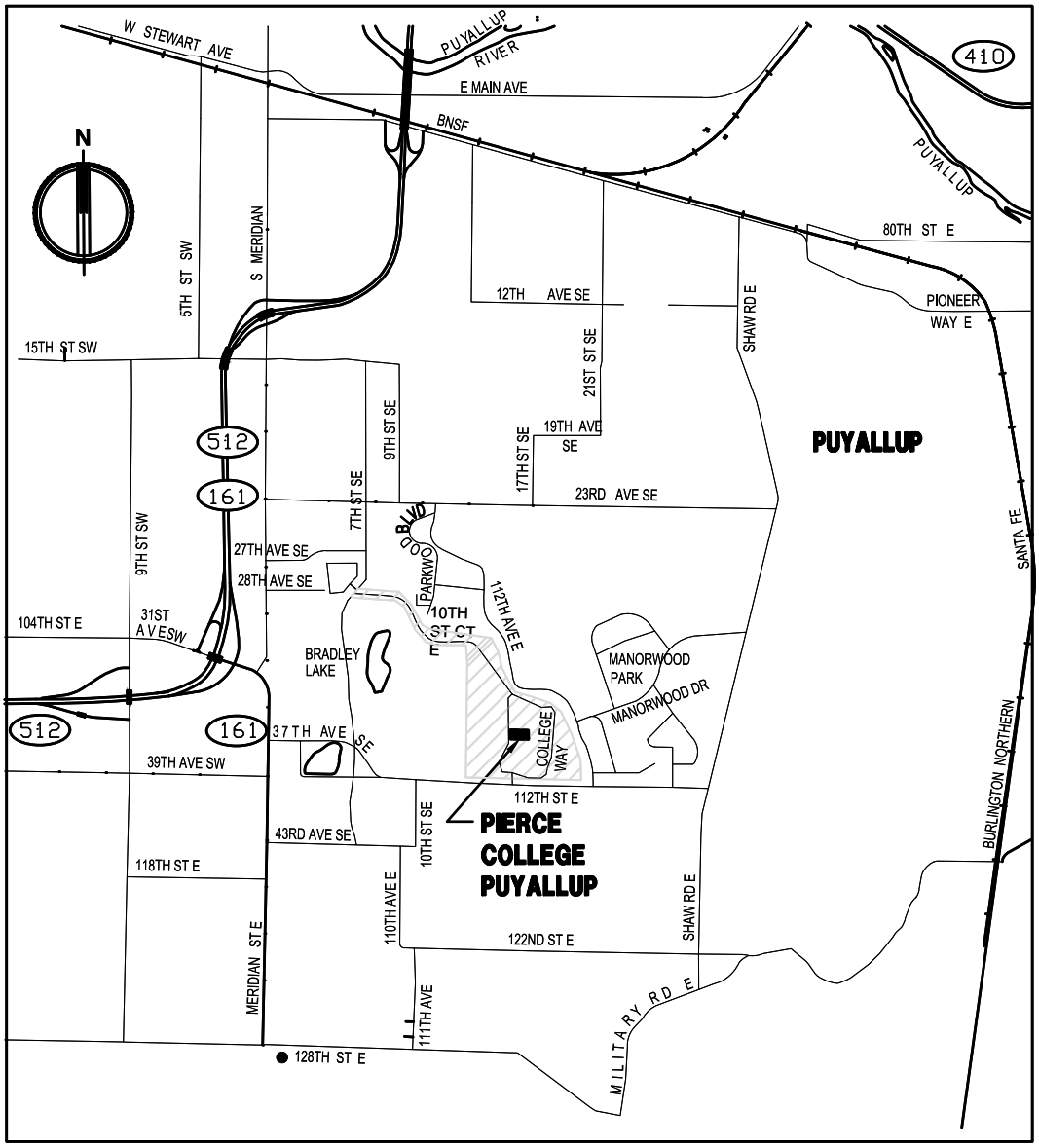
Appendix A

Exhibits



AHBL
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Tacoma, WA 98403
253.383.2422 TEL 253.383.2572 FAX

Pierce College Puyallup

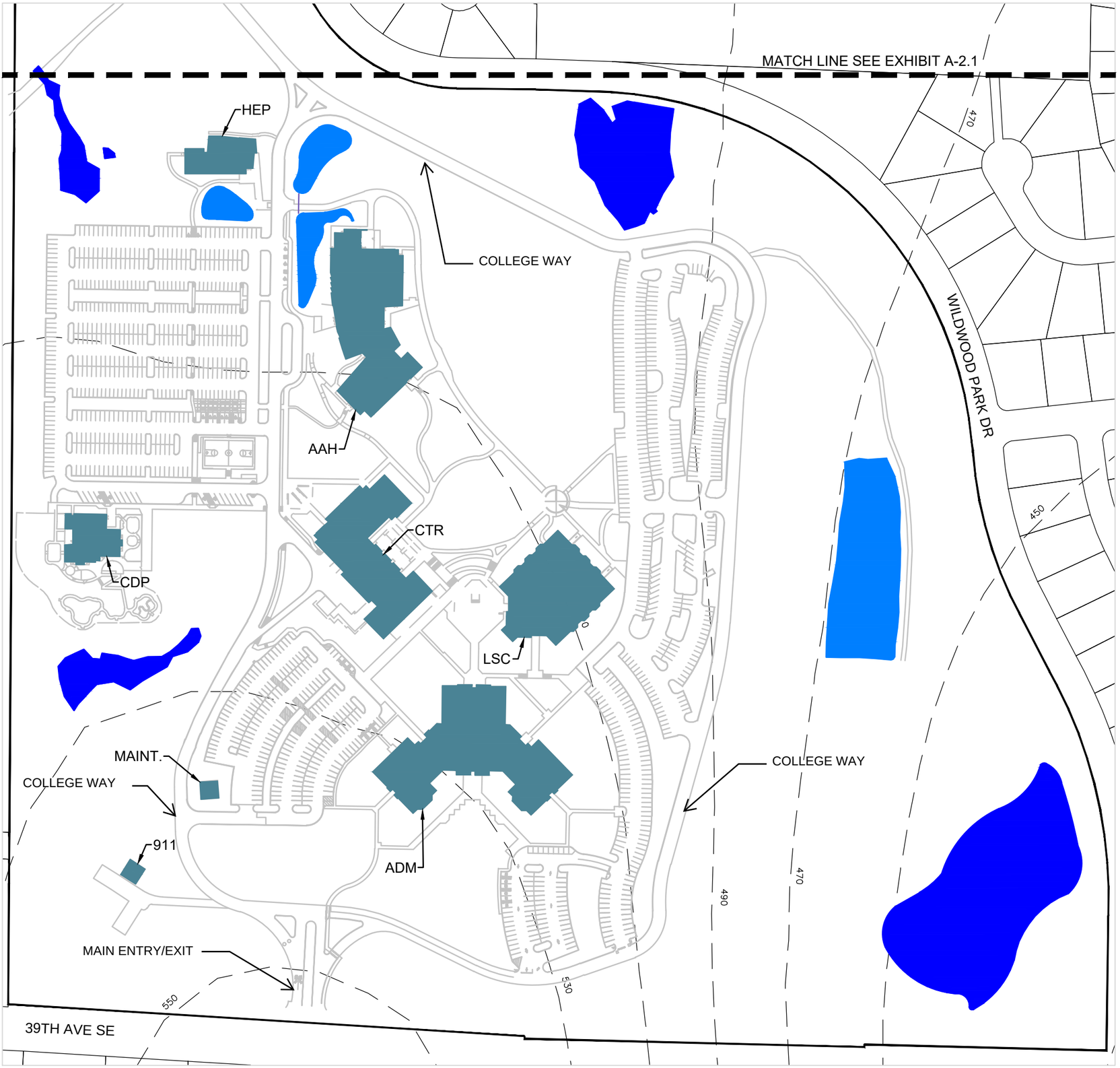
Vicinity Map

DRAWN BY: ACP | DATE: 6/29/2021 | JOB NO.: 2190297.10

EX A-1

PCPC MASTER PLAN - PRELIM STORM REPORT

EXISTING CONDITIONS MAP - EXHIBIT A-2.0



LEGEND

- EXISTING FACILITY
- WETLAND
- EXISTING STORM POND

EXISTING FACILITIES

ADM	Administration Building
AAH	Arts and Allied Health Building
CTR	College Center Building
HEP	Health Education Center
LSC	Library Sciences Building
CDP	Child Cevelopment Center
MAINT.	Maintenance Building
911	911 Emergency Building

N

GRAPHIC SCALE

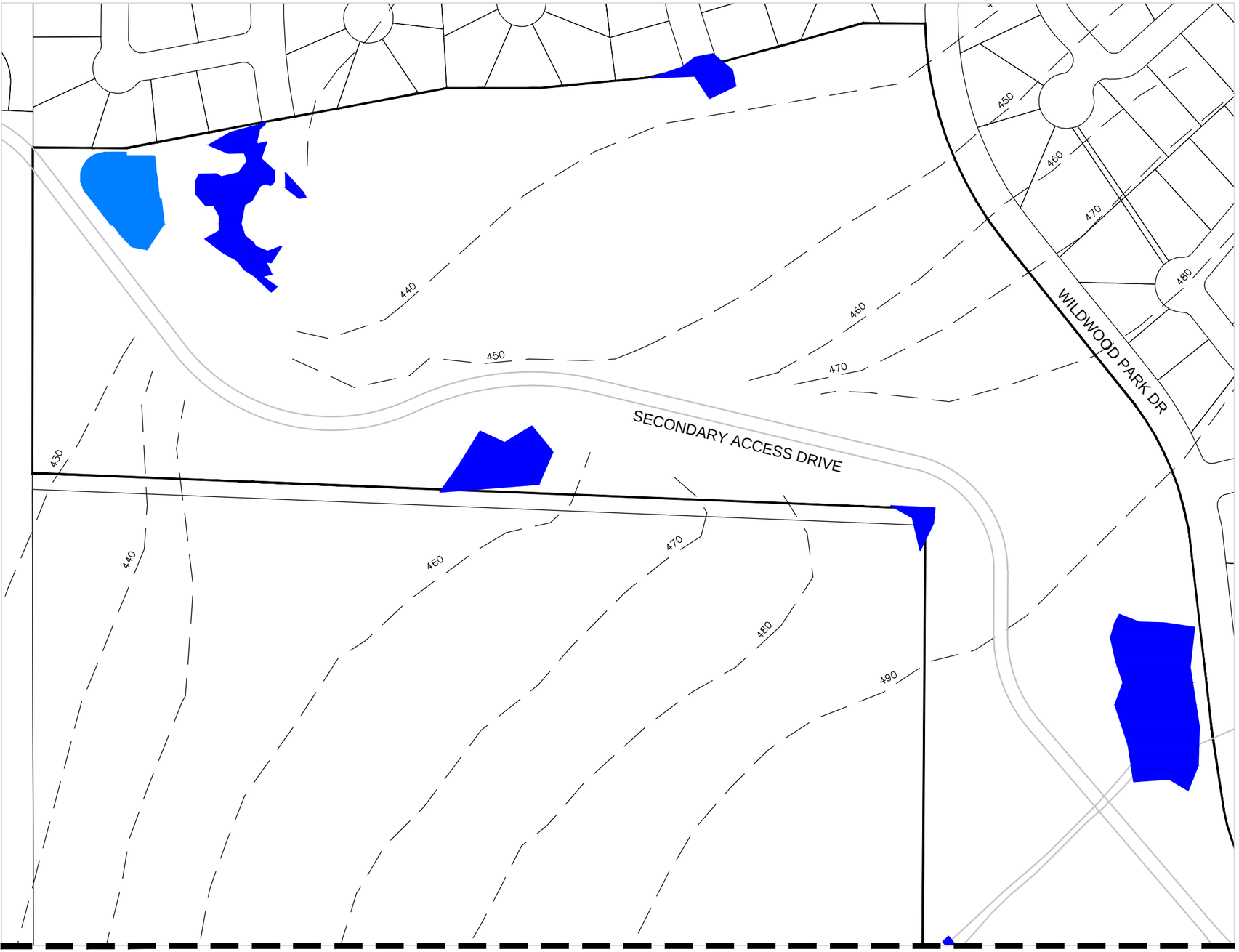
0 100 200 400

1" = 200 FEET

A2.0

PCPC MASTER PLAN - PRELIM STORM REPORT

EXISTING CONDITIONS MAP - EXHIBIT A-2.1



MATCH LINE SEE EXHIBIT A-2.0

LEGEND

- EXISTING FACILITY
- WETLAND
- EXISTING STORM POND

EXISTING FACILITIES

ADM	Administration Building
AAH	Arts and Allied Health Building
CTR	College Center Building
HEP	Health Education Center
LSC	Library Sciences Building
CDP	Child Cevelopment Center
MAINT.	Maintenance Building
911	911 Emergency Building

N

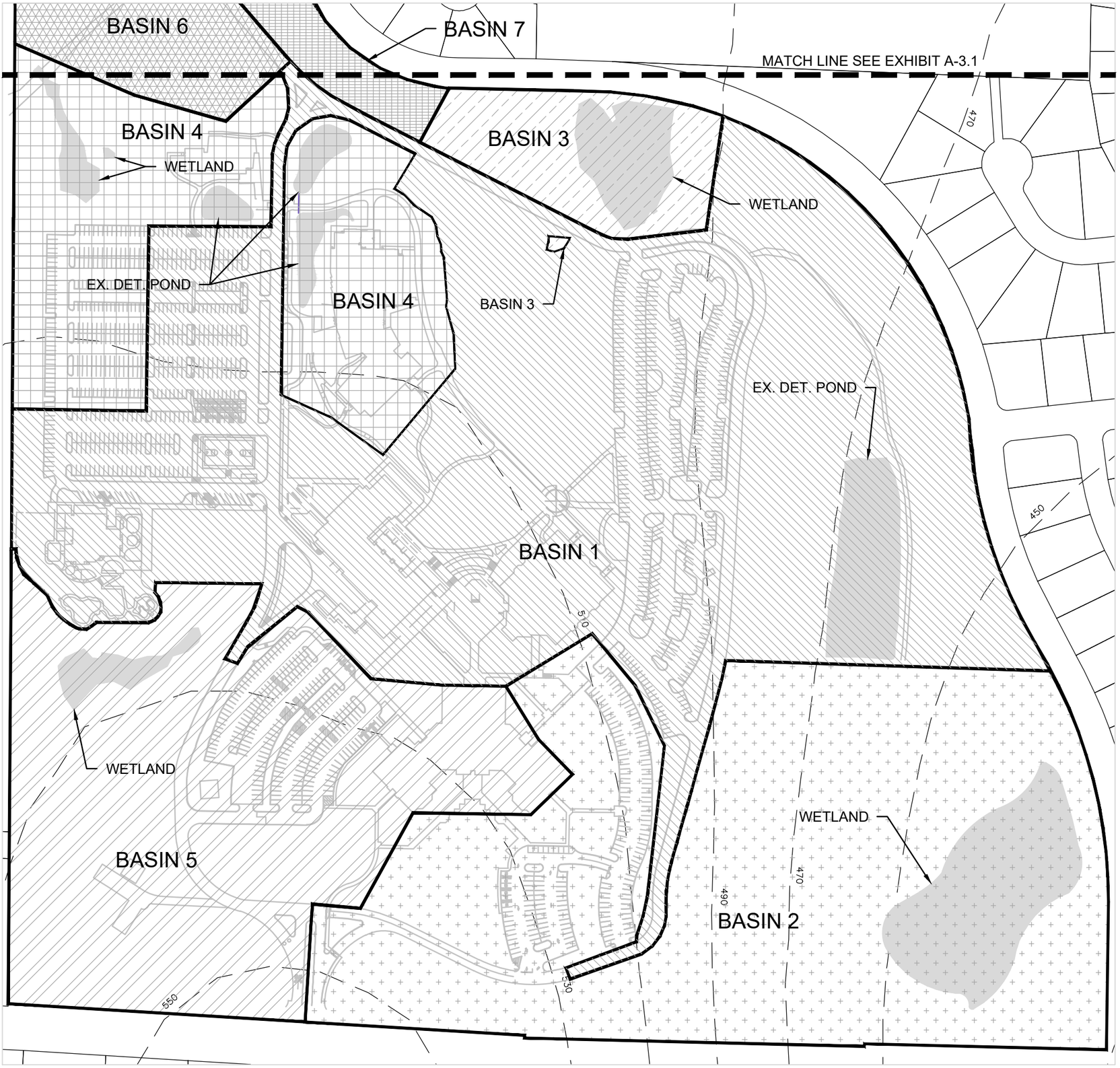
GRAPHIC SCALE

0 100 200 400

1" = 200 FEET

PCPC MASTER PLAN - PRELIM STORM REPORT

SUB-BASIN MAP - EXHIBIT A-3.0



- BASIN 1 - 33.54 AC
- BASIN 2 - 21.30 AC
- BASIN 3 - 2.89 AC
- BASIN 4 - 9.30 AC
- BASIN 5 - 14.05 AC
- BASIN 6 - 6.78 AC
- BASIN 7 - 4.04 AC

N

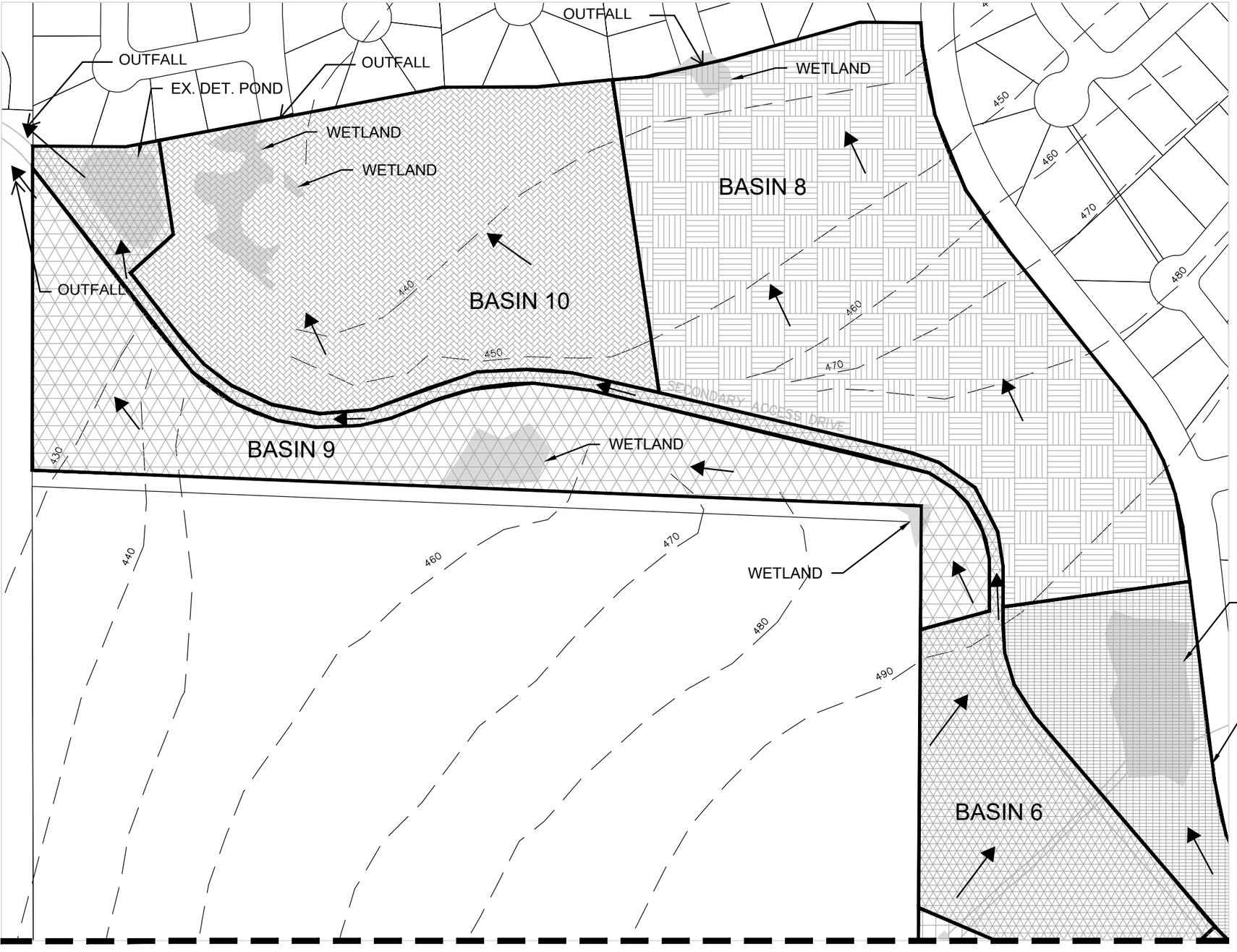
GRAPHIC SCALE

0 100 200 400

1" = 200 FEET

PCPC MASTER PLAN - PRELIM STORM REPORT

SUB-BASIN MAP - EXHIBIT A-3.1



MATCH LINE SEE EXHIBIT A-3.0

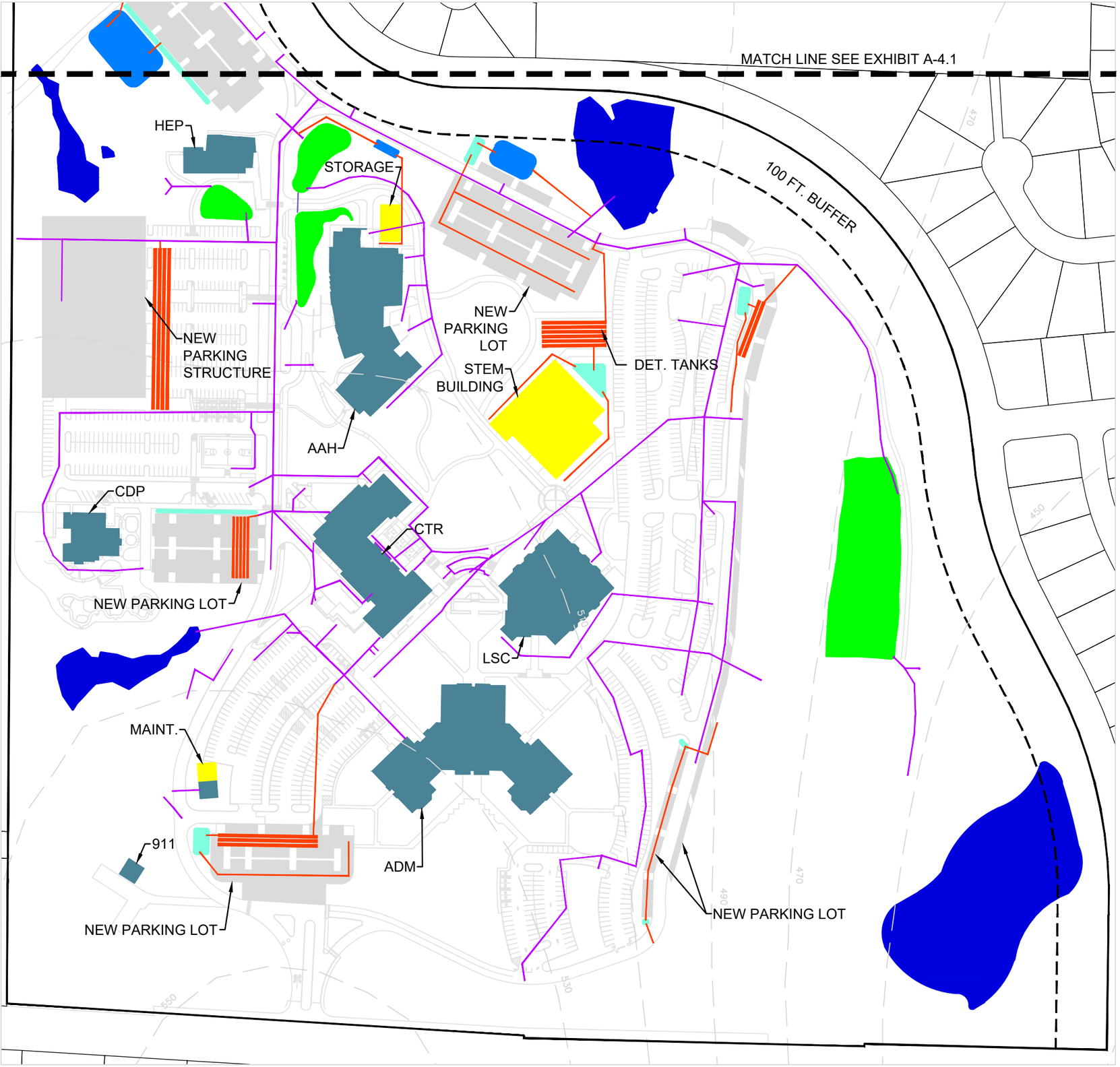
- BASIN 6 - 6.78 AC
- BASIN 7 - 4.04 AC
- BASIN 8 - 13.39 AC
- BASIN 9 - 7.33 AC
- BASIN 10 - 10.27 AC
- NATURAL DRAINAGE PATH

N

GRAPHIC SCALE

0 100 200 400

1" = 200 FEET



PCPC MASTER PLAN - PRELIM STORM REPORT

DEVELOPED CONDITIONS - EXHIBIT A-4.0

LEGEND

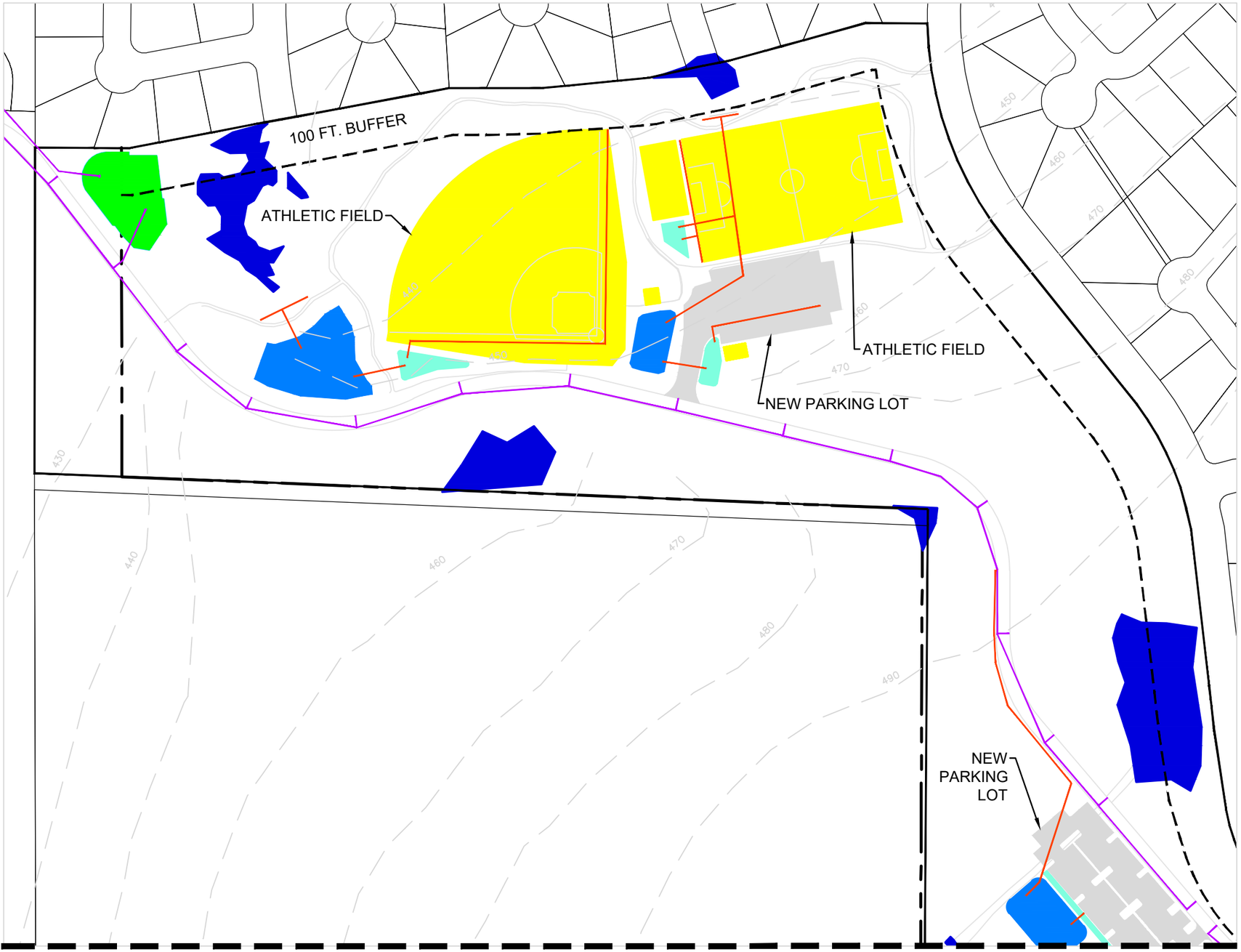
- EXISTING FACILITY
- FUTURE ADDITIONAL PARKING
- FUTURE NEW FACILITIES AND FIELDS
- WETLAND
- EXISTING DETENTION POND
- PROPOSED DETENTION POND
- PROPOSED BIORETENTION FACILITY
- STORM LINE EXISTING
- STORM LINE PROPOSED
- PROPOSED STORM DETENTION PIPE
- EXISTING CONTOURS

EXISTING FACILITIES

ADM	Administration Building
AAH	Arts and Allied Health Building
CTR	College Center Building
HEP	Health Education Center
LSC	Library Sciences Building
CDP	Child Cevelopment Center
MAINT.	Maintenance Building
911	911 Emergency Building

FUTURE PROJECTS

ATHLETIC FIELDS	New Fields for Baseball, Soft Ball, and Soccer
ADM	Administration Renovation and Expansion
CDP	Child Development Center Expansion
LSC	New Classroom Building
PARKING	New Parking Structure for Classroom Buildings
STEM BUILDING	New Science Technology Engineering and Math Building
STORAGE	New Campus Storage Building
MAINT.	Maintenance Shop Expansion
PORT.	Remove Portable Structure
NEW PARKING LOT	New Parking for Campus and Athletic Fields



PCPC MASTER PLAN - PRELIM STORM REPORT

DEVELOPED CONDITIONS - EXHIBIT A-4.1

LEGEND

- EXISTING FACILITY
- FUTURE ADDITIONAL PARKING
- FUTURE NEW FACILITIES AND FIELDS
- WETLAND
- EXISTING DETENTION POND
- PROPOSED DETENTION POND
- PROPOSED BIORETENTION FACILITY
- STORM LINE EXISTING
- STORM LINE PROPOSED
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- EXISTING CONTOURS

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MAINT.	Maintenance Shop Expansion
PORT.	Remove Portable Structure
NEW PARKING LOT	New Parking for Campus and Athletic Fields

National Flood Hazard Layer FIRMette

FEMA

122°16'39"W 47°9'35"N

0 250 500 1,000 1,500 2,000 Feet

1:6,000

122°16'2"W 47°9'10"N

Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 Cross Sections with 1% Annual Chance
- 17.5 Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

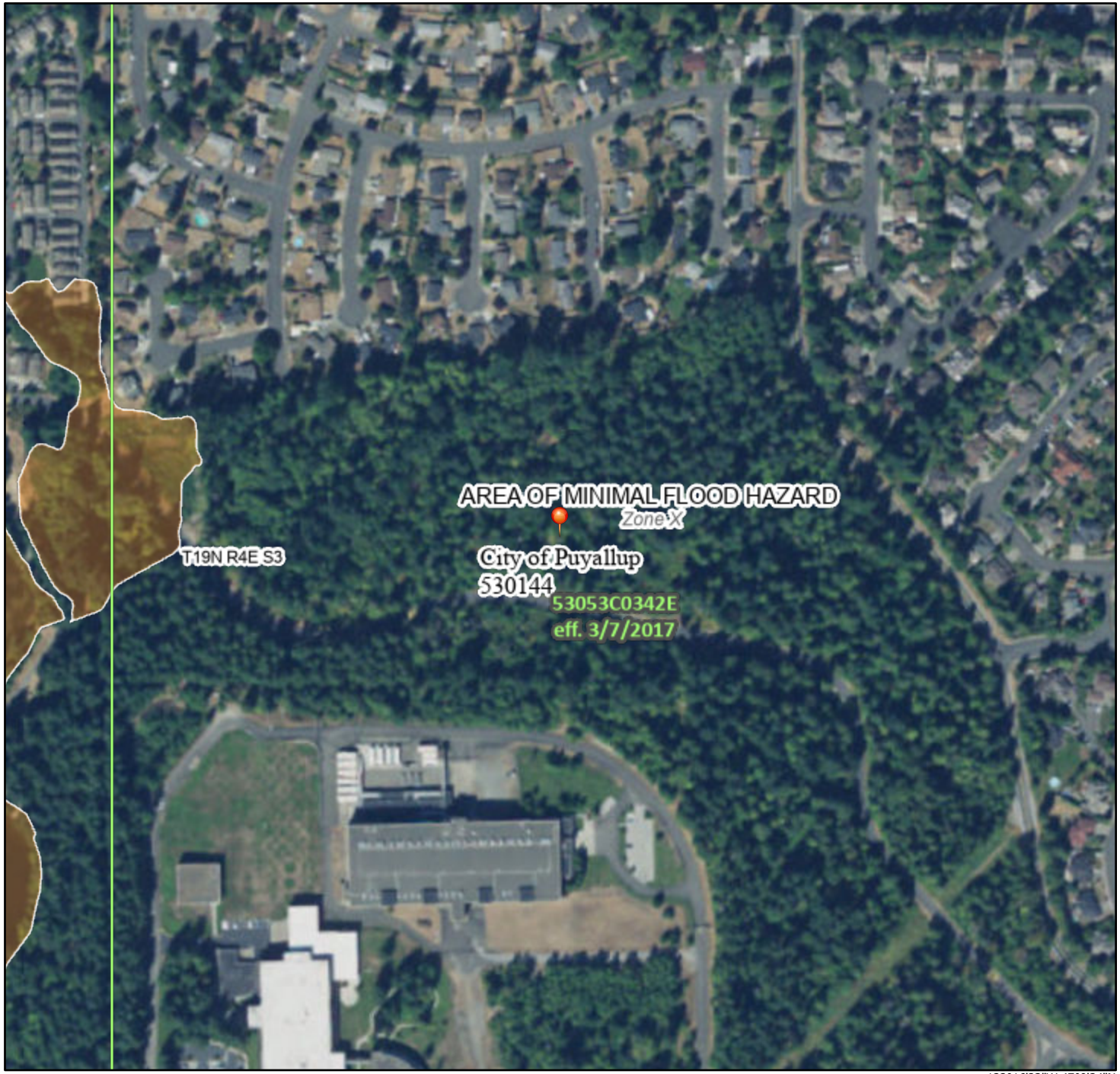
The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 6/29/2021 at 4:45 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

National Flood Hazard Layer FIRMette

FEMA

122°17'1"W 47°9'59"N



122°16'23"W 47°9'34"N

0 250 500 1,000 1,500 2,000 Feet

1:6,000

Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
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OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 Cross Sections with 1% Annual Chance
- 17.5 Water Surface Elevation
- Coastal Transect
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 6/29/2021 at 4:51 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

City of Puyallup Drainage Basins

Legend

Drainage Basins

- Clarks Creek
- Pothole
- Puyallup River North
- Puyallup River South
- Shaw Road
- State Highway

Wetlands

- Field-verified
- Unverified
- Buffer
- Mitigation Site

- City Limits
- Waterbodies
- Streams

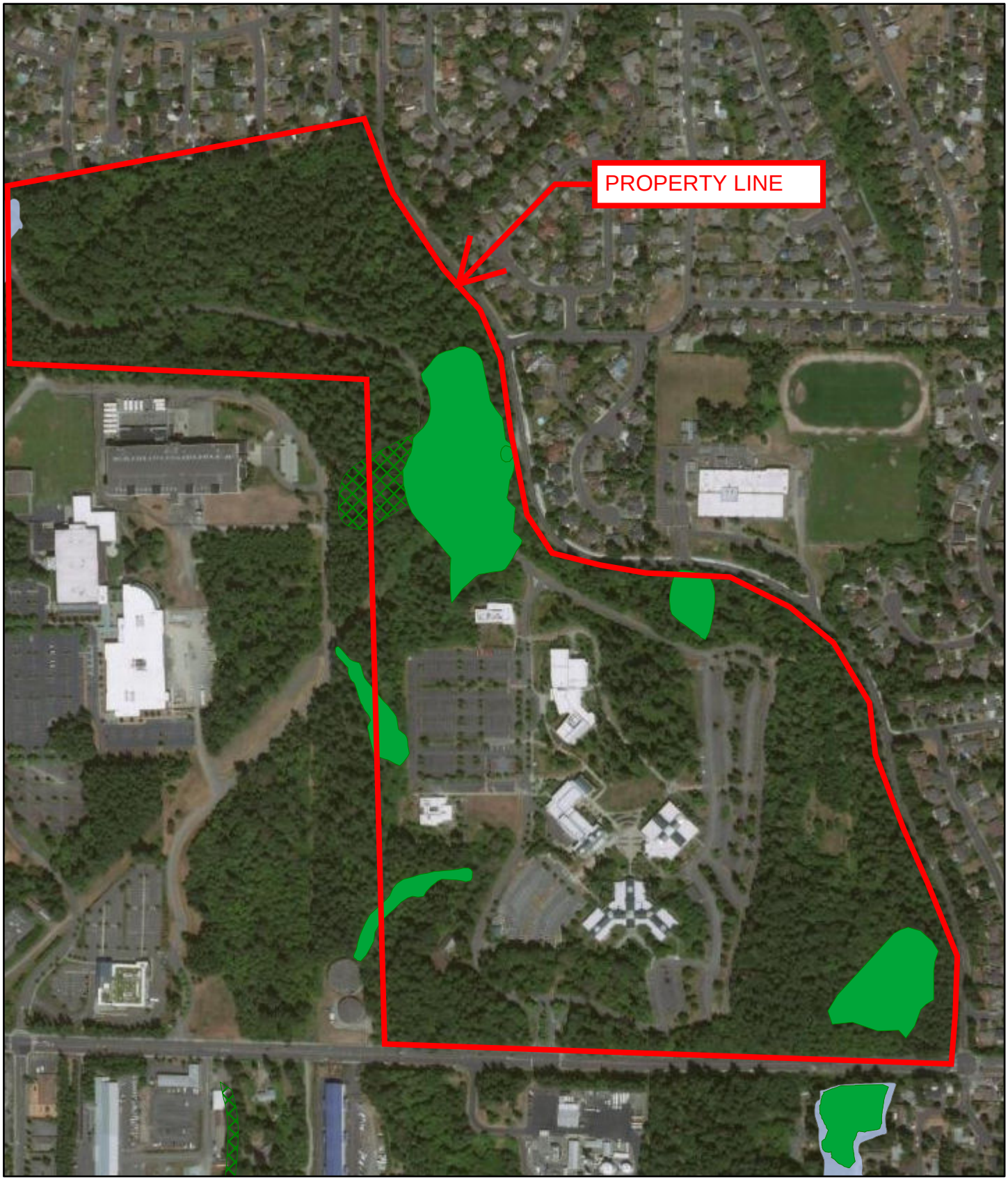
City of Puyallup drainage data provided as part of the November 2011 Comprehensive Stormwater Plan developed by Brown and Caldwell.
Edited by City of Puyallup Collections Division.

0 1,500 3,000 6,000
Feet

Date: 1/2/2020

File Name: jgrbich/COP Website/Drainage Basins.mxd (PDF)

ArcGIS Web Map



6/29/2021, 11:26:01 AM

1:9,028

0 0.05 0.1 0.2 mi

0 0.07 0.15 0.3 km

City Limits

Unverified

Wetlands

Regulated Floodplain 2017

Field-verified

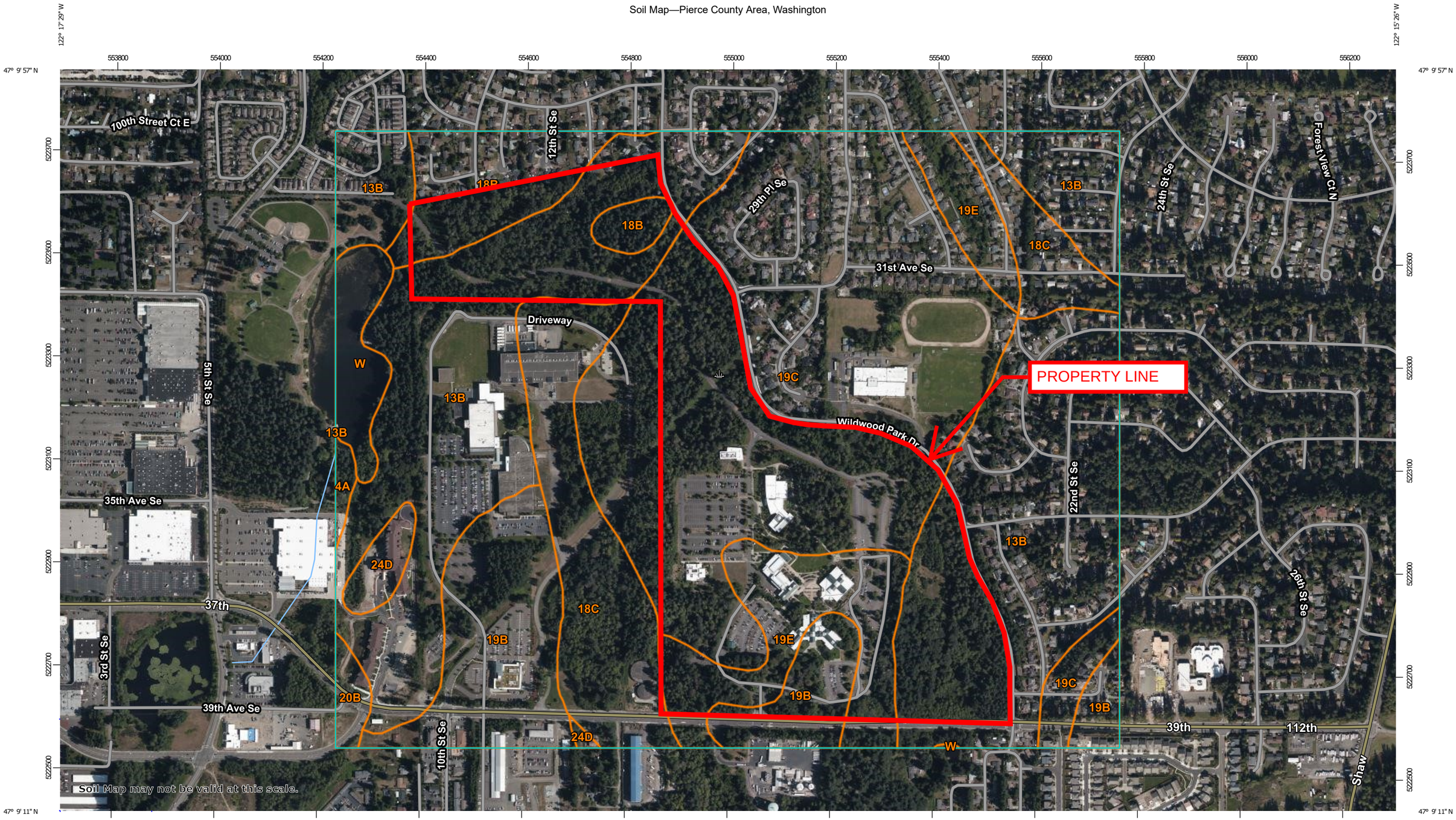
Zone X (SHADED)

Unverified

Maxar

Web AppBuilder for ArcGIS

Maxar | Jennifer Recco, GIS Coordinator, City of Puyallup;


122° 17' 29" W
122° 15' 26" W
47° 9' 57" N
47° 9' 11" N
553800
554000
554200
554400
554600
554800
555000
555200
555400
555600
555800
556000
556200
5223700
5223500
5223300
5223100
5222900
5222700
5222500
100th Street Ct E
12th St Se
29th Pl Se
24th St Se
Forest View Ct N
31st Ave Se
Driveway
PROPERTY LINE
Wildwood Park Dr
22nd St Se
26th St Se
5th St Se
35th Ave Se
37th
3rd St Se
39th Ave Se
10th St Se
39th
112th
Shaw
13B
18B
19E
18C
W
19C
4A
24D
19B
20B
Soil Map may not be valid at this scale.
Map Scale: 1:7,010 if printed on B landscape (17" x 11") sheet.
N
Meters
0 100 200 400 600
Feet
0 300 600 1200 1800
Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features

- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Pierce County Area, Washington
Survey Area Data: Version 16, Jun 4, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 29, 2018—Jul 22, 2019

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
4A	Bellingham silty clay loam	1.4	0.3%
13B	Everett very gravelly sandy loam, 0 to 8 percent slopes	157.9	34.8%
18B	Indianola loamy sand, 0 to 5 percent slopes	20.3	4.5%
18C	Indianola loamy sand, 5 to 15 percent slopes	41.7	9.2%
19B	Kapowsin gravelly ashy loam, 0 to 6 percent slopes	42.1	9.3%
19C	Kapowsin gravelly ashy loam, 6 to 15 percent slopes	141.4	31.2%
19E	Kapowsin gravelly ashy loam, 30 to 65 percent slopes	32.9	7.3%
20B	Kitsap silt loam, 2 to 8 percent slopes	2.8	0.6%
24D	Neilton gravelly loamy sand, 8 to 25 percent slopes	4.4	1.0%
W	Water	8.8	1.9%
Totals for Area of Interest		**453.7**	**100.0%**

Pierce County Area, Washington

4A—Bellingham silty clay loam

Map Unit Setting

National map unit symbol: 2hr7
Elevation: 0 to 820 feet
Mean annual precipitation: 35 to 60 inches
Mean annual air temperature: 50 degrees F
Frost-free period: 150 to 210 days
Farmland classification: Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season

Map Unit Composition

Bellingham and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Bellingham

Setting

Landform: Till plains
Parent material: Alluvium

Typical profile

H1 - 0 to 4 inches: silty clay loam
H2 - 4 to 60 inches: clay

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 0 to 4 inches
Frequency of flooding: FrequentNone
Frequency of ponding: None
Available water capacity: High (about 11.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: C/D
Forage suitability group: Wet Soils (G002XN102WA)
Other vegetative classification: Wet Soils (G002XN102WA)

Hydric soil rating: Yes

Data Source Information

Soil Survey Area: Pierce County Area, Washington
Survey Area Data: Version 16, Jun 4, 2020

Pierce County Area, Washington

13B—Everett very gravelly sandy loam, 0 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2t629
Elevation: 30 to 900 feet
Mean annual precipitation: 35 to 91 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 180 to 240 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Everett and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Everett

Setting

Landform: Eskers, moraines, kames
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Crest, interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Sandy and gravelly glacial outwash

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
A - 1 to 3 inches: very gravelly sandy loam
Bw - 3 to 24 inches: very gravelly sandy loam
C1 - 24 to 35 inches: very gravelly loamy sand
C2 - 35 to 60 inches: extremely cobbly coarse sand

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 3.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: A

Forage suitability group: Droughty Soils (G002XS401WA), Droughty Soils (G002XN402WA), Droughty Soils (G002XF403WA)
Other vegetative classification: Droughty Soils (G002XS401WA), Droughty Soils (G002XN402WA), Droughty Soils (G002XF403WA)
Hydric soil rating: No

Minor Components

Alderwood
Percent of map unit: 10 percent
Landform: Ridges, hills
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Crest, talf
Down-slope shape: Linear, convex
Across-slope shape: Convex
Hydric soil rating: No

Indianola
Percent of map unit: 10 percent
Landform: Terraces, eskers, kames
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Data Source Information

Soil Survey Area: Pierce County Area, Washington
Survey Area Data: Version 16, Jun 4, 2020

Pierce County Area, Washington

18B—Indianola loamy sand, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: 2t62k
Elevation: 0 to 980 feet
Mean annual precipitation: 30 to 81 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 170 to 210 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Indianola and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Indianola

Setting

Landform: Terraces, eskers, kames
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy glacial outwash

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
A - 1 to 6 inches: loamy sand
Bw1 - 6 to 17 inches: loamy sand
Bw2 - 17 to 27 inches: sand
BC - 27 to 37 inches: sand
C - 37 to 60 inches: sand

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 99.90 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 3.9 inches)

Interpretive groups

Land capability classification (irrigated): 4s
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: A

Forage suitability group: Droughty Soils (G002XV402WA), Droughty Soils (G002XS401WA), Droughty Soils (G002XN402WA), Droughty Soils (G002XF403WA)
Other vegetative classification: Droughty Soils (G002XV402WA), Droughty Soils (G002XS401WA), Droughty Soils (G002XN402WA), Droughty Soils (G002XF403WA)
Hydric soil rating: No

Minor Components

Alderwood
Percent of map unit: 8 percent
Landform: Hills, ridges
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Crest, talf
Down-slope shape: Convex, linear
Across-slope shape: Convex
Hydric soil rating: No

Everett
Percent of map unit: 5 percent
Landform: Kames, eskers, moraines
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Crest, interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Norma
Percent of map unit: 2 percent
Landform: Depressions, drainageways
Landform position (three-dimensional): Dip
Down-slope shape: Concave, linear
Across-slope shape: Concave
Hydric soil rating: Yes

Data Source Information

Soil Survey Area: Pierce County Area, Washington
Survey Area Data: Version 16, Jun 4, 2020

Pierce County Area, Washington

18C—Indianola loamy sand, 5 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2t635
Elevation: 0 to 980 feet
Mean annual precipitation: 30 to 81 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 170 to 210 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Indianola and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Indianola

Setting

Landform: Kames, terraces, eskers
Landform position (three-dimensional): Riser
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy glacial outwash

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
A - 1 to 6 inches: loamy sand
Bw1 - 6 to 17 inches: loamy sand
Bw2 - 17 to 27 inches: sand
BC - 27 to 37 inches: sand
C - 37 to 60 inches: sand

Properties and qualities

Slope: 5 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 99.90 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 3.9 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: A
Forage suitability group: Droughty Soils (G002XS401WA), Droughty Soils (G002XN402WA)

Other vegetative classification: Droughty Soils (G002XS401WA), Droughty Soils (G002XN402WA)
Hydric soil rating: No

Minor Components

Alderwood
Percent of map unit: 8 percent
Landform: Ridges, hills
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Nose slope, talf
Down-slope shape: Linear, convex
Across-slope shape: Convex
Hydric soil rating: No

Everett
Percent of map unit: 5 percent
Landform: Kames, eskers, moraines
Landform position (two-dimensional): Shoulder, footslope
Landform position (three-dimensional): Crest, base slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Norma
Percent of map unit: 2 percent
Landform: Depressions, drainageways
Landform position (three-dimensional): Dip
Down-slope shape: Concave, linear
Across-slope shape: Concave
Hydric soil rating: Yes

Data Source Information

Soil Survey Area: Pierce County Area, Washington
Survey Area Data: Version 16, Jun 4, 2020

Pierce County Area, Washington

19B—Kapowsin gravelly ashy loam, 0 to 6 percent slopes

Map Unit Setting

National map unit symbol: 2t61w
Elevation: 50 to 900 feet
Mean annual precipitation: 30 to 50 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 150 to 220 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Kapowsin and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Kapowsin

Setting

Landform: Moraines
Landform position (two-dimensional): Toeslope, summit
Landform position (three-dimensional): Base slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Volcanic ash mixed with glacial drift over dense glaciomarine deposits

Typical profile

Ap - 0 to 7 inches: gravelly ashy loam
Bhs - 7 to 11 inches: gravelly ashy loam
Bs1 - 11 to 15 inches: gravelly ashy loam
2Bs2 - 15 to 25 inches: loam
3Bstm - 25 to 29 inches: loam
3Cd - 29 to 59 inches: gravelly loam

Properties and qualities

Slope: 0 to 6 percent
Depth to restrictive feature: More than 80 inches; More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: About 11 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 5.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3s

Hydrologic Soil Group: B
Forage suitability group: Limited Depth Soils (G002XF303WA), Limited Depth Soils (G002XN302WA)
Other vegetative classification: Limited Depth Soils (G002XF303WA), Limited Depth Soils (G002XN302WA)
Hydric soil rating: No

Minor Components

Alderwood
Percent of map unit: 5 percent
Landform: Ridges, hills
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Crest, talf
Down-slope shape: Linear, convex
Across-slope shape: Convex
Hydric soil rating: No

Mckenna
Percent of map unit: 2 percent
Landform: Depressions, drainageways
Landform position (three-dimensional): Dip
Down-slope shape: Concave, linear
Across-slope shape: Concave
Hydric soil rating: Yes

Dupont
Percent of map unit: 2 percent
Landform: Depressions, troughs
Landform position (three-dimensional): Dip
Down-slope shape: Concave, linear
Across-slope shape: Concave
Hydric soil rating: Yes

Norma
Percent of map unit: 2 percent
Landform: Depressions, drainageways
Landform position (three-dimensional): Dip
Down-slope shape: Concave, linear
Across-slope shape: Concave
Hydric soil rating: Yes

Harstine
Percent of map unit: 2 percent
Landform: Ridges
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Crest
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

Neilton
Percent of map unit: 2 percent
Landform: Outwash terraces

Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Data Source Information

Soil Survey Area: Pierce County Area, Washington
Survey Area Data: Version 16, Jun 4, 2020

Pierce County Area, Washington

19C—Kapowsin gravelly ashy loam, 6 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2t61x
Elevation: 50 to 900 feet
Mean annual precipitation: 30 to 50 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 150 to 220 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Kapowsin and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Kapowsin

Setting

Landform: Moraines
Landform position (two-dimensional): Toeslope, footslope
Landform position (three-dimensional): Side slope, base slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Volcanic ash mixed with glacial drift over dense glaciomarine deposits

Typical profile

Ap - 0 to 7 inches: gravelly ashy loam
Bhs - 7 to 11 inches: gravelly ashy loam
Bs1 - 11 to 15 inches: gravelly ashy loam
2Bs2 - 15 to 25 inches: loam
3Bstm - 25 to 29 inches: loam
3Cd - 29 to 59 inches: gravelly loam

Properties and qualities

Slope: 6 to 15 percent
Depth to restrictive feature: More than 80 inches; More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: About 11 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 5.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e

Hydrologic Soil Group: B
Forage suitability group: Limited Depth Soils (G002XF303WA), Limited Depth Soils (G002XN302WA)
Other vegetative classification: Limited Depth Soils (G002XF303WA), Limited Depth Soils (G002XN302WA)
Hydric soil rating: No

Minor Components

Alderwood
Percent of map unit: 5 percent
Landform: Ridges, hills
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Nose slope, talf
Down-slope shape: Linear, convex
Across-slope shape: Convex
Hydric soil rating: No

Neilton
Percent of map unit: 2 percent
Landform: Outwash terraces
Landform position (three-dimensional): Riser
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Norma
Percent of map unit: 2 percent
Landform: Depressions, drainageways
Landform position (three-dimensional): Dip
Down-slope shape: Concave, linear
Across-slope shape: Concave
Hydric soil rating: Yes

Mckenna
Percent of map unit: 2 percent
Landform: Depressions, drainageways
Landform position (three-dimensional): Dip
Down-slope shape: Concave, linear
Across-slope shape: Concave
Hydric soil rating: Yes

Dupont
Percent of map unit: 2 percent
Landform: Depressions, troughs
Landform position (three-dimensional): Dip
Down-slope shape: Concave, linear
Across-slope shape: Concave
Hydric soil rating: Yes

Harstine
Percent of map unit: 2 percent
Landform: Ridges
Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Nose slope
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

Data Source Information

Soil Survey Area: Pierce County Area, Washington
Survey Area Data: Version 16, Jun 4, 2020

Pierce County Area, Washington

19E—Kapowsin gravelly ashy loam, 30 to 65 percent slopes

Map Unit Setting

National map unit symbol: 2t620
Elevation: 50 to 900 feet
Mean annual precipitation: 30 to 50 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 150 to 220 days
Farmland classification: Not prime farmland

Map Unit Composition

Kapowsin and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Kapowsin

Setting

Landform: Moraines
Landform position (two-dimensional): Footslope, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Volcanic ash mixed with glacial drift over dense glaciomarine deposits

Typical profile

Ap - 0 to 7 inches: gravelly ashy loam
Bhs - 7 to 11 inches: gravelly ashy loam
Bs1 - 11 to 15 inches: gravelly ashy loam
2Bs2 - 15 to 25 inches: loam
3Bstm - 25 to 29 inches: loam
3Cd - 29 to 59 inches: gravelly loam

Properties and qualities

Slope: 30 to 65 percent
Depth to restrictive feature: More than 80 inches; More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: About 11 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 5.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e

Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Alderwood
Percent of map unit: 10 percent
Landform: Ridges, hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope, nose slope, talf
Down-slope shape: Linear, convex
Across-slope shape: Convex
Hydric soil rating: No

Barneston
Percent of map unit: 5 percent
Landform: Eskers, moraines, kames
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Data Source Information

Soil Survey Area: Pierce County Area, Washington
Survey Area Data: Version 16, Jun 4, 2020

Pierce County Area, Washington

20B—Kitsap silt loam, 2 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2hpt
Elevation: 0 to 590 feet
Mean annual precipitation: 37 inches
Mean annual air temperature: 50 degrees F
Frost-free period: 160 to 200 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Kitsap and similar soils: 85 percent
Minor components: 3 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Kitsap

Setting

Landform: Terraces
Parent material: Glaciolacustrine deposits

Typical profile

H1 - 0 to 10 inches: ashy silt loam
H2 - 10 to 32 inches: silty clay loam
H3 - 32 to 60 inches: stratified silt to silty clay loam

Properties and qualities

Slope: 2 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 16 to 23 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: High (about 11.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: C/D
Forage suitability group: Soils with Few Limitations (G002XS501WA)
Other vegetative classification: Soils with Few Limitations (G002XS501WA)
Hydric soil rating: No

Minor Components

Bellingham

Percent of map unit: 3 percent
Landform: Depressions
Hydric soil rating: Yes

Data Source Information

Soil Survey Area: Pierce County Area, Washington
Survey Area Data: Version 16, Jun 4, 2020

Pierce County Area, Washington

24D—Neilton gravelly loamy sand, 8 to 25 percent slopes

Map Unit Setting

National map unit symbol: 2hq1
Elevation: 0 to 690 feet
Mean annual precipitation: 30 to 55 inches
Mean annual air temperature: 50 degrees F
Frost-free period: 145 to 210 days
Farmland classification: Not prime farmland

Map Unit Composition

Neilton and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Neilton

Setting

Landform: Eskers
Parent material: Glacial outwash

Typical profile

H1 - 0 to 3 inches: gravelly loamy sand
H2 - 3 to 21 inches: gravelly loamy sand
H3 - 21 to 60 inches: very gravelly sand

Properties and qualities

Slope: 8 to 25 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Very low (about 2.1 inches)

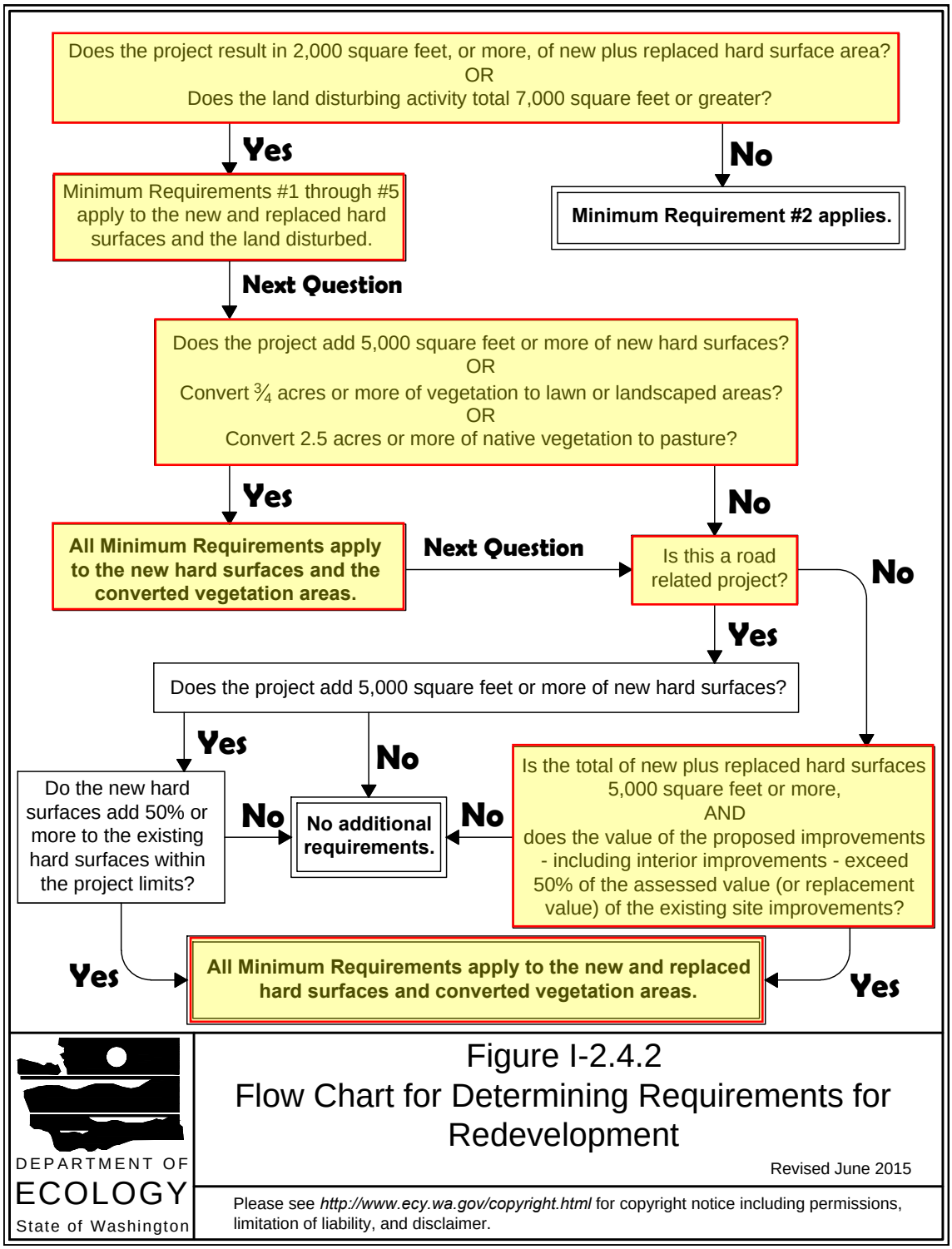
Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: A
Forage suitability group: Droughty Soils (G002XN402WA)
Other vegetative classification: Droughty Soils (G002XN402WA)
Hydric soil rating: No

Data Source Information

Soil Survey Area: Pierce County Area, Washington
Survey Area Data: Version 16, Jun 4, 2020

Figure I-2.4.2 Flow Chart for Determining Requirements for Redevelopment



Appendix B

Flow Control and Water Quality Calculations

PCPC MASTER PLAN - PRELIM STORM REPORT

KEY MAP - EXHIBIT B-1

LEGEND

- EXISTING FACILITY
- FUTURE ADDITIONAL PARKING
- FUTURE NEW FACILITIES AND FIELDS
- WETLAND
- EXISTING DETENTION POND
- PROPOSED DETENTION POND
- PROPOSED BIORETENTION FACILITY

B-2 ATHLETIC FIELDS, PARKING LOT, & BLDG'S

B-4 STORAGE BUILDING

B-11 PARKING LOT 7

B-5 PARKING LOT 1

HEP

B-10 PARKING LOT 6

B-6 PARKING LOT 2

B-3 STEM BUILDING

B-10 PARKING LOT 6

AAH

CDP

CTR

B-7 PARKING LOT 3

LSC

B-9 PARKING LOT 5

ADM

B-8 PARKING LOT 4

EXISTING FACILITIES

ADM	Administration Building
AAH	Arts and Allied Health Building
CTR	College Center Building
HEP	Health Education Center
LSC	Library Sciences Building
CDP	Child Cevelopment Center

Pondcalc Worksheet - Athletic Fields and Parking Lot + Buildings

Instructions: ,,
1 Enter site information in the yellow highlighted cells
2 Verify no error message is displayed
3 Results are displayed in Green Box
*Note: pondcalc will not work for negative landcover conversions.
pondcalc does not handle existing EI or TG very well.

Disclaimer: This spreadsheet is provided without warranty of any kind. Use this spreadsheet at your own risk. All facility sizes should be verified using KCRTS software.

Rainfall Region	ST	{either ST or LA	see rainfall regions map}
Scale Factor:	1.00	{ 0.8 - 1.2	see rainfall regions map}
FC Level:	2	{ 1, 2, or 3	see flow control app map}

Pg 21 - KCTRS User Manual

Predeveloped acres	Landcover type	Postdeveloped acres	Adjusted Acres converted cover	Error Messages
3.12	TF	0	3.12	
	TP		0	
	TG	0	0	
0	EI	3.12	3.12	**50% of field turf modeled as EI**

TF= till forest, TP = till pasture, TG = till grass, EI = effective impervious

Acreage Check:	post	pre
gross	3.12	3.12
adjusted	3.12	3.12

Storage Estimate:
4.9 inches per converted acre
4.9 inches per gross acre
1.3 ac-ft
55,192 cubic-ft

Bioretention Facility Sizing
*=0.036/SF of EI (PGIS)
*=1,560SF/AC
EI = 3.12 AC
Bioretention Area
4867 SF

WWHM = 120% = 66,230 CF (Required Detention Pond Volume)

Pondcalc Worksheet - STEM Building

Instructions: ,,
1 Enter site information in the yellow highlighted cells
2 Verify no error message is displayed
3 Results are displayed in Green Box
*Note: pondcalc will not work for negative landcover conversions.
pondcalc does not handle existing EI or TG very well.

Disclaimer: This spreadsheet is provided without warranty of any kind. Use this spreadsheet at your own risk. All facility sizes should be verified using KCRTS software.

Rainfall Region	ST	{either ST or LA	see rainfall regions map}
Scale Factor:	1.00	{ 0.8 - 1.2	see rainfall regions map}
FC Level:	2	{ 1, 2, or 3	see flow control app map}

Pg 21 - KCTRS User Manual

Predeveloped acres	Landcover type	Postdevelop acres	Adjusted Acres converted cover	Error Messages
0.92	TF	0	0.92	
	TP		0	
	TG	0	0	
0	EI	0.92	0.92	**Includes 20% of bldg size for site surfacing**

TF= till forest, TP = till pasture, TG = till grass, EI = effective impervious

Acreage Check:	post	pre
gross	0.92	0.92
adjusted	0.92	0.92

Storage Estimate:
4.9 inches per converted acre
4.9 inches per gross acre
0.4 ac-ft
16,275 cubic-ft

WWHM = 120% = 19,529 CF (Required Detention Volume)

Flow Control Facility Size
6' Detention Pipe = **691 Linear Feet**

Pondcalc Worksheet - Storage Building

Instructions: ,,
1 Enter site information in the yellow highlighted cells
2 Verify no error message is displayed
3 Results are displayed in Green Box
*Note: pondcalc will not work for negative landcover conversions.
pondcalc does not handle existing EI or TG very well.

Disclaimer: This spreadsheet is provided without warranty of any kind. Use this spreadsheet at your own risk. All facility sizes should be verified using KCRTS software.

Rainfall Region	ST	{either ST or LA	see rainfall regions map}
Scale Factor:	1.00	{ 0.8 - 1.2	see rainfall regions map}
FC Level:	2	{ 1, 2, or 3	see flow control app map}

Pg 21 - KCTRS User Manual

Predeveloped acres	Landcover type	Postdeveloped acres	Adjusted Acres converted cover	Error Messages
0.08	TF	0	0.08	
	TP		0	
	TG	0	0	
0	EI	0.08	0.08	**Includes 20% of bldg size for site surfacing**

TF= till forest, TP = till pasture, TG = till grass, EI = effective impervious

Acreage Check:	post	pre
gross	0.08	0.08
adjusted	0.08	0.08

Storage Estimate:
4.9 inches per converted acre
4.9 inches per gross acre
0.0 ac-ft
1,415 cubic-ft

WWHM = 120% = 1,698 CF (Required Detention Pond Volume)

Pondcalc Worksheet - Parking lot 1

Instructions: ,,
1 Enter site information in the yellow highlighted cells
2 Verify no error message is displayed
3 Results are displayed in Green Box
*Note: pondcalc will not work for negative landcover conversions.
pondcalc does not handle existing EI or TG very well.

Disclaimer: This spreadsheet is provided without warranty of any kind. Use this spreadsheet at your own risk. All facility sizes should be verified using KCRTS software.

Rainfall Region	ST	{either ST or LA	see rainfall regions map}
Scale Factor:	1.00	{ 0.8 - 1.2	see rainfall regions map}
FC Level:	2	{ 1, 2, or 3	see flow control app map}

Pg 21 - KCTRS User Manual

Predeveloped acres	Landcover type	Postdeveloped acres	Adjusted Acres converted cover
1.18	TF	0	1.18
	TP		0
	TG	0	0
0	EI	1.18	1.18

Error Messages

TF= till forest, TP = till pasture, TG = till grass, EI = effective impervious

Acreage Check:	post	pre
gross	1.18	1.18
adjusted	1.18	1.18

Storage Estimate:
4.9 inches per converted acre
4.9 inches per gross acre
0.5 ac-ft
20,874 cubic-ft

Bioretention Facility Sizing
*=0.036/SF of EI (PGIS)
*=1,560SF/AC
EI = 1.18 AC
Bioretention Area
1841 SF

WWHM = 120% = 25,049 CF (Required Detention Pond Volume)

Pondcalc Worksheet - Parking lot 2

Instructions: ,,
1 Enter site information in the yellow highlighted cells
2 Verify no error message is displayed
3 Results are displayed in Green Box
*Note: pondcalc will not work for negative landcover conversions.
pondcalc does not handle existing EI or TG very well.

Disclaimer: This spreadsheet is provided without warranty of any kind. Use this spreadsheet at your own risk. All facility sizes should be verified using KCRTS software.

Rainfall Region	ST	{either ST or LA	see rainfall regions map}
Scale Factor:	1.00	{ 0.8 - 1.2	see rainfall regions map}
FC Level:	2	{ 1, 2, or 3	see flow control app map}

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Predeveloped acres	Landcover type	Postdevelop acres	Adjusted Acres converted cover
1.65	TF	0	1.65
	TP		0
	TG	0	0
0	EI	1.65	1.65

Error Messages

TF= till forest, TP = till pasture, TG = till grass, EI = effective impervious

Acreage Check:	post	pre
gross	1.65	1.65
adjusted	1.65	1.65

Storage Estimate:
4.9 inches per converted acre
4.9 inches per gross acre
0.7 ac-ft
29,188 cubic-ft

WWHM = 120% = 35,026 CF (Required Detention Volume)

Flow Control Facility Size
6' Detention Pipe = **1,239 Linear Feet**

Pondcalc Worksheet - Parking Lot 3

Instructions: ,,
1 Enter site information in the yellow highlighted cells
2 Verify no error message is displayed
3 Results are displayed in Green Box
*Note: pondcalc will not work for negative landcover conversions.
pondcalc does not handle existing EI or TG very well.

Disclaimer: This spreadsheet is provided without warranty of any kind. Use this spreadsheet at your own risk. All facility sizes should be verified using KCRTS software.

Rainfall Region	ST	{either ST or LA	see rainfall regions map}
Scale Factor:	1.00	{ 0.8 - 1.2	see rainfall regions map}
FC Level:	2	{ 1, 2, or 3	see flow control app map}

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Predeveloped acres	Landcover type	Postdeveloped acres	Adjusted Acres converted cover
0.6	TF	0	0.6
	TP		0
	TG	0	0
0	EI	0.6	0.6

Error Messages

TF= till forest, TP = till pasture, TG = till grass, EI = effective impervious

Acreage Check:	post	pre
gross	0.6	0.6
adjusted	0.6	0.6

Storage Estimate:
4.9 inches per converted acre
4.9 inches per gross acre
0.2 ac-ft
10,614 cubic-ft

Bioretention Facility Sizing
*=0.036/SF of EI (PGIS)
*=1,560SF/AC
EI = 0.60 AC
Bioretention Area
936 SF

WWHM = 120% = 12,737 CF (Required Detention Volume)

Flow Control Facility Size
6' Detention Pipe = **451 Linear Feet**

Pondcalc Worksheet - Parking Lot 4

Instructions: ,,
1 Enter site information in the yellow highlighted cells
2 Verify no error message is displayed
3 Results are displayed in Green Box
*Note: pondcalc will not work for negative landcover conversions.
pondcalc does not handle existing EI or TG very well.

Disclaimer: This spreadsheet is provided without warranty of any kind. Use this spreadsheet at your own risk. All facility sizes should be verified using KCRTS software.

Rainfall Region	ST	{either ST or LA see rainfall regions map}	Pg 21 - KCTRS User Manual
Scale Factor:	1.00	{ 0.8 - 1.2 see rainfall regions map}	
FC Level:	2	{ 1, 2, or 3 see flow control app map}	

Predeveloped acres	Landcover type	Postdeveloped acres	Adjusted Acres converted cover
0.75	TF	0	0.75
	TP		0
	TG	0	0
0	EI	0.75	0.75

Error Messages

TF= till forest, TP = till pasture, TG = till grass, EI = effective impervious

Acreage Check:	post	pre
gross	0.75	0.75
adjusted	0.75	0.75

Storage Estimate:
4.9 inches per converted acre
4.9 inches per gross acre
0.3 ac-ft
13,267 cubic-ft

Bioretention Facility Sizing
*=0.036/SF of EI (PGIS)
*=1,560SF/AC
EI = 0.82 AC
Bioretention Area
1170 SF

WWHM = 120% = 15,921 CF (Required Detention Volume)

Flow Control Facility Size
6' Detention Pipe = **563 Linear Feet**

Pondcalc Worksheet - Parking Lot 5

Instructions: ,,
1 Enter site information in the yellow highlighted cells
2 Verify no error message is displayed
3 Results are displayed in Green Box
*Note: pondcalc will not work for negative landcover conversions.
pondcalc does not handle existing EI or TG very well.

Disclaimer: This spreadsheet is provided without warranty of any kind. Use this spreadsheet at your own risk. All facility sizes should be verified using KCRTS software.

Rainfall Region	ST	{either ST or LA	see rainfall regions map}
Scale Factor:	1.00	{ 0.8 - 1.2	see rainfall regions map}
FC Level:	2	{ 1, 2, or 3	see flow control app map}

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Predeveloped acres	Landcover type	Postdevelop acres	Adjusted Acres converted cover
0.14	TF	0	0.14
	TP		0
	TG	0	0
0	EI	0.14	0.14

Error Messages

TF= till forest, TP = till pasture, TG = till grass, EI = effective impervious

Acreage Check:	post	pre
gross	0.14	0.14
adjusted	0.14	0.14

Storage Estimate:
4.9 inches per converted acre
4.9 inches per gross acre
0.1 ac-ft
2,477 cubic-ft

Bioretention Facility Sizing
*=0.036/SF of EI (PGIS)
*=1,560SF/AC
EI = 0.14 AC
Bioretention Area
218 SF

Parking Lot 5 will provide full dispersion for flow control.

Pondcalc Worksheet - Parking Lot 6

Instructions: ,,
1 Enter site information in the yellow highlighted cells
2 Verify no error message is displayed
3 Results are displayed in Green Box
*Note: pondcalc will not work for negative landcover conversions.
pondcalc does not handle existing EI or TG very well.

Disclaimer: This spreadsheet is provided without warranty of any kind. Use this spreadsheet at your own risk. All facility sizes should be verified using KCRTS software.

Rainfall Region	ST	{either ST or LA see rainfall regions map}	Pg 21 - KCTRS User Manual
Scale Factor:	1.00	{ 0.8 - 1.2 see rainfall regions map}	
FC Level:	2	{ 1, 2, or 3 see flow control app map}	

Predeveloped acres	Landcover type	Postdeveloped acres	Adjusted Acres converted cover
0.31	TF	0	0.31
	TP		0
	TG	0	0
0	EI	0.31	0.31

Error Messages

TF= till forest, TP = till pasture, TG = till grass, EI = effective impervious

Acreage Check:	post	pre
gross	0.31	0.31
adjusted	0.31	0.31

Storage Estimate:
4.9 inches per converted acre
4.9 inches per gross acre
0.1 ac-ft
5,484 cubic-ft

Bioretention Facility Sizing
*=0.036/SF of EI (PGIS)
*=1,560SF/AC
EI = 0.31 AC
Bioretention Area
484 SF

WWHM = 120% = 6,581 CF (Required Detention Volume)

Flow Control Facility Size
6' Detention Pipe = **233 Linear Feet**

Pondcalc Worksheet - Parking lot 7

Instructions: ,,
1 Enter site information in the yellow highlighted cells
2 Verify no error message is displayed
3 Results are displayed in Green Box
*Note: pondcalc will not work for negative landcover conversions.
pondcalc does not handle existing EI or TG very well.

Disclaimer: This spreadsheet is provided without warranty of any kind. Use this spreadsheet at your own risk. All facility sizes should be verified using KCRTS software.

Rainfall Region	ST	{either ST or LA see rainfall regions map}	Pg 21 - KCTRS User Manual
Scale Factor:	1.00	{ 0.8 - 1.2 see rainfall regions map}	
FC Level:	2	{ 1, 2, or 3 see flow control app map}	

Predeveloped acres	Landcover type	Postdeveloped acres	Adjusted Acres converted cover
0.95	TF	0	0.95
	TP		0
	TG	0	0
0	EI	0.95	0.95

Error Messages

TF= till forest, TP = till pasture, TG = till grass, EI = effective impervious

Acreage Check:	post	pre
gross	0.95	0.95
adjusted	0.95	0.95

Storage Estimate:
4.9 inches per converted acre
4.9 inches per gross acre
0.4 ac-ft
16,805 cubic-ft

Bioretention Facility Sizing
*=0.036/SF of EI (PGIS)
*=1,560SF/AC
EI = 1.18 AC
Bioretention Area
1482 SF

WWHM = 120% = 20,166 CF (Required Detention Pond Volume)