

Purple Springs Nursery 2017 Farm Book

v.2 March 21, 2017

1. Introduction

On June 7, 2016, Purple Springs Nursery Inc. of 4516 Hullcar Road, Armstrong BC was served with a Pollution Prevention Order (PPO) under the Environmental Management Act (File: 108431). The PPO referenced the lands identified by PID 011-227-486 as well as other lands associated with the operation, and identified the specific substance of concern as nitrate from agricultural waste. As part of the PPO requirements, the operation is required to submit a 2017 Farm Book which is a summary of nutrient use and cropping on the property as well as scheduled monitoring activities for 2017.

This report is the 2017 Farm Book as required under the PPO. It contains information on the proposed 2017 nutrient use on the operation, and the soil, compost, groundwater and surface water sampling to be undertaken during 2017. This Farm Book will be updated on April 30, July 31 and October 30 2017 as 2017 operational information becomes available.

Purple Springs is a nursery operation located on Hullcar Road in Spallumcheen BC (Figure 1). They grow a variety of tree species primarily for landscaping and street tree plantings. The operation's land base consists of 192 acres (78 hectares) of agricultural land used for growing trees and an additional 14 acres (5.5 hectares) of land used for farm operations related to growing of trees but not used for active tree production. In addition, there is a small area of land for buildings, parking, equipment storage etc.

The 2016 Nutrient Management Report contains details about the composting process at Purple Springs, and the placement of compost on the site. Please refer to this report for additional information.

Note: Information considered proprietary by Purple Springs Nursery has been removed from this report and will be provided to the Ministry of Environment in a separate letter. Purple Springs Nursery does not wish this information to be made public as it will provide competitors with information about their proprietary nutrient management program.

2. Land base for tree production in 2017

The total land base used for tree production in 2017 will be 78 hectares. The land base is divided into fields. Table 1 contains a list of all fields and their areas. The location of each field is identified on Figure 2 (end of report).

Table 1. Purple Springs Field ID and Area

Field Name	Area	
	acres	hectares
Red	18	7.3
White	16	6.5
Yellow	38	15.4
Blue	25	10.1
Corn field	11	4.5
Green	41	16.6
Brown	19	7.7
Olympic	22	8.9
Lagoon	3	1.2
Total	193	78

Each field is subdivided into rows. Trees are grown in-ground in the rows on a 4-5 year rotation. After trees are dug for sale, the rows are seeded to a cover crop for one or two years. At any time, approximately 20% of the row area is planted to cover crops (Sudan grass, Daikon radish or fall rye) and the remainder is planted to trees. In the fall prior to planting with trees, the cover crop is cultivated and the rows are amended with compost. Strips of permanent grass cover are maintained between each tree row.

At the time of writing, no decisions had been made about which rows will be planted in 2017. This information will be contained in the quarterly updates.

3. Groundwater monitoring

In 2017, Purple Springs will do the following groundwater monitoring as recommended in the 2016 Nutrient Management Report:

Nitrogen constituents: Project wells 7, 8 and 13 tested quarterly for ammonia, nitrate, organic nitrogen, total nitrogen and total kjeldahl nitrogen.

Water levels: Project wells 7, 8 and 13 monitor water levels quarterly.

At the time of writing, no groundwater data for 2017 was available. Data will be provided in regular updates as it becomes available.

4. Storage capacity for organic materials for compost production

The organic materials used at Purple Springs in 2017 are expected to be manure and wood waste. Some of the wood waste was received during the month of February, the remainder will be delivered over the next month. The manure will be delivered to the site between mid-March and mid-April (dates to be confirmed) and will be stockpiled temporarily on-site until blended into compost. Compost production is scheduled to start by mid to late April 2017.

Manure will be delivered and stored in a temporary field storage site in Yellow Field (identified in Figure 3) for a 1 week period (approximately) in spring. Manure is typically delivered and incorporated into the compost blend with hog fuel within 2 days. Stockpiles of manure will be covered for the approximately 2

day period before they are blended into a compost windrow. Because the storage period for each stockpile of manure is 2 days or less, covering the piles will prohibit any leaching of constituents into the surrounding soil if there is a significant rainfall event. A small berm will be placed upslope of manure stockpiles to divert runoff from piles. The temporary storage site for 2017 is located on a silt loam soil which has a moderate to high nutrient retention capacity and good moisture holding capacity. This combined with the tarping of piles and berming to keep run-on water away will be equivalent to placing piles on an impermeable surface and will be protective of groundwater supplies.

Because the operation only temporarily stores organic materials (less than 9 months), it does not require any permanent storage facilities for organic materials. The stockpile area will be sited at least 30 metres from domestic water sources, the high water mark of surface water sources and property boundaries.

5. Organic materials to be used on site in 2017

In 2017 Purple Springs will use manure and wood waste to produce compost for use on the nursery. Details about the types and quantities of manure to be brought on to the site for composting in 2017 are found in a separate letter report. There will be no inorganic nitrogen fertilizer used on site in 2017. The two organic wastes will be the only source of nitrogen brought on to the farm in 2017. Compost will provide all nutrient requirements.

6. Organic materials management in 2017

Manure will be temporarily stockpiled in a temporary storage area as discussed in Section 4 until it is blended with wood waste and placed in compost windrows.

Compost windrows will be sited in the area identified in the Yellow field (Figure 3). Trees have been removed and are scheduled to be replanted in this area in spring 2018. Rationale for the acceptability of in-situ field composting at Purple Springs was contained in the 2016 Farm Book/Nutrient Management Report. Location of compost windrows will be updated once placed in late spring/early summer. Required setbacks from wells and surface water will be maintained when placing compost windrows.

7. Timing of compost application and application rates

Timing of compost application: Compost will be applied in early to mid-September 2017 to rows where trees have been removed. The exact timing and locations will be updated once it is known which rows will be amended in fall 2017. Required setbacks from wells and surface water will be maintained when applying compost to row areas.

Compost application rate: Compost will be applied at the standard rate; application rate details are found in a separate letter report. The standard rate will add an estimated 2 kg per hectare of plant-available nitrogen (nitrate + ammonium-N) to the soil in fall 2017. Table 2 contains compost and nitrogen application rate calculations.

Compost that was applied in 2016 is expected to release 68 kg per hectare of plant-available nitrogen from breakdown of compost organic matter during the 2017 growing season (20% of the nitrogen in the compost). It is expected that the trees or cover crops on site will utilize all of this nitrogen. Compost

applications in years prior to that will release a smaller amount of nitrogen from the organic nitrogen in the compost, also expected to be all taken up by trees.

Other nutrient additions: Purple Springs will use no nitrogen fertilizer in 2017. All nitrogen requirements of the trees will be supplied by the compost.

Table 2. Nitrogen Content of Purple Springs Compost

Source of nitrogen	Calculation	Nitrogen (kg/yr)
Nitrogen from compost	(100% dry basis, from October 2016 lab analysis of finished compost): - Total nitrogen 0.65% N - NH ₄ -N 15 ppm - NO ₃ -N 21 ppm	
Nitrogen applied to site in compost at:		
Plant-available nitrogen from compost in year of application	NH ₄ -N in finished compost	0.8 kg/ha
	NO ₃ -N in finished compost	1.1 kg/ha
	Nitrogen mineralized from organic matter during year following application (assumes 20% of N mineralized during first growing season after application)	68 kg/ha
Plant-available N per hectare in compost yr 1 post-application	0.8 + 1.1 + 68 = 70	70 kg/ha/yr
Tree nitrogen requirement	Deciduous trees 1-4 yrs of age	112-134 kg/ha/yr

8. Planting areas 2017

At the time of writing (March 2017) Purple Springs does not know which areas will be planted in 2017. This information will be provided in the updates.

9. Drainage management measures to be completed in 2017

A drainage ditch to contain runoff from the upper area of the nursery (fields White and Yellow) will be completed in 2017 as per the 2016 letter report from Rod Maclean, P. Eng. that accompanied the 2016 Nutrient Management Report. Upgrades to the planned wetland treatment area are also scheduled to be made. Progress with these drainage management measures will be summarized in updates. A site map showing improvements will be included at that time. The approximate area of improvements has been marked on Figure 3; a more detailed map will be provided when works are completed.

10. Other planned monitoring events in 2017

Soil: as per the recommendation in the 2016 Nutrient Management Report, we plan to collect samples below and down slope of two compost windrows in fall 2017 to monitor movement of nitrogen from compost into the soil on site. Samples will be collected to 60 cm depth and analyzed for nitrate-N and

ammonium-N. We will participate in the Ministry of Agriculture Post-harvest Nitrate Study if it is repeated in fall 2017.

Compost: We will collect a composite sample from two compost windrows in fall 2017 just prior to compost placement to determine compost organic, ammonia and nitrate-nitrogen levels.

Surface water: We plan to collect a sample of surface runoff before and after entering the constructed wetland area twice during 2017; during freshet and during a period of low flow. Samples will be analyzed for nitrate, ammonia and total nitrogen.

11. Farm Book Updates

We will update cropping and compost production information and monitoring information on April 30, July 31 and October 30 2017 and provide information to the Ministry.

Prepared by:

Ruth McDougall, M.Sc., PAg.
Consulting Agrologist

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Figure 1. Location Map - Purple Springs Nursery (map courtesy of Associated Environmental)

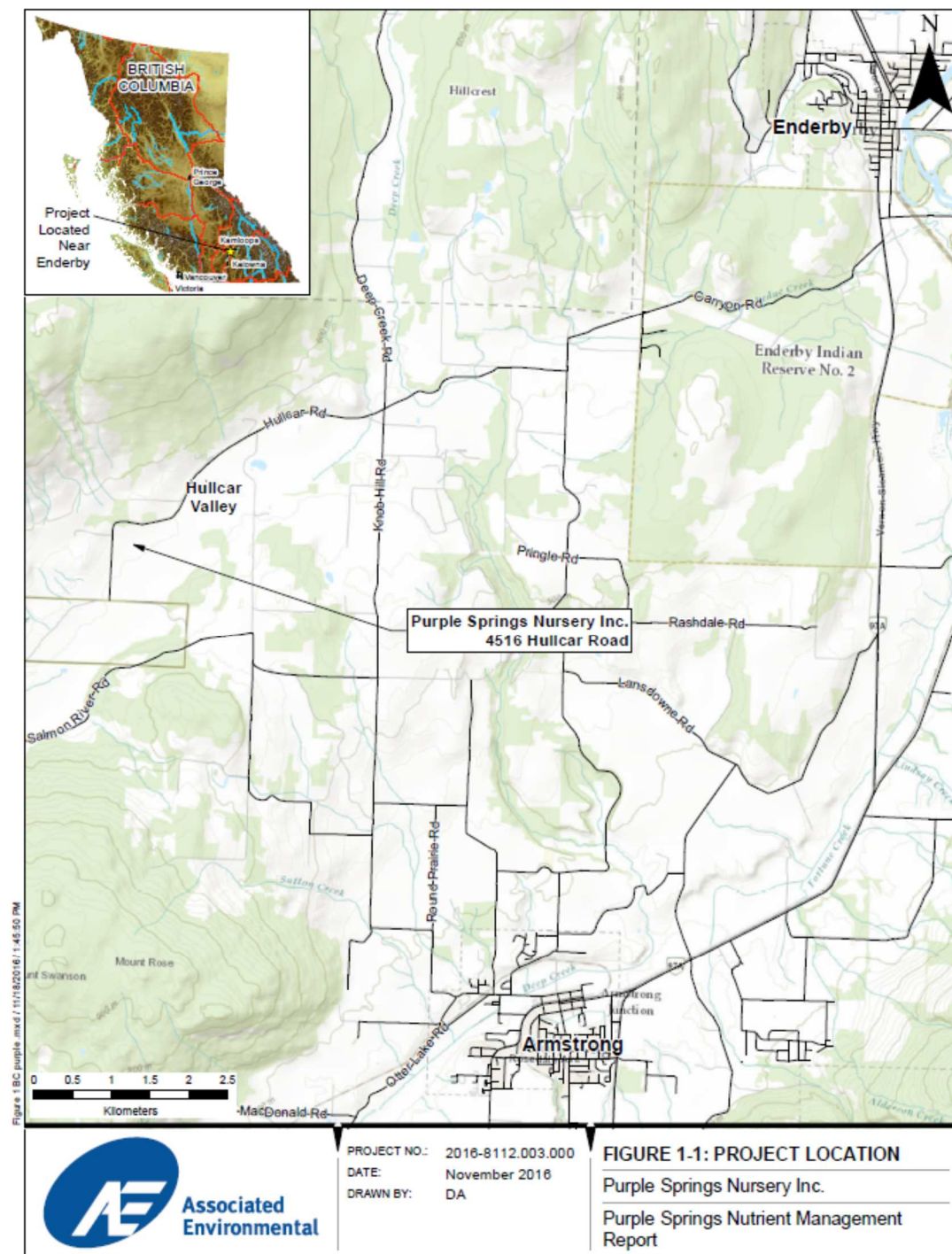
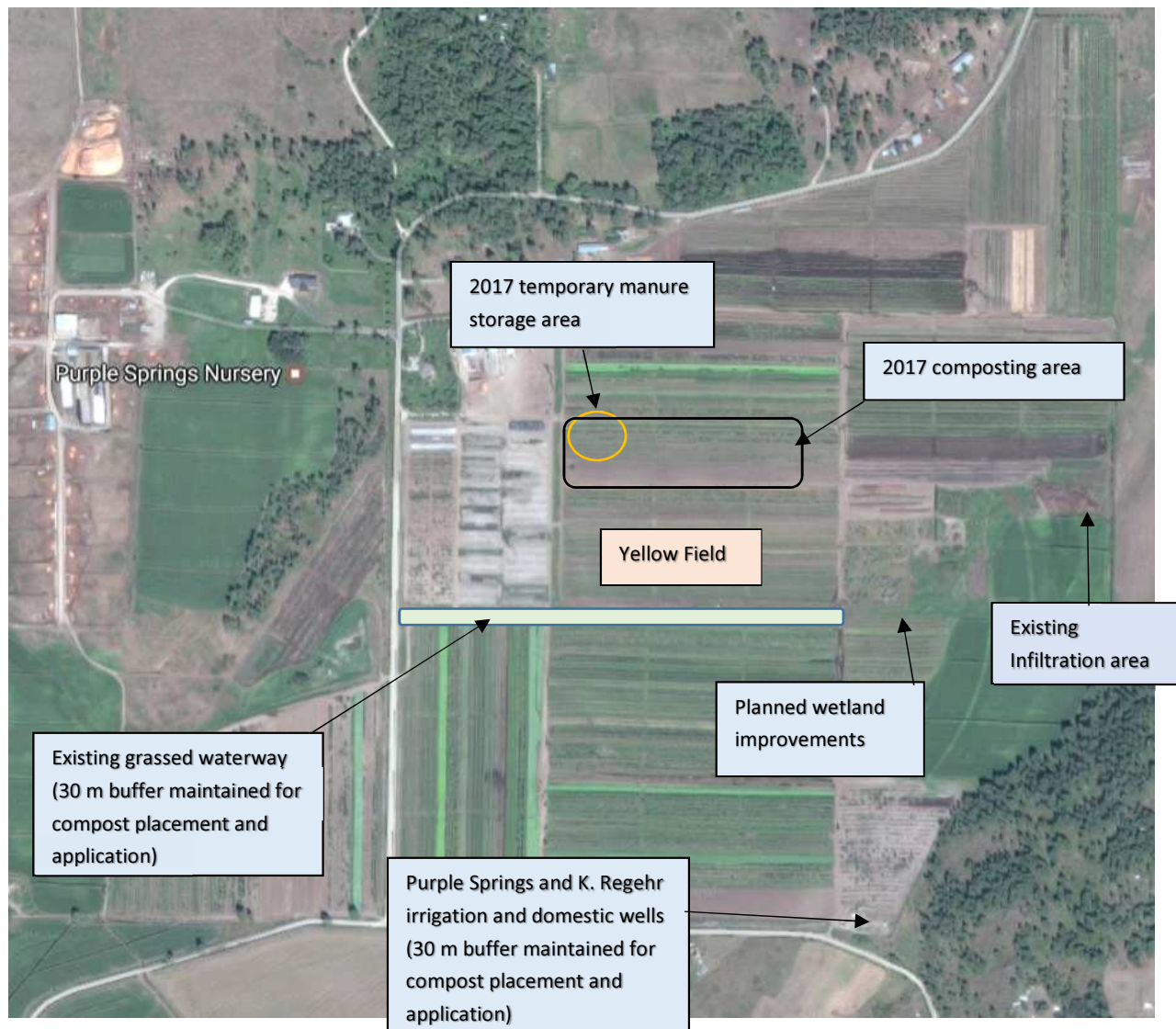


Figure 2. Location and ID of Purple Springs Nursery Fields, and Irrigation Wells



Approximate scale: 1 cm = 100 m

Figure 3. Location of 2017 Temporary Storage Areas, Composting Areas and Irrigation Wells



Approximate scale: 1 cm = 100 m