APPENDIX F

WETLAND EVALUATION

WETLAND EVALUATION

This wetland is 2.18 ha in size and is located near East Uniacke at the northern end of the area slated for expansion of the Weeks Constructin quarry. Approximately 27 % of the wetland is located within the proposed expansion area property. The rest of the wetland is located outside of the property. The wetland occupies a basin that is bounded by mature softwood forest except at its southern end where it is bounded by the existing quarry. The wetland is a wetland complex composed of mixedwood treed basin swamp and basin bog. Mixedwood treed basin swamp is found around the margin of the wetland where peat depths are relatively shallow. An open tree canopy composed mainly of a mixture of red maple, black spruce and tamarack characterizes this wetland type. Shrub cover is well developed and consists largely of trailing blackberry (*Rubus hispidus*), sweet gale (*Myrica gale*), leather-leaf (*Chamaedaphne calyculata*), swamp rose (*Rosa nitida*), and winterberry (*Ilex verticillata*). The ground vegetation layer is dominated by sphagnum moss along with lesser amounts of royal fern (*Osmunda regalis*), bog goldenrod (*Solidago uliginosa*), tawny cotton grass (*Eriophorum virginicum*), and sedge (*Carex exilis*).

Basin bog is located in the interior of the wetland. This habitat is characterized by a sparse shrub layer composed largely of sweet gale, speckled alder (*Alnus incana*) and stunted red maple (*Acer rubrum*) and tamarack (*Larix laricina*). The ground vegetation layer is well developed and consists of a carpet of sphagnum moss punctuated by patches of sedge (Carex exilis), bog goldenrod and tawny cottongrass. Ericaceous shrubs are scarce and graminoid species are abundant suggesting that this bog is more fertile than most bogs. This may indicate that this portion of the wetland receives some groundwater inputs. As such, it is transitional between bogs which are nutrient poor and fens which relatively fertile.

The wetland is relatively free of disturbance. Drainage water from the quarry settling pond drains into the wetland but there was no evidence that these inputs were adversely affecting the wetland. Wetland plant communities located near the settling pond were healthy and of similar species composition to plant communities elsewhere in the wetland. There was no evidence of tree die back associated with alteration of wetland hydrology. Black spruce, a species sensitive to water level alterations, was present near the outfall of the settling pond and was in good health suggesting that current inputs of drainage water from the existing quarry are not adversely affecting plant communities in the wetland. There was evidence to indicate that there have probably been water level fluctuations in the wetland in the past 10 to 20 years. Heavily rotted standing dead trees were common and trailing blackberry was abundant. These features are often found in wetlands that have been subjected to water level fluctuations such as beaver flooding. There is some minor disturbance associated with quarrying operations. Fly rock from the quarry has landed in the wetland producing a number of small pools. These pools are only found within approximately 50 m of the edge of the quarry.

The amount of wetland habitat potentially disturbed by the project is less than two hectares, therefore, the wetland evaluation uses the ten-step process described in the Nova Scotia Department of the Environment

Wetland Directive. In the following text each of the questions associated with each of the ten steps is addressed.

Step 1. Evaluate Wildlife Habitat Potential.

This wetland does not appear on wetland atlas mapping due to its small size and no Golet Score (a wetland evaluation system used to determine the value of wetlands as wildlife habitat) has been assigned to it. During the field surveys, all species of bird, mammal, reptile and amphibian detected within and immediately adjacent to the wetland were recorded. Wildlife species were detected on the basis of visual sightings, vocalizations, tracks, feces, skeletal remains, and distinctive signs such as claw marks or dens.

The wetland was surveyed for birds, mammals and herpetiles on June 30, 2003 and additional wildlife information was collected during a second visit on September 15, 2003. Birds observed in the wetland included White-throated Sparrow, Blue-headed Vireo, Black-capped Chickadee, Dark-eyed Junco, Swamp Sparrow, American Goldfinch and Common Yellowthroat. Tracks and feces of varying hare and white-tailed deer were observed in the wetland suggesting that these mammals use the wetland or travel through it. Herpetile species noted from the wetland included green frog, pickerel frog, northern spring peeper, four-toed salamander, eastern smooth green snake, and maritime garter snake. The wetland contains only a few small pools which suggests that it does not provide valuable habitat for waterfowl or semi-aquatic mammals such as muskrat (*Ondatra zibethicus*) and beaver (*Castor canadensis*). The few small pools present in the wetland provide limited amphibian breeding habitat. These pools do not provide suitable habitat for fish. Overall, the wetland is considered to have relatively low value as wildlife habitat due to its small size and lack of diverse habitats.

Step 2. Evaluate for Rare and Endangered Species

A vegetation survey was conducted to determine if any rare vascular plant species were present. A total of 74 species of vascular plant were encountered during the survey (Table G1). None of these species is considered to be rare in Nova Scotia (Atlantic Canada Conservation Data Centre (ACCDC) 2003; Nova Scotia Department of Natural Resources (NSDNR) 2003), or Canada (Committee on the Status of Endangered Wildlife in Canada (COSEWIC) 2003). None of the bird, and mammal species recorded in the wetland are considered to be rare nationally (COSEWIC 2003) or provincially (ACCDC 2003, NSDNR 2003). One relatively rare amphibian species, the four-toed salamander, was found in the wetland. A female four-toed salamander and her clutch of eggs were found in a small pool at the northern tip of the wetland (Figure 5.1) outside of the property. Four-toed salamanders nest in sphagnum moss hummocks at the edges of pools or sluggish streams. Suitable four-toed salamander nesting habitat was found only at the northern tip of the wetland where several small pools were found. Four-toed salamander is listed by NSDNR as a yellow species indicating that it is sensitive to anthropogenic activities. Local herpetologists believe that this species is more widespread and abundant than previously thought. A

recent study (JWEL 1999) corroborates this belief. The study found four-toed salamander nest sites in 25 of 46 locations tested with a total of 79 nests found in the 25 sites where the species was present. Nests were found in a variety of natural and anthropogenic sites. JWEL has encountered four-toed salamanders at a wide variety of locations in Nova Scotia. The quarrying activity will not result in the loss of wetland habitat in Wetland 1 since most of the wetland is located outside of the property and the portion located inside the property is inside a buffer zone which will not be disturbed. There is some potential for the hydrology of the wetland to be altered. This is expected to result in the wetland becoming wetter. This may result in the creation of more pools suitable for four-toed salamander breeding. Changes in wetland hydrology are expected to occur over the course of approximately 25 to 30 years as the quarry gradually expands to its final size. This should help to alleviate the effects of hydrological change by allowing plant and animal communities to acclimatize to the changes. Mitigative measures such as the spreading of clean gravel on the quarry floor and the construction of surface water flow retention/siltation structures will substantially reduce the effects of quarry development on the hydrology of the wetland. Four-toed salamanders are able to adapt to changing conditions and have been found nesting in a variety of disturbed sites including roadside ditches, beaver floodings, wheel ruts and old borrow pits. Given these findings, expansion of the quarry is not expected to have a significant long-term effect on local four-toed salamander populations.

Step 3. Evaluate Groundwater Recharge Potential

The wetland may function as a groundwater recharge site. It receives both surface water and groundwater inputs from a portion of a watershed approximately 36.7 km^2 in size; however, there is no evident surface water outflow suggesting that water is lost from the wetland through evapotranspiration and groundwater flow. No wells are located within approximately one kilometer and most groundwater from this watershed would be expected to flow to the north away from any inhabited areas. Given the size of the wetland and its location relative to inhabited areas it is not expected to play a significant role in the replenishment of local water supplies.

Step 4. Evaluate the Role of the Wetland in Surface Flow Regulation

The wetland may play a role in surface water flow regulation by capturing surface water from the surrounding watershed and temporarily storing it or diverting some into groundwater flow. The wetland will not be physically altered by quarrying activity so that its ability to carry out this function should not be significantly impaired. However, quarrying activities will result in an increase in the size of the watershed for this wetland as the local topography is altered thereby increasing the amount of surface water entering the wetland. The exposure of bedrock in the quarry will result in reduced infiltration in the watershed resulting in further increases in surface water volumes entering the wetland. These increased surface water inputs may decrease the effectiveness of the wetland at regulating surface water flow. The wetland currently has no outflow. Increased inflows of surface water as a result of quarrying activity may

result in the development of an intermittent outflow stream. The implementation of mitigative measures to control surface water flow such as the lining of the pit floor with clean gravel and the construction of appropriately sized surface water flow retention/siltation structures will help to ensure that the effectiveness of the wetland in regards to surface water flow regulation is not reduced.

Step 5. Evaluate the Agricultural use of the Wetland

The wetland is not used for agricultural production nor does it have any agricultural potential due to its small size.

Step 6. Evaluate the Potential Role of the Wetland in Water Treatment

The wetland currently receives water from the existing quarry. The settling pond for the quarry decants into the southern end of the wetland and may help to polish the quarry drainage water by filtering out suspended particulates. The plant communities located at the outflow of the settling pond appear to be healthy suggesting that existing inputs of surface water from the quarry are not adversely affecting the wetland. As the quarry expands the amount of surface water entering the wetland will increase, particularly, once the excavation proceeds past the existing watershed divide and water that normally flows to the north will be diverted to the south. The role of the wetland in water treatment will increase as the quarry expands. The increased inputs of surface water may result in changes in the biota of the wetland. Increased water level fluctuations may result in the mortality of wetland tree species sensitive to water level fluctuations such as black spruce. Water may tend to accumulate on the surface of the wetland resulting in the loss of terrestrial biota and the establishment of aquatic plants and animals. Increased inputs of surface water may also result in the accumulation of inorganic sediments in the wetland near the inflow from the settling pond resulting in the smothering of low slow growing plants such as sphagnum moss and the establishment of species characteristic of fresh marshes such as broad-leaved cat-tail and bulrushes. In order to maintain the ability of the wetland to effectively polish surface waters discharged from the quarry, it is important to apply effective erosion and sedimentation control in the quarry to prevent the wetland from being smothered by heavy inputs of sediment. This can be accomplished in several ways. Weeks Construction has reduced the size of the quarry so that the amount of the southern watershed intercepted by the quarry is greatly reduced. This will reduce the amount of water entering the wetland and will also reduce the potential for sediment to enter the wetland. Other mitigative measures including the spreading of clean gravel on the quarry floor and the construction of surface water flow retention/siltation structures will substantially reduce the amount of sediment entering the wetland.

Step 7. Evaluate the Potential for Peat Development

The wetland is too small to provide potential for commercial peat extraction and the peat present in the wetland would have a high wood content reducing its value as horticultural peat.

Step 8. Have you Addressed all Potential Issues with the Wetland Proposal?

All issues have been addressed.

Step 9. Address Additional Concerns

There are no additional concerns.

Step 10. Summary of Wetland Evaluation

This wetland provides several wetland functions including the provision of habitat for an uncommon amphibian species, the four-toed salamander, probable ground water infiltration site, surface water flow control, and polishing of surface water discharged from the existing quarry. Expansion of the quarry will not result in the loss of wetland habitat and it is expected that these wetland functions will continue. Quarrying activity will result in a progressive increase in the volume of surface water entering the wetland which may result in changes in wetland habitat structure as species intolerant of water level fluctuations are eliminated and replaced by species tolerant of wetter conditions. Inputs of sediment may also alter wetland biota. Incorporating mitigative measures to even out stormwater flow and prevent erosion and sedimentation can minimize these changes. Implementation of these measures will minimize adverse changes to the wetland and maintain the existing wetland functions.