Chehalis Basin Mitigation Bank Prospectus

Chehalis, WA

Prepared for

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Introduction

Womble Carlyle Ecology Innovations, LLC (WCEI) proposes the establishment of the Chehalis Basin Umbrella Mitigation Bank (proposed bank). The proposed bank includes two sites: the National Avenue site and the Hanaford Valley site. The two sites are located within WRIA 23, the Upper Chehalis Basin. WCEI proposes the bank to provide compensatory mitigation for unavoidable impacts to wetlands and aquatic habitats that could occur in the proposed bank's service area. WCEI may propose expanding the bank by adding additional sites or enlarging either of the proposed sites; bank expansion would be proposed during the banking development process as approved by the Interagency Review Team (IRT) (Figure 1, Vicinity Map).

The National Avenue site is comprised of six parcels, totaling 97.14 acres, owned by the City of Chehalis, Lewis County, and private landowners. This site includes a channelized segment of Coal Creek, segments of Salzer Creek and is nearly entirely wetland. WCEI has acquired options to purchase exclusive development rights for four of the properties identified as the National Avenue Site. Additionally, Lewis County has agreed to include parcel 005605083008 in the project. Wetland mitigation is an allowed land use for all the properties.

The Hanaford Valley site is comprised of 11 parcels owned by TransAlta Centralia Mining, LLC (TCM), totaling 197.88 acres. The parcels are all adjacent to two existing compensatory mitigation sites along Big Hanaford Creek. The two mitigation projects were developed by TCM and constructed in 2007-2008. The Hanaford Valley site includes four units that surround the existing mitigation sites, functionally enlarging the rehabilitated wetland floodplain area. WCEI is in negotiations with TCM to acquire exclusive development rights for all TCM properties. TCM has consented to the inclusion of the Hanaford Valley site in this prospectus.

The two sites proposed as the Chehalis Basin Mitigation Bank total approximately 295.02 acres; information regarding properties that compose the mitigation bank is summarized below in Table 1. Figures showing land use zoning of the National Avenue and Hanaford Valley sites are provided as Appendix A.

Table 1. Property Information Summary

Property Owner	Parcel Number	Zoning	Mitigation Permitted Land Use?
National Ave site			
City of Chehalis	005605083005	Wetland	Yes
K&K Adventures LLC	005605083006	Heavy Industrial	Yes
Lewis County	005605083008	Gen. Commercial	Yes
K&K Adventures LLC	005605083007	Gen. Commercial	Yes
K&K Adventures LLC	005605085001	Gen. Commercial	Yes
K&K Adventures LLC	005606003006	Gen. Commercial	Yes
Hanaford Valley site			
TCM	125234203000	Rural residential	Yes[1]
TCM	12523440000	Rural residential	Yes[1]
TCM	023428000000	Forestry	Yes[1]
TCM	023434002010	Rural residential	Yes[1]
TCM	023434002014	Rural residential	Yes[1]
TCM	023434002011	Rural residential	Yes[1]
TCM	023434002007	Rural residential	Yes[1]
TCM	023432003003	Rural residential	Yes[1]
TCM	023439001001	Rural residential	Yes[1]
TCM	023438001000	Rural residential	Yes[1]
TCM	002431000000	Forestry	Yes[1]
TCM	023436000000	Forestry	Yes[1]

Qualification of Sponsor and Design Team

WCEI is a company with old roots stretching back to the genesis of mitigation banking. Mr. Bob Sokolove, the president of WCEI, has been at the forefront of mitigation banking since its inception and has successfully sponsored banks across the United States. He was a founding member and held the office of treasurer for the National Mitigation Banking Association, has testified before Congress and advised regulators on the creation of wetland mitigation banking regulations, and wrote the Wetlands Mitigation Banking Bill passed by the Maryland State Legislature. WCEI has the expertise, the experience, and the commitment to create a quality mitigation bank in Chehalis, Washington.

[1] Mitigation was an allowable land use in 2008, WCEI is verifying that it is still allowable.

The design team is led by Mr. Brent Haddaway of Cascade Environmental Group (CEG). Mr. Haddaway has worked in wetland mitigation in Washington State for over 15 years and has worked on two other mitigation bank projects in the Chehalis Basin (North Fork Newaukum Mitigation Bank and Dillenbaugh Creek Mitigation Bank) as well as two other large mitigation projects for TransAlta Centralia Mine in the Hanaford Creek Sub-basin. Hydrologic analysis will be provided by Mr. Ed Salmien of Watershed Professionals Network. Mr. Salmien has been a professional hydrologist in the Pacific Northwest for over 20 years and has extensive experience in stream flow modeling and restoration design. The design team will also have the support of Williamsburg Environmental Group (WEG), the parent company to CEG. WEG has developed mitigation and restoration projects throughout the eastern United States and will provide GIS analysis and engineering support as needed.

Proposed Service Area and Needs Analysis

The proposed service area for the Chehalis Basin Mitigation Bank is Water Resource Inventory Area (WRIA) 23, the Upper Chehalis Basin (Figure 2). The proposed mitigation bank service area includes large expanses of wetland areas, including developable areas along the Interstate 5 corridor and surrounding population centers. Presently, a single-user bank is located in WRIA 23, which is owned and operated by the Washington Department of Transportation (WSDOT). WSDOT has numerous projects in its 20 year plan that will likely require wetland mitigation, making it unlikely that the existing bank will be able to meet all future mitigation demands in the basin. Potential credit users of the Chehalis Basin Mitigation Bank include the Cities of Chehalis and Centralia, Lewis County, real estate developers, the Burlington Northern Santa Fe (BNSF) railroad, public works departments of other cities within the service area, the Army Corps of Engineers, and the Centralia Coal Mine.

Bank Stewardship

The proposed bank will be protected under a conservation easement or other protection mechanism approved by the IRT. WCEI will identify an appropriate land steward and provide an adequate endowment to assure the site's perpetual protection; WCEI will identify a land steward during the MBI development process in close coordination with the IRT.

National Avenue Site

The National Avenue site is located at T14N, R2W, Section 20. It is situated east of the Burlington Northern Santa Fe Railroad, west of National Avenue, and south of the Lewis County Fairgrounds in the City of Chehalis. The site is located at the boundary of the both the Coal and Salzer Creek sub-basins, within WRIA 23, the Upper Chehalis Watershed.

The proposed 97.14-acre site is located in an urban setting within the City of Chehalis, includes the immediate floodplains of Coal and Salzer Creeks, and is approximately 1 mile east of the Chehalis River (Figure 3). The National Avenue site is comprised of six parcels owned by the City of Chehalis and private landowners. Five parcels occur as 86.26 contiguous acres (West Unit) and an additional 10.88 acre parcel across National Avenue (East Unit) are proposed as mitigation bank (Figure 4). The cities of Chehalis and Centralia have experienced multiple significant flooding events resulting in property damage and the temporary closing of Interstate 5 as recently as January 2009; the cities experienced 13 significant damaging flood events since the 1920's (City of Chehalis 2010). Lewis County currently operates a flood control levee on the north side of Salzer Creek, outside of the proposed bank site.

Site Description

The National Avenue site includes approximately 97.14 acres of wetland, 3,000 linear feet of Coal Creek channel, approximately 1,300 linear feet of ditches (more ditches may be present but not yet identified), and approximately 500 linear feet of Salzer Creek in the East Unit and an additional 1,000 feet of the south bank of Salzer Creek in the West Unit. A mitigation project was previously implemented by applicants other than WCEI along Coal Creek within the National Avenue site (Figure 5). This mitigation site will be redesigned and incorporated into the proposed bank construction. The process for accounting for the previous mitigation effort will be determined during the mitigation bank instrument development as it relates to credits owed by the previous party attempting mitigation on the site.

The site is undeveloped land that has been degraded by ditching and channel straightening; it was last used as a hay field and seasonal pasture in the late 1990's. Coal Creek and Salzer Creek occur within the site as straightened and deepened channels. Coal Creek flows down the center of the West Unit, disconnected from its floodplain due to the channel depth. The channel depth ranges from approximately 4-8 feet in areas not affected by beaver ponding and tends to become deeper as Coal Creek reaches its confluence with Salzer Creek at the north end of the site. Two large ditches have been identified on the site (additional ditches may be present but obscured by the dense reed canarygrass (*Phalaris arundinaceae*)) routing water to Coal Creek. A large road-side ditch that intercepts runoff from National Avenue and routes water north into Salzer Creek also occurs along the eastern edge of the site in the National Avenue right of way (Figures 5). Salzer Creek flows through the East Unit, crosses under a National Avenue bridge and then flows across the northern boundary of the West Unit. The segment of Salzer Creek within the East Unit has an established riparian community, but the vegetation within the floodplain throughout most of the property is primarily comprised of weedy species. The segment of Salzer Creek within the West Unit is channelized, incised and its banks are mostly vegetated by reed canarygrass.

Based on vegetation, landscape position, and professional opinions of consultants that have performed studies on the property in the past (Keeney 2010 pers comm.), the site is presumed to be nearly entirely wetland with modified hydrogeomorphic (HGM) conditions. The on-site wetlands appear to have been historically riverine and likely experienced regular flooding from overbank events during winter and spring months corresponding with precipitation events. In its current condition, overbank flood frequency and residence time has been reduced and is now likely limited to winter months due to the deepened creek channels and roadside ditching. The site also includes four beaver ponds (typically considered depressional HGM class) that are confined to the straightened channel of Coal Creek. A formal delineation will be performed to identify upland areas present within the site.

The site is predominantly palustrine emergent wetland, but does include patches of palustrine scrub shrub communities and has supported forested communities in the past. Most of the site is

dominated by reed canarygrass with interspersed patches of Douglas spirea (*Spiraea douglasii*), meadow foxtail (*Alopecurus pratensis*), and slough sedge (*Carex obnupta*). The vegetation occurs in fairly distinct communities which will be treated as separate management units. Approximately 1/3 of the site was formerly covered by a mature stand of Oregon ash (*Fraxinus latifolia*) occurring mostly along the Coal Creek channel in the southern half of the site. Most trees have died or are showing significant signs of stress, likely due to a blocked culvert und the BNSF railroad, impounding water on the site and the subsequent increase of the duration of soil saturation. WCEI is working with the City of Chehalis to repair the blocked culvert. No human-built water control structures are known to occur within the National Avenue site.

The entire site is underlain by reed silty clay loam, a hydric soil. This soil is common in floodplain areas in the Chehalis basin and has slow permeability and is poorly drained. A soils map is provided as Appendix B.

Site Selection

The proposed mitigation bank site was selected because it provides opportunities for substantial functional lift through stream restoration and wetland rehabilitation and enhancement while occurring in a landscape position that will allow the site to be self sustaining. The proposed mitigation bank site is located at the confluence of Coal and Salzer Creeks and includes segments of both creeks that are degraded from channel straightening and ditching. The site's degraded condition provides opportunities to improve or restore a range of functions. Once constructed, the National Avenue site will be able to provide functions that will address watershed needs by lowering stream temperature, providing nutrient uptake, and improving baseflow support, which address watershed goals (Chehalis Basin Partnership 2010). The site's contributing basin is primarily Coal Creek (but is influenced by flows in Salzer Creek), which is relatively undeveloped and appears to have stable hydrologic conditions based on land use and initial field reconnaissance. The Coal Creek Basin is wetland-dominated floodplain with few road crossings and the Coal Creek channel is not incised in the upper basin where observable from public roads. The contributing basin land-use includes low-density residential areas and timber lands, with relatively low amounts of impervious surface, indicating hydrologic conditions in the basin are generally stable.

The National Avenue site is located in an urban setting, in a wetland-dominated area with relatively high property values. The site occurs near the town centers of Chehalis and Centralia and the Interstate 5 corridor and associated development desirability, and would therefore be in a similar landscape setting to likely bank users. In addition to being located in a similar landscape position as potential impact sites, the site is also located in a wetland dominated area, making avoidance of wetlands difficult.

Existing Functions

Existing functions are degraded due to ditching, creek straightening, and the introduction or colonization of invasive vegetation. The existing functions will be evaluated and compared to estimated level of functions during the MBI development process, with input about assessment protocol from the IRT.

Project Goals and Objectives for the National Avenue Site

The goal of the Chehalis Basin Mitigation Bank at the National Avenue site is to restore, rehabilitate, and enhance wetland functions to compensate for future impacts to wetlands or other aquatic resources. The site has been selected because it has the potential to provide ecological functional lift in an urban setting that has been subject to flooding and water quality concerns.

The goals of the proposed mitigation bank at the National Avenue site are to:

- Improve hydrologic , water quality, and habitat functions in the mitigation bank site; and
- Provide a self-sustaining wetland and stream complex that will not require maintenance.

The objectives of the mitigation bank at the National Avenue site are to:

- Restore typical creek and floodplain conditions by re-aligning and re-configuring the on-site, channelized section of Coal Creek;
- Improve functionality of Salzer and Coal Creeks, and their wetland floodplain by filling or modifying existing ditches, allowing for improved water treatment and baseflow support functions;

- Improve functionality of Salzer Creek by restoring flood-plain topography in the parcel located east of National Avenue; and
- Enhance native plant communities within the site, and provide conditions on site that will support self-sustaining, native-dominated vegetation communities.

Conceptual Site Design

Site design will be developed in consultation with the IRT after sufficient hydrologic analysis and a review of design resource materials. Figure 6 shows the design components; creek restoration will be located based on hydrologic analysis and protection of existing native plant communities. Living trees will be avoided in channel relocations; impacted snags will be relocated within the site to improve habitat. Native vegetation will be restored to areas dominated by reed canarygrass and existing native vegetation will be protected or enhanced. The site design will include the following elements:

- Re-alignment and reconfiguration of Coal Creek to an appropriate geomorphologic condition at the West Unit;
- Grading of the floodplain to restore floodplain surface roughness and to aid in vegetation management (concentrating grading work in areas already dominated by invasives) at both units;
- Filling or modifying on-site ditches and the National Avenue roadside ditch to improve the treatment of runoff, to improve base flow support functions, and improve water quality inputs to Salzer Creek provided by the proposed site and the adjacent right-of-way;
- Restoration of floodplain topography along Salzer Creek at the East Unit; and
- Improvement of vegetation community composition on site and re-establishment of forested wetlands by removal of invasives, particularly reed canarygrass, and augmentation of existing native communities through supplemental plantings at both sites.

Functions to be Restored or Enhanced at the National Avenue Site

The National Avenue site will provide wetland and stream functional improvements by restoring wetland and stream complex structure and biological components. Specific function groups to be restored or enhanced are:

- Hydrologic functions – will be improved by increasing stream channel length and increasing channel and floodplain complexity, increasing the seasonal saturation durations by increasing flood frequency and enhancement or filling of ditches;
- Water quality functions – will be improved by increasing site shade, increasing site biomass for nutrient uptake, decreasing flood velocities, and increasing soil saturation area and duration; and
- Habitat functions – will be improved by increasing stream length, area, and complexity, increasing native vegetation cover, protecting existing habitat features, and buffering the site from disturbance by establishing woody vegetation cover along the outer edges of the site. Existing snags will be retained or relocated to maintain and distribute habitat structures.

Potential Site Constraints or Conflicts and Land Uses that Might Affect the National Avenue Site's Function

The National Avenue site is located adjacent to the right-of-ways of National Avenue and BNSF railroad, Salzer Creek, and filled lots that are used intermittently for log storage. The right-of-ways are not maintained and are vegetated similarly to the proposed mitigation bank site. The National Avenue right-of-way includes an underground sewage pipe that is operated and maintained by the City of Chehalis; the sewage line is in working condition and there are no plans to improve or relocate the sewage line. The City has a planned project to widen National Avenue, but no timetable has been set and the City does not view this project as a high priority. No site constraints or conflicts are known; the site includes no easements, utilities, or infrastructure that will limit site design. The site is not located on agricultural lands of long term commercial significance. Water rights have not been secured for the National Avenue site, and are not anticipated being needed to develop the National Avenue site project.

Mitigation banking is allowed by both Chehalis municipal code (Nacht 2010 pers comm) and Lewis County Code (LCC 17.35.620(1)(d)). The State of Washington and federal government both have specific rules to guide the mitigation bank development and implementation. The Chehalis Basin Mitigation Bank will comply with all rules and codes governing its development and implementation.

Hanaford Valley Site

The proposed bank is located in the Hanaford Valley west of the Centralia Steam Plant, and includes acreage in both Lewis and Thurston Counties. This location is in the floodplain of Big Hanaford Creek, a tributary to the Skookumchuck River, within Upper Chehalis Basin (WRIA 23). The legal location of the proposed bank is Section 30 or Township 15 North, Range 1 West and Sections 23, 25, 26 of Township 15 North, Range 2 West (Figure 10). TCM submitted a prospectus in September of 2007 for developing this site as a mitigation bank. The prospectus was deemed complete by the IRT co- chairs but TCM elected not to develop the project. Much of the following site description text was taken from the original bank prospectus (Jones & Stokes 2007).

The proposed site is comprised of 8 parcels (Figure 11) that are would be developed as a mitigation bank adjacent to two previously developed mitigation projects, the Kopiah Project Wetland Mitigation Plan (US Army Corps of Engineers [Corps] permit #200600909 – referred to as the Big Hanaford Creek mitigation site) and the Pit 7 Rail Alternative Mitigation Plan (Corps permit # 200600278 – referred to as the Rail Upgrade mitigation site). The proposed bank would expand on the wetland floodplain rehabilitation provided by these sites, and would provide connectivity to upland and wetland habitats.

The proposed bank would include 197.88 acres, divided into a north unit (29.33 acres), northeast unit, (29.68 acres) south unit (120.97 acres), and west unit (17.90 acres) surrounding two existing mitigation sites in Hanaford Valley. The four bank units would combine with the two existing mitigation sites to establish a large, contiguous riverine wetland rehabilitation project that would span Hanaford Valley near the Centralia Steam Plant.

Site Description

The proposed bank property was acquired by TCM in 2006 and is currently unused. Prior to acquisition, the property had been used for hay production and pasture. Most of the site is now vegetated by pasture grasses and weeds typical of seasonal wetlands in western Washington. The western portions of the proposed bank are vegetated with mature Oregon ash wetland forest that would be preserved as part of the proposed bank. The proposed bank is surrounded by existing mitigation sites, commercial timberland, county road, railroad spur, the Centralia Steam Plant, unused pasture land, and a little-used access road (Figure 12).

The proposed mitigation bank is predominantly wetland. Uplands are generally limited to constructed features (e.g., sediment pond berms) that would be removed during proposed bank development. The wetlands originally developed as riverine forested, scrub-shrub, and emergent wetlands prior to being converted to agricultural lands (United States Surveyor General 1867). Big Hanaford Creek, tributary streams, and adjacent wetlands were ditched in the early 1900s to increase drainage and reduce floodplain and wetland interaction and to increase farmlands and pasture; the site includes approximately 8,220 linear feet of ditches. Native vegetation was removed and replaced with pasture and hay grasses. Several sediment ponds were constructed in the 1970s in the northeast corner of the proposed bank site. Ponding of the wetland floodplain to create sediment ponds converted those areas to depressional emergent wetland with low ecological value.

Floodplain interaction within the bank was restored in 2007 by re-aligning Big Hanaford Creek during the implementation of the Kopiah Project Wetland Mitigation Plan. Hydrologic, habitat, and water quality functions have been improved at the Big Hanaford Creek mitigation site, an approximately 600-foot wide corridor along the restored Big Hanaford Creek. The proposed bank would expand the floodplain to the surrounding areas, rehabilitating and enhancing wetland function in this portion of Hanaford Valley, further increasing the functional lift of the approved mitigation site.

Hydrology data collected by Jones & Stokes and URS Corporation (consultant) through wetland delineations and other fieldwork (Jones & Stokes 2005) indicate a high groundwater table throughout the proposed bank early in the growing season, with dryer conditions and absence

of a high water table during the summer and fall months. Although soils begin to dry during summer months and the soil is not saturated throughout the wetland, soil moisture is present. The presence of wetland shrub and tree species in similar soils with similar hydroperiods downstream of the mitigation site indicate that forested and scrub-shrub wetlands would be supported at the Big Hanaford Creek site.

Additional observations of hydrologic conditions were made in association with flooding of the Hanaford Valley in December 2005, January 2006, and November 2006. During a heavy rainfall event from mid-December 2005 through mid-January 2006, flooding began in the lower reach of the proposed bank and moved upstream. Most of the valley-wide flooding occurred in the western half of the proposed bank, where ground surface elevations are generally lower than further upstream. Eventually the flood extended across approximately 1,200 to 1,800 feet of the valley floodplain. Flood depths of 1.5 to 2 feet occurred on open flat terrain based on flood lines as observed on ground photographs taken December 29, 2005, and January 20, 2006, compared to the 1-foot contour maps previously prepared for this site. In the upstream (eastern) half of the proposed bank, there were areas of ponding and overbank flooding, but large portions of this part of the valley did not flood. Valley flood water had fully receded by January 23, 2006. Flooding did not occur on site during the rest of the winter and spring after water receded, although ponding was still present in topographic low areas (as of April 4, 2006). Another flooding event in November 2006 followed a pattern similar to the 2005 flood.

The hydrologic conditions of the proposed bank would be wetter as a result of more frequent flooding at the adjacent Big Hanaford Creek mitigation site. Big Hanaford Creek floods are low-velocity due to the flat topography of the Hanaford, Skookumchuck, and Chehalis Basins.

Wetlands in the abandoned sediment ponds are supported hydrologically by inflow coming from the active sediment basin to the east, supplemented by direct precipitation. The inflow typically occurs from late October until mid-May. Outflows from the abandoned pond occur in three places from openings in the dike, flowing eventually into Big Hanaford Creek.

Most of the proposed bank is vegetated by pasture grasses and weeds. Reed canarygrass (*Phalaris arundinacea*), bentgrass (*Agrostis* spp.), meadow foxtail (*Alopecurus pratensis*), velvet grass

(*Holcus lanatus*), and Himalayan blackberry (*Rubus discolor*) are among the dominant species throughout the broad floodplain.

Preservation areas proposed for the west and north units of the proposed bank are vegetated by mature Oregon ash (*Fraxinus latifolia*) forest with a predominantly native understory of Nootka rose (*Rosa nutkana*), twinberry (*Lonicera involucrata*), willow (*Salix,* spp.), slough sedge (*Carex obnupta*), and small-fruited bulrush (*Scirpus microcarpus*). This mature forest community extends beyond the boundary of the proposed bank onto existing mitigation properties and adjacent private properties.

The inactive sediment ponds in the northeast unit have not been maintained, and pond berms are sloughing. However, these areas still impound water and create wetter habitat than in surrounding wetlands. These inactive ponds are dominated by cattails (*Typha latifolia*) and lesser amounts of other plant species tolerant of long-term inundation.

The Natural Resources Conservation Service (NRCS) Web Soil Survey (NRCS 2007) maps the greater portion of the Hanaford Creek floodplain as the very deep, poorly drained Godfrey and Reed series silty clay loams, both of which are hydric soils (Appendix B).

Site Selection

The proposed mitigation bank would continue the rehabilitation of Hanaford Valley, and complement the functional lift provided by the Big Hanaford Creek realignment developed at the Big Hanaford Creek mitigation site. The restored flood functions provided by the Big Hanaford Creek mitigation site construction, large size of the valley, and presence of adjacent undeveloped areas make Hanaford Valley a suitable location for the proposed bank. Actions considered important to site selection include the following:

- The proposed bank design would complement and provide additional lift to the Big Hanaford Creek mitigation site by expanding floodplain rehabilitation efforts.
- The proposed bank would restore, rehabilitate, enhance, and preserve riverine wetlands of a common historical geomorphic wetland type in the proposed service area.
- Mitigation goals address the Chehalis Basin Management Plan (Chehalis Basin Partnership

2007) priorities.

- The proposed bank would contribute to a mitigation program that would allow continued rehabilitation of Hanaford Valley.
- The proposed bank would preserve high quality forested wetlands, restore, rehabilitate and enhance degraded wetlands, and improve habitat, water quality, and hydrologic functions in the valley bottom.

Existing Functions

Existing functions are degraded due to ditching, straightening of Big Hanaford Creek (which was restored in 2007), and introduction of invasive vegetation through grazing and haying practices. The existing functions will be evaluated and compared to estimated level of functions during the MBI development process, while determining the best assessment protocol in consultation with the IRT.

Project Goals and Objectives for the Hanaford Valley Site

The proposed bank at the Hanaford Valley site will restore, rehabilitate, enhance and preserve wetland functions to compensate for future impacts to wetlands or other aquatic resources. The site has been selected because it has the potential to provide ecological functional lift in a rural setting that would expand on previous rehabilitation efforts that have already restored typically flood plain functions to Big Hanaford Creek. As a result, the proposed bank will provide improved hydrologic, water quality, and habitat functions over existing conditions.

The goals of the proposed mitigation bank at the Hanaford Valley site are to:

- Improve hydrologic , water quality, and habitat functions in the mitigation bank site; and
- Provide a self-sustaining wetland and stream complex that will not require maintenance.

The objectives of the mitigation bank at the Hanaford Valley site are to:

- Restore floodplain hydrologic conditions by filing ditches, removing fill (sediment pond berms), and minor grading as needed;

- Improve hydrologic, water quality, and habitat functions of the Hanaford Valley floodplain by re-establishing native plant communities.
- Preserve existing mature Oregon ash forested wetlands via conservation easement by restoring native plant communities to the surrounding floodplain to provide buffering; and
- Expand previous landscape-scale floodplain restoration efforts and provide conditions on site that will support self-sustaining, native-dominated vegetation communities.

Conceptual Site Design

Site design will be developed in consultation with the IRT, using analysis developed for the BHC mitigation site, observed post-construction site conditions, and initial monitoring results. Figure 13 shows the design components; ditches will be filled, sediment pond berms will be removed, and any other human-made features will be removed, native vegetation communities will be restored, and mature Oregon ash forested wetland areas will be preserved. The site design will include the following elements:

- Filling of approximately 8,220 linear feet of ditches to appropriate floodplain elevations;
- Removing sediment pond berms and any other flood plain structures that reduce wetland area or alter surface water movements;
- Restore native forested, scrub-shrub, and emergent plant communities, complementing the adjacent BHC and Rail Upgrade mitigation sites; and
- Preserve existing mature Oregon ash forested wetlands on the western end of the site via conservation easement and by buffering ash forests through adjacent enhancement and rehabilitation work.

Functions to be Restored or Enhanced at the Hanaford Valley Site

The Hanaford Valley site will provide wetland and floodplain functional improvements by removing floodplain alterations, such as berms and ditches, protecting existing mature Oregon ash forested wetlands, and restoring native plant communities. Specific function groups to be restored or enhanced are:

- The proposed bank would improve hydrologic functions by slowing floodwaters and restoring historic wetland hydroperiod. Surface roughness provided by plantings would cause Big Hanaford Creek flood flows to decrease in velocity and lose erosive capacity. Historic hydroperiod would be restored by filling ditches, and removing sediment pond berms and other constructions. Ditch-filling would retain floodwaters on the site longer, decreasing the duration of flooding elsewhere in the basin. Eliminating ditches and removing isolated drain tile would also decrease the wetland area that is drained by the ditches and discharged toward Big Hanaford Creek. This would allow the surrounding wetland area to retain wetter conditions into spring and summer months, providing baseflow support to Big Hanaford Creek. Filling ditches and matching the surface topography of adjacent wetland floodplain would maintain a similar hydrologic regime as the surrounding areas. Removing sediment pond berms and other human-made structures would restore historic surface water flood patterns. Minor grading can also restore and reconnect swales to Big Hanaford Creek to re-establish historical floodplain connectivity to the creek. The proposed bank, once established, would likely provide hydrologic functions at a high level.

- The proposed bank would improve water quality functions by restoring historical wetland hydroperiod and hydrologic regimes, creating surface roughness features to decrease floodwater velocities, and increasing biomass to capture sediment and uptake dissolve nutrients. Hydroperiod and hydrologic regimes would be restored in the rehabilitation/enhancement area by filling ditches that drain the area and limited grading. Surface and shallow groundwater would be retained for greater duration in areas affected by ditches and seasonal baseflow support and chemical uptake would be increased. The native soils that underlie the site include high clay content, providing relatively high action exchange capacity to adsorb chemicals and treat water.

- The proposed bank would increase habitat for a wide range of species by increasing habitat niches in the site itself, and by improving connectivity to aquatic resources in the Big Hanaford Creek basin. Establishing woody and native plants would provide

increased cover and forage for wildlife. Woody plants would provide vertical habitat stratification, increase overall biomass, increase habitat type diversity, provide recruitment source for snags and woody debris, serve as habitat for invertebrate species, and provide cover that would buffer the site from outside disturbances. Restored emergent areas would provide a habitat type that is uncommon in the basin.

The increased hydroperiod would allow intermittent and seasonally ponded areas to increase. Increased ponding improves habitat directly by providing habitat niches and indirectly by contributing to plant diversity. The site would provide connectivity to the Rail Upgrade mitigation site preservation area, Big Hanaford Creek mitigation site, and other existing wetlands in Hanaford Valley.

- The preservation area proposed for the west and north units would provide water quality, hydrologic, and habitat functions at a high level after the Big Hanaford Creek mitigation site construction restores regular overbank flooding. The preservation area would include attributes of high-functioning floodplain wetland such as mature, diverse native vegetation; remnant floodplain topography; and woody debris. Existing high-quality native plant communities allow this component of the proposed bank site to provide all functions at a high level after flood functions are restored to Big Hanaford Creek. Hydrologic functions would perform at a high level in the preservation area after flood functions are restored to Big Hanaford Creek because flooding would occur on a more natural cycle in the preservation area.

Potential Site Constraints or Conflicts and Land Uses that Might Affect the Hanaford Valley Site's Function

The proposed bank includes rights-of-way for two above-ground transmission lines, one underground water line, and a little-used access road. These areas will have vegetation restrictions and may require access. Effects, if any, these areas may have on achieving proposed bank goals will be addressed during proposed bank instrument development. TCM owns the water line and acquired right-of-way use permits from the owners of the transmission lines for previous mitigation projects.

The proposed bank would occur in two jurisdictions: Thurston and Lewis Counties. The Planning Departments from both Counties have been contacted regarding their current policies on mitigation banking. Lewis County's guidance on banking is found in Lewis County Code (LCC) 17.35.620(1)(d) and states that creating wetlands to be used as mitigation is encouraged. The County has confirmed that a wetland mitigation bank is consistent with the Lewis County planning process (Lien pers. comm.). Lewis County is updating their critical areas ordinance and will provide additional guidance on mitigation banking. Thurston County's critical areas ordinance currently does not address mitigation banks. However, off-site mitigation could be an option if on-site opportunities do not exist (Wilson pers. comm.). When Thurston County reviews and revises their critical areas ordinance, the options of banking may be analyzed and reviewed at that time. Copies of email responses from both counties are available upon request.

The proposed bank includes parcels zoned for residential, forestry, and agricultural uses. Both jurisdictions were contacted to discern whether any portion of the proposed bank would be considered an Agricultural Land of Long Term Commercial Significance. Portions of the proposed bank in Thurston County are not suitable for this designation (Adaire pers. comm.). As of fall 2007, Lewis County was under "notice of invalidity of zoning" and therefore currently did not have any formally adopted Agricultural Lands of Long Term Commercial Significance. The lands proposed as the Hanaford Valley mitigation bank do not appear likely to be so designated given their proximity to zoned industrial lands (Hartstrom pers. comm.). Table 2 shows the specific zoning for all parcels included within the proposed bank. Zoning maps are depicted in Appendix A.

Mitigation banking is allowed by both Chehalis municipal code (Nacht 2010 pers comm) and Lewis County Code (LCC 17.35.620(1)(d)). The State of Washington and federal government both have specific rules to guide the mitigation bank development and implementation. The Chehalis Basin Mitigation Bank will comply with all rules and codes governing its development and implementation.

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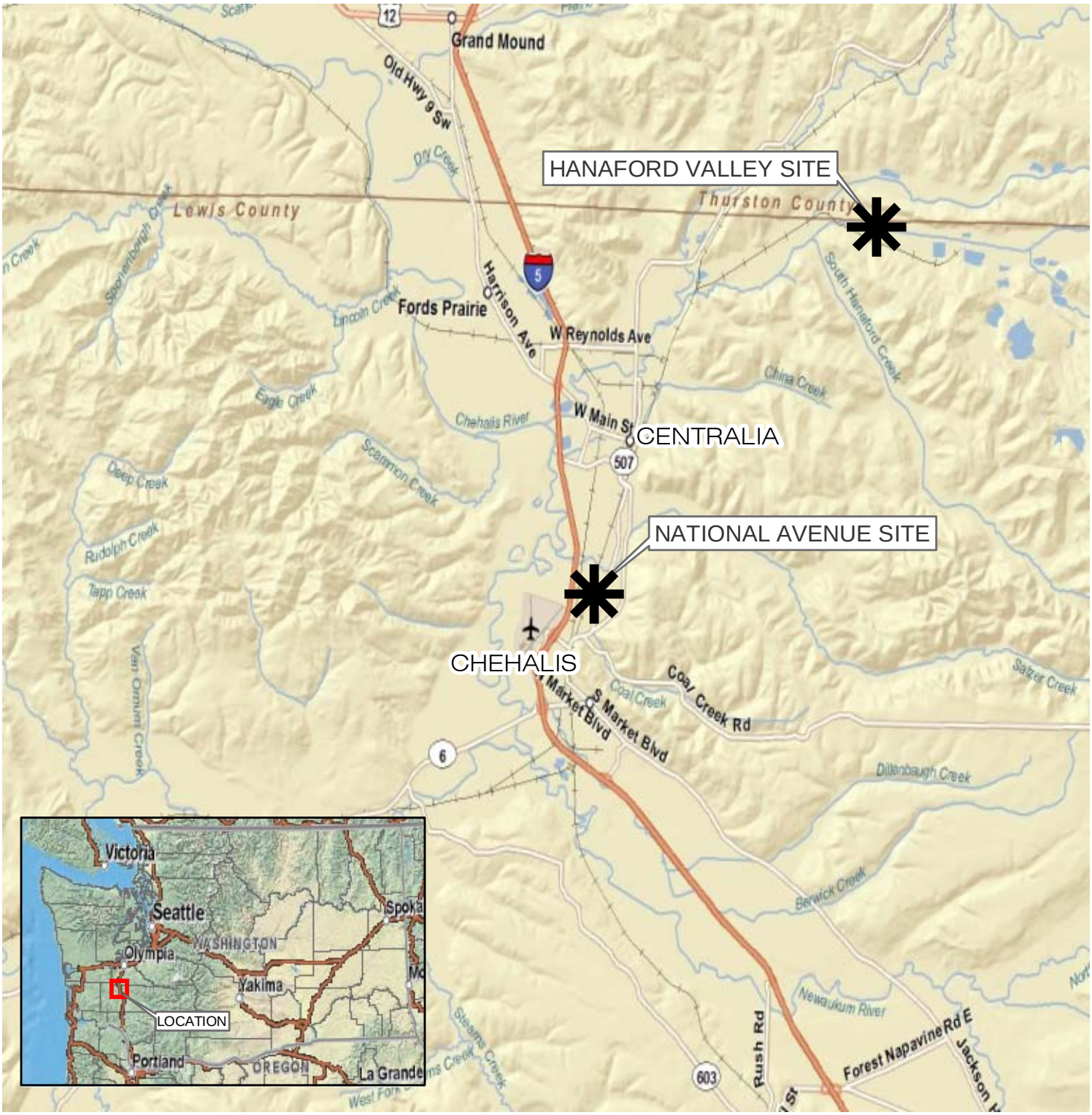


2 1 0 2 Miles

SCALE: 1 INCH = 2 MILES

CHEHALIS RIVER SITE:
LATITUDE: 46° 38' 37.80" N
LONGITUDE: 123° 00' 43.50" W

HANAFORD VALLEY SITE:
LATITUDE: 46° 45' 42.50" N
LONGITUDE: 122° 53' 02.00" W

NATIONAL AVENUE SITE:
LATITUDE: 46° 41' 08.13" N
LONGITUDE: 122° 57' 49.94" W

SOURCE: ESRI STREET MAP USA

CASCADE ENVIRONMENTAL GROUP

WOMBLE CARLYLE ECOLOGY INNOVATIONS, LLC

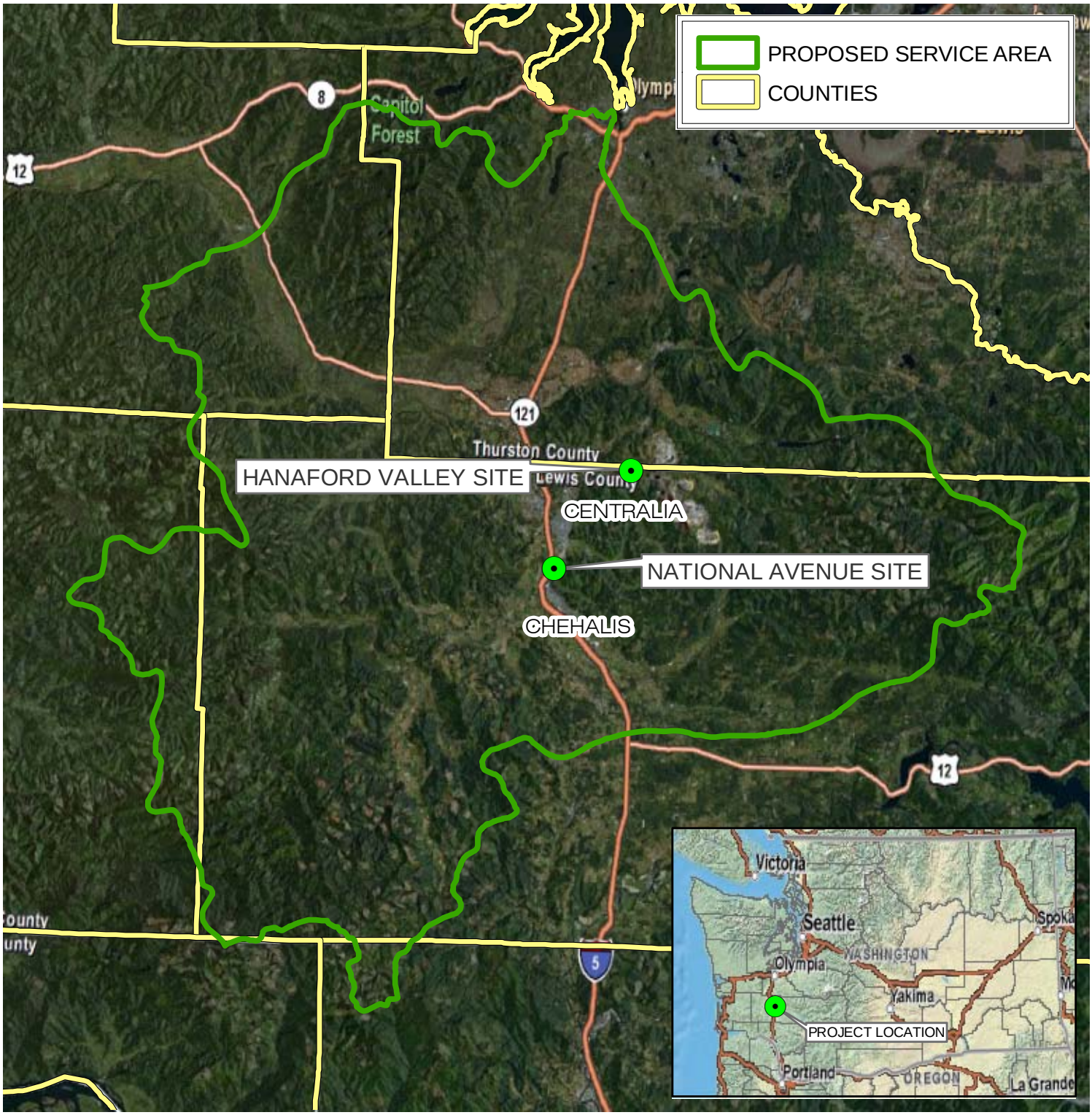
FIGURE 1

VICINITY MAP

CHEHALIS BASIN MITIGATION BANK

LEWIS COUNTY, THURSTON COUNTY, & CITY OF CHEHALIS, WASHINGTON

DECEMBER 2010



SCALE: 1 INCH = 40,000 FEET

CHEHALIS RIVER SITE:
LATITUDE: 46° 38' 37.80" N
LONGITUDE: 123° 00' 43.50" W

HANAFORD VALLEY SITE:
LATITUDE: 46° 45' 42.50" N
LONGITUDE: 122° 53' 02.00" W

NATIONAL AVENUE SITE:
LATITUDE: 46° 41' 08.13" N
LONGITUDE: 122° 57' 49.94" W

SOURCE: USGS HUC, ESRI

CASCADE ENVIRONMENTAL GROUP

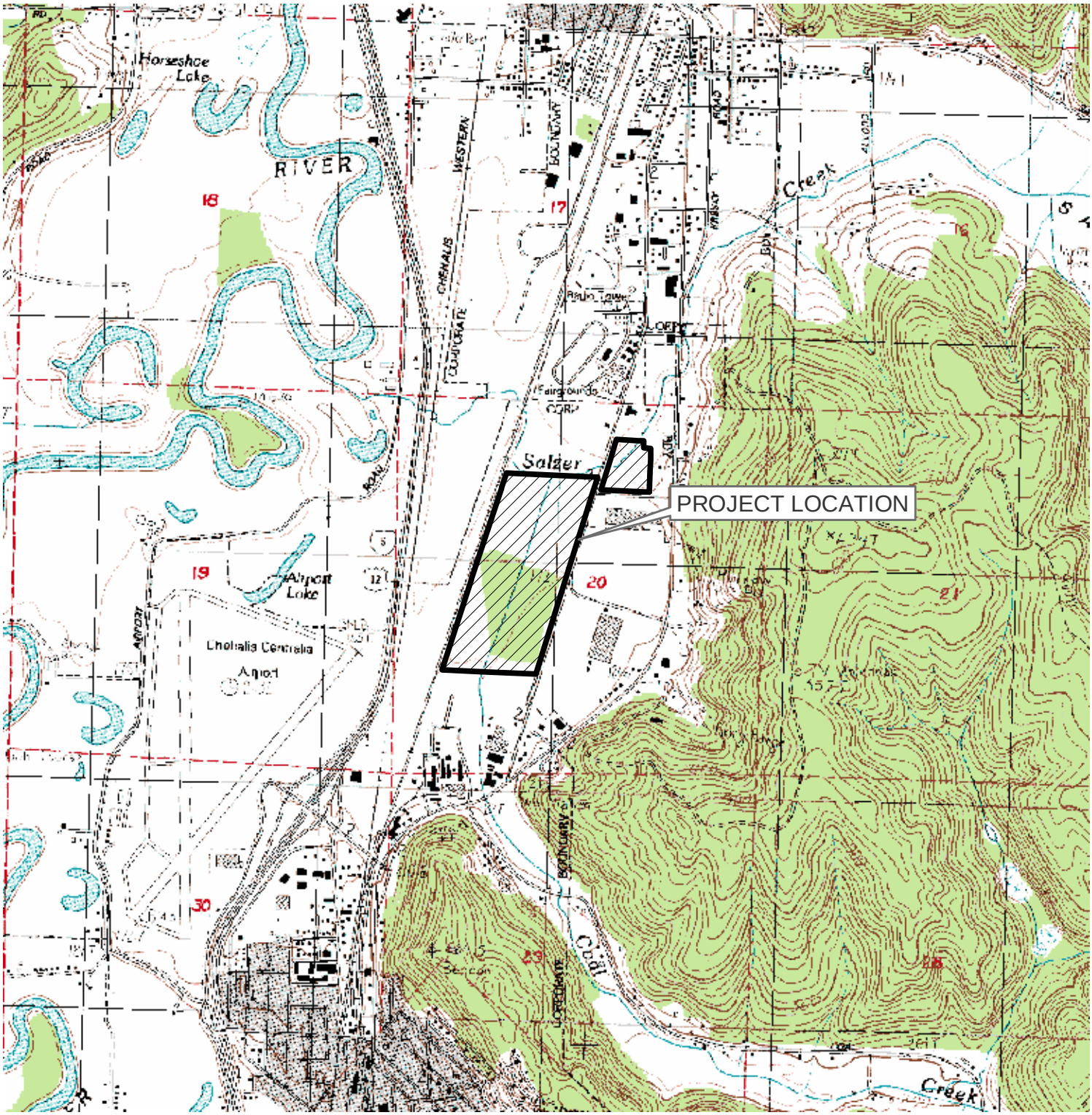
WOMBLE CARLYLE ECOLOGY INNOVATIONS, LLC

FIGURE 2

PROPOSED SERVICE AREA - WRIA 23
CHEHALIS BASIN MITIGATION BANK

LEWIS COUNTY, THURSTON COUNTY, & CITY OF CHEHALIS, WASHINGTON

DECEMBER 2010



2,000 1,000 0 2,000 Feet

SCALE: 1 INCH = 2,000 FEET

LATITUDE: 46° 41' 08.13" N
LONGITUDE: 122° 57' 49.94" W

SOURCE: USGS 7.5 MINUTE SERIES TOPOGRAPHIC MAP, CENTRALIA, WA QUADRANGLE, 1990

CASCADE ENVIRONMENTAL GROUP

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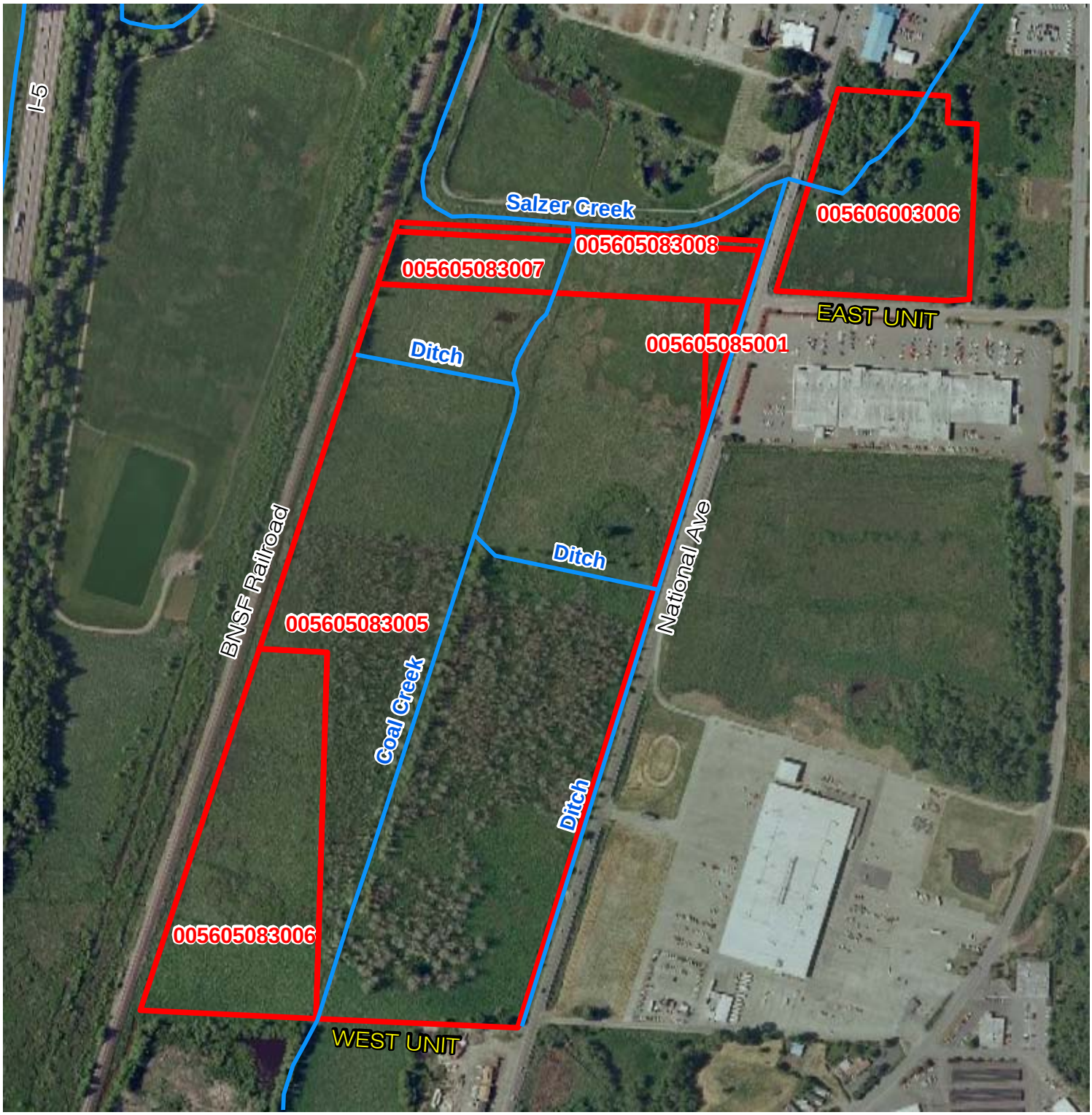
FIGURE 3
LOCATION MAP
CHEHALIS BASIN MITIGATION BANK - NATIONAL AVENUE SITE

CITY OF CHEHALIS, WA | DECEMBER 2010



500 250 0 500 Feet

SCALE: 1 INCH = 500 FEET

LATITUDE: 46° 41' 08.13" N
LONGITUDE: 122° 57' 49.94" W

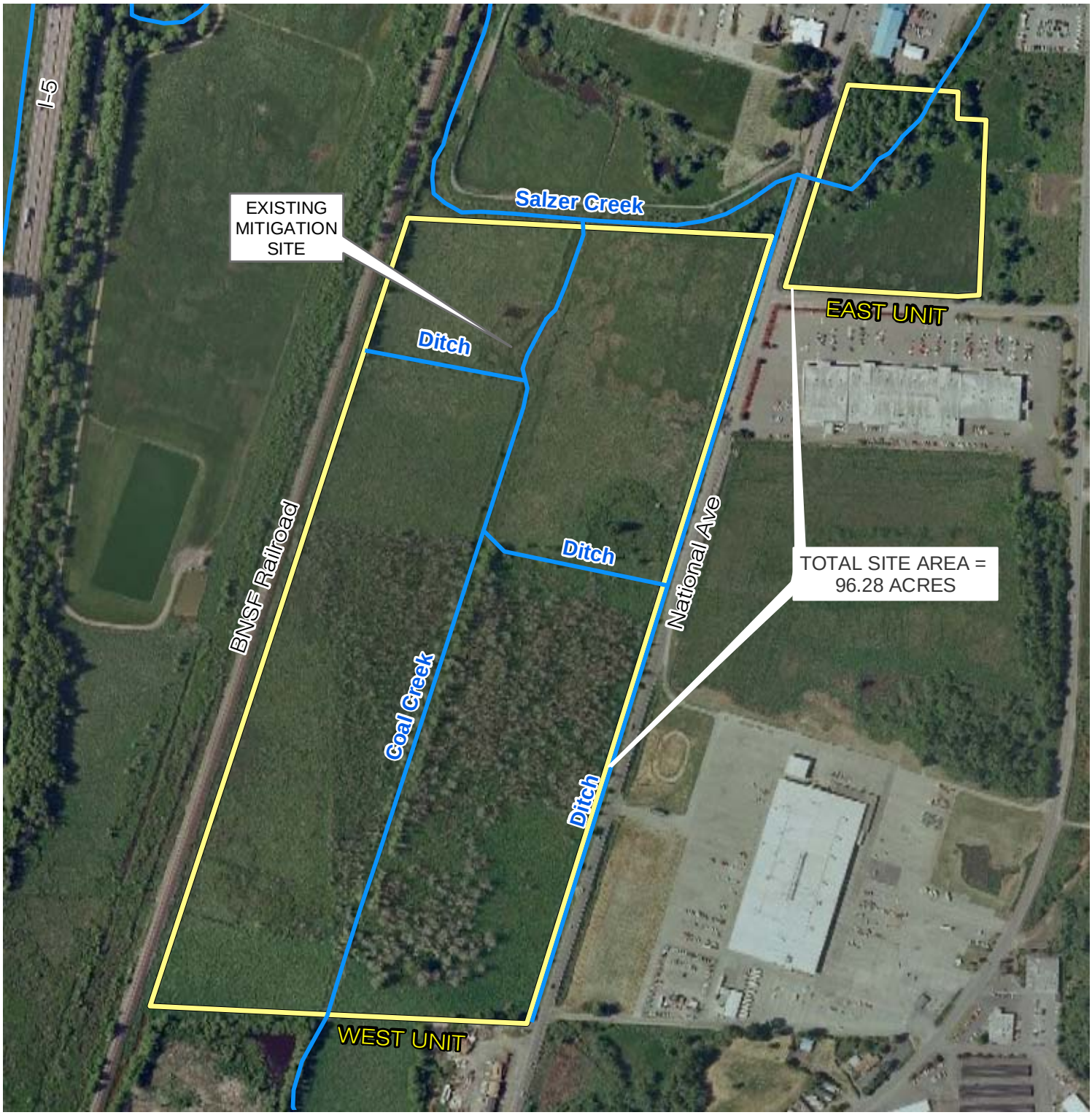
SOURCE: AERIALS EXPRESS, 2009

CASCADE ENVIRONMENTAL GROUP

WOMBLE CARLYLE ECOLOGY INNOVATIONS, LLC

FIGURE 4
PARCEL MAP
CHEHALIS BASIN MITIGATION BANK - NATIONAL AVENUE SITE

CITY OF CHEHALIS, WA | DECEMBER 2010



500 250 0 500 Feet

SCALE: 1 INCH = 500 FEET

LATITUDE: 46° 41' 08.13" N
LONGITUDE: 122° 57' 49.94" W

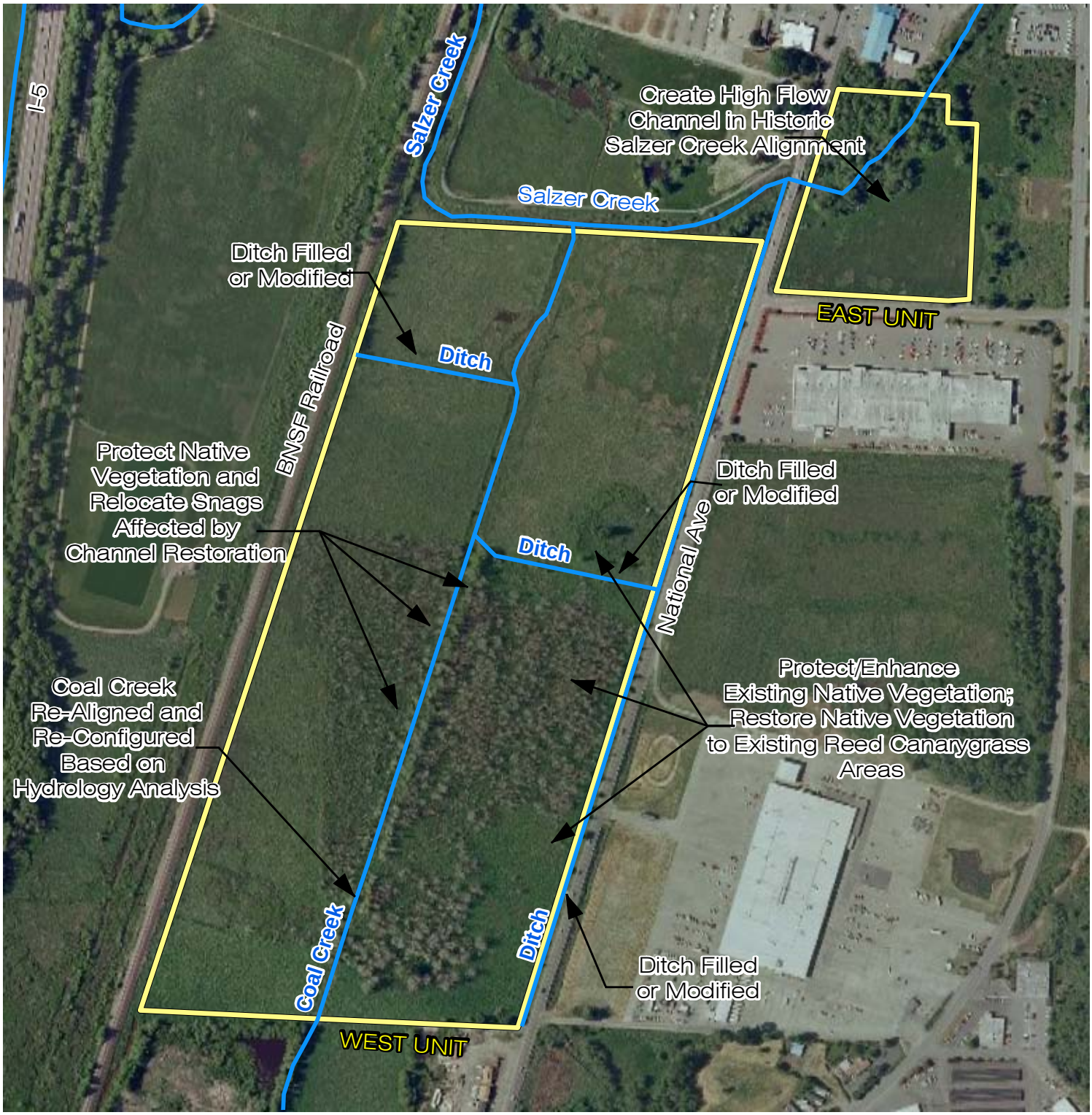
SOURCE: AERIALS EXPRESS, 2009

CASCADE ENVIRONMENTAL GROUP

WOMBLE CARLYLE ECOLOGY INNOVATIONS, LLC

FIGURE 5
SITE OVERVIEW
CHEHALIS BASIN MITIGATION BANK - NATIONAL AVENUE SITE

CITY OF CHEHALIS, WA | DECEMBER 2010



500 250 0 500 Feet

SCALE: 1 INCH = 500 FEET

LATITUDE: 46° 41' 08.13" N
LONGITUDE: 122° 57' 49.94" W

SOURCE: AERIALS EXPRESS, 2009

CASCADE ENVIRONMENTAL GROUP

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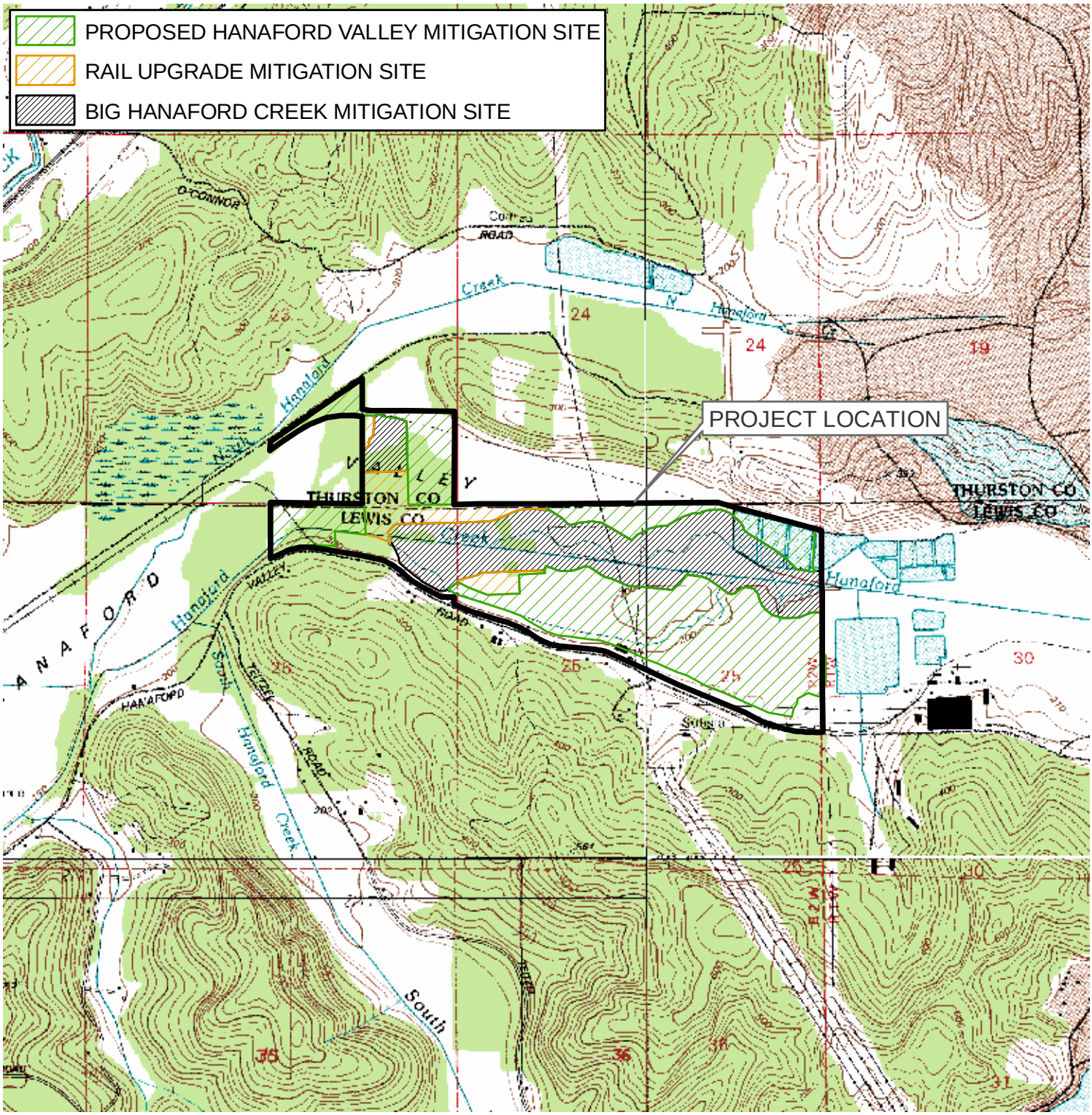
FIGURE 6
DESIGN CONCEPT
CHEHALIS BASIN MITIGATION BANK - NATIONAL AVENUE SITE

CITY OF CHEHALIS, WA | DECEMBER 2010



2,000 1,000 0 2,000 Feet

SCALE: 1 INCH = 2,000 FEET

LATITUDE: 46° 45' 42.50" N
LONGITUDE: 122° 53' 02.00" W

SOURCE: USGS 7.5 MINUTE SERIES
TOPOGRAPHIC MAPS,
BUCODA, WA QUADRANGLE, 1990
CENTRALIA, WA QUADRANGLE, 1990
LOGAN HILL, WA QUADRANGLE, 1990
VIOLET PRAIRIE, WA QUADRANGLE, 1990

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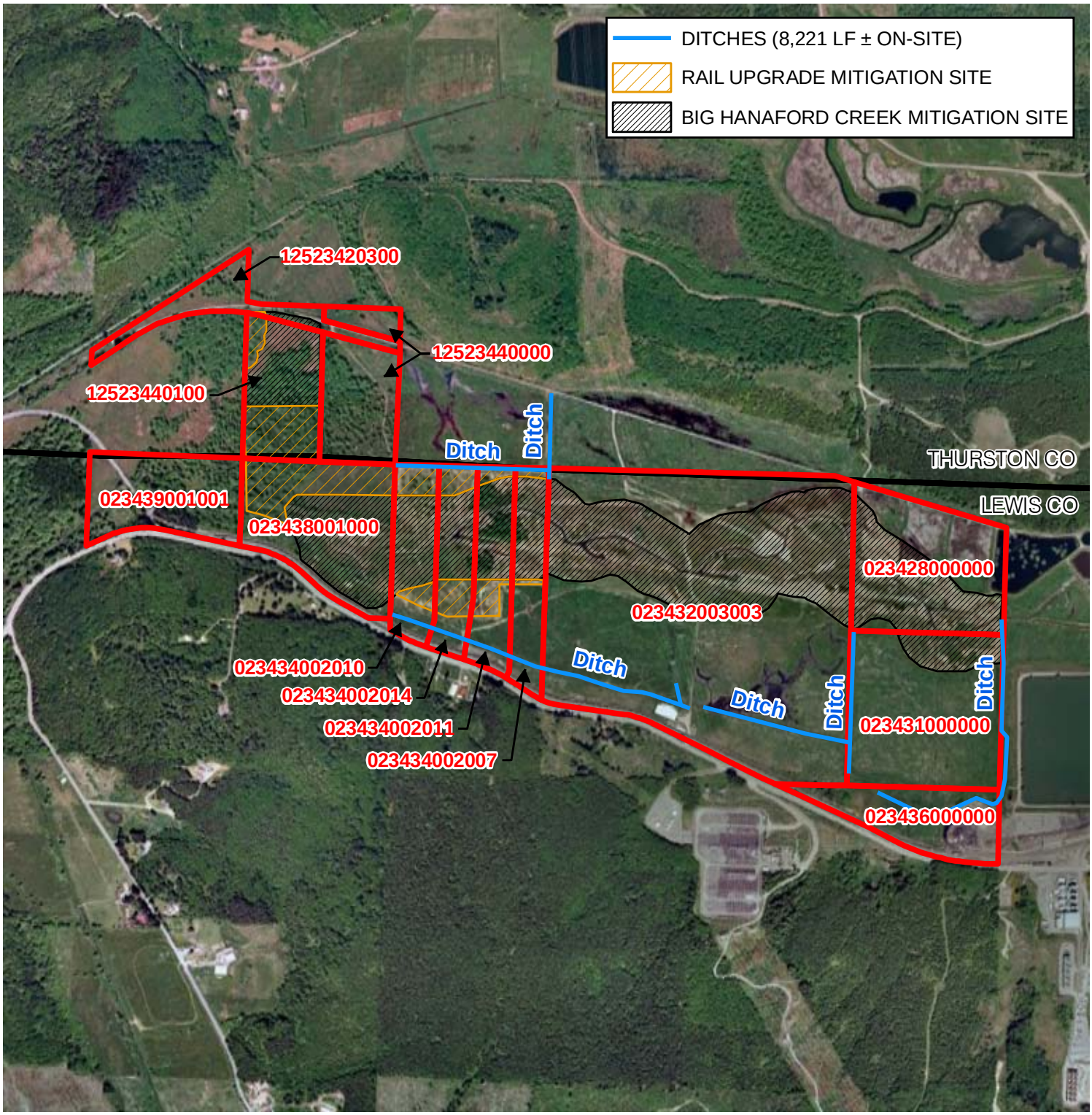
WOMBLE CARLYLE ECOLOGY INNOVATIONS, LLC

FIGURE 7
LOCATION MAP
CHEHALIS BASIN MITIGATION BANK - HANAFORD VALLEY SITE

LEWIS COUNTY, WA
THURSTON COUNTY, WA

DECEMBER 2010



1,200 600 0 1,200 Feet

SCALE: 1 INCH = 1,200 FEET

LATITUDE: 46° 45' 42.50" N
LONGITUDE: 122° 53' 02.00" W

SOURCE: AERIALS EXPRESS, 2009

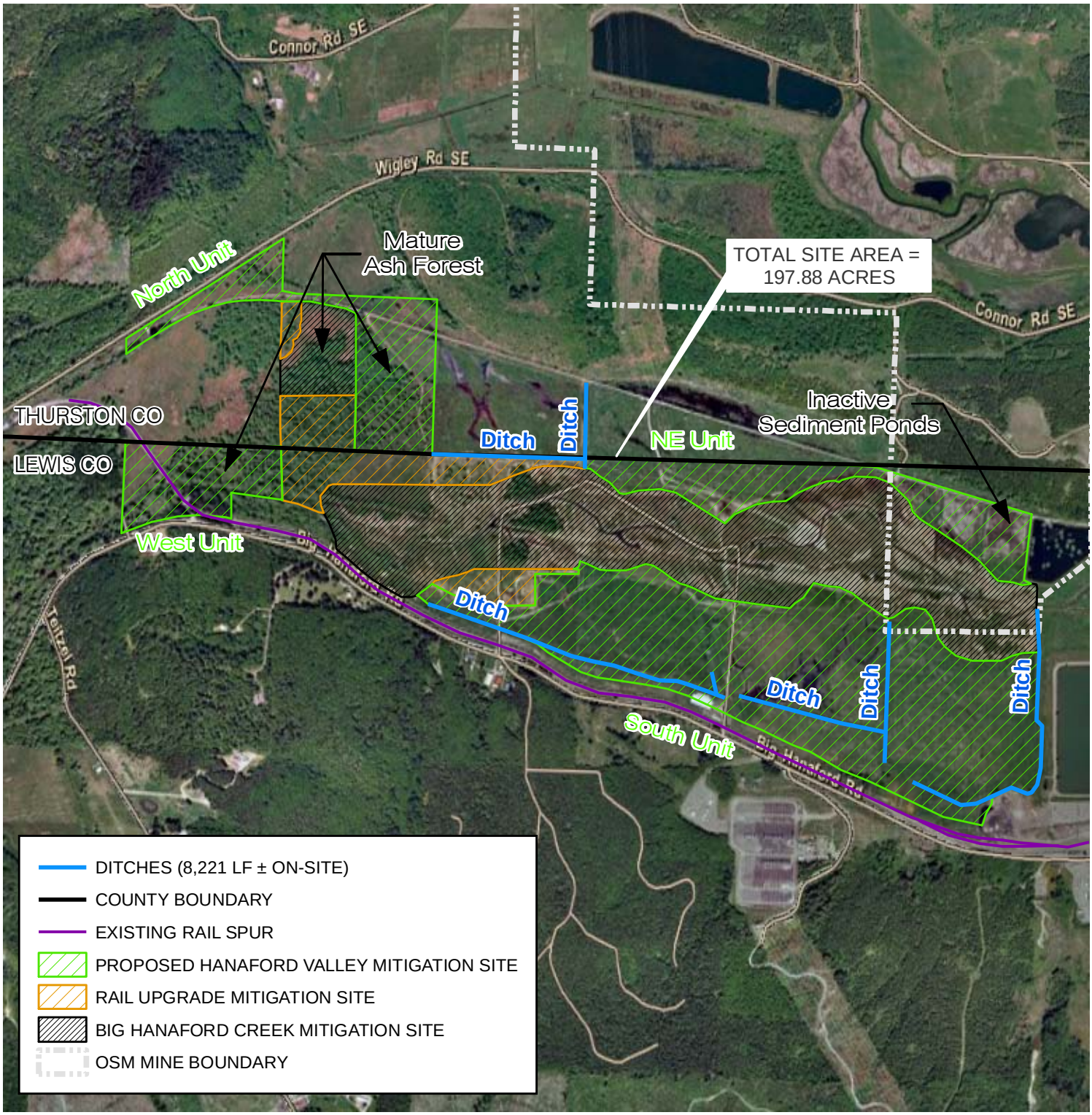
CASCADE ENVIRONMENTAL GROUP

WOMBLE CARLYLE ECOLOGY INNOVATIONS, LLC

FIGURE 8
PARCEL MAP
CHEHALIS BASIN MITIGATION BANK - HANAFORD VALLEY SITE

LEWIS COUNTY, WA
THURSTON COUNTY, WA

DECEMBER 2010



1,200 600 0 1,200 Feet

SCALE: 1 INCH = 1,200 FEET

LATITUDE: 46° 45' 42.50" N
LONGITUDE: 122° 53' 02.00" W

SOURCE: AERIALS EXPRESS, 2009

CASCADE ENVIRONMENTAL GROUP

WOMBLE CARLYLE ECOLOGY INNOVATIONS, LLC

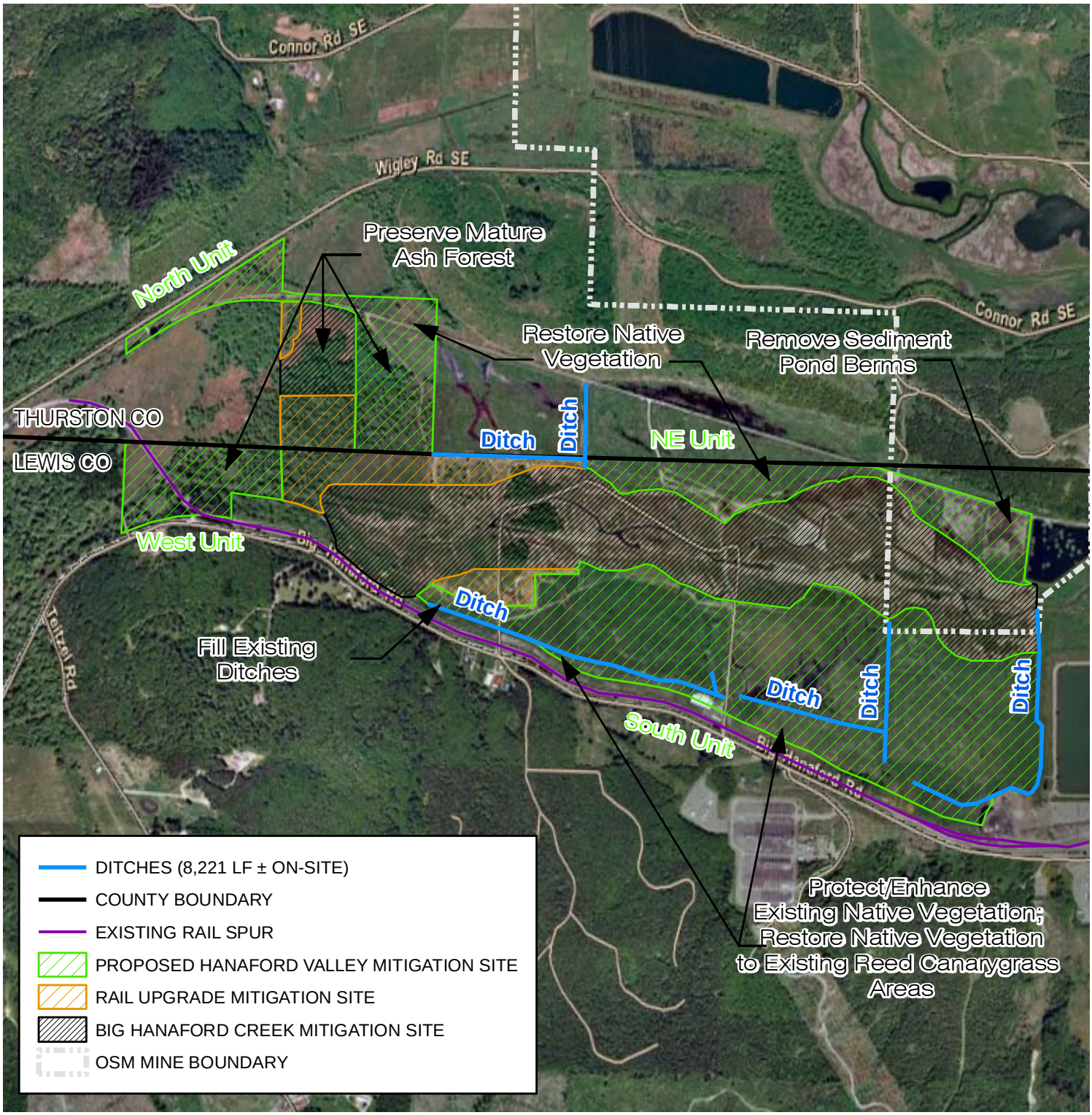
FIGURE 9

SITE OVERVIEW

CHEHALIS BASIN MITIGATION BANK - HANAFORD VALLEY SITE

LEWIS COUNTY, WA
THURSTON COUNTY, WA

DECEMBER 2010



1,200 600 0 1,200 Feet

SCALE: 1 INCH = 1,200 FEET

LATITUDE: 46° 45' 42.50" N
LONGITUDE: 122° 53' 02.00" W

SOURCE: AERIALS EXPRESS, 2009

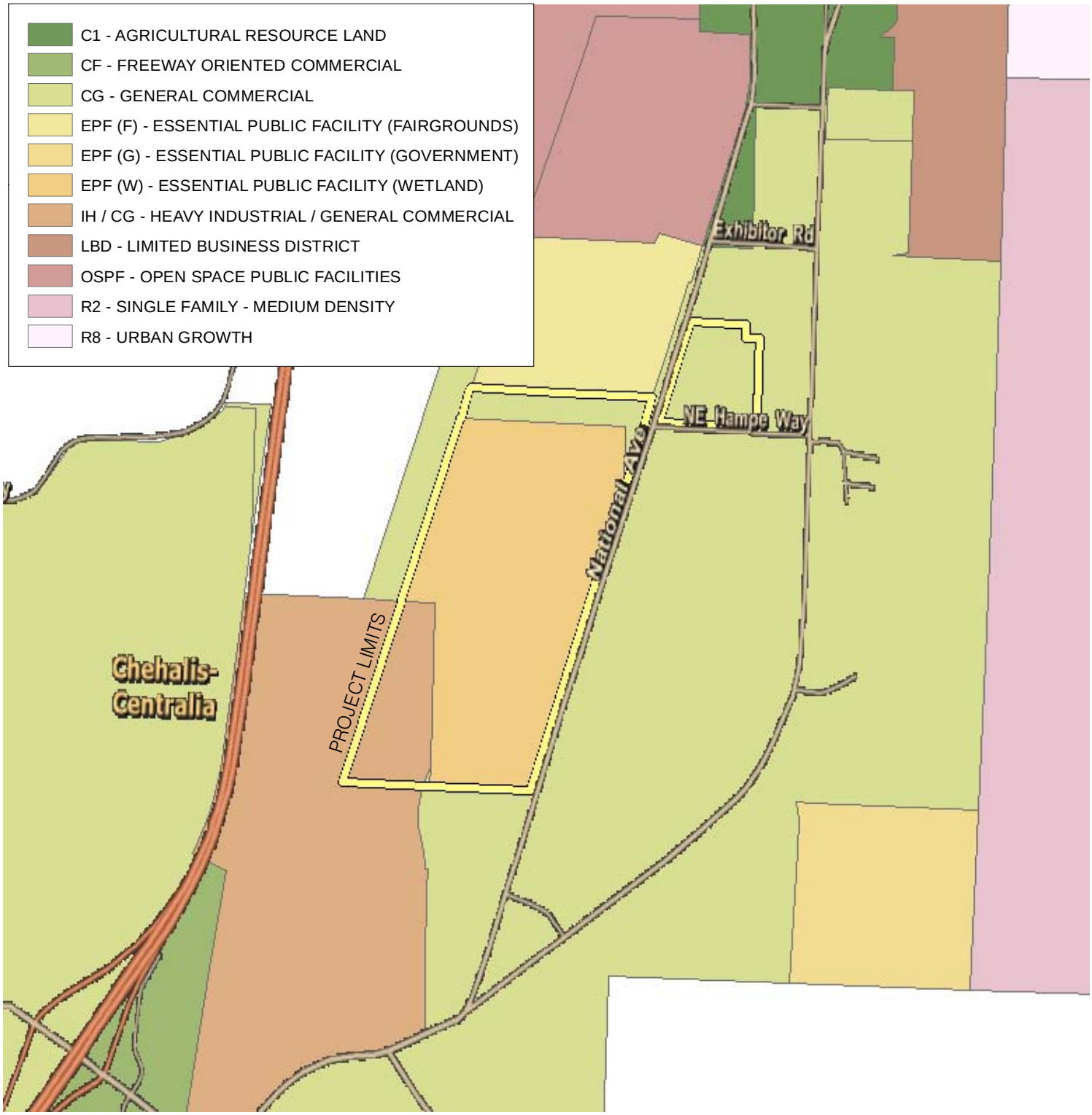
CASCADE ENVIRONMENTAL GROUP

WOMBLE CARLYLE ECOLOGY INNOVATIONS, LLC

FIGURE 10
DESIGN CONCEPT
CHEHALIS BASIN MITIGATION BANK - HANAFORD VALLEY SITE

LEWIS COUNTY, WA
THURSTON COUNTY, WA

DECEMBER 2010



1,000 500 0 1,000 Feet

SCALE: 1 INCH = 1,000 FEET

LATITUDE: 46° 41' 08.13" N
LONGITUDE: 122° 57' 49.94" W

SOURCE: CITY OF CHEHALIS ZONING, 2009

CASCADE ENVIRONMENTAL GROUP

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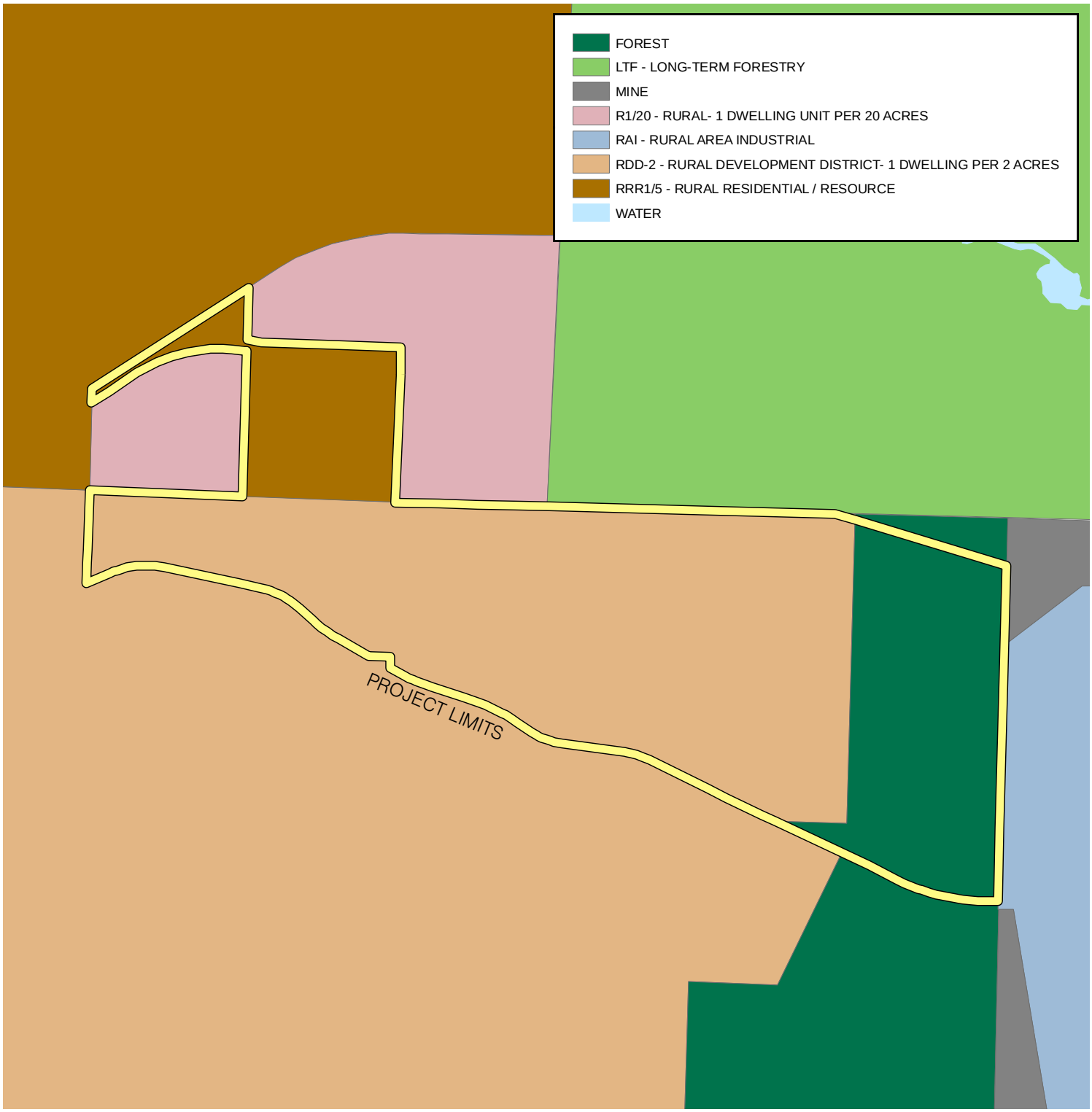
APPENDIX A
ZONING MAPS
CHEHALIS BASIN MITIGATION BANK - NATIONAL AVENUE SITE

CITY OF CHEHALIS, WA | DECEMBER 2010



1,200 600 0 1,200 Feet

SCALE: 1 INCH = 1,200 FEET

LATITUDE: 46° 45' 42.50" N
LONGITUDE: 122° 53' 02.00" W

SOURCE:LEWIS COUNTY ZONING, 2009
THURSTON COUNTY ZONING, 2005

CASCADE ENVIRONMENTAL GROUP

WOMBLE CARLYLE ECOLOGY INNOVATIONS, LLC

APPENDIX A
ZONING MAPS
CHEHALIS BASIN MITIGATION BANK - HANAFORD VALLEY SITE

LEWIS COUNTY, WA
THURSTON COUNTY, WA

DECEMBER 2010

500 250 0 500 Feet

SCALE: 1 INCH = 500 FEET

LATITUDE: 46° 41' 08.13" N
LONGITUDE: 122° 57' 49.94" W

SOURCE: AERIALS EXPRESS, 2009

CASCADE ENVIRONMENTAL GROUP

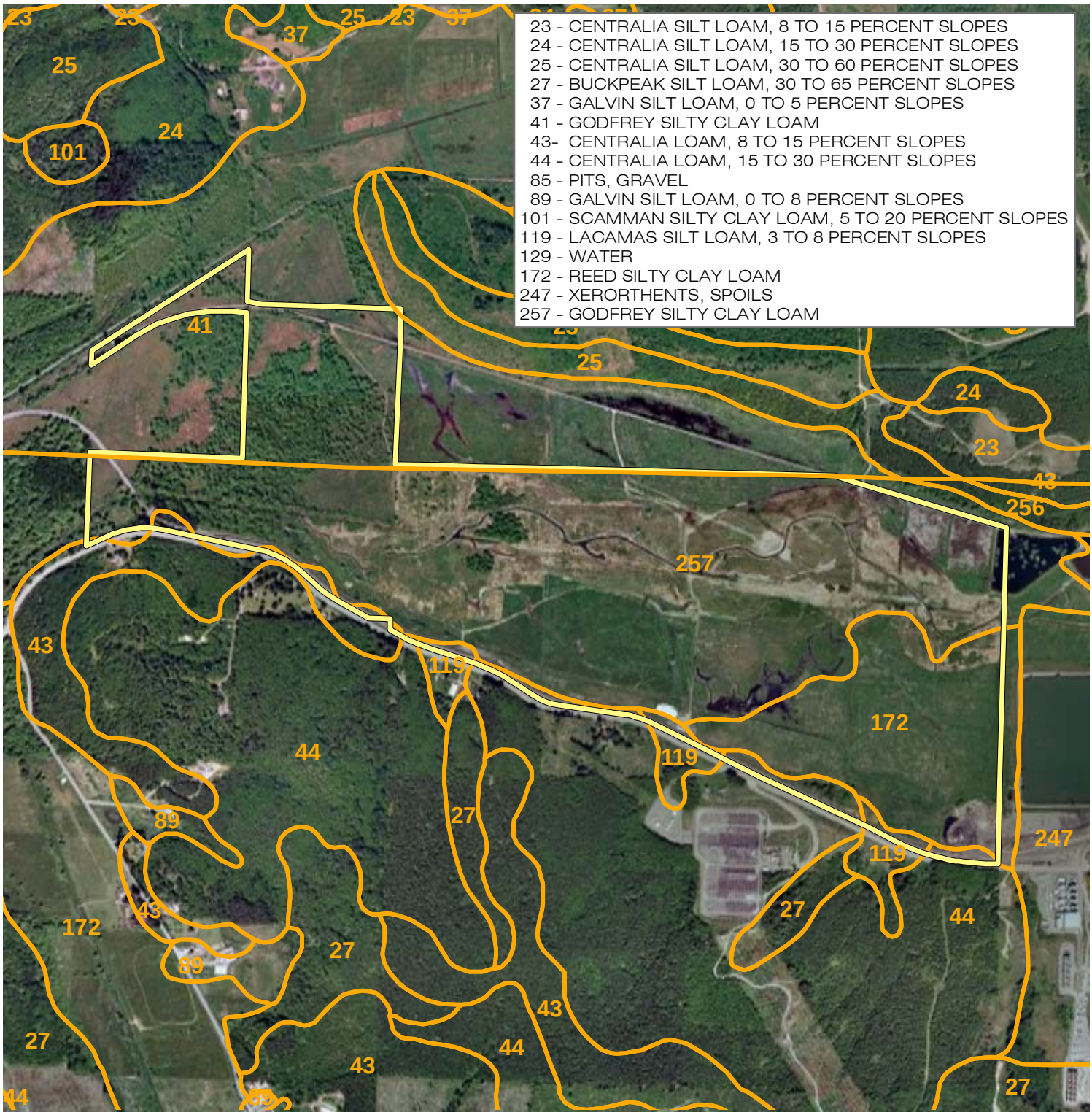
WOMBLE CARLYLE ECOLOGY INNOVATIONS, LLC

APPENDIX B

SOILS MAPS

CHEHALIS BASIN MITIGATION BANK - NATIONAL AVENUE SITE

CITY OF CHEHALIS, WA | DECEMBER 2010



SCALE: 1 INCH = 1,200 FEET

LATITUDE: 46° 45' 42.50" N
LONGITUDE: 122° 53' 02.00" W

SOURCE: AERIALS EXPRESS, 2009

CASCADE ENVIRONMENTAL GROUP

WOMBLE CARLYLE ECOLOGY INNOVATIONS, LLC

APPENDIX B

SOILS MAPS

CHEHALIS BASIN MITIGATION BANK - HANAFORD VALLEY SITE

LEWIS COUNTY, WA
THURSTON COUNTY, WA

DECEMBER 2010