

October 1, 2018

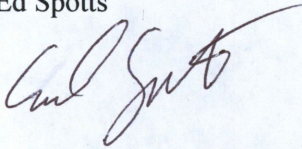
**Mr. Darrel Nitschke**  
**North Dakota Public Service Commission**  
**600 E. Boulevard, Dept. 408**  
**Bismarck, ND 58505-0480**

Mr. Nitschke,

Please find attached the 2018 Annual Monitoring Report of Tree and Shrub Reclamation Planting Survival for the Vantage West Spur Lateral Pipeline. Based on monitoring of Right of Way regeneration and mitigation plantings, the project is currently in compliance with the 75 % of 2:1 mitigation requirement. Final monitoring is planned for 2019.

Please let us know if you have any questions or comments.

Ed Spotts



Senior Scientist

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**Annual Tree and Shrub Planting Survival Monitoring Report**

KC Harvey Environmental, LLC

Ed Spotts, Senior Scientist

**2018 ANNUAL MONITORING REPORT OF  
TREE AND SHRUB RECLAMATION  
PLANTING SURVIVAL**

Prepared for:

State of North Dakota Public Service Commission

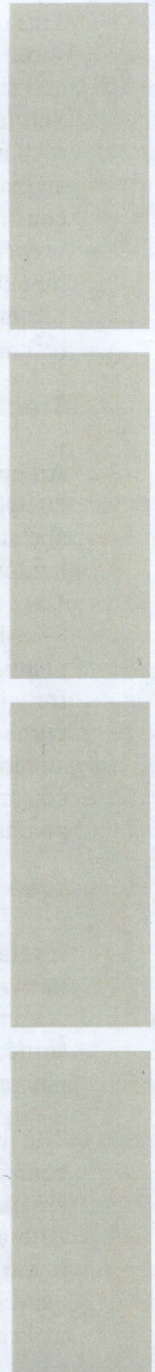
Vantage West Spur Lateral Pipeline

Case No: PU-15-142

October 1, 2018

**KC HARVEY**  
ENVIRONMENTAL, LLC

**PEMBINA**



## Introduction

This document is a report of the third annual Vantage West Spur Lateral Pipeline monitoring for tree and shrub reclamation planting survival. Vantage Pipeline US LP (Pembina Pipeline Corp.) replanted trees and shrubs removed during construction using the methods outlined in the State of North Dakota Public Service Commission (NDPSC) approved Tree and Shrub Reclamation Plan submitted June 2015. The 47.8 mile pipeline alignment extends from a natural gas processing plant near Williston, North Dakota to an existing pipeline system near Stady, North Dakota within Divide and Williams Counties. The construction right-of-way (ROW) is 100 feet wide, which is made up of 30 feet of permanent right-of-way (PROW) and 70 feet of temporary work space. The PROW will be maintained for the lifetime of the pipeline. Vantage/Pembina Pipeline agrees to comply with all stipulations in the NDPSC's Tree and Shrub Mitigation Specifications, including completing annual inspections for three years following reclamation.

## Tree and Shrub Reclamation Plantings

An inventory of planted tree and shrub species was documented in a letter to the NDPSC dated May 9, 2016 titled Tree and Shrub Reclamation Plan for Vantage West Spur Pipeline Case No. PU-15-142. Trees and shrubs were planted as part of the pipeline reclamation in May 2016 (Table 1). Vantage worked with landowners along the pipeline ROW to identify desired species and locations for plantings (Table 1). The 1097 replacement tree and shrubs (2016 and 2107 plantings) were planted outside of the Vantage West Spur ROW, as requested by the landowners. Locations were shown in the 2017 Annual Report. Most plantings were added to home sites, shelterbelts, and windbreaks. Two planting sites were near wetlands for wildlife habitat improvement. Trees and shrubs planted were one and two-year-old saplings and were purchased from Divide County Conservation District. In addition, some shrub species (snowberry, rose, silverberry) were expected to naturally regenerate from root where the species were present pre-pipeline construction. Trees and shrubs disturbed by the pipeline construction were replaced at a rate of 2:1. The goal is for  $\geq 75\%$  survival (420 plants) three years after planting.

## Tree and Shrub Reclamation Planting Survival Monitoring

A total of 280 trees and shrubs were removed during pipeline construction (Table 1). There were 705 individual plants of seven species planted on the Vantage West Spur Pipeline in 2016 as part of the original reclamation effort. Species included chokecherry, caragana, ponderosa pine, Colorado blue spruce, Russian olive, poplar and cottonwood. To address losses, 392 additional trees and shrubs were planted the spring of 2017 and 64 are planned for replanting in fall of 2018.

The tree and shrub reclamation plantings were monitored for survival in the spring and fall of 2018 by counting the number of live stems per species. Table 1 documents the number of surviving and regenerating reclamation plantings. A total of 133 planted in either 2016 or 2017 survived to spring 2018. Although Vantage worked with landowners to plant requested species at desired planting locations at home sites, shelterbelts, and windbreaks survival rate was low due to the severe drought condition experienced during 2017. Where landowners did water trees, the survival was higher (see Russian olive in Table 1).

Regeneration data collected in 2018 shows 388 regenerated plants, resulting in a grand total of 521 reclamation plantings (Table 1). **This total of 521 plants exceeds the 75% of 2:1 replacement ratio of 420 plants.**

## Future Monitoring

It is expected that additional shrubs will continue to regenerate on the reclaimed ROW, adding to the overall total. A survey of regenerated and planted plants will be completed during 2019 to verify and document final plant numbers and compliance.

Table 1. Tree and shrub species present on the Vantage West Spur Lateral Pipeline ROW.

Species	Number Removed from ROW	2016 Planted	2017 Planted	2018 Planted (Planned)	Total Planting Survival	Regeneration	Total Live Plants 2018
Caragana	16	--	--	--	--	--	--
Chokecherry	5	--	--	--	--	--	--
Chokecherry, Caragana	--	100	62	--	--	--	--
Colorado Blue Spruce	--	200	170	--	64	--	64
Colorado Blue Spruce, Ponderosa Pine	--	100	80	64	31	--	31
Cottonwood	2	--	--	--	--	--	--
Cottonwood, Ponderosa Pine	--	195	70	--	37	--	37
Green Ash	8	--	--	--	--	--	--
Horizontal Juniper	33	--	--	--	--	14	14
Poplar	--	10	10	--	1	--	1
Prairie Rose	18	--	--	--	--	126	126
Rabbitbrush	--	--	--	--	--	127	127
Russian Olive	--	100	--	--	--	--	--
Sage	14	--	--	--	--	--	--
Silver Buffaloberry	--	--	--	--	--	--	--
Silver sagebrush	--	--	--	--	--	1	1
Silverberry	22	--	--	--	--	45	45
Western Snowberry	162	--	--	--	--	55	55
Wood's Rose	--	--	--	--	--	20	20
<b>Totals</b>	<b>280</b>	<b>705</b>	<b>392</b>	<b>64</b>	<b>133</b>	<b>388</b>	<b>521</b>

Note: 75 % survival of 2:1 mitigation = 420 plants.