

## CITY COUNCIL AGENDA ITEM

### CITY OF SHORELINE, WASHINGTON

<b>AGENDA TITLE:</b>	Puget Sound Drainage Basins Plan Discussion		
<b>DEPARTMENT:</b>	Public Works		
<b>PRESENTED BY:</b>	Uki Dele, Surface Water Manager – Surface Water		
<b>ACTION:</b>	<input type="checkbox"/> Ordinance	<input type="checkbox"/> Resolution	<input type="checkbox"/> Motion
	<input checked="" type="checkbox"/> Discussion	<input type="checkbox"/> Public Hearing	

#### PROBLEM/ISSUE STATEMENT:

This discussion is an update of the City's Basin Planning effort and the results of the most recent effort the Puget Sound Drainage Basins Plans.

The adopted 2011 Surface Water Master Plan emphasized a basin planning approach to improve the management of the City of Shoreline's (City's) surface water infrastructure. The purpose of the City's basin planning effort is to provide a comprehensive representation of the natural and built infrastructure within the City's portions of various drainage basins so that the City can direct its stormwater management resources toward correcting existing issues and minimizing potential future problems..

The Puget Sound Drainage Basins Plan is the last basin plan to be completed in the City's basin planning program. It includes all the remaining basins that were not included in previous planning efforts and most of the basins that drain to Puget Sound.

The primary issues identified in the Puget Sound drainages are related to aging and/or insufficient stormwater infrastructure. The pipe condition assessment found that 10 percent of the stormwater pipes in the drainages are in poor structural condition and may require repair in the near future. Additionally, persistent drainage problems were identified in the vicinity of NW Ridgefield Rd and Springdale Ct. NW in the Innis Arden neighborhood. Groundwater seepage contributes to localized flooding and erosion in some areas and many ditches in the Puget Sound drainages have been filled in by adjacent homeowners. Additionally, public stormwater infrastructure crosses private properties in several locations without easements or other means of access for maintenance and repair.

#### RESOURCE/FINANCIAL IMPACT:

There is no resource or financial impact associated with this discussion. The majority of recommended management actions identified in the Puget Sound Drainage Basins Plan will be prioritized in the 2017 Surface Water Master Plan Update alongside other management actions identified in the other surface water basin plans. The additional costs to address these actions will also be analyzed in the Master Plan update. Pipe

repair and replacement projects will be prioritized in the on-going pipe repair and replacement program.

### **RECOMMENDATION**

No action is required at this time. This item is for Council discussion. The basin plan recommended surface water management actions and associated costs will be prioritized as part of the 2017 Surface Water Master Plan Update.

Approved By:        City Manager ***DT***    City Attorney ***MK***

## **INTRODUCTION**

The City completed the Puget Sound Drainage Basins Plan to assess conditions in the drainage basins not previously evaluated in other basin plans. Drainage, erosion, water quality, and natural resources conditions were evaluated in 14 separate drainage areas. The assessment includes identification of problems and recommended actions to address the problems. These recommended actions include capital projects such as programmatic repair and replacement of infrastructure, and site-specific drainage improvements. Additionally, maintenance, operations, and targeted outreach solutions are also recommended.

## **BACKGROUND**

The adopted 2011 Surface Water Master Plan emphasized a basin planning approach to improve the management of the City of Shoreline's (City's) surface water infrastructure. The purpose of the City's basin planning effort is to provide a comprehensive representation of the natural and built infrastructure within the City's portions of various drainage basins so that the City can direct its stormwater management resources toward correcting existing issues and minimizing potential future problems.

The City completed its first basin plan for the Thornton Creek basin in 2009, followed by the Storm Creek Basin Plan and the Boeing Creek Basin Plan in 2013, and the McAleer Creek Basin Plan and Lyon Creek Basin Plan in 2015. These reports provided the City with a list of prioritized capital projects including pipe repairs and replacement projects.

Each basin plan has successively improved upon previous planning efforts. Beginning with the Boeing and Storm Creek Basin Plans, systematic condition assessment of the City's stormwater pipes were conducted and involved video inspection of tens of thousands of linear feet of pipe and creation of a prioritized list of recommended pipe repairs based on the inspection results. The McAleer and Lyon Creek Basin Plans expanded on the pipe condition assessment approach to include criticality analysis of the pipes to prioritize repair projects.

The Puget Sound Drainage Basins Plan project began in July 2015. The scope of the basin plans was to comprehensively assess surface water conditions in the landscape and conveyance network (i.e., streams, ditches and pipes) so that integrated strategies that include maintenance, repair and replacement, capital, and outreach programs can be used to address problems. Methods of assessment include specific evaluation of infrastructure condition assessment, drainage, and aquatic habitat (streams and wetlands).

The Puget Sound Drainage basins include drainage basins on the west side of Shoreline that drain to Puget Sound, with the exception of Boeing Creek and Storm Creek. The other drainage basins included in this basin plan are the Edmonds Way drainage, Bitter Lake, and West Lake Washington. Attachment A shows a plan view of the study area. Attachments B-1 through B-7 show the open channel and piped drainage network in the drainage Basins evaluated.

Management strategies recommended have been prioritized and will eventually be prioritized in the 2017 Surface Water Master Plan Update to allow for an implementation strategy that meets future needs and available resources of the Utility.

## **DISCUSSION**

A link to the basin plan report (PDF format) is on the City's website:  
<http://www.cityofshoreline.com/home/showdocument?id=29999>

The following discussion provides a summary of the key findings of the basin plan, including infrastructure condition, drainage issues, natural resources, and a summary of recommendations:

### **Infrastructure Condition Assessment**

The condition assessment included inspection of 1,081 stormwater pipes with a total length of 77,930 linear feet and 894 structures (catch basins and manholes) within the study drainage areas. The condition assessment included inspection rating according to the industry standard National Association of Sewer Service Companies (NASSCO) system of rating pipe defects using the Quick Structural Rating (QSR) and Quick Maintenance Rating (QMR) methodology. The ratings and the descriptions are presented below in Table 1.

Table 1 – Pipe Condition Assessment Ratings

<b>NASSCO Rating</b>	<b>Description</b>	<b>Estimated Time to failure</b>
0	EXCELLENT: no defects	Unlikely in the foreseeable future
1	EXCELLENT: minor defects	Unlikely in the foreseeable future
2	GOOD: defects that have not begun to deteriorate	20 years or more
3	FAIR: moderate defects that will continue to deteriorate	10 to 20 years
4	POOR: severe defects that will become Grade 5 defects within the foreseeable future	5 to 10 years
5	IMMEDIATE ATTENTION: defects requiring immediate attention	Has failed or will likely fail within the next 5 years

The findings indicate that poor pipe conditions are relatively common to the extent that 10% of all pipes in the drainage areas are probably in very poor structural condition and may require replacement within the next five or ten years. This percentage is similar to condition rating results in previous basin plans. See Attachments C-1 through C-7 for maps showing pipe condition ratings.



## **Drainage Issues**

Drainage issues were assessed through review of open service requests and problem areas identified by City staff. Several issues were resolved during the basin study, based on field investigation. Capital projects were recommended for other site-specific issues ranging from ditch improvements to modifications for inadequate drainage system infrastructure. The most significant drainage issue in the Puget Sound drainage basins is on-going flooding in the vicinity of NW Ridgefield Rd. and Springdale Ct. NW. A phased capital project is recommended for this area, with the goal of improving the conveyance system and reducing flooding.

Public stormwater pipes crossing private properties were assessed for potential relocation or easement acquisition. Drainage easements were recommended if no feasible relocation alternative was available.

## **Aquatic Habitat**

Open stream channels and wetlands in the drainage areas were assessed for general habitat conditions. Fish use was not confirmed in this study, however, it is expected to be limited in the streams evaluated because of (1) partial or full fish passage barriers at several stream crossings near their mouths to Puget Sound, (2) non-contiguous open-channel segments, or (3) seasonal flow conditions. Anadromous fish may access the lower portions of Blue Heron Creek, Barnacle Creek North and Barnacle Creek South during certain flows.

## **Summary of Recommendations:**

Recommended stormwater management actions include the following:

- Stormwater Pipe Repair and Replacement –divided into multiple recommended projects based upon different priorities and types of repair actions.
- Small projects to improve drainage at ten (10) locations:
  - NW 195<sup>th</sup> Place and Richmond Beach Drive NW Flood Reduction
  - NW 196<sup>th</sup> Place and 21<sup>st</sup> Avenue NW near Richmond Beach Library Drainage Improvements
  - Springdale Ct. NW and NW Ridgefield Rd. Drainage Improvements
  - 20<sup>th</sup> Avenue NW between NW 190<sup>th</sup> Street and NW 193<sup>rd</sup> Street Infrastructure Improvements
  - 167<sup>th</sup> Place NW Storm Drainage Stabilization
  - Heron Creek Culvert Crossing Improvement
  - 18<sup>th</sup> Avenue NW and NW 204<sup>th</sup> Street Drainage System Improvements
  - NW 180<sup>th</sup> Street and 8<sup>th</sup> Avenue NW Ditch Improvements
  - NW 194<sup>th</sup> Place and 25<sup>th</sup> Avenue NW Ditch Improvements
  - NW 197<sup>th</sup> Place and 15<sup>th</sup> Avenue NW Flood Reduction
- Studies regarding various basin-specific and/or City-wide stormwater management approaches:

- Options Analysis at 32<sup>nd</sup> Avenue NE and NE 147<sup>th</sup> Street to Reduce Flooding
- Evaluate 26<sup>th</sup> Avenue NE Flooding between NE 155<sup>th</sup> Street and NE 153<sup>rd</sup> Street to Develop Potential Solutions
- Acquire stormwater easements at 23 locations
- Coordinate removal of other utility lines (twenty lines) that cut through stormwater pipes

The locations of site-specific CIPs and studies is shown in Attachment D. Pipe repair and replacement projects include multiple locations and are not shown on Attachment D.

### **STAKEHOLDER OUTREACH**

The first open house for the Puget Sound Drainage Basins plan was held on September 15, 2015 at the King County Richmond Beach Library Branch to solicit input from residents and provide information on the basin planning approach. Display boards were posted for attendees to note surface water problems or concerns in the study area. Three residents attended the meeting and provided feedback on drainage issues. Confirmed issues included drainage issues on 20<sup>th</sup> Avenue NW in the vicinity of NW 190<sup>th</sup> Street, flooding on Richmond Beach Drive and NW 195<sup>th</sup> Street, and flooding in the vicinity of Springdale Ct. NW. No new drainage issues were brought to the attention of City staff during the open house.

The second open house was hosted on January 12, 2017 at City Hall Council Chambers to share the results of the Puget Sound Drainage Basins plan study and solicit additional input or concerns. Display boards were posted of the basin plan study area and the locations of capital projects and a PowerPoint presentation was given to share results of the study. A survey was conducted to gauge citizen priorities for surface water management. Three residents attended the open house. Survey results indicate that the attendees consider most surface water management issues (water quality, erosion, habitat and natural resources, and flooding) to be high priorities. All attendees, but one considered pipes and infrastructure to be a high priority. Two issues were brought to the attention of City staff during the open house, both involving the existing designation of stream channels in the Puget Sound drainage basins. One resident questioned the designation of the stream channel (unnamed stream channel) in the vicinity of the BNSF railroad track in the Middle Puget Sound (Railroad) drainage area (Attachment B-1). Another resident questioned the designation of the stream channel in the upper Blue Heron Creek Basin (Attachment B-3).

### **COUNCIL GOAL(S) ADDRESSED**

The basin plan and its recommended projects support Council Goal # 2: Improve Shoreline's utility, transportation, and environmental infrastructure.

### **RESOURCE/FINANCIAL IMPACT**

There is no resource or financial impact associated with this discussion. The majority of recommended management actions identified in the Puget Sound Drainage Basins Plan

will be prioritized in the 2017 Surface Water Master Plan Update alongside other management actions identified in the other surface water basin plans. The additional costs to address these actions will also be analyzed in the Master Plan update. Pipe repair and replacement projects will be prioritized in the on-going pipe repair and replacement program.

### **RECOMMENDATION**

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### **ATTACHMENTS**

Attachment A. Puget Sound Drainage Basins Location Map

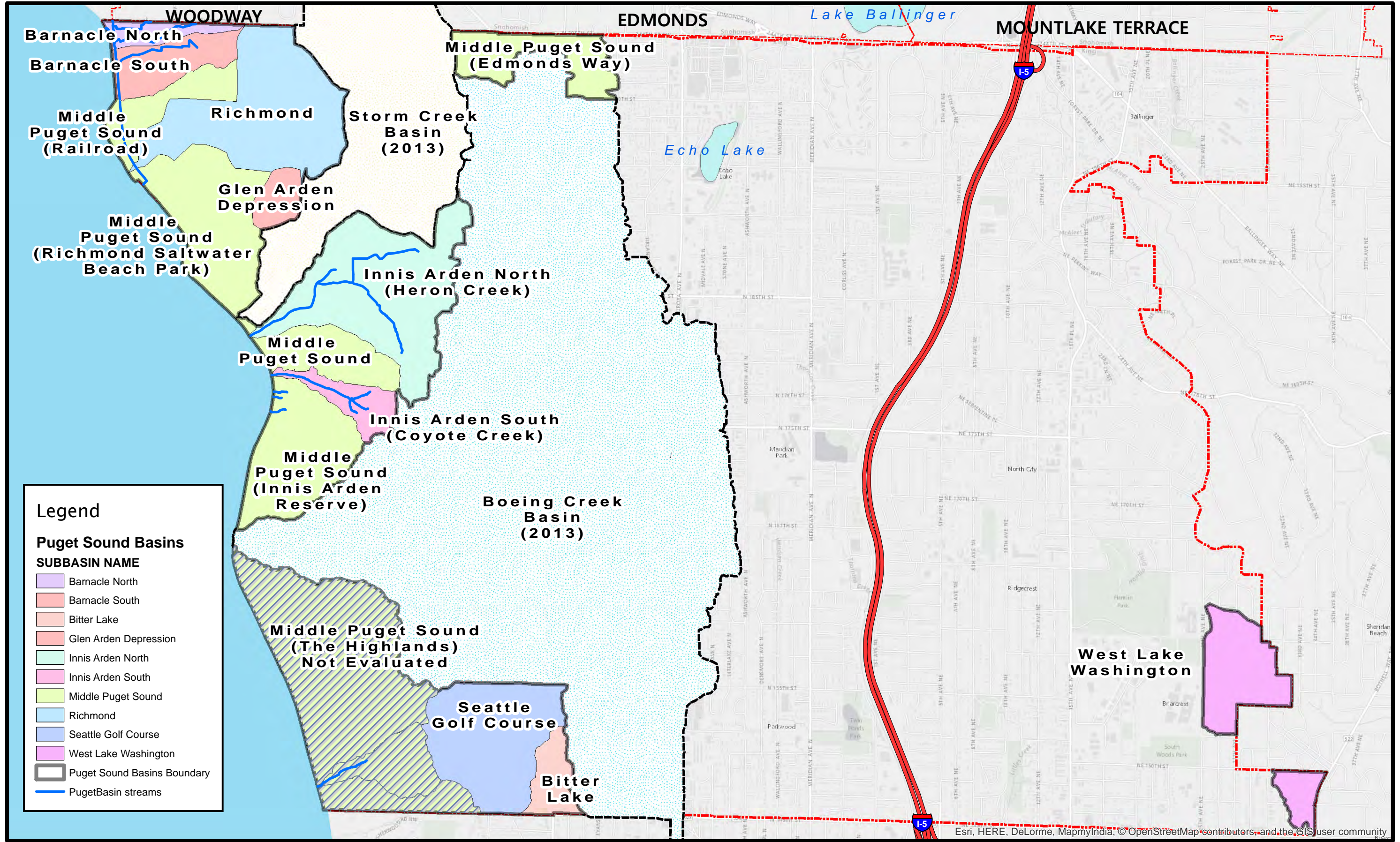
Attachments B-1 through B-7: Maps of Channel and Piped Drainage Networks

Attachment C -1 through C-7: Maps of Pipe Condition Ratings

Attachment D. Location of CIPs

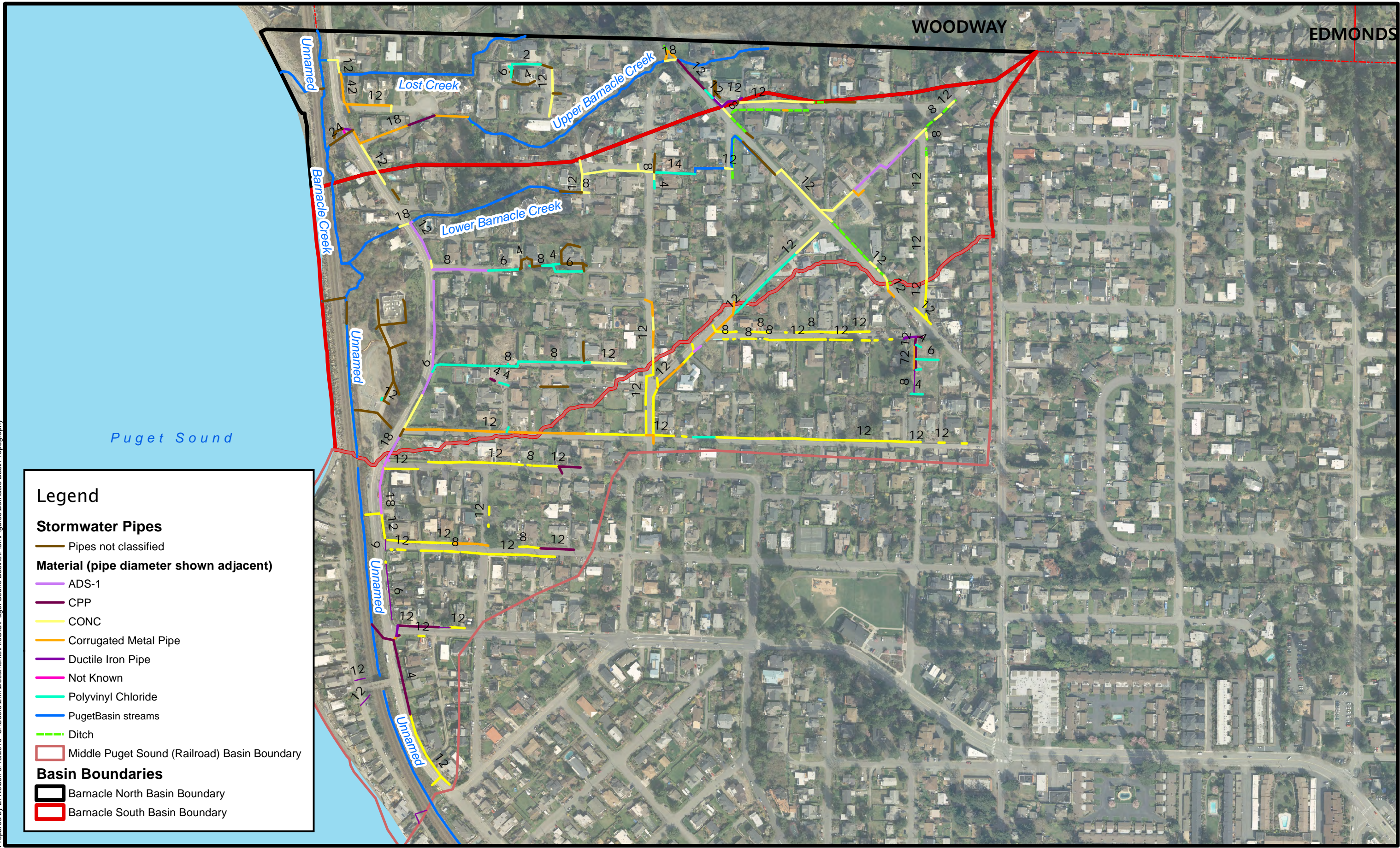


Prepared by E. Nelson 8/31/2016 C:\Users\Erin\Documents\ArcGIS\Puget Sound Basins GIS\Puget Sound Basins Overview Figure 1-2

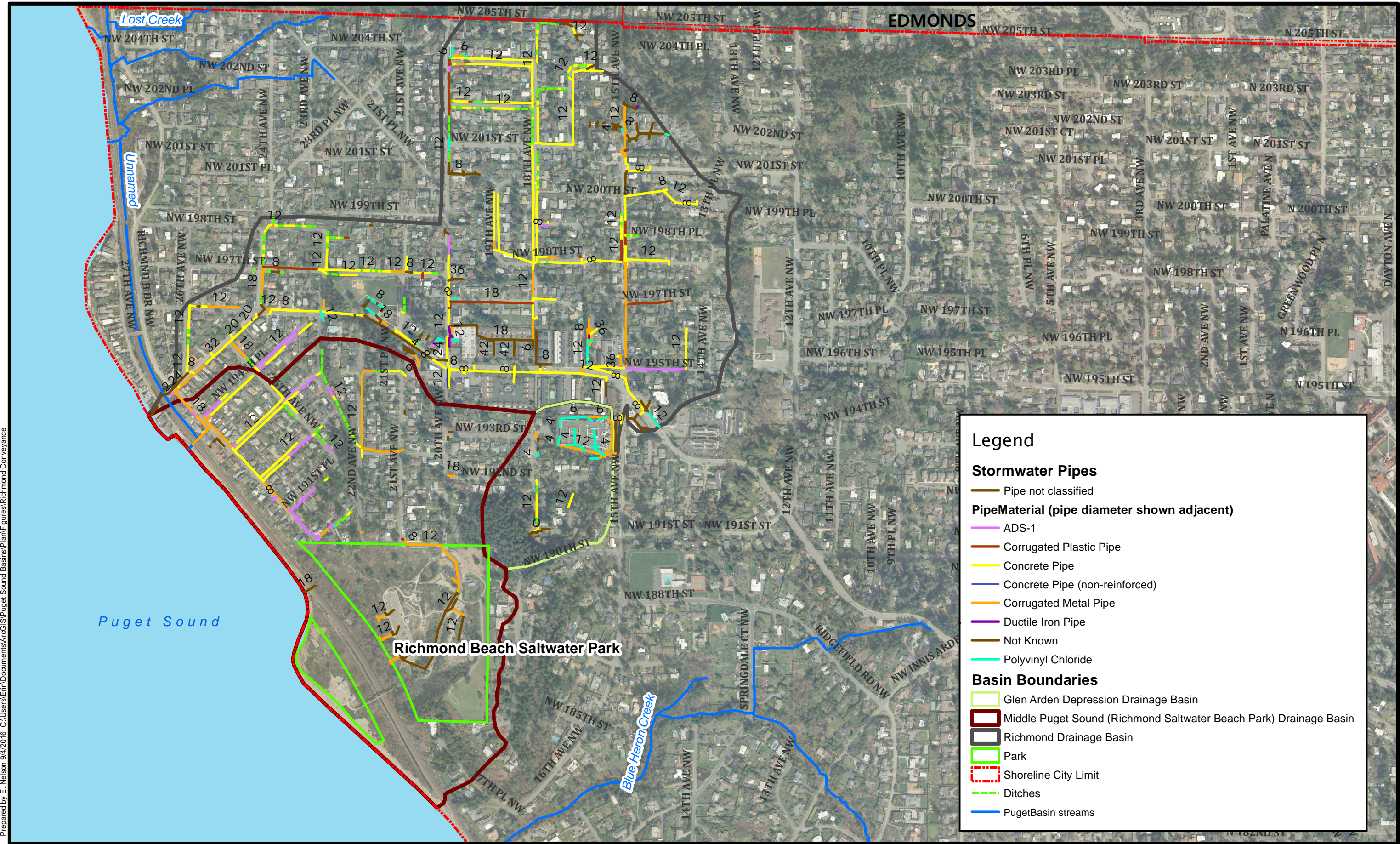




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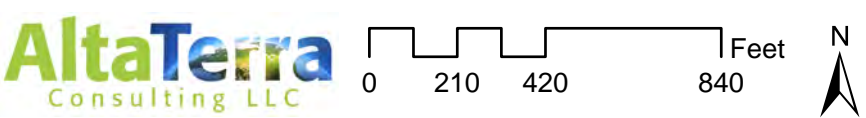




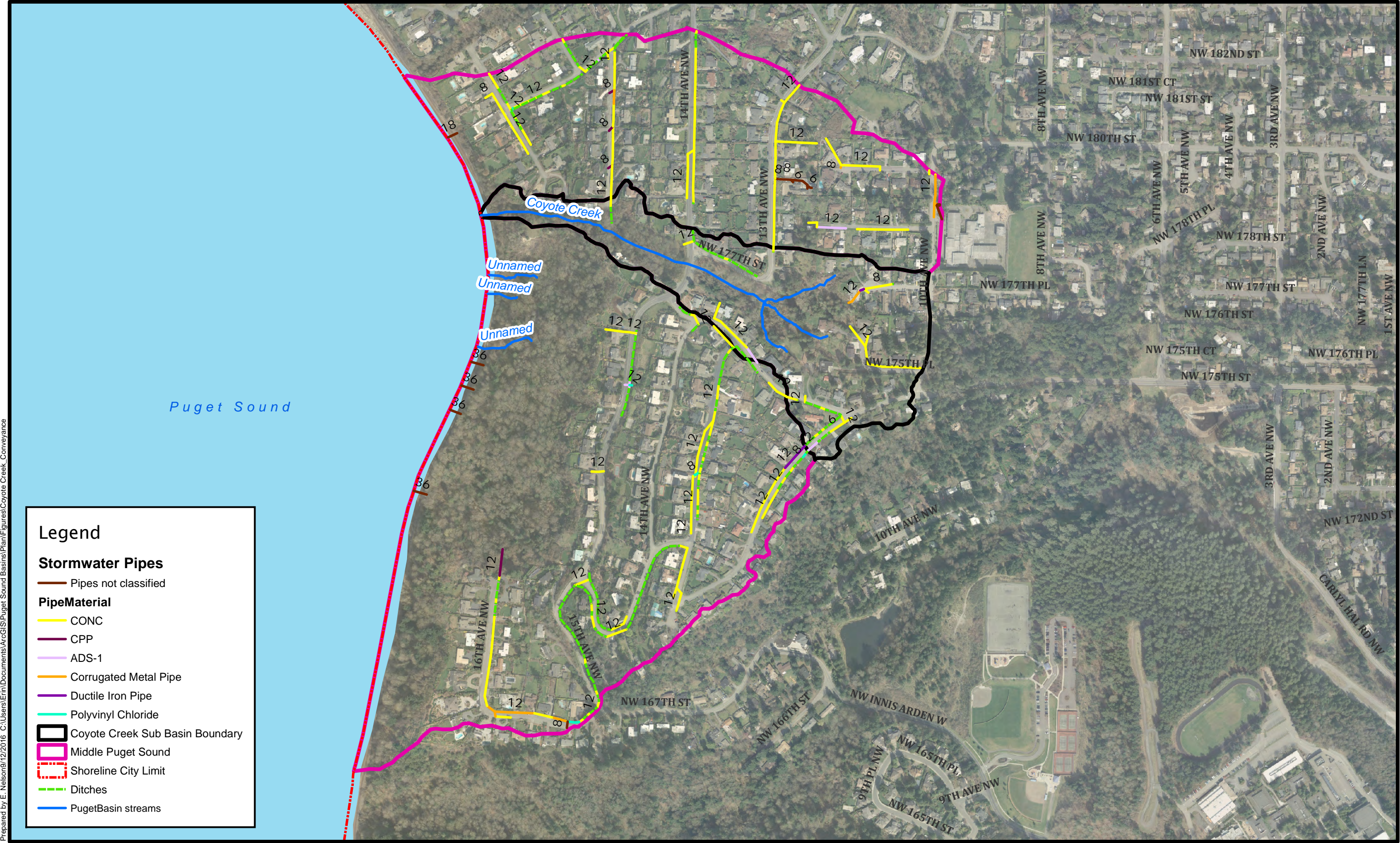


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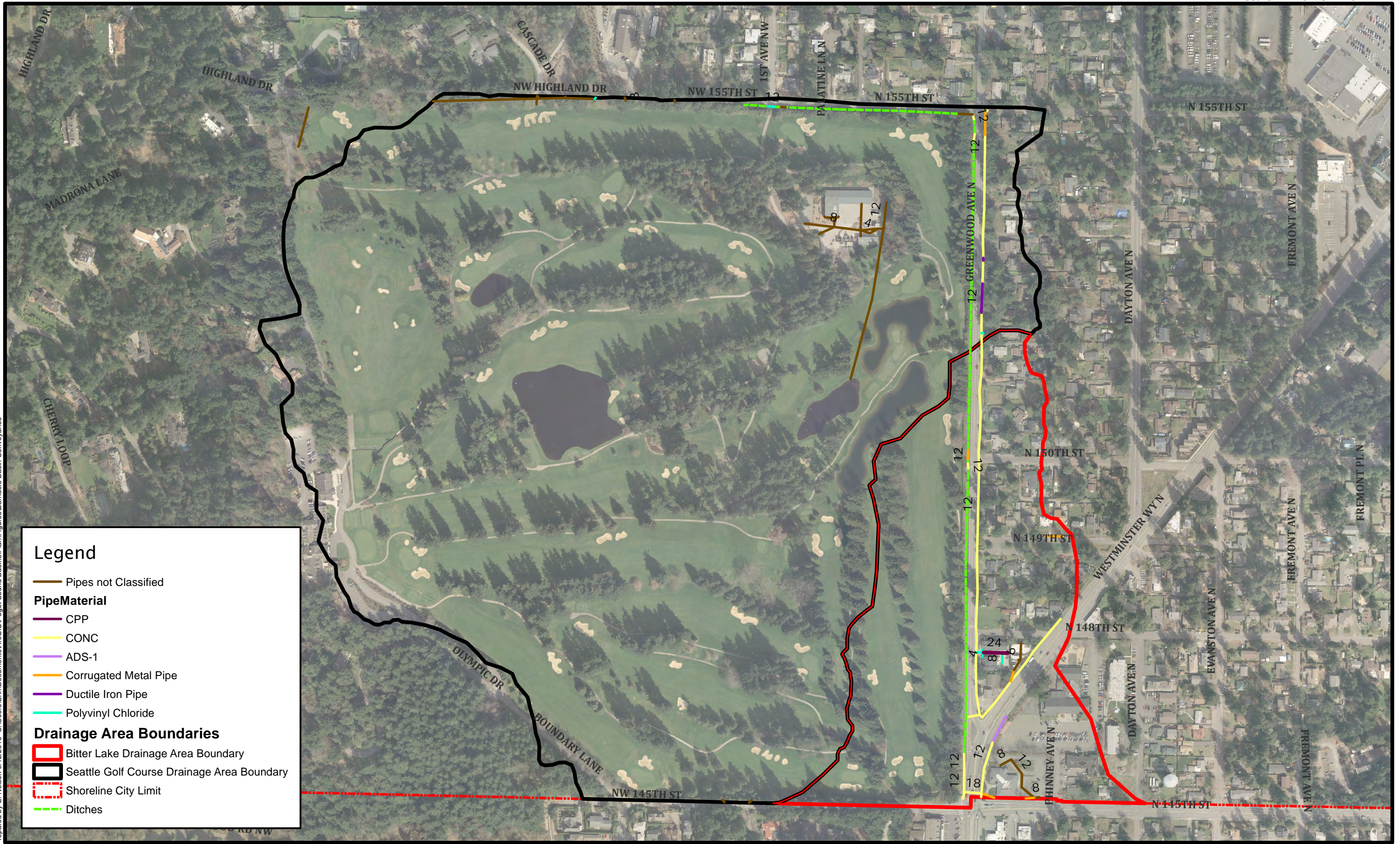






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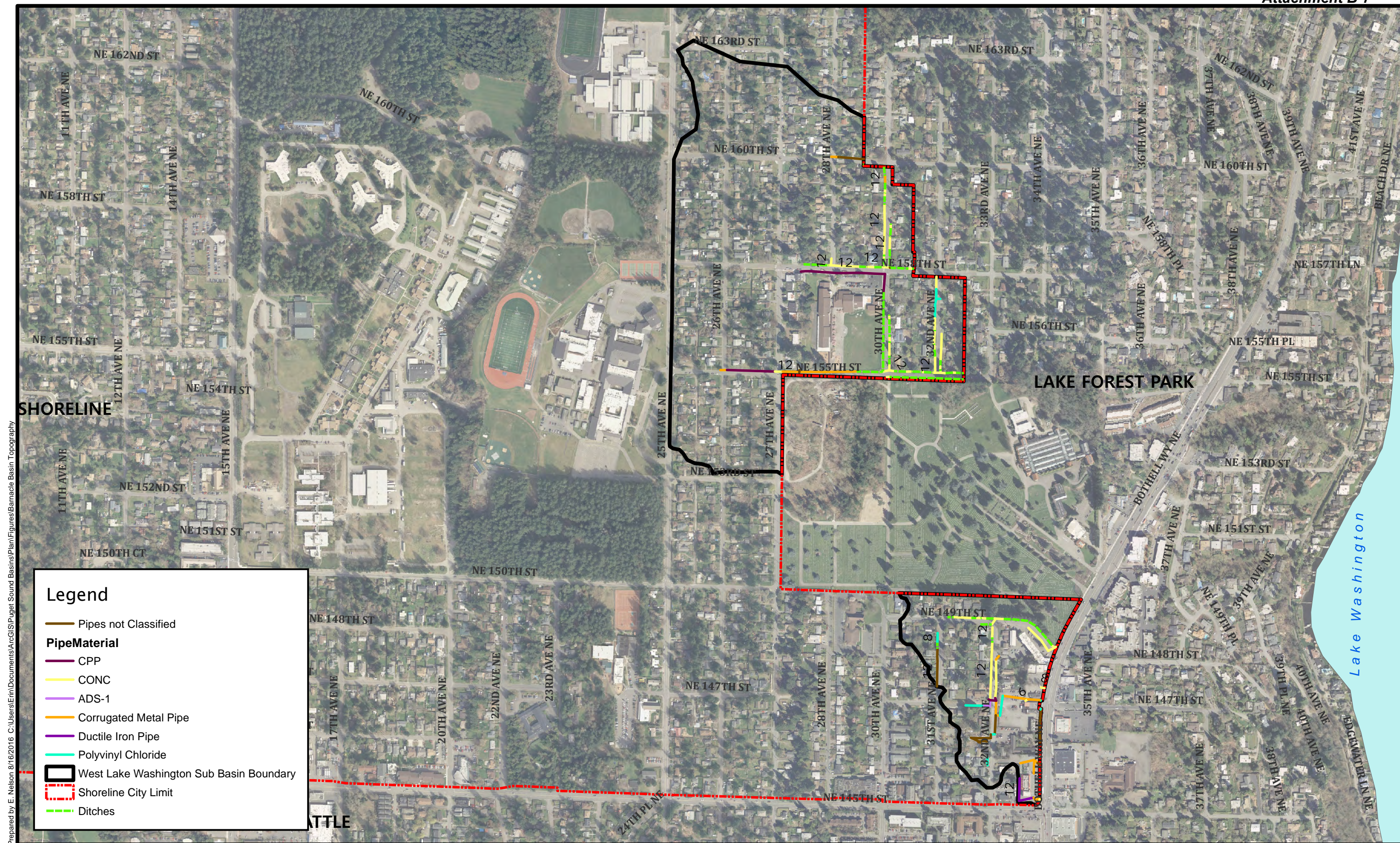


Attachment B-5. Seattle Golf Course and Bitter Lake Drainage Areas Open Channel and Piped Drainage Network





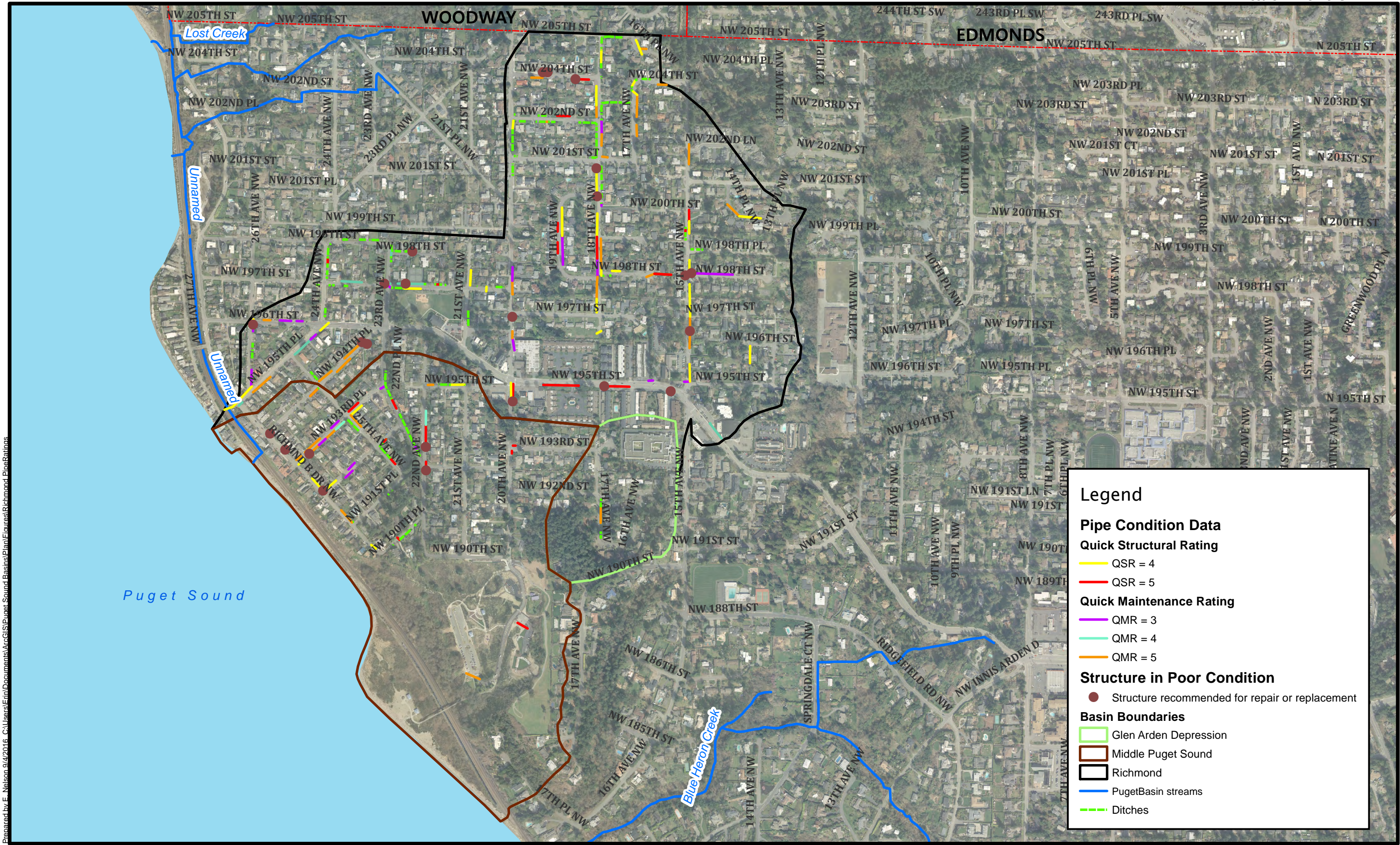






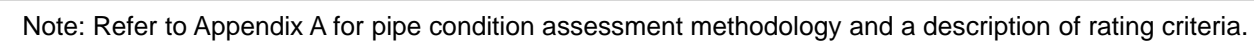






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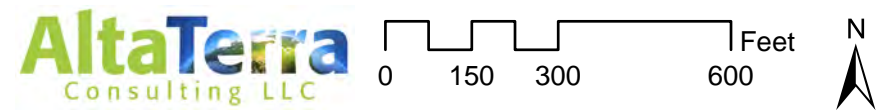




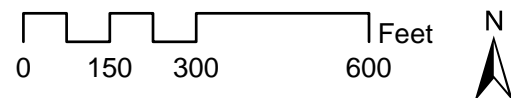




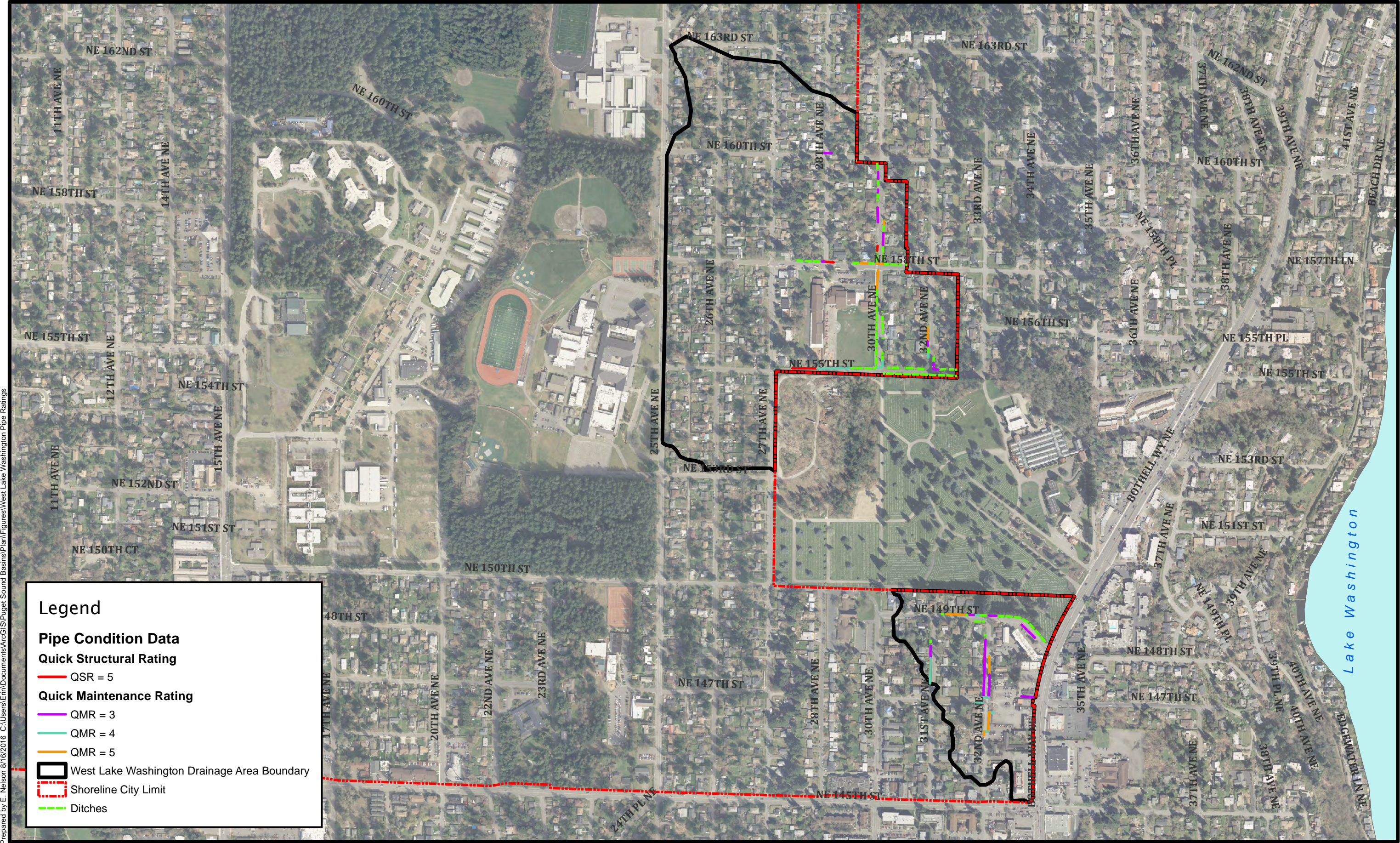
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