Alternative Vegetation Options for Public Lands

ESPM 4041W - Problem Solving for Environmental Change

Report #3/7

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Executive Summary

Oakdale has the opportunity to decrease costs, increase environmental services, and enhance the quality of life of its citizens by implementing alternative vegetation strategies in open public spaces. We define alternative vegetation strategies as planned plots of vegetation that deviate from traditional turf grasses. Environmental Studies students from the University of Minnesota collaborated with the City of Oakdale to create this report, which recommends best alternative vegetation management strategies specific to Oakdale. This report intends to provide Oakdale with the recommendations and resources to implement these alternative vegetation strategies in a way that is most suitable for Oakdale.

In order to gather information on current public open spaces and how they are maintained, site tests were conducted at Powerline Park, Golfview Park, and the boulevard along Hadley Avenue North. These three areas were chosen in order to represent three different types of spaces that alternative vegetation strategies can be implemented in. These three sites were also identified as sites with the highest potential for improvement through alternative vegetation strategies. Research was gathered through site visits, interviews, literature review, and secondary data analysis. Findings from this research prompted four main recommendations for alternative vegetation options:

1. Low-input turfgrass
2. Prairie restoration plots
3. Rain gardens
4. Community gardens

Considerations for implementation costs, environmental services, and usability by citizens of Oakdale were made for each recommendation. These recommendations are limited by some aspects of the research process. Comprehensive and specific data for costs and environmental services are not yet available for some alternative vegetation strategies because scientific research has not yet been conducted in these areas. However, based on information and estimates provided by experts, these alternative vegetation strategies are recommended with confidence. Implementation and evaluation strategies are also included within this report. These strategies include criteria for assessing quality of implemented vegetation and surveys for assessing public perception of aesthetics and recreational value of Powerline and Golfview Parks.

By implementing the recommended alternative vegetation strategies provided within this report, Oakdale can improve their city in three main ways: reduce costs associated with current turf maintenance, increase environmental services, and enhance the aesthetics of public spaces.
Introduction

The City of Oakdale offers a wide variety of managed green spaces for the community. With 28 parks, Oakdale is committed to providing a high quality of life for its residents by improving economic, social, and environmental health of the community (Comprehensive Plan, 2010). In order to continually improve the city, Oakdale officials, staff, and residents are always considering new perspectives. Students from the University of Minnesota in the Environmental Science, Policy and Management Major collaborated with the City of Oakdale in the Fall of 2013 to create a management plan regarding the implementation of alternative vegetation options for public lands that may reduce the economic and environmental costs involved with maintenance of public parks.

This report evaluates the management inputs for open public lands, provides recommendations for alternative vegetation options, and includes methods for evaluating these recommendations. Throughout this report, “alternative vegetation options” indicates any landscaping option that can replace mowed turfgrass, which may include rain garden systems, native plants, or, simply a different type of grass. We analyzed three specific areas: Powerline Park, Golfview Park, and the boulevard along Hadley Avenue. These parks became pilot areas to examine potential alternative vegetation options that would provide economic, social, and environmental benefits for the City of Oakdale. By studying options for these specific areas, guidelines can be drafted to aid future decisions on the best management practices for similar public lands.

To keep the aforementioned parks suitable for public use, the City of Oakdale must bear the cost of mowing equipment, turfgrass maintenance supplies such as fertilizers or herbicides, and the labor needed to carry out these maintenance regimens. Although the potential alternative vegetation options may have a relatively high initial cost, the cost-savings for each subsequent maintenance season may ultimately save the City of Oakdale money (Nedunuri et al., 2013). These savings can be allocated to other areas of interest for the City of Oakdale to perpetuate and improve their already flourishing community.

However, the benefits of implementing alternative vegetation options are not limited to the allocation of maintenance cost savings. With careful consideration of the changing demographics, needs, and values of the community, the alternative vegetation options can enhance public parks to meet neighborhood preferences. Investing in the values of current and future park users will increase the popularity of the parks, strengthen community bonds, and amplify the beauty of the City of Oakdale. The suggestions put forth in this report acknowledge and respect the need for citizen input in order to reach the full potential social benefit of public park space.
Additional environmental benefits of the alternative vegetation options recommended in this report include assurance that Oakdale’s parks continue to enhance the aesthetic appeal of the city without jeopardizing the health of its unique natural assets. Reducing the use of fertilizer or herbicides and fossil fuelled equipment in underutilized areas decreases the environmental burdens associated with park maintenance (Harayashiki et al., 2013). The suggested options offer increased environmental services, a term used within this report to describe the benefits that natural systems provide, such as plants that filter rainwater before it is returned to groundwater supply (Khalaf et al., 2013). Environmental services are imperative to the health of the overall environment in Oakdale, therefore implementing alternative vegetation strategies will magnify the benefits of these open parks.

The economic, environmental, and social benefits described above were the criteria for the alternative vegetation options recommended throughout this report. These criteria were gauged specifically for the City of Oakdale to enhance their unique community while also meeting the requirements of the resource limits available for this project. By implementing alternative vegetation options in open public spaces, Oakdale has the opportunity to improve the allocation of tax dollars, increase the suitability of its parks for its citizens, and develop environmental services for the continued beauty and health of the city.

Vision Statement

“The City of Oakdale is committed to serving the continuing community-wide needs of our citizens by enhancing the vitality and quality of life for all.” City of Oakdale

Mission Statement

As a group of students, we drafted a vision for what we would like to see for the City of Oakdale, and to align that with their mission. We aim to create a cohesive, achievable set of recommendations in collaboration with the Oakdale community to enhance the vitality and quality of life, sustainability of the local land and waters, and foster greater community engagement now and into the future.

More specifically, this report aims to recommend alternative vegetation options for low use turf areas in Oakdale that decrease turf maintenance inputs, increase environmental services, and enhance the quality of life for residents who use those spaces.

Goals and Objectives

The goal of this report is to identify alternative vegetation options for the City of Oakdale that will maximize the use of their open public lands while lowering the requirements for their maintenance. Alternative vegetation options are a viable
investment for the City of Oakdale because the costs that are incurred by the traditional maintenance of these open spaces are not exclusively monetary.

The following objectives guide the work within this project:

- Assess current vegetation in Oakdale public spaces
- Assess inputs for each vegetation type
- Assess necessary maintenance for each vegetation type
- Research and evaluate different vegetation types
- Interview experts in the field
- Develop and recommend a implementation plan for Powerline Park, Golfview Park, and the boulevard along Hadley Avenue for the City of Oakdale
- Develop alternative vegetation guidelines for future use
- Develop survey questions to assess community use of high value areas
- Create an evaluation system to determine success of implemented conversions

Methods

Site Description

Oakdale, MN, is a small suburb approximately seven miles east of downtown St. Paul, as shown by the map in Figure 1. It is surrounded by several other suburbs, and has a total population of 27,378 as of the 2010 census. The city is composed of 38% residential, 10% industrial/commercial, and 51% public and open space by land area (Comprehensive Plan, 2010). Oakdale is located in a temperate climate at 45°N with harsh winters and a growing season that typically lasts from May to October. Within Oakdale, three specific parks were assessed for alternative vegetation.

A signature street running through the heart of Oakdale, Hadley Avenue, is a 5.5-mile long stretch of road which incorporates a paved path along its entire length. Between the road and path is a mowed turfgrass boulevard, which offers few benefits apart from traffic separation. The path provides a recreation corridor for residents, connecting parks, residential areas, and commercial districts.

Powerline Park is a grassy 3-acre park that lies under the right-of-way for a high voltage power line in southern Oakdale. It is located specifically north of 4th Street North, between Interstate 694 and Helmo Avenue North. It is surrounded by townhomes, a small commercial district, and the Oak Marsh Golf Course. Several families were observed in the surrounding neighborhoods during site visits to the park. The land is zoned as Planned Unit Development (PUD) according to the zoning map for Oakdale, which allows for multiple uses (City of Oakdale.)
Golfview Park is a 1.57-acre park located east of MN-120 and south of Hadley Avenue North just off of 56th Street North in the northern reaches of the City of Oakdale. It consists of a playground area, a basketball court, and a nonregulation-size soccer field with sprayed lines and goals. It is also adjacent to a small forest and wetland to the east. The park is zoned as PUD, allowing for multiple uses.

Research Techniques

Site Visits

Site visits to Powerline Park, Golfview Park, and the boulevard along Hadley Avenue North were conducted to gain a better understanding of surroundings and characteristics specific to Oakdale. The three park areas mentioned above were visited because City Officials were concerned with the large maintenance requirements and perceived low use of these sites. They specifically asked that these

Figure 1. Map of seven-county metropolitan area with left inset of location in Minnesota and right inset of the City of Oakdale.
spaces be addressed. These areas represent the variety of maintained turfgrass spaces in Oakdale, with some land-use types excluded, and were central to framing this report. In order to better understand the scope of this project, it was important to make observations about the size, surroundings, and state of each park. Qualitative observations were made by taking notes and photographs during each site visit. These observations were used as a frame of reference for quantitative research such as area, topography, soil types, and vegetation type.

**Interviews**

Developing an understanding of how Oakdale is currently managing the vegetation in their parks was important to providing recommendations for alternative vegetation options. Oakdale staff members, specifically the Environmental Services Superintendent and Parks Superintendent, were key informants for understanding current management practices. These individuals were interviewed with the intent to understand: 1) maintenance budgets for city parks; 2) current maintenance schedule and time spent maintaining parks; 3) species of turfgrass in parks; 4) current use of parks by citizens; and 5) future plans for turf management of parks.

Chris Larson, the City Forester and Environmental Services Superintendent at Oakdale Public works, provided city maps and information such as area of mowed space, maintenance costs, labor, and community use on the three sites focused on in this report.

Once the baseline understanding of Oakdale’s parks was gathered, individuals with insights into alternative vegetation options were interviewed. A University of Minnesota (UofMN) Turf Club student member was interviewed to gain insight into the best low-input turfgrass for public parks.

All interviews were conducted through email, phone, and/or in person. Once the baseline understanding of Oakdale’s parks was gathered, individuals with insights into alternative vegetation options were interviewed. Sam Bauer, a UofMN Extension Educator and also a UofMN Turf Club student member were interviewed to gain insight into the best low-input turfgrass for public parks. Mr. Bauer also provided information on the best application procedures for low-input turf. Julia Bohnen, a horticultural researcher with the UofMN, was interviewed to gather information and to find specific data regarding the option of establishing prairies within different landscape settings of Oakdale.

**Secondary Data and Literature Review**

An extensive online search was conducted for scholarly articles and various science journals on the subject of alternative vegetation, turf management, prairie establishment, and rain gardens. These articles provided widely accepted data and methods for implementation and were used in the analysis of the advantages and disadvantages of different types of turf and vegetation covers for the City of Oakdale. Literature published by Xcel Energy and various government agencies provided
Findings

There are several opportunities for improvement in natural resource management in the City of Oakdale that could best be achieved by implementing alternative vegetation strategies. We identified areas within Oakdale that currently require considerable inputs and costs for turf management. Alternative vegetation in these areas has the potential to reduce the time and costs associated with turfgrass treatment inputs. In addition to the economic benefits of reducing turf inputs, there is potential to increase the environmental benefits by improving runoff water quality. Low-input turfgrass, prairie grass, and rain gardens have been identified as potential strategies to help Oakdale realize these benefits, and ideal pilot plot areas for each of these options have been identified. In addition to these strategies, community gardens were considered within the context of Oakdale’s previous evaluation of community garden options. With proper assessment of community interest and organization, there is an opportunity for Oakdale to successfully target community garden sites for the future. All previously mentioned alternative vegetation opportunities must be designed with right-of-way laws in mind as these laws are applied to public spaces in order to ensure safety in transmission line zones and along roadways.

Based on a foundation of information gathered from the City of Oakdale staff and other experts, we developed a set of recommendations that, if implemented, will benefit the city in the economic, environmental, and social attributes valued by city officials and residents. Taken together, these recommendations can assist Oakdale in accomplishing their natural resource goals outlined in the Comprehensive Plan (Comprehensive Plan, 2010).

Current Vegetation and Maintenance Practices

Ninety-six acres of public land in Oakdale are city-maintained turfgrass consisting of a mix of Kentucky blue and ryegrass species (Koesling interview). These grass species require a high level of inputs to maintain their ideal “American Lawn” appearance. Several turfgrass species exist that can reduce the amount of inputs needed for turf management. These grasses can dramatically reduce the economic inputs needed to maintain the turf, while also providing substantial environmental benefits.

In 2012, Oakdale spent $109,889 annually to maintain 96 acres of managed turf. These funds were divided between the costs of labor ($66,474), inputs such as weed control ($26,915), and mower fuel ($16,500). By averaging spending costs per acre,
Oakdale spends $1,144.68 per acre in 2012 (Larson interview). Current turf management inputs include: mowing, irrigation, fertilization, aeration and pest control. These inputs collectively make up the total funds Oakdale is spending on turf management.

The green spaces are mown through the months of April and October, but this can change from year to year based on the growing season for that year. There are also no current programs that address low-maintenance mowing within the city of Oakdale (Koesling interview).

The current practices for irrigation are controlled by on-site irrigation and adjusted according to the weekly weather conditions, wet or dry. This is controlled by a system of built-in air sensors that prevent watering if there has been more than ¼ inches of precipitation (Koesling interview). The systems are generally set to water overnight. In addition, many of the high-use sports fields are aerated twice a year, in the spring and fall, but other less frequently used green spaces are only aerated once a year in the fall (Koesling interview).

Other forms of management on the 96 acres of green spaces include fertilization and weed control. Fertilization and weed control are generally contracted out by the City of Oakdale. In the most recent years these services have been provided by Truegreen (Koesling interview). Within the parameters of the contract the fertilizers are a liquid fertilizer (18-0-6) and a dry fertilizer (20-0-20), both are applied in accordance with manufacturer specifications (Koesling interview). The fertilizers applied by the company are Trimec encore, Trupower Turflon sidekick, Tri-power CDMS, or any approved equivalent. These are applied in a single pass at a maximum of two times per year and are again applied within specifications from the manufacturer (Koesling interview and CDMS, Tri-power selective species).

Right of Ways

The proposed sites for alternative vegetation within Powerline Park and the boulevard along Hadley Avenue North are both subject to the restrictions of right-of-way laws. Vegetation in Powerline Park must follow the regulations outlined by Xcel Energy Company in order to maintain the safe and efficient operation of the transmission lines that run through the park (Xcel Energy). Vegetation along Hadley Avenue North is considered a public right-of-way, which imposes maintenance requirements in order to keep up visibility on the roads and decrease soil erosion along roadways (Minnesota Department of Transportation). These requirements are summarized in reference sheets, which are included in Appendices A and B.
Low-Input Turf

Generally, low-input turf has advantages that lower the environmental impacts and costs associated with traditional turf management practices. Sam Bauer, an Extension Educator and horticulture expert from the UofMN summarize the benefits of low-input turf as:

- Low-input turf grows slower than traditional turf; therefore mowing time is reduced. It is estimated that with low-input turf, mowing can be reduced by at least half, with some estimates of 2/3 to 3/4 reductions.
- Low-input turf requires at least half of the nitrogen requirement of traditional turf.
- Low-input turf requires 3/4 or less of the irrigation requirement of traditional turf.
- Low-input turf faces fewer disease and insect pressures; therefore, less fungicides and insecticides are needed.
- Low-input turf has fewer weeds because the turf is healthier under a low-maintenance program, therefore requiring less herbicide.

While low-input turfgrass species are known to require lower inputs, it is difficult to quantify exactly how the low-input grasses will affect a given area. These are estimates of what can be expected by planting low-input turf.

Because low-input turf requires fewer inputs, savings are created. These savings are both economic and environmental. Economically, fewer inputs mean fewer dollars spent maintaining the turf. In Table 1, a comparison is made between the costs per acre of current turf management and the costs per acre of low-input turf management. Also included in the table is the payback period for implementing low-input turfgrass by reseeding. The payback period demonstrates the time it takes to pay off the initial capital investment from the cost savings generated by implementing the low-input turfgrass. It is apparent through the calculations that time and materials can be saved to different degrees through implementation of low-input turfgrass. Calculations of these values can be found in Appendix C.

| Table 1: Current turf vs. low-input turf cost comparison per acre. |
|------------------------|------------------------|------------------------|------------------------|------------------------|
|                        | Annual costs of mowing | Annual cost of fertilizer | Annual total cost | Payback period               |
| Current turf management | $864.31                | $280.36                | $1144.64            | ---                        |
| Low-input turf management | $216.08 - $432.15      | $70.10 - $140.18        | $286.18 - $572.33  | 10 months - 1 year and 7 months |

Environmentally, fewer inputs mean fewer negative impacts on the environment. One important input that will be reduced is fertilizer. Traditional fertilizer application procedures often use more fertilizer than is needed. Fertilization mismanagement of urban vegetation represents a potential source of nutrients that may contribute to water quality impairment (Carey et al., 2012). This water quality impairment is
caused both by excess nutrient runoff in the soil and grass clippings running off into the storm drain system. Currently, Oakdale does not collect grass clippings after mowing (Koesling interview). Leaving grass clippings on the lawn can reduce the amount of fertilizer needed to be applied (estimated to be equal to one nutrient application); however, when the clippings enter storm drains they can cause additional lake and stream water impairment (Carey et al., 2012).

According the Minnesota Pollution Control Agency, no waters in Oakdale are designated as “Impaired” due to nutrient loading (Minnesota Pollution Control Agency). However, implementing low-input turf can ensure local waters remain healthy and help Oakdale to continue to meet local Total Maximum Daily Load (TMDL) standards.

Selection of Low-Input Turf Species
Several grass species exist that can lower the inputs for maintaining open spaces. However, through much research, the consensus among experts is that fine fescues are the best option for low-input turf in the Midwest (Watkins et al., 2011). To ensure the turf is disease and pest resistant, experts suggest a mix of fine fescues species. While there is no consensus supporting a fescue mix that is best for Midwest climates, there are many mixes available that have low-input qualities (see Recommendations for suggested mixes).

Application Options and Procedures
There are two main application procedures for implementing low-input turf: interseeding and reseeding. Both applications are effective in producing a new stand of low-input turf, however benefits and drawbacks differ greatly.

**Interseeding** is the process of gradually trying to establish low-input grass species in an existing stand of turf. To get decent establishment of low-input turf species, this will require at least 3 to 5 years of seeding at a high rate of 6 to 8 lbs. per 1,000 square feet. The seeding rate required for this process is high because some of the seeds will be lost through competition with existing grasses. There will be minimal establishment of new seed with this approach, which is why seeding will be required for several years. After five years, it is estimated that 50 to 75% of the turf will be the new low-input turf species (Bauer interview).

At a seeding rate of 8 lbs. per 1,000 square feet this will take 348.5 lbs. of seed per acre. Considering five years of seeding at an estimated price of $2.00 per lb., interseeding will cost $3,485 per acre (RamyTurf Products).

**Reseeding** is the process of removing the existing stand of turf and replacing it with low-input turf. The easiest and most cost effective method is to use Roundup to remove the existing stand and then reseeding the entire area with the low-input turfgrass. Reseeding requires a lower rate of around 5 lbs. per 1,000 square feet and
only requires one application of seed. It is estimated that after six weeks, a new stand of 100% low-input turf will be established (Bauer interview).

At a seeding rate of 5 lbs. per 1,000 square feet this will take 217.8 lbs. of seed per acre. To eliminate the existing stand, Roundup can be used. Considering one seeding application at a price of $2.00 per lb., reseeding will cost $435.60 (RamyTurf Products). A concentrated mix of Roundup costs $169.99 from a local Home Depot store and is enough to cover 10 acres (Home Depot). A sprayer application is needed to use Roundup. A 2-gallon sprayer will cost $19.62 (Home Depot). In total, including cost of seed and Roundup, the cost to reseed is $452.60 per acre, plus the cost of the sprayer. This information is summarized in Table 2.

Sam Bauer, UofMN Extension Educator and horticulture expert performed a webinar on the 8-step process for this, which he calls species conversion. A link to this process is provided below:
http://www.turf.umn.edu/2013/07/yesterdays-webinar-on-home-lawn-renovation-is-available/

<table>
<thead>
<tr>
<th>Seeding method</th>
<th>Inputs</th>
<th>Time to establish</th>
<th>% Low-input turf established</th>
<th>Lbs. of grass seed per acre</th>
<th>Cost per acre</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interseeding</td>
<td>Grass seed</td>
<td>3-5 years</td>
<td>50-75%</td>
<td>348.5</td>
<td>$3,485</td>
</tr>
<tr>
<td>Reseeding</td>
<td>Grass seed</td>
<td>1 year</td>
<td>100%</td>
<td>217.8</td>
<td>$452.60</td>
</tr>
</tbody>
</table>

Prairie Vegetation

Converting low-use areas to prairie plants is a viable type of alternative vegetation. Native prairie grasses and forbs (flowering plants), such as little bluestem, side-oats grama, and black-eyed Susan once covered much of Oakdale’s landscape (Minnesota Department of Natural Resources). Native prairie plantings have the potential to benefit Oakdale, but also have some costs. Prairies have the potential to provide a plethora of environmental benefits to a landscape. Some of these include stormwater infiltration, groundwater recharge, soil stabilization, pollinator and wildlife habitat, and an overall increase in biodiversity. Public perception can initially be negative due to the less managed look of prairie restorations, but visual appeal can be increased by designing gardens of native bunch grasses and using rail fences to create a defined border (Bohnen interview). Plantings in public spaces can also be used as an opportunity to educate citizens on the natural history of the area and benefits of prairie plants through educational signage (Wandersee et al., 2007).
The most significant costs associated with prairies are initial seed cost and invasive species control during establishment. Seed mixes for small areas will generally cost between $25 and $35 per 1000 sq. ft. or $600 to $1000 per acre. Customized seed mixes can cost even more, but are sometimes necessary to provide the best-suited species for a specific site (Prairie Moon Nursery). Invasive species control can be done in a variety of ways, with different costs associated with each control method. Table 3 considers four common weed control practices.

<table>
<thead>
<tr>
<th>Control method</th>
<th>Best used for</th>
<th>Labor intensity</th>
<th>Monetary cost</th>
<th>Effectiveness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hand weeding</td>
<td>Interspersed invasive plants</td>
<td>Very high</td>
<td>Very low</td>
<td>Very</td>
</tr>
<tr>
<td>Herbicide application</td>
<td>Larger invasions, targetable species</td>
<td>Low to medium</td>
<td>Moderate to high</td>
<td>Moderate to very</td>
</tr>
<tr>
<td>Spot mowing</td>
<td>Large weed patches</td>
<td>Low</td>
<td>High</td>
<td>Moderate to inconsistent</td>
</tr>
<tr>
<td>Burning</td>
<td>General maintenance</td>
<td>High but occasional</td>
<td>Moderate</td>
<td>Very</td>
</tr>
</tbody>
</table>

An important consideration when planning a prairie restoration is site selection. By selecting a site with a high likelihood of success, maintenance associated with the restoration can be greatly reduced. The soils, hydrology, climate, and amount of sunlight should also be taken into account when selecting species for a restoration (Bohnen interview).

Seeding the prairie into existing turf can involve a minimal amount of work, especially if resources such as a boom sprayer and seed drill are already available. The turfgrass should be killed either with herbicide such as glyphosate, or left to grow as it may keep other undesirable plants from establishing. In either case, planting in fall or winter (when there is little to no snow on the ground) provides the most benefits to the quick establishment of the restoration with the fewest inputs the following year. Seeds can be sown with either a seed drill or broadcast by hand, and don't need to be worked in, as the freeze-thaw cycle will work them into the surface of the soil (Prairie Moon Nursery).

Rain Gardens

Chapter 6 of Oakdale’s Comprehensive Plan includes an interest in creating Low Impact Development (LID) projects across the city in an effort to reduce runoff from stormwater. Rain gardens are a great way to accomplish this goal. According to the Ramsey-Washington Metro Watershed District (RWMWD) “a rain garden (or bioretention basin) is a landscaped shallow depression that is designed to capture stormwater runoff from roofs, driveways, roads and other hard surfaces” (Rain
Garden II, 2013). Angie Hong, East Metro Water Resource Education Program Educator, wrote a blog about rain gardens in the Oakdale Patch. Rain gardens are an important addition to many city water systems because “in most communities, streets connect to streams through a series of underground stormwater pipes. Rain and melting snow washes off rooftops, driveways and streets and carries dirt, litter and contaminants to lakes, rivers and streams that might be miles away” (Hong, 2011). Rain gardens help mitigate harmful urban and lawn runoff that enters our water systems. They also provide the cities with beautification and educational efforts. Some potential neighbors of rain gardens often worry about stagnant water, however, “when properly designed and installed, rain gardens absorb water within one to two days, leaving no time for mosquito eggs to hatch” (Hong, 2011). In addition, Hong based her information from material provided by Blue Thumb (Create a Raingarden).

Local Project
One of the most successful nearby installations of rain gardens is the Maplewood Mall Stormwater Infiltration Retrofit Project put in place by the RWMWD. This was a large best management practice project that was put in place to reduce runoff into Kohlman Lake. Runoff from the impervious surfaces (parking lots) of the Mall flows into local water systems and eventually makes its way to Kohlman Lake. Figure 2 shows a map containing both the Maplewood Mall and Kohlman Lake. The five phases of the project, from negotiations to construction, lasted from 2008 until the project was finished in 2012. This project received approval for three levies and one loan. They also received five grants such as the Minnesota Pollution Control Agency (MPCA) 319 grant and Clean Water Fund Grant. The entire project cost approximately $5,275,000. “The project now results in the capture, filtration or infiltration of 20 million gallons of stormwater runoff per year. This is estimated to reduce phosphorus loading by 60% and reduce sediment loads by 90%” (Maplewood Mall Retrofit). The 55 rain gardens installed filter 9 million of the 20 million gallons of runoff per year. The project will be maintained by the RWMWD and will work with the Simon Property Group (owners of the Maplewood Mall property). The rain gardens will be inspected regularly and will require annual maintenance including mulch replacement, sump catch basin cleaning, and weeding. Figure 3 is a before and after picture of a rain garden at the Mall (Rain Garden II, 2013).

The Maplewood Mall project is a prime example of how well-funded and well-designed rain gardens can successfully create a positive impact on urban runoff and community education about urban water management. Smaller rain garden pilot projects in community parks are a much less costly endeavor.

Garden Requirements
A smaller, community rain garden requires preliminary research before it can be implemented. This data includes amount of rainwater flow, salt runoff, electrical wires, soil type, and water table level. According to Paige Ahlborg, Watershed Project Manager at the RWMWD, the water table level in Oakdale tends to be high, but a simple test of the water table level and soil type for infiltration rate will tell if a
certain area is fit for a rain garden. Neighborhood rain gardens have been implemented in many cities across the Twin Cities metropolitan area. For example, the Anoka Conservation District along with the Rice Creek Watershed District helped implement private property rain gardens in Rice Lake in 2010. Table 4 provides a cost analysis of constructing a neighborhood rain garden. For this project, funding came from the Rice Creek Watershed District, local landowners and the State of Minnesota. The total project cost was $23,777; with six rain gardens that each cost approximately $4,000. Ongoing maintenance for one of these sites is approximately
These gardens use a patent-pending technology called the Rain Guardian, developed by the Anoka Conservation District. The Rain Guardian Bunker is a pretreatment chamber that is built into the curb cut that collects debris flowing with water before it enters the garden and clogs it up. The estimated price from the Rice Lake projects included the addition of the Rain Guardian, so a decision to not use it would decrease this price.

The rain gardens in Rice Lake and Maplewood Mall illustrate the kind of gardens that could be implemented in the parks of Oakdale. They also provide examples for funding options available to rain garden projects. The addition of rain gardens in underutilized park areas near rain water flow paths will divert urban runoff from underground stormwater pipes to a natural plant filtration system.

Table 4: Rice Lake rain garden cost analysis.

<table>
<thead>
<tr>
<th>Project Specs</th>
<th>Installation Funding</th>
<th>Other Funding</th>
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<tr>
<td>Rain gardens installed</td>
<td>RCWD</td>
<td>Design</td>
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<tr>
<td>Date installed</td>
<td>October 2010</td>
<td>$11,421</td>
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<tr>
<td>Total planting area</td>
<td>1,691 ft²</td>
<td>Landowners,  $3,935</td>
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<tr>
<td>Total capacity</td>
<td>1,297 ft³</td>
<td>State of MN CWF, $8,421</td>
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<tr>
<td>Watershed treated</td>
<td>12.31 acres</td>
<td>Total project cost, $23,777</td>
</tr>
</tbody>
</table>


Community Gardens

Community gardens are a growing tradition in the Twin Cities and neighboring suburban areas. In 2012 the 7-county metro area had 319 food-producing community gardens that were registered with the Gardening Matters garden directory (Community Gardens in Minnesota, 2012). The only community garden currently registered in the City of Oakdale is located at the Guardian Angels Catholic Church and managed by volunteers who donate the produce to local food shelves. The City of Oakdale has the opportunity to become a part of the community gardening movement by converting some of its currently unused public space into gardens. “Integrating food production into places where people live, work, and play supports healthy eating, community resilience, and food literacy” (Winig et al., 2013).

Land Suitability Analysis

The first step to creating any community garden is to gauge interest within the community. A survey of community members is the best way to do this. A meeting can also be used to gage interest. The next step to forming a community garden is to choose a site within the community and analyze its suitability to host a garden. According to Dig, Eat, & Be Healthy, there are 6 considerations to take when determining suitability of an area of land (Winig et al., 2013). These considerations include:
• The owner of the site
• The past and present uses of the site
• The site characteristics such as slope, solar exposure, ground cover, soil quality, contamination, water and electrical access (see Appendix I for the Garden Site Evaluation Checklist)
• The site location relative to potential users, including schools, community centers, and residential areas
• The accessibility of the site via transit, parking, etc.
• The allowable uses for the site (e.g., agriculture and land use laws)

Planning and Garden Budgeting
Discussion about the budget for a garden is a very important topic. A well-planned budget can ensure the sustainability of the garden for years to come. The initial cost of creating a garden would include contracted labor, construction, soil, plants, seeds, etc. (Become a Rebel, 2007). CommunityGarden.org provides a Cost Estimate Worksheet to help determine initial costs; this worksheet is located in Appendix I. From this, we determined that the initial construction cost of a community garden would be approximately $2 to $3 per square foot depending on the circumstances of the area and types of plants desired. However, if the land has fertile/healthy soil, meaning it does not need added topsoil, and if things like plants, labor and tools can be donated, the price will decrease. There are many grants available to support community gardens in the Twin Cities. “Over the past two years, the Minnesota Department of Health has spent about $89,354 to help start community gardens around the state through its Statewide Health Improvement Program, also known as SHIP” (Brooks, 2013). Gardening Matters also offers support and funding for beginning community gardens in the Twin Cities. Communities can also develop a donation letter to be sent to local businesses and families. After the first year, there are no start-up costs, and members can focus on budget supported by user fees and other sources. In Appendix I there is a Sample Budget Worksheet developed by Gardening Matters. The numbers are estimates, however, it provides a general overview of what a 3-year plan for a community garden looks like. From there it is all about coordination, advertisement, safety, and growing.

Recommendations
In summary, we recommend Oakdale seize the opportunity to reduce their turf management inputs by replacing traditional turfgrass with low-input grasses in locations that have large mowing areas and are not used for athletic fields. One such location is Powerline Park, with a large expanse of turf that must follow transmission line right-of-way specifications. Another recommendation that can reduce the need for turf maintenance is to expand the prairie grass plots in the Oakdale Nature Center along the boulevard on Hadley Avenue North. Landscaped plots designed to not obstruct a driver’s view would extend the beauty of the Nature Center and provide
environmental benefits such as storm water management. A third recommendation is the opportunity for the city to promote environmental and recreational benefits within their public lands by placing rain gardens in appropriate areas along the boundaries of Powerline Park. Rain gardens are recommended because they contribute to improved water quality while requiring only periodic maintenance. Community gardens are another opportunity; however, proper assessment of community interest in the project must be conducted before moving forward on a community garden project. Community gardens can inspire public engagement, and reduce areas of mowed vegetation. The recommended alternative vegetation strategies align with our findings and Oakdale's goals laid out in the Comprehensive Plan, which ensures that these practices will enhance Oakdale's unique community.

**Use Low-Input Turfgrass to Reduce Economic and Environmental Costs**

It is recommended that Oakdale implement a low-input turfgrass pilot plot in Powerline Park. Reseeding with low-input turf has many economic and environmental benefits. It is recommended a mix of fine fescue grass species be used (see Findings section: Low-Input Turf).

Reseeding open spaces such as Powerline Park aligns with the goals outlined in Oakdale's Comprehensive Plan. As Oakdale aims to “promote the use of a diversity of plant species in landscape plans to minimize impacts from plant diseases and pests, and to minimize the spread of plant diseases and pests,” a mix of fine fescue grass species aligns perfectly with this goal. Because current turf is mostly Kentucky Blue grass with a little rye grass, it is not meeting the goal to diversify plant species. A mix of fine fescue species, as recommended in the Selection of Fine Fescue Mix section can help meet this goal.

Low Impact Development is another cornerstone in Oakdale's Natural Areas Protection Resources and Techniques section within the Comprehensive Plan, and reseeding with low-input turfgrass species supports this initiative. According to the Comprehensive Plan, “Low-input Development is a sustainable stormwater management strategy that focuses on managing stormwater locally, rather than relying solely on a system of pipes and stormponds” (Comprehensive Plan, 2010). Low-input turfgrass can reduce the amount of fertilizer and grass clippings that have the potential to enter stormwater runoff therefore meeting the objectives of this goal (see Findings section: Low-Input Turf).

**Pilot Plot**

All publicly managed turf in Oakdale cannot be converted at once, but Oakdale can start with an area of Powerline Park as a pilot plot. Powerline Park is a relatively low-use park, and would work well for a low-input turf management site. The area highlighted in the Powerline Park map found in Appendix D is the area recommended for conversion to low-input turf. This area is approximately 1.5 acres. While the area
recommended does not encompass the entire area of the park that is currently mowed turf, we feel this area has features that make it a good pilot plot. First, the walking paths in the park make an ideal barrier on the south and west side, and the drainage ditch next to Helmo Avenue North makes an ideal barrier on the eastern side. We feel it is small enough that the capital investment is not overly burdensome ($679 or .06% of current turf management budget), and it is large enough that it can be evaluated and compared to current turf management practices.

Selection of Fine Fescue Mix
There are two methods for selecting which species of fescue to use: 1) choose individual species and make your own mix, or 2) choose a low-input mix from a local or online seed distributor. To make the best mix, it is suggested that Oakdale choose the top performers of each fescue species according to the UofMN’s Fine Fescue Cultivars Turfgrass Quality Rankings (Miller et al., 2013). Sam Bauer, UofMN Extension Educator suggests a mix of 30% strong creeper, 30% slender creeper, 20% hard, and 20% chewing (percentages by weight). Choosing a low-input mix from a distributor, such as CUTLESS low-growing turf from RamyTurf is an alternative to creating your own mix (RamyTurf).

Application Procedure
The reseed method for implementing low-input turf is recommended over interseeding. Reseeding is the fastest, easiest, and most cost effective method for converting to the low-input turf (see the Findings section: Low-input turf). Between August 15 and September 15 is the best time of year to convert turf because there is no pressure from summer annual grassy weeds (Bauer interview).

Evaluation Criteria
Turfgrass is often evaluated on specific criteria devised by the National Turfgrass Evaluation Program (NTEP), an organization that the turfgrass industry in the USA and many parts of the world rely upon (Morris and Shearman, 2013). An example for a turfgrass evaluation guideline can be found in Appendix E. It is recommended that Oakdale follow the evaluation NTEP criteria for evaluating the low-input turfgrass. This criterion can be used by Oakdale as a way to keep records about the quality of the low-input turf over time. A link to the complete instructions for evaluating turfgrass under the NTEP guidelines can be found here: http://www.ntep.org/pdf/ratings.pdf

Challenges
While reseeding is the most efficient method for converting an existing turf stand to a low-input stand, there are drawbacks. In order to reseed, the existing stand must be removed via herbicide. The process of applying Roundup herbicide will kill the entire area and will turn the grass brown for several weeks until the new grass begins to grow. This may cause concern among citizens questioning why Oakdale would purposefully kill good grass. To inform the public, Oakdale staff can post signage
around areas of the park explaining the benefits and timeline for low-input turf restoration. An example of this signage is seen in Appendix F.

Another challenge with implementing low-input turf is that it needs to be done right the first time. For example, if Roundup is not correctly applied, grass and weed species may survive and remain in the area. If the existing grass or weeds are not completely eliminated, they may invade the newly established fine fescue turf. At this point, it will be very difficult and costly to remove them (Bauer interview). Ensuring the existing grass species are eliminated by carefully following the conversion procedures is very important to maintaining the integrity of the low-input turfgrass plot.

By following the suggested steps for implementing low-input turf, Oakdale can realize many economic and environmental benefits associated with low-input turf and bring them closer to meeting their long term goals identified in their Comprehensive Plan.

**Implement Prairies for Plant Diversity, Water Quality, and Aesthetics**

The best way to implement native prairie restorations in Oakdale is to create pilot plots, similar to the trial areas suggested in the previous recommendation. These plots would be used to test implementation methods as well as to create positive public perception of native plants. This type of restoration can use a diversity of plants native to east-central Minnesota, which meets specific natural resource goals stated in Oakdale's comprehensive plan. Prairies can also meet Oakdale’s goal of lowering stormwater runoff while increasing groundwater infiltration. A map of the pilot plots can be found in Appendix D.

**Pilot Restoration Areas**

Oakdale is committed to highlighting the Discovery Center, as stated in the city’s Comprehensive Plan, and a way to draw in more visitors is to begin expanding aspects of the Discovery Center beyond its borders. This can be accomplished, along with the goal of reducing turf maintenance, by converting the mowed grass adjacent to the entrance to the Discovery Center entrance and along the boulevard on the west side of Hadley Avenue to either short prairie plants or prairie bunch grasses and forbs planted into mulch. The conversion could be implemented as a pilot plot area from 44th Street North to 46th Street North, with the potential for expansion in the future.

The first option, short prairie plants, would give the boulevard a more natural look and provide better educational options for trail users. This would involve killing off the current vegetation and seeding native grasses and forbs by hand due to the irregular shape of the plot. To have as little time as possible without green plants, the seeding should be done in the fall with a seed mix suited for quick establishment. An example of this is the PDQ (Pretty Darn Quick) Seed mix for mesic soils from Prairie
Moon Nursery or similar seed from other seed distributors. Establishment of this mix can be expected within the first year. The restoration would require at least monthly inspection for necessary weed control, but would not require many other inputs.

The second option for the boulevard, consisting of bunch grasses planted into mulch, would provide a more landscaped look. These plantings would require killing the turfgrass with herbicide in the spring. Plugs of prairie plants could then be planted directly into that sod. Some examples of plants include little bluestem, wild bergamot, and prairie dropseed. Little weed control would be necessary, as the dead sod would prevent some weed growth, and mulch could be applied between plants to suppress weed growth later on. The only other requirement for this method would likely be watering of the plants during dry periods in the first year to achieve better establishment.

Another small area for possible prairie implementation would be Powerline Park. There is a small triangle formed by intersecting asphalt paths that would provide an ideal pilot plot for an experimental prairie. It is unlikely to fall victim to species invasion, as the plot would not be bordered by any unmanaged areas. It could be bordered by a cedar rail fence or framing fencing to give a cleaner looking border and keep path users from trampling the restoration. Quick establishment is once again an important factor, so a seed mix similar to the PDQ mix, mentioned earlier, would be suitable for this area. Planting would involve killing the turf with herbicide and hand seeding in the fall due to the irregular shape of the plot. Once again, this could be a great opportunity to utilize educational signage, teaching residents about the plants found in the restoration and benefits it can provide. If this area seems to work well, a restoration could easily be expanded into other areas of the park, while still leaving some area open for active use.

Monitoring

A monitoring plan would need to be in place to evaluate the success of these pilot areas. A numerical rating should be used for the criteria to make it easier to analyze the results. The evaluations should be done by the same group of people over several years and averaged to provide less an assessment over time. Criteria developed from the NTEP Turfgrass Evaluation Guidelines were adjusted for application in prairie restorations. A monitoring worksheet listing criteria can be found in Appendix G.

Challenges

The most significant potential challenge associated with these restorations is weed control. Even in the best situations, aggressive weeds can invade a plot. Weed issues should be kept under control by using a combination of herbicide, hand weeding, burning, and possibly spot mowing as discussed in the Findings section of this report. Another challenge may be public backlash against replacing turf with less manicured plants or the temporary brown areas that will result from the herbicide during the seeding process. This can be alleviated by the use of temporary signage explaining the process and eventually permanent educational signage to explain benefits of the
restoration. Examples of signage can be found in Appendix F. Over time, announcements with maps that locate prairie vegetation sites can be featured on the city website or at the Discovery Center. This communication could encourage residents to visit the prairie vegetation sites over the year to learn about these plants or consider options for their own property.

Create Rain Gardens to Improve Water Quality and Aesthetics

Implementing rain gardens is a great investment opportunity for Oakdale that will assist with its goals of urban runoff mitigation and community education laid out in the Comprehensive Plan in Chapter 6. “The City of Oakdale should pursue education and outreach opportunities for its residents to increase awareness of the city’s natural resources and the importance of resource protection” (Comprehensive Plan, 2010). We recommend that the City of Oakdale evaluate the possibility of constructing a pilot rain garden in Powerline Park. A rain garden in this park would provide aesthetic appeal, improve rain garden awareness for the residents, mitigate potential pollutants coming from Helmo Avenue and the surrounding area, and contribute to a slight reduction in mowed lawn area within the park. Rainwater from the mowed area in this neighborhood flows into a ditch which leads to a pond at the south end of the community, and depending on the intensity of the precipitation it can be unfiltered. Rainwater and surface waters from the roads enter stormwater drains linked with local bodies of water. The phosphorus, nitrogen, and sediment carried by the surface water runoff entering these bodies of water can result in impaired water conditions. Water from Powerline Park, which is located within the RWMWD, eventually flows into larger bodies of water within the Mississippi River watershed.

Benefits

There are many benefits to implementing a rain garden in Powerline Park. These include reducing the amount of mowed space and adding to the natural beauty of the area with native plants, grasses, and flowers. The surrounding community and the proximity to Helmo Avenue would ensure high visibility for this pilot plot. Implementing a rain garden would raise awareness of runoff mitigation and encourage people to consider the destination of surface water runoff. An example of signage for the rain garden can be seen in Appendix F. There is an obvious natural rain ditch at the edge of the park along Helmo Avenue running from north to south, going through two underground culverts, and ending in a small pond. A map highlighting this area can be found in Appendix D. This drainage pattern was verified using Google Earth to identify elevation levels of the area. Figure 4 shows the ditch and culverts in Powerline Park.

First Steps

The first step to creating a rain garden in the highlighted area, as well as for future projects, is to conduct a study to assess rainwater flow, salt runoff, electrical wires, soil type, and water table level. Using the Web Soil Survey site provided by the
Figure 4. Ditch and culvert at Powerline Park (Photo Credit: Tatiana Hakanson).
United States Department of Agriculture, we were able to determine that the estimated soil type of the targeted land in Powerline Park is a Kingsley Sandy Loam (Web Soil Survey, 2013). This kind of soil infiltrates water quickly and has a low tendency to pond and flood. In addition, it tends to have a water table level about 80 inches below the surface. Further testing would have to be done, since the Web Soil Survey is not precise enough for a final determination. We identified a few attributes about the direction of surface water flow along the road and the grass area; however, further assessment of flow rates would need to be conducted for this site. This could include concentration measurements of sediments, salt, and other pollutants such as phosphorus and nitrogen. Since Powerline Park is in the Ramsey-Washington Metro Watershed District, an assessment project could be coordinated between the RWMWD and the City of Oakdale.

Garden Location
A possible location for the rain garden in Powerline Park is shown in Appendix D. This depicts two rain gardens connected by a culvert under the sidewalk. The rain gardens would drain water from the park and residents’ lawns as well as from the roads via constructed inlets in approximately three spots along the road. The number of inlets could be adjusted to allow for an appropriate amount of drainage from the roads into the gardens. Once the rain gardens reach their maximum water level, the rest of the water could continue to flow into the pond. The reason the proposed location of the northern garden does not start further north is because there is a small electric box for the surrounding houses stands in the middle of the ditch.

Funding
The rain garden that we recommend is larger than the ones created in Rice Lake (see Findings section: Rain Gardens). If we calculate that the one designed at Powerline Park would be approximately five times larger the Rice Lake example, then we can estimate the cost of the garden to be about $20,000. A budget analysis for the exact specifications of this garden would need to be determined on a sit-by-site basis. To address some of these costs, the RWMWD has a cost share program through the Best Management Practices (BMP) Incentives Program. This program is run by Paige Ahlborg, who informed us that the program offers funding on a year round basis to governments and residents to implement projects that prevent flooding, restore clean water by filtering pollutants, protect groundwater quality, and provide educational opportunities for residents. A rain garden in Powerline Park can accomplish all of these goals. Projects can be funded up to 75% or $100,000. There are many other grants for stormwater management, such as the ones used for the Maplewood Mall retrofit. Once the specifications and general funding for the project is finalized, the plants selection could be decided by the city with input from community members. Appendix H provides a list of salt tolerant plants that can be used in a rain garden if the salt content of runoff is high.
Challenges

All of the site testing that needs to be done to implement a rain garden can make it difficult to create one in a new community. Cost and maintenance can also be a problem if people are unsure of where the responsibilities lie. However, if communities plan ahead, a rain garden can be a great addition to a neighborhood or park. Rain gardens do not require substantial maintenance once they are installed. Rain gardens should be evaluated routinely for functionality and the health of the plants. Annual maintenance for the garden may include mulch replacement, sediment basin cleaning and weeding. The rain gardens managed by the Anoka Conservation District are generally maintained by landowners or volunteers, which would be a possibility for this rain garden.

Constructing a rain garden in Powerline Park is a viable option for the City of Oakdale to continue their efforts to implement Low Impact Development projects to reduce pollutants reaching important water sources. A pilot project in this location will be a great start to greater awareness of rain gardens in the communities of Oakdale, and an evaluation of interest in using this form of alternative vegetation to achieve multiple benefits.

Establish Community Gardens to Benefit and Involve Citizens

We recommend that a portion of the currently mowed and underutilized land in Golfview Park be considered for a community garden. Oakdale has a great chance to oversee the establishment of the first neighborhood community garden within their boundaries. According to Gardening Matters’ Multiple Benefits of Community Gardening, benefits of community gardens include: economic, food production, health benefits, community member exercise, crime prevention, youth education, and cultural opportunities (Community Gardens in Minnesota, 2012). They can bring beauty to a neighborhood and foster connections between community members. “Community Gardens offer unique opportunities to establish relationships within and across physical and social barriers” (Community Gardens in Minnesota, 2012). Chris Larson, City Forester, as well as other city officials expressed the desire to reduce the amount of mowed turfgrass in public parks. The Comprehensive Plan says that Oakdale wishes to “continue to proactively plan and implement strategies to make Oakdale more sustainable and promote and encourage the health of its residents” (Comprehensive Plan, 2010). A community garden in Golfview Park could reduce the amount of mowed area significantly and would bring community members together working towards a common goal.

Suitability

Golfview Park, located in the northern part of Oakdale, is a suitable location for a garden because it has plenty of open and underutilized land. All of the open land in Golfview Park is currently being mowed by the city to form a reduced-size soccer field, when an alternative use of the land could save time and money and promote
community collaboration. At a Parks and Recreation Commission meeting held in 2012, Community Development Specialist Logan Martin stated that “Golfview Park offered good topography, adequate size, near multi-family housing (Cedric’s Landing), access to water, easy vehicular and pedestrian access, and a 22-stall parking lot” in regards to a community garden (Bastyr et al., 2012). Parks Superintendent Bastyr stated there might not be a conflict among uses of the park because “no organized sports are held at Golfview Park” (Bastyr et al., 2012). So far, progress on a community garden in Golfview Park has not gone forward, so now is the opportunity to take the next step.

First Steps

The first step to implementing a community garden at Golfview Park would be to administer a survey to the surrounding community. Appendix I provides an example of a survey that can be given to community members in Oakdale to gauge interest in the addition of a community garden in their area. A survey given to the community members surrounding Port St. Lucie Civic Center in Florida on surveymonkey.com was used as a reference to create the survey for Oakdale. This survey is specific to Golfview Park, but can be changed for other feasible areas where a community garden could be created. If there is neighborhood support and a few community members (preferably more than 8) who are willing to take on leadership roles, then the project can proceed. See Appendix I for an example Community Gardener Agreement that can be used to keep members accountable for their use of the space (Twin Cities Community Garden Start-Up Guide, 2009). The numbers and wording of the document should be changed based on a specific site. Next, “it is advisable to have the soil at the site tested for fertility, pH and presence of heavy metals, such as lead or toxins, such as arsenic” (Twin Cities Community Garden Star-Up Guide, 2009). This will determine if and how much topsoil additives are needed. Toxins are generally a larger problem in urban areas, but it is still a smart step to take for any garden.

Community members interested in the garden can then pool resources and find donations for items such as gardening tools, seeds, plants, and construction materials. Members will have to determine budget and apply for grants and ask for donations to fund the project. Garden members can make decision on the size of the garden, the type of garden (ex: raised bed), and the types of plants to be put in the garden once the budget is known. These decisions can be made with the Community Garden Planning Worksheet, found in Appendix I, which provides examples of questions the members of the garden can use to make decisions on aspects of the garden such as gardening methods, plot sizes, and member fees (Twin Cities Community Garden Star-Up Guide, 2009). We have created a suggested location and size for the garden highlighted in Appendix D.

This plot is suggested because it would take up a significant amount of the mowed space (half of the soccer field), providing plenty of space for many community members to have a plot in this garden. However, it would leave half of the soccer
field for people to enjoy. This is the perfect location for families because the garden is set directly between the playground, half soccer field, and basketball court. Kids can play while parents garden.

The proposed garden is approximately 12,000 sq. ft. This is a very big garden that could hold a large number of plots. If the estimated cost per sq. ft. is set at $2.50 (the average cost taken from the cost estimate worksheet from Findings: Community Gardens), then the cost of a garden of that size would be $30,000. These are simply rough estimates, so further research into the resources available to the community could decrease the price. The size of the garden is one way to reduce price. One of the ways to develop a maintenance budget over time is to establish a plot fee for people who want to be involved in the garden. The appropriate fee can be determined from the amount of money needed to sustain the garden using the sample budget worksheet.

**Challenges**

Community gardens are a difficult endeavor to begin because they take a lot of coordination. The initial costs can be high and there are a lot of materials to gather and organize to help a garden get started. Gardener dropout can be a problem, which is why it is important to establish a contract and garden fee to hold people accountable. This is also why it is important to have several members interested in running the garden from the start. Members must be dedicated and organized to make a garden sustainable. When successful, however, an established garden can become an important site for community connection and collaboration.

**Benefits**

In this report we are, for the most part, looking at parks and other public land. There are many benefits to starting a community garden on public land. Having a community garden a park avoids high land values when leasing the land for a garden. Governments can offer land to grow on for low costs and having the garden reduces land maintenance costs for the city because community members become partners in taking care of the land. Public land allows for easy access to community members as well as possible access to trash pickup and water. A pilot garden in Golfview Park will promote community connection and inspire the development of other gardens in the future.

**Resident Interest and Perception Monitoring**

To assess the resident interest in and perception of the implementation of alternative vegetation, we developed an example survey for distribution by the city of Oakdale before and after implementation of each recommendation. The survey can be found in Appendix J. A survey method is a good means to evaluate the needs of Oakdale residents due to the town’s size, roughly 27,000. Often a small community shares a strong common vision and is inclusive in its decision making which would make a
survey of residents an effective method to analyze the needs of the residents near the parks as well as citizens across Oakdale (Payne et al., 2013).

The focus can be open-ended, supplemented with ranking based, questions in order to determine the perceptions of as well as the effectiveness the vegetation changes. Open-ended questions allow for more focused and less generalized answers (Fielding et al., 2013). The open-ended questions will help determine the frequency of use of the park and the type of changes that might be necessary for the area, while the supplemented quantitative data will help determine the overall effectiveness of the project by looking at pre and post rankings on categories such as aesthetics, diversity of vegetation in the area, and perceived recreational value (Petursdottir et al., 2013).

A survey could be administered to households in the area and distributed online in order to achieve a better response rate compared to mailed surveys (Fielding, et. al. 2013). The survey target population would be households within the immediate area of the park as these residents would be the people most likely to use and be affected by changes within the park. The survey audience should exclude children; however, it can be assumed that their perceived needs are different from those of adults and would require a specialized research method (Özgüner, 2011)

**Conclusion**

The City of Oakdale has the opportunity to decrease costs related to turf maintenance, increase environmental services, and enhance the quality of life of its citizens by implementing alternative management strategies. The recommendations for alternative vegetation strategies put forth in this report were chosen because they best complement Oakdale’s resources, values, culture and Comprehensive Plan goals.

Three sites were analyzed as the best potential areas for implementation: Powerline Park, Golfview Park, and the boulevard along Hadley Avenue North. Each of these sites serves a different purpose in the community but offers an example of a different alternative management strategy that can be implemented in additional sites in the future. The alternative vegetation recommended for Oakdale include low-input turfgrass, prairie grasses, rain gardens and community gardens. Cost analysis shows that up-front investments may be relatively high, but the projected decrease in maintenance in future years result in overall savings. In addition to savings, a deviation from turfgrass can enhance these open spaces, which may lead to increased use of the parks and community satisfaction. Although these recommendations are given with confidence supported by careful research, it is important to note that nuances of each site may limit the transference of a given recommendation to other areas. However, with proper surveying and planning of a potential alternative vegetation sites, these recommendations can be implemented with success. The
resources included in this report are intended to aid in the implementation process in order to increase efficiency of the proposed changes.

The alternative vegetation strategies recommended in this report offer Oakdale the most viable options for balancing the needs of cost, environmental health, and public opinion. Considering the natural resource goals stated in Oakdale’s Comprehensive Plan, it is clear that the city values its environmental and recreational assets. The recommendations provided will help the city achieve these goals, if implemented. As a member of the Minnesota GreenStep Cities program, Oakdale has already invested time and effort into environmental projects, and these strategies allow Oakdale to further those investments and continue to be a leader in city sustainability. If maintained properly, the benefits borne from the implementation of the recommended alternative vegetation strategies have the potential to serve Oakdale’s budget, environmental standards, and aesthetic preferences for generations to come.

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Mezera, Nathan; University of Minnesota Turf Club Member, Minneapolis, MN. Telephone Interview. September 15, 2013.


Appendix A: Right of Way – Transmission Lines

Table A-1: Maintenance Practices for Transmission Lines

<table>
<thead>
<tr>
<th>Maintenance Practice</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tree Removal</td>
<td>Tree Removal is emphasized for long-term and cost effective vegetation control.</td>
</tr>
<tr>
<td>Tree Pruning</td>
<td>If tree removal is not possible, tree branches are cut to comply with standards for transmission lines and tree care.</td>
</tr>
<tr>
<td>Vegetation Clearing</td>
<td>Manual and mechanized clearing methods are used when vegetation is too tall for herbicide application.</td>
</tr>
<tr>
<td>Herbicide Application</td>
<td>Herbicides are applied to control root systems of woody-stemmed vegetation to reduce cost of maintenance. Herbicides are registered by U.S. EPA and applied by licensed applicators.</td>
</tr>
<tr>
<td>Debris Cleaning</td>
<td>Debris from maintenance activities usually left on the right of way to degrade. Debris that falls into roadways, waterways, fences, lawns, pastures, or other maintained areas would be disposed of.</td>
</tr>
</tbody>
</table>

Figure A-1: Visual representation of the maintained right of way corridor for transmission lines. (Taken from Xcel report).

Information and Figure A-1 adapted from Xcel Energy “Transmission Right of Way: Tree Clearing and Maintenance” guide.
Appendix B: Minnesota Roadway Right of Way Reference Sheet

The City of Oakdale recognizes Public Right of Way as defined by Minnesota Statute § 237.162, subdivision 3 (City of Oakdale).

Minnesota Statute § 237.162, subdivision 3:

**Public right-of-way**

"Public right-of-way" means the area on, below, or above a public roadway, highway, street, cart way, bicycle lane, or public sidewalk in which the local government unit has an interest, including other dedicated rights-of-way for travel purposes and utility easements of local government units.

A public right-of-way does not include the airwaves above a public right-of-way with regard to cellular or other non-wire telecommunications or broadcast service.

**State mowing policy**

- Excessive mowing is discouraged in order to prevent soil erosion
- The entire right-of-way may be mowed to maintain sight distance.
- The entire right-of-way may be mowed, burned, or tilled for establishment of permanent vegetative cover or for prairie vegetation management.

Permissible grass heights, from chapter five of the MN/DOT Maintenance Manual, are listed in Table B-1.

**Table B-1: Permissible Grass Heights (MNDOT)**

<table>
<thead>
<tr>
<th></th>
<th>Urban Height (mm)</th>
<th>Rural Height (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Minimum</td>
<td>Minimum</td>
</tr>
<tr>
<td>Shoulder sod:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>gravel or paved</td>
<td>100</td>
<td>150</td>
</tr>
<tr>
<td>Vegetation growing on gravel shoulders will be controlled by blading. Vegetation growing in cracks in bituminous shoulders should be destroyed by herbicides, soil sterilants, or other acceptable methods.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shoulder inslope top 2 swaths</td>
<td>100</td>
<td>300</td>
</tr>
<tr>
<td>Ditches and backslopes below top 2 swaths</td>
<td>100</td>
<td>300</td>
</tr>
<tr>
<td>Steep slopes steeper than 1:3</td>
<td>Terminal</td>
<td>Terminal</td>
</tr>
<tr>
<td>Medians less than 17 m greater than 17 m</td>
<td>100</td>
<td>300</td>
</tr>
<tr>
<td>Interchanges</td>
<td>100</td>
<td>300</td>
</tr>
</tbody>
</table>
Appendix C: Turfgrass Cost Comparison

Payback Periods for Reseeding:

\[
Payback\ Period = \frac{Capital\ investment}{Annual\ savings}
\]

Payback Periods based on range of potential savings:

\[
\frac{\$452.60}{\$286.18} = 1.6\ years\ (1\ year\ and\ 7\ months)
\]

\[
\frac{\$452.60}{\$572.33} = .8\ years\ (10\ months)
\]

The cost of the sprayer was not included within the capital investment. It is assumed that the City of Oakdale already owns a sprayer, and if not, the allocation of the cost over all maintained acres is negligible.

Calculations:

Costs by Category

Labor: $66,474
Weed Control: $26,915
Fuel: $16,500

96 acres of publicly maintained turf

(Larson, Chris)

Current Turf Management Costs of Mowing Calculations:

Labor and Fuel:

\[
\$66,474 + \$16,500 = \$82,972\ total\ for\ labor\ and\ fuel
\]

Per Acre:

\[
\frac{\$82,972}{96\ acres} = \frac{\$864.31}{acre}
\]

Savings Calculation:

Savings of mowing time can range from 1/2 of the cost to 3/4 of the cost (Bauer interview)
\[
864.31 \times \frac{1}{2} = 432.16 \\
864.31 \times \frac{3}{4} = 648.23
\]

Low Input Costs:

\[
864.31 - 432.16 = 432.15 \\
864.31 - 648.23 = 216.08
\]

Current Turf Management Costs of Fertilizer Calculations:

Weed Control per acre:

\[
\frac{26,915}{96 \text{ acres}} = \frac{280.36}{\text{acre}}
\]

Savings Calculation:

Savings of fertilizer use can range from 1/2 of the cost to 3/4 of the cost (Bauer interview).

\[
280.36 \times \frac{1}{2} = 140.18 \\
280.36 \times \frac{3}{4} = 210.27
\]

Low Input Costs:

\[
280.36 - 140.18 = 140.18 \\
280.36 - 210.27 = 70.10
\]
Appendix D: Maps of Proposed Vegetation for Powerline and Golfview Parks

Powerline Park with Proposed Features
Golfview Park with Proposed Community Garden
Appendix E: Low-Input Turfgrass Evaluation Criteria

This evaluation guideline was created based off the National Turfgrass Evaluation Program Turfgrass Evaluation Guidelines. Quality is based on 9 being best and 1 being poorest. A rating of 6 or above is generally considered acceptable. A quality rating value of 9 is reserved for a perfect or ideal grass, but it also can reflect an absolutely outstanding treatment plot. The NTEP requires quality ratings on a monthly basis (Morris and Shearman, 2013).

Date:
Location:
Weather:
Employee or Volunteer Name:

<table>
<thead>
<tr>
<th>NTEP Turfgrass Evaluation Guidelines</th>
<th>Ranking (0-9)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turfgrass quality</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Genetic Color</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Turfgrass density</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percent Living Ground Cover</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Turfgrass Texture</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other Color Data</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Spring green-up</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Winter Color</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Seasonal Color/Color Retention</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other Data</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Pest Problems</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Environmental Stress</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Drought Stress</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Winter Injury</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Traffic Tolerance</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Thatch Accumulation</em></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Additional Comments:
Appendix F: Educational Signage

Low-input Turfgrass

Low-Input Turf Project

The City of Oakdale is implementing low-input turf grass in this area. The new grass will cost less to maintain, benefit the environment, and look healthy. Although it is brown now, by next spring this area will have new low-input turfgrass.

Why Low Input Turf Grass?

<table>
<thead>
<tr>
<th>Cost Savings</th>
<th>Environment</th>
<th>Looks &amp; Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less mowing needed</td>
<td>Decreased use of fertilizer</td>
<td>Similar appearance as original grass</td>
</tr>
<tr>
<td>Fewer fertilizer applications</td>
<td>Increased run-off water quality</td>
<td>Will withstand normal use</td>
</tr>
<tr>
<td>Less weed control</td>
<td></td>
<td>Fewer weeds</td>
</tr>
</tbody>
</table>

Prairie Grass Restoration Project

The City of Oakdale has implemented a prairie grass plot in this area. The use of prairie grass decreases maintenance, creates wildlife habitat, and improves groundwater recharge. These plots help increase the environmental health of the City of Oakdale.

Why Prairie Grass?

Decreased Maintenance
- Occasional weed management needed
- No mowing needed

Wildlife Habitat
- Attracts pollinators such as butterflies and bees
- Increases native species

Groundwater Recharge
- Prairie plots allow water to flow into the ground instead of into sewers

Illustration provided by Sarah Norman of the Conservation Research Institute.

Rain Garden

Rain Garden Project

The City of Oakdale is implementing a rain garden in this area. Rain gardens require little maintenance but increase stormwater management, water quality, and groundwater recharge. This project is sponsored by Ramsey-Washington Metro Watershed District

Why Rain Gardens?

- **Stormwater Management**
  - During heavy rainfall, excess water can collect in a rain garden instead of flooding other areas.

- **Water Quality**
  - The plants in rain gardens help settle sediments in the water so water that flows into the ground is cleaner.

- **Groundwater Recharge**
  - Rain gardens hold excess water so it can flow into the ground instead of into the sewer.

Full report on this topic:
An Alternative Vegetation Options Guide for Public Lands, Report 337 prepared for the City of Oakdale by University of Minnesota students.
## Appendix G: Prairie Plot Monitoring Worksheet

Date:
Location:
Weather:
Employee or Volunteer Name:

**Rank the following criteria from 1-9 with 1 being poorest and 9 being best quality:**

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Ranking 1-9</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percent Ground Cover</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percent Invasive Species</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Traffic Stress</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drought Stress</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Salt Damage</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pest Problems</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aesthetics</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Additional comments:
### Appendix H: Salt Tolerant Rain Garden Species

**Salt Tolerant Rain Garden Species**

<table>
<thead>
<tr>
<th>Scientific Name</th>
<th>Common Name</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Grasses/Sedges</strong></td>
<td></td>
</tr>
<tr>
<td>Carex scoparia</td>
<td>Lance-fruiting oval sedge</td>
</tr>
<tr>
<td>Carex vulpinoida</td>
<td>Brown fox sedge</td>
</tr>
<tr>
<td>Eleocharis erythropoda</td>
<td>Red-rooted spike rush</td>
</tr>
<tr>
<td>Iliocorns erythropoda</td>
<td>Spike rush</td>
</tr>
<tr>
<td>Leersia orisoides</td>
<td>Rice cut grass</td>
</tr>
<tr>
<td>Scorpus atrovines</td>
<td>Dark green rush</td>
</tr>
<tr>
<td>Scorpus cyperinus</td>
<td>Wool grass</td>
</tr>
<tr>
<td>Scorpus validus</td>
<td>Soft stem bulrush</td>
</tr>
<tr>
<td>Spartina pectinata</td>
<td>Prairie cord grass</td>
</tr>
<tr>
<td><strong>Forbs</strong></td>
<td></td>
</tr>
<tr>
<td>Alisma subcordatum</td>
<td>Common water plantain</td>
</tr>
<tr>
<td>Asclepias incarnata</td>
<td>Swamp milkweed</td>
</tr>
<tr>
<td>Aster simplex</td>
<td>Panicled aster</td>
</tr>
<tr>
<td>Equisetum hyemale</td>
<td>Tall scouring rush</td>
</tr>
<tr>
<td>Eupatorium perfoliatum</td>
<td>Boneset</td>
</tr>
<tr>
<td>Helium autumnale</td>
<td>Sneezeweed</td>
</tr>
<tr>
<td>Helianthus grosseserratus</td>
<td>Sawtooth sunflower</td>
</tr>
<tr>
<td>Iris virginica shrevei</td>
<td>Blue flag iris</td>
</tr>
<tr>
<td>Juncus torreyi</td>
<td>Torrey's rush</td>
</tr>
<tr>
<td>Lobelia siphilitica</td>
<td>Great blue lobelia</td>
</tr>
<tr>
<td>Lycoptus americanus</td>
<td>Common water horehound</td>
</tr>
<tr>
<td>Polygonon amphibium stipulaceum</td>
<td>Water knotweed</td>
</tr>
<tr>
<td>Polygonon lapathifolium</td>
<td>Heartsease</td>
</tr>
<tr>
<td>Sagittaria latifolia</td>
<td>Common arrowhead</td>
</tr>
<tr>
<td>Silphium perfoliatum</td>
<td>Cupplant</td>
</tr>
<tr>
<td>Typha species</td>
<td>Cattails</td>
</tr>
<tr>
<td>Verbena hastata</td>
<td>Blue vervain</td>
</tr>
</tbody>
</table>
Appendix I: Community Garden Resources

COMMUNITY GARDEN PLANNING WORKSHEET

Discuss these questions and work together to generate ideas and polices for your community garden. Add more questions as necessary and delete when appropriate.

Garden name ____________________________

Garden Opening Date _____________________ Closing Date _____________________

People & Plots

How many plots? ______________ How many people? ______________

Will the be plot fees? ______________ If so, how much? ______________

What do plot fees include? (water tilling, tools, etc.) ______________

What is the process for plot selection? ______________

What about for last year’s gardeners? ______________

What are specific plot care requirements (weed control, etc.) ______________

What if the plot is not planted or maintained? ______________

Will a warning be given? ______________ By whom? ______________ After how long? ______________

What should gardeners have accomplished by the closing date? ______________

Will a portion of the fee be refunded if gardener leaves plot in good condition? ______________

Policies

What are the rules on pesticides, herbicides and fertilizers? (Gardening Matters strongly recommends only organic pest controls and fertilizers, and no herbicide use). ______________

If a garden OK’s chemical use, what are application rules? (for example on windy days)? ______________

What are the garden’s policies on:

Compost Bin and its maintenance: ______________

Water ______________

Tools ______________

Overripe/diseased vegetables ______________

Structures/supports ______________

More Possible Policies

What are the garden’s policies on:
- Trash
- Parking
- Locking of gate

Are gardeners responsible for a common garden task?

Are gardeners responsible for weeding the paths around their plots?

It is OK to grow tall or vining plants?

Are non-gardeners and children permitted in the garden?

What about pets?

Who should be notified if there is a problem in the garden?

Organization

What should a gardener do in case of an extended absence?

Will there be a treasurer? A bank account?

Who will cut grass on borders and boulevards?

Will the garden have a bulletin board or information kiosk?

Do gardeners want to order seeds or plants as a group?

Garden Features

Will the garden:
- Set aside a plot for a food shelf? Who will tend it?
- Include plots accessible by wheelchair?
- Have a picnic table, bench, trellis or sandbox?

Set aside space for perennial plants (raspberries, strawberries) or fruit trees?

Have a flower border? Who will tend it?

What about a spring work day?

Parties!

Must gardeners attend group work day? When?

What about a regular gardening time?

What about a harvest potluck?
Community Gardener Agreement

(Watts Family) Community Garden Agreement
Rules, Terms, and Conditions for Participation
2009

Introduction
The (organization/garden coordinator/committee) is the highest governing authority at the (Watts Family) Community Garden.

Breaking any rules, terms, and conditions is cause for exclusion from the garden and loss of your plot.

1. You will receive one verbal warning from the garden coordinator/committee.
2. If no response or correction has been made, you will receive written notice two weeks later.
3. In another two weeks, if no response or correction has been made, you will receive written final notification that you have forfeited your gardening privileges and plot.
4. You will be allowed to reapply for another garden plot only after one year, and only at the discretion of the garden coordinator/committee.

Rules, Terms, and Conditions for Participation
If accepted as a gardener, I will abide by the following rules, terms, and conditions:

1. I use this garden at the sole discretion of (Watts Family) Community Garden. I agree to abide by its policies and practices.
2. The fee for the use of the garden is ($32.00) per plot, per year (January 1 – December 31), due on or before (January 1). Fee for half a year after (beginning July 1 or later) is ($16.00). There are no refunds.
3. Once I have been assigned a plot, I will cultivate and plant it within two weeks. My plot cannot be left fallow or unused for any period of three weeks or longer.
4. My plot is (20 x 20) feet. I will not expand my plot beyond this measurement or into paths or other plots. I will keep all my plants within the limits of my garden plot and will not allow any plants to grow more than six feet high. I must keep my plot free of weeds, pests and diseases.
5. I will keep my plot, paths, and surrounding areas clean and neat. I will completely separate my trash into three groups: 1) dead plants, leaves, and other green waste plant parts; 2) rocks, stones, and asphalt; and 3) paper, plastic, cardboard, wood, metal, etc. I will put each type of trash only in the areas designated specifically for each. Anything I bring from my home I will take back home. I will not bring household trash and leave it at the (Watts Family) Community Garden.
6. I will have no more than two plots in the (Watts Family) Community Garden. If I adopt an abandoned plot during the season, I will be happy to relinquish it the following year.
7. I will not plant any illegal plant. I will not smoke, drink alcoholic beverages, use illegal drugs, or gamble in the garden. I will not come to the garden while under the influence of alcohol or illegal drugs. I will not bring weapons or pets or other animals to the garden.
8. (If the garden is fenced and locked) Guests and visitors, including children, may enter the garden only if I accompany them. They must follow all rules, terms, and conditions stated here. I will supervise my children at all times when they are in the garden. I am solely responsible for the behavior of my guests.

9. The garden coordinator/committee will assign me general garden maintenance tasks each month, and I must complete them by the end of the month that I am assigned them.

10. I will water my plot according to water-wise guidelines. (If I use more than the recommended amount of water, I will pay a fee each month to cover the cost of this additional water.

11. I will attend the regular (bi-monthly) garden club meetings. If workshops are offered, I will attend at least one on each of the following topics: soil preparation and maintenance, watering the vegetable garden, and pest and disease control.

12. I will not apply any pesticides in the garden without the approval of the garden coordinator/committee.

13. I will not make duplicate keys of any locks at the garden or give my key or lock combination to another person.

14. I will not take food or plants from other gardeners’ plots. I will not take anything from the garden that is not rightfully mine.

15. I will respect other gardeners, and I will not use abusive or profane language or discriminate against others.

16. I will work to keep the garden a happy, secure, and enjoyable place where all participants can garden and socialize peacefully in a neighborly manner.

17. I forfeit my right to sue the owner of the property.

Commitment
I have read and understand the application and accept these rules, terms, and conditions stated above for the participation in the (Watts Family) Community Garden.

Signed: ____________________________ Date: __________________

Gardener

Approved: __________________________ Date: __________________

Garden Coordinator/Committee Member

9/07 (be sure to change this date when the agreement form is changed, and we suggest adding the date to the electronic version as well. Be sure to change the year at the top each season)
Cost Estimate Worksheet

Use our Garden Cost Checklist together with this worksheet to get an estimate of your total costs.

Our garden covers __________ square feet
We have $________ to pay for materials

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum Costs (soil, plants, etc):</td>
<td>$_____________</td>
</tr>
<tr>
<td>(approx. $1.30 to $2.00 per square foot)</td>
<td></td>
</tr>
<tr>
<td>Planning:</td>
<td>$_____________</td>
</tr>
<tr>
<td>Additional Materials:</td>
<td>$_____________</td>
</tr>
<tr>
<td>Fittings and Furniture:</td>
<td>$_____________</td>
</tr>
<tr>
<td>Outdoor Structures:</td>
<td>$_____________</td>
</tr>
<tr>
<td>Ponds and Pools:</td>
<td>$_____________</td>
</tr>
<tr>
<td>Contracted Labor and Construction:</td>
<td>$_____________</td>
</tr>
<tr>
<td>(approx. $.70 to $1.00 per square foot)</td>
<td></td>
</tr>
</tbody>
</table>
Other Costs: ____________________________

Add the above lines to find

Total costs: ____________________________

Then subtract

Money on hand: ____________________________

To find

TOTAL MONEY NEEDED: ____________________________
### Garden Site Evaluation Checklist

**Sun:**
- Shade/Partial Shade/Full Sun (6-8hrs):
- Shading Structure Description:
- Facing Southwest/South/Southeast/North/Northeast/Northwest:

**Soil:**
- Texture (sand/silt/clay/organic matter):
- Drainage (wet-moderate-dry):
- Depth of Topsoil (where darker soil ends):
- Compact/Loose:
- pH level (soil test):
- Nutrient levels (soil test): N-P-K
- Lead or Other Toxins (soil test):

**Topography:**
- Flat or sloped (degree)

**Water Access:**
- On-site/Neighboring Apt./Home/Busines/Church
- Type and Proximity to Garden and Future Plots:

**Site Amenities:**
- Shed or Tool Box Site:
- Composting Site:
- Estimate of # of Plots:
- Visibility (safety and publicity):
- Parking:
- Restroom Access:
- Power:
- Site History (parking lot/gas station/residential):
- Vehicle Access:

**Neighborhood:**
- Interest/Involvement Level of Neighbors:
- Demographic Profile (Children/young adults/adults/senior citizens):
- Crime (drugs/vandalism/violent crime/theft):
- Animals (deer/raccoons from the hills/dogs):

**Quick Sketch of Property:**
Sample Budget Worksheet

Use this worksheet to list anticipated costs for items that your garden group have planned. Record actual expenditures and donations as they occur.

We’ve included some typical expenses for gardens here in this sample budget. Please note the dollar amounts used in the worksheet are not estimates and are only illustrative.

<table>
<thead>
<tr>
<th>Line Items</th>
<th>1st Year</th>
<th>2nd Year</th>
<th>3rd Year</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Revenue/Income</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plot Fees (20 plots x $25/plot)</td>
<td>$500</td>
<td>$500</td>
<td>$500</td>
</tr>
<tr>
<td>Neighborhood Start-up Grant</td>
<td>$500</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Garage Sale Fundraiser</td>
<td></td>
<td>$300</td>
<td></td>
</tr>
<tr>
<td>Balance from previous year</td>
<td>--</td>
<td>$700</td>
<td>$600</td>
</tr>
<tr>
<td><strong>Total Income</strong></td>
<td>$1,000</td>
<td>$1,200</td>
<td>$1,400</td>
</tr>
<tr>
<td><strong>Expenses/ Costs</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Basic Elements</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water bill (meter and/or hydrant hook-up)</td>
<td>$100</td>
<td>$100</td>
<td>$100</td>
</tr>
<tr>
<td>Water system (supplies, like hoses &amp; barrels)</td>
<td>$100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tool storage and combo lock</td>
<td></td>
<td>$100</td>
<td></td>
</tr>
<tr>
<td>Hand tools (shovels, rakes, trowels, pruners)</td>
<td></td>
<td>$100</td>
<td></td>
</tr>
<tr>
<td>Lease fee (if applicable)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Liability insurance (if applicable)</td>
<td>$100</td>
<td>$100</td>
<td>$100</td>
</tr>
<tr>
<td>Woodchips</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Compost or topsoil</td>
<td></td>
<td></td>
<td>$100</td>
</tr>
<tr>
<td>Plant materials (seeds &amp; seedlings)</td>
<td></td>
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<tr>
<td>Printing (agreements, flyers, etc)</td>
<td></td>
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<tr>
<td>Garden sign – construction materials (stakes, board, paint, brushes)</td>
<td>$100</td>
<td></td>
<td></td>
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<tr>
<td><strong>Nice Additions (Wishlist)</strong></td>
<td></td>
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<tr>
<td>Bulletin board – construction materials</td>
<td></td>
<td></td>
<td>$100</td>
</tr>
<tr>
<td>Pavers</td>
<td></td>
<td></td>
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<tr>
<td>Fence</td>
<td></td>
<td></td>
<td>$100</td>
</tr>
<tr>
<td>Hedges</td>
<td></td>
<td></td>
<td>$100</td>
</tr>
<tr>
<td>Picnic table</td>
<td></td>
<td></td>
<td>$100</td>
</tr>
<tr>
<td>Arbor</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tree(s)</td>
<td></td>
<td></td>
<td>$100</td>
</tr>
<tr>
<td><strong>Total Expenses</strong></td>
<td>$300</td>
<td>$600</td>
<td>$700</td>
</tr>
<tr>
<td><strong>NET INCOME (income-expenses)</strong></td>
<td>$700</td>
<td>$600</td>
<td>$700</td>
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</tbody>
</table>
Example Survey

1. If there were a community garden in Golfview Park where you could grow your own plants or vegetables, would you be interested in participating?

☐ It's a great idea — I support it.

☐ I'm not enthusiastic about it, but it's OK with me.

☐ I'm neutral — neither for nor against.

☐ I don’t like the idea — I do not support it.

2. If you are interested in participating, what type of planting space would you be interested in?

☐ Plots — an individual garden spot just for me

☐ Communal garden — help with large garden collectively with a group of people

3. Please select which method of growing plants you would be most interested in:

☐ In-ground garden

☐ Raised beds

☐ Container gardening

☐ Other (please specify)

4. What types of plants would you be interested in growing? (Please check all that apply)

☐ Vegetables

☐ Fruits

☐ Herbs

☐ Flowers
5. Why would you participate in a community garden? (Please check all that apply)

- Access to fresh vegetables/growing my own food
- Learn about gardening
- Save money
- Socializing/Recreation/Community Involvement
- Enjoy gardening
- Serve on Community Garden Committee
- Other (please specify)

6. What kind of things are you interested in doing? (Please check all that apply)

- Having a garden plot
- Caring for the borders and common areas of the garden
- Organizing members
- Creating bylaws
- Teaching others about gardening
- Fundraising and finding sponsors
- Grant writing
- Publicity (distributing flyers, graphic design, talking to the press, etc.)
7. How much time would you be willing to spend working in a community garden?

○ I do not want to work in the garden

○ 1 to 2 hours per week

○ 3 to 4 hours per week

○ 5 or more hours per week

8. How would you use your garden harvest?

○ Eat and preserve the harvest for future meals

○ Donate some or all of it

○ Teach children and/or adults how to grow and preserve food

○ Sell it

9. Are you interested in finding out more about gardening through information meetings or training sessions?

○ Yes

○ No

10. Would you like help from garden volunteers with growing your plants?

○ Yes

○ No

11. Would you like us to contact you with information on upcoming community garden meetings?

○ Yes

○ No
12. What kind of help would you like to have with your garden plot?

13. What sort of guidelines do you think there should be for gardening in your plot?

14. Please share any other comments about community gardening.
Appendix J: Example Survey to be distributed by Oakdale

Oakdale Vegetation Change

A survey to assess the use and perception Oakdale’s Park, undergoing vegetative changes, by residents in nearby areas.

Email address for future contact
(All information will remain confidential)

How far do you live from the park?
- 0 to 5 blocks
- 6 to 10 blocks
- 11 to 15 blocks
- Over 15 blocks

In the summer how often do you or your family use the park?
- Daily
- Weekly
- Monthly
- Rarely

Are other seasons similar in how often the park is used?

<table>
<thead>
<tr>
<th></th>
<th>Less</th>
<th>Equal</th>
<th>More</th>
</tr>
</thead>
<tbody>
<tr>
<td>Winter</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spring</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fall</td>
<td></td>
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</tbody>
</table>
What do you frequently use the park for?
(Biking, relaxing, sports, dog walking, etc...) List all that apply

Rate the current condition of the aesthetics of the park

1 2 3 4 5

Aesthetically displeasing ○ ○ ○ ○ ○ Aesthetically pleasing

Current recreational value of park
(How highly you rate recreational use in that park)

1 2 3 4 5

Little use value ○ ○ ○ ○ ○ High use value

Current condition of plant diversity

1 2 3 4 5

Little Variety ○ ○ ○ ○ ○ Lots of variety

What is your gender?
○ Male
○ Female
What age range do you fall into?

- 19 or younger
- 20-29
- 30-39
- 40-49
- 50-59
- 60+

What are the ages of children in your household?

- 0 to 5 years
- 6 to 10 years
- 11 to 15 years
- 16 to 18 years
- N/A

How many children fall into the age range 0 to 5 years?

How many children fall into the age range 6 to 10 years?

How many children fall into the age range 11 to 15 years?

How many children fall into the age range 16 to 18 years?