



AN ALLETE COMPANY

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September 30, 2016



Mr. Darrell Nitschke
Executive Secretary
North Dakota Public Service Commission
600 E. Boulevard Ave., Dept. 408
Bismarck, North Dakota 58505-0480

RE: Bison 4 Wind Project
Oliver/Morton Counties
Siting Application
Case No. PU-13-127

Southwest Oliver Transmission Line Project
Final Construction Inspection- November 2014
Case No. PU-11-620

Minnesota Power's Application for a Corridor
Certificate and Route Permit for a DC Line
Reroute in Cass County, North Dakota
Case No. PU-14-121

Dear Mr. Nitschke:

Attached please find Minnesota Power's 2016 Tree and Shrub Survival Report in the above-referenced cases. An original for each Case Number has been placed in today's mail.

Please let me know if you have any questions related to this matter.

Yours truly,

David R. Moeller

DRM:
Attach.

Minnesota Power 2016 Tree and Shrub Survival Report

For Bison 4 (PU-13-127), SW Oliver 230 HVTL (PU-11-620)
and DC Line Reroute (PU-13-121)





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2016 Tree and Shrub Report- Bison 4, SW Oliver 230 HVTL & DC Line Reroute

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2016 Tree and Shrub Report- Bison 4, SW Oliver 230 HVTL & DC Line Reroute

Introduction

In 2014 Minnesota Power (an ALLETE Company) completed construction of its Bison 4, 205 MW wind facility (PU-13-127), 11 mile SW Oliver 230 kV high voltage transmission line (PU-11-620) and 0.7 mile DC Line Reroute (PU-13-121) (collectively the “Projects”). During construction of these Projects some trees and shrubs were removed.

In keeping with the Certificate of Site Compatibility and Route Permits issued for the Projects by the North Dakota Public Service Commission (PSC), Minnesota Power developed a Tree and Shrub Mitigation Plan (Plan) to facilitate tree and shrub mitigation associated with each project (Appendix B). Plan for each project were filed with the PSC prior to beginning mitigation activities. The Plan facilitated the replacement of trees and shrubs disturbed during construction to minimize any associated environmental impacts.

Per PSC order requirement, tree and shrub mitigation species are to be planted at a ratio of 2:1 for every stem removed during construction. Additionally, mitigation is expected to have at least a 75% survival rate at three years post planting.

The following is Minnesota Power’s 2016 Survival Report for the Projects.

Survival Report

All three Project mitigation plantings were combined and comprise the same planting effort. For purposes of discussion the combined planting effort will be referred to as Planting 4.

Minnesota Power preformed the first round of survival surveys for Planting 4 in the fall of 2016. Below, Table 1-1 outlines the corresponding survival rates and percent survival for Planting #4.

Table 1-1 **Planting #4** Bison
4, SW Oliver 230 kV HVTL and DC Line Reroute

2016 Survival Check	Stems Planted for 2:1 Ratio	Stems Observed	Percent Survival
Tree/Tall Shrub Species	350	594	170%
Low Shrub Species	120	262	218%

Results/Conclusion

Upon Review of the 2016 Survey Results for Planting 4, all mitigation survival ratios were adequate. Planting 4’s next survival check is scheduled for the Fall of 2017. Any additional mitigation activities that may result will be covered in Minnesota Power’s 2017 Tree and Shrub Survival Report.

Table 2-1 Survival Results
Planting 4

	2016	2017	2018
Tree/ Tall Shrubs	Adequate	TBD	TBD
Low Shrubs	Adequate	TBD	TBD

APPENDIX A

2016 Planting 4 Survival Survey Results

**WOODLAND PLANT SURVIVABILITY MONITORING
FROM MINNESOTA POWER- A DIVISION OF ALLETE, INC
WITHIN THE BISON 4 WIND FARM**

Conducted by Minnesota Power September 30, 2016

A survival count of Planting 4 for the Bison 4 wind farm, SW Oliver 230kV High Voltage transmission line and DC Line Reroute was conducted by Minnesota Power staff on September 30, 2016. The survival results can be found in table 1-2 in the Minnesota Power 2016 Tree and Shrub Survival Report.

Tree and Tall Shrub survival for the first growing season was 81%. 594 living Tall Trees/Shrubs were identified from a total of 733 stems originally planted. Although the survival was at 81%, the 733 stems originally planted is greater than the mitigation requirements (350 stems) based upon the 2014 disturbance sampling. The Tree/Tall Shrub replacement numbers are well above the 2:1 replacement survival numbers required by the North Dakota Public Service Commission (ND PSC).

Low Shrub survival for the first growing season was 80%. 262 living Low Shrubs were identified from a total of 328 originally planted. Although the survival was at 80%, the 328 stems originally planted is greater than the mitigation requirements (120 stems) based upon the 2014 disturbance sampling. The Low Shrub replacement numbers are well above the 2:1 replacement survival numbers required by the North Dakota Public Service Commission (ND PSC).

Based on a 2:1 planting ratio 350 Tree/Tall Shrub species and 120 Low Shrub species were required for mitigation. In 2016, 594 Tree and Tall Shrub stems survived and 262 Low Shrubs survived. This puts the mitigation survival rate survival rate for Trees and Tall Shrubs at 170% and Low Shrubs at 218%. This survival ratio for Planting 4 exceeds ND PSC requirements for successful mitigation of disturbed woodlands during construction. Planting 4 will surveyed in 2017 & 2018 to insure compliance with ND Public Service Commission Tree and Shrub Mitigation requirements.

APPENDIX A

Minnesota Power- A Division of ALLETE, Inc:
 Bison 4, SW Oliver 230 HVTL and DC Line Reroute
 Woodland Plant Survivability Monitoring 2016 for Planting 4
 30-Sep-16

Planting 4- 2016 check

Overall Survival: 2016

Species	Total Alive	Total Planted	% Survival
Chokecherry	131	185	71%
Green Ash	323	416	78%
Plum	49	37	132%
Boxelder	91	95	96%
Lilac	262	328	80%

	Total Alive	Total Planted	% Survival
Trees/Tall Shrubs	594	733	81%
Low Shrubs	262	328	80%

Total Needed For 2:1 Mitigation

	Number of stems needed for <u>2:1 Ratio</u>	Number of stems <u>observed</u>	Mitigation <u>% Survival*</u>
Trees/Tall Shrub	350	594	170%
Low Shrub	120	262	218%

* If Mitigation % Survival is greater than 100%, survival exceeds mitigation requirement:

**Total Needed For 2:1 Mitigation
 2016 Survival Results**

	Number of stems needed for <u>2:1 Ratio</u>	Number of stems <u>observed</u>	Mitigation <u>% Survival*</u>
Trees/Tall Shrub	350	594	170%
Low Shrub	120	262	218%

* If Mitigation % Survival is greater than 100%, survival exceeds mitigation requirements

APPENDIX B

Minnesota Power's Tree and Shrub Mitigation Plans

Minnesota Power Tree and Shrub Mitigation Plan

For Bison 4 (PU-13-127) and 230 kV HVTL (PU-11-620)



A WIND ENERGY INITIATIVE OF MINNESOTA POWER IN NORTH DAKOTA

APPENDIX B



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Tree and Shrub Mitigation Plan- Bison 4 & 230 kV HVTL

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Appendix A- Alternative Mitigation Location Agreements

Appendix B- Woodland Inventory Procedures & Survey Results

- **Bison 4**
- **SW Oliver 230 HVTL Extension**
- **Mitigation Survey Results**

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Case # PU-13-127 & PU-11-620

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Introduction

Throughout 2013 and 2014 Minnesota Power (an ALLETE company) constructed its Bison 4, 204 MW wind energy conversion facility (Facility) as well as an associated 11 mile long 230 kilovolt (kV) high voltage transmission line (HVTL). During construction of both, some trees and shrubs were disturbed. In keeping with the North Dakota Public Service Commission's (PSC) Certificate of Site Compatibility for Bison 4 and the Certificate of Corridor Compatibility for the HVTL, Minnesota Power has developed this Tree and Shrub Mitigation Plan. This mitigation plan will facilitate the replacement of the trees and shrubs disturbed during construction and minimize any associated environmental impacts.

Number and Variety of Trees

Post construction vegetation surveys were performed for both the Bison 4 and HVTL project areas to determine the number of stems disturbed, the species disturbed and their location. The post construction vegetation surveys were performed by Western Ecosystems Technology Inc. (WEST). The following table (Table 1-1) shows the total number of trees and shrubs disturbed during construction of Minnesota Power's Bison 4 Facility.

Table 1-1 Trees Disturbed During Construction

Trees/Tall Shrubs	-	-
American elm	Ulmus americana	32
Boxelder	Acer negundo	13
Chokecherry	Prunus virginiana	50
Eastern cottonwood	Populus deltoides	4
Green ash	Fraxinus pennsylvanica	31
Hawthorn	Crataegus	15
Peachleaf willow	Salix amygdaloides	2
Russian olive	Elaeagnus angustifolia	5
Siberian elm	Ulmus pumila	52
American plum	Prunus americana	6
Total		210
Shrubs	-	-
Buffaloberry	Shepherdia	45
Siberian peashrub	Caragana arborescens	35
Total	-	80



Mitigation Plan

Following the requirements of the PSC Certificate of Site Compatibility for the Bison 4 Facility and the Certificate of Corridor Compatibility for the HVTL, Minnesota Power will mitigate trees and shrubs disturbed during construction. The disturbed trees and shrubs will be replaced at a minimum ratio of 2:1. However, the actual planting of most species will be at a ratio closer 3:1 to account for mortality associated with any planting/re-vegetation effort.

All disturbed trees and shrubs will be replaced by the same or similar species in following with the PSC's Tree and Shrub Mitigation Specifications.

Upon completion of mitigation activities, the planting site will then be monitored for three years to ensure that there has been a 75% survival rate based on a **2:1** planting regime. Survival surveys will occur in the fall of each year and will be used to determine if any additional mitigation activities will be required.

Proposed Number, Variety, Type

Table 1-2 lists the number of stems disturbed during construction, the species disturbed and the minimum number of mitigation stems required. The percent survival will be determined assuming a 2:1 planting ratio.

In following with recommendations provided by local Soil Conservation Districts, range management professionals and local expertise, Minnesota Power has opted to replace the species that were disturbed by construction with species that are native, that do not have noxious qualities, are suitable for available soil types and are available for purchase with local NRCS offices in North Dakota. As a result of these parameters, the following adjustments to mitigation species have been made:

- Trees/Tall Shrubs
Siberian elm and Russian olive are non-native species and will not be used for mitigation. Instead, both species will be replaced with Green Ash which is native to North Dakota. Due to problems with disease resistance and availability, both Eastern cottonwood and American elm will be replaced with Green Ash as well. Hawthorn is considered a noxious species in North Dakota. As a result, Minnesota Power will be replace those disturbed stems with chokecherry. The two disturbed peachleaf willows will be replaced with American Plum.

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Tree and Shrub Mitigation Plan- Bison 4 & 230 kV HVTL

- Shrubs
Due to soil type, availability and desired species, Buffaloberry and Siberian pea shrub will be replaced with Common lilac.

Table 1-2 # Replacement stems (by Species) for Bison 4 and associated 230 kV HVTL			
Common Name	Scientific Name	Plants Removed	Minimum mitigation stems
Green ash	Fraxinus pennsylvanica	124	248
Chokecherry	Prunus virginiana	65	130
Boxelder	Acer negundo	13	26
American plum	Prunus americana	8	16
Lilac	Syringa vulgaris	80	160

Location and Date of Replacements

A total of 17 landowners had trees or shrubs affected by the project. In an effort to maintain customer satisfaction, project acceptance and a high standard of public relations, Minnesota Power has developed an alternative site for the mitigation plantings to occur, if requested by land owners. Land owners have their choice to have mitigation activities occur either on their ownership or on Minnesota Power’s alternative site.

Four landowners preferred to have mitigation plantings occur on their property. Nine land owners preferred mitigation (planting) activities not occur on their ownership and have instead opted for Minnesota Power’s alternative site. Four landowners did not respond after two direct mailings and three phone call attempts. As a result, those mitigation stems will be planted at Minnesota Power’s alternative site as well.

The Minnesota Power alternate site is located in Morton County in Section 4 - Township 140N - Range 86W. See Attached Figure #1 for mitigation site location information.

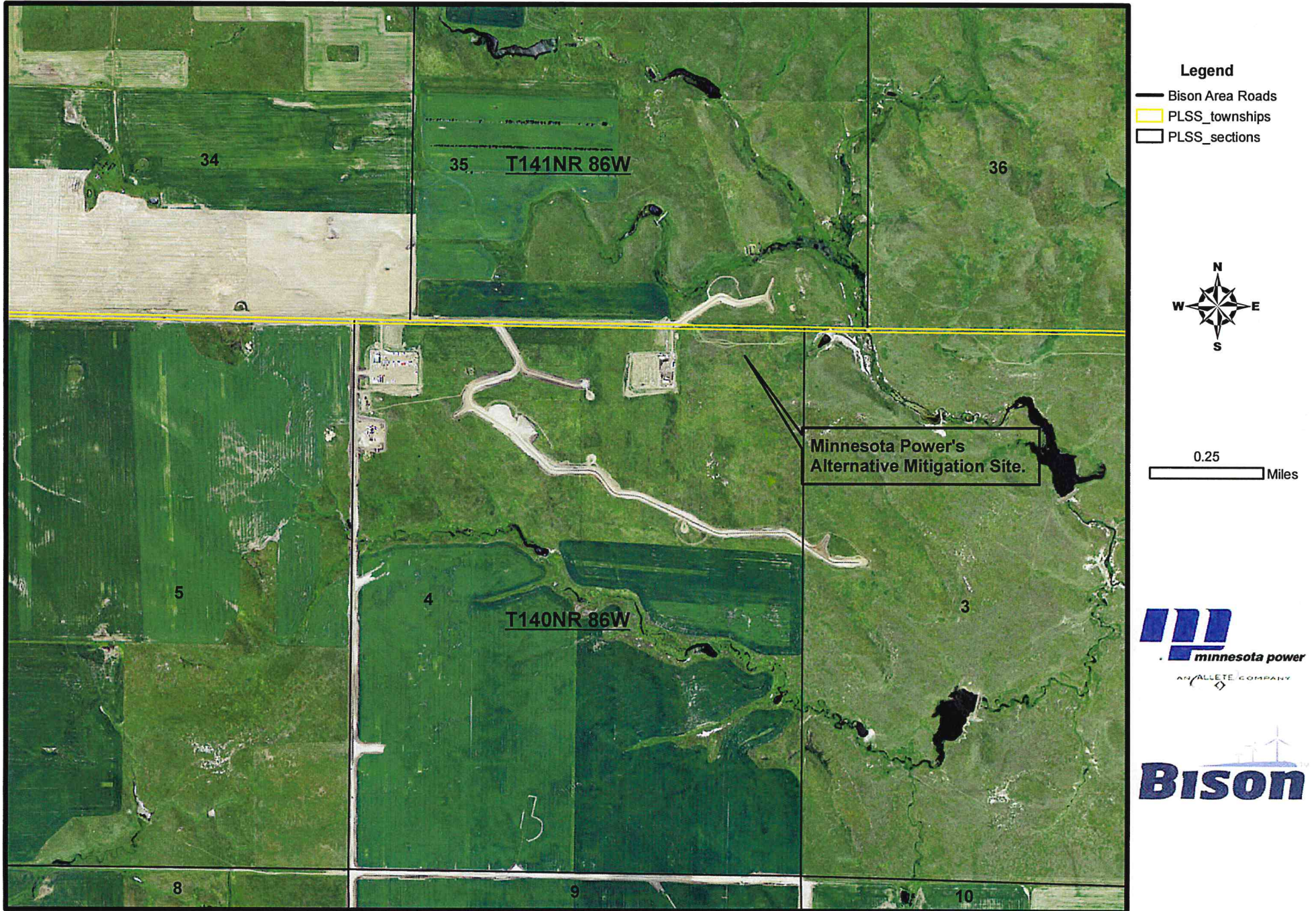
Figure 1

-Mitigation Site Location

Figure 1

APPENDIX B

Minnesota Power Alternative Mitigation Site.



Appendix A

-Alternative Mitigation Agreements

APPENDIX B



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Alternative Mitigation Location Agreement

Warren E. and Delores C. Reiner, CONSENTOR, for valuable consideration, hereby acknowledge consent and convey unto MINNESOTA POWER legally incorporated as ALLETE, Inc., a Minnesota corporation, CONSENTEES and its successors, the right to perform tree and shrub mitigation activities at a mitigation restoration site which is not located on the CONSENTOR personal property.

The CONSENTOR understand that this replaces their rights to have tree and shrub mitigation, as required by applicable permits issued by the North Dakota Public Service Commission, activities performed on the CONSENTOR personal property in favor of a location determined at the CONSENTEES discretion.

CONSENTOR

NAME HERE Warren Reiner

NAME HERE Delores Reiner

COUNTY OF Oliver.

This instrument was drafted by:
Minnesota Power
30 West Superior Street
Duluth, MN 55802



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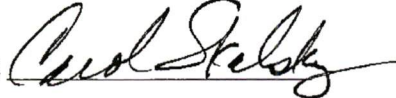
Alternative Mitigation Location Agreement

David L. and Carol J. Skalsky, CONSENTOR, for valuable consideration, hereby acknowledge consent and convey unto MINNESOTA POWER legally incorporated as ALLETE, Inc., a Minnesota corporation, CONSENTEES and its successors, the right to perform tree and shrub mitigation activities at a mitigation restoration site which is not located on the CONSENTOR personal property.

The CONSENTOR understand that this replaces their rights to have tree and shrub mitigation, as required by applicable permits issued by the North Dakota Public Service Commission, activities performed on the CONSENTOR personal property in favor of a location determined at the CONSENTEES discretion.

CONSENTOR

NAME HERE 

NAME HERE 

COUNTY OF Oliver.

This instrument was drafted by:
Minnesota Power
30 West Superior Street
Duluth, MN 55802

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Alternative Mitigation Location Agreement

Clinton H. Redmann, CONSENTOR, for valuable consideration, hereby acknowledge consent and convey unto MINNESOTA POWER legally incorporated as ALLETE, Inc., a Minnesota corporation, CONSENTEES and its successors, the right to perform tree and shrub mitigation activities at a mitigation restoration site which is not located on the CONSENTOR personal property.

The CONSENTOR understand that this replaces their rights to have tree and shrub mitigation, as required by applicable permits issued by the North Dakota Public Service Commission, activities performed on the CONSENTOR personal property in favor of a location determined at the CONSENTEES discretion.

CONSENTOR

NAME HERE

Clinton Redmann

COUNTY OF Oliver.

This instrument was drafted by:
Minnesota Power
30 West Superior Street
Duluth, MN 55802

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Alternative Mitigation Location Agreement

Jason J. and Melanee L. Pulver, CONSENTOR, for valuable consideration, hereby acknowledge consent and convey unto MINNESOTA POWER legally incorporated as ALLETE, Inc., a Minnesota corporation, CONSENTEES and its successors, the right to perform tree and shrub mitigation activities at a mitigation restoration site which is not located on the CONSENTOR personal property.

The CONSENTOR understand that this replaces their rights to have tree and shrub mitigation, as required by applicable permits issued by the North Dakota Public Service Commission, activities preformed on the CONSENTOR personal property in favor of a location determined at the CONSENTEES discretion.

CONSENTOR

NAME HERE

Jason J. Pulver

NAME HERE

Melanee Pulver

COUNTY OF Oliver.

This instrument was drafted by:
Minnesota Power
30 West Superior Street
Duluth, MN 55802

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Alternative Mitigation Location Agreement

William and Louise Schultz, CONSENTOR, for valuable consideration, hereby acknowledge consent and convey unto MINNESOTA POWER legally incorporated as ALLETE, Inc., a Minnesota corporation, CONSENTEES and its successors, the right to perform tree and shrub mitigation activities at a mitigation restoration site which is not located on the CONSENTOR personal property.

The CONSENTOR understand that this replaces their rights to have tree and shrub mitigation, as required by applicable permits issued by the North Dakota Public Service Commission, activities performed on the CONSENTOR personal property in favor of a location determined at the CONSENTEES discretion.

CONSENTOR

NAME HERE

William Schultz

NAME HERE

Louise Schultz

COUNTY OF Oliver.

This instrument was drafted by:
Minnesota Power
30 West Superior Street
Duluth, MN 55802



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Alternative Mitigation Location Agreement

Darren and Cheri Klingenstein, CONSENTOR, for valuable consideration, hereby acknowledge consent and convey unto MINNESOTA POWER legally incorporated as ALLETE, Inc., a Minnesota corporation, CONSENTEES and its successors, the right to perform tree and shrub mitigation activities at a mitigation restoration site which is not located on the CONSENTOR personal property.

The CONSENTOR understand that this replaces their rights to have tree and shrub mitigation, as required by applicable permits issued by the North Dakota Public Service Commission, activities performed on the CONSENTOR personal property in favor of a location determined at the CONSENTEES discretion.

CONSENTOR

NAME HERE Darren Klingenstein NAME HERE Cheri Klingenstein

COUNTY OF Oliver.

This instrument was drafted by:
Minnesota Power
30 West Superior Street
Duluth, MN 55802

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Alternative Mitigation Location Agreement

Dennis and Joan Peltz, CONSENTOR, for valuable consideration, hereby acknowledge consent and convey unto MINNESOTA POWER legally incorporated as ALLETE, Inc., a Minnesota corporation, CONSENTEES and its successors, the right to perform tree and shrub mitigation activities at a mitigation restoration site which is not located on the CONSENTOR personal property.

The CONSENTOR understand that this replaces their rights to have tree and shrub mitigation, as required by applicable permits issued by the North Dakota Public Service Commission, activities preformed on the CONSENTOR personal property in favor of a location determined at the CONSENTEES discretion.

CONSENTOR

NAME HERE

NAME HERE

COUNTY OF Oliver.

This instrument was drafted by:
Minnesota Power
30 West Superior Street
Duluth, MN 55802

Appendix B

-Woodland Inventory Procedures & Survey Results

- Bison 4
- SW Oliver 230 HVTL Extension
- Mitigation Survey Results

Mitigation Survey Results

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Tree and Shrub Mitigation Survey Results/Requirements Per Site Permits

For Minnesota Power's Bison 4 and SW Oliver 230 KV HVTL Extension

ND PUC Docket Numbers PU-13-127 & PU-11-620

Landowner and Species of Tree/Shrub	Trees/Shrubs Removed
Anton & Cynthia Heidrich	33
Eastern cottonwood	1
Hawthorn	6
Russet buffaloberry	6
Silver buffaloberry	20
Clinton Redmann	14
Siberian elm	4
Silver buffaloberry	10
David & Carol Skalsky, Leonard & Mary Hueske	5
Chokecherry	3
Peachleaf willow	2
Dennis & Joan Peltz	36
American elm	10
Green ash	13
Siberian elm	13
Duane & Lynette Keller	52
American elm	8
American plum	4
Boxelder	1
Chokecherry	20
Green ash	3
Hawthorn	9
Siberian peashrub	7
Elmer & Mable Bauer	4
American elm	4
Esther Keller	5
American elm	5
Eunice Schirado L.E.; ETAL	30
Siberian elm	30
Evelyn Conitz ~ LE	16
American plum	2
Canada buffaloberry	4
Chokecherry	5

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Silver buffaloberry	5
Frances Windhorst	5
Chokecherry	4
Green ash	1
Jason & Melanee Pulver	2
Russian olive	2
Jerome & Yvonne Voegelé	15
Boxelder	12
Russian olive	3
Kenny Klingenstein - Kari & John Barlund	5
American elm	5
Lyle Kinnischtzke	13
Cottonwood	3
Green ash	10
Roger & Eunice Bueligen	8
Chokecherry	7
Siberian elm	1
Roger & Marvel Klingenstein	7
Chokecherry	7
Schultz Trust	4
Siberian elm	4
Terrence Leingang	32
Green ash	4
Siberian peashrub	28
Warren & Delores Reiner	4
Chokecherry	4
Total Total	285

**Minnesota Power Tree and Shrub Replacement Plan for the
DC Line Reroute Project**

Case#: PU-14-121



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Minnesota Power Tree and Shrub Mitigation Plan. Pages 2-3

Figure 1. Mitigation Site Location

Appendix A- Woodland Inventory Survey Results



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Tree and Shrub Mitigation Plan- DC Line Reroute
Case # PU-14-121

Introduction

In 2014 and 2015 Minnesota Power (an ALLETE company) constructed a 0.7 mile long reroute of its 250 kilovolt (kV) direct current high voltage transmission line (DC Line). During construction, some trees and shrubs were disturbed. In keeping with the North Dakota Public Service Commission's (PSC) Certificate of Corridor Compatibility, Minnesota Power has developed this Tree and Shrub Mitigation Plan. This mitigation plan will facilitate the replacement of the trees and shrubs disturbed during construction and minimize any associated environmental impacts.

Number and Variety of Trees

Post construction vegetation surveys were performed to determine the number of stems disturbed, the species disturbed and their location. The post construction vegetation surveys were performed by KDK Consulting Inc. The following table (Table 1-1) shows the total number of trees and shrubs disturbed during construction of Minnesota Power's DC Line reroute.

Table 1-1 Trees Disturbed During Construction

Trees/Tall		
Shrubs	-	-
Boxelder	Acer negundo	3
Siberian elm	Ulmus pumila	20
Total	-	23

Mitigation Plan

Following the requirements of the PSC Certificate of Corridor Compatibility for Minnesota Powers DC Line Reroute Project, Minnesota Power will mitigate trees and shrubs disturbed during construction. The disturbed trees and shrubs will be replaced at a minimum ratio of 2:1. However, the actual planting will be at a ratio closer 3:1 to account for mortality associated with any planting/re-vegetation effort.

All disturbed trees and shrubs will be replaced by the same or similar species in following with the PSC's Tree and Shrub Mitigation Specifications.

Upon completion of mitigation activities, the planting site will then be monitored for three years to ensure that there has been a 75% survival rate based on a **2:1** planting regime. Survival surveys will occur in the fall of each year and will be used to determine if any additional mitigation activities will be required.

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Proposed Number, Variety, Type

Table 1-2 lists the number of stems disturbed during construction, the species disturbed and the minimum number of mitigation stems required. The percent survival will be determined assuming a 2:1 planting ratio.

In following with recommendations provided by local Soil Conservation Districts, range management professionals and local expertise, Minnesota Power has opted to replace the species that were disturbed by construction with species that are native, that do not have noxious qualities, are suitable for available soil types and are available for purchase with local NRCS offices in North Dakota. As a result of these parameters, the following adjustments to mitigation species have been made:

- **Trees/Tall Shrubs**
Siberian are non-native species and will not be used for mitigation. Instead, the species will be replaced with Green Ash which is native to North Dakota.

Table 1-2 Replacement stems by species for DC Line Reroute

Common Name	Scientific Name	Plants Removed	Minimum mitigation stems
Green ash	Fraxinus pennsylvanica	20	40
Boxelder	Acer negundo	3	6

Location and Date of Replacements

One landowner had trees or shrubs affected by the project. In an effort to maintain customer satisfaction, project acceptance and a high standard of public relations, Minnesota Power has developed an alternative site for the mitigation plantings to occur, if requested by land owners. Land owners have their choice to have mitigation activities occur either on their ownership or on Minnesota Power's alternative site.

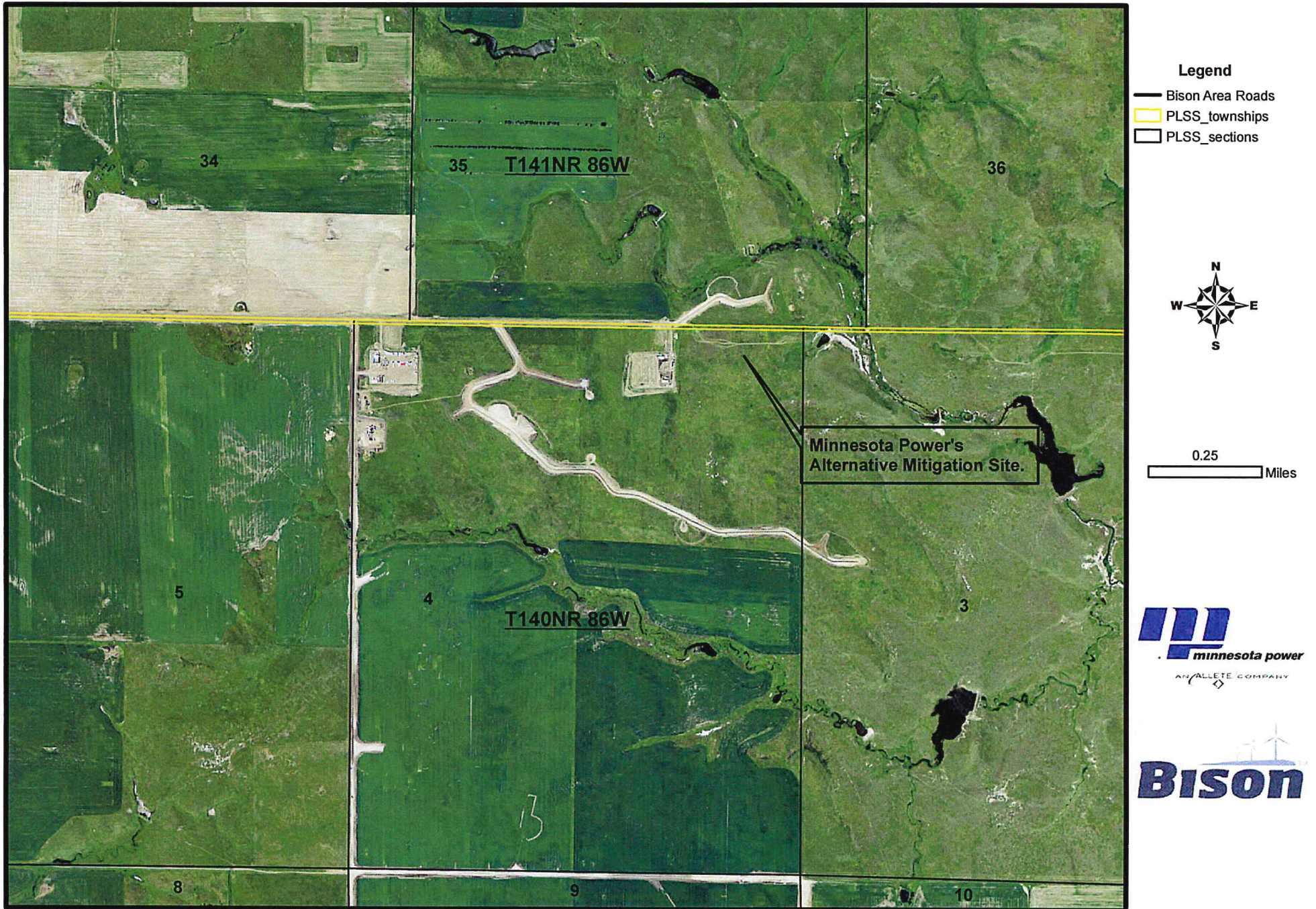
The landowner did not respond after two phone call attempts and two mailing attempts. As a result, the mitigation plantings will occur on Minnesota Power's Alternative Site.

The Minnesota Power alternate site is located in Morton County in Section 4-Township 140N-Range 86W. See Attached Figure #1 for mitigation site location information.

Figure 1

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Minnesota Power Alternative Mitigation Site.



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Appendix A-

- Woodland Inventory Survey Results

APPENDIX B

**SHELTERBELT DISTURBANCE- DC LINE REROUTE (PU-14-121)
FOR MINNESOTA POWER- A DIVISION OF ALLETE, INC.
WITHIN T137N-R54W- SECTION 11**

Conducted by KDK Consulting October 22, 2015

An estimated count of trees removed within a 120 foot right-of-way through a shelterbelt for a DC Line reroute was conducted by KDK Consulting on October 22, 2015. Each row had an original tree spacing of 6', thusly a potential of 20 trees present for each row within the sampled 120' right-of-way provided by Mr. Dan McCourtney of Minnesota Power. The shelterbelt is in declining health due to age and/or disease. Most surviving trees were mature with large canopies allowing the shelterbelt to still function as a windbreak for the adjacent cropland, thus reducing wind erosion.

Six rows were present within the shelterbelt with a row spacing of 10' between rows. The easternmost row had faded from existence well north of the right-of-way, with no evidence of any trees disturbed. The remaining five rows had variable survival within the right-of-way. From east to west, the rows had an estimated survival of 60%, 30%, 20%, 40%, and 40%, respectively. The latter 3 rows appear to have had no survival in the south 3/4 of the 120' right-of-way based on review of aerial photography and ground reconnaissance indicators. All trees in the shelterbelt were Siberian Elm, with the exception of the first row from the east that was disturbed. Boxelder trees were embedded within the row (approximately 1/4 of the trees were Boxelder within the immediate vicinity of the right-of-way. A higher percentage of Boxelder trees were surviving in the row the further north one moved away from the right-of-way and were a majority of the surviving trees in the north half of the shelterbelt).

Based on that information, and if the survival patterns within each row followed what was observed to the north of the right-of-way, the following estimates for trees removed would be as follows:

From east to west:

- Row 1: 20 trees possible * 60% = 12 trees (9 Siberian Elm, 3 Boxelder)
- Row 2: 20 trees possible * 30% = 6 trees (All Siberian Elm)
- Row 3: 5 trees possible * 20% = 1 tree (Siberian Elm)
- Row 4: 5 trees possible * 40% = 2 trees (Both Siberian Elm)
- Row 5: 5 trees possible * 40% = 2 trees (Both Siberian Elm)

An estimated total of 23 trees were present prior to disturbance within the 120' right-of-way with 20 of these trees being Siberian Elm and 3 Boxelder. This number of trees present prior to disturbance may be slighter lower as the survival percentages appears to drop off in the sampled right-of-way based on a recent aerial photo and the current ground reconnaissance. Based on available evidence, it appears that the 23 trees would likely be a worst case scenario for the amount disturbed during the reroute.