ADDENDUM: CHANGES TO REVISED COGENERATION PROJECT COMPENSATORY MITIGATION PLAN

This addendum to the Revised Cogeneration Project Compensatory Mitigation Plan (Plan), which is dated April 21, 2003, was prompted by comments received from the Corps, Ecology, and Shapiro & Associates during the May 14, 2003 meeting. The changes requested at that meeting are discussed here under five topics and presented in the order that they are presented in the Plan.

1. **East Restoration Area**

   The wetland planned for restoration in the East Restoration Area will now be expanded to total 0.5 acre in size. As discussed in Section 4.6, the Plan had only intended to restore the 0.2 acre of existing wetland area within the East Restoration Area. Figure 3 Restoration Areas Plan – Topography and Plant Community Distribution has been revised to demonstrate the change.

   As previously, post-mitigation topography of the East Restoration Area will direct most surface and subsurface runoff to the wetland area. A portion of this water will travel directly from the upland area to be re-created within the Restoration Area. The remaining moisture will enter the wetland as surface water diverted to the seasonally inundated wetland area from a ditch that will be installed along the south edge of the East Restoration Area. As explained in the Plan, the surface water delivery will be designed to minimize intra-seasonal water level fluctuation and prevent flooding. The seasonally inundated wetland area will be situated in the central part of the restored/created wetland.

   Calculations using the SCS method indicate that surface runoff from the drainage area is adequate to sustain 0.5 acre of restored/created wetland. The seasonally inundated wetland area, which will be 0.2 acre in size and approximately 5,200 ft^3 in volume, should reach maximum storage capacity by February in a year with normal rainfall. This area will likely retain maximal surface water levels for much of the wet season and draw down completely by the latter half of the dry season. Subsurface seepage from adjacent uplands and from the seasonally inundated area will provide the water to the seasonally saturated wetland area.

   No direct mitigation credit will be sought for the 0.3 acre of the 0.5-acre wetland that will be created within the East Restoration Area. Although the wetland will be 150% larger than previously designed, the benefits to functional performance have not been quantified. Thus, the increase in functional performance from the proposed restoration, as derived from predicting post-mitigation conditions in the West Restoration Area, underestimates the overall increase that will likely occur.

2. **Mitigation Ratio**

The Plan proposes to enhance the CMAs to compensate for total wetland impacts at a ratio greater than 3:1. In particular, a total of 110 acres will be rehabilitated to compensate for 35.37 acres of unavoidable wetland impact. Although wetland buffers (uplands) will be included in the compensatory mitigation areas (CMAs), no direct quantitative credit has been claimed by including these areas. A breakdown of the ratios by type of compensation is provided by a revised version of Table 9 shown below.

TABLE 9
SUMMARY OF COMPENSATORY MITIGATION ACRES, RATIOS, AND CREDITS

Type of Compensatory Mitigation	Size of Proposed Compensatory Mitigation Areas (acres)	Proposed Mitigation Ratio	Mitigation Credit (acres) [1]
Enhancement of existing degraded wetlands to compensate for temporary impacts to PEM wetlands	4.86	1:1	4.86
Enhancement of existing degraded wetlands to compensate for impacts to PFO wetland	7.61	4.5:1	1.69
Enhancement of wetland buffer areas (uplands)	28.43	-	-
Enhancement of existing degraded wetlands to compensate for permanent impacts to PEM wetlands	69.21	2.4:1	28.82
Total area	**110.11**	**3.1:1**	**35.37**

[1] Mitigation credit determined by dividing the acreage of each mitigation type by the proposed mitigation ratio.

3. **Reed Canarygrass Control**

Although control of reed canarygrass will occur according to the Plan, the herbicide applied to infested areas will only contain one of the surfactants approved for use in aquatic areas in Washington. The addition of surfactant to glyphosate-based herbicide greatly enhances the herbicide's effectiveness (Diamond and Durkin, 1997). The surfactants approved for use in aquatic areas include R-11, X-77, and LI-700 (Shoblom pers. comm. 2003; Emmitt pers. comm. 2003). These surfactants impart substantially less toxicity to aquatic organisms than the surfactants associated with Roundup®, a commonly used herbicide. Because the surfactants in Roundup® (i.e., Polyoxyethylene alkylamine and ethoxylated tallowamine) are considered substantially more toxic than the surfactants mentioned above, Roundup® will not be used in the mitigation areas.

If it is determined that herbicide applications are not effectively controlling reed canarygrass, then other means of controlling reed canarygrass, such as mechanical removal, will be stepped up to ensure that the control program is successful.

4. **Ditch Plugging**

As stated in the plan, portions of ditches within the CMAs will be plugged (filled) to help restore historical drainage patterns and improve hydrologic functional performance. Instead of refraining from modifying portions of ditches that convey relatively high flows during winter storm events due to concerns regarding erosion/siltation and feasibility, all portions of ditches outside of the forested areas will be filled. Thus, ditch filling will now occur in the portion of the main ditch west of the forested patch west of the main portion of CMA2 and south of its panhandle. Measures will be taken to control erosion in the vicinity of the ditch to be filled.

Filling this portion of the ditch is now indicated in the revised version of Figure 9A. The total fill needed for this activity has more than doubled to 455 cubic yards, as indicated in the revised version of Figure 9B.

5. **Inlet Channel**

The plan for the inlet channel that will deliver surface water to CMA2 from the detention basin within the cogeneration plant site has undergone a number of changes. Instead of terminating south of the east-west ditch, the channel will extend to near the northern edge of CMA2. As a result, a substantially larger amount of CMA2 will receive runoff from the inlet channel. This will help improve hydrologic functional performance at the site.

To augment dispersion of runoff, the west berm of the inlet channel will consist entirely of permeable material (i.e., gravel). The east berm and the channel bed will consist of compacted native material. Runoff in the channel will seep through the west berm and continue westward down the slope as sheet flow and semi-concentrated flow. Adjustable weirs may be installed in the channel to ensure that surface water is distributed evenly throughout the channel, maximizing runoff dispersion across CMA2.

The channel will include some slight meanders to follow existing topography and thereby minimize grading. The meanders may also suppress water velocity, allowing a more even distribution of outflow from the permeable berm. As a result, the total length of the inlet channel will be 1,740 feet, which is nearly 700 feet longer than had been previously designed. The path that the channel will take is shown in Figure 9A. Profile drawings showing more details of the new design for the inlet channel are shown in Figure 9C.

Because the inlet channel will extend through the area that drains south towards the east-west ditch, topographic modifications will be made to direct drainage to the west. A broad and shallow swale will be excavated just west of the northern extent of the inlet channel. Other topographic high spots farther downslope will be lowered to ensure that surface water can flow westward across the entire length of the CMA2 panhandle. The newly designed swales and other topographic modifications are shown in Figure 9A. The general locations of the swales are indicated by cross-sections EE' and FF' in Figure 9A. A typical profile of the swales is shown in Figure 9D.

A larger amount of uplands within CMA2 will likely become wetlands as a result of the new design. Some of this area will be converted to wetland by excavating the broad swale and lowering surface elevations north of the east-west ditch. Due to uncertainty regarding the amount and locations of wetland conversion, no credit is claimed for wetland creation that occurs in CMA2.

Due to the wider dispersion of runoff across CMA2, a larger amount of the wetlands within this site will become seasonally inundated wetland areas. In addition, a larger proportion of the runoff will now reach Terrell Creek through a small channel that extends north from CMA2. However, most of the runoff will continue to reach Terrell Creek near its crossing with Jackson Road. The hydrologic pathways and seasonally inundated areas likely to develop as a result of the updated design are shown in Figure 10B. The effect of these changes on the planting design are reflected in the updated version of Figure 11B, which shows plant community distribution in CMA2.

References

Diamond, Gary L. and Patrick R. Durkin. 1997. Effects of surfactants on the toxicity of glyphosate, with specific reference to Rodeo. Syracuse Research Corporation and Syracuse Environmental Research Associates, Inc. Syracuse, NY. www.fs.fed.us

Emmitt, Kathleen. 2003. Personal communication. Washington State Department of Ecology.

Shoblom, Tricia. 2003. Personal communication. Washington State Department of Ecology.