1.0 INTRODUCTION

1.1 PURPOSE

Wetland Resources, Inc. (WRI) investigated plant and animal communities on "The Villages" assemblage of properties in January, February, and March of 2007, as well as March and May of 2008. The purpose of this report is to provide baseline biological information about the existing wildlife and vegetation conditions for an Environmental Impact Statement (EIS) on the proposed development of The Villages. This document also examines the potential impacts of the proposed development and each of the alternatives, as well as mitigation measures to reduce the proposed impacts. A separate report assesses the stream and wetland conditions found onsite and the potential impacts of the proposed development, titled "Wetland Assessment for The Villages" prepared by WRI (2008).

1.2 STUDY AREA

The study area is located within the city limits of Black Diamond in southwest King County, Washington and in the King County Urban Growth Area (UGA) (Figure 1). It is comprised of several parcel assemblages (Parcels B, C, D, E, F and BDA) and covers approximately 1,189.9 total acres, including the Guidetti parcel. The Guidetti parcel is approximately 20-acres in size and was not evaluated because it is assumed to be entirely wetland and/or buffer. This assemblage is further located within portions of Sections 11, 15, 22, 23 and 27, Township 21N, Range 6E, W.M (Figure 2).

The study area consists of parcel assemblages identified as the North Area (Parcel B), and the Main Property (Parcels C, D, E, F, BDA). The North Area (Parcel B - 1 parcel, 81.53 acres) is located at the northern edge of the Black Diamond city limits, west of the intersection of Summit Drive and SR 169 (3rd Ave). Parcel C (2 parcels, 54.62 acres) is located at the western edge of the city limits, south of Lake Sawyer, west of the intersection of Roberts Drive, Lake Sawyer Road and SE Auburn-Black Diamond Road. Parcel D (11 parcels, 226 acres) is located at the western edge of the city limits, southwest of the intersection of Roberts Drive, Lake Sawyer Road and SE Auburn-Black Diamond Road and Parcel C. Parcel E (1 parcel, 151 acres) is located in the southwest portion of the city limits, southeast of the intersection of Roberts Drive, Lake Sawyer Road and SE Auburn-Black Diamond Road and east of Parcel D. Parcel F (12 parcels, 265.99 acres) is located southwest of downtown Black Diamond, north of SE Green Valley Road. BDA (20 parcels, 395.74 acres) is located in the southwest edge of the city limits, north of the intersection of SE Green Valley Road and 240th Avenue SE.

Approximately 90-100 years ago, much of the city of Black Diamond was widely used for a coal seam mining operations. The study area and surrounding land was converted to managed forest plantations several decades ago, and continues to be used for timber harvesting today. Land use to the east, toward the center of the City of Black Diamond, is comprised of mixed residential and commercial development. Much of the project area has been recently annexed into to the City of Black Diamond as part of an expanded Urban Growth Area.

Property boundaries and topography were surveyed by Triad Associates and received at our office in 2005 and updated in 2007. Triad Associates also provided historical aerial photographs of the site taken in 1980, 1985, 1990, 2000, and 2005.

2.0 METHODS

2.1 PLANT COMMUNITY INVENTORIES

Plant communities throughout the entire site were investigated, inventoried, and classified through several site visits in conjunction with a review of aerial photographs and existing federal, state, and local mappings. Historic and present land uses on the site and in the surrounding areas were noted by reviewing aerial photographs, forest practice applications, and field observations.

To assess plant communities, WRI personnel investigated the subject properties in January, February, and March of 2007, as well as March and May of 2008. WRI used habitat unit assessment forms, a plotless sampling method (Mueller-Dombois and Ellenburg 1974), and the Braun-Blanquet cover-abundance scale to objectively describe the habitat types, plant species composition, and relative species abundance in the different habitat units. We also noted general forest conditions, as well as special habitat features, such as snags and downed logs. Appendix A lists all plants species detected, including both common and scientific names. Scientific names for plants follow Hitchcock and Cronquist (1976) as updated by Pojar and Mackinnon (1994). Appendix B includes the common names and scientific names of animals detected on the subject properties. Wetland descriptions are detailed in a separate report, titled "Wetland Assessment for The Villages" (Wetland Resources, Inc. 2008).

The classification of plant communities was based on both local and national systems. Classifications were based primarily on the King County Wildlife Habitat Profile (1987), and cross-referenced with Cowardin (1979) and Anderson (1976). The King County system was chosen because of its high applicability to habitats local to the Puget Sound region, which cover the Villages site. WRI also delineated wetlands on the property according to the Washington State Wetlands Identification and Delineation Manual (Washington State Department of Ecology Publication #96-94, March 1997). Refer to the wetland assessment report (WRI 2008) for details regarding the onsite wetlands.

2.2 WILDLIFE INVENTORY

WRI determined wildlife use by conducting a thorough field investigation, as well as reviewing information provided by local agencies and researching published materials. Information about the site was also extrapolated from WRI experience with inventorying similar sites in the region, based on an understanding of species-habitat relationships developed from our research and management experience in western Washington habitats.

Field visits to inventory wildlife and habitat were conducted in January, February, and March of 2007, as well as March and May of 2008. Site investigations consisted of habitat assessment, point counts, and transects to determine actual and potential wildlife usage including the presence of priority wildlife species and habitats. Visual and aural point counts were carried out at locations representative of the different habitats identified on site. Data was collected for 30 minutes at each point count station while standing quietly. East-west and north-south transect surveys were completed in which habitat types were evaluated for signs of past and current wildlife markings and activity, including but not limited to nests, feeding sign, tree markings, scat, and tracks. Special habitat features such as snags and stands of large trees were also noted.

Field observations were also augmented with information about species-habitat preferences, in order to determine the potential occurrence of additional wildlife species. Previous WRI wildlife studies conducted on similar properties were reviewed (WRI 2006, 2007, 2008). Also, data regarding habitat-species relationships was garnered from Maser (1998) and Johnson et al. (1997) for mammals, Peterson (1990) for birds, and Stebbins (1966) for reptiles and amphibians. Additional documents reviewed include Plant and Animal Assessment Draft EIS Snoqualmie Ridge II, Raedeke and Associates (2003).

2.3 Endangered, Threatened, Sensitive, and Other Priority Species

WRI contacted the Washington Natural Heritage Program to inquire into the possibility of any endangered, threatened, or sensitive plant species found on or near the Villages properties. The Washington Natural Heritage Database was searched for records of rare plants and high quality ecosystems (see Appendix C). WRI also reviewed information on plant species of special concern (endangered, threatened, and sensitive) that might be found in the project area, using Pojar and MacKinnon (1994). During field surveys, WRI searched for the presence of these species that could potentially occur on the subject property.

The Washington Department of Fish and Wildlife (WDFW) was also contacted regarding documented information on the presence of Priority Habitats and Species (PHS). WDFW provided PHS maps of the project site and surrounding areas. WRI staff reviewed the WDFW PHS maps as well as information on the WDFW website regarding priority habitats and wildlife species. During field investigations, WRI searched for signs indicating the presence of priority species and habitats.

3.0 EXISTING CONDITIONS

3.1 GENERAL PROPERTY DESCRIPTIONS

As previously mentioned, the Villages project site consists of several parcels: Parcel B (the North Area), and Parcels C, D, E, F and BDA (the Main Property). The following sections describe each of the sections, including general discussions of site conditions and representative areas of vegetation and habitat features. Wetlands are detailed in a separate Wetland and Stream Assessment Draft EIS report (WRI 2008).

Most of the project area has been managed for timber harvests and contains a network of logging roads. Several Forest Practice Applications for thinning and clear-cutting have been approved for these areas. Ongoing timber harvesting activity is expected for these properties. The property also contains portions of Black Diamond Lake and many wetland systems.

3.1.1 THE NORTH AREA - PARCEL B

The North Area (Parcel B, 81.53 acres) is rectangular in shape. It is bordered by residential and commercial properties to the east, cleared land to the south & southwest, and additional forested land to the west & north. The area ranges in elevation from approximately 590 up to 660 feet above sea level, with the lowest portion in the northwest and the highest portion in the eastern edge of the area.

Topography within Parcel B is generally undulating with a northwest aspect slope in the northwest corner of the parcel and a southwest aspect slope in the southwest corner of the parcel. The area contains several gravel logging roads and many mountain bike trails throughout. A depression containing wetlands runs across the middle of the parcel from southeast to northwest. There is also a wetland and railroad grade in the southwest portion of the parcel.

A review of available aerial photographs indicates that the northwest corner of the parcel was clear-cut at some point during the 1990s, while the majority of the parcel appears to have been cut between the late 1970s and early 1980s. Both portions appear to have been replanted with Douglas fir.

A mix of shrubs and young Douglas fir saplings currently cover the northwest corner of Parcel B. The remainder of Parcel B is currently forested with an approximately 25 to 30 year old stand of Douglas fir with a sparse understory. During our field surveys, WRI delineated 12 wetlands on Parcel B.

3.1.2 The Main Property - Parcels C, D, and E

Parcels C, D, & E are located north and south of SE Auburn-Black Diamond Road, west of downtown Black Diamond. Parcel C is 57.8 acres, irregularly-shaped, and bordered by Lake Sawyer Road to the east, SE Auburn Black Diamond Road to the south, residential development to the west, and forested land to the north. Parcel D is 220.9 acres, rectangular, and bordered by SE Auburn Black Diamond Road to the north, a mix of residential & forested lands to the west, and forested lands to the south and east. Parcel E is east of and adjacent to Parcel D. Parcel E is 155.3 acres, irregularly-shaped, and bordered by wetland to the north and east, forested lands to the west and south, and residential property to the southeast. The area ranges in elevation from 520 to 610 feet above sea level with the lowest area in the northwest corner of Parcel D and the highest point along the southern edge of Parcel E.

Topography is generally flat within Parcel C and the northern portion of Parcel D. Topography in Parcel E and the southern portion of Parcel D is undulating with alternating swaths of uplands and lowlands running northwest to southeast.

Parcels C, D, and E are comprised of primarily even-aged douglas-fir-dominated forests of varying ages. According to Plum Creek records, saplings on Parcel C are 15 to 23 years old, trees on the northern half of Parcel D are 23 years old, and trees in the remainder of this area are 29 years old (as of 2008). There is a large scrub-shrub wetland covering the northeast portion of Parcel E, and several wetland systems running southeast to northwest within Parcels D & E. These parcels contain many dirt and gravel logging roads and skidder trails. The parcels can be accessed via SE Auburn Black Diamond Road. WRI identified 15 wetlands within parcels C, D, and E.

3.1.3 The Main Property - Parcel F and BDA

The BDA parcel and Parcel F are located east, south, & west of Black Diamond Lake; north of SE Green Valley Road; and southwest of downtown Black Diamond. The BDA parcel is 395.74 acres, irregularly shaped, and bordered by Black Diamond Lake in the northeast, rural residential properties in the southwest, and forested lands on all other sides. Parcel F is east of and adjacent to the BDA parcel. Parcel F is 265.99 acres and is irregularly shaped. Parcel F is bordered by Black Diamond Lake to the northwest; rural residential properties to the northwest, northeast, and south; forested lands to the north and west; and Enumclaw-Black Diamond Road (Hwy 169) to the east. The area ranges in elevation from approximately 540 to 710 feet above sea level, with the lowest point along the western edge of the BDA parcel and the highest point in the southwestern portion of Parcel F.

Topography throughout this area is variable. Topography in Parcel F and the northern portion of the BDA parcel is undulating with alternating upland and lowland areas running northwest to southeast. The southern portion of the BDA parcel contains a large low area spanning west to east.

Vegetation is also variable within this area. The eastern half of the BDA parcel is primarily covered by a mixed forest of medium-mature age with many wetland areas. This mixed forest contains trees of varying ages with the larger trees estimated at 60 to 80 years old. Most of parcel F and the western portion of the BDA parcel are primarily vegetated with even-aged Douglas fir forests of young to medium age, approximately 30 years old. The easternmost tip of Parcel F is covered by a young forest, approximately 14 years old. Wetland Resources identified 72 wetlands within Parcel and BDA.

3.2 Plant Communities

According to Franklin and Dyrness (1973) the vegetation cover type for the area where the Villages is located is mapped as Western Hemlock Zone. This vegetation zone historically covered much of Western Washington. Western hemlock, Douglas fir, and western red cedar typically dominate old-growth forests in the Puget Sound region. Nearly all of the Western Hemlock Zone, including the Villages site, has been altered by timber harvests. Current conditions throughout the Puget Sound region consist primarily of a mixture of even-aged Douglas fir forests and developed lands.

As mentioned in the above sections, the Villages parcels have been primarily managed for timber harvests. Most of the forested lands onsite are even-aged Douglas fir forests, ranging from ten to thirty-five years in age. Some of these forests have also been thinned.

Based on our site investigations and review of aerial photographs and agency mappings, the habitat onsite can be divided into a variety of habitat units (vegetation cover types) based on the dominating plant communities and upland/wetland conditions. The following sections describe the habitat units currently found on the Villages parcels.

3.2.1 Uplands

The vast majority of the site is covered in upland (non-wetland) habitat types, dominated by even-aged stands of Douglas fir, managed for timber production. Most of these forests are in an early-succession stage of regeneration due to cutting and thinning performed in during the 1970s, 1980s, and 1990s.

Several upland habitat units have been identified on the Villages site, including coniferous forest (Fc), mixed forest (Fm), shrub/sapling stage of forest succession (Fs), and bare areas (B). Figures 3.1, 3.2, and 3.3 show the distributions of these different habitat units, while Table 4 shows the plant species and their relative abundance in each of the habitat units. Descriptions of the habitat units follow.

Coniferous Forest (Fc) (King County Habitat Profile # 24.A)
This habitat unit covers the majority of each of the Villages areas. Because of past timber harvests, these forests are generally dominated by even-aged Douglas fir stands ranging in age from twenty to thirty-five years. These forests also contain additional species of trees scattered throughout, including western hemlock, western red cedar, red alder, and black cottonwood. The majority of the trees have diameters at breast height (dbh) ranging from five to fourteen inches. Sword fern, salmonberry, trailing blackberry, bracken fern, vine maple, Oregon grape, Himalayan blackberry, and red elderberry dominate the understory in this habitat unit. The coniferous forest (Fc) habitat unit is found on Parcels B, D, E, F, and the BDA parcel.

Mixed Forest (Fm) (King County Habitat Profile # 24.C)
Mixed forests dominated by coniferous and deciduous trees cover large portions of the eastern half of the BDA parcel. Trees in this habitat vary in age up to approximately 80 years old. Tree species are a mix of bigleaf maple, red alder, bitter cherry, Douglas fir, western red cedar, and western hemlock. The shrub layer is dominated by vine maple, salal, trailing blackberry, red huckleberry, sword fern, red-osier dogwood, Himalayan blackberry, salmonberry, and red elderberry. This area also contains a significant amount of snags and downed trees.

Shrub/Sapling Stage of Forest Succession (Fs) (King County Habitat Profile # 21.A)
This habitat unit is found in the northwest corner of Parcel B, all of Parcel C, and the eastern corner of Parcel F. This habitat unit is dominated by a combination sapling trees and shrubs. Sapling trees consist primarily of Douglas fir, with smaller amounts of red alder, black cottonwood, bitter cherry, and western red cedar. The shrub/herbaceous layer is dominated by vine maple, scot's broom, salal, Oregon grape, Himalayan blackberry, trailing blackberry, Indian plum, salmonberry, red huckleberry, bracken fern.

3.2.2 Wetlands, Streams, and Ponds

The Villages project site contains 99 wetlands, and portions of Black Diamond Lake. Wetland Resources located, classified, and delineated wetlands as part of a Wetland Assessment; Draft EIS dated July 17, 2008. Parcel B contains 12

wetlands, parcels C, D, & E contain 15 wetlands, and parcels F and BDA contain 72 wetlands. The portions of Black Diamond Lake within the project area are located in the northeastern corner of the BDA parcel and the northwestern corner of Parcel F. Detailed wetland descriptions can be found in our Wetland Assessment dated July 17, 2008.

The aquatic habitats located onsite can be divided into four different habitat units: forested wetlands, shrub wetland, bog, and open water. These habitat units are described below.

Forested Wetland (Fw) (King County Habitat Profile # 15)
Forested wetlands are found in low areas throughout the Villages project site. The forested wetland habitat unit (Fw) is dominated by a canopy of red alder and black cottonwood, with smaller amounts of western hemlock. The shrub layer is dominated by salmonberry, willow, vine maple, Himalayan blackberry and hardhack, while the herb layer is dominated by lady fern, slough sedge, skunk cabbage, and creeping buttercup.

Shrub Wetland (Sw) (King County Habitat Profile # 11)
The shrub wetland habitat unit is found in the northeastern portion of Parcel E, within the North Area. Vegetation in this zone is dominated by hardhack, salmonberry, and yellow skunk cabbage, with smaller amounts of bitter cherry and western hemlock.

Bog *(Bw)* (King County Habitat Profile # 13)
A forested bog wetland habitat is located adjacent to Black Diamond Lake, along its southwestern edge, within the BDA parcel. Vegetation in this zone is dominated by western hemlock and sphagnum moss. The bog is located within the wetland area adjacent to Black Diamond Lake on Parcel BDA (Figure 3.3). This bog is listed in DNR's Washington Natural Heritage Program as a high quality native ecosystem.

Open Water (Pw) (King County Habitat Profile # 9)
Portions of Black Diamond Lake are located in the northeastern corner of the BDA parcel and the northwestern corner of Parcel F. This open water area contains shrubs and emergent vegetation along its edges and is bordered by mixed forests and a bog wetland.

3.2.3 Special Habitat Features

Special habitat features are landscape elements that have unique value to wildlife, including, but not limited to, standing dead or partially dead trees (snags), downed woody debris, and edges between habitat types. The different types of special habitat features are described in the following sections.

Snags
Snags provide many wildlife species with important feeding, roosting, and/or nesting sites. Small snags are located throughout all of the forested habitat units on the Villages site (coniferous forest, mixed forest, and forested wetlands). Most of these snags are relatively small (less than twelve inches dbh) red alders in various stages of decay.

The eastern half of the BDA parcel contains large areas of medium to mature mixed forest that contain the largest-sized and greatest abundance of snags within the Villages site. Many of the snags in this zone show evidence of woodpecker usage, including small holes from downy and hairy woodpeckers, as well as the larger characteristic excavations of pileated woodpeckers, a state-listed candidate species.

Downed Woody Debris
Downed woody debris includes downed logs, large fallen dead limbs, and stumps. Downed woody debris is important to many wildlife species as it provides cover, foraging, and resting areas. Many amphibian species depend upon downed woody debris for survival. On the Villages site, downed woody debris was found throughout the forested habitats. The most significant concentration of woody debris was noted in the medium to mature mixed forest located in the BDA parcel.

Edges
The Villages project site contains a variety of edge habitats. Edge habitats provide birds and mammals with a mix of cover and feeding opportunities. The most prominent edge habitats on the Villages property occur where forests meet shrub wetland, bog, and open water. These types of edges occur in northeastern portion of parcel E, the northeastern corner of the BDA parcel, and the northwestern corner of Parcel F. Less distinct edge habitats occur where forests of different ages meet, between upland and wetland forests, and between different wetland types. These less distinctive edges occur throughout all of the Villages properties.

3.2.4 Endangered, Threatened, and Sensitive Plant Species

There are no Federal or State listed endangered, threatened, or sensitive plant species known to exist on the Villages project site according to the Washington Department of Natural Resources' Natural Heritage Program Database, 2007. Wetland Resources conducted field surveys in January, February, and March of 2007. No Federal or State listed endangered, threatened, or sensitive plants species were found during our field surveys.

A list of endangered, threatened, and sensitive plants for King County are presented in Table 2. Based on habitat preferences in Pojar and MacKinnon (1994) and our field surveys, we believe that it is unlikely that the site contains any of the endangered, threatened, or sensitive plants on the DNR rare plants list for King County, due to the lack of preferred habitats located on site.

3.2.5 High Quality Native Ecosystems

The Washington Natural Heritage Database (WNHP) also maintains records of high quality ecosystems. WNHP records show two high quality ecosystems located adjacent to Black Diamond Lake, on the BDA parcel of the Villages site. These high quality ecosystems include a low elevation riparian wetland and forested sphagnum bog. WNHP indicates that these habitats are in excellent condition and recommends that these significant natural features be considered in site planning. Also, according to King County's Wildlife Habitat Profile (1987), bogs are of limited distribution in King County and are sensitive to changes in surrounding land use. The protection of bogs entails control over adjacent land uses and over the quality of water that enters them (King County, 1987). Detailed management guidelines excerpted from *Community Profile of Sphagnum-dominated Peatlands in Western Washington*, 2001 are provided in Appendix D.

3.3 WILDLIFE

The Villages site and surrounding lands provide habitat for a diversity of wildlife species common to Puget Sound lowland second-growth forests, wetlands, and lake habitats. Most of the habitats found on the Villages properties are relatively common in the region. The sphagnum bog adjacent to Black Diamond Lake is listed with the Washington State Department of Natural Resources' Natural Heritage Database as a high quality wetland ecosystem. Based on a review of available literature such as King County's Wildlife Habitat Profile (1987), as well as our professional experience and expertise, WRI created a species list of wildlife expected to use the habitat types found on the Villages site (Appendix B). This list was also cross-referenced with species lists for similar Puget Sound lowland sites (Raedeke 2003 and WRI 2008). This list denotes species detected on site during our field surveys, as well as species detected on nearby sites of the same habitat types (WRI 2000), and species that are expected to utilize the site. Species likely to be present on the Villages site would also be expected in similar habitats in the Puget Sound lowlands.

The following sections discuss the wildlife species that are likely to use the habitats found on the Villages properties.

3.3.1 Reptiles and Amphibians

Most reptiles and amphibians live shy and secretive lives, spending most of their time hidden within their habitats, only to emerge for specific portions of their life cycle. Because of this, less is known about their distribution and habitat requirements than other types of wildlife species. Special inventorying techniques are often needed to fully inventory their presence.

Amphibians have a complex life cycle where they go through a series of developmental stages including egg, larvae, adult larvae, and metamorphosed larvae. Most amphibians are dependent upon aquatic resources, such as ponds and wetlands, for some portion of their life cycle, most commonly for breeding. Others are able to breed and lay eggs within downed logs and other moist terrestrial habitat features. Amphibians found in our region are carnivorous, feeding on insects and other invertebrates. In turn, many species prey upon amphibians, including mammals, birds, snakes, fish, and other amphibians.

There are twelve species of amphibians known to occur in the Puget Sound lowland habitats that could occur within the Villages project site (Appendix B). During our field surveys, only pacific tree frogs were detected. As mentioned above, amphibians are generally hidden within the landscape for much of the year. Our field surveys were conducted in January, February, and March of 2007. Additional species that are likely to inhabit the Villages properties include: northwestern salamander, long-toed salamander, pacific giant salamander, roughskin newt, ensatina, western redback salamander, western toad, red-legged frog, and bullfrog. Cascade frogs generally occur above 2,600' in elevation and are thus unlikely to inhabit the site. Spotted frogs have nearly disappeared from Washington State. Only three small local populations are known to exist in Washington, none of which are in King County (McAllister 1997). It is therefore unlikely that spotted frogs exist on the Villages property.

There are eight species of reptiles known to occur in the Puget Sound lowlands that could occur within the Villages project site (Appendix B). Though no reptiles were observed during our site visits, seven of these reptile species are likely to occur within the habitats on the project site. These species include the northern alligator lizard, western fence lizard, rubber boa, common garter snake, western terrestrial garter snake, northwestern garter snake, and painted turtle. The western pond turtle has been nearly extirpated from Washington State and is only known to occur in several small, localized populations in Klickitat and Pierce County. It is very unlikely that western pond turtles occur on the Villages properties.

3.3.2 Birds

The Villages property contains a variety of habitats that support a wide range of bird species. Many species live in these habitats year round, while others are only present for winter or summer, or during migration. A total of 160 bird species could potentially use the habitats found on the site. Of these species, 26 bird species were detected on site through field surveys. Field surveys were conducted in January, February, and March of 2007.

A variety of birds associated with aquatic habitats could use the open water and wetland habitats during portions of the year. The American bittern, killdeer, common snipe, and great blue heron are likely to inhabit the onsite wetlands though were not observed during our site visits. Double-crested cormorant, wood duck, mallard, bufflehead, and common merganser were observed on Black Diamond Lake. Additional duck species likely utilize the lake.

Several species of raptors could utilize the habitat units found on the Villages property. Sharp-shinned, cooper's, and red-tailed hawks are common species that are very likely to inhabit the site. Larger species, such as turkey vultures and bald eagles may pass over the site while traveling between feeding areas. No raptor nests were noted on the Villages properties. Most of the site lacks larger trees that raptors prefer for nesting. Bald eagles are a state-listed threatened species and are discussed in detail in section 3.3.4. Owls that may inhabit the site include barred owl, great-horned owl, northern-saw whet owl, northern pygmy owl, western screech owl, and barn owl.

Several upland game bird species are likely to inhabit the project site. California quail was observed on site. In addition to California quail, game bird species expected to inhabit the site are ruffed grouse, band-tailed pigeon, and mourning dove.

Several woodpecker species were detected on the subject property, including the downy woodpecker, northern flicker, and pileated woodpecker, a state listed candidate species. The pileated woodpecker is discussed in further detail in section 3.3.4. Most of the woodpecker activity was observed in the mixed forest habitat unit. Additional species of woodpeckers expected to utilize the site include hairy woodpecker and red-breasted sapsucker.

There are a large number of perching birds, also known as songbirds or passerines, which could inhabit the Villages project site, especially during the summer when many species migrate to the Puget Sound region. Passerines are generally small land birds that utilize a variety of vocalizations including call notes and songs. Passerines are the largest grouping of birds

and contain a diversity of different families that have different feeding strategies. There are 72 species of passerines that may be found within the project site for at least some portion of their life cycle. During our field surveys, we observed 13 passerine species including steller's jay, American crow, raven, black-capped chickadee, red-breasted nuthatch, brown creeper, winter wren, golden-crowned kinglet, American robin, spotted towhee, song sparrow, dark-eyed junco, and red-winged blackbird. These species are common year-round residents in the Puget Sound lowlands. Additional year-round residents expected to utilize the site include the bewick's wren, varied thrush, European starling, and house finch. Summer resident passerine species expected to inhabit the site include the pacific slope flycatcher, common yellowthroat, swainson's thrush, evening grosbeak, western tanager, cedar waxwing, and the American goldfinch.

3.3.3 Mammals

There are 52 species of mammals that could utilize the habitats found on the Villages properties. Many mammals are nocturnal and most are shy and elusive. Species were primarily detected by noting tracks and signs while transecting the properties. 14 mammal species were detected on site.

The Virginia opossum was detected on site. Opossum are the only marsupial (pouched mammal) found in North America. They are omnivorous and well adapted to many habitat types. We expect them to be found in all terrestrial habitats located on the Villages property.

Insectivores are insect eating mammals and include moles and shrews. The townsend's mole was the only insectivore detected on site. We expect the site to contain additional insectivores including the pacific mole and several shrew species.

Bat species require specialized techniques to inventory. Many bat species are migratory and are present in the region only during the warmer portions of the year when insects are more abundant. There is also less known about bat populations, distribution, and abundance in Washington State. Some require caves for roosting while others utilize snags. Several bat species may forage aerially over the Villages site. No bats were detected during our field surveys.

Several carnivore species were detected on site, including raccoon, coyote, and bobcat. Raccoons forage primarily along watercourses and associated forests, as well as residential areas. Raccoons were detected in several of the habitat units found onsite. Numerous coyote tracks and scats were found throughout the project site. Coyotes are very well adapted to Puget Sound habitats and are likely to be abundant on the Villages property and surrounding lands. Bobcat tracks and scat was found within the mixed forest

within the South Area. Bobcats are very secretive and prefer forested habitats. Additional carnivores expected to utilize the site include striped skunk, spotted skunk, ermine, long-tailed weasel, mink, black bear, and mountain lion.

A variety of rodent species were detected including beaver, mountain beaver, Douglas squirrel, eastern gray squirrel, and deer mouse. Beavers were detected in Black Diamond Lake. Mountain beaver are large nocturnal rodents that build tunnel networks on moist hillsides and feed on shrubs. Mountain beaver tunnels were observed within the forest habitats found on Villages site. Douglas squirrels are small squirrels that feed primarily on Douglas fir cones and other seeds. Douglas squirrels are expected to occur throughout the coniferous forests found on site. Eastern gray squirrels are adapted to residential areas and mixed forests and are expected to utilize those areas on site. Deer mice are the most abundant mouse species found in western Washington. They occur in all terrestrial habitat types. Additional rodent species that likely occur within the Villages project site include townsend's chipmunk, vole species, and pacific jumping mouse.

Two rabbit family species were detected on site. Eastern cottontails are an introduced rabbit species that is well adapted to suburban and rural areas. They prefer edge habitats and deciduous/mixed forests. Snowshoe hares are larger and prefer coniferous forests in both lowland and mountainous areas. Both species were found on site. No additional rabbit family species are expected to occur on the Villages project site.

Two species of hoofed mammals were found within the subject property, including black-tailed deer and elk. Sign of black-tailed deer was found in all of the terrestrial habitats on site. Rocky Mountain elk were released at several locations throughout the Puget Sound region during the 1920s and 1930s. These populations have persisted and expanded, and may have interbred with existing populations of Roosevelt elk. Elk sign was also found in all of the terrestrial habitats found on site. The mixed forest habitat unit appeared to contain the highest density of elk usage.

3.3.4 Endangered, Threatened, Sensitive, and Other Priority Species

Priority Habitat and Species (PHS) maps and information for the project site was obtained from the Washington Department of Fish and Wildlife (WDFW). The WDFW defines priority habitat as "a habitat type with unique or significant value to many species" and priority species as "fish and wildlife species requiring protective measures and/or management guidelines to ensure their perpetuation." The maps show locations for current WDFW records of priority habitats and species on the Villages site and in the surrounding areas. Priority habitats shown on the map within the Villages site

indicate several unknown small wetland areas that have not been mapped by WDFW. These wetland areas have been mapped by WRI and detailed descriptions are contained in a separate report titled "Wetland Assessment Draft EIS for the Villages" (WRI 2008).

Endangered, Threatened, and Sensitive Species

The WDFW PHS maps do not indicate any records of endangered, threatened, or sensitive amphibian, reptile, bird, or mammal species on the Villages project site (WDFW 2005).

There is a WDFW record of a bald eagle nesting site adjacent to Sawyer Lake, approximately three quarters of a mile west of Parcel B and half a mile north of Parcel C. Bald eagles are a state listed threatened species. According to the WDFW information, this nesting site is located at the southern end of Sawyer Lake and contains two nests located in a group of two old trees, thirty feet down from the treetops. The record is from 2001 and the site is at least a half-mile away from the Villages project site. The Villages property does contain some large coniferous trees adjacent to Black Diamond Lake that could be utilized for nests in the future by bald eagles. No bald eagles or their nests were sighted on the Villages property during our surveys, though we expect bald eagles would occasionally fly over the site and forage at Black Diamond Lake. Management recommendations include maintaining large trees adjacent to open water.

Spotted frogs are a state listed endangered species. WDFW has no records of spotted frogs on or near the subject property. Historically spotted frogs were more widespread throughout the Puget Sound region. Due to pollution, habitat loss, and the introduction of non-native predatory fish and bullfrogs, spotted frogs have nearly disappeared from Washington State. Only three small local populations are known to exist in Washington, none of which are in King County (McAllister 1997). It is therefore unlikely that spotted frogs exist on the Villages property.

The western pond turtle is a state listed endangered species. Historically, the western pond turtle was widespread in the Puget Sound region. Over-harvesting and the introduction of non-native fish and the bullfrog have contributed to the turtle's decline. The western pond turtle has been nearly extirpated from Washington State and is only known to occur in four small, localized populations in Klickitat and Thurston County (Hallock 2005). It is very unlikely that western pond turtles occur on the Villages properties.

Other Priority Species

The Washington Department of Fish and Wildlife designates additional species as "Priority" for conservation and management beyond those already listed

as Endangered, Threatened, or Sensitive. These additional designations include Candidate, Monitor, and Game species and are discussed in the following sections.

State Candidate

State Candidate species are those fish and wildlife species that will be reviewed by WDFW for possible listing as Endangered, Threatened, or Sensitive according to the process and criteria defined in WAC-232-12-297 (WDFW 1999). There are nine Candidate Species that could occur on the Villages project site and each are discussed below.

Western toads are listed as Candidate Species due to rapid and unexplained declines in their populations in Washington State (Hallock 2005). Western toads can occur in a variety of terrestrial habitats in the Puget Sound region. It is likely that western toads exist on the Villages property. WRI personnel have observed western toads in similar habitats in the Puget Sound region. Management recommendations include creating buffers around ponds and wetlands to maintain breeding habitat.

Cascades frogs are listed as Candidate Species. Historically, cascade frogs were found at elevations from 1200 to 9000 feet. Their populations have been declining significantly in the southern portion of its range in northern California. It is listed as a candidate species because populations may be declining. The cascade frog is currently found at elevations above 2600 feet, most commonly in cold streams at timberline that do not contain salmonids. Because of these habitat preferences, we do not expect the cascade frog to exist within the Villages property.

The northern goshawk is a state-listed Candidate Species as well as a federally listed species of concern because of concerns about its population status. The northern goshawk inhabits mature coniferous forests at mid to high elevations. There are 91 documented breeding territories in the western Cascades. Because the Villages property is a low elevation site with few mature coniferous trees, it is unlikely that the northern goshawk occurs onsite.

The golden eagle is a state listed Candidate Species for potential listing as an endangered species, as its population is declining in the Northwest for unknown reasons. The golden eagle is primarily found in the eastern Cascades, though is sometimes found in mature and old-growth forests on the edge of open areas in western Washington. Though golden eagles may fly over the site as part of migration or foraging, it is unlikely for a golden eagle to inhabit the Villages property, as the site lacks large conifer trees adjacent to open uplands which are preferred for nesting and perching.

The merlin is also a Candidate Species, though recent research shows that no population changes have occurred over the last forty years. Merlins are common in many western Washington habitats. Though no merlins were detected during our field surveys, it is possible for the species to utilize the site. The WDFW provides no management recommendations for merlins.

The Vaux's swift is a listed Candidate Species. The Vaux's swift is associated with old-growth forests where it nests in primarily dead hollow trees and other large snags. The Vaux's swift also nests in older construction brick chimneys. It is unlikely for the Vaux's swift to inhabit the site because the site lacks large hollow trees, large snags, and old chimneys.

Pileated woodpeckers are listed as Candidate Species because they are a "keystone habitat modifier." They create large excavations in trees and snags that provide nesting and roosting habitat to a wide variety of cavity-nesting wildlife species. Pileated woodpecker excavations were detected on site in the mixed forest habitat unit. Management recommendations for pileated woodpeckers include retaining forest in the largest patches available, as well as retaining or creating snags and retaining live trees in the largest size class available (WDFW 2003).

The purple martin is a state listed Candidate Species because of population declines over the last fifty years due to loss of nesting habitat. Purple martins are colonial cavity nesters and require snags with existing cavities or nesting boxes near water. Purple martins are found in the Puget Sound region, primarily close to human habitation where people have installed nesting boxes. It is unlikely that purple martins inhabit the Villages property because the site does not provide adequate nesting opportunities.

Townsend's big-eared bat is also a state listed Candidate Species because population declines have been noted. They can occur in a variety of habitats throughout Washington. These bats require caves, mines, built structures, or large snags for roosting. WRI did not detect any viable bat roosting habitat during our field surveys. Townsend's big-eared bats could forage aerially above the site.

State monitor

State monitor species are species that are monitored for status and distribution. These species are managed by the WDFW, as needed, to prevent them from becoming endangered, threatened, or sensitive. WDFW Monitor Species also include: species that were previously listed as endangered, threatened, or sensitive within the last five years, species that require habitat that is of limited availability during some portion of their life cycle, species that are indicators of environmental quality, and species in which there are unresolved taxonomic questions that may affect their candidacy for listing as endangered, threatened, or sensitive. Species are

often considered a priority only within known limiting habitats (e.g., breeding areas) or within areas that support a relatively high number of individuals (e.g. regular large concentrations) (WDFW 2008). There are five Monitor Species that could occur within the habitats located on the Villages property. Each is discussed below.

The osprey is a state listed Monitor Species. Osprey populations declined during the last century due to the use of DDT. Since the ban of DDT in 1972, osprey populations have increased. There is a WDFW record of an osprey nest adjacent to the Green River, approximately one quarter of a mile south of the South Area of the Villages project site. The record is from 1994 and no further description is provided. Ospreys forage over water and prefer to nest near water in large dead trees or similar structures. No osprey nests were detected on the Villages property during our field surveys. The site does contain large trees adjacent to Black Diamond Lake that could be utilized by osprey.

The great blue heron is a state listed Monitor Species because of their vulnerability during the breeding season, when they aggregate into communal roosts, also known as rookeries. Suitable great blue heron breeding habitat is declining as human populations increase (WDFW 2004). Great blue herons are common and only their nesting/breeding areas (communal roosts/rookeries) are considered priority habitat. No great blue heron roosts/breeding areas were detected on site.

The black-crowned night heron is also a state listed Monitor Species and their breeding sites are considered priority. Black-crowned night herons are known to breed in central Washington along the Columbia River. Though rare, these herons occasionally winter over in the Puget Sound region. They are not known to breed in western Washington and thus no priority breeding habitat would be located on the Villages site.

The western bluebird is listed as a Monitor Species and breeding sites are considered priority habitat. The western bluebird nests in cavities in snags, openings in buildings, and nest boxes. Its population has declined over recent decades due to a reduction in nesting cavities and competition with house sparrows and European starlings for nesting cavities. Though not common, western bluebirds do breed in western Washington, including King County (Seattle Audubon Society, 2006). Western bluebirds may inhabit the Villages project site. No management recommendations have been developed by the WDFW.

The pacific water shrew is included on the WDFW list of Monitor Species. The range and numbers of these animals are thought to have declined due to loss of suitable wetland habitat, especially near urban areas and farmlands. The pacific water shrew is found near aquatic habitats throughout the Puget

Sound region. WDFW does not provide specific management recommendations for the pacific water shrew. Existing wetland protections and buffers will retain significant habitat for the pacific water shrew.

State game

State game species include native and non-native wildlife species of recreational importance, commercial importance, or recognized species used for tribal ceremonial and subsistence purposes, that are vulnerable to habitat loss or degradation. There are ten Game Species that may inhabit the Villages project site for all or part of their life cycle. These species include trumpeter swan, wood duck, common goldeneye, barrow's goldeneye, bufflehead, hooded merganser, band-tailed pigeon, mink, elk, and black-tailed deer. Four of these species, wood duck, bufflehead, black-tailed deer, and elk, were detected during our field surveys. These species are discussed further below.

The trumpeter swan is listed as a Game Species and its priority areas are regular concentrations and regular large concentrations. "Regular concentrations" are areas that are commonly or traditionally used by a group of animals on a seasonal or year-round basis. "Regular large concentrations" are areas that are commonly or traditionally used by significantly large aggregations of animals, relative to what is expected for a particular species or geographic area. Trumpeter swans often migrate and/or winter over in western Washington. They often aggregate in empty farm fields. No trumpeter swans were detected during our field surveys.

The wood duck, common goldeneye, barrow's goldeneye, bufflehead, and hooded merganser are cavity-nesting ducks that are Game Species. The wood duck and bufflehead were detected on site, in Black Diamond Lake. Nesting cavities used for breeding are considered priority for cavity nesting ducks. Black Diamond Lake and the adjacent habitats provide excellent habitat for these species. Several additional lakes are within one mile of the project boundaries. Management recommendations for cavity-nesting ducks include building nesting boxes, maintaining snags near wetlands, and maintaining mast producing trees and shrubs (such as hazelnuts).

The band-tailed pigeon is a state-listed Game Species. Band-tailed pigeons are found in coniferous forest in western Washington. Breeding areas, regular concentrations, and occupied mineral springs are considered priority areas. Hunting seasons have been closed for periods due to population declines. The band-tailed pigeon breeds in close proximity to mineral springs. The Villages property does not provide band-tailed pigeon breeding habitat because it does not contain any mineral spring areas. The site does provide foraging habitat. Management recommendations for band-tailed pigeons include avoiding clear-cutting, and replanting clear-cuts with multiple tree species that produce berries, fruits, and nuts.

Mink are a state-listed fur-bearing Game Species found in and adjacent to aquatic habitats. No mink were detected during our field surveys, though they are likely to utilize Black Diamond Lake, as well as the onsite wetlands and adjacent upland habitats. The WDFW has not developed management recommendations for mink.

Elk are a state-listed Game Species found in the western Cascades. Calving areas, migration corridors, and regular/regular-large concentrations are considered priority areas. Elk sign was found in all of the upland habitats on the Villages property. Elk sign is most abundant on the BDA parcel. No calving areas were detected on site. The elk found on site may be considered a regular concentration. No elk management recommendations for residential developments have been developed by WDFW. WDFW management recommendations for timber harvest activities for elk include keeping road densities at one mile per square mile on winter range, limiting clear-cut sizes to forty acres, retaining at least fifty percent thermal cover, and reducing disturbances during the winter season.

The Green River drainage basin and surrounding areas are known to be a migration corridor that allows elk to move freely between winter and summer ranges. Elk are also known to winter over in the Green River and surrounding areas. Maintaining connections between the existing wetland systems on site could preserve east-west and north-south travel corridors that connect to additional habitat offsite. Protected wetlands and their buffers will benefit elk by preserving significant amounts of elk habitat.

Site development may increase the available food for elk, as they are known to graze on grass and browse on landscape plantings. This may attract more elk to the area, creating the potential for human-elk conflict (complaints about lawn/landscape damage) and road hazards (collisions). Elk would likely feed in residential lawns and parks, as well as damage landscape plantings.

Tall fences can be installed in specific areas to reduce these conflicts. Lower speed limits and elk crossing signs in strategic locations can further reduce the road hazard (vehicle collisions with elk). Protective fencing could also be installed around landscape plantings (such as sapling trees that elk are known to graze), and/or tree/shrub species preferred by elk could be avoided in landscape plantings. Future landowners could be notified and educated about living in elk habitat. Portions of the maintained open space areas could be designated for elk usage.

Black-tailed deer are also listed as a Game Species. Regular and regular-large concentrations as well as migration corridors are considered priority areas. Black-tailed deer were detected throughout the Villages property. Management recommendations for black-tailed deer include maintaining a

mixture of cover and forage areas within a typical home range (one square mile), encouraging the growth of browse species, and managing the open road system at minimum densities (WDFW 1991).

3.4 Wildlife Habitat Networks or Corridors

Wildlife habitat networks or corridors are landscape connections between separate wildlife populations. Oftentimes these corridors connect wildlife populations that have been separated by human activity such as development, roads, or logging. These corridors can take a variety of different forms. Examples include linear patches of forest connecting two larger forests, hedgerows spanning across agricultural land, utility easements, and wetland systems.

Corridors can provide habitat for certain species, movement pathways, extensions of foraging ranges for large wide-ranging species, and escape from predators (Levenson 1981). Corridors may also have disadvantages, such as providing conduits for disease, fire, pests, and exotic species; increasing exposure to predation; and potentially having negative genetic impacts on a population (Noss 1987).

The Villages properties provide large-scale landscape corridors for wide-ranging mammals such as elk, black bear, and cougar. Parcel F and BDA contribute to providing elk with an east-west travel corridor up and down the Green River drainage that connects wintering habitat with higher elevation habitats utilized during the warmer months of the year. All of the parcels connect and extend existing habitats on adjacent lands. On a smaller scale, many of the parcels provide connectivity between on-site wetland systems, utilized by a variety of species such as beaver, river otter, mink, and raccoon. Management recommendations include maintaining east-west and north-south habitat corridors, as well as maintaining connections between wetland systems.

4.0 IMPACTS

BD Partners, LP proposes to develop the Villages project site into a mixture of residential housing at different densities, commercial areas, and open space. Two development alternatives as well as a No Action alternative are under consideration for the purposes of this EIS. The discussion of impacts of the alternatives for Villages is based on our field surveys, review of available literature, and information provided by the project consultants.

Proposal – Mixed Development: The proposal includes developing the site with a mix of residential and commercial areas, as well as a school site. Development would include low, medium, and high-density residential areas, as well as parks, utilities, commercial/office, civic, schools, mixed use areas, and associated roads. Approximately 435.8 acres (37%) would be maintained as natural open space (native vegetation). Additional open space will be provided in the form of parks, ponds, and playfields.

Alternative 1 –Development Alternative: Alternative 1 includes developing the site with a different mix of residential, commercial, civic, and school development. There would be more high-density residential development and less low & medium density residential development. Approximately 475.3 acres (40%) would be maintained as natural open space (native vegetation). Additional open space will be provided in the form of parks, ponds, and playfields.

Alternative 2 – No Action Alternative: The no action alternative assumes that the Villages development is not approved, current land uses continue, and the 49 parcels would be eventually sold over time resulting in gradual development and potential subdivision of created parcels by individual property owners over time.

Detailed descriptions of the proposal and each of the alternatives can be found in the DEIS. The likely impacts to the plant and animal communities of the property are discussed in the following sections.

The proposal and the two development alternatives involve urbanization. Urbanization is a process where rural characteristics of an area are removed and converted to those associated with urban and suburban areas. Urbanization often includes a process of habitat alteration that changes the characteristics of the plant communities and the habitat available for wildlife. The major habitat-related features of urbanization include loss of vegetation, isolation or fragmentation of remaining vegetation patches, replacement of native vegetation with ornamental species, removal of snags and downed logs, an increase in the use of pesticides, insecticides, and herbicides, the presence of “super” predators (domestic dogs and cats), and increased noise and other disturbance factors (Thomas et al. 1974).

4.1 Proposal – Preferred Alternative - Mixed Development

The proposal includes development of residential, commercial/retail/office areas, as well as a school, civic, open space, and roads on the site. The residential portion would include a mixture of low, medium, high-density, and mixed-use development, and would cover approximately 587.2 acres. The 587.2 acres of residential areas would consist of 295.6 acres of low-density development, 205.7 acres of medium-density development, 67.3 acres of high-density development, and 18.6 acres of mixed-use development. Additionally, school grounds would cover approximately 30 acres, commercial/retail/office would cover 68.1 acres, civic areas at 3 acres, and streets at 65.8 acres.

435.8 acres would be maintained as natural open space. Additional open space would be provided in neighborhood parks, trails, and playfields. Natural open space on the site would consist of wetlands, streams, and their buffers, steep slopes, and vegetative screening. Native vegetation would be maintained in the natural open space areas and allowed to continue growing in its natural state. These large open space areas would connect to much larger off-site habitat including the Rock Creek wetlands and Black Diamond Lake. Much of the onsite natural open space would be contiguous, providing good connectivity with off-site habitats.

4.1.1 Impacts to Vegetation

A majority of the native vegetation (habitats) outside of critical areas and buffers would be converted to urban and suburban uses (residential and commercial development). The existing vegetation would be replaced with roads, driveways, buildings, and landscaped non-native plantings. The vegetation to be removed consists primarily of young forests that have been managed for timber production and smaller amounts of other cover types. Areas of native vegetation to be retained include Black Diamond Lake, creeks, wetlands, steep slopes, and their associated buffers.

Post-development, some of the remaining habitats would become edge habitats, occurring in strips of forest between developed areas, while other areas would remain as large contiguous blocks of habitat that connect to additional open space off-site. The largest portions of natural open space would occur around Black Diamond Lake, the Rock Creek wetland, and the large wetland systems found on site. These preserved areas will provide wildlife movement corridors throughout the project area.

The spread of non-native invasive vegetation would likely increase due to the additional edges created between developed areas the patches of retained native vegetation. Some portions of native vegetation may be retained within the proposed parks, though it would be highly fragmented. Virtually all of the

native vegetation would be removed from the commercial and residential areas, and would be replanted with typical lawn grasses and ornamental plants. Additionally, the interspersion of development areas and retained natural open space will expose the retained areas to more sunlight and wind. This may affect the vegetation and influence the species composition towards those that prefer drier, sunnier conditions.

The BDA parcel contains a sphagnum-dominated peatland (bog) associated with Black Diamond Lake. Sphagnum-dominated bogs are unique wetland resources that are considered Category I wetlands. They are also listed as a priority habitat with DNR's Natural Heritiage Program. Management guidelines outlined in an interagency document recommend 200-foot protective buffers.

4.1.2 Impacts to Wildlife

Development of the site under the proposal would have a significant impact on the abundance, distribution, and composition of the wildlife species found on the site. Additionally, indirect impacts to the retained natural open space will likely make it less suitable for some species of wildlife that currently inhabit the site.

Habitat available for native wildlife would be significantly reduced as a result of the site development. This would reduce wildlife populations, alter the species composition throughout the site, and may eliminate some species from the site. Wildlife species favored by urban and suburban environments are habitat generalists, some of which are exotic species.

Bird species favored by urban and suburban environments are generally ground-feeding seed-eaters, whereas canopy-foraging insectivores are not favored by these environments. Overall bird species diversity will likely decrease on developed portions of the site, while populations of specific species may increase (Batten 1972). Planted ornamentals typically support far fewer insect species than native vegetation due to smaller amount of foliage in the upper canopy. The use of insecticides by homeowners is also known to further reduce food resources for insectivorous species (Penland 1984).

Bird species likely to utilize the urbanized environments and increase in population include American robin, American crow, dark-eyed junco, song sparrow, bushtit, rufous hummingbird, European starling, rock dove, house finch and house sparrow. Species that dwell in forested habitats that are able to tolerate partly urbanized environments, such as black-capped chickadee and winter wren will likely continue to utilize the remaining forested open space habitats. Bird species that are most likely to be adversely impacted by the site development include are those that are least tolerant of human disturbance as well as ground and shrub-nesting species.

Examples include flycatchers, vireos, warblers, thrushes, tanagers, and grouse.

Mammal species favored by urban and suburban environments are often small to medium sized habitat generalists. Populations of mammals that are likely to continue or increase post development include eastern gray squirrel, raccoon, shrews, mice, coyote, eastern cottontail, and Virginia opossum. Species likely to be adversely affected include carnivores and larger mammals such as bobcat, mountain lion, and black bear.

Reptile and amphibian species are likely to decrease as a result of site development. Most of these species rely on forest duff, downed logs, and wetlands. Though the wetland will be maintained, many other habitat features will be eliminated. Additionally, native species are likely to be impacted by "super-predators" (domestic dogs and cats), which will increase in abundance after development (Penland 1984).

Habitat fragmentation caused by the development in combination with increased human use of trails will also affect animal movement patterns by causing animals to avoid areas of high human activity. Road crossing will through retained areas of natural open space will also create barriers for small mammals and some amphibians. Species that are sensitive to habitat changes will likely be eliminated from the site. However, many species will continue to use the remaining open natural space.

Current conditions allow wildlife to travel relatively freely between available habitats. Development under the proposal will likely force many species to be funneled through the remaining natural open space areas. The open space areas generally connect to additional habitat offsite and should act as wildlife corridors post development. The open space surrounding Black Diamond Lake and its associated wetlands will likely serve as an important wildlife corridor, allowing movement between habitats located off site.

4.1.3 Impacts to Endangered, Threatened, Sensitive, and Other Priority Species

No endangered, threatened, or sensitive plants species are known or likely to occur onsite. Consequently, the proposal would not impact such species.

Development of the site is also not expected to impact any endangered, threatened, or sensitive animal species. None of these species have been documented on the site and the site lacks potential habitat for those species. Although bald eagles are likely to pass over the site while traveling between foraging areas, it is unlikely that they utilize the site as it lacks large trees preferred for nesting. As mentioned above, the nearest known

bald eagle nest is a mile and half away from the site on the fringe of Lake Sawyer.

The loss of habitat due to site development under the proposal is likely to reduce available habitat for several candidate species. Western toads occur in a variety of terrestrial habitats and are likely to occur on site. The reduction in available habitat may reduce the population of western toads on the site. Western toads breed in wetlands and WDFW management recommendations for western toads are to maintain buffers around ponds and wetlands. Nearly all of the wetland habitats on site will be maintained through natural open space. This will maintain breeding habitat for western toads and will allow for continued population to exist on site, post development.

Reduction in available habitat may also affect pileated woodpeckers, a state-listed candidate species. Pileated woodpecker sign was found on snags within the forested habitats onsite. WDFW management recommendations include retaining forests in the largest patches possible, as well as retaining snags and live trees in the largest size class available. Pileated woodpeckers are likely to continue to utilize the remaining forested open space, though the reduction in habitat is likely to reduce their population over time.

Another state-listed Candidate Species, the merlin is likely to occur on the Villages property. It is unclear whether alterations to the onsite habitats under the proposal will impact merlins. Merlins are common in a variety of western Washington habitats and prey upon passerine bird species. Because populations of some passerine species may increase due to the habitat changes, it is possible that foraging opportunities for merlins may improve. The WDFW does not provide management recommendations for merlins.

Several state listed monitor species likely occur onsite. The great blue heron, a monitor species, is not likely to be affected by the development associated with the proposal. No breeding habitat (rookeries) for great blue herons were found onsite and thus will not be affected. Great blue herons typically forage in wetland areas, which will be maintained as part of the retained natural open space.

Pacific water shrews, another Candidate Species, also inhabit wetlands, which will be retained. The western bluebird, a Candidate Species, may occur onsite, utilizing cavities in trees and snags for nesting. Reductions in forested habitats would reduce the available nesting opportunities for western bluebirds. WDFW does not provide management recommendations for western bluebirds, though the installation of nesting boxes may mitigate for some of the reduced habitat.

Several state-listed Game Species occur onsite and have the potential to be impacted by the development associated with the proposal.

The wood duck, common goldeneye, barrow's goldeneye, bufflehead, and hooded merganser are cavity-nesting ducks that are Game Species. The wood duck and bufflehead were detected on site, in Black Diamond Lake. Nesting cavities used for breeding are considered priority for cavity nesting ducks. Black Diamond Lake and the adjacent habitats provide excellent habitat for these species. Several additional lakes are within one mile of the project boundaries. Management recommendations for cavity-nesting ducks include building nesting boxes, maintaining snags near wetlands, and maintaining mast producing trees and shrubs (such as hazelnuts).

The band-tailed pigeon is a state listed game species. The Villages property does not provide breeding habitat for band-tailed pigeons, though they may utilize the site for foraging. Reductions in forested habitats will reduce foraging opportunities for band-tailed pigeons. WDFW management recommendations include planting a variety of tree species that produce berries, fruits, and nuts.

Mink are a state-listed fur-bearing Game Species. Mink may utilize Black Diamond Lake and wetland habitats found on the Lawson Hills property. Mink are not likely to be affected by the development associated with the proposal because these habitats will be retained.

Elk and black-tailed deer are state-listed Game Species which utilize the Villages property. Reductions in habitat and increased human activity may reduce elk and deer populations on site, though the increase in edge habitat and grassy areas may provide additional foraging opportunities.

Calving areas, migration corridors, and regular/regular-large concentrations are considered priority areas for elk. Elk sign was found in all of the upland habitats on the Villages property. Elk sign is most abundant on the BDA parcel. No calving areas were detected on site. The elk found on site may be considered a regular concentration. No elk management recommendations for residential developments have been developed by WDFW. WDFW management recommendations for timber harvest activities for elk include keeping road densities at one mile per square mile on winter range, limiting clear-cut sizes to forty acres, retaining at least fifty percent thermal cover, and reducing disturbances during the winter season.

The Green River drainage basin and surrounding areas are known to be a migration corridor that allows elk to move freely between winter and summer ranges. Elk are also known to winter over in the Green River and surrounding areas. Maintaining connections between the existing wetland systems on site could preserve east-west and north-south travel corridors that connect to

additional habitat offsite. Protected wetlands and their buffers will benefit elk by preserving significant amounts of elk habitat.

Site development may increase the available food for elk, as they are known to graze on grass and browse on landscape plantings. This may attract more elk to the area, creating the potential for human-elk conflict (complaints about lawn/landscape damage) and road hazards (collisions). Elk would likely feed in residential lawns and parks, as well as damage landscape plantings.

Tall fences can be installed in specific areas to reduce these conflicts. Lower speed limits and elk crossing signs in strategic locations can further reduce the road hazard (vehicle collisions with elk). Protective fencing could also be installed around landscape plantings (such as sapling trees that elk are known to graze), and/or tree/shrub species preferred by elk could be avoided in landscape plantings. Future landowners could be notified and educated about living in elk habitat. Portions of the maintained open space areas could be designated for elk usage.

Black-tailed deer were also detected throughout the Villages property. Regular and regular-large concentrations as well as migration corridors are considered priority areas. Management recommendations for black-tailed deer include maintaining a mixture of cover and forage areas within a typical home range (one square mile), encouraging the growth of browse species, and managing the open road system at minimum densities (WDFW 1991).

4.2 Alternative 1 – Development Alternative

Through Alternative 1, the site would be developed with a different mix of low, medium, and high-density residential areas. Medium and high-density zones would increase while low-density zones would decrease. The overall residential acreage would decrease while the acreage dedicated to natural open space would increase. Also, less area would be developed as commercial/retail/office space and roads.

The total area of residential development under Alternative 1 would be 589.5 acres, split between 283.9 acres of low-density development, 218.6 acres of medium-density development, 68.4 acres of high-density development, and 18.6 acres of mixed-use development. Under Alternative 1 there would be 28.3 acres of commercial/retail/office development, 30 acres set aside for schools, and 63.8 acres of roadway. The total area of natural open space would consist of 475.3 acres. Additional open space would be provided in neighborhood parks, trails, and playfields.

> Impacts to plants and animals for Alternative 1 would be similar to impacts resulting from the proposal. The primary difference between the proposal and Alternative 1, in terms of impacts to plants and

animals, is the difference in acreage retained as open space. Alternative 1 would retain 475.3 acres of natural open space versus 435.8 acres in the proposal. For Alternative 1, this increase in natural open space would reduce the amount of vegetation loss and wildlife habitat loss associated with site development. The additional open space in Alternative 1 provides for larger corridors adjacent to Black Diamond Lake and its associated wetlands. Impacts to wetlands and buffers would remain the same as the proposal. Impacts to endangered, threatened, and sensitive species would also be the same as the proposal.

4.3 Alternative 2 - No Action Alternative

The No Action alternative assumes that development would not occur under this application and that the site would continue to be managed for timber production while over time lots would continue to be sold off to both developers and individual property owners.

Impacts from continued management for timber harvests would include periodic thinning and clearing. Harvested areas would grow back and develop until future harvest or management occurs. Forests outside of critical areas and buffers would be continually harvested for timber over time. Forests within critical areas and their buffers would be allowed to develop into mature forests. Impacts from continued timber harvests would be relatively lower and less-permanent in relation to the proposal or Alternative 1.

4.3.1 Individual Lot Development

Over time, lots would continue to be sold off to developers and/or individual landowners for development, resulting in numerous separate parcels. Subsequent owners may also pursue subdivisions of parcels subject to approval by the City of Black Diamond. Under this alternative, the parcels would be developed individually rather than under an overall coordinated site plan. Streams, wetlands, and their buffers would likely remain intact as required under City codes. Additional retained natural open space cannot be determined, as the amount of clearing would be at the discretion of each individual landowner.

Impacts to plants and animals from individual lot development under the No Action Alternative could be much more significant. There is no requirement for 50% open space retention under the individual lot development scenario.

4.3.2 Impacts to Plant Communities

Significant portions of the existing vegetation are likely to be removed as part the individual lot development scenario. Individual landowners would determine the amounts removed while maintaining critical areas and their buffers. Clearing could range from only that which would be necessary to construct a home and driveway to as much as clearing an entire lot. Most cleared areas are likely to be converted into homes, lawns, and pasture. The difference between the loss of existing vegetation under this Alternative versus the proposal and Alternative 1 is undeterminable as it depends upon the choices of individual landowners. Aside from stream and wetland corridors, it is likely that the remaining natural open space would be highly fragmented under this alternative in comparison to the proposal and Alternative 1, as the retained areas are not likely to be coordinated between separate landowners. Road crossing may also be numerous under this alternative as there would be no coordinated road system. Additionally, under the No Action Alternative, there would be no requirement for 50% open space retention.

4.3.3 Impacts to Wildlife

This alternative will also reduce populations of wildlife on the site, as habitats become converted to residential uses, remaining habitats become fragmented, and human use increases. Species that prefer large blocks of forest would be adversely affected and some may be eliminated from the site. As with the Proposal and Alternative 1, as the site becomes developed, populations of wildlife species preferring urban and suburban habitat may increase. The reduction in wildlife populations resulting from this alternative may be more or less than the other alternatives, depending on whether more or less area of native vegetation is cleared. Less wildlife corridors are likely to be maintained under this alternative, as it is unlikely that individual landowners would coordinate efforts to maintain open space.

5.0 MITIGATION

The State Environmental Policy Act (SEPA) (WAC 197-11-768; cf. Cooper 1987) has defined mitigation and in order of desirability, may include:

1. ***Avoidance*** – avoiding impacts by not taking action or parts of an action;

2. ***Minimization*** – minimizing impacts by limiting the degree or magnitude of the action and its implementation;

3. ***Compensation*** – which may involve:

    a. Repairing, rehabilitating, or restoring the affected environment;

    b. Replacing or creating substitute resources or environments;

    c. Mitigation banking

The Proposed Action incorporates several mitigating measures that would avoid or reduce impacts to wildlife and vegetation on-site.

5.1 Required and Proposed Mitigation

Under City of Black Diamond Sensitive Area Ordinances, site development would include avoiding and minimizing impacts to sensitive areas, including wetlands, streams, steep slopes, and their designated buffers. These areas provide a framework for maintaining native vegetation and providing wildlife habitat. Except for small amounts of wetland fill in small isolated wetlands and where roads and utilities cross stream and wetland systems, all of these sensitive areas will be retained. Furthermore, the site plan includes protecting significantly more natural open space than what is required under City codes.

5.2 Additional Recommended Mitigation Measures

Several of the priority species that could inhabit the site, or are known to inhabit the site, are cavity-nesters. Reductions in habitat resulting from development will reduce nesting opportunities. As mitigation, nesting boxes of various sizes could be installed, preferably in forested buffers adjacent to wetland areas.

Elk are a state-listed Game Species that are utilizing the Villages site.

The Green River drainage basin and surrounding areas are known to be a migration corridor that allows elk to move freely between winter and summer ranges. Elk are also known to winter over in the Green River and surrounding areas. Maintaining connections between the existing wetland systems on site could preserve east-west and north-south travel corridors that connect to additional habitat offsite. Protected wetlands and their buffers will benefit elk by preserving significant amounts of elk habitat.

Site development may increase the available food for elk, as they are known to graze on grass and browse on landscape plantings. This may attract more elk to the area, creating the potential for human-elk conflict (complaints about lawn/landscape damage) and road hazards (collisions). Elk would likely feed in residential lawns and parks, as well as damage landscape plantings.

Tall fences can be installed in specific areas to reduce these conflicts. Lower speed limits and elk crossing signs in strategic locations can further reduce the road hazard (vehicle collisions with elk). Protective fencing could also be installed around landscape plantings (such as sapling trees that elk are known to graze), and/or tree/shrub species preferred by elk could be avoided in landscape plantings. Future landowners could be notified and educated about living in elk habitat. Portions of the maintained open space areas could be designated for elk usage.

Educational and/or interpretive materials that provide information and foster an appreciation of the natural features of the site's open space could be developed and made available through public agencies and/or local conservation groups. These types of materials improve public awareness of natural resources and help reduce unnecessary disturbance or destruction of habitat and native vegetation.

6.0 SIGNIFICANT UNAVOIDABLE ADVERSE IMPACTS

The following is a summarization of the Impacts analysis provided in Section 4.0 in this report.

Impacts under the Proposal and Alternative 1:

A significant portion of mixed forest, sapling forest, coniferous forest, and to a lesser extent, forested wetland habitats will be replaced with a mix of residential, commercial, roads, parks, and a school. Retained areas of natural open space would remain contiguous with offsite habitats, though remaining habitat would be significantly more fragmented;

Significant decreases in the populations of wildlife currently inhabiting the site and a shift in species composition to those that are more tolerant of urban/suburban areas; species that prefer larger blocks of habitat may be eliminated from the site; animals displaced to habitats offsite may not survive; and

Remaining natural open space will experience a significant increase in human disturbances including noise, light, introduction of invasive plants, and an increase in domestic dogs and cats.

Impacts under Alternative 2:

Impacts to plants and animals from individual lot development under the No Action Alternative could be much more significant than the Proposal or Alternative 1. Lots would be sold off individually under this scenario. There is no requirement for 50% open space retention under the individual lot development scenario.

Significant portions of the existing vegetation are likely to be removed as part of the individual lot development scenario. Aside from stream and wetland corridors, it is likely that the remaining natural open space would be highly fragmented under this alternative in comparison to the proposal and 4.3.3.

This alternative will also reduce populations of wildlife on the site, as habitats become converted to residential uses, remaining habitats become fragmented, and human use increases. Fewer wildlife corridors are likely to be maintained under this alternative, as it is unlikely that individual landowners would coordinate efforts to maintain open space.

7.0 LIMITATIONS

This Plants and Animals Assessment, Draft Environmental Impact Statement has been prepared for and supplied to BD Villages Partners, LP as a means of assessing the on site plant and animal conditions and the potential impacts to them associated with site development. 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 plants, animals, and habitats 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.

The work for this report has conformed to the standard of care employed by wildlife biologists. No other representation or warranty is made concerning the work or this report and any implied representation or warranty is disclaimed.

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FIGURES AND TABLES