Wetland Resources, Inc.

Delineation / Mitigation / Restoration / Habitat Creation / Permit Assistance

9505 19th Avenue S.E.
Suite 106
Everett, Washington 98208
(425) 337-3174
Fax (425) 337-3045

CRITICAL AREA STUDY
AND
MITIGATION PLAN

FOR

Heathers Ridge South

Wetland Resources, Inc. Project #11122

Prepared By:

Wetland Resources, Inc.
9505 19th Ave SE, Suite 106
Everett, WA 98208
(425) 337-3174

For:

Quadrant Homes
14725 SE 36th Street, #200
Bellevue, WA 98006

February 23, 2015

TABLE OF CONTENTS

APPENDICES

PROJECT LOCATION AND SITE DESCRIPTION

Wetland Resources, Inc. (WRI) completed a site investigation on October 20, 2011 and August 20, 2013 to evaluate and delineate jurisdictional wetlands and streams on and in the vicinity of King County parcel #0325059100. The subject property is located south of the intersection of 134th Avenue NE and NE 100th Street in the City of Redmond, Washington. The Public Land Survey System (PLSS) locator for the site is Section 03, Township 25N, Range 05E, W.M. The subject property is situated within the Cedar/Sammamish Watershed, or Water Resources Inventory Area (WRIA) 8.

The 1.53-acre subject property is undeveloped and located in a residential setting. The site has a gentle southeast aspect with a shallow ravine along the eastern border. The eastern and southern portions of the site contain forested vegetation, and scattered trees are present in the northwest corner as well. The center portion is dominated by a mix of herbaceous and scrub-shrub vegetation. The subject property is bordered on the north by NE 100th Street. Developed parcels are located to the east, west, and south, along with undeveloped, forested areas.

The October 2011 and August 2013 site investigations resulted in the identification of one stream along/near the eastern property boundary and extending off-site to the southeast. In addition, steep slopes (approx. 40%) are located in the southeast property corner.

PROJECT DESCRIPTION

The project applicant is proposing the construction of eight single-family lots and associated infrastructure on the subject property. The project site is located in the R-1 and RIN zones.

REVIEW OF EXISTING INFORMATION

As part of this project, public resources were reviewed to gather background information on the subject property, the surrounding area, and critical areas in the vicinity. The following information was examined:

- USFWS National Wetlands Inventory: The National Wetland Inventory (NWI) does not indicate any wetland areas on the subject property.
- USDA/NRCS Web Soil Survey: The soil mapped within the project area includes Alderwood gravelly sandy loam, 0 to 6 percent slopes, and Alderwood gravelly sandy loam, 6 to 15 percent slopes. Neither soil is classified as hydric by the Natural Resources Conservation Service (NRCS).
- WDFW SalmonScape Interactive Mapping System: The SalmonScape interactive map illustrates the off-site portion of the stream identified during the October 2011 and August 2013 site investigations. SalmonScape also indicates that fish use (Coho salmon) is present in the easternmost portion of the stream, east of Willows Road NE, approximately two miles away from the subject property.
- StreamNet Interactive Mapper: The StreamNet interactive mapping system illustrates the off-site portion of the identified stream and indicates fish use in the same location as the SalmonScape map.

- WDFW Priority Habitat and Species (PHS) Interactive Map: There are no priority habitats or listed species on the subject property per the PHS Interactive Map. The off-site portion of the identified stream is illustrated, however.
- King County iMap Interactive Mapping Tool: Similar to the other mapping systems, the King County iMap illustrates the off-site portion of the identified stream.
- City of Redmond Maps: The off-site portion of the identified stream is illustrated on the following City of Redmond maps: Critical Areas Map (Map 64.4: Wetlands), Critical Areas Map (Map 64.3: Streams Classification), and Fish and Wildlife Habitat Conservation Areas. The stream is labeled Gun Club Tributary on the City's Streams Classification Map. The stream is also illustrated on the City's Property Viewer Interactive Map.

METHODOLOGY

Wetland boundaries were determined using the routine determination approach described in the Corps of Engineers Wetlands Delineation Manual (Environmental Laboratory 1987), or Corps Manual, and the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountians, Valleys, and Coast Region (Version 2.0) (U.S. Army Corps of Engineers 2010), or the Regional Supplement. Under the routine methodology, the process for making a wetland determination is based on three steps:

1.) Examination of the site for hydrophytic vegetation (species present and percent cover);

2.) Examination of the site for hydric soils;

3.) Determining the presence of wetland hydrology

The following criteria must be met in order to make a positive wetland determination:

Vegetation Criteria

The Corps Manual and 2010 Regional Supplement define hydrophytic vegetation as "the assemblage of macrophytes that occurs in areas where inundation or soil saturation is either permanent or of sufficient frequency and duration to influence plant occurrence." Field indicators are used to determine whether the hydrophytic vegetation criteria have been met. Examples of these indicators include, but are not limited to, the rapid test for hydrophytic vegetation, a dominance test result of greater than 50%, and/or a prevalence index score less than or equal to 3.0.

Soils Criteria

The 2010 Regional Supplement (per the National Technical Committee for Hydric Soils) defines hydric soils as soils "that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part." Field indicators are used to determine whether a given soil meets the definition for hydric soils. Indicators are numerous and include, but are not limited to, presence of a histosol or histic epipedon, a sandy gleyed matrix, depleted matrix, and redoximorphic depressions.

Hydrology Criteria

Wetland hydrology encompasses all hydrologic characteristics of areas that are periodically inundated or have soils saturated to the surface for a sufficient duration during the growing season. Areas with evident characteristics of wetland hydrology are those where the presence of water has an overriding influence on the characteristics of vegetation and soils due to anaerobic and chemically reducing conditions, respectively. The strongest indicators include the presence of surface water, a high water table, and soil saturation within at least 12 inches of the soil surface.

BOUNDARY DETERMINATION FINDINGS/RESULTS

No wetlands were identified on or near the subject property during the October 2011 and August 2013 site investigations. However, one stream was identified along and near the eastern property boundary. The ordinary high water mark (OHWM) of the stream was identified using the methodology described in the Washington State Department of Ecology document Determining the Ordinary High Water Mark on Streams in Washington State (Second Review Draft) (Olson and Stockdale 2010). The stream was categorized according to Redmond Zoning Code (RZC) section 21.64.020(A)(2)(d) and was classified according to the U.S. Fish and Wildlife Service (USFWS) Classifications of Wetlands and Deepwater Habitats of the United States (Cowardin et al., 1979), also known as the Cowardin Classification System.

Stream

The identified stream is a perennial feature that meets the criteria for a Class IV stream per RZC 21.64.020(2)(d). It enters the property in the northeast corner via a culvert under NE 100th Street, crosses the northeast property corner, and then flows off-site to the southeast. The stream continues flowing south, roughly paralleling the eastern property boundary. Based on the Cowardin Classification System, the stream is a riverine, lower perennial, unconsolidated bottom, mud and cobble-gravel system (R2UB1/3)

The stream is a tributary to the Sammamish River and does not support fish in the vicinity of the subject property, nor does it have the potential to support fish in that area. A steep gradient (>16 percent) east of the property and a lack of suitable on-site, in stream habitat prevents fish access or use of the stream.

Per RZC section 21.64.020(B)(3), perennial Class IV streams require 36-foot buffers measured horizontally from the OHWM.

Upland/Buffer Areas

Vegetation throughout the upland and buffer areas consists of trees in the northwest corner and along the eastern property boundary. The center of the property is relatively open and appears to be abandoned pasture that is currently dominated by Himalayan blackberry (*Rubus armeniacus*) and creeping buttercup (*Ranunculus repens*). The southern portion of the subject property is forested and part of a forested corridor that extends off-site to the south. Typical vegetation in the forested portions of the site is represented by big leaf maple (*Acer macrophyllum*), Indian plum (*Oemleria cerasiformis*), Himalayan blackberry (*Rubus armeniacus*), creeping buttercup (*Ranunculus repens*), and sword fern (*Polystichum munitum*). Vegetation in the abandoned pasture area is comprised of scattered big-leaf maple saplings, with Himalayan blackberry, creeping buttercup,

colonial bentgrass (*Agrostis tenuis*), orchard grass (*Dactylis glomerata*), and small patches of reed canarygrass (*Phalaris arundinacea*). Soils across the site have matrix colors ranging from very dark grayish brown to dark yellowish brown with textures of gravelly sandy loam from 0 to 18 inches below the surface. Soils were moist to dry during the October 2011 and August 2013 site investigation.

FUNCTIONS AND VALUES ASSESSMENT

The methodology for this functions and values assessment is based on professional opinion developed through past field analyses and interpretations. This assessment pertains specifically to the on-site stream system, but is typical for assessments of similar systems throughout western Washington.

Streams and their associated floodplains in western Washington perform a variety of ecosystem functions including the movement of water and sediment, recharge of groundwater, treatment of pollutants, dynamic stability, and habitat diversity. Assessments of these functions for the project site are provided below.

The on-site stream serves to collect stormwater from the surrounding areas and convey it to downstream systems. The vegetation and micro topography in the adjacent upland buffer serves to filter and trap sediments and pollutants in small, overbank areas bordering to the stream and to naturally purify in-stream flows. The stream and associated buffer comprise part of a larger, natural area (extending off-site to the south/southeast) that provides some wildlife habitat as well as a protected movement corridor. Forested and scrub-shrub vegetation in the stream buffer provides shade and allochthonous material to the stream and downstream systems and generally improves the stream's functions and values.

Along with the preceding functions and values, stream buffers often provide additional functions in western Washington such as physical protection to the stream and aesthetic value.

PROPOSED DEVELOPMENT ACTIVITIES

The project applicant is proposing the development of an 8-lot subdivision and associated infrastructure. In order to accomplish this project, portions of the stream buffer must be reduced. To compensate for these reductions, buffer width averaging is being proposed. The resulting stream buffer will be slightly larger in area than the standard buffer area prior to averaging. In addition, two stormwater outfall pipes will extend into the stream buffer and rip-rap dispersion pads will be located at the pipe outlets. The outfall pipes – which will be placed below ground – represent temporary impacts; the areas will be returned to their pre-existing conditions following installation. The rip-rap pads will be planted with willow whips to compensate for the small impact area and to assist with stormwater dispersion. Furthermore, temporary buffer impacts (220 SF) will occur in the northern portion of the stream buffer, east of Lot 2. Grading activities will occur in this area in order to avoid the installation/construction of additional rockery walls. The temporary impact area will be restored with native vegetation.

GENERAL MITIGATION STANDARDS

Per section 21.64.010(I) of the RZC, all adverse impacts to critical areas must be mitigated. The following sequence of mitigation actions must be applied by the project applicant:

- Avoiding the impact altogether by not taking a certain action or parts of actions;
- Minimizing impacts by limiting the degree or magnitude of the action and its implementation, by using appropriate technology, or by taking affirmative steps, such as project redesign, relocation, or timing, to avoid or reduce impacts;
- Rectifying the impact to the critical area by repairing, rehabilitating, or restoring the affected environment to the conditions existing at the time of the initiation of the project;
- Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action;
- Compensating for the impact by replacing or providing substitute resources or environments; and/or
- Monitoring the hazard or other required mitigation and taking remedial action when necessary.

Complete avoidance of stream buffer impacts is not feasible for this project. The proposed lot sizes are the smallest practicable while still allowing for some usable yard/lawn areas. Per the RZC, the minimum average lot area for this zone is 4,000 square feet (SF); the proposed yard areas are required to meet the lot sizes. In addition, the RZC requires that 10% of the project site area be provided by lot-by-lot open space. For the proposed Heathers Ridge South project, the required lot-by-lot open space is 6,800 SF; the project applicant is proposing 7,075 SF.

Stream buffer impacts have been minimized to the maximum extent practicable. The buffer will be reduced only where necessary to allow for lot development, and nowhere will the buffer be reduced to less than 25 percent of the standard buffer width. There are several areas where the buffer could have been further reduced, thereby utilizing the full, allowable reduction, yet this was avoided in order to minimize impacts.

The affected environment, i.e. the reduced buffer areas, cannot be repaired, rehabilitated, or restored to previously existing conditions since buffer reduction is a permanent action. Similarly, reducing or eliminating the impacts over time is not feasible due to their permanent nature. However, averaging will replace the lost square footage and maintain buffer functions and stream protection.

Compensation for the reduced buffer areas will be in the form of buffer width averaging. The total area (square footage) of the new/averaged buffer areas will be slightly larger than those areas that are being reduced. This will maintain the existing buffer functions and will avoid any future impacts. Buffer width averaging does not require monitoring since the stream buffer is not being planted with additional native vegetation.

BUFFER WIDTH AVERAGING

The proposed project will require averaging the width of the stream buffer in order to allow for lot development and to avoid greater impacts. Per section 21.64.020(B)(6) of the RZC, stream buffer width averaging may be approved by the Administrator if the following criteria are met:

- The width reductions will not reduce stream or habitat functions, including those of non-fish habitat;
- The width reduction will not degrade the habitat, including habitat for salmonid fisheries;
- The proposal will provide additional habitat protection;
- The total area contained in the stream buffer area after averaging is no less than that which would be contained within the standard stream buffer area; and
- The buffer width is not reduced to less than 25 percent of the standard stream buffer width, or 25 feet, whichever is greater.

The Class IV stream will not be impacted by the buffer reductions due to the small size/quantity of the areas being reduced. The replaced/additional buffer areas will adequately replace those areas being reduced. They are similar in nature and vegetative composition. Since the on-site and adjacent portions of the stream are not fish-bearing, salmonid/fisheries habitat is not an issue.

The total stream buffer area (on the west side of the stream, adjacent to/within the project site) prior to buffer width averaging is 15,298 SF. Following averaging, stream buffer area will total 15,330 SF. This represents a slight increase in overall buffer area.

Furthermore, the size of the buffer area following averaging will be no less than the size of the standard buffer area, and the width of the buffer shall not be reduced more than 25 percent of the standard buffer width (i.e. no less that 27 feet).

Permanent signage and fencing shall be installed along the perimeter of the critical area boundary per RZC 21.64.010(R). In addition, a Native Growth Protection Area (NGPA) tract will be established for the on-site stream and buffer area to provide permanent protection for these resources.

STORMWATER OUTFALL IMPACTS

Two stormwater outfall pipes will be constructed within the project site. One will be placed within a portion of the southern stream buffer. This pipe will originate south of Lot 6 and extend east into the buffer. The second outfall pipe will be located adjacent/parallel to the northern property boundary and will extend east into the stream buffer. Rip-rap dispersion pads will be located at both pipe outlets. These pipes represent temporary impacts; they will be placed below ground and the areas will be returned to their previously existing conditions following installation. The dispersion pads will be planted with willow whips (*Salix* sp.) to aid in stormwater dispersion and help reduce the velocity of stormwater as it exits the pipe. The northern rip-rap pad (64 SF) will be planted with 16 willow whips while the southern pad (25 SF) will be planted with 7 willow whips. Whips will be planted two feet on-center (OC).

TEMPORARY GRADING IMPACTS

Approximately 220 SF of stream buffer will be temporarily impacted by grading activities. The impact area will be located in the northern portion of the stream buffer, just east of Lot 2. Grading this area will avoid the need for additional rockery walls and, therefore, permanent impacts. The impact area will be restored with two (2) big leaf maple trees (*Acer macrophyllum*) and four (4) Indian plum shrubs (*Oemleria cerasiformis*). The trees shall be planted 10 feet on-center and the shrubs will be planted 6 feet on-center.

USE OF THIS REPORT

This Critical Area Study is supplied to Tom Ellsworth and Quadrant Homes as a means of determining on-site critical area conditions as required by the City of Redmond. This report is based largely on readily observable conditions and, to a lesser extent, on readily ascertainable conditions. No attempt has been made to determine hidden or concealed conditions.

The laws applicable to critical areas are subject to varying interpretations and may be changed at any time by the courts or legislative bodies. This report is intended to provide information deemed relevant in the applicant's attempt to comply with the laws now in effect.

This delineation and report conforms to the standard of care employed by wetland ecologists. No other representation or warranty is made concerning the work or this report and any implied representation or warranty is disclaimed.

Wetland Resources, Inc.

Jim Rothwell
Senior Ecologist, PWS

REFERENCES

City of Redmond, WA. 2011. Redmond Zoning Code.

Cowardin, L.M., V. Carter, F.C. Golet and E.T. Laroe. 1979. Classification of Wetlands and Deep Water Habitats of the United States. U.S. Fish and Wildlife Service. FWS/OBS 79/31.

Environmental Laboratory. 1987. Corps of Engineers Wetland Delineation Manual. Technical Report Y-87-1. Environmental Laboratory, Department of the Army, Corps Waterways Experiment Station, Vicksburg, MS.

KCGIS Center. 2012. King County iMAP: Interactive Mapping Tool. http://www.kingcounty.gov/operations/GIS/Maps/iMAP.aspx. Accessed October 2014.

Lichvar, R.W. 2013. The National Wetland Plant List: 2013 wetland ratings. Phytoneuron 2013-49: 1–241. Published July 17, 2013. ISSN 2153 733X

Munsell Color. 2012. Munsell Soil Color Book. Munsell Color, Grand Rapids, MI.

StreamNet. 2013. StreamNet Mapper. http://www.streamnet.org/mapping_apps.cfm. Accessed October 2014.

U.S. Army Corps of Engineers (Corps). 2010. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0). U.S. Army Engineer Research and Development Center Environmental Laboratory. Vicksburg, MS. Publication # ERDC/EL TR-10-3.

U.S. Fish and Wildlife Service. National Wetland Inventory (NWI). Wetlands Mapper. http://www.fws.gov/wetlands/. Accessed October 2014.

USDA-NRCS. Web Soil Survey. http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm Accessed October 2014.

Washington State Department of Fish and Wildlife (WDFW). 2013. Priority Habitats and Species: PHS on the Web. http://wdfw.wa.gov/mapping/phs/. Accessed October 2014.

Washington State Department of Fish and Wildlife (WDFW). 2011. SalmonScape. http://wdfw.wa.gov/mapping/salmonscape/index.html. Accessed October 2014.

Appendix A

Field Data Summary Sheet (October 2011)

Field Data Sheet
Ellsworth 134th Ave - WRI # 11122
Investigation Date: 10.20.2011

Pit	Depth	Texture	Color	Moisture	Species	%	Status	Strata
S1	0-18"	Gravelly Sandy Loam	10YR 3/2	moist	*Acer macrophyllum*	80	FacU	tree
Upland					*Oemleria cerasiformis*	30	FacU	Shrub
					Polystichum munitum	20	FacU	Herb
					Tolmiea menziesii	50	Fac	Herb
					Erodium cicutarium	20	FacU	Herb
					Rubus ursinus	10	FacU	Woody Vine
					Urtica dioica	10	Fac+	Herb
Conclusion: Upland - Parameters for hydrophytic vegetation, hydric soils, and wetland hydrology are not met.								
S2	0-18"	Gravelly Sandy Loam	10YR 4/4	dry	*Acer macrophyllum*	80	FacU	Tree
Upland					*Oemleria cerasiformis*	20	FacU	Shrub
					Rubus ameniacus	10	FacU	Shrub
					Ranunculus repens	30	FacW	Herb
					Erodium cicutarium	20	FacU	Herb
					Polystichum munitum	10	FacU	Herb
Conclusion: Upland - Parameters for hydrophytic vegetation, hydric soils, and wetland hydrology are not met.								
S3	0-5"	Silt Loam	10YR 3/2	moist	sapling *Acer macrophyllum*	30	FacU	Tree
Upland	5-18"	Gravelly Sandy Loam	10YR 3/2 (4/4 mixed)	dry	*Rubus ameniacus*	20	FacU	Shrub
					Ranunculus repens	50	FacW	Herb
Area appears recently cleared or abandoned pasture - soils somewhat disturbed					*Agrostis tenuis*	30	Fac	Herb
					Dactylis glomerata	10	FacU	Herb
					Phalaris arundinacea	10	FacW	Herb
Conclusion: Upland - Parameters for hydrophytic vegetation, hydric soils, and wetland hydrology are not met.								
S4	0-18"	Gravelly Sandy Loam	10YR 3/2	dry	*Rubus ameniacus*	60	FacU	Shrub
Upland			10YR 4/4		*Ranunculus repens*	70	FacW	Herb
			mixed		*Phalaris arundinacea*	20	FacW	Herb
			disturbed soils					
Conclusion: Upland - Parameters for hydrophytic vegetation, hydric soils, and wetland hydrology are not met.								

Appendix B

City of Redmond Stream Summary Sheet

CityofRedmond
WASHINGTON

STREAM SUMMARY SHEET

Stream Summary			Buffer Summary			Riparian Corridor Summary		
Label[1]	Type[2]	Linear Feet[3]	Required[4]	Proposed[5]	Averaging[6]	Disturbed Area[7]	Filled Area[8]	Mitigation Area[9]
A	IV	124.2 feet	36 feet	27 feet	Prior: 15,298 SF	89 SF (rip-rap)	1,183 SF	1,215 SF
					After: 15,330 SF	220 SF (grading)		(throughout buffer)

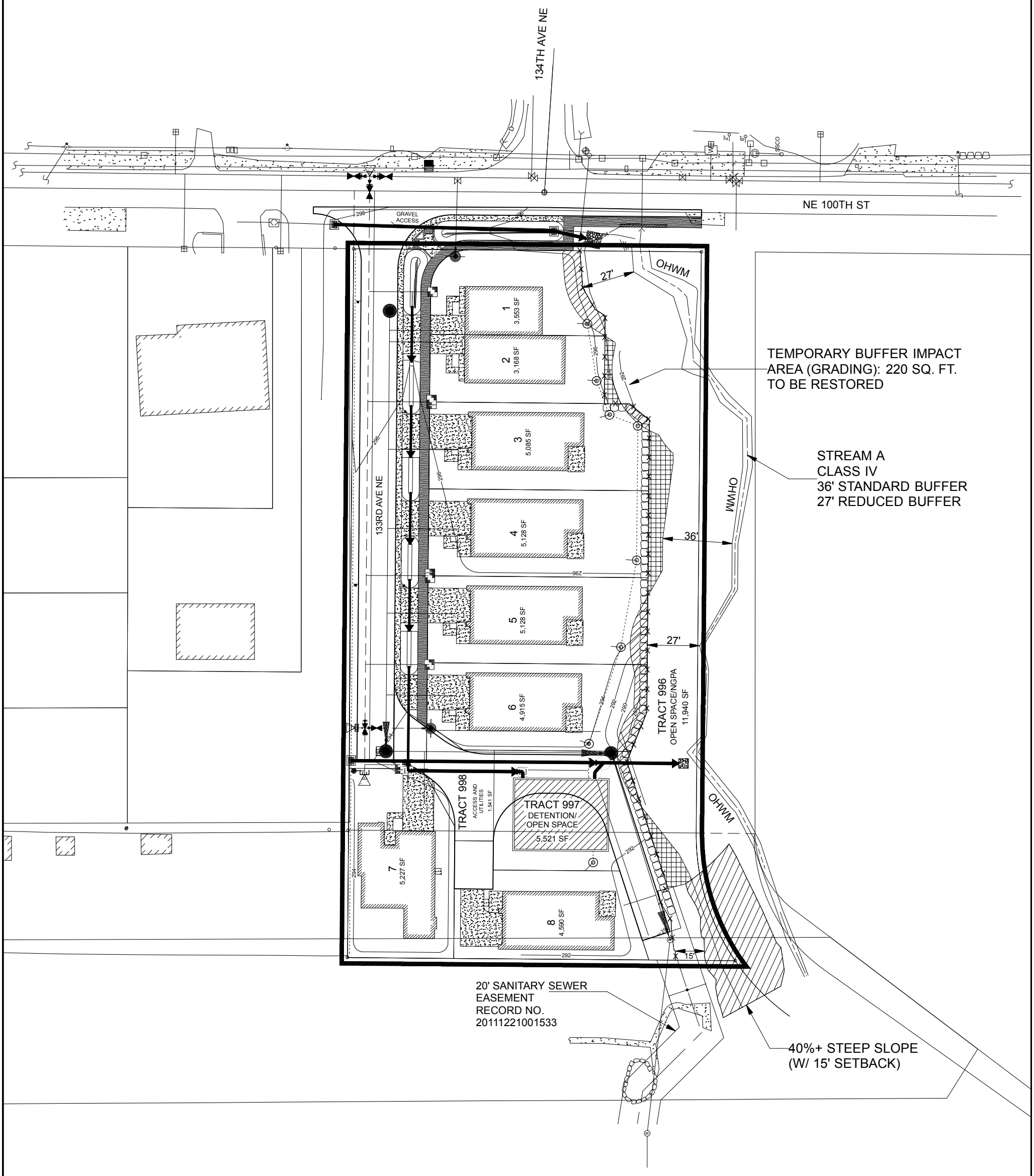
[1] Stream A, B, C, etc.
[2] Stream type per City stream classification system.
[3] Length of stream on the property.
[4] Required buffer width in feet per RCDG.
[5] Proposed buffer width in feet.
[6] Note if buffer averaging is used. If so, identify minimum and maximum buffer widths in feet as well as area in square feet contained within the buffer prior to and after averaging.
[7] Area of buffer that is disturbed in square feet.
[8] Area of buffer to be filled in square feet, such as for a road crossing.
[9] Location and size in square feet of riparian corridor mitigation.

Appendix C

Critical Areas Map

CRITICAL AREAS MAP
HEATHERS RIDGE SOUTH

PORTION OF SECTION 03, TOWNSHIP 25N, RANGE 05E, W.M.



Scale 1" = 50'

0 25 50 75 100

LEGEND

- STREAM
- BUFFER REDUCTION (1,183 SF)
- BUFFER ADDITION (1,215 SF)
- STEEP SLOPE
- x——x FENCE/NGPA SIGN BNDRY

Wetland Resources, Inc.
Delineation / Mitigation / Restoration / Habitat Creation / Permit Assistance
9505 19th Avenue S.E. Suite 106 Everett,Washington 98208
Phone: (425) 337-3174
Fax: (425) 337-3045
Email: mailbox@wetlandresources .com

CRITICAL AREAS MAP
HEATHERS RIDGE SOUTH

The Quadrant Corp.
14725 SE 36th Street
Suite 200
Bellevue, WA 98006

Sheet 1/1
WRI Job #15023
Drawn by: JR
Date: 2\20\2015