



## Tree Inventory and Impact Report

230 kV GD Line Reroute

GREAT RIVER ENERGY<sup>SM</sup>

A Touchstone Energy<sup>®</sup> Cooperative



South Minnewaukan and Stevens  
Townships

October 2013

Ramsey County, North Dakota

I hereby certify that this field investigation and report was prepared by me or under my direct supervision.

A handwritten signature in blue ink, appearing to read 'Mark D. Aanenson'.

Mark D. Aanenson

Date: 10-7-2013

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Ph. (701) 237-5065  
HE Project No. R126113\_016

# Great River Energy - 230 kV GD Line Reroute

## Tree Inventory and Impact Report

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Prepared by:



**Houston Engineering Inc.**

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## Introduction

Great River Energy is proposing to relocate two segments of an existing 230 kV transmission line that travels between Grand Forks and Devils Lake, North Dakota ("Project"), as shown in **Figure 1-1**. This transmission line is the last 80 miles of a 240 mile transmission line outlet with interconnecting load centers at Devils Lake, Minot, and Grand Forks, North Dakota. The line is an outlet for the Stanton generation plant, and serves a broader purpose of stabilizing the electrical transmission grid in and outside of North Dakota. Since the construction of the transmission line in 1966, several wetland basins along the transmission line route have become flooded, resulting in compromised clearances under the existing transmission line. Surveys have identified the need to mitigate clearance discrepancies as a result of the increased water elevations. Great River Energy proposes to relocate around these expanded water bodies.

The Project consists of the reroute of two segments of the Ramsey to Grand Forks 230 kV transmission line. The need for the reroutes is due to compromised clearances over standing surface water due to flooded conditions in two locations (**Figure 1-2**). The total reroute lengths are 1.75 miles for Segment 7 and 2.25 miles for Segment 8. The majority of the line will be constructed the same as the existing transmission line, which consists of wood poles with H-frame cross arms and braces. The wood poles will be either cedar or Douglas fir and pressure treated with Penta. Span lengths will generally range from 600 to 800 feet; however, longer spans may be necessary in certain areas depending on the topography.

### Requirement for Tree Inventory and Replacement

The North Dakota Energy Conversion and transmission facility Siting Act requires an application for a Certificate of Corridor Compatibility to meet the criteria set forth in the North Dakota Century Code (NDCC Chapter 49-22). In addition, there is discussion with regard to exclusion areas, avoidance areas, and the selection criteria set forth in the North Dakota Administrative Code (NDAC, Section 69-06-08-02).

In accordance with Section 69-06-08-02(3), adverse effects resulting from the location, construction and maintenance of a transmission facility shall be minimized to the extent practicable, and shall be managed and maintained at an acceptable minimum. Wetlands, woodlands, and wooded areas are one of the selection criteria categories identified. The purpose of the Inventory is to identify the type and number of trees and shrubs within the Project Corridor that may be impacted; and develop a replacement plan for the unavoidable impacts.

## **Project Approach**

HEI's approach for the tree inventory and replacement plan included an initial review of the aerial photography for Segment 7 and Segment 8 in order to identify wooded areas and windbreaks that could potentially be impacted by a reroute. The Project Corridor for the two segments was further evaluated during a pedestrian survey conducted in June 2012, and a subsequent windshield survey in October 2012. As a result of the previous reviews, trees and shrubs were identified at two locations along the Segment 8 reroute located west of Crary. The two locations were further evaluated during a field visit on February 12, 2013; and during a follow-up field visit on February 25<sup>th</sup> with the tree removal contractor. Site photography of the locations is shown in Appendix A.

## **Tree Inventory Methods**

Tree inventory methodologies were based on a guidance document<sup>1</sup> provided by the North Dakota Public Service Commission (ND PSC). This document indicates that all trees should be inventoried in windbreaks and shelterbelts regardless of size, and in native growth areas if the tree has a minimum one (1) inch diameter at breast height (dbh). In addition, shrubs found in native growth areas should all be inventoried. The guidance document further indicates that in native growth areas where it is impractical to count individual trees, a representative area may be chosen and characterized (types and numbers), and that information projected over the entire area to identify the type and number of trees.

Large trees identified in both locations were individually counted and included, Boxelder (*Acer negundo*) and Peachleaf Willow (*Salix amygdaloides*). The east location had two patches of small shrubby trees, Chokecherry (*Prunus virginiana*) that was counted using a sample plot method, with those results applied to the entire area to be disturbed. The west location had several similar sized patches of shrubs/small trees (Chokecherry) scattered throughout the area. The majority of the Chokecherry encountered in both locations had a 1-inch dbh or larger. Three representative patches of Chokecherry were inventoried to determine the number of stems in each patch. The stem count was averaged for the three patches resulting in a count of 40 stems per patch. There were twelve similar patches within the Project Corridor at the two locations that will be removed.

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<sup>1</sup> Public Service Commission, Tree and Shrub Mitigation Specifications. Case No. PU-12-398 see Appendix B.

A second distinctive wooded area with a slightly different growth pattern than the previous was also identified. This area was characterized by a uniform coverage of smaller shrubs. The species found in these areas included Chokecherry and Common Buckthorn (*Rhamnus cathartica*). Many of these shrubs had stems that were less than 1-inch dbh. As a result, the areas where these species occurred was measured and characterized by an area impact.

## Inventory Results

### *Sampled species and coverage*

The tree and shrub species observed during the field visits are listed in Table 1. Table 1 includes the stem counts for the respective species, and the area of shrubs that will be removed from the two locations within the Project Corridor. The locations of the trees and shrubs inventoried are shown in Figure 1-3.

**Table 1. Tree Inventory Results**

<b>Species</b>	<b>Tree / Shrub</b>	<b>Number Removed</b>
<i>Acer negundo</i>	Large Tree	109 stems
<i>Salix amygdaloides</i>	Large Tree	2 stems
<i>Prunus virginiana</i>	Small Tree	480 stems
<i>Prunus virginiana / Rhamnus cathartica</i>	Shrubs	4,278 ft <sup>2</sup>

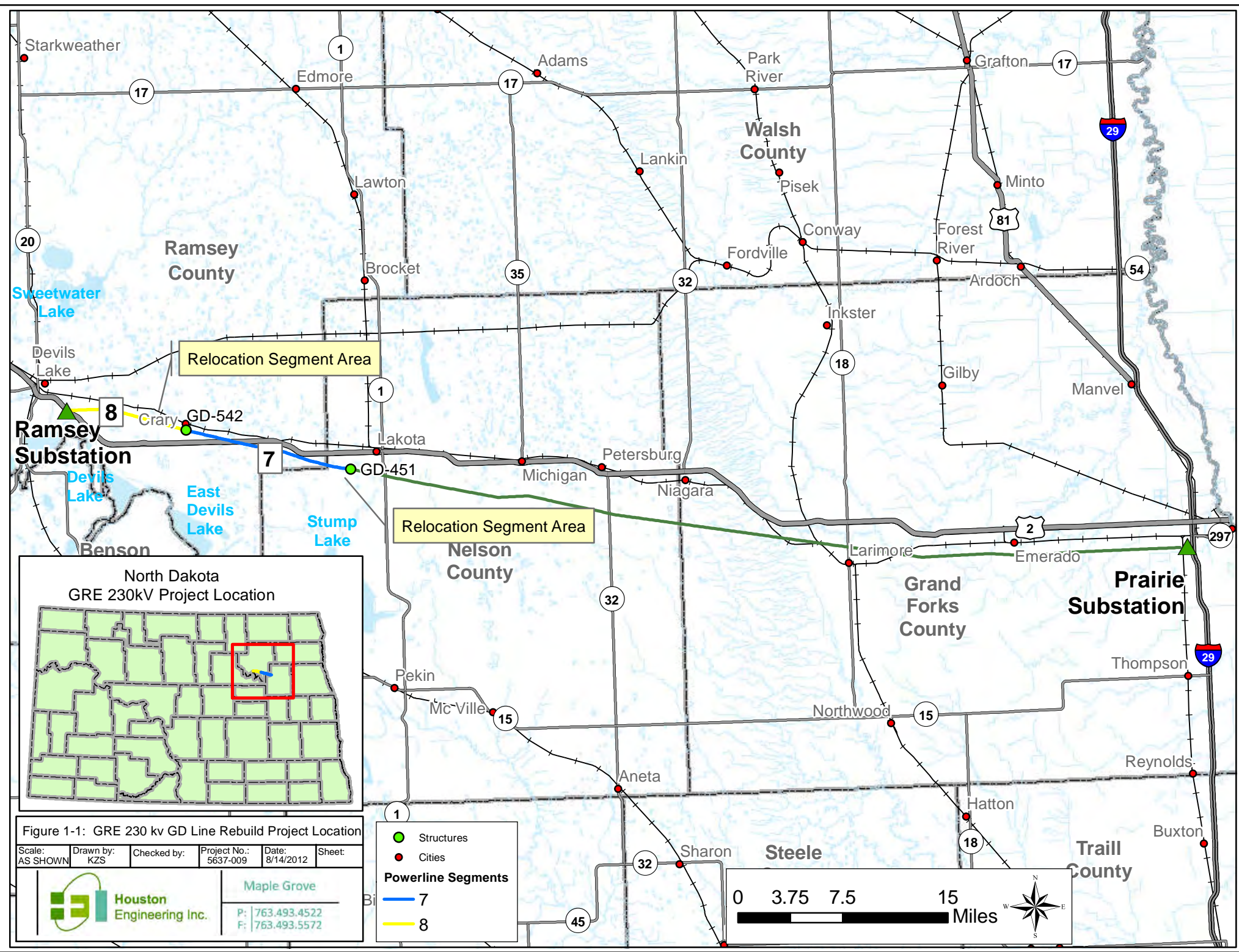
### **Impact calculations and tree mitigation quantities**

The ND PSC requires a 2:1 replacement ratio for trees and shrubs removed as a result of the construction of an electric transmission line. Based upon the results of our field inventory, 222 large tree species, and 960 small to medium-sized tree/shrub species will need to be replaced. In addition, 8,556 square feet (~.20 acre) will need to be replaced with small shrubs. The actual species used for the replacement trees and shrubs should be selected based on the soil types and landscape position for the replacement site(s). It is anticipated that the replacement site(s) will be adjacent to the impact sites. Great River Energy will work with these landowners on locations and designs of the replacement areas. Trees and planting services will be acquired from the Ramsey County Soil

Conservation District. Details of the planting plan, species used and weeding/maintenance activities will be coordinated with input from the Conservation District staff and landowners.

# Figures

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Starkweather

Edmore

Adams

Park River

Grafton

Ramsey County

Walsh County

Sweetwater Lake

Devils Lake

East Devils Lake

Stump Lake

Benson

Nelson County

Grand Forks County

Prairie Substation

Ramsey Substation

Relocation Segment Area

Relocation Segment Area

Figure 1-1: GRE 230 kv GD Line Rebuild Project Location

Scale: AS SHOWN	Drawn by: KZS	Checked by:	Project No.: 5637-009	Date: 8/14/2012	Sheet:
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**Houston Engineering Inc.**

Maple Grove

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- Structures
- Cities

**Powerline Segments**

- 7
- 8

0 3.75 7.5 15 Miles

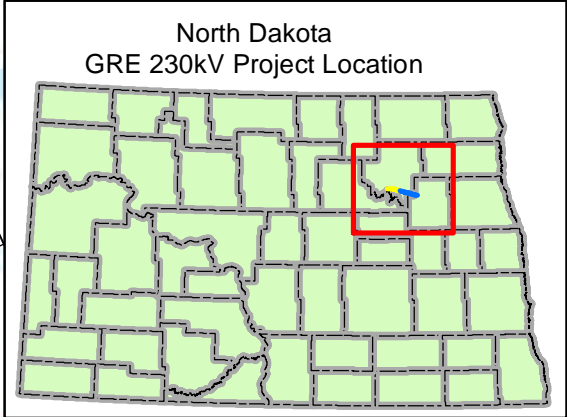
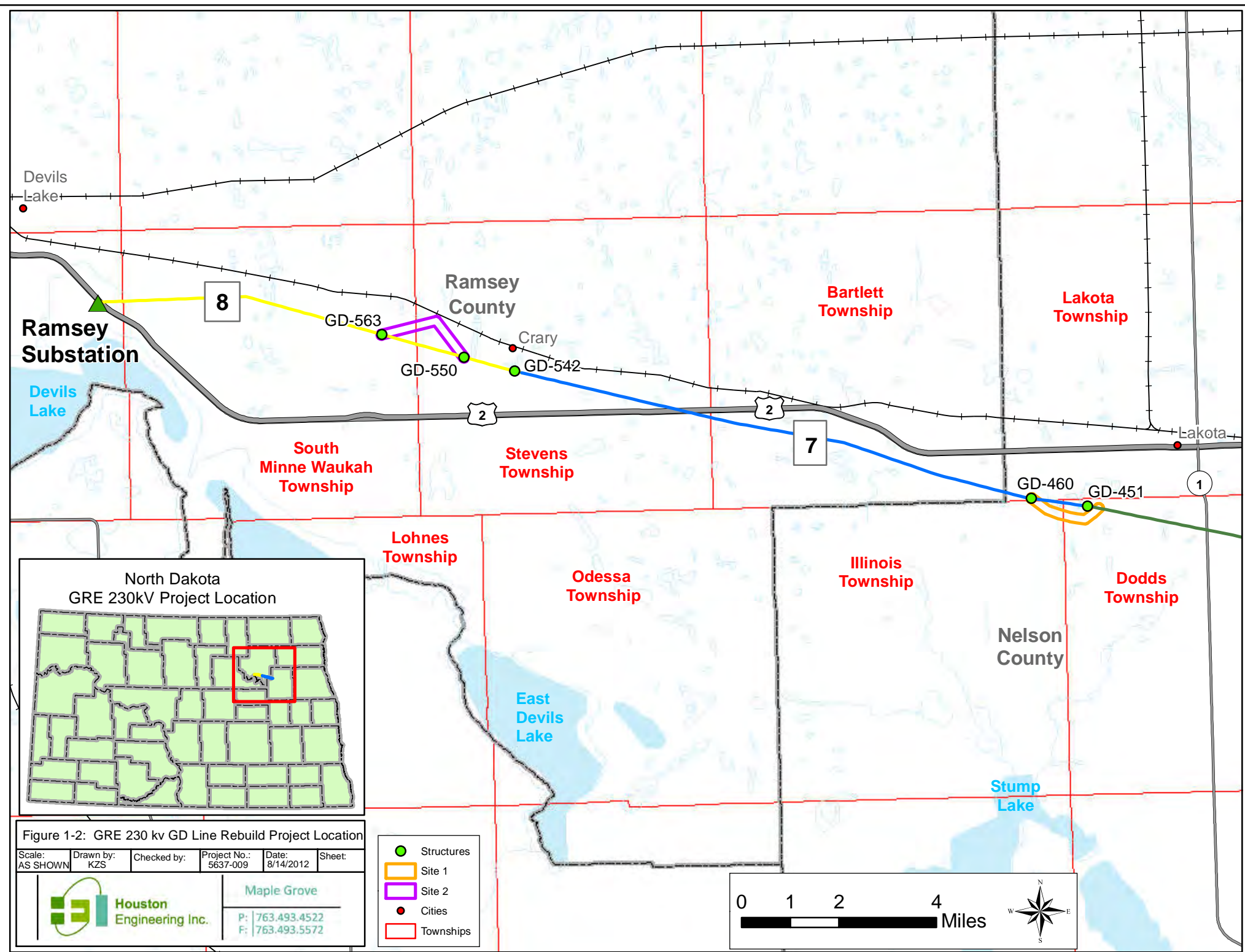


Figure 1-2: GRE 230 kv GD Line Rebuild Project Location

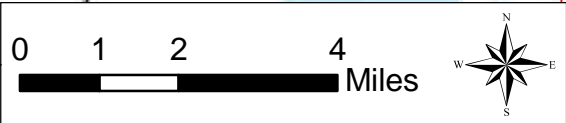
Scale: AS SHOWN	Drawn by: KZS	Checked by:	Project No.: 5637-009	Date: 8/14/2012	Sheet:
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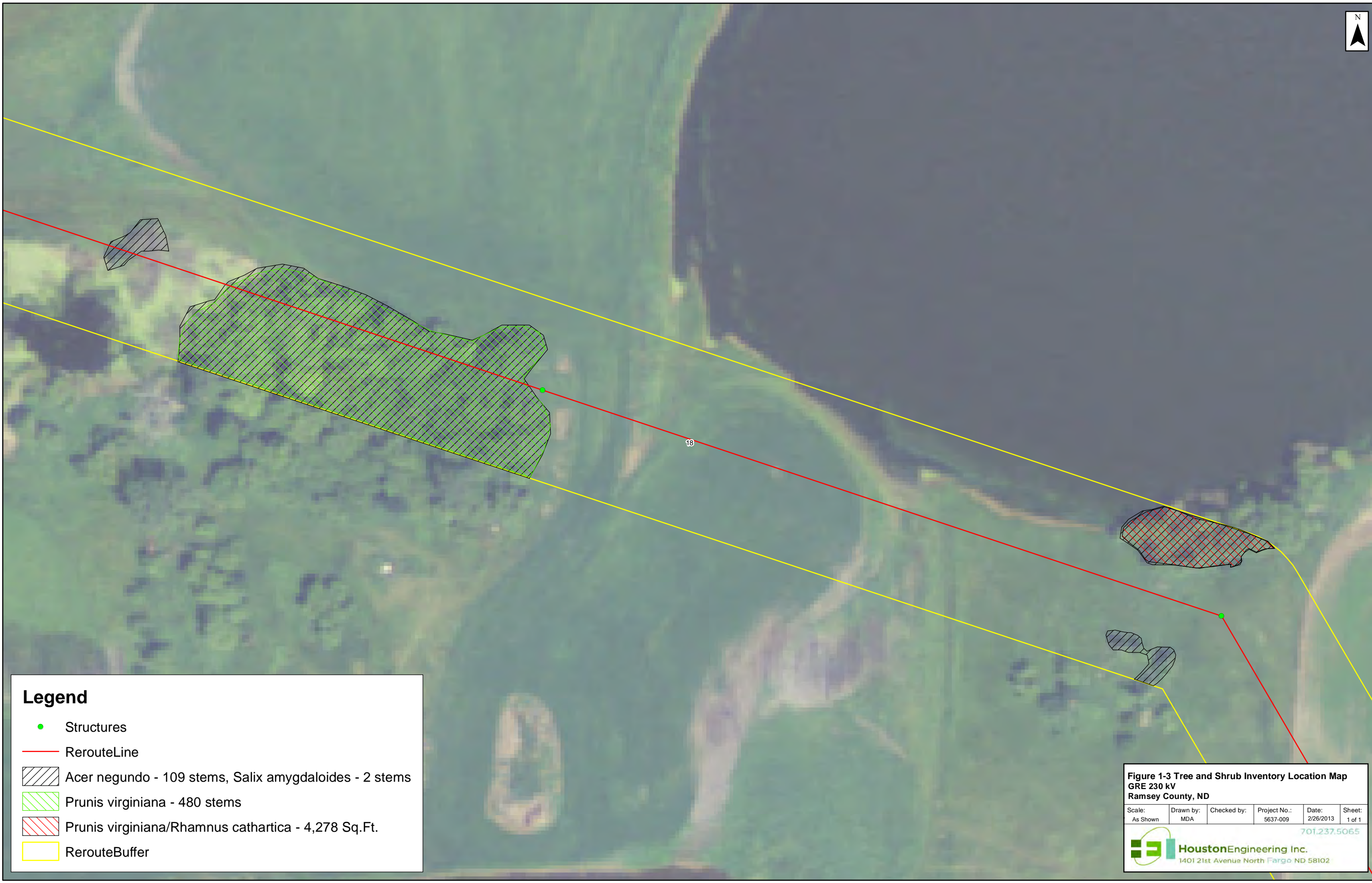
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- Structures
- Site 1
- Site 2
- Cities
- Townships





### Legend

- Structures
- RerouteLine
- Acer negundo - 109 stems, Salix amygdaloides - 2 stems
- Prunus virginiana - 480 stems
- Prunus virginiana/Rhamnus cathartica - 4,278 Sq.Ft.
- RerouteBuffer

**Figure 1-3 Tree and Shrub Inventory Location Map**  
GRE 230 kV  
Ramsey County, ND

Scale: As Shown	Drawn by: MDA	Checked by:	Project No.: 5637-009	Date: 2/26/2013	Sheet: 1 of 1
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# Appendices

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## Appendix A

### Site Photography



New Alignment Staked – Boxelder Trees, Looking West



Boxelder – Chokecherry Mix of Trees and Shrubs



East Site – Chokecherry Shrubs throughout the Site



Typical “Clump” of Chokecherry at the Western Site



Crews Cutting the Larger Trees - West Site



The New Alignment Looking East



Black Knot Disease – Typically Found on Chokecherry Trees



Typical Trees and Shrubs at the East Site

## Appendix B

# Public Service Commission Guidance on Tree and Shrub Mitigation

**STATE OF NORTH DAKOTA**  
**PUBLIC SERVICE COMMISSION**

**Great River Energy**  
**230 kV Transmission Line – Grand Forks – Devils Lake**  
**Siting Application**

**Case No. PU-12-398**

**Tree and Shrub Mitigation Specifications**

**Inventory**

1. Trees and shrubs anticipated to be cleared, including those that are considered invasive species or noxious weeds (*e.g.*, *Caragana arborescens*, *Elaeagnus angustifolia*, *Rhamnus cathartica*, *Tamarix chinensis*, *T. parviflora*, *T. ramosissima*, *Ulmus pumila*), must be inventoried before cutting. The inventory must record the location, number, and species of trees and shrubs.
2. In windbreaks, shelterbelts and other planted areas, trees or shrubs anticipated to be cleared, regardless of size, must be inventoried for replacement.
3. In native growth areas, trees anticipated to be cleared that are 1 inch diameter at breast height (dbh) or greater must be inventoried for replacement.
4. In native growth areas, shrubs anticipated to be cleared in the permanent right-of-way must be inventoried for replacement.
5. In native growth areas outside the permanent right-of-way, shrubs must be cut flush with the surface of the ground, taking care to leave the naturally occurring seed bank and root stock intact. If soil disturbance is necessary, the native topsoil must be preserved and replaced after construction. Shrubs must be allowed to regenerate naturally where native topsoil is preserved and replaced. Where native topsoil is not preserved and replaced, shrubs anticipated to be cleared must be inventoried for replacement.
6. In native growth areas, trees and shrubs may be inventoried by actual count or by a sampling method that will properly represent the woody vegetation

population. A sampling plan developed by the company, filed with the North Dakota Public Service Commission (Commission) and approved prior to the start of construction must define the sampling method to be used for trees, for tall shrubs and for low shrubs. The data from the sample plots must be extrapolated to the total acreage of the wooded area to be cleared to determine the species and quantity of trees and shrubs to be replaced.

### **Clearing for Construction**

7. Trees and shrubs must be selectively cleared, leaving mature trees and shrubs intact where practical.
8. The maximum width of clear cuts through windbreaks, shelterbelts and all other wooded areas is 50 feet, unless otherwise approved by the Commission.
9. If the area of trees or shrubs actually cleared differs from the area inventoried, the difference in number of trees and shrubs to be replaced must be noted on the inventory.

### **Replacement**

10. Prior to tree and shrub replacement, documentation identifying the number and variety of trees and shrubs removed, as well as the mitigation plan for the proposed number, variety, type, location and date of replacement plantings, must be filed with the Commission for approval.
11. Two 2-year-old saplings must be planted for every one tree removed. Two shrubs (stem cuttings) must be planted for every one shrub removed.
12. Except in the case of invasive or noxious species, trees and shrubs must be replaced by the same species or similar species, suitable for North Dakota growing conditions as recommended by the North Dakota Forest Service. Invasive or noxious species must be replaced by similar non-invasive or non-

noxious species suitable for North Dakota growing conditions as recommended by the North Dakota Forest Service.

13. Landowners must be given the option of having replacement trees and shrubs planted on the landowner's property, either on or off the right-of-way. The landowner must also be given the opportunity to waive those options in writing in order to have replacement trees and shrubs planted off the landowner's property.
14. At the conclusion of the project, documentation identifying the actual number, variety, type, location and date of the replacement plantings must be filed with the Commission.
15. Tree and shrub replacements must be inspected annually, in September, for three years. The first annual inspection must be at least one year from the anniversary date of the original plantings. A report of each annual inspection must be submitted to the Commission by October 1 of each year, documenting the condition of plantings and any woodlands work completed as of September of each year. If after the third annual report the survival rate is less than 75%, the Commission may order additional planting(s).