APPENDIX F

MnDOT Parcel 75: Oak Savanna Vegetation Management Plan

This appendix provides an example of a vegetation management plan completed by the Minnesota Department of Natural Resource for the Minnesota Department of Transportation property located in Shakopee known as MnDOT Parcel 75.

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Parcel 75: Oak Savanna

Shakopee, Minnesota

Vegetation Management Plan

May 2005

Parcel 75: Oak Savanna Vegetation Management Plan

Parcel 75 – Oak Savanna

Natural Resource Management Plan and Resource Inventory

I. Introduction

Parcel 75, currently owned by Mn/DOT, is located in the NW ¼ of the SE ¼ of Section 11, Township 115N, Range 22W in the City of Shakopee, Scott County, Minnesota. It is southwest of the Trunk Highway 169/ County Road 18 interchange along Southbridge Parkway and approximately ¾ mile NE of Deans Lake.

The 40-acre parcel includes a native oak savanna- sand barrens subtype, and two high-voltage transmission lines (HVTL) owned by Xcel Energy. Xcel Energy prepared an Environmental Assessment Worksheet (EAW) regarding the addition of a third HVTL next to the existing one on the west edge of the parcel. Construction of the towers for the third HVTL began in January 2005.

This vegetation management plan describes a coordinated strategy for stewardship that addresses biological management, obligations of ownership, and visitor management.

The Minnesota Department of Transportation (Mn/DOT), the Minnesota Department of Natural Resources (DNR), the City of Shakopee, and Xcel Energy worked cooperatively to develop the management strategies described in this plan. The plan references plant and animal inventories prepared by the DNR in 1980, 1995, and updated in 2004.

A. Site Significance

Today, Parcel 75 represents some of the last remaining native oak savanna in Minnesota. Before European settlement, oak savanna covered roughly 10% of the state (http://www.nps.gov/miss/restoration/oaksav.html). Today, less than 65,000 acres, only 2/10 of 1%, remains of the original pre-settlement oak savanna in the Midwest (http://nature.org/wherewework/northamerica/states/minnesota/preserves/art6944.html). Much of it has been cleared for farming because of the rich soil often associated with it or has been developed for residential or commercial use.

The pre-settlement vegetation of the Shakopee area was predominately oak savanna with seasonally flooded wetland basins and fresh meadows. Parcel 75, now surrounded by residential development and roads, is a remnant of a unique type of savanna, referred to as sand barrens, that occurs on well-drained sandy substrate. The site still harbors many native species of xeric-adapted grasses and forbs as well as some mesic species in lower areas. See **Error! Reference source not found.** for the 2004 species list.

Many open grown bur oaks and bur oak seedlings exist throughout the site. The biodiversity of native grasses and forbs is still high despite the presence of such non-native invasive plants as buckthorn, tartarian honeysuckle, leafy spurge, ragweed, garlic mustard, and reed canary grass. It is likely that the native seed banks are still viable in the open grassland areas as well as some of the areas that are becoming more closed-in woodlands.

The site is about one mile south of the Minnesota River and the Wilke Unit of the Minnesota River Valley National Wildlife Refuge. It is less than one mile northeast of Deans Lake and its surrounding wetlands. The City of Shakopee has designated the areas to the south and

west of Dean's Lake as part of its interrelated parks and open space system. Parcel 75, then, extends the potential habitat for wildlife (pheasants, grouse, plains pocket mouse, and gopher snake) between Deans Lake and the Minnesota River.

B. Historical Context

Parcel 75 is within an area described in a 1958 Scott County Soil Survey as predominantly Zimmerman fine sand with slopes of 2-6% and 6-12%, with either slightly or moderately eroded slopes. Consequently, it was deemed unsuitable for farming and has never been plowed. As recently as 1997, Parcel 75 and the several square miles to the south of it were still relatively untouched by farming or development. However, it has been used as pasture land for horses and has been heavily grazed as recently as the early 1990's.

The natural vegetation is that of an oak savanna, sand-barrens sub-type, dominated by open-grown bur oaks (*Quercus macrocarpa*) with many species of xeric-adapted grasses and forbs historically occurring on upland south and westerly facing slopes, and more mesic species occurring in lower areas. In 1995, the MN/DNR surveyed the site as part of the County Biological Survey. [Species lists from 1995 and updated lists from 2003-04 are found in Appendix 5 & 6.] Several species of plants and animals that are listed as rare or as species of concern were found at the site, including the rhombic-petalled primrose, plains pocket mouse, and gopher snake. The site's savanna character is transitioning to woodland with the increasing presence of red and northern pin oak, red cedar, as well as poplar and green ash in some of the low areas.

Xcel Energy (formerly Northern States Power) acquired Parcel 75 in several pieces between 1971 and 1976. It was sold to Mn/DOT in 1995 as excess right-of-way related to the westerly extension of TH 169 in 1995-96. Much of the area to the south -- as far as Dean Lake – was parceled out soon thereafter and developed for commercial or residential use. (See **Error! Reference source not found.** - Land Use maps, 1997 and 2000.)

C. Current Master Plan Context--Dean Lakes Greenspace

The Deans Lake Area Park, Open Space, and Trail Master Plan developed by the City of Shakopee in July 2001 describes the natural vegetation (savannas, wetlands) around Deans Lake as one of the more ecologically unique and valuable areas of the city and credits these features with enriching the "human cultural experience". It further sets forth the City's intent to preserve natural and ecological values of the area within the context of developing the land for human use.

Parcel 75 lies within the Southbridge Area of Shakopee surrounding Deans Lake. Southbridge is primarily a residential area but the City has established objectives to preserve natural areas for open space, neighborhood parks and greenways trails and corridors. The overall master plan for the area includes developing a strategy for ecological stewardship of the natural open spaces. The City of Shakopee has expressed interest in acquiring Parcel 75 from Mn/DOT with the intention of integrating it with the park and trail system already set aside in and around Deans Lake. Natural resource management would be conducted with the intent of maintaining the savanna ecotype.

II. Existing Condition

In 1995, the DNR County Biological Survey Program included Parcel 75 in a survey done of the Deans Lake area. Referred to as "Site 4", the area extended north and east from Dean's Lake to include S11, T115 R22W. Generally characterized as "formerly oak barrens on large sand deposit in the river valley", Parcel 75 can be described as "degraded prairie rather than old field as it is co-dominated by prairie grasses and contains species typical of dry, sand prairie."

An earlier survey, conducted in 1980 to the north of Parcel 75 where the NSP Blue Lake Sub-station has since been built, likewise characterizes the area as "an ecologically sensitive sand dune and prairie habitat".

Soils on the site are predominantly fine sand. Plant species common throughout the area today include *Amorpha canescens, Schizachyrium scoparium, Koeleria pyramidata, Bouteloua curtipendula, B. hirsuta, Calamovilfa longifolia, Aristida basiramea, Stipa spartea, Penstemon occidentalis, P. grandiflorus, Liatris aspera, L. punctata, Physalis herterophylla, Froelichia floridana, Lespideza capitata.* Species lists from both the 1980 and 1995 surveys are found in Appendix 3 & 5, respectively.

Many of the species present at the time of the 1980 and 1995 surveys are still present today. A species list from summer 2004 is also found in Appendix 6.

The absence of fire in the area has given non-native invasive plant species the opportunity to become established on Parcel 75. Northern pin oak (avg dbh ~ 3-5") and red cedar have filled in the oak openings to create overgrown woodlands; quaking aspen has filled in the lower mesic areas, including a low area classified as a PFOB wetland. Oak wilt is also present on the site and has been treated twice, once in 1999 and again in November 2004. Many of the prairie openings have become overgrown with raspberry, honeysuckle, and buckthorn. Patches of leafy spurge are present and spreading in 4-5 locations at the site. Ragweed and reed canary grass are predominant on the northeastern corner but found throughout.

III. Desired Condition

The goal of the vegetation management plan is to outline a restoration strategy that will re-establish the savanna character of the site, rejuvenate the native plant community, and reduce the presence of invasive plant species. The woodlands need to be opened up. The grasslands will benefit from controlled burns to rejuvenate the native seed bank and increase the vigor of the plant community.

The plant species lists from surveys conducted in 1975, 1980, and 1995 (see Appendices) serve as a reference point for the desirable plant community since the level of disturbance prior to 1997 was primarily limited to grazing.

The open-grown bur oaks and bur oak seedlings currently present on the site are included in the desirable plant community. Generally, individual trees will occur scattered through the site or in relatively small clusters. The open grasslands will include many species of xeric-adapted grasses and forbs. A plant survey conducted in 1980 notes the presence of blue grama, sand dropseed, little bluestem, and sand reed grass, along with golden aster, lead plant, blazing star, pasque flower, purple prairie clover and large-flowered penstemon, and rhombic petalled primrose. "Grasses adapted to more mesic sites include Indian grass, switch grass, and big bluestem." In 1975, as well as presently, Junegrass, *Bouteloua gracilis & B. curtipendula*, porcupine grass and needle grass (*Aristida* spp); heath aster and puccoon have

been noted on the site. Blueberry and bog birch were also noted in the lower areas of the site in 1980.

By implementing a vegetation management strategy designed to manage invasive plant species, treat disease (oak wilt), open up the woodland and include controlled burns, the natural savanna character of the site should be much improved by 2010. Because the degradation to this site occurred as a result of surface disturbance (e.g. grazing and disturbance related to nearby residential and commercial development) rather than a deeper disruption of the substrate and the root beds of the plant community, it is likely that the seed bank of native species is still viable.

There are several conditions present at the site that pose considerable challenges for restoration. Residential development and roadways surround Parcel 75 (housing on the west and east, and roads to the north and south); high-voltage transmission lines (HVTL) parallel the property line on the west and east sides. The persistent pressure of continued disturbance will require long-term slow effort to achieve and maintain progress. Small steps. Restore one small area and stabilize it before starting the next one.

However, restoring the savanna will enhance a unique community resource and improve the site as habitat for wildlife in general and, in particular, for three species of special concern previously documented on the site.

> Rhombic-petalled primrose *(Oenothera rhombipetala)* – Habitat: sand dunes or sand barrens prairie. Bloom in evening. http://www.lib.ksu.edu/wildflower/fourpoint.html
>
> Plains pocket mouse (*Perognathus flavescens*) -- Habitat: sandy soil, covered with *Stipa* spp, little bluestem (*Schizachyrium scoparium*), blue grama (*Bouteloua gracilis*) , three-awn (*Aristida* spp). Burrows beneath plants roots. Eats seeds of grasses and weeds including needle grass (*Stipa* spp), bind weed (*Calystegia* spp), sandbur grass (*Astragulus* spp), sedge (*Cyperus* spp), spiderwort (*Tradescantia* spp), puccoon (*Lythospermum* spp). http://www.nsrl.ttu.edu/tmot1/perflave.htm
>
> Gopher snake/ bullsnake (*Pituophis catenifer*) -- Habitat: favor open prairies, and especially sand prairies; in Minnesota, typically near the St. Croix, Mississippi and Minnesota Rivers. Prefer loose, sandy soil that allows easy burrowing. They are large snakes that need a lot of space. Hibernate in winter, burrow during summer, sun themselves in spring & early fall. http://www.herpnet.net/Minnesota-Herpetology/snakes/Bullsnake.html

IV. BMP's or Actions to Achieve Desired Condition

Comprehensive restoration of the oak savanna at Parcel 75 includes four major components and best management practices (BMP's) listed here but described more fully below.

1) treat/ manage oak wilt;
2) manage invasive plant species using brush removal, bio-control and controlled burns;
3) rejuvenate the native plant community using controlled burns, mowing, and selective re-seeding;
4) manage human disturbance due to recreation.

A. Oak Wilt

The City of Shakopee ordinance for shade tree disease prevention and control requires effectively treating trees infected with oak wilt in order to prevent spread of the disease. Parcel 75 was first treated for oak wilt in 1999 by cutting vibratory plow lines to inhibit the spread of oak wilt fungus through root connections and to isolate infected and at-risk oak trees. Plow lines were cut again in November 2004 to treat the recurrence of the disease and again sever the root connection between at-risk and healthy trees. Infected and at-risk trees were cut and chipped on site, scattering chips at < 1" depth so as to not inhibit the growth of the ground layer of native plants.

Diseased and at-risk trees should be cut and stumps treated with a mix of 50% Garlon 3a and 50% 'environmentally-friendly anti-freeze' to be applied with a pipe dauber. Cut trees should either be chipped or removed from the site to prevent sporulation of the fungus. Any chips left at the site should be scattered at low densities (< 1" layers) so as to not inhibit the growth of the ground layer of native plants.

Additional remediation is recommended for the soil disturbance caused by the action of the vibratory plow to inhibit or prevent opportunistic invasive plants (e.g. leafy spurge, garlic mustard, ragweed, red cedar, etc) from becoming established. Raking the soil back into place and reseeding with a quick-growing annual grass, such as rye or hybrid slender wheat grass (ReGreen), will prevent erosion and allow the native seed bank to begin establishing on its own. Supplemental re-seeding with local native species collected on the site may be necessary as well.

B. Invasive Plants

Treatment for oak wilt will consequently open up the woodlands by removing infected and at-risk trees. The integrity of the savanna will also depend on the management of non-native invasive species as an important component of restoration and maintenance. Additional and continued restoration strategies/ techniques are needed in order to preserve the native character of this site.

Bio-Control

Leafy spurge is on the Minnesota Department of Agriculture (MDA) "prohibited noxious weeds" list in Minnesota. As such, landowners are responsible for its timely control or eradication. Biocontrol for leafy spurge began on the site in 2004 when Mn/DOT foresters released root-feeding flea beetles (*Aphthona* spp) on 5 locations within Parcel 75. Mn/DOT will monitor the site and release additional beetles as necessary until such time as Parcel 75 is conveyed to other ownership.

Herbaceous Plants

Garlic mustard is also on the MDA "prohibited noxious weeds" list. Bio-control research is underway at several major universities. In the meantime, managing its spread is done predominantly by mechanical methods such as manually pulling it out of the ground or spraying it with herbicide, typically glyphosate (Rodeo®, Roundup®). Treatment is similar for ragweed and reed canary grass. Controlled burns, when conducted in the spring, may also reduce the plants' vigor and set back the population.

Brush Removal

Tartarian honeysuckle and buckthorn also have a significant presence on the site. These shade tolerant woody species grow quickly, filling in the understory and out-competing native plant species. Red cedar, red oak and northern pin oak seedlings fill in the tree canopy, shading out the herbaceous ground layer of plants. Managing woody shrub and tree species requires cutting large shrubs and trees, then burning or removing the brush piles and treating

the stumps with herbicide (as for diseased trees). Care must be taken to avoid damaging oaks from April to July to minimize new infestations of oak wilt. Controlled burns will also help to prevent woody shrub species from taking over.

C. Rejuvenate Native Plant Community

Steps should be taken to rejuvenate the native plant seed bank concurrently with managing invasive plants to facilitate establishing the desired plant community. Controlled burns serve this purpose by removing residual plant material, releasing essential nutrients back into the soil and reducing the competition from non-native species thereby releasing the native seed bank.

Controlled Burning

Conducting controlled burns at this site will require considerable caution due to the proximity of the powerlines and to TH169 and Southbridge Parkway, two heavily traveled roadways adjacent to the site on the north and south. Xcel Energy staff cautions that conducting burns near the HVTL may increase the risk of 'arcing' which could result in injury or death to crew members, and/or wide-spread power outages.

Arcing occurs when the density of carbon particles in the smoke is high enough to conduct an electrical discharge from the line to the ground, similar to lightning. The hazard increases as line voltage and the amount of smoke increases, and distance to the ground decreases. (Paul D. Ohlenbusch and James W. Kunkel, Prescribed Burning Safety, Kansas State University, March 1996, http://www.oznet.ksu.edu/library/crpsl2/L565.pdf)

A publication titled "Wildfire fighting near high voltage electric transmission lines" distributed by Flathead County, MT, firefighting crews, states that "spot fires... normally do not generate enough smoke to create an electric safety hazard. Small burning trees under the tower or steel pole lines that exceed the height of an individual (6 feet) present a real threat of creating a phase to ground short. Maintain 100 foot clearance between the trees and fire fighting operations."

The sandy substrate and sparse vegetation (low fuel-load) in the grassy areas of Parcel 75 suggest that a controlled fire would burn low, cool, and fast and would be less likely to create the conditions that initiate arcing. A burn prescription that includes small manageable plots, low wind (5-15 mph), cool air temperatures (55- 70°F) and medium-high humidity would help to keep the fire cool and smoke at a minimum. (pers. comm., Mark Cleveland, DNR Ft. Snelling State Park)

It is important to consult with the appropriate city and state government offices prior to any scheduled burns to determine which permits will be required. The local fire department must also be notified in advance of the burn to assist with public relations and provide back-up safety measures.

Conducting controlled burns in the wooded areas will inhibit non-native species (including seedlings of red and pin oaks, red cedar, honeysuckle, buckthorn, raspberry, sumac and reed canary grass, ragweed, leafy spurge and garlic mustard). The larger trees may even provide a barrier preventing smoke from drifting over the nearby roadways and residential areas.

Mowing

In the absence of fire beneath the power lines, mowing can be used to manage the non-native grasses and forbs. Summer and early fall months are the best times to mow, before the plants set seed. This decreases their seed production and avoids scattering the seed during mowing.

D. Recreational Disturbance

In a natural area such as this one that is surrounded by development, it is important to manage the constant occurrence of human disturbance from recreational activities. Deliberately define trails and gathering places. Install educational plaques and kiosks to foster awareness and appreciation of the uniqueness of the savanna and encourage visitors to contribute to its care by understanding the fragility of the sand substrate.

E. Overall Management

The level of management at this site will need to be fairly ongoing, diligent, and consistent but also measured -- the "don't bite off more than you can chew" approach – for restoration activities to be successful. Because it is bounded on all sides by development, the site will always be pressured by human disturbance and the nearby populations of invasive non-native plants (see **Error! Reference source not found.** – Site Map). Restrictions on human use may be considered for activities that have potential for considerable impact to the site (e.g. mountain bikes, playgrounds, picnic areas, etc).

Native species currently present on the site provide a good resource for seed collection and re-seeding throughout the site as needed (e.g. repairing vibratory plow lines). Controlled burns will provide the seed bank an opportunity to rejuvenate and may minimize the need for supplementing with nursery plants.

The site has great potential for cooperative input between public and private influence. A citizen's group, much like the one that participated in the development of the Deans Lake Area Park, Open Space, and Trail Master Plan, would serve all stakeholders well to advocate for the preservation of the site.

V. BMP Priority Array

Table 1 below lists the primary restoration activities and, as an example, a relative timeline through summer 2007.

Table 1 – Restoration Activities Timeline

Activity	2004		2005				2006				2007	
	Fall	Wtr	Spg	Sumr	Fall	Wtr	Spg	Sumr	Fall	Wtr	Spg	Sumr
Oak Wilt												
- monitoring												
- vibratory plow												
- cutting/ removal												
- re-seed plow lines												
Biocontrol for leafy spurge (*Aphthona* spp)												
Mow under power lines												
Shrub/ tree cutting, on-going when possible												

Controlled burns, as possible												
Spray herbicide (reed canary grass, ragweed, etc)												

A. General Restoration Approach/ Priorities

Ideally, Parcel 75 would be managed as one 'big piece', cutting out all the brush and 'non-target-community' trees (e.g. red/pin oaks, red cedars, buckthorn, honeysuckle, etc) throughout the site in 1-4 visits using park staff and volunteers. Controlled burns would be done every year for the first three years to diminish the invasive plant populations and rejuvenate the native seed bank, then periodically as needed.

However, due to limited resources of both funding and labor, a much more moderate and measured approach is realistic. Opening too many areas too soon/ rapidly by removing trees and shrubs may only leave these areas vulnerable to invasive plants and further degradation if it is not possible to follow-up with burns on a regular basis. Therefore, prioritizing not only the methods or strategies to follow but also specific parts of the site to be restored will allow smaller portions to become established as oak savanna prior to beginning the next one.

In addition to monitoring for oak wilt and leafy spurge, maintaining the vegetation beneath the power lines is a priority. In the absence of burns, mowing will help keep shrubs and trees from reaching heights that could directly interfere with the power lines or could cause problems in the event of an unintentional fire.

On-going removal of undesirable trees and shrubs, particularly buckthorn, honeysuckle and red cedar, can be done with the help of park staff and coordinated volunteer events. Priority for burning should be directed to specific areas of the site that may be more conducive to a controlled burn due to location and possibly to areas that function as a seed source for invasive species (i.e. areas of high density and seed production).

1. Oak Wilt

The City of Shakopee Shade Tree Disease Control Ordinance requires property owners to treat oak wilt. Periodic monitoring for symptoms is important as 'infections' can recur or be re-introduced to the site. Leaf die-back or browning in mid-summer may be a sign of the disease.

If pockets of the disease are discovered, measures should be taken to prevent spread. Vibratory plow lines may be cut in the soil to sever the root connections between at-risk and healthy trees. Infected and at-risk trees should be. The soil disturbance caused by the plow should then be remedied to reduce erosion and inhibit opportunistic invasive plants from becoming established, allowing the native seed bank to begin establishing on its own. Follow-up remedies include raking the soil smooth and re-seeding with quick-growing annual vegetation (such as rye or hybrid slender wheat grass (ReGreen)) and native seed collected from the site.

2. Biocontrol and Management of Invasive Species

Leafy spurge is on the MN Department of Agriculture (MDA) list of Prohibited Noxious Weeds. Mn/DOT began biocontrol of leafy spurge on Parcel 75 in 2004 by releasing root-feeding flea beetles (*Aphthona* spp) at several locations within the site. MDA has also released flea beetles at many sites surrounding Parcel 75. Continued monitoring of the flea

beetle populations on existing patches and scouting for new patches will minimize the rate at which this noxious weed spreads.

Buckthorn is included on the MDA Restricted Noxious Weeds list. Removal of buckthorn and honeysuckle and treating the stumps with glyphosate and/ or triclopyr should continue on an on-going basis as labor becomes available. Brush piles should then be removed from the site, burned, or chipped.

Reed canary grass and ragweed may also be controlled by using glyphosate. Early season herbicide treatment may be more appropriate in grassy areas beneath the power lines when controlled burns are not scheduled. http://www.weeds.iastate.edu/mgmt/2004/giantrag.shtml

3. Controlled Burns

The timeliness of completing controlled burns may not be predictable due to the uncertainty of funding resources and to the need for a very tight burn prescription for areas in close proximity to the power lines and the adjacent roadways.

However, burns might be prioritized in various portions of the site as follows:

- newly opened areas where diseased trees have been removed;
- grassy areas away from power lines (will also weaken leafy spurge, ragweed, reed canary grass, raspberry, etc).

VI. Funding and Resources Available

Public participation in many restoration activities required on the site will be a valuable asset and reduce the need for a large funding base. Participants very often develop a sense of ownership in the project and are more likely to assume a role of stewardship of the site. Volunteer activities might include pulling invasive plants, cutting and removing brush, collecting and distributing seed and as well as litter control. Local residents as well as various businesses, Sentence-to-Serve, and Minnesota Conservation Corps are some possible participants. Controlled burns, mowing and herbicide application should be reserved for trained and licensed personnel.

3/21/05: emaild Bob Wryk for confirmation of this.
Mn/DOT will continue to fund usual right-of-way maintenance activities as long as the property remains in Mn/DOT ownership. Mn/DOT has also committed to funding specific activities related to treating oak wilt: vibratory plow lines, cutting and treating affected trees.

LCMR grants – Every two years, the Legislative Committee on Minnesota Resources accepts grant applications that address the preservation or restoration of Minnesota natural areas. A grant application could be submitted to the LCMR directly for management of this site. The next round of funding will likely be announced in 2005 with applications due in early 2006. http://www.lcmr.leg.mn/lcmr.htm

DNR Land conservation grants

Greenways / Corridors program -- A portion of the LCMR funds is typically granted to the MN DNR for the Greenways and Conservation Corridors Program. A grant application could be submitted to the DNR to contribute to the management of Parcel 75. http://www.dnr.state.mn.us/grants/land/metrogreen.html

MN ReLeaf Program --
The program assists Minnesota communities with planting and caring for their trees for a variety of purposes. Treating oak wilt is included in the scope of eligible activities. http://www.dnr.state.mn.us/grants/forestmgmt/releaf.html

Metropolitan Council
Minnesota Statute Section 473.315 authorizes the "Metropolitan Council with the advice of the Metropolitan Parks and Open Space Commission to make grants from any funds available to it for recreation open space purposes to any municipality, park district or Park District located wholly or partially within the metropolitan area to cover the cost, or any portion of the cost, of acquiring or developing regional recreation open space in accordance with the *[Regional Recreation Open Space] Policy Plan".*

USFWS
Technical and Financial Assistance Available for Habitat Restoration, contact, Sally Valdes at 703.358.2201 or *Sally_Valdes@fws.gov*.

Table: Funding/ Labor Contributors

Vegetation Management Activities	Mn/DOT	City of Shakopee	Xcel Energy	MNDNR	Other
Oak wilt:					LCMR/ DNR
Vibratory plow	X				
Cutting	X				
Chipping		X	X		
Mowing under HVTL	X	X	X		
Invasives:					
Leafy spurge	X				
Buckthorn					Volunteers[1]
Honeysuckle					Volunteers[1]
Controlled burns		?	?		X – GRG[2]
All					LCMR/ DNR?

1 Volunteers = Sentence to Serve, MCC, Great River Greening

2 GRG = Great River Greening

VII. Follow-up: long-term maintenance

Long-term restoration and maintenance of Parcel 75 will be required because the site is surrounded by development and subject to persistent disturbance and pressure from invasive plant species. Intervention will likely be more intensive early on, until the native plant community has regained its vigor. It may be neither possible nor realistic to completely eliminate invasive plant species from the site. However, annual maintenance or at least monitoring will be necessary to maintain the desired level of site integrity.

Monitoring can be formal, by establishing transects or plots to quantitatively track changes in the plant community; or informal, by simply walking the site and mapping the boundaries or general locations and density of various invasive plant species (e.g. is the patch of leafy spurge bigger or smaller, or more sparse/ dense this year than last?; is it

present in a new location, or has it disappeared from an old one?; has the biodiversity of native plants changed, are there additional species now present, what is their abundance? Etc.).

Management of required activities such as treating oak wilt and biocontrol of leafy spurge will fall to current ownership, in coordination with other entities as feasible. As long as the parcel is in public ownership, the remaining activities may be suited to the collaborative effort of many entities including Mn/DOT, the City of Shakopee, Xcel Energy, non-profit organizations and public initiative.

Coordinating annual volunteer events to remove buckthorn and honeysuckle -- as well as garlic mustard, reed canary grass, and raspberry -- cut red cedar, and collect and distribute seeds will keep the community involved, contribute to managing invasive plants, and be an effective use of limited funds.

Source of 'outline questions': (http://www.ser.org/content/guidelines_ecological_restoration.asp#2)