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REQUIREMENTS APPROVAL  
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December 8, 2000

Mr. Phillip Schneider  
Washington State Department of Fish and Wildlife  
3190 160<sup>th</sup> Avenue SE  
Bellevue, Washington 98008

Subj: Joint Aquatic Resources Permit Application (JARPA) and Specific Attachments for Hydraulic Projects Approval - Miller Creek Project. Prepared by Parametrix, Inc. for the Port of Seattle (Port), July 2000. Submitted to the Washington Department of Fish and Wildlife.

Dear Mr. Schneider:

At the request of the Airport Communities Coalition, I have reviewed and evaluated the subject JARPA materials for their scientific adequacy. In this exercise, I have tried to determine what impact, if any, would the proposed construction have on fish or fish habitat in Miller Creek. Of particular interest in my evaluation was the Port's, or their consultant's, assessment of individual and cumulative impacts of the proposed construction projects. I have evaluated each assessment of potential impact by answering three questions: 1) did the Port or their consultant present the most appropriate information, 2) was the information complete and credible, and 3) was the information properly analyzed and interpreted?

In undertaking this assignment, I have relied on my education, specialized training, and twenty-five years experience (post Ph.D.) as a fisheries biologist and water quality planner (see attached Curriculum Vitae).

**Opinions**

My opinions and the detailed evaluations on which they are based are found in the succeeding sections:

**Miller Creek Relocation Project**

As described in the JARPA by Parametrix, the Port's consultant, the physical design (stream gradient, channel depth, size of gravel, placement of large woody debris, etc.) of the 980-foot Miller Creek Relocation Project is based on habitat requirements for

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cutthroat trout. The planned features include: shading with native plants to minimize temperature increases during the summer; higher velocity riffles to maintain oxygen levels and reduce sedimentation; and the placement of logs, rocks, and other structures to provide refuge.

While the proposed design appears to incorporate habitat requirements of cutthroat trout, the descriptions of the project found in both the JARPA and the Natural Resource Mitigation Plan (NRMP) (Parametrix 1999), on which the JARPA is based, do not include scientific citations (references) in support of the proposed design standards. Also, no scientific data or calculations are provided to assure the scientific reviewer that the proposed design does, in fact, meet requirements for cutthroat trout. In evaluating the proposed project design, I am left with the impression that I should simply "trust them to do the right thing." I must ask whose (which scientist's) fish habitat design standards are we using? This design was based on someone's studies, done where? Has this particular design been used elsewhere? Did it work? What were the shortcomings? How was this design changed to accommodate local features?

If Parametrix implements the design for relocating Miller Creek as presently conceived, summer water temperatures in the relocated reach will likely exceed the preferred summer maximums for cutthroat and other species for several years following construction, and perhaps longer. Oxygen concentrations also will likely be depressed. In my opinion, it will take at least three to five years, perhaps longer, for riparian vegetation to grow tall enough to provide any meaningful shading (canopy) in this reach of Miller Creek, even if the introduced native shrubs and trees all survive and achieve average growth each season. As a result, cutthroat and other aquatic life will likely be displaced to other reaches of the stream where temperature and oxygen meet their preferences or tolerances. This condition could exist each summer for a few years or for a longer period of time, until the riparian vegetation grows tall enough to establish a functional stream canopy.

There also will likely be a problem achieving the performance standard of a minimum flow depth of 0.25 feet for the stream channel during 0.5-cfs summer low flow conditions (see page 5-4 of the NRMP [Parametrix 1999]). Mr. William Rozeboom of Northwest Hydraulic Consultants, Seattle, Washington (personal communication, November 2000), indicates that the NRMP documents do not include hydraulic calculations to determine whether or not the proposed low-flow channel would maintain the stated goal of a minimum 0.25 feet in depth at a 0.5-cfs flow rate. In the absence of such data, Mr. Rozeboom performed his own analyses of hydraulic characteristics presented on pages 5-7 and 5-9 of the NRMP (Parametrix 1999) for the proposed 6-inch deep low-flow channel, assuming a Manning "n" roughness value of 0.035, an average bed slope of 0.22%, and bed and top widths of 6 feet and 8 feet, respectively. Mr. Rozeboom determined that these hydraulic data presented in the NRMP would indicate a normal flow of about 0.15 feet for a flow of 0.5 cfs. He also determined that if pool and riffle conditions developed in the proposed channel geometry, the critical-flow depth of flow in

6-foot wide riffle sections (such as over the 6-foot wide notches in the weir logs) would be about 0.06 feet.

Mr. Rozeboom identified another feature of the proposed construction that could cause even lower depths of summer-period flow and a risk of the stream going dry through portions of the reconstructed reach. This risk comes from the proposal to shape a 6-inch deep low-flow channel on a 32-foot wide, two-foot thick "bed" of spawning gravels, which is to overlay a geotextile fabric that isolates the gravel from the underlying native soils. The spawning gravels are to consist of pebbles ranging from about 0.2 inches in diameter to 1.5 inches in diameter (see page 42 of Revised Implementation Addendum, NRMP [Parametrix, 2000a]). Mr. Rozeboom believes that without interstitial fine materials (sand and silt), these gravels will have a high porosity and a correspondingly high capacity to convey (allow) subsurface flow. It was Mr. Rozeboom's opinion that this high subsurface flow capacity is likely to reduce, and might intermittently eliminate, surface flow through the relocated and reconstructed reach.

Mr. Rozeboom's findings indicate that the 0.5-foot minimum flow depth will not be maintained under summer low-flow conditions. Failure to achieve the design minimum flow depth supports my opinion that summer water temperatures in the stream could exceed preferred summer maximums for cutthroat trout and other aquatic species. A reduction in depth to 0.15 feet in the relocated main channel and 0.06 feet in riffles could also limit movement of all but the smallest fish throughout the relocated reach and conceivably lead to stranding and mortality of larger fish. Use of spawning gravels without interstitial fine materials (sand and silt) to prevent subsurface flow could increase the potential for thermal stress and stranding.

#### **Instream Enhancement Projects**

The proposed instream enhancement projects, of which there are four, are located south of the Vacca Farm on Miller Creek and include removing man-made structures (weirs, footbridges, driveways, riprap, and old tires), restoring the natural flow of the stream, and introducing large woody debris to the new stream channel.

For the most part, the Port's proposal to remove man-made structures (weirs, footbridges, driveways, riprap, and old tires) is appropriate for improving fish habitat in Miller Creek. At issue, however, is whether or not the overall project and, in particular, what is installed in lieu of man-made structures to stabilize the bank will be a net enhancement and, will remain during storm events. According to the 1999 NRMP (page 5-63), the existing condition of the mitigation site is characterized by riparian vegetation that consists primarily of lawns and some trees, which "does not provide shade, bank stabilization, or habitat complexity." Under existing conditions, the banks are stabilized by introduced measures including tire riprap that is proposed for removal as an instream enhancement project. Since the existing riparian vegetation is incapable of providing bank stabilization, it follows that removal of the existing bank protection works will cause an increase in bank erosion and stream sediment for whatever period it takes for

stabilizing riparian vegetation to develop. The local turbulence caused by the proposed introduction of large woody debris to the channel will likely cause additional bank erosion and stream sediment loading during the period it takes for the stream channel to reach a new equilibrium.

The NRMP (Parametrix 1999) recognizes the need to implement erosion control measures to stabilize eroding banks but does not identify which specific measures would be employed. Table 5.2-6 (pg 5-64) referenced by the plan on page 5-71 does not provide proposed mitigation projects and appears to be cited in error.

In my opinion, what this means is that fish will try to make a living in a less fish-friendly environment, at least in the short-term. Miller Creek, as a result of storm-induced changes, will not likely meet cutthroat requirements. This could go on for a few years or for a longer period of time, until the stream stabilizes and establishes a more or less permanent meander. It is very likely that follow-up restoration will be required and that the stream will have to be monitored routinely.

### **Stormwater Outfalls**

Additional temporary and permanent stormwater detention facilities and outfalls are to be constructed to allegedly mitigate impacts from the proposed third runway construction activities and new, impervious surfaces. Seven temporary ponds, four permanent ponds, and two treatment facilities are to be constructed and operated.

In my opinion, additional point-source discharges to Miller Creek will occur with the possibility of increased local impacts if all the proposed stormwater detention ponds and treatment facilities are built. Below each outfall on the creek, there will be an area of scoured substrate, which will likely increase or decrease in size as a function of discharge velocity. Scoured stream substrate is poor habitat for fish and other aquatic species.

While the Preliminary Comprehensive Stormwater Management Plan prepared by Parametrix (2000b) includes the volumes and discharge velocities for existing detention facilities on Miller Creek, the discharge velocities for the proposed outfalls are not presented. It is suggested in the Preliminary Comprehensive Stormwater Management Plan (Parametrix 2000b) that flows and water quality from the proposed stormwater detention facilities will meet requirements of King County's Surface Water Design Manual (KCC 9.04) but there is no specific assessment of potential impacts associated with the construction of these facilities. Again I am left with the impression that I should simply "trust them" to build facilities that have little or no adverse impact.

### **Cumulative Impacts**

Unfortunately, there is no attempt to link any of the proposed construction projects on Miller Creek, yet there is potential for cumulative impacts. Each of the proposed construction projects, as presently described and assessed, stand alone and are not

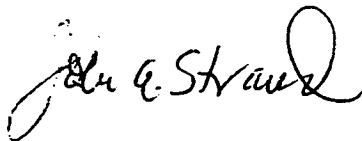
evaluated in the context of the overall change that Miller Creek will undergo if the Port is permitted to build the third runway. Even if the Port does not believe there will be cumulative impacts, they are remiss for not considering this possibility and providing a rational assessment. Their work must be viewed as incomplete if they have not carried out this assessment.

### Summary

It is my opinion that the JARPA for Miller Creek does not address all the impacts on fish and fish habitat from the proposed construction projects. Notable omissions include the potential impacts of elevated temperatures on cutthroat and other aquatic species that will occur on the relocated reach of Miller Creek following construction, because of insufficient shading and not achieving design minimum flow depth for the stream channel during summer low flow conditions. The reduction in depth in the relocated main channel also could limit movement of all but the smallest fish throughout the relocated reach and conceivably lead to stranding and mortality of larger fish. The addition of spawning gravels to the relocated stream channel without providing interstitial fine materials (sand and silt) could intermittently eliminate surface flow during summer low-flow conditions, increasing the likelihood of fish stranding. New stormwater discharges on Miller Creek are not evaluated for their potential to cause increased local scouring that would diminish the quality of habitat for cutthroat trout and other aquatic species. The potential for cumulative impacts of the sum total of all the proposed construction on Miller Creek is also ignored. Finally, the authors of the JARPA are remiss for not including all relevant information (data), calculations, and scientific references to assure the public and their scientific peers that the proposed restoration designs, particularly for the relocation of Miller Creek, are credible and have a reasonable chance to succeed.

Thank you for the opportunity to comment on the subject JARPAs. I am available by phone or e-mail at your convenience to discuss any of my comments in greater detail.

Yours very truly,



John A. Strand, Ph.D.  
Principal Biologist

Attachment (Curriculum Vitae)

Cc: Peter Eglick  
Kimberly Lockard  
William Rozeboom

Cc (continued):

Nancy Brennan-Dubbs  
Jonathan Freedman  
Ray Hellwig  
Gerry Jackson  
Ann Kenny  
DeeAnn Kirkpatrick  
Kitty Nelson  
Tom Sibley  
Gail Terzi  
Gordon White

**References**

Parametrix, Inc. (Parametrix). 1999. Seattle-Tacoma International Airport Master Plan Update. Natural Resource Mitigation Plan. Prepared for the Port of Seattle by Parametrix, Inc., Kirkland, Washington.

Parametrix, Inc. (Parametrix). 2000a. Seattle-Tacoma International Airport Master Plan Update. Natural Resource Mitigation Plan. Revised Implementation Addendum. Prepared by Parametrix, Inc., Kirkland, Washington.

Parametrix, Inc. (Parametrix). 2000b. Preliminary Comprehensive Stormwater Management Plan. Seattle-Tacoma International Airport Master Plan Update Improvements. For Agency Review. Prepared for the Port of Seattle by Parametrix, Inc., Kirkland, Washington.