CITY OF MEDINA

KING COUNTY **WASHINGTON**

STORMWATER MANAGEMENT ACTION PLAN

G&O #20597
MARCH 2023

Gray & Osborne, Inc.
CONSULTING ENGINEERS

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CHAPTER 1

INTRODUCTION

As a Phase II NPDES permittee, the City of Medina is required to prepare a Stormwater Management Action Plan (SMAP). The NPDES Phase II requirement to complete watershed-scale stormwater management is based upon a 2008 Pollution Control Hearings Board Phase I ruling that recognized it would not be possible to maintain water quality and aquatic habitat in low land streams without focusing on a broader scale than individual site and development projects. Ecology recognizes that stormwater programs must include planning and development of policies that address receiving water needs and retrofit provisions.

The following SMAP is intended to address the water quality of runoff within the jurisdiction so that a plan can then be created to protect runoff in a certain concentrated area within a prioritized watershed. The Plan provides a watershed assessment, prioritization of a primary area to focus future restoration efforts on as well as a description of these efforts. In addition, this Plan provides a schedule and estimated costs necessary to provide these efforts.

Compilation of this Plan was aided by tools developed by the Department of Ecology and the Department of Commerce. These tools were used in the receiving water assessment and prioritization of watersheds with the purpose of choosing effective stormwater management strategies that will provide the most benefit within a chosen watershed.

- The NPDES Phase II Fact Sheet (Ecology 2018);
- Building Cities in the Rain (Commerce, 2016); and
- Ecology Puget Sound Characterization Project Interactive Map
    - (https://fortress.wa.gov/ecy/coastalatlas/wc/landingpage.html)

RECEIVING WATERS CONDITION ASSESSMENT

BASIN DELINEATION AND RECEIVING WATERS

The first step to understanding the water quality within a region is to delineate basins and recognize the receiving waters downstream. The immediate receiving water in Medina is primarily Lake Washington (see Figure 1-1). Lake Washington is connected with Lake Union to the west where water then joins with the Puget Sound.

Utilizing the natural topography as a guide for delineation, the basins shown in Figure 1-2 were created. A total of three watersheds were delineated for the purposes of assessment. These include the Medina Park Basin, Fairweather Creek Basin, and the Lake Washington Basin. The contributing areas for each watershed are listed in Table 1-1. Each of these basins drain directly to Lake Washington.

TABLE 1-1

Watershed Areas

	Fairweather Creek Basin	Medina Park Basin	Lake Washington Basin
Watershed Area within City UGA (ac)	207	211	473
Total Watershed Area (ac) to a Flow-Control Exempt Water Body	564	215	572
% Within City UGA	37%	98%	83%

DESIRED WATER QUALITY BENEFIT

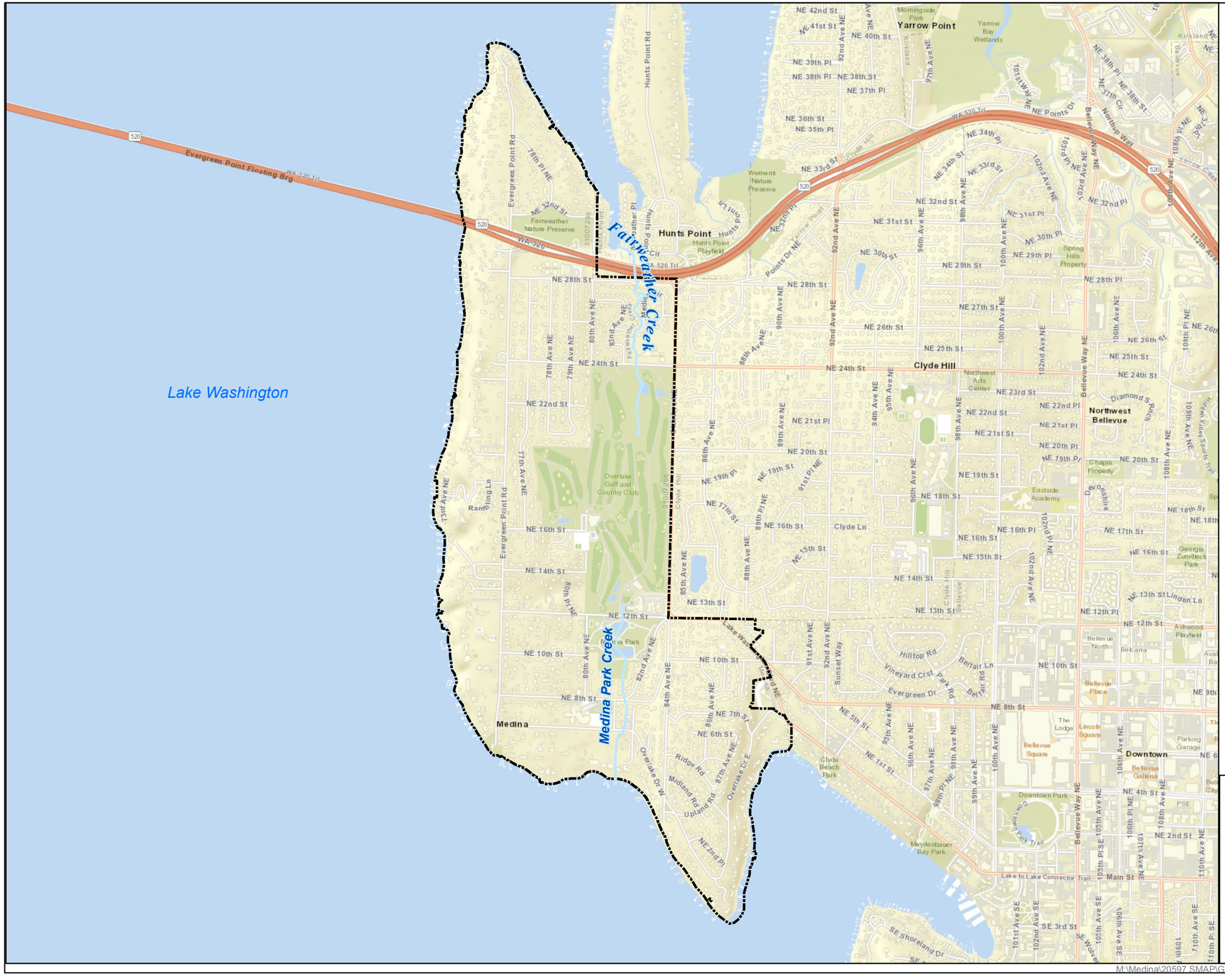
This SMAP intends to identify feasible approaches that the City may take to improve water quality and habitat in the receiving waters. Generally, the allowable quality of stormwater runoff is guided by the Washington State water quality standards (WAC 173-201A) where the standards are intended to be consistent with the public health and enjoyment of the waters while they also propagate protection of fish, shellfish and wildlife. The standards are based upon use for aquatic life. Table 1-2 lists the known fisheries in Lake Washington immediately downstream of the City's boundaries.

TABLE 1-2

Fisheries Present in Downstream Receiving Waters

	Fairweather Creek Basin	Medina Park Basin	Lake Washington Basin
Fall Chinook	✓	✓	✓
Coho	✓	✓	✓
Winter Steelhead	✓	✓	✓
Sockeye	✓	✓	✓
Bull Trout	✓	✓	✓
Kokanee	✓	✓	✓

The water quality standards are based upon the presence of these fish as noted in Table 1-3 below.



CITY OF MEDINA
STORMWATER MANAGEMENT
ACTION PLAN
FIGURE 1-1
VICINITY MAP

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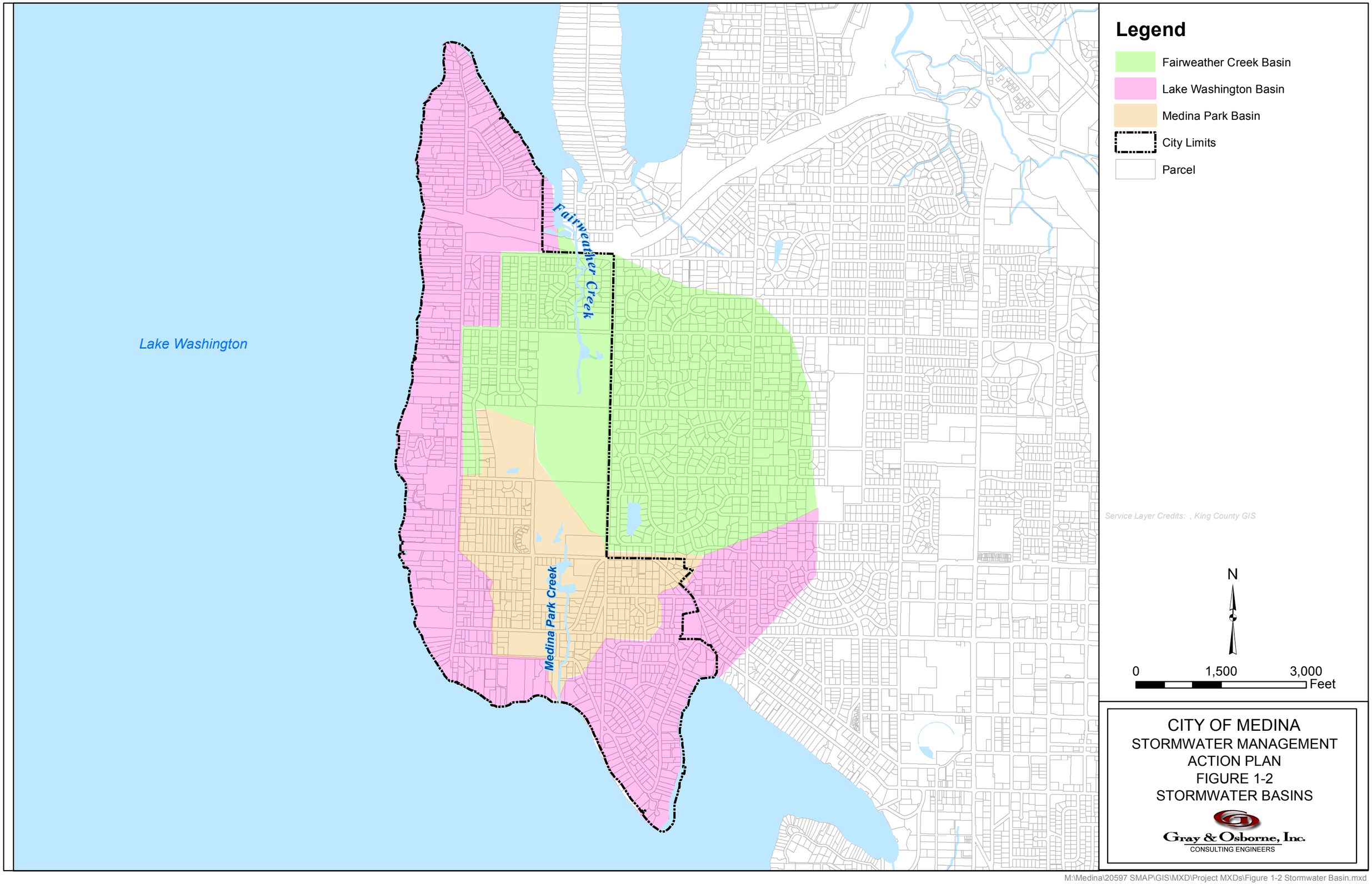
M:\Medina\20597.SMAP\GIS\MXD\Project MXDs\Figure 1-1 Vicinity Map.mxd



M:\Medina\20597 SMAP\GIS\MXD\Project MXDs\Figure 1-2 Stormwater Basin.mxd

TABLE 1-3

Freshwater Water Aquatic Life Criteria (WAC 173-201A-200)

Category	Criteria
Temperature	• Core Summer Salmonid Habitat o 16 degrees C
Dissolved Oxygen	• Core Summer Salmonid Habitat o 9.5 mg/L
Turbidity	• Core Summer Salmonid Habitat o Turbidity shall not exceed: 5 NTU over background when the background is 50 NTU or less; or a 10 percent increase in turbidity when the background turbidity is more than 50 NTU
Total Dissolved Gas	• Core Summer Salmonid Habitat o Total dissolved gas shall not exceed 110 percent of saturation at any point of sample.
pH	• Core Summer Salmonid Habitat o pH shall be within the range of 6.5 to 8.5, with a human-caused variation within the above range of less than 0.2 units.

All receiving waters are listed as primary contact uses (per WAC 173-201A-602). The primary contact uses are subject to bacteria criteria as shown in Table 1-4.

TABLE 1-4

Freshwater Primary Contact Bacteria Criteria (WAC 173-201A-200)

Category	Criteria
E. coli	E. coli organism levels within an averaging period must not exceed a geometric mean value of 100 CFU or MPN per 100 mL, with not more than 10 percent of all samples (or any single sample when less than ten sample values exist) obtained within the averaging period exceeding 320 CFU or MPN per 100 mL.

CFU – colony forming units
MPN – most probable number

CHAPTER 2

RECEIVING WATER CONDITIONS ASSESSMENT BACKGROUND

For each of the three basins, the following presents available data on fish, water flow, water quality and land use opportunities. No new information was developed for this Plan. All data was obtained from readily available sources such as government websites. With each category, the potential to make an impact via stormwater management is listed in terms of low (i.e., little chance to protect or restore the area) or high (i.e., greater chance to protect or restore the area). Stormwater management can be used to either restore or protect an area using such means as policy, structural retrofits or operation principles. The background data discussed herein will be utilized to prioritize the three basins in terms of their need to be protected and/or restored. By reviewing the potential for stormwater management impacts, the City is able to prioritize a single basin to focus on for protection and/or restoration efforts.

FISH RELATED DATA

Aquatic life and its associated habitat are important metrics for measuring the overall health of a watershed. The known fish species within the area are provided in Table 1-2 in Chapter 1. The following provides an assessment of fish barriers and stream habitat for these species within the local watershed. In addition, a discussion of benthic invertebrae or invertebrates is provided as another useful measure in determining the current health of a stream.

FISH BARRIERS

In review of the Washington State Department of Fish and Wildlife's (WDFW) SalmonScape site (https://apps.wdfw.wa.gov/salmonscape/), fish passage blockages exist within the basins as shown in more detail in Table 2-1 and Figure 2-1. According to the database, Medina Park Basin has a single blockage while the Fairweather Creek Basin has two blockages. Due to the retrofit opportunities at all blockages in the Medina Park Basin and Fairweather Creek Basin, each basin was listed as "high" for stormwater management influence purposes.

TABLE 2-1

Fish Passage Blockages

	Fairweather Creek Basin	Medina Park Basin	Lake WA Basin
Culverts			
Partial Blockage	1	1	0
Total Blockage	0	0	0
Unknown Blockage	0	2	0
Dams			
Total Blockage	0	0	0
Total Blockages Per Basin	**2**	**1**	**0**
Stormwater Management Influence	**High**	**High**	**Low**

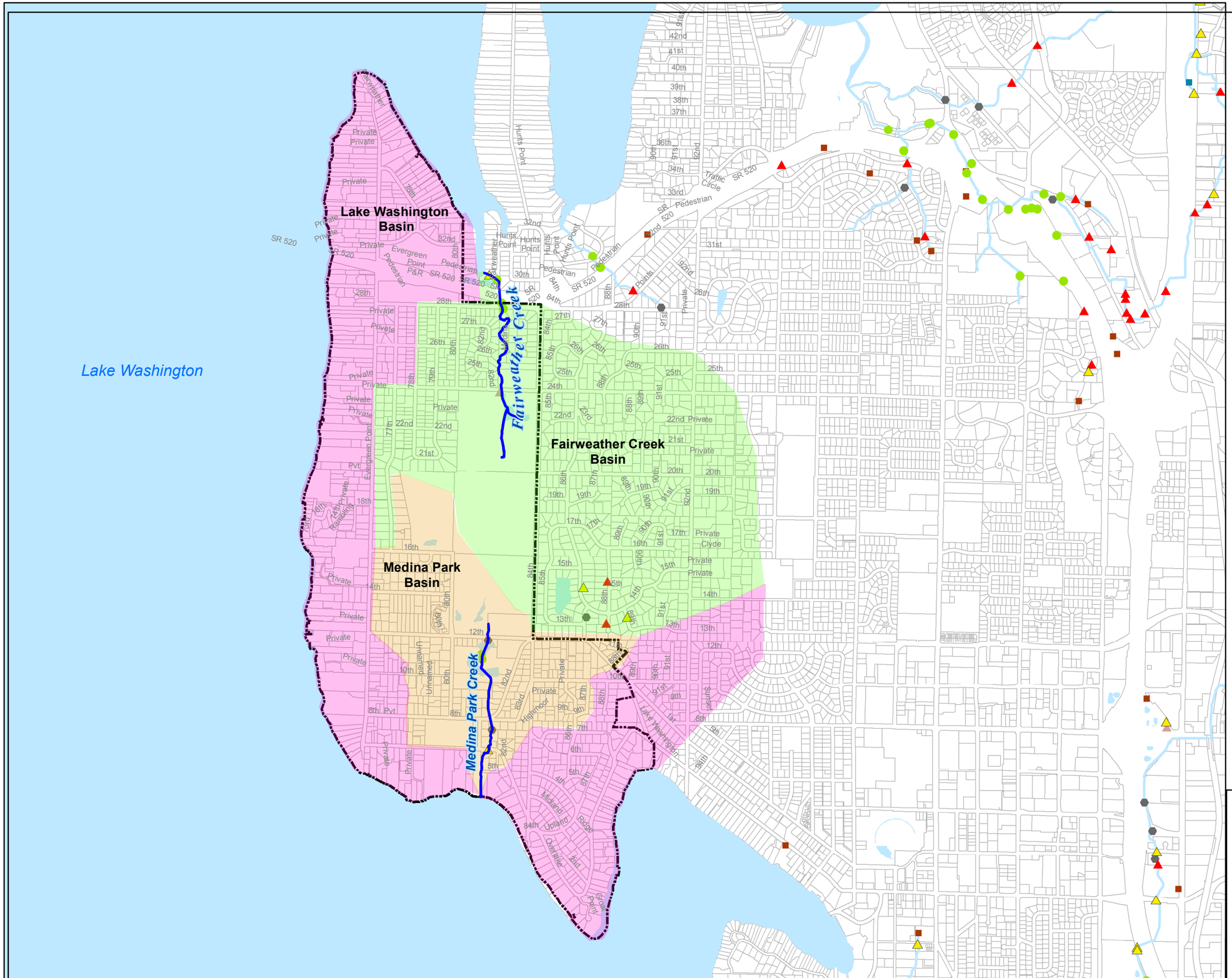
FISH HABITAT

Stream Typing

A number of resources are available to assess fish habitat. One of these resources includes stream typing. The stream typing defined by the Washington State Department of Natural Resources includes:

- **Type S** (Shoreline) – Streams and waterbodies designated as "shorelines of the state".
- **Type F** (fish) – Known to be used by fish or meet the physical criteria to be potentially used by fish. May not flow all year.
- **Type Np** (Non-fish) – Have flow year round and may have intermittent dry reaches downstream. Do not meet physical criteria of a Type F stream. Also proven not to contain fish.
- **Type Ns** (Non-fish Seasonal) – Do not have surface flow for at least some portion of the year and do not meet the physical criteria of a Type F stream.

Figure 2-2 displays the stream typing of tributaries to Fairweather Creek and the Lake Washington Basin as provided by Wild Fish Conservancy Northwest. This figure indicates that the Fairweather Basin includes Fish and Non-Fish bearing streams. The Lake Washington Basin includes two streams of unknown type. The Medina Park Basin does not include any streams that have been classified by the Department of Natural Resources.



Legend

- Not a barrier
- Partial Fish Passage Blockage
- Total Fish Passage Blockage
- Barrier, Unknown Percent Passable
- Diversion
- Unknown
- City Limits
- Streams
- Fairweather Creek Basin
- Lake Washington Basin
- Medina Park Basin

Source: Medina GIS, King County GIS. WDFW SalmonScape

N

0 1,500 3,000 Feet

CITY OF MEDINA
STORMWATER MANAGEMENT ACTION PLAN
FIGURE 2-1
FISH BLOCKAGES

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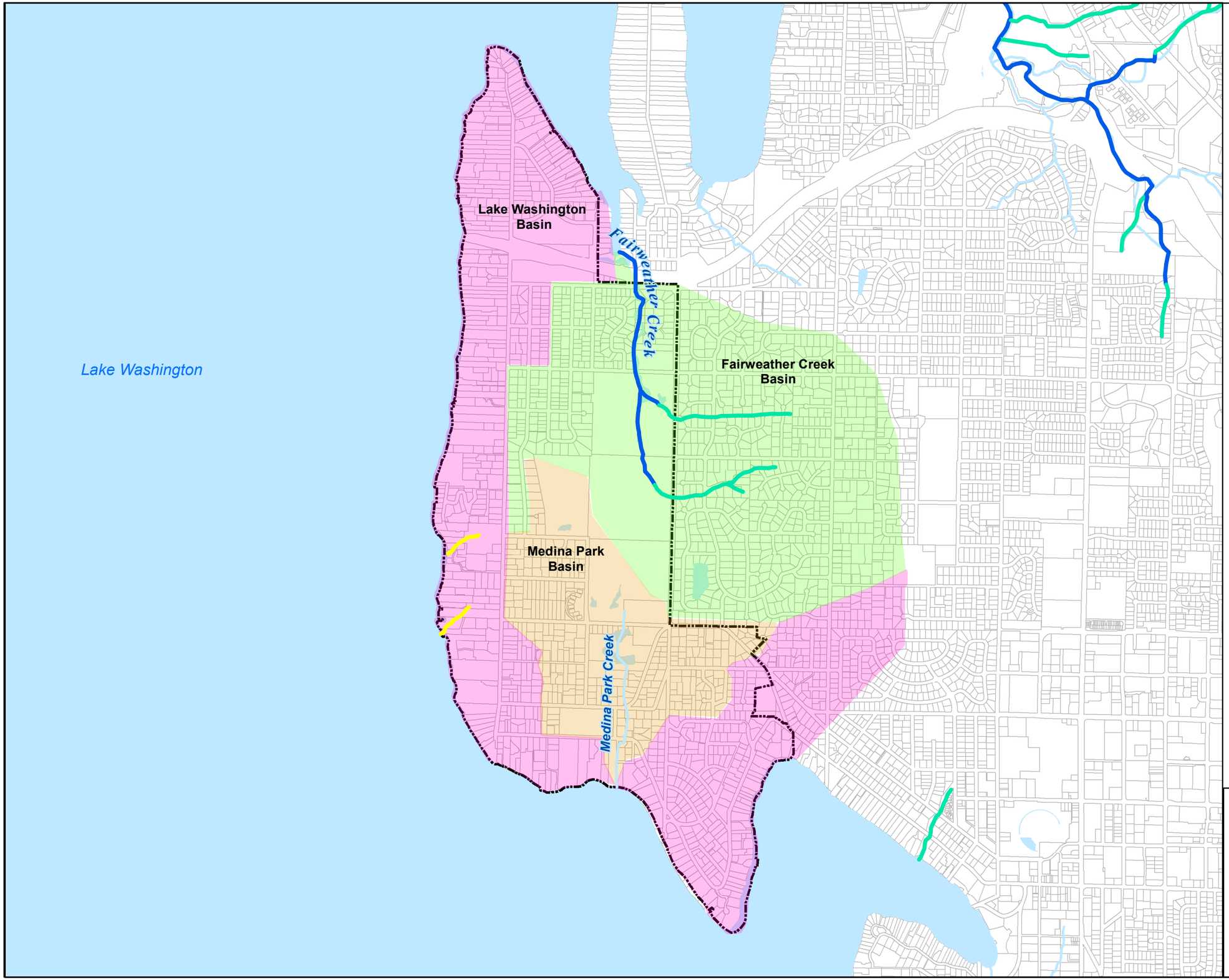
M:\Medina\20597.SMAP\GIS\MXD\Project MXDs\Figure 2-1 Fish Passage Blockages.mxd



Legend

- City Limits
- Fairweather Creek Basin
- Lake Washington Basin
- Medina Park Basin

Stream Type

- Fish (Type F)
- Non-fish (Type N)
- Unknown (Type U)

Source: Medina GIS, King County GIS. WDFW SalmonScape

N

0 1,500 3,000 Feet

CITY OF MEDINA
STORMWATER MANAGEMENT
ACTION PLAN
FIGURE 2-2
STREAM TYPES

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M:\Medina\20597 SMAP\GIS\MXD\Project MXDs\Figure 2-2 Stream Type.mxd

Puget Sound Habitat Characterization

The Puget Sound Characterization Project is a project developed in part by the Department of Ecology which provides a tool that highlights the most important areas to protect and restore throughout the Puget Sound region while also highlighting which areas are most suitable for development. The project resulted in a web-based interactive map which divides the region into assessment units (or "AU"s). For each AU, the map shows watershed assessments related to:

- Water Flow (delivery, surface storage, recharge, and discharge)
- Water quality (sediment, nutrients, pathogens, and metals)
- Landscape assessments of fish and wildlife habitat in their environments:
    - Terrestrial
    - Freshwater
    - Marine Shorelines

The Fairweather Creek Basin, Lake Washington Basin, and Medina Park Basin all share the same AUs. These AUs are 8118 and 8121. Figure 2-3 depicts the location of the correlated assessment units in Medina.

The Fish and Wildlife Habitat module assesses the relative value of an AU as freshwater, terrestrial, or marine habitat. The three basins delineated as part of this Plan do not include marine habitat. The following describes each of the freshwater and terrestrial elements.

- Freshwater – The Freshwater indices assess the relative conservation value for habitats as a function of the number of salmonids that are present both within the AU and downstream of it as well as consideration of other features such as the presence of wetlands and undeveloped floodplains present within the AU.

- Terrestrial – The Terrestrial index assesses the relative conservation value for land based habitats (forests, open space, etc.) as a function of landscape integrity and the locations of priority habitats and species.

Table 2-2 displays the results of the habitat related characteristics of the watershed basins within the City.

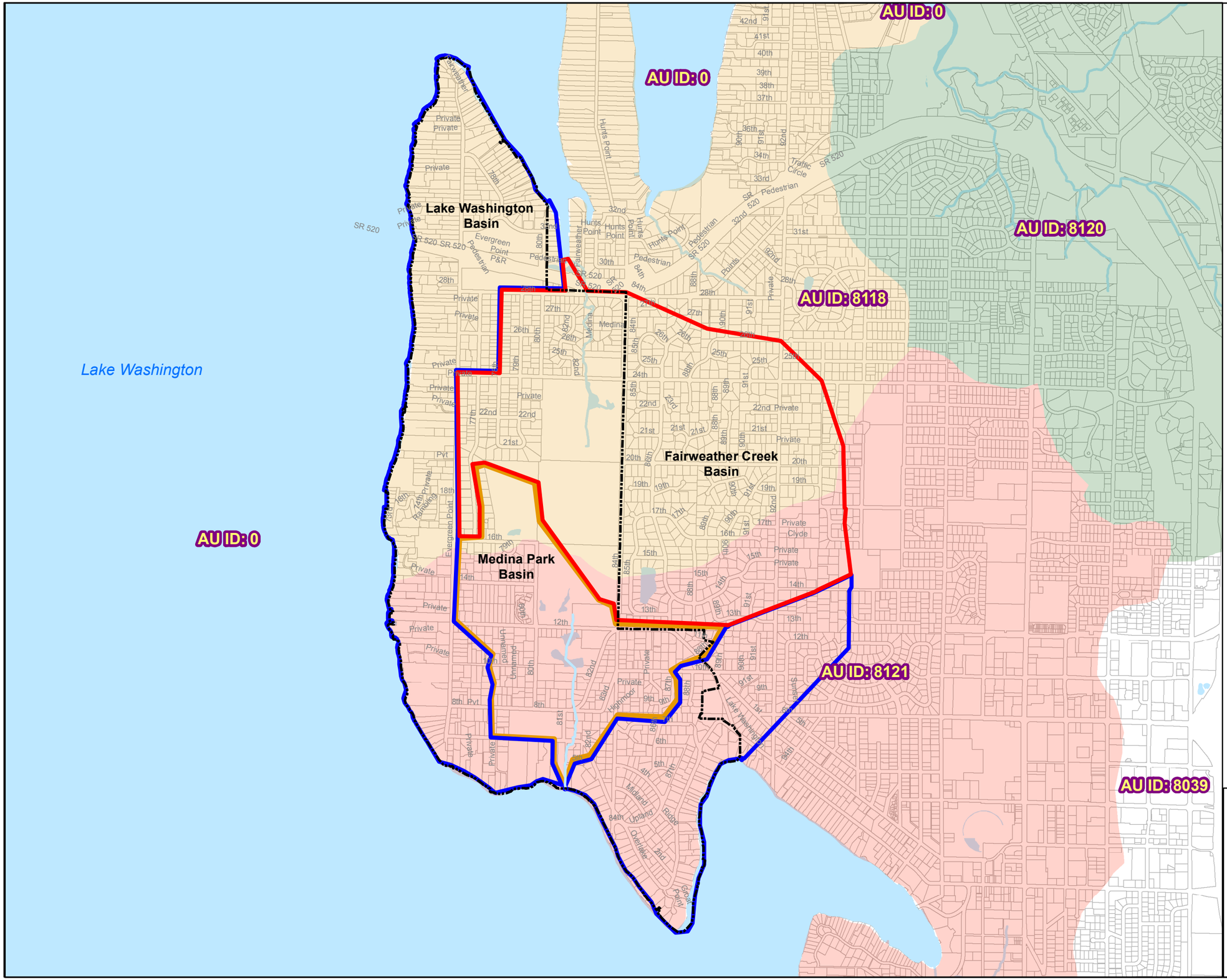
TABLE 2-2

Puget Sound Characterization Project Habitat Results

	Fairweather Creek Basin	Medina Park Basin	Lake Washington Basin[7]
Freshwater			
Sum Freshwater Index Components[1]	5	7	5/7
Max Freshwater Index Components [1]	9	7	9/7
Hydrogeomorphic Features[2]	3.6-4.0	3.6-4.0	3.6-4.0
Salmonid Habitat			
Downstream Habitats Index[1]	1	3	1/3
Local Habitats Index[3]	0	1	0/2
Aquatic Ecological Integrity[4]	11-20	31-40	11-20/31-40
Terrestrial			
Habitats Index[5]	0-1.91	0-1.91	0-1.91
Open Space Blocks[6]	0.11-0.20	0.11-0.20	0.11-0.20
Stormwater Management Influence	**High**	**High**	**High**

(1) Scores range from 1 to 20 (lowest to highest).
(2) Scores range from 1 to 10 (lowest density to highest density for environmental features).
(3) Scores range from 0 (No freshwater local Salmonid Habitat) to 10 (highest value of Salmonid Habitats).
(4) Scores range from 1 to 100 (lowest to highest based on the ecological ability to support and maintain a biological community).
(5) Scores range from 1 to 100 (lowest to highest based on the integrity of the landscape and locations of priority).
(6) Scores range from 0.00 to 1.0 (lowest to highest based on the amount of area that supports natural habitats, semi-natural habitats, or serve as actual habitats for wildlife).
(7) Note, Figure 2-3 illustrates that the Lake Washington Basin includes both AU 8118 and 8121. Given both AUs are evenly split in this Basin. Both results will be accounted for in the table. When there is only one score represented, this relays that both AUs have the same score.

Table 2-2 indicates that the Fairweather Creek Basin presents the lowest habitat value scores. Nonetheless, each basin is in poor condition which results in each basin having a high potential stormwater management influence, meaning that stormwater management projects may have a high impact on downstream water quality. In summation, the Fairweather Creek Basin is considered to have the highest restoration opportunity.



CITY OF MEDINA
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ACTION PLAN
FIGURE 2-3
ASSESSMENT UNITS

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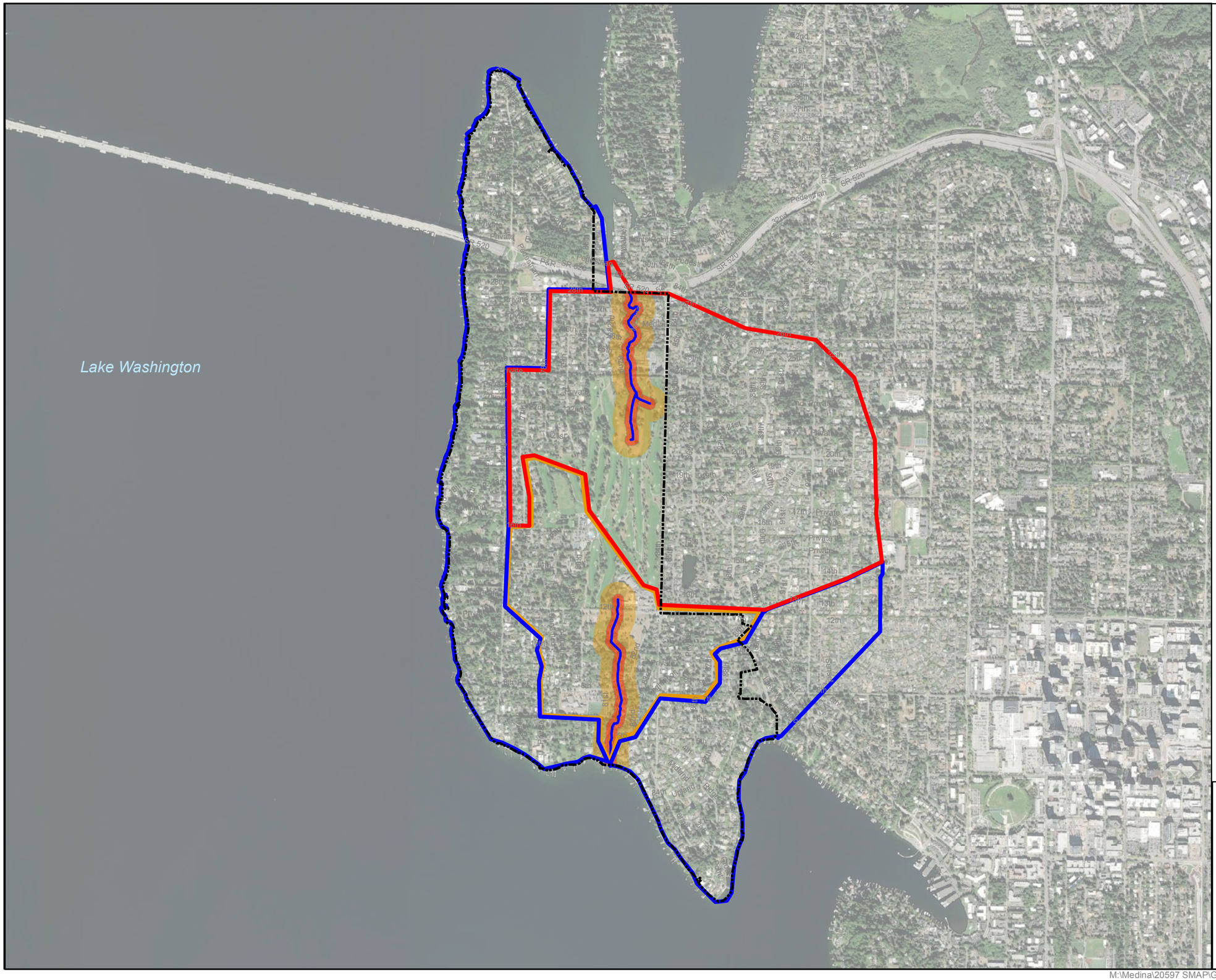
M:\Medina\20597 SMAP\GIS\MXD\Project MXDs\Figure 2-3 Assessment Units .mxd



Legend

- City Limits
- Streams
- 100 ft Vegetation Buffer
- 300 ft Vegetation Buffer
- Fairweather Creek Basin
- Lake Washington Basin
- Medina Park Basin

N

0 1,500 3,000 Feet

CITY OF MEDINA
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ACTION PLAN
FIGURE 2-4
VEGETATION BUFFERS

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M:\Medina\20597 SMAP\GIS\MXD\Project MXDs\Figure 2-4 Vegetation Buffers.mxd

Vegetation Buffers

The presence of existing vegetated buffers that overhang a stream correlate well with the potential for fish recovery. Utilizing GIS stream information and aerial photography, an approximate percentage was estimated for the vegetated buffer along the lineal feet of stream within the basins (see Figure 2-4). Table 2-3 presents the buffer related data.

TABLE 2-3

Estimated Vegetative Stream Coverage

	Fairweather Creek Basin		Medina Park Basin		Lake Washington Basin[(1)]	
	100 ft Buffer	**300 ft Buffer**	**100 ft Buffer**	**300 ft Buffer**	**100 ft Buffer**	**300 ft Buffer**
Linear Feet of Stream with Vegetative Buffer	0	0	0	0	N/A	N/A
Total Linear Feet of Stream	2,700	2,700	2,700	2,700	N/A	N/A
Percent of Stream with a Vegetative Buffer	0%	0%	0%	0%	N/A	N/A
Stormwater Management Influence	**High**	**High**	**High**	**High**	**Low**	**Low**

(1) No streams are located in this basin.

As seen in Table 2-3, the Lake Washington basin has no defined streams. Although both the Medina Park and Fairweather Creek Basin have streams, there is little high quality vegetative buffer present. With this, the Medina Park and Fairweather Creek Basins present an equal opportunity to be restored for the purposes of enhancing habitat for aquatic life.

Benthic Index of Biotic Integrity (B-IBI)

BIBI scores are created from a standardized scoring system which represent the diversity and abundance of macroinvertebrates in a stream. This in turn, can be used as one indicator of the biological health of the stream. This index has also been found to have a good correlation between impervious surface and flow metrics. Only one set of B-IBI data appears to have been conducted amongst the three basins that are a part of this Plan. The data was taken within Fairweather Creek and is shown in Table 2-4. This data was obtained from the Puget Sound Stream Benthos site (https://pugetsoundstreambenthos.org/SiteMap.aspx) which represents a collaboration of data from many cities, counties and tribes throughout the Puget Sound Region.

TABLE 2-4

Regional B-IBI Data for the Bellevue North Subbasin (WRIA 8) in Fairweather Creek

Site ID	Subbasin	Stream	Latitude	Longitude	Event Date	Overall Score
0498 Fairweather	Bellevue North Subbasin	Fairweather Creek			10/9/2001	13.0
	Excellent					
	Excellent/Good - Good					
	Good/Fair – Fair					
	Fair/Poor - Poor					
	Poor/Very Poor – Very Poor					
Stormwater Management Influence	**High**					

As anticipated, the Fairweather Creek reveals a poor B-IBI score. Supporting this result, the May 2018 King County Report entitled *Stormwater Action Monitoring Status and Trends Study of Puget Lowland Ecoregion Streams: Evaluation of the first Year (2015) of Monitoring Data* illustrated that when measuring the B-IBI scores of streams within the UGA of a city, the resulting B-IBI scores were poor.

FLOW RELATED DATA

EXISTING FLOW CONTROL FACILITIES

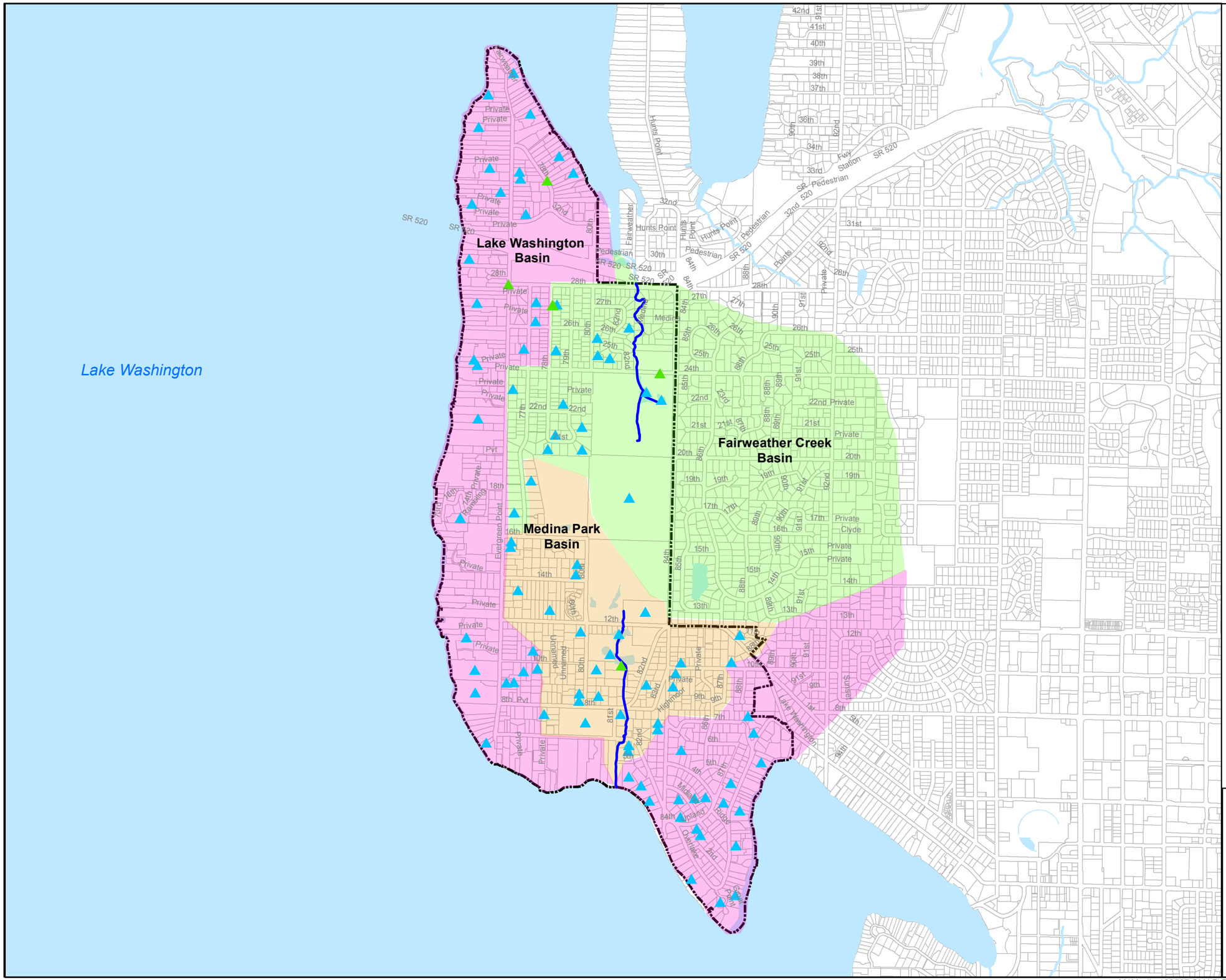
As part of the development process throughout the years, numerous flow control facilities have been installed in Medina. These typically include detention ponds, detention pipes and/or infiltration facilities. Due to the large homes present in Medina, many private detention pipes exist on private property. Table 2-5 lists the number of known flow control facilities that are within each basin.

TABLE 2-5

Existing Flow Control Facilities

	Fairweather Creek Basin	Medina Park Basin	Lake Washington Basin
Total	18	28	51
Stormwater Management Influence	**High**	**High**	**High**

The location of each flow control facility is displayed in Figure 2-5. Most of these flow control facilities have been in service since 2010. It is assumed each basin has the same level of retrofit opportunity as the bulk land use of Medina is fairly consistent across each



Legend

- City Limits
- Public Flow Control Facilities
- Private Flow Control Facilities
- Stream
- Fairweather Creek Basin
- Lake Washington Basin
- Medina Park Basin

Source:Medina GIS, King County GIS

N

0 1,500 3,000 Feet

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FIGURE 2-5
EXISTING FLOW CONTROL

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M:\Medina\20597 SMAP\GIS\MXD\Project MXDs\Figure 2-5 Existing Flow Control.mxd

of the basins. Future retrofit opportunities include new public systems in the street or possibly expansion of the existing ponds near the golf course.

PUGET SOUND FLOW CHARACTERIZATION

The Puget Sound Characterization Project included assessments based upon flow in the various AUs mentioned previously. The water flow assessment model results indicate the relative importance of the AU in its "unaltered" state and in its "altered" state in terms of water flow processes. The water flow processes within the model include:

- Delivery – the physical features that control how precipitation is delivered to the landscape. Includes quantity of precipitation, forest cover, and potential for snow events.

- Surface Storage – features that control the movement of water at the surface, including depressional wetlands and floodplains.

- Recharge – the potential for infiltration and percolation of precipitation into groundwater.

- Discharge – the movement of groundwater back to the surface via wetlands, floodplains or permeable deposits.

The characterization model first looks at whether features that are of high **importance** to the watershed process (either via delivery, surface storage, recharge or discharge) are present. For instance, a watershed that receives a lot of rain, has a number of wetlands or floodplains, has infiltrative soils, or has steeped wetlands or permeable types of floodplains would rank as high importance compared to those watersheds that are missing these components deemed critical for moving water through a basin.

The second part of the model includes reviewing human-based **degraded** areas within the watershed that likely impair the critical features reviewed in the importance model (i.e., delivery, surface storage, recharge or discharge). For instance, the clearing of forests affects delivery of precipitation or the construction of impervious surfaces impedes recharge of groundwater. Wells can impact the watershed by withdrawing groundwater that would be available to streams and wetlands. Likewise, filling in wetlands would decrease the amount of natural storage that would exist within the watershed.

Table 2-6 presents the results of the flow characterization for the AUs in the subject basins. It should be noted that in the importance category, the higher the ranking, the more that basin has features that are important to moving water through the watershed. In the degradation category, the higher the ranking, the more degraded the area is and the more likely that its natural watershed processes are being disturbed. The characterization project combined the results of the importance and degradation models to reflect a priority level suggesting how a jurisdiction can move forward. Figure 2-6 shows that for

areas with high importance but little degradation, a City should focus on protecting these areas (i.e., through planning efforts). For areas of high importance but severe degradation, a City should focus on restoration efforts (i.e., mitigating for past damage). For areas of low importance and low degradation, little planning is needed and the City would be in conservation mode for these regions. For areas that have low importance (i.e., few features to transmit water) but high degradation, development is most appropriate.

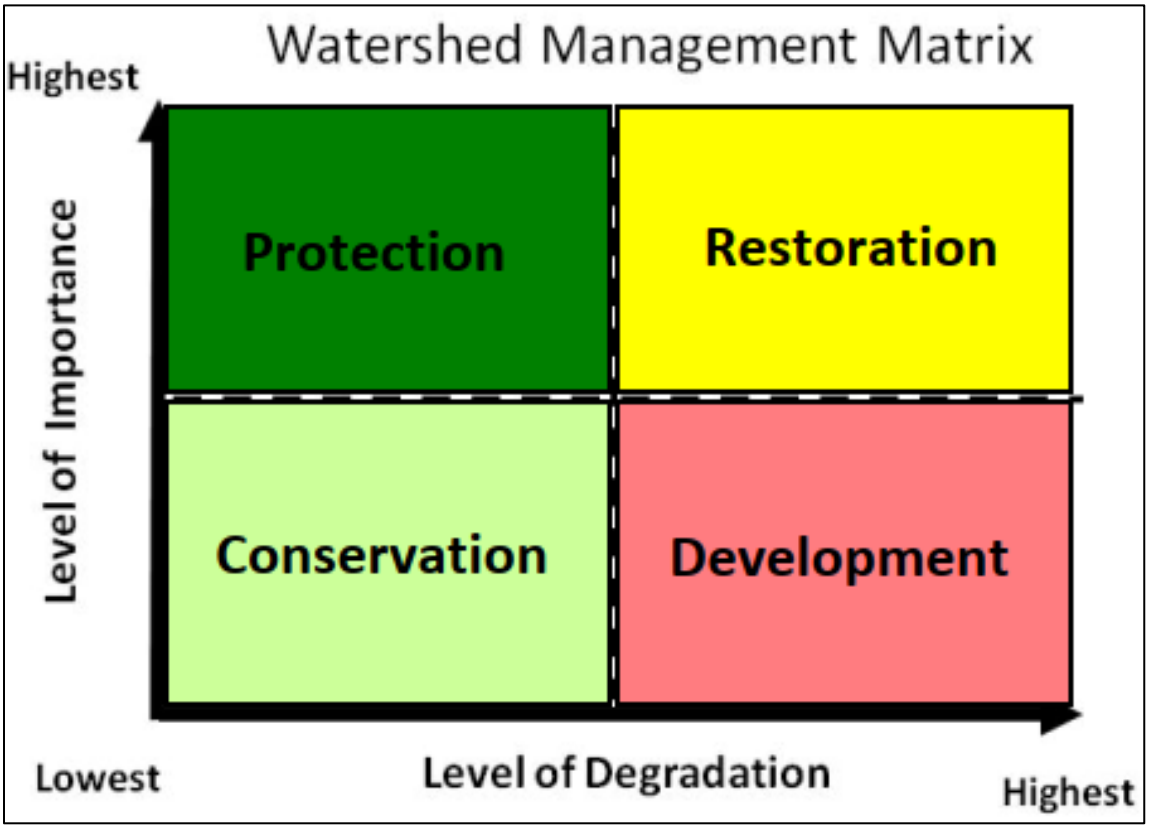


FIGURE 2-6

Characterization Project Matrix Describing Protection or Restoration Efforts Based on Flow

TABLE 2-6

Puget Sound Characterization Project Flow Results

	Fairweather Creek Basin	Medina Park Basin	Lake Washington Basin
Overall			
Importance *(Presence of Natural Features)*	High	Moderate High	High/Moderate High
Amount of Degradation *(Based on Current Land Use)*	High	High	High
Protection and Restoration	Highest Restoration	Restoration	Highest Restoration/ Restoration
Delivery			
Importance *(Presence of Natural Features)*	Moderate High **(High = A lot of rain/snow)*	High **(High = A lot of rain/snow)*	Moderate High/High **(High = A lot of rain/snow)*
Amount of Degradation *(Based on Current Land Use)*	Moderate High	High	Moderate High/High
Protection and Restoration	Restoration	Highest Restoration	Highest Restoration/ Restoration
Surface Storage			
Importance *(Presence of Natural Features)*	High **(High = Numerous wetlands/floodplains)*	Low **(High = Numerous wetlands/floodplains)*	Low/High **(High = Numerous wetlands/floodplains)*
Amount of Degradation *(Based on Current Land Use)*	High	Moderate	High/Moderate
Protection and Restoration	Highest Restoration	Restoration/ Development	Highest Restoration/ Restoration/ Development
Recharge			
Importance *(Presence of Natural Features)*	Moderate High **(High = Very infiltrative)*	Moderate High **(High = Very infiltrative)*	Moderate High **(High = Very infiltrative)*
Amount of Degradation *(Based on Current Land Use)*	Moderate/High	Moderate/High	Moderate/High
Protection and Restoration	Restoration	Restoration	Restoration
Discharge			
Importance *(Presence of Natural Features)*	High **(High = More sloped wetlands/ floodplains; allows groundwater to resurface)*	Moderate High **(High = More sloped wetlands/ floodplains; allows groundwater to resurface)*	Moderate High/High **(High = More sloped wetlands/ floodplains; allows groundwater to resurface)*
Amount of Degradation *(Based on Current Land Use)*	High	Moderate	Moderate/High
Protection and Restoration	Highest Restoration	Protection	Highest Restoration/ Protection
Stormwater Management Influence	**High**	**High**	**High**

As seen in Table 2-6, all basins show restoration or development as measures that could be taken for flow purposes. Per the matrix in Figure 2-6, these results represent the fact that the basins generally have important features to a watershed and yet, they have been highly degraded and therefore, measures could be taken to restore or undo the damage of the past.

WATER QUALITY RELATED DATA

EXISTING WATER QUALITY TREATMENT

In each of the Medina basins, it is assumed all of the areas within the basin are developed and yet currently, have untreated runoff. It is known that a marginal number of private properties do have limited water quality treatment measures. However, these are considered marginal and are therefore discounted. Installation of underground treatment systems that utilize filters, proprietary media, or similar features can be installed so as to trap pollutants in each basin. Each basin is considered to have equal stormwater treatment opportunities.

PUGET SOUND WATER QUALITY CHARACTERIZATION

Similar to the flow assessments, the Puget Sound Characterization Project included a water quality assessment model. The water quality assessment model includes five water quality models. Within each model the "export potential" submodel evaluates the system under natural conditions and the "degradation" submodel evaluates the system based on current land cover. The water quality models are as follows:

- Sediment Model – The export potential submodel assesses the relative capacity of an AU under natural conditions to transport soils particles downstream. The degradation submodel assesses the relative sediment load based on current land cover.

- Phosphorous Model – The export potential submodel assesses the relative capacity of an AU under natural conditions to transport phosphorous downstream based on areas that act as sources and sinks of phosphorous. The degradation submodel assesses the relative capacity to generate and load phosphorous into aquatic system during a storm based on current land cover.

- Nitrogen Model – The export potential submodel assesses the relative capacity of the AU to transport nitrogen downstream based on evaluation of areas that act as sinks which facilitate denitrification. The degradation submodel assesses the relative capacity of an AU to generate and load nitrogen into aquatic systems during a storm based on current land use.

- Pathogens Model – The export potential submodel assesses the relative capacity of the AU under natural conditions to generate and transport pathogens downstream. The degradation submodel assesses the relative capacity under the current land cover to generate and load pathogens into the aquatic systems during a storm.

- Metals Model – The export potential submodel assesses the relative capacity of an AU to generate and transport toxic metals downstream based on an evaluation of areas that act as sinks which can trap metals. The degradation submodel assesses the relative capacity to generate and load toxic metals into aquatic systems during a storm.

Table 2-7 presents the results of the water quality characterization for the AUs in the subject Medina basins. Similar to the flow model, the project resulted in a prioritization matrix (see Figure 2-7). Greater "sources" represent more ways to transport soil (i.e., higher chance of soil erosion, less features like wetland to keep soil stationary). Conversely, "sinks" represent locations where soil is to remain trapped such as in wetlands or floodplains or in places with fewer streams. As seen in Figure 2-7, if a basin has low degradation, a jurisdiction may want to focus on "protecting" the area (i.e., through planning/land use actions) as opposed to restoring (i.e., vegetate/control high erosion areas and/or enhance wetlands).

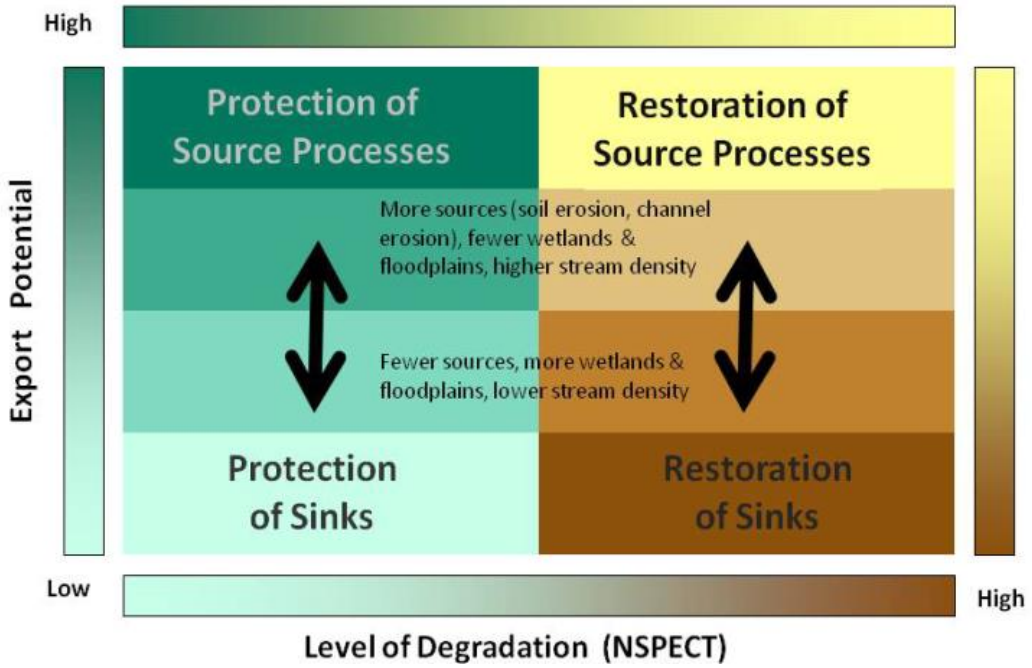


FIGURE 2-7

Characterization Project Matrix Describing Protection or Restoration Efforts Based on Water Quality

TABLE 2-7

Puget Sound Characterization Project Water Quality Results

	Fairweather Creek Basin	Medina Park Basin	Lake Washington Basin
Sediment			
Export Potential	Moderate High	Moderate	Moderate/Moderate High
Amount of Degradation *(Based on Current Land Use)*	Moderate High	Moderate High	Moderate High
Protection and Restoration	Restoration of Source Processes	Restoration of Sinks	Restoration of Sinks/ Restoration of Source Processes
Phosphorus			
Export Potential	Moderate	Low	Low/Moderate
Amount of Degradation *(Based on Current Land Use)*	Low	Moderate High	Low/Moderate High
Protection and Restoration	Protection of Sinks	Restoration of Sinks	Protection of Sinks/ Restoration of Sinks
Metals			
Export Potential	Low	Moderate	Low/Moderate
Amount of Degradation *(Based on Current Land Use)*	Low	Moderate High	Low/Moderate High
Protection and Restoration	Protection of Sinks	Restoration of Sinks	Protection of Sinks/ Restoration of Sinks
Nitrogen			
Export Potential	Low	Moderate	Low/Moderate
Amount of Degradation *(Based on Current Land Use)*	Low	Moderate High	Low/Moderate High
Protection and Restoration	Protection of Sinks	Restoration of Sinks	Protection of Sinks/ Restoration of Sinks
Pathogens			
Export Potential	Low	Low	Low
Amount of Degradation *(Based on Current Land Use)*	Low	Moderate High	Low/Moderate High
Protection and Restoration	Protection of Sinks	Restoration of Sinks	Protection of Sinks/ Restoration of Sinks
Stormwater Management Influence	**High**	**High**	**High**

Per Table 2-7, all three basins have potential for restoration of sediment related areas. This may involve repairing currently erosive areas. For sediment, phosphorus, metals, nitrogen and pathogens, the assessment indicates the restoration of sinks of the current areas within the Medina and Lake Washington Basins should be provided. This may relate to land use planning and/or the potential to provide more stringent water quality

codes where development would install higher levels of treatment to address these water quality related constituents. Alternatively, retrofits could be focused on the roads which are the main polluters in Medina. In contrast, the Fairweather Basin should be protected.

303D LISTING RELATED DATA FOR FAIRWEATHER CREEK BASIN

The only available information for stream water quality in Medina is located in the Fairweather Creek Basin. Since the City of Medina is mainly a residential city adjacent to a flow control exempt lake, many sites outfall directly into Lake Washington. This results in a lack of available information on stormwater conditions and designed drainage systems. Table 2-8 and Figure 2-8 highlight the most recent water quality data that was collected by King County from 1975-2008. The location of the monitoring stations is shown in Figure 2-9. This station is currently an inactive site.

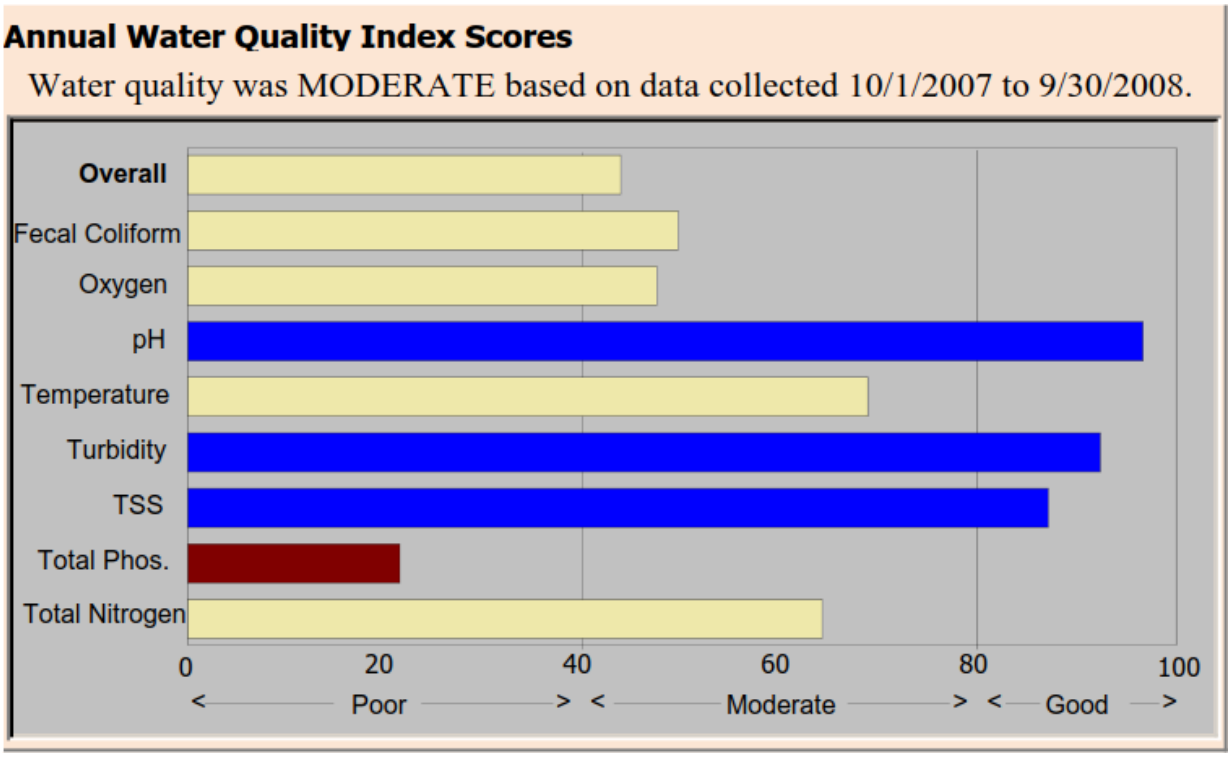


FIGURE 2-8

Annual Water Quality Index Scores

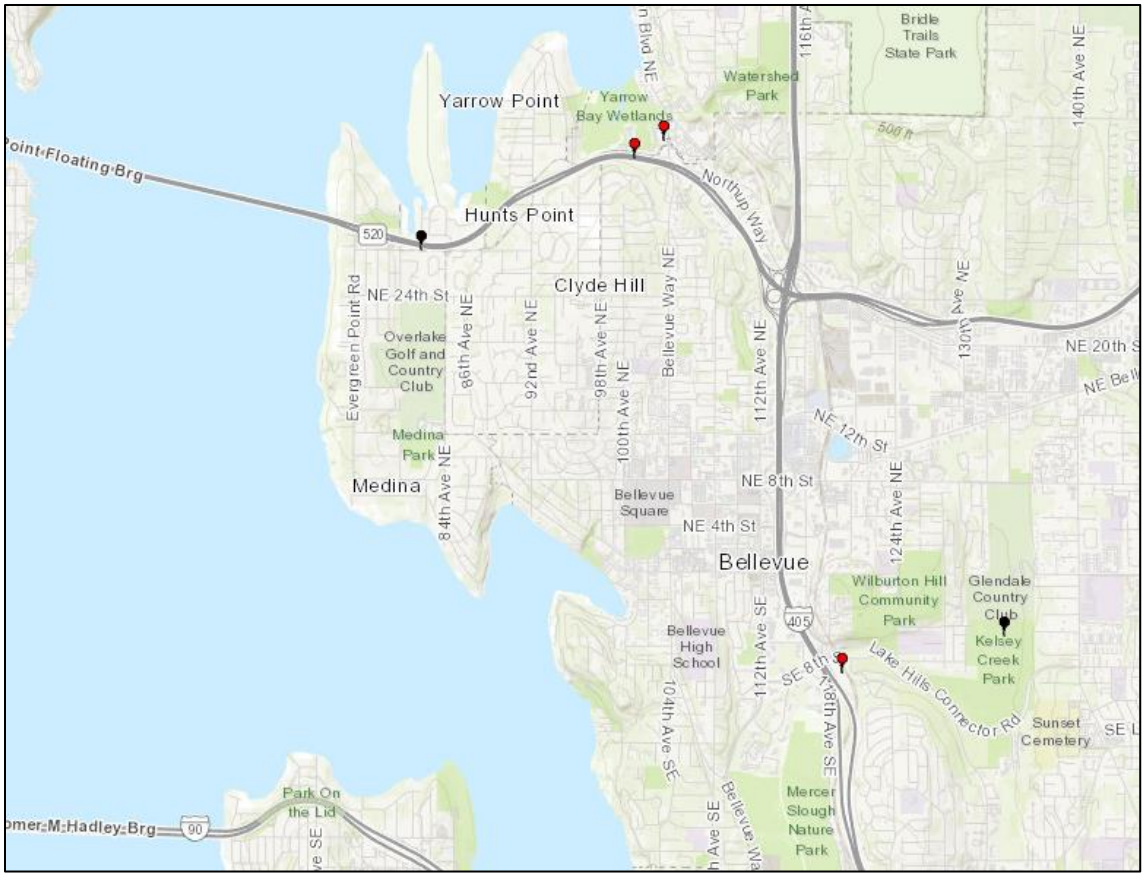


FIGURE 2-9

Water Quality Testing Site

TABLE 2-8

Water Quality Monitoring Summary for Fairweather Creek from 1975-2008

Parameter	No. of Samples	Mean	Minimum	Maximum	Median	Std. Deviation
Dissolved Oxygen (mg/L)	159	9.5	5.5	12.3	9.4	1.6
Temperature (C)	297	13.1	0.9	23.9	13.1	5.0
Turbidity (NTU)	301	8.51	0.50	470.00	4.2	28.66
pH	211	7.59	6.24	8.5	7.6	0.33
Conductivity (mSIEMS/cm)	124	250.3	112.0	502.0	256.0	44.8
TSS (mg/L)	300	9.84	0.8	103.00	5.8	13.85
Ortho-Phosphorus (mg/L)	300	0.869	0.0068	0.7580	0.0701	.0681
Total Phosphorus (mg/L)	300	0.1428	0.0180	0.7910	0.1290	0.0808
Ammonia (mg/L)	301	0.069	0.007	0.963	0.0456	0.0934
Nitrate (mg/L)	301	0.9986	0.1110	2.900	0.960	0.3441
Total Nitrogen (mg/L)	216	1.5196	0.7760	3.73	1.44	0.4022
Fecal Coliform (CFU/100ML)	296	685	0	9900	220	1395

(1) King County Stream Reports-Fairweather Creek-0498; https://green2.kingcounty.gov/streamsdata/WatershedInfo.aspx?Locator=0498

State water quality standards were revised in 2003. Fairweather Creek is now categorized as "Core Summer Salmonid Habitat" for aquatic life use, and "Extraordinary Contact" for recreational use. Portions of Fairweather Creek have been assigned an additional "Supplemental Spawning and Incubation Protection" temperature criteria of 16 degrees C. Fairweather Creek is also on the Washington State Department of Ecology's 303(d) list for violation of dissolved oxygen, water temperature, fecal coliform bacteria, and copper standards. Of the 27 streams monitored in King County, Fairweather Creek had the fourth highest metals concentrations. It is possible that the proximity of highway SR 520 is a source of these contaminates.

For comparison, it should be noted that in the May 2018 King County Report entitled *Stormwater Action Monitoring Status and Trends Study of Puget Lowland Ecoregion Streams: Evaluation of the first Year (2015) of Monitoring Data*, the Study found that of the local Puget Sound streams studied, all of the streams outside of the UGA yielded fecal coliform values that were within an acceptable range.

LAND USE OPPORTUNITY

Land use can have a profound impact on the health of water quality in the region. Greater unmitigated amounts of impervious surface would result in higher amounts of stormwater runoff which may erode local creeks and threaten aquatic habitat downstream. Likewise, pollution generating impervious surfaces such as roads have the opportunity to transport pollutants downstream which also endangers aquatic habitat.

EXISTING LAND USE

To understand the state of the watershed, it is important to view land use as it exists today, how it has changed over the years, and what land use is anticipated for the future. Table 2-9 show the amount of estimated impervious surface that exists within the city limits. This data reveals that the highest percentage of impervious surface is located in the Medina Park Basin. In addition, the current vacant parcels are displayed in Figure 2-10. The land use for these parcels is based upon the future land use for Medina.

TABLE 2-9

Impervious Surface Acreage within City Limits

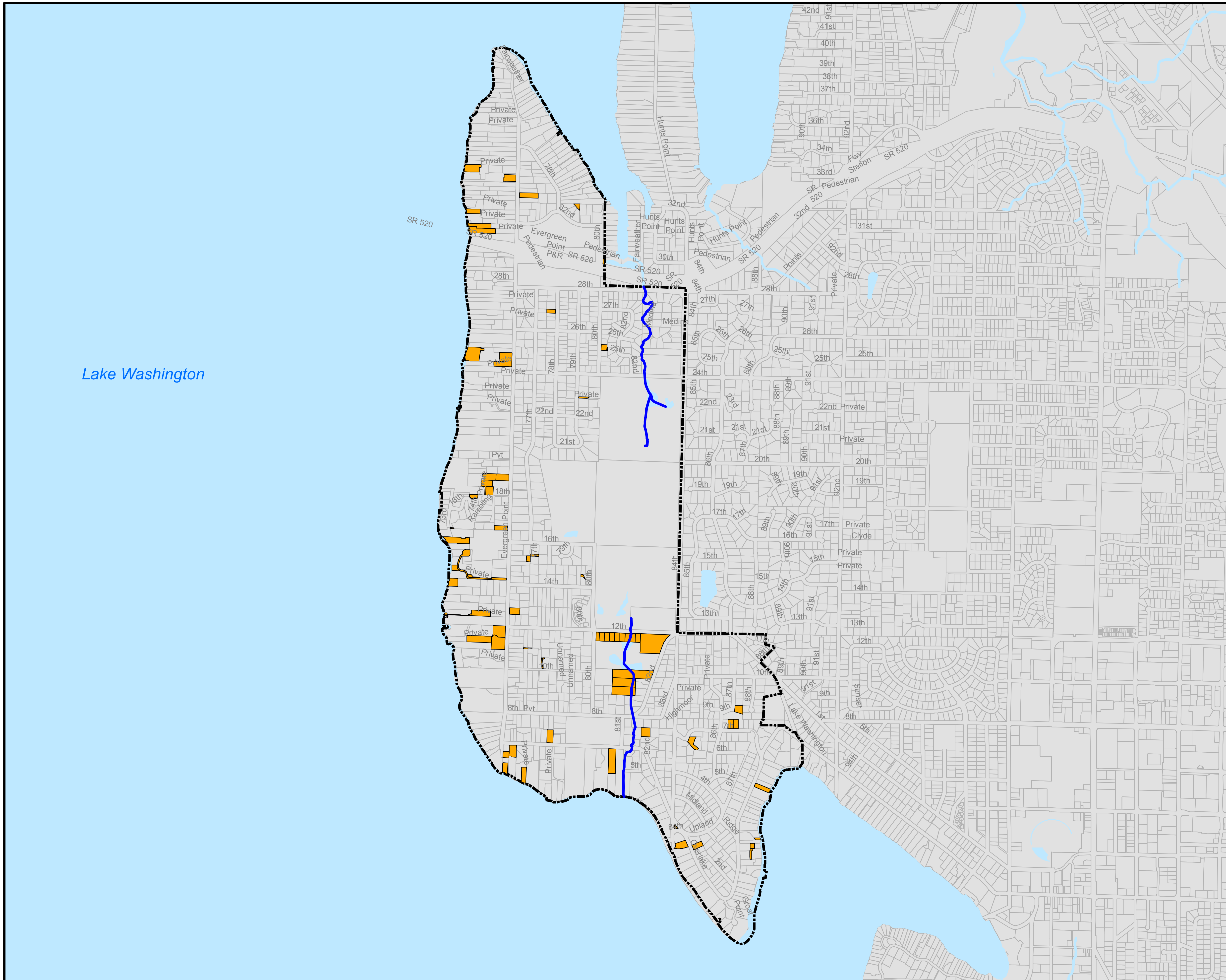
	Fairweather Creek Basin (ac)	**Medina Park Basin (ac)**	**Lake Washington Basin (ac)**
Impervious Surface	70	86	172
Total Acreage (within City limits)	213	224	500
Percent Impervious	33%	38%	34%
Stormwater Management Influence	**High**	**High**	**High**

(1) Impervious percentage determined by using ratio for percent imperviousness per dwelling unit per acre as listed in the 2019 Dept. of Ecology Stormwater Management Manual for Western Washington.

The Lake Washington Basin is considered to be the highest priority since it has the highest amount of impervious area.

DESIGNATED FUTURE LAND USE

According to King County GIS data, there are vacant parcels located throughout the City. Table 2-10 and Figure 2-11 provide the designated land use and the potential impervious surfaces that could result in each basin should all of the land be built out to its maximum lot coverage as allowed by current city code. Based upon Table 2-10, the Fairweather Creek Basin has the highest potential impervious area percentage; however, the Lake Washington Basin also contains a greater number of impervious acreage (281 acres versus 126 acres). Therefore, the Lake Washington Basin is considered to be the basin with the highest restoration opportunity.



Legend

- City Limits
- Streams
- Vacant(Single-family)

Source: Medina GIS, King County GIS

N

0 1,500 3,000 Feet

CITY OF MEDINA
STORMWATER MANAGEMENT
ACTION PLAN
FIGURE 2-10
VACANCY MAP

Gray & Osborne, Inc.
CONSULTING ENGINEERS

M:\Medina\20597 SMAP\GIS\MXD\Project MXDs\Figure 2-10 Vacant Land Use.mxd

Lake Washington

Legend

- City Limits
- SR-30 (Suburban Gardening Residential)
- R-16 (Single Family Residential)
- R-20 (Single Family Residential)
- R-30 (Single Family Residential)
- Public (Parks and Public Spaces)
- Fairweather Creek Basin
- Lake Washington Basin
- Medina Park Basin

N

0 1,500 3,000 Feet

CITY OF MEDINA
STORMWATER MANAGEMENT
ACTION PLAN
FIGURE 2-11
FUTURE LAND USE

Gray & Osborne, Inc.
CONSULTING ENGINEERS

Source: Pierce County GIS, King County GIS

M:\Medina\20597 SMAP\GIS\MXD\Project MXDs\Figure 2-11 Future Land Use.mxd

TABLE 2-10

Land Use and Potential Impervious Acreage within City Limits

	Maximum Lot Coverage Allowed Per City Code	Fairweather Creek Basin (ac)		Medina Park Basin[(1)] (ac)		Lake Washington Basin[(1)] (ac)	
		Designated Acres	Potential Impervious acres	Designated Acres	Potential Impervious Acres	Designated Acres	Potential Impervious Acres
Neighboring Auto Servicing (NA)	100%	0	0	0	0	0	0
Public Parks and Spaces	30%	0	0	31	9	22	7
R-16 (Single-Family Residential)	55%	48	26	98	54	104	57
R-20 (Single-Family Residential)	55%	113	62	54	30	190	105
R-30 (Single-Family Residential)	55%	0	0	3	1	98	54
SR-30 (Suburban Gardening Residential)	55%	18	10	0	0	0	0
Roads	100%	28	28	26	26	58	58
Total		**207**	**126**	**211**	**120**	**473**	**281**
			61%		**57%**		**59%**
Stormwater Management Influence			**High**		**High**		**High**

ENVIRONMENTAL JUSTICE

As established by the Department of Ecology, pollution and environmental contamination impacts all residents in the state. However, studies have shown that people of color, low-income people, and indigenous people are impacted the most by environmental pollution. Higher levels of exposure cause negative impacts on the lives of those afflicted. In many cases, this results in higher rates of illness, disease, and hospitalization, causing lower life expectancy for impacted groups. Therefore, the State of Washington is committed to addressing the disproportionate impacts that pollution has on disadvantaged communities and aims to remediate some of the long-standing issues affecting these communities.

An emphasis on environmental justice allows the City to focus its efforts on measures that can aid historically disadvantaged communities. In developing a prioritized list of projects, the City should evaluate the impact that a given project may have on communities with low wages, and higher proportions of people of color or indigenous people. Projects with the highest benefit on water quality should be prioritized, especially those that have the potential to provide benefits to these communities.

DEMOGRAPHIC

There are three major ethnic groups that reside in Medina: White (Non-Hispanic), Asian (Non-Hispanic), and Multiracial (Non-Hispanic). The breakdown of these groups is presented in Table 2-11. As noted, the predominant ethnic group in Medina is Non-Hispanic White. A specific geographic distribution of the demographic groups is not provided, so it is assumed that each group is distributed uniformly throughout the City.

TABLE 2-11

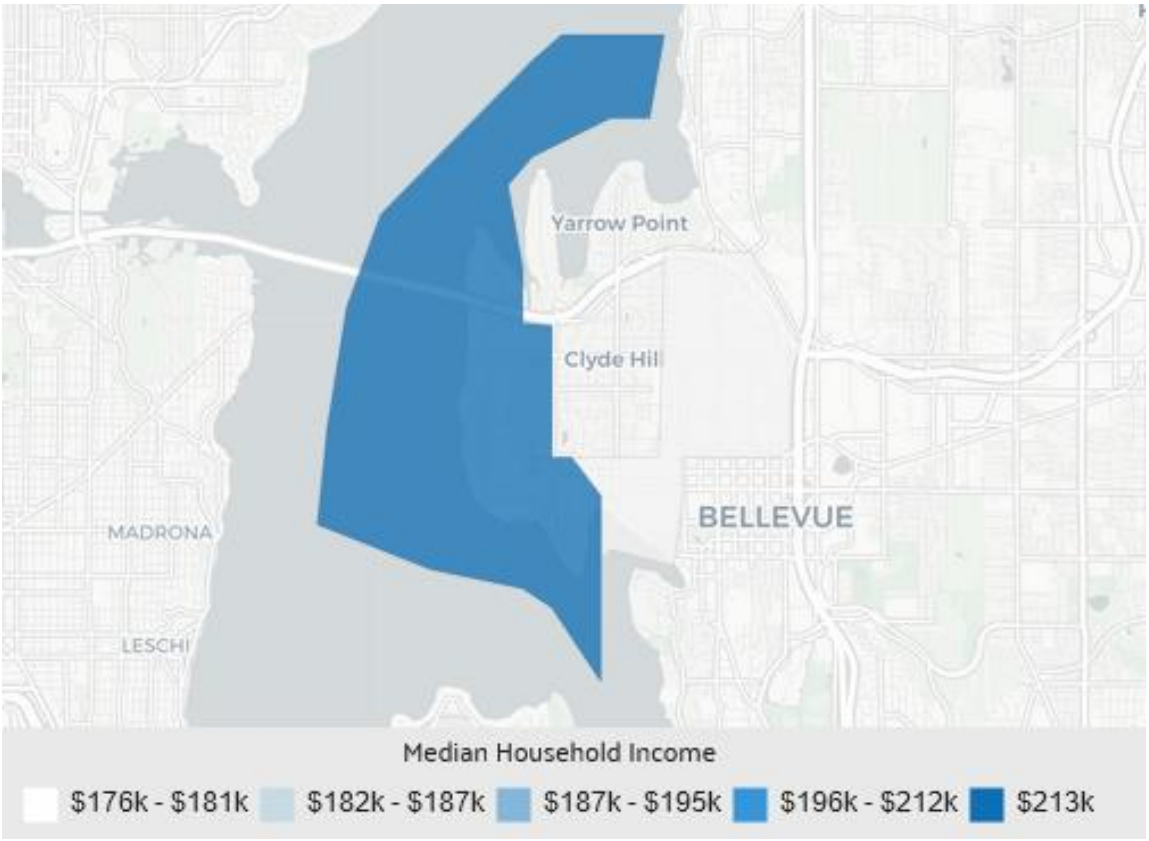
Ethnic Group Distribution

Ethnic Group	% of Medina's Population
White (Non-Hispanic)	66.4
Asian (Non-Hispanic)	24.0
Multiracial (Non-Hispanic)	4.6
White (Hispanic)	3.6
Black or African American (Non-Hispanic)	1.1
Other (Hispanic)	0.3
Multiracial (Hispanic)	1.3
American Indian & Alaska Native (Hispanic)	1.3
Black or African American (Hispanic)	1.2
American Indian and Alaska Native (Non-Hispanic)	1.0

Source: https://datausa.io/profile/geo/algona-wa#demographics

WAGE DIVIDE

The US Government provides an average household income for the City of Medina as shown in Figure 2-12. The City has an average household income of approximately $213,000. Only 5.1 percent of the population live below the poverty line which is to say their salary is typically less than $22,000 a year if there are no children of 18 years and older based upon data from the United States Census Bureau. The population below the poverty line, is primarily comprised of people that are Asian, White, and Black ethnic groups.



(https://datausa.io/profile/geo/medina-wa/)

FIGURE 2-12

Medina Income Distribution

Based on the demographic distribution in the City, there are no high priority basins to target for environmental justice improvements. In terms of environmental justice and considering the potential impact on disadvantaged communities, there are no basins that will take higher precedence over the other.

WATERSHED INVENTORY SUMMARY

Table 2-12 includes a summary of all of the various parameters and associated stormwater management influence considered within this Chapter.

TABLE 2-12

Stormwater Management Influence Summary

	Fairweather Creek Basin (ac)	Medina Park Basin (ac)	Lake Washington Basin (ac)
Stormwater Management Influence			
Watershed Area w/in City UGA (ac)	213	224	500
Total Watershed Area (ac) to a Flow-Control Exempt Water Body	543	224	567
% within City UGA	39%	100%	88%
Fish			
Fish Barriers	**High**	**High**	**Low**
Fish Habitat – Stream Typing	**High**	**Low**	**High**
Fish Habitat – Puget Sound Habitat Characterization	**High**	**High**	**High**
Stream Vegetation Buffer	**High**	**High**	**Low**
B-IBI	**High**	**-**	**-**
Flow			
Existing Flow Control Facilities	**High**	**High**	**High**
Flow Control – Puget Sound Habitat Characterization	**High**	**High**	**High**
Water Quality			
Existing Water Quality Treatment	**High**	**High**	**High**
Water Quality – Puget Sound Habitat Characterization	**High**	**High**	**High**
303d Listing Parameters	**High**	**-**	**-**
Land Use			
Existing/Future Land Use	**High**	**High**	**High**
Environmental Justice			
Demographic	**Low**	**Low**	**Low**
Wage Divide	**Low**	**Low**	**Low**
Overall Score	**High**	**High**	**High**

As shown in Table 2-13, all basins have an element of high stormwater management influence and therefore are considered during the watershed prioritization process discussed in Chapter 3.

CHAPTER 3

RECEIVING WATER PRIORITIZATION

The previous chapter demonstrated that each of the three basins have the potential to be influenced by stormwater management efforts. The following will prioritize these basins and narrow the list to a single basin to focus future recovery efforts.

PRIORITIZATION METHOD

In selecting a high priority basin, it is imperative to review which basin will receive the most benefit from implementation of stormwater facility retrofits, tailored implementation of stormwater related actions and other land/development management actions.

Table 3-1 presents a relative ranking of each of the parameters assessed in Chapter 2 (fish habitat, flow, water quality, land use and environmental justice). For each category, the basins were scored on a relative scale from "1" to "3" with "3" representing the most negative impact. For instance, the Medina Park Basin contains the greatest amounts of fish barriers and therefore, receives a score of "3" whereas the Lake Washington Basin has the least number of fish barriers and therefore, receives a score of "1."

TABLE 3-1

Basin Prioritization Summary

	Fairweather Creek Basin (ac)	Medina Park Basin (ac)	Lake Washington Basin (ac)
Relative Condition[(1)]			
Watershed Area w/in City UGA (ac)	213	224	500
Total Watershed Area (ac) to a Flow-Control Exempt Water Body	543	224	567
% within City UGA	39%	100%	88%
General Description			
	Topography is from south to north and includes Fairweather Creek which discharges to Lake Wa. and has a TMDL for DO, temperature, fecal coliform and copper ; Land use includes developed residential, commercial, a school, and the golf course. Ample flow control exists but there is little treatment.	Topography is from north to south where runoff discharges to Lake Wa. via an unnamed creek; Land use includes developed residential, the golf course, gas stations, a church and two schools. Ample flow control exists but there is no treatment.	Topography is generally westerly where runoff flows directly toward Lake Washington; Land use is developed residential. Ample flow control exists but there is no treatment.
Fish			
Fish Barriers	2	3	1
Fish Habitat – Stream Typing	3	1	2
Fish Habitat – Puget Sound Habitat Characterization	3	3	3
Stream Vegetation Buffer	3	3	3
B-IBI	3	N/A	N/A

TABLE 3-1 – (continued)

Basin Prioritization Summary

	Fairweather Creek Basin (ac)	**Medina Park Basin (ac)**	**Lake Washington Basin (ac)**
Flow			
Existing Flow Control Facilities	3	2	1
Flow Control – Puget Sound Habitat Characterization	3	3	3
Water Quality			
Existing Water Quality Treatment	2	3	3
Water Quality – Puget Sound Habitat Characterization	3	3	3
303d Listing Parameters	3	N/A	N/A
Land Use			
Existing Land Use	2	1	3
Future Development	2	1	3
Environmental Justice			
Demographic	1	1	1
Wage Divide	1	1	1
Total Score	34	25	27

(1) A score of 1 represents the relative best condition compared to a score of 3 which is the relative worst condition of each of the basins.

HIGH PRIORITY BASIN/CATCHMENT AREA

Figure 3-1 shows an overview of the basins and how each basin scored per Table 3-1. As shown, the Fairweather Creek Basin had the highest score, revealing it as the most probable location to focus retrofit efforts. The motivation behind selecting the Fairweather Creek Basin as the high priority basin includes:

- Contains a fish bearing stream
- Poor B-IBI score
- Smallest amount of flow control facilities
- 303d Listing
- Highest concentration of impervious surface

Due to the listed reasons above, the City will focus stormwater restoration related efforts on the Fairweather Creek Basin.

PREDICTED POLLUTANT LOADING IMPACTS

As a base measurement to improvement, Table 3-2 and Table 3-3 predicts the current and future pollutant loading impacts within the Fairweather Creek Basin.

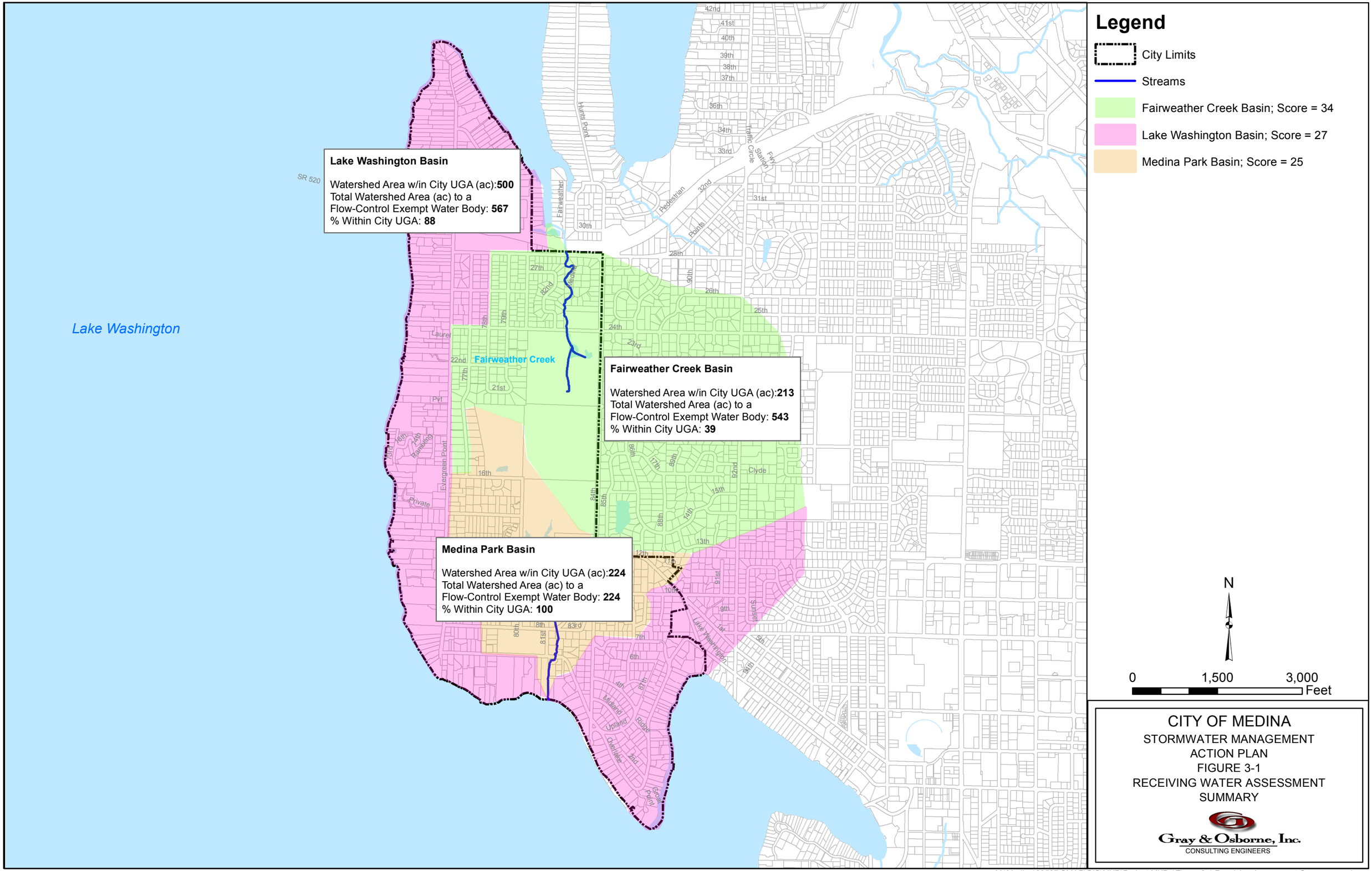
TABLE 3-2

Anticipated Loadings for Existing Land Use within the Fairweather Creek

	Unit Loading (per kg ha^{-1})(2)			Total Loading (lbs/ac)(1)			Total
	Residential	Commercial	Industrial	Residential	Commercial	Industrial	Loading
Acreage				89.0	0.0	0.0	
TSS	0.05	0.28	0.71	3.97	0.00	0.00	3.97
Dissolved Phosphorus	0.00011	0.00011	0.00015	0.01	0.00	0.00	0.01
Nitrogen	0.0043	0.0043	0.0043	0.34	0.00	0.00	0.34
Copper	0.000051	0.000051	0.000051	0.00	0.00	0.00	0.00
Lead	0.000027	0.000027	0.000027	0.00	0.00	0.00	0.00
Zinc	0.00031	0.00031	0.00031	0.02	0.00	0.00	0.02
PAHs	6.70E-07	6.70E-07	6.70E-07	0.00005	0.000000	0.000000	0.0001

(1) 0.893 lbs/ac = 1 kg ha-1.

(2) Data provided from the Western Washington NPDES Ph. I Stormwater Permit, Final S8.D Data Characterization 2009-2013 by Hobbs, W., B. Lubliiner, N. Kale, and E.Newell, 2015. If specific land uses weren't specified, the median value was chosen.



Source: Medina GIS, King County GIS

M:\Medina\20597 SMAP\GIS\MXD\Project MXDs\Figure 3-1 Receiving Assessment Summary.mxd

TABLE 3-3

Anticipated Loadings for Future Land Use within the Fairweather Creek

	Unit Loading (per kg ha^{-1})(2)			Total Loading (lbs/ac)(1)			Total
	Residential	Commercial	Industrial	Residential	Commercial	Industrial	Loading
Acreage				179	0	0	
TSS	0.05	0.28	0.71	7.98	0.00	0.00	7.98
Dissolved Phosphorus	0.00011	0.00011	0.00015	0.02	0.00	0.00	0.02
Nitrogen	0.0043	0.0043	0.0043	0.69	0.00	0.00	0.69
Copper	0.000051	0.000051	0.000051	0.01	0.00	0.00	0.01
Lead	0.000027	0.000027	0.000027	0.00	0.00	0.00	0.00
Zinc	0.00031	0.00031	0.00031	0.05	0.00	0.00	0.05
PAHs	6.70E-07	6.70E-07	6.70E-07	0.0001	0.0000	0.0000	0.0001

(1) 0.893 lbs/ac = 1 kg ha^{-1}.

(2) Data provided from the Western Washington NPDES Ph. I Stormwater Permit, Final S8.D Data Characterization 2009-2013 by Hobbs, W., B. Lubliiner, N. Kale, and E.Newell, 2015. If specific land uses were not specified, the median value was chosen.

The largest anticipated change between today's land use and buildout conditions relates to total suspended solids. From existing land use to the final land use, it is anticipated that TSS will increase by approximately 4 pounds per acre which is an increase of 100 percent. Based upon this evaluation, potential retrofits and land use policies should target the generation of TSS.

CHAPTER 4

STORMWATER MANAGEMENT ACTION PLAN

Using the basin priority criteria discussed in Chapter 3, the Fairweather Creek Basin was categorized as the highest priority basin and the high priority catchment area within the City for focused stormwater improvements (see Figure 4-1). The potential for stormwater retrofits, land management/development strategies, and stormwater management actions designated for this high priority catchment area will be discussed within this chapter.

PLANNED STORMWATER RETROFIT

The City of Medina has proposed completing two different stormwater improvements within the Fairweather Creek Basin. The two projects will be located along NE 28th Street and NE 24th Street (see Figure 4-2).

NE 28TH STREET RETROFIT PROJECT

A water quality vault is proposed to be installed at the eastern end of NE 28th Street. The vault would include a proprietary structure that consists of a specialized media that filters pollutants from stormwater runoff. The goal of this project is to provide "enhanced" treatment as defined by the Department of Ecology which will not only filter pollutants by settling out total suspended solids but also by providing treatment for various metals. Types of vaults that may be considered include the OldCastle BioPod Biofilter (12' x 24' vault or multiple vaults with an equivalent surface area) and Contech's Modular Wetland System (4' x 8' Modular Wetland). The construction of this project is scheduled to begin in 2026. The area that would benefit from this retrofit equates to approximately 4.8 acres.

NE 24TH STREET RETROFIT PROJECT

The second retrofit project is located along NE 24th Street and will include converting approximately 200 lineal feet of an existing ditch into a biofiltration swale that meets Ecology's requirements per BMP T9.10. This bioswale will consist of a specialized media that will filter and trap pollutants entrained in stormwater runoff. The construction of this project is estimated to begin in 2037. The area that would benefit from this retrofit equates to approximately 8.5 acres.

RETROFIT AREA SUMMARY

If each of these retrofits are constructed, a total of approximately 13.3 acres of land will receive treatment as seen in Table 4-1. The planning-level cost for each retrofit is also provided within Table 4-1 while Appendix A provides the detailed cost estimate.

TABLE 4-1

Retrofit Area Effect

Retrofit	Area Treated (ac)	Total Project Cost
NE 28th Street (Water Quality Vault)	4.8	$469,000
NE 24th Street (Biofiltration Swale)	8.5	$121,000
Total Area Treated (ac)	13.3	
Percent of Fairweather Creek Basin Within City UGA Treated	6.46%	

(1) Total project cost estimate includes construction, 30 percent construction contingency, sales tax, and 30 percent for project administration and construction management.

LAND MANAGEMENT

There are no plans to change city code to adjust zoning or land use policies in order to protect or conserve undeveloped areas within the selected priority catchment area. As the subbasin selected is already built out, like most of the City, conserving existing undeveloped land is not a viable option. City codes already provide for tree retention and wide setbacks from adjacent parcels for landscaping. However, the City is committed to providing water quality based retrofits as well as conducting stormwater management actions as noted further herein.

STORMWATER MANAGEMENT ACTIONS

General Stormwater Management actions taken in Medina include prioritization of:

- Street sweeping and catch basin cleaning;
- Maintenance of city-owned stormwater facilities;
- Illicit discharge/spill inspections;
- Public education/outreach.

These measures are required per the City's NPDES Municipal Permit; however, these actions will be prioritized within the selected catchment area over other areas within the City.

IMPLEMENTATION SCHEDULE AND COSTS

SHORT-TERM ACTIONS (6-YEAR PLAN)

Stormwater goals have been established for each year between 2023 and 2028. Table 4-2 lists the stormwater actions for each year. This table includes the estimated cost and a general description of the stormwater activity. The total sum of all stormwater actions over the 6-year period is estimated to cost $469,000 (in 2023 dollars). This sum includes

Legend

- City Limits
- Non-Prioritized Basin
- Prioritized Basin (Fairweather Creek Basin)

N

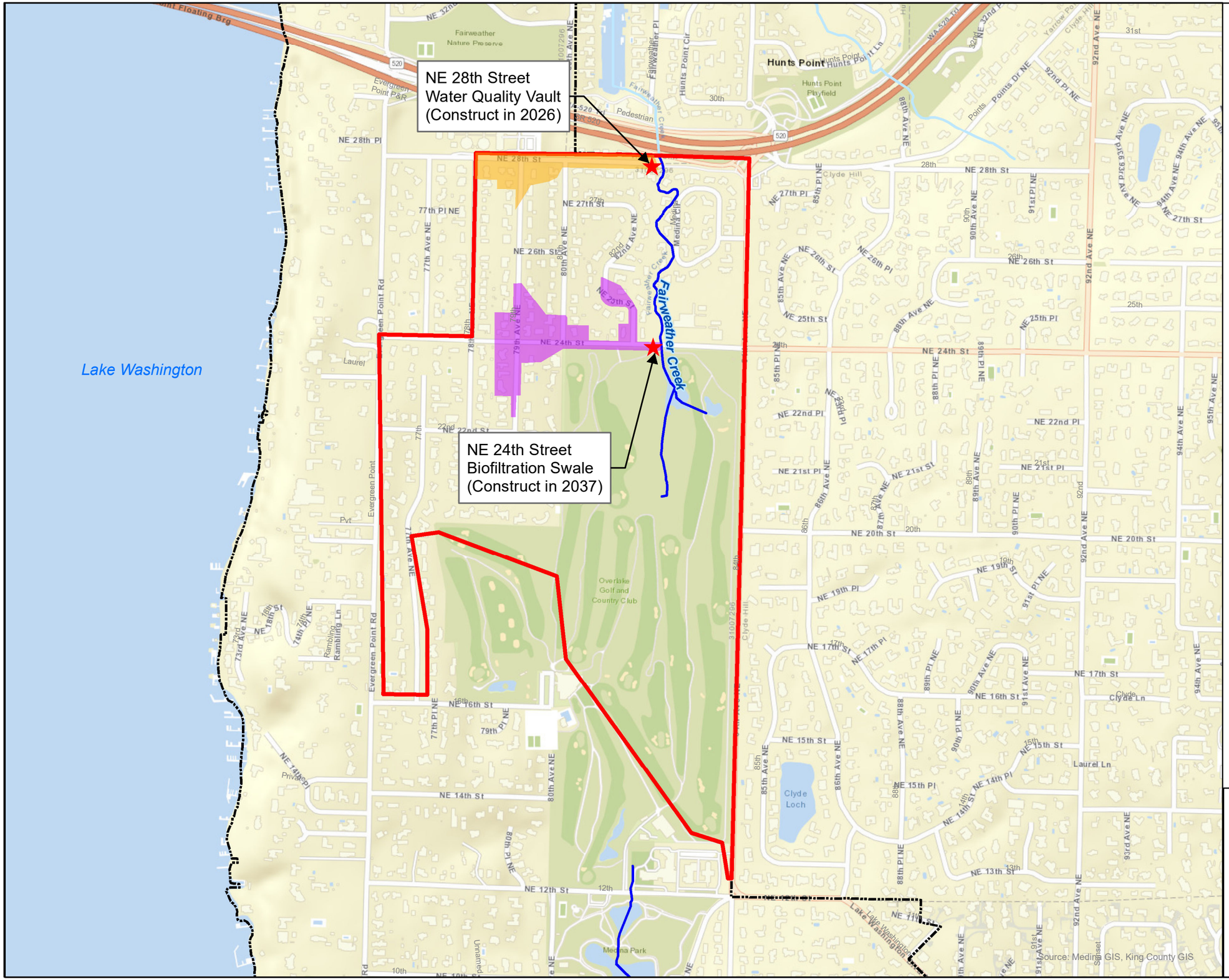
0 0.5 Miles

CITY OF MEDINA

STORMWATER MANAGEMENT
ACTION PLAN
FIGURE 4-1
HIGH PRIORITY CATCHMENT AREA

Gray & Osborne, Inc.
CONSULTING ENGINEERS

M:\Medina\20597 SMAP\GIS\MXD\Project MXDs\Figure 4-1 Prioritized Basin.mxd



M:\Medina\20597 SMAP\GIS\MXD\Project MXDs\Figure 4-2 Retrofit Locations.mxd

the construction cost for the NE 28th Street Retrofit project in 2026. Included in Appendix A is the method used for each of the costs for the stormwater management actions.

TABLE 4-2

Short-Term Plan (2023-2028)

Project/ Stormwater Action	Project Description	2023	2024	2025	2026	2027	2028
Street Sweeping	Sweep streets 9 months every year	$3,840	$3,840	$3,840	$3,840	$3,840	$3,840
Catch Basin Inspection	Inspect 1/2 catch basins each year	$1,800	$1,800	$1,800	$1,800	$1,800	$1,800
Catch Basin Cleaning	Clean 1/4 catch basins cleaning each year	$3,500	$3,500	$3,500	$3,500	$3,500	$3,500
Public Stormwater Facility Maintenance	Inspect and maintain each facility each year	$1,400	$1,400	$1,400	$1,400	$1,400	$1,400
IDDE Inspection	Assume 4 IDDE events occur each year	$480	$480	$480	$480	$480	$480
Public Outreach/Education	Educate on stormwater best management practices and provide opportunities for the public to participate in stewardship activities	$480	$480	$480	$480	$480	$480
SMAP Evaluation	Evaluate and critique the current SMAP, revise as needed	$480	$480	$480	$480	$480	$480
Retrofit Project	Construct NE 28th Street Retrofit project				$469,000		
Total Annual Cost		**$11,980**	**$11,980**	**$11,980**	**$480,980**	**$11,980**	**$11,980**

Note: All activities are only for facilities located within the high priority catchment area.

LONG-TERM ACTIONS (20-YEAR PLAN)

Following the conclusion of the six-year plan, a set of long-term actions are planned through the year 2042. These actions range from SMAP evaluations to catch basin cleaning. Each of these actions is listed in Table 4-3. The total cost for these stormwater actions over the course of 14 years is estimated at $121,100 (in 2023 dollars). This amount includes the construction cost for the NE 24th Street Retrofit project in 2037.

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TABLE 4-3

Long-Term Plan (2029-2042)

Project/ Stormwater Action	Project Description	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042
Street Sweeping	Sweep streets 9 months every year	$3,840	$3,840	$3,840	$3,840	$3,840	$3,840	$3,840	$3,840	$3,840	$3,840	$3,840	$3,840	$3,840	$3,840
Catch Basin Inspection	Inspect 1/2 catch basins each year	$1,800	$1,800	$1,800	$1,800	$1,800	$1,800	$1,800	$1,800	$1,800	$1,800	$1,800	$1,800	$1,800	$1,800
Catch Basin Cleaning	Clean 1/4 catch basins cleaning each year	$3,500	$3,500	$3,500	$3,500	$3,500	$3,500	$3,500	$3,500	$3,500	$3,500	$3,500	$3,500	$3,500	$3,500
Public Stormwater Facility Maintenance	Inspect and maintain each facility each year	$1,400	$1,400	$1,400	$1,400	$1,400	$1,400	$1,400	$1,400	$1,400	$1,400	$1,400	$1,400	$1,400	$1,400
IDDE Inspection	Assume 4 IDDE events occur each year	$480	$480	$480	$480	$480	$480	$480	$480	$480	$480	$480	$480	$480	$480
Public Outreach/Education	Educate on stormwater best management practices and provide opportunities for the public to participate in stewardship activities	$480	$480	$480	$480	$480	$480	$480	$480	$480	$480	$480	$480	$480	$480
SMAP Evaluation	Evaluate and critique the current SMAP, revise as needed	$480	$480	$480	$480	$480	$480	$480	$480	$480	$480	$480	$480	$480	$480
Retrofit Project	Construction of the NE 24th Street Retrofit project									$121,000					
Total Annual Cost		**$11,980**	**$11,980**	**$11,980**	**$11,980**	**$11,980**	**$11,980**	**$11,980**	**$11,980**	**$132,980**	**$11,980**	**$11,980**	**$11,980**	**$11,980**	**$11,980**

Note: All activities are only for facilities located within the high priority catchment area.

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BUDGET

Medina anticipates that the funds necessary to pay for the stormwater management actions and retrofit projects listed in this document will be acquired through either City funds or through grants obtained through the Department of Ecology. The total cost in 2023 dollars is estimated to be $829,600 over the course of 20 years. This amount includes the short- and long-term actions planned. The City will identify funding sources (typically real estate excise taxes, Ecology Capacity Grants, and general fund revenue from property taxes) for the projects through its annual budgeting process and will continue to manage these funds on an annual basis to ensure they can adequately fund the plan presented herein.

PROGRAM ASSESSMENT

It is recommended that this stormwater management plan be assessed throughout the next 20 years to ensure it is being implemented as intended and that water quality treatment goals are being met. The ongoing assessment of this plan will involve recording the progress made with each of the program elements (retrofits, stormwater management actions, budget), identifying areas of improvement, and then incorporating those improvements into the SMAP as needed.

Medina plans to evaluate their SMAP on an annual basis. This review will involve a checklist of items. This includes tracking the progress against the action timelines as listed in the short and long-term plans provided in Tables 4-2 and 4-3.

Assessing this program will allow the City to provide ongoing progress updates to City officials, the public, and Ecology in terms of the City meeting and managing its stormwater goals.

APPENDIX A

COST ESTIMATE

CITY OF MEDINA
NE 28th Street Retrofit - Water Quality Vault Project
Engineer's Construction Cost Estimate
VERSION: 2/21/2023
G &O #20597

NO.	ITEM	QUANTITY	UNIT	UNIT PRICE	AMOUNT
1.	Minor Changes (S.P. 1-04.4(1))	1	CALC	$ 5,000.00	$ 5,000.00
2.	SPCC Plan (S.P. 1-07.15(1))	1	LS	$ 500.00	$ 500.00
3.	Mobilization, Cleanup, and Demobilization (S.P. 1-09.7)	1	LS	$ 26,000.00	$ 26,000.00
4.	Project Temporary Traffic Control (S.P. 1-10.5)	1	LS	$ 4,000.00	$ 4,000.00
5.	Clearing and Grubbing (S.P. 2-01.5)	1	LS	$ 2,000.00	$ 2,000.00
6.	Gravel Borrow, Incl. Haul (S.P. 2-03.5)	0	TN	$ 35.00	$ -
7.	Unsuitable Foundation Excavation, Incl. Haul (S.P. 2-03.5)	10	CY	$ 50.00	$ 500.00
8.	Locate Existing Utilities (S.P. 2-09.5)	1	LS	$ 2,000.00	$ 2,000.00
9.	Crushed Surfacing Base Course (S.P. 4-04.5)	80	TN	$ 80.00	$ 6,400.00
10.	Commercial HMA (S.P. 5-04.5)	60	TN	$ 200.00	$ 12,000.00
11.	CPEP Storm Sewer Pipe, 12 In. Diam.	350	LF	$ 120.00	$ 42,000.00
12.	Removal of Unsuitable Material (Trench) (S.P. 7-08.5)	10	CY	$ 50.00	$ 500.00
	Bank Run Gravel for Trench Backfill (S.P. 7-08.5)	360	TN	$ 35.00	$ 12,600.00
13.	Trench Excavation Safety Systems (S.P. 7-08.5)	1	LS	$ 2,000.00	$ 2,000.00
14.	Erosion/Water Pollution Control (S.P. 8-01.5)	1	LS	$ 6,000.00	$ 6,000.00
15.	OldCastle BioPod Vault or Contech Modular Wetland	1	EA	$ 156,000.00	$ 156,000.00
	Subtotal Construction Cost				$ 277,500
	Construction Contingency (30%)	30%			$ 83,250
					$ 360,750
	Sales Tax (10.1%) Serves Roadway - Assume Rule 171	0.00%			$ -
	Total Construction Cost				$ 360,750
	Project Administration/Construction Management	30%			$ 108,225
					$ 468,975
	CONSTRUCTION COST ESTIMATE (ROUNDED)				**$ 469,000**

CITY OF MEDINA
NE 24th Street Biofiltration Swale Project
Engineer's Construction Cost Estimate
VERSION: 2/21/2023
G &O #20597

NO.	ITEM	QUANTITY	UNIT	UNIT PRICE	AMOUNT
1.	Minor Changes (S.P. 1-04.4(1))	1	CALC	$ 5,000.00	$ 5,000.00
2.	SPCC Plan (S.P. 1-07.15(1))	1	LS	$ 500.00	$ 500.00
3.	Mobilization, Cleanup, and Demobilization (S.P. 1-09.7)	1	LS	$ 7,000.00	$ 7,000.00
4.	Project Temporary Traffic Control (S.P. 1-10.5)	1	LS	$ 13,000.00	$ 13,000.00
5.	Clearing and Grubbing (S.P. 2-01.5)	1	LS	$ 12,000.00	$ 12,000.00
6.	Excavation, Backfill, Compaction and Grading for Roadway, Incl. Haul (S.P. 2-03.5)	150	CY	$ 65.00	$ 9,750.00
7.	Locate Existing Utilities (S.P. 2-09.5)	1	LS	$ 2,000.00	$ 2,000.00
8.	Trench Excavation Safety Systems (S.P. 7-08.5)	1	LS	$ 5,000.00	$ 5,000.00
9.	Bypass Pumping	1	LS	$ 5,000.00	$ 5,000.00
10.	Topsoil (S.P. 8-02.5)	45	CY	$ 120.00	$ 5,400.00
11.	Seeding, Fertilizing and Mulching	580	SY	$ 5.00	$ 2,900.00
12.	Erosion/Water Pollution Control (S.P. 8-01.5)	1	LS	$ 4,000.00	$ 4,000.00
	Subtotal Construction Cost				$ 71,550
	Construction Contingency	30%			$ 21,465
					$ 93,015
	OldCastle BioPod Vault or Contech Modular Wetland				
	Sales Tax (10.1%) Serves Roadway - Assume Rule 171	0.00%			$ -
	Total Construction Cost				$ 93,015
	Project Administration/Construction Management	30%			$ 27,905
					$ 120,920
	CONSTRUCTION COST ESTIMATE (ROUNDED)				**$ 121,000**