Appendix A.6:
Call-Response Surveys For Red-Shouldered Hawk

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Introduction:

Critical Connections Ecological Services, Inc. (CCES) was retained by Tiller Corporation to conduct red-shouldered hawk (*Buteo lineatus*) call-response surveys within the 114 acre proposed project area on the Zavoral property in Scandia, Washington County, Minnesota (**Figure 1**). The Zavoral property contains an inactive aggregate mine that is proposed to re-open and will involve mining and restoration of 64 acres. The proposed project is currently undergoing environmental review in the form of an environmental impact statement (EIS). At the request of Tiller Corporation, the City of Scandia and AECOM (the City's environmental consultants for the EIS), CCES conducted these call-response surveys to compliment visual and auditory raptor surveys completed by CCES in the summer of 2009.

Surveys for red-shouldered hawks were conducted within the Zavoral property the week of May 22-28, 2010. The results of these surveys will be useful to Tiller Corporation, the City of Scandia, and AECOM to assess potential impact to red-shouldered hawks, if any, in their preparation of a biological evaluation portion of the EIS.

Survey Methods:

The purpose of the call-response survey is to assess the presence or absence of red-shouldered hawks and active nest sites (**Table 1**). Surveys were conducted to elicit a response within a ¼ mile radius of the survey points/transects within the Zavoral property, an area that includes the entire 114 acre subject property. Broadcast call-response surveys were conducted according to survey techniques described by Iverson and Fuller (1991), McLeod (1996), and McLeod and Andersen (1998). Red-shouldered hawk calls were broadcast at 22 points (**Table 2**), located at approximate 100-meter (0.06-mile) intervals along two survey transects within the Zavoral property. Two survey transects were used to account for major topographic variations (bluff top/river bottom) and habitat (open herbaceous/forested) variations within the subject property (see **Figure 1**). Call-response surveys for red-shouldered hawks were conducted on two days between May 22-28, 2010. The surveys covered the expected time when adults would be completing incubation and young of the year would be fledging. Surveys took place during daylight hours (½ hour after sunrise to ½ hour before sunset), and were not conducted during adverse weather conditions, such as heavy rain or high winds.

Table 1. Call-Response Survey Target Species

Common Name	Scientific Name	MN Status
Red-shouldered Hawk	*Buteo lineatus*	Special Concern

A team of two observers played pre-recorded red-shouldered hawk calls at each point using a portable digital audio (i.e., MP3) player and a handheld megaphone. We set the output of the megaphone to between 100 and 110 decibels at 1 meter from the source using a calibrated sound-level meter (McLeod 1996). We broadcast the red-shouldered hawk call from the Stokes Field Guide to Bird Songs of Eastern and Central North America (Elliot et al. 1997). During call broadcasts, we held the megaphone at a height of approximately 1.5 meters and rotated the megaphone 120 degrees between each 20 second broadcast. Each call was played three times consecutively at each point, with the observer turning 120 degrees for each call, such that the full 360-degree circumference was covered. Observers watched for flying hawks and listened for vocalized responses for four minutes immediately following the call broadcast. All members of the Order Falconiformes (e.g., hawks, eagles, vultures, and falcons) seen or heard during the survey were recorded. The locations of any response, both visual and auditory, were recorded in field notes. When flying birds were observed, the approximate direction of flight was also noted. While walking between points, observers recorded any raptor activity and scanned the forested areas for potential nests. The dominant habitat/plant community type was recorded at each survey point and is consistent with the 2009 land cover classification assessment of the Zavoral property. The survey was conducted along two transects, each with 11 listening points. Listening points were located with a global positioning system, and were transposed onto digital orthophotographs using ArcGIS™ 9.2 geographic information system software. Observers with high auditory acuity and the ability to recognize red-shouldered hawks by sight and sound conducted call-response surveys.

Survey Results:

A total of three raptors were observed and recorded during the call-response surveys for red-shouldered hawks within the Zavoral property. These three raptors included two red-tailed hawks (*Buteo jamaicensis*), and one bald eagle (*Haliaeetus leucocephalus*). No red-shouldered hawks (*Buteo lineatus*, target species) were detected during the surveys. **Table 2** summarizes the raptors detected during both surveys.

Table 2. Summary of Call-Response Survey Results

Broadcast Point	Dominant Habitat Type [From 2009 MLCCS Land Cover Survey]	Number and Species of Birds Observed	
		Survey 1	Survey 2
1A	Maple Basswood Forest/ Road Edge	NR	NR
1B	Maple Basswood Forest	NR	NR
1C	White Pine Hardwood Forest	NR	NR
1D	Altered Non-Native Short Grasses with Sparse Trees	1 Red-Tailed Hawk (V/A)	NR
1E	Altered Non-Native Short Grasses with Sparse Trees	NR	NR
1F	Altered Non-Native Deciduous Woodland	NR	NR
1G	Altered Non-Native Short Grasses with Sparse Trees	NR	NR
1H	Altered Non-Native Short Grasses with Sparse Trees	1 Red-Tailed Hawk (V/A)	NR
1I	Altered Non-Native Short Grasses with Sparse Trees	NR	1 Bald Eagle (V)
1J	Altered Non-Native Forest	NR	NR
1K	Altered Non-Native Short Grasses	NR	NR
2A	Maple Basswood Forest	NR	NR
2B	White Pine Hardwood Forest/Ravine	NR	NR
2C	Black Ash Seepage Swamp Edge	NR	NR
2D	White Pine Hardwood Forest	NR	NR
2E	White Pine Hardwood Forest	NR	NR
2F	White Pine Hardwood Forest /Ravine	NR	NR
2G	White Pine Hardwood Forest	NR	NR
2H	White Pine Hardwood Forest	NR	NR
2I	White Pine Hardwood Forest /Stream	NR	NR
2J	White Pine Hardwood Forest	NR	NR
2K	White Pine Hardwood Forest	NR	NR

NR = no response, (V) = Visual Observation, (A) = Auditory Observation

Conclusions and Discussion

The red-shouldered hawk is associated with mixed coniferous-deciduous woodlands, moist hardwood forests, swamps, river bottomlands, and wooded marsh openings, with the borders of lakes and streams or other wetlands being especially favored habitat (Johnsgard 1990, Coffin and Pfannmuller 1988). Widespread loss and fragmentation of riparian habitats has forced this species to rely on upland forests to a greater extent (Ebbers 1991a). In such areas, human-made grasslands may replace wetlands as hunting habitat (Ebbers 191a). American beech and sugar maple are frequently selected for nesting, where the nest is usually built in a secure crotch of a large-diameter tree situated well below the canopy (Ebbers 1991a). Morris and Lemon (1983) found that red-shouldered hawk nests were typically in mature deciduous forest stands dominated by sugar maple and American beech and characterized by mature trees and a reduced understory. Home ranges for the red-shouldered hawk are smaller when compared to those of the northern goshawk. In Michigan, Craighead and Craighead (1956) found that mean breeding home ranges were 63 hectares, but varied from 7.7 to 155 hectares.

No responses of red-shouldered hawks were detected by CCES ecologists during the May 2010 call-response surveys of the Zavoral property. Furthermore, no visual evidence of red-shouldered hawks was observed during the May 2010 call-response surveys. The results of the 2010 call-response surveys are consistent with the results of the audial and stick nest surveys completed at the Zavoral property in 2009. While red-shouldered hawks are a documented resident raptor species of the greater St. Croix River Valley's deciduous forest, mixed coniferous forest, and floodplain forest habitats, no red-shouldered hawks have been detected within the proposed mining areas or adjacent forest habitats of the Zavoral property in 2009 or 2010.

References

Coffin, B., Pfannmuller, L. 1988. Minnesota's Endangered Flora and Fauna. University of Minnesota Press, Minneapolis.

Craighead, J., and F. Craighead. 1956. Hawks, owls, and wildlife. Stackpole Company, Harrisburg, PA.

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McLeod, M.A. and D.E. Andersen. 1996. Status and habitat selection of red-shouldered hawks in the Chippewa National Forest. Final report to U.S. Dept. of Agri., Forest Service, Chippewa National Forest.

McLeod, M.A. and D.E. Andersen. 1998. Red-shouldered hawk broadcast surveys—factors affecting detection of responses and population trends. Journal of Wildlife Management 62:1385-1397.

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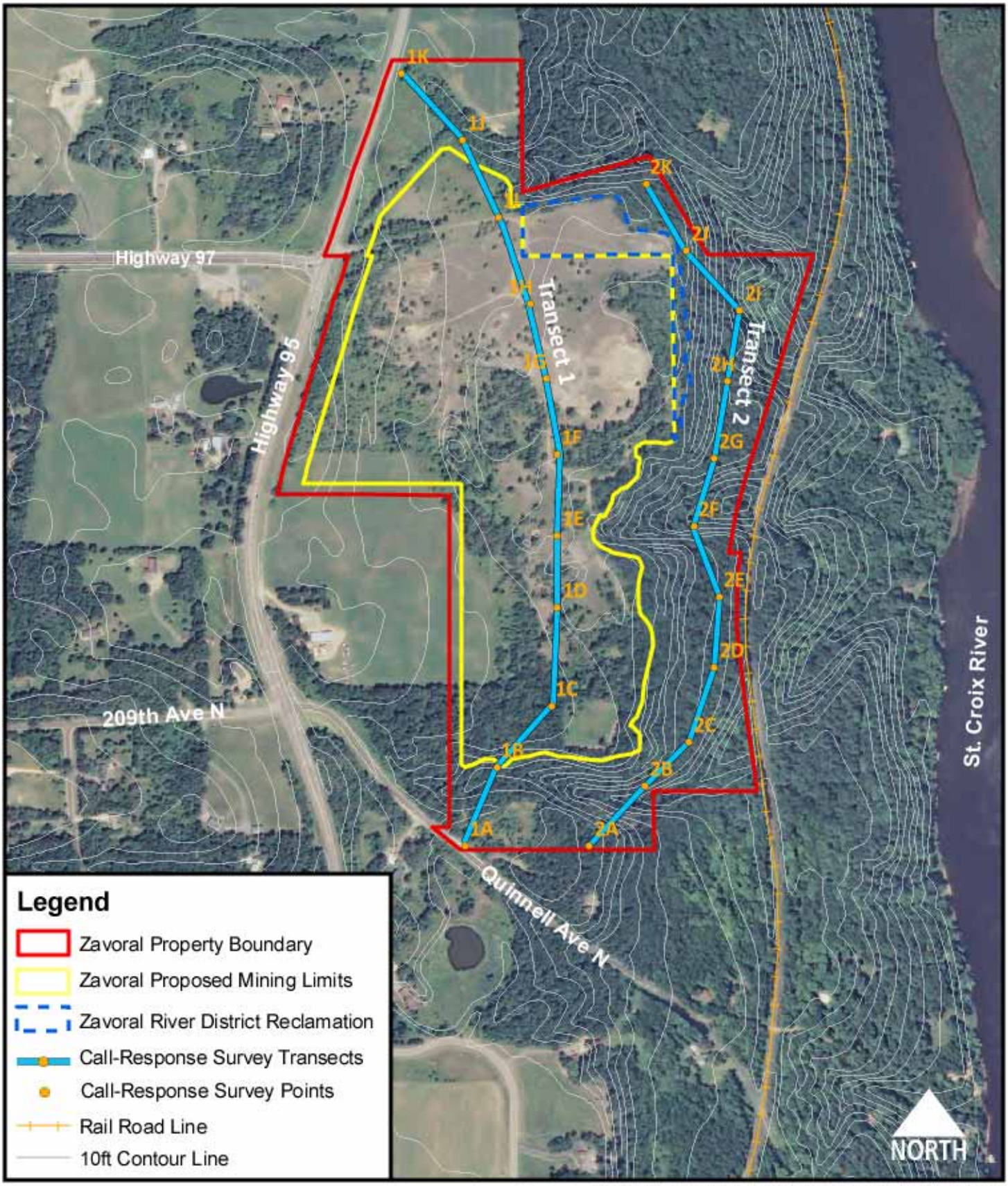

Aerial Photo Source: 2008 FSA Color Aerial Photograph

0 250 500 1,000 1,500 2,000 Feet

Critical Connections
Ecological Services, Inc.

Red-Shouldered Hawk (*Buteo lineatus*)
May 2010 Call-Response Surveys
Location of Survey Transects and Points
Zavoral Property, Scandia, Minnesota

Figure 1

2011 Follow-Up Surveys

Call-Response Surveys for Red-Shouldered Hawk (*Buteo lineatus*)

Zavoral Property, Scandia, Minnesota

Critical Connections Ecological Services, Inc.

May 24, 2011

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Introduction:

Critical Connections Ecological Services, Inc. (CCES) was retained by Tiller Corporation to conduct red-shouldered hawk (*Buteo lineatus*) call-response surveys within the 114 acre proposed project area on the Zavoral property in Scandia, Washington County, Minnesota (**Figure 1**). The Zavoral property contains an inactive aggregate mine that is proposed to re-open and will involve mining and reclamation of 64 acres. The proposed project is currently undergoing environmental review in the form of an environmental impact statement (EIS). At the request of Tiller Corporation, the City of Scandia and AECOM (the City's environmental consultants for the EIS), CCES conducted these call-response surveys to compliment visual and auditory raptor surveys completed by CCES in the summer of 2009 and spring of 2010.

Initial surveys for red-shouldered hawks were conducted within the Zavoral property the week of May 22-28, 2010. The results of the initial surveys were provided to Tiller Corporation, the City of Scandia, and AECOM in a report dated November 8, 2010, to assess potential impact to red-shouldered hawks, if any, in their preparation of a biological evaluation portion of the EIS. No red-shouldered hawks were detected during the May 2010 surveys of the Zavoral property. AECOM reviewed the 2010 surveys, and commented that they believed the 2010 surveys were conducted too late into the red-shouldered hawks' breeding season to be considered conclusive. For this reason, AECOM requested that additional call-response surveys be conducted in March and April of 2011 as a follow up to the 2010 surveys. This report includes the survey methods and results of the additional 2011 call-response surveys for red-shouldered hawks conducted by CCES, at the request of AECOM.

Survey Methods:

The purpose of the call-response survey is to assess the presence or absence of red-shouldered hawks and active nest sites (**Table 1**). Surveys were conducted to elicit a response within a ¼ mile radius of the survey points/transects within the Zavoral property, an area that includes the entire 114 acre subject property. Broadcast call-response surveys were conducted according to survey techniques described by Iverson and Fuller (1991), McLeod (1996), and McLeod and Andersen (1998). Red-shouldered hawk calls were broadcast at 22 points (**Table 2**), located at approximate 100-meter (0.06-mile) intervals along two survey transects within the Zavoral property. Two survey transects were used to account for major topographic variations (bluff top/river bottom) and habitat (open herbaceous/forested) variations within the subject property (see **Figure 1**). Call-response surveys for red-shouldered hawks were conducted on two days: March 29, 2011, and April 12, 2011. The surveys covered the expected time when adults would be establishing nesting sites and territories. Surveys took place during daylight

hours (½ hour after sunrise to ½ hour before sunset), and were not conducted during adverse weather conditions, such as heavy rain or high winds.

Table 1. Call-Response Survey Target Species

Common Name	Scientific Name	MN Status
Red-shouldered Hawk	*Buteo lineatus*	Special Concern

A team of two observers played pre-recorded red-shouldered hawk calls at each point using a portable digital audio (i.e., MP3) player and a handheld megaphone. We set the output of the megaphone to between 100 and 110 decibels at 1 meter from the source using a calibrated sound-level meter (McLeod 1996). We broadcast the red-shouldered hawk call from the Stokes Field Guide to Bird Songs of Eastern and Central North America (Elliot et al. 1997). During call broadcasts, we held the megaphone at a height of approximately 1.5 meters and rotated the megaphone 120 degrees between each 20 second broadcast. Each call was played three times consecutively at each point, with the observer turning 120 degrees for each call, such that the full 360-degree circumference was covered. Observers watched for flying hawks and listened for vocalized responses for four minutes immediately following the call broadcast. All members of the Order Falconiformes (e.g., hawks, eagles, vultures, and falcons) seen or heard during the survey were recorded. The locations of any response, both visual and auditory, were recorded in field notes. When flying birds were observed, the approximate direction of flight was also noted. While walking between points, observers recorded any raptor activity and scanned the forested areas for potential nests. The dominant habitat/plant community type was recorded at each survey point and is consistent with the 2009 land cover classification assessment of the Zavoral property. The survey was conducted along two transects, each with 11 listening points. Listening points were located with a global positioning system, and were transposed onto digital orthophotographs using ArcGIS™ 9.2 geographic information system software. Observers with high auditory acuity and the ability to recognize red-shouldered hawks by sight and sound conducted call-response surveys.

Survey Results:

No red-shouldered hawks (*Buteo lineatus*, target species) and no raptors were detected during the surveys. **Table 2** summarizes the raptors detected during both surveys.

Table 2. Summary of the March and April 2011 Call-Response Survey Results

Broadcast Point	Dominant Habitat Type [From 2009 MLCCS Land Cover Survey]	Number and Species of Birds Observed	
		Survey 1 (March 29)	Survey 2 (April 12)
1A	Maple Basswood Forest/ Road Edge	NR	NR
1B	Maple Basswood Forest	NR	NR
1C	White Pine Hardwood Forest	NR	NR
1D	Altered Non-Native Short Grasses with Sparse Trees	NR	NR
1E	Altered Non-Native Short Grasses with Sparse Trees	NR	NR
1F	Altered Non-Native Deciduous Woodland	NR	NR
1G	Altered Non-Native Short Grasses with Sparse Trees	NR	NR
1H	Altered Non-Native Short Grasses with Sparse Trees	NR	NR
1I	Altered Non-Native Short Grasses with Sparse Trees	NR	NR
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2J	White Pine Hardwood Forest	NR	NR
2K	White Pine Hardwood Forest	NR	NR

NR = no response, (V) = Visual Observation, (A) = Auditory Observation

Conclusions and Discussion

The red-shouldered hawk is associated with mixed coniferous-deciduous woodlands, moist hardwood forests, swamps, river bottomlands, and wooded marsh openings, with the borders of lakes and streams or other wetlands being especially favored habitat (Johnsgard 1990, Coffin and Pfannmuller 1988). Widespread loss and fragmentation of riparian habitats has forced this species to rely on upland forests to a greater extent (Ebbers 1991a). In such areas, human-made grasslands may replace wetlands as hunting habitat (Ebbers 191a). American beech and sugar maple are frequently selected for nesting, where the nest is usually built in a secure crotch of a large-diameter tree situated well below the canopy (Ebbers 1991a). Morris and Lemon (1983) found that red-shouldered hawk nests were typically in mature deciduous forest stands dominated by sugar maple and American beech and characterized by mature trees and a reduced understory. Home ranges for the red-shouldered hawk are smaller when compared to those of the northern goshawk. In Michigan, Craighead and Craighead (1956) found that mean breeding home ranges were 63 hectares, but varied from 7.7 to 155 hectares.

No responses of red-shouldered hawks were detected by CCES ecologists during the March 29 and April 12, 2011 call-response surveys of the Zavoral property. Furthermore, no visual evidence of red-shouldered hawks was observed during the March 29 and April 12, 2011 call-response surveys. The results of the 2010 and 2011 call-response surveys for red-shouldered hawks are consistent with the results (i.e. negative detections) of the audial and stick nest surveys completed at the Zavoral property in 2009. While red-shouldered hawks are a documented resident raptor species of the greater St. Croix River Valley's deciduous forest, mixed coniferous forest, and floodplain forest habitats, no red-shouldered hawks have been detected within the proposed mining areas or adjacent forest habitats of the Zavoral property in 2009, 2010, or 2011.

References

Coffin, B., Pfannmuller, L. 1988. Minnesota's Endangered Flora and Fauna. University of Minnesota Press, Minneapolis.

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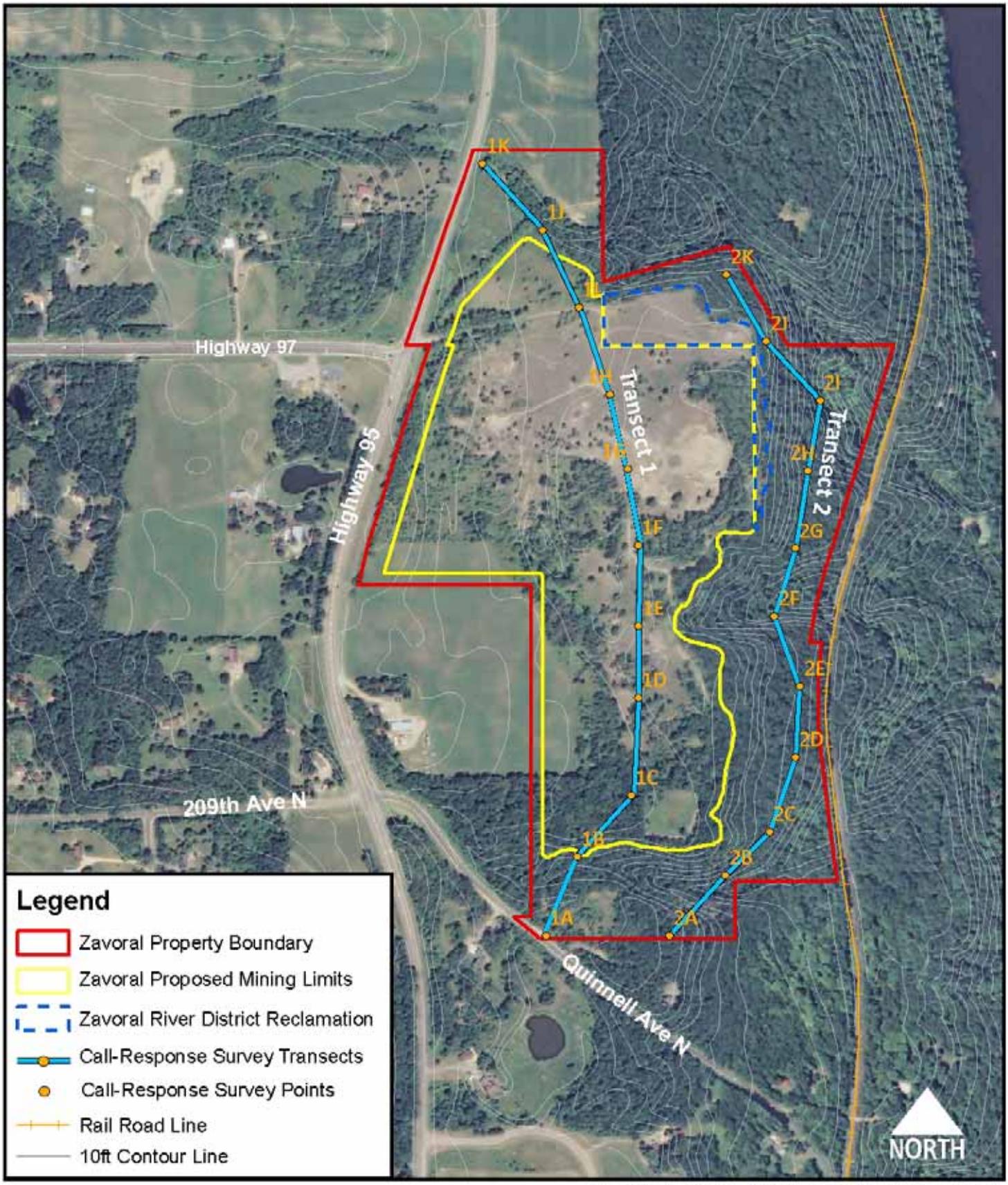

Aerial Photo Source: 2008 FSA Color Aerial Photograph

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Critical Connections
Ecological Services, Inc.

Red-Shouldered Hawk (*Buteo lineatus*)
March 29 and April 12, 2011 Call-Response Surveys
Location of Survey Transects and Points
Zavoral Property, Scandia, Minnesota

Figure 1