ADDENDUM

to Final Report
on the Present and Future Water Demand Study carried out
by Summit Environmental Consultants

June 27, 2007

PURPOSE OF THE ADDENDUM

The purpose of the **addendum** is to address comments and answer questions that were raised by the Multi-Stakeholder Committee upon reading the final report and following a presentation on the study findings.

The Present and Future Water Demand Study (PFWDS) and the final report met the terms of reference that were developed for the project. The intention of the **addendum** is not to question the validity of the study findings but to add clarity, highlight a number of statements made in the report, and provide context in order to minimize misinterpretation of the data and comments that are found in the final report. The reader is reminded that the study findings, including the projections for future water demand, were based on available data and assumptions made by Summit Environmental Consultants. The findings are useful for general water planning purposes. However, for specific planning within geographic areas, further data should be collected to confirm assumptions and water demand estimates.

No further funding was available to have the Consultant, Summit Environmental Consultants, make further changes to the final report. Therefore, the Multi-Stakeholder Committee (MSC) undertook to prepare an addendum as a separate document.

1) THE DIFFERENCE BETWEEN *WATER DEMAND* AND ESTIMATED *WATER USE*

The study estimated that the present *water demand* by all sectors in the Nicola watershed is approximately 53.3 million cubic metres while present estimated *water use* is 74.2 million cubic metres. The difference of about 20 million cubic metres, referred to as distribution loss, represents the volume of water that does not reach its intended use but either returns to the ground (leaky pipes) before reaching its destination or evaporates.

Key to interpreting correctly the study findings on water demand and use is understanding the difference between the phrases *water demand* and *water use*. For purposes of this study and as used in the final report, *water demand* is defined as follows: For all sectors (industrial, business, commercial, domestic, institutional, and resorts and recreation) **except** agriculture, *water demand* is defined as the quantity of water required to optimally maintain their respective activities. To determine the water demand for these sectors, Summit developed a number of assumptions and calculations. These are explained in the final report on pages 31through 41.

For the agricultural sector, *water demand, w*ith or without the word 'crop' preceding the phrase, refers to the amount of water a crop needs to grow in the field and achieve maximum yield under

ideal conditions. Pages 21 to 41 of the report discuss Summit's assumptions and methodology for determining *water demand* by the agricultural sector.

Water demand by the agricultural sector DOES NOT refer to the water withdrawn either from surface water or groundwater. The water withdrawn is called estimated *water use,* an estimated figure based on *water demand* and irrigation efficiency. See 4) below for a definition of irrigation efficiency.

Water use for all sectors, agriculture included, reflects the quantity of water withdrawn from the source, be it surface or groundwater, and includes losses through the distribution system and potential consumption of water in excess of what is actually needed.

These terms are further discussed on Pages 3 and 4 of the report.

Tables 5.1 and 5.2 (pages 114 and 115, respectively) present *water demand* and estimated *water use* by sub-basin and sector, respectively.

2) FUTURE PROJECTIONS FOR WATER DEMAND BASED ON CROP DEMAND, NOT WATER USE

Projections for water demand in agriculture are based on 2006 crop water demand figures, not on estimated water use. In other words, the calculations to estimate **future water demand** were based on *water demand*, which refers to the amount of water that a crop needs to grow in the field to achieve maximum yield under ideal conditions. Ideal conditions mean 100% irrigation efficiency, that is, no water loss due to evaporation, leaks and over-watering and no wind.

Because of the volume of distribution losses (see 1) above), forecasts based on estimated current use rather than current water demand should be considered when planning for sustainable agriculture in the Nicola basin. For example, in Table 8.2, summarizing future agricultural water requirements in the watershed, scenarios predict figures of 40.5 to 48.3 million cubic metres based on crop water demand. In reality, water extracted from the source to deliver these quantities to the fields (actual water use) will be roughly 48% higher to account for distribution loses. These distribution losses are inherent to irrigation and can only be improved by a maximum of between 7% and 10% in the basin by improving irrigation efficiency. Therefore, in planning for as sustainable agriculture in the watershed, water use requirements of between 59.9 and 71.5 million cubic metres by 2050 should be considered rather than the projections for crop water demand.

3) VALUE OF FLOOD IRRIGATION

Flood irrigation is discussed under Section 8.4.1. The statement is made that by "converting flood irrigation to a more efficient system, it would be possible to improve overall irrigation efficiency by nearly 7%". Notwithstanding this comment, flood irrigation has/may have other benefits (in some sub-basins) beyond providing water for crop production. Flood irrigation provides water for vegetation (trees, bushes, grasses, etc.) and wildlife, brings nutrients to vegetation (e.g. riparian vegetation) and contributes towards plant and animal biodiversity. These are all important values that need to be considered in order to have flourishing communities in a sustainable watershed. Any decision to change from flood irrigation to another type of irrigation should take into account these values. In addition, in some areas where flood irrigation is practiced, alternatives to store the spring freshet are not economically or environmentally feasible.

4) IRRIGATION EFFICIENCIES

For this study, irrigation efficiency is defined as the percentage of the water that is withdrawn from the source that is beneficially used by the crop. Irrigation efficiency reflects water losses due to distribution system losses (e.g. leaks), evaporation and poor irrigation practices (e.g. over-watering). (Final report, Page 3 and Pages 120 to 122.) Thus, the lower the irrigation efficiency, the greater the amount of water that

a) never reaches the crop because of leaks and evaporation and /or
b) the crop cannot use the water (over watering).

There was significant discussion around the term *irrigation efficiencies* as it applies or could apply in practice in the Nicola watershed. Land management decisions are based on a variety of factors and objectives and using less water may not always be possible or desired. Since the terms of reference for this study required the Consultant to look at the impact of water conservation practices, the common method is to use standardized irrigation efficiency formulae for the agricultural sector.

5) KEY TABLES IN THE REPORT

The reliability of the figures in the report tables depends on the accuracy of the assumptions.

Table 5.1 and 5.2 (pages 114 and 115, respectively). Given new information about the volumes of water used by the Spius Creek Fish Hatchery, the estimated annual water demand and use for

the Spius sub-basin and for the institutional sector bear re-examination when there will be calculations done for the water balance for this sub-basin and the watershed as a whole.

Table 5.3 – It should be noted that the *actual use* column is an estimate only.

Table 5.4 and Table 5.5, footnote 3 (pages 120 and 121, respectively) – new wording: Some of the water withdrawn from the Moore sub-basin may be used in the Stump Lake sub-basin. Since irrigated fields cross sub-basin boundaries and the boundaries could not clearly be seen in sufficient detail on the maps that were produced, it was not possible to assess to a high degree of accuracy the diversion of water (irrigation) from the Moore to the Stump Lake sub-basin.

6) WHY SOME LANDOWNERS DO NOT USE ALL THE WATER THEY ARE LICENSED TO EXTRACT

One of the key findings of the study is that the volume of surface water licensed for agriculture use in all but the combined Middle Nicola and Clapperton sub-basins, is quite a bit higher than the estimated agricultural *water demand* or *water use* (Table 5.5, page 122). If some landowners with water licenses do not withdraw all of the water they are allowed, it could be because the pump capacity of their irrigation systems limits how much water can be withdrawn from the source within the time frame allowed by the license. Other reasons include: the water supply is not there, the water is not needed for the crop, there has been sufficient rain at the right time, and/or the river has changed course.

7) THEORETICAL VERSUS ESTIMATE

The meaning of the word 'theoretical' and 'estimate' differ. An estimate is an approximate calculation based on one or more assumptions. For example, Summit assumed that the number of wells in the Ministry of Environment's database represented 50% of the actual number of operating wells. When they then calculated the demand for groundwater, they first multiplied the number of wells in the data base by 2. Then they multiplied the new well number by the average daily consumption per household, times the number of households in the area to arrive at the final figure. This final figure is an estimate of groundwater use.

Theoretical is defined as pertaining to or based on theory. In the well example above, there is no theory associated with how to determine the number of wells in an area. The calculation that was performed did not try to either prove or disprove the actual number of wells in the area. A theory is a system of assumptions, accepted principles and rules of procedure devised to analyse, predict

or otherwise explain the nature or behavior of a specified set of phenomena. A theory implies that it has to be proved or disproved.

In this study, the objective was not to confirm or disprove a theory, but to calculate series of numbers based on certain assumptions and/or criteria.

8) SECTION 5.9.5 – INSTITUTIONS - PAGE 102

It was brought to Nicola WUMP's attention after the final report was completed that there was an error in the commentary under Groundwater. The Spius Creek Fish Hatchery utilizes significant quantities of both groundwater and surface water – use is 24 hours a day, seven days a week.

Water is withdrawn from Spius Creek under a license. Little water would be lost to evaporation or discharge to ground as retention time in the facility is probably an hour or less until it is discharged back into Spius Creek a few hundred metres downstream from the point of diversion.

Water is also withdrawn from medium to deep aquifer(s) through three production wells (pump levels approximately 120 to 160 ft. below ground surface). Generally, at least two wells are producing water for the facility on a 24 hour a day seven day a week basis – and for a significant part of the year, all three wells are used. The total amount of water withdrawn from both surface and groundwater is estimated to be 4.3 million litres per day.

9) SECTION 6.0, PAGE 123

It should be noted that the study did not examine licensed instream flows since that is part of a water supply analysis. Future revisions to instream flow guidelines will consider water supply.

The second paragraph of Section 6.1 states that "no flows are presently licensed for instream flows in three sub-basins". While this is correct for the main channels of the creeks and other water courses in these sub-basins, there are licenses on the side channels of some of these bodies of water.

10) THE LIMITS OF THE DEMAND STUDY – NO SUPPLY DATA

The scope of the Present and Future Water Demand Study excluded collecting information on water supply. The report therefore presents no supply data. The purpose of the study was to look at water demand only. Water supply will be done through a separate study. The reason for the separation was the cost of doing a combined study.

The fact that there is no water supply data in the report should not in any way discredit the findings on water demand. The findings from the Present and Future Water Demand Study fill one knowledge gap that was identified. The water balance, a key piece of information that remains to be determined, will flow once a watershed-wide water supply study has been completed.