

Richfield

BARK LAKE PARK MASTER PLAN

Village of Richfield
Adopted: November 11, 2015



Acknowledgments

We especially thank the park users, community members, neighborhood residents, organizations, and the many others who participated in the development of these plans. Your thoughts, concerns, and ideas have shaped the vision for these parks and will guide improvements for Bark Lake Park for years to come.

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Introduction

Purpose of the Bark Lake Park Master Plan

The Village of Richfield, Wisconsin has a wealth of both passive and active recreation opportunities for its residents, making it a desirable place to live and visit. This master plan focuses on the future of the only “neighborhood park” {(as defined by National Park and Recreation Association standards) NPRA} located within the Village of Richfield: Bark Lake Park. The purpose of this master plan is to guide park improvements, by establishing an overall vision for the park, addressing existing issues related to pedestrian circulation, access, activities, and outlining strategies for future funding, project implementation, and routine maintenance.



The Village Board has requested these individual master park plans be constructed and adopted as part of the Comprehensive Park Planning Process. It is imperative that Staff continually review these plans and make updates as projects are completed to ensure that the parks are being utilized to their fullest extent. It is understood that this is a living, breathing, document and should be updated and modified as such, when needed. The Village of Richfield manages approximately 212 acres of park land. Our parks and trails provide extensive recreational opportunities for those who live here—and for those who are visiting.

Each park in the Village of Richfield has its own ‘niche’. The Bark Lake Park ‘niche’ is that it is the only “neighborhood park” which primarily services the local residents of the immediate surrounding area. Contrary to the users of the Village’s other parks, Bark Lake Park is unique in that it mainly services only Village of Richfield residents.

Bark Lake Park is also the smallest of all of the Village of Richfield parks and historically it has been one of the most neglected for routine maintenance due to its comparably low volume of users. During the development of the Bark Lake Master Plan it was realized that two categories needed to be addressed. First, “Immediate Needs” and second, “Future Needs”. “Immediate Needs” were those ones with low cost, high impact solutions. “Future Needs” were those types of improvements that likely would need to be saved for over multiple years before purchasing would occur.

Staff began the individual park planning process with Bark Lake Park for two reasons. The first being its comparative neglect for an extended period of time and the lack of a general direction the Park Commission had when considering various park improvements. The second was to tie this document into some of the other larger planning efforts the Village has undertaken in recent years, namely, the Village’s 2014 Comprehensive Plan Update and its 2013 Comprehensive Park Plan.

We would like to thank the Bark Lake Association, the residents who live on Bark Lake and the surrounding area for their willingness to participate in this community planning event. The thoughtfulness of their insights and considerations have made this plan what it is. This roadmap for future park planning has given the Village and these stakeholders a future directive that its never had before!

Demographics and Trends

VILLAGE DEMOGRAPHICS

Like most municipalities around the country, the Village of Richfield experienced tremendous growth from the early 1990s to the early 2000s. The rate of population growth experienced in Richfield, 7.2% and 15.3%, respectively, were significantly higher than what occurred in the State of Wisconsin.

When examining the data by age demographics, the primary age group in Richfield has continued to be the ‘Baby Boomer’ generation, ages 50-64, followed closely by ‘Generation Xs’ in the age range of 39-49. Congruent with the Village’s 2004 overall Village Comprehensive Plan, the Village has continued to see a downward decline in the number of children in the Village (0-17). The Village has seen the direct impact in this demographic needs change most recently in the request for a pickle ball court in Fireman’s Park. Providing amenities to all demographics and users is something the village must remain vigilant in doing during future park planning endeavors.

The Village’s Park Commission, Village Board, and Park Staff have a common and unified goal, to ensure that our parks serve a full spectrum of our community’s recreational needs. By continuing to monitor population trends, area classroom sizes and by maintaining the close partnerships with our youth sports organizations, the Village will be able to respond better to community needs, resolve conflicts among groups of different park users before they occur and manage park assets more efficiently and effectively.

RECREATION TRENDS

While Bark Lake Park is the only Village owned “Neighborhood Park,” several other parks throughout the Village which are either privately or publicly owned could also be classified as such:

Name/Description	Acres	Park/Site Type	Ownership	Features/Facilities
Amy Belle School	8.5	Neighborhood	School District	Playground equipment, ball field, basketball courts
Richfield School	8.8	Neighborhood	School District	Playground equipment, ball fields, basketball courts
Friess Lake School	27.0	Neighborhood	School District	Playground equipment, ball fields, basketball courts
Friess Lake School	40.0	Conservancy	School District	Wooded, undeveloped
Plat School	5.0	Neighborhood	School District	Playground equipment, ball fields, basketball courts
St. Augustine School	5.0	Neighborhood	Private	Playground equipment, ball fields, basketball courts
St. Gabriel School	10.0	Neighborhood	Private	Playground equipment, ball fields, basketball courts

Taking these “parks” into consideration, the Village has a “surplus” in the allotted acreage it has allocated for “Neighborhood Parks”, which means the provided amenities are more than suitable for our current residents pursuant to NPRA standards. It’s important the Village identifies its other “Neighborhood Parks” and the amenities provided there so we may better understand which amenities are already being provided for at other areas throughout the Village and what we might be deficient in.

Park Type	Existing Acreage	Acres/1000 Persons	Acres NRPA Recommends	Surplus or (Deficit) Acreage
Neighborhood	69.3	1 to 2	11.3 to 22.6	58 to 46.7
Notes: 2010 Population = 11,339				

Relationship to Other Plans

The Bark Lake Park Master Plan is designed to help implement capital improvements and projects in the park over the next five (5) years. The park master plan is compatible with other planning efforts in the Village including the Village of Richfield's Comprehensive Plan and the Village of Richfield Master Park Plan. In the creation of this plan both the Comprehensive Plan and Master Park Plan were referenced in order to ensure the planning criteria set forth was what is desirable for the Village based upon what was approved previously by the Village Board and Park Commission. It is important that changes within related plans are updated into the individual park master plans to ensure we are offering the community a comprehensive recreation system.

The Comprehensive Park Master Plan was completed and approved by the Village of Richfield Park Commission in 2014. This was the first step in the development of a focused outline to Park Planning in the Village of Richfield.

At the July, 2014 Park Commission meeting the Park Commission voted to approve the Comprehensive Park Master Plan with the following motion:

Motion by Commissioner Heidi Woelfel to approve R2014-07-01, a Resolution Addendum to the 2013-18 Comprehensive Park Plan to include park improvements as an 'Action Plan' pursuant to the requirements of the Wisconsin DNR and to forward the 2013-2018 Comprehensive Park Plan onto the Village Board for formal adoption; Seconded by Commissioner Don Filipiak; Motion passed without objection.

While the Comprehensive Plan gives a broad outline of substantial future projects to pursue the Park Commission approved this plan under the assumption that more specific plans would be brought forth to give a more encompassing outline and picture as to the development of each individual park.

The implementation of these individual Master Park Plans and the future projects and items outlined in the plans will give more clarification to Commission Members, Staff and the public as to the needs of the Village's park system.

The Comprehensive Master Park Plan outlines general necessities for the Village Park system and Staff will utilize this plan as a starting point in order to expound upon those ideas and create master plans that will be utilized in future Capital Improvement Planning and Budgeting criteria.

These Park plans are necessary to ensure that the Park Commission and Staff have direction of where to focus energy and resources in our Village Park system. Staff will continue to track general maintenance to and park planning projects throughout the life of the Master Plan in order to ensure at the time of Master Park Planning updates we have the necessary information to make immediate and decisive decisions regarding the Comprehensive Park Master Plan and Individual Park Plans.

One Park within the Village that Staff is not responsible for the Master Planning of is the Village of Richfield Historical Park. The Village of Richfield's Historical Park is managed by the Richfield Historical Society via a management agreement held with the Village. Because of this Master Planning is completed by a number of individuals within the Historical Society and a file of the Master Plan is held at Village Hall. In the same way our Master Plans help us to focus our energy and resources on particular projects in one park at a time, the Richfield Historical Park Master Plan is utilized in the same capacity and gives their Board direction on where to focus energies in the Historical Park.

Park Master Planning Schedule

Due to Staff limitations the Village is forced to focus their energies on only one Park Planning Process per year. Village Staff chose to begin with the Bark Lake Park Master Plan in order to address immediately pressing issues related to intent and use of the Bark Lake Park. We also sought to create a planning process and document that could be duplicated as a base format for the remaining park Master Plans. The way in which we will continue to go about updating the Park Master Plans will generally be conducted as follows:

2014	Comprehensive Park Master Plan
2015	Bark Lake Park Master Plan
2016	Heritage Park Master Plan
2017	Fireman's Park Master Plan
2018	Nature Park Master Plan
2019	Comprehensive Park Master Plan
2020	Bark Lake Park Master Plan
2021	Heritage Park Master Plan
2022	Fireman's Park Master Plan
2023	Nature Park Master Plan
2024	Comprehensive Park Master Plan
2025	Bark Lake Park Master Plan
2026	Heritage Park Master Plan
2027	Fireman's Park Master Plan
2028	Nature Park Master Plan
2029	Comprehensive Park Master Plan
2030	Bark Lake Park Master Plan
2031	Heritage Park Master Plan
2032	Fireman's Park Master Plan
2033	Nature Park Master Plan

As the Village grows so will the anticipated need for a larger Village Staff and resources. During this time the schedule may alter and the need to reevaluate one plan over another may take precedence.

Community Input & The Planning Process

Community engagement was an important part of the planning process to produce this park master plan. Input was solicited from a wide range of stakeholders, and park users. Village Staff sought to gain feedback from the various community stakeholders and relay that information to the Park Commission throughout the Park Planning Process. The Village Park Commission meets regularly on a Bi-Monthly basis which gave Staff ample time to schedule meetings and gain community feedback between Park Meetings.

Below is the list of scheduled dates most important during the Park Planning Process.

Date	Bark Lake Park Master Planning Timeline
June 16th, 2015	Preliminary Staff Assessment of Park Needs
June 24 th , 2015	Public Workshop Meeting
July 8 th , 2015	Presentation of data collection
August 4th, 2015	Bark Lake Association Meeting
August 21st, 2015	Meeting with Engineers to discuss needs of the Master Plan
September 9 th , 2015	Park Commission Site Visit/Master Plan Rough Draft submittal
September 30th, 2015	Preliminary Site Plan and Cost Estimates back from the Engineers
October 14th, 2015	Finalize list of Bark Lake Park Master Planning Projects
October 30th, 2015	Final Site Plan and Cost Estimates back from Engineers
November 11 th , 2015	Final Bark Lake Master Plan implementation

A preliminary assessment of park needs was conducted early in the planning process amongst Village Staff, and a list of needs and potential projects was generated. An assessment of the condition of the park, the list of current needs and potential projects were relayed during the Bark Lake Park Master Planning Workshop Meeting and prioritization of those projects also took place at that time. Residents within a 1,000' of Bark Lake Park were mailed notices of the Bark Lake Park Master planning workshop and approximately ten (10) residents attended the meeting.

From the Public Workshop Meeting a community survey was generated listing the various projects believed to be most pertinent to the residents in attendance at the Bark Lake Master Planning Workshop. The Community Survey (Appendix III) asked for individuals to rank the potential projects as either an immediate or future need. The survey was posted on the Village of Richfield's website and distributed through the social media accounts. Appendix IV is a completed survey received by Village Staff. The survey was discussed at the August 4th Bark Lake Association meeting in which approximately 40 residents of the Bark Lake Community were present.

Feedback to the projects and ideas was generated throughout the planning process and then relayed to the Park Commission at their regular Meetings. The Park Commission also met out at the Bark Lake Park before the September 9th meeting for which public notice was given. At the Special Park Commission Meeting on October 14th the Village of Richfield Park Commission finalized the project list to be included in the Master Site Plan.

In addition to public and community input, the Bark Lake Park master plan has benefitted from the efforts of key Park Commission members who visit the park on a regular basis. Their input was largely gained through site visits, work sessions, and one-on-one meetings with park and planning staff.



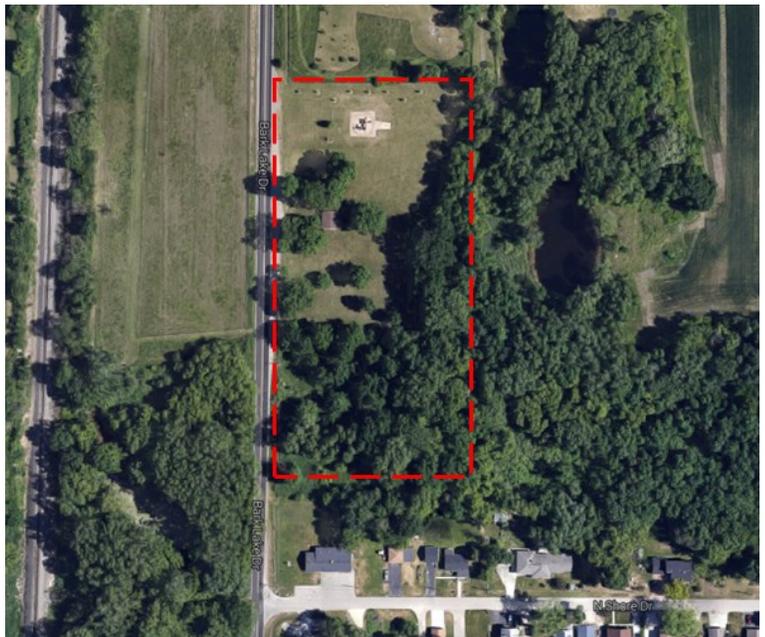
Bark Lake Park Master Plan

Park Location

Bark Lake Park, in the southwest part of the Village, is one of the largest “neighborhood parks” in Richfield. Located on Bark Lake Drive, just south of Bark Lake Road, it encompasses five (5) acres and has a mix of recreation uses. A large majority of this park is taken up by wooded and low lands, while open space and recreational uses otherwise comprise the park. To the north and east, residential homeowners surround the current park. The road is adjacent to the western most border of the park and residents pull off to the gravel shoulder of this road to park as an undesignated parking lane. Bark Lake Park was dedicated to the then Town of Richfield in 1990 from the Richfield Volunteer Fire Company. The Certified Survey Map dated May 14th, 1990 states:

“This conveyance is subject to the real estate herein conveyed being used exclusively for park, fire department or public purposes and if sold to private parties or used for private purposes, then this conveyance shall be null and void and the real estate revert to grantor or it’s successor. At no time shall said premises be used for a public dump or for public garage disposal purposes.”

The location of Bark Lake Park provides a beautiful setting for park visitors. Located just north of Bark Lake, it’s open space provides generally flat areas for both passive and active recreational options. Strategically placed clusters of trees occupy the northern part of the landscape and are scattered throughout. It is the only Village park with direct physical access to the land which is not on a main arterial roadway.



Site Conditions & Analysis

Bark Lark Park is a unique park in that according to NPRA standards, it could technically be classified as either a “Neighborhood Park” or a “Community Park”. The following are NPRA standards and definitions for each category of parkland, along with the ratio of park acreage to residential population, and the service radius the respective classifications of parks serve.

NEIGHBORHOOD PARK

“A park designed to serve a residential neighborhood or subdivision. Neighborhood parks typically include playground equipment, unmarked play areas and picnic facilities. Larger neighborhood parks may include basic baseball/softball fields, courts (tennis, volleyball, basketball, etc.), picnic areas, or restroom facilities. These parks should be within a comfortable walking distance of intended users.”

Typical Size: 1 to 5 acres

Per Capital Standard: 1 to 2 acres per 1,000 residents

Accessibility Standard: 1/4 to 1/2 mile radius

COMMUNITY PARK

“Parks intended to serve passive and active recreational needs of several neighborhoods or subdivisions. These parks include all of the improvements found in neighborhood parks as well as other possible features such as lighted athletic fields, courts designed for competitive athletics, swimming pools, walking trails, restrooms, picnic conservation lands. These parks are usually located within a short drive or walk of intended users.”

Typical Size: 5 to 40+ acres

Per Capital Standard: 5 to 10 acres per 1,000 residents

Accessibility Standard: 1 to 2 mile radius

Bark Lake Park is a quaint park that users in the area may bike or walk to on side roads. It’s main amenities include a park shelter with electrical service and seating which may be reserved at Village Hall along with playground equipment.

At the Bark Lake Park Master Planning Public Workshop meeting, the potential expansion of the park, it’s open space and potential amenities, were discussed with the idea in mind that it could be possible to bring this park up to a pseudo- “Community Park” standard with more ‘intensive’ uses and open space areas. While the park’s total lot size is five (5) acres, the fact remains that approximately three (3) acres of the park is utilized. In order to undertake the effort of clearing a majority of trees along the southern border, significant consideration to the FEMA regulated floodplains along the southern property boundary line as well as any Southeastern Wisconsin Regional Plan Commission (SEWRPC) delineated wetlands would need to be surveyed. Upon review of the topography of the lot and in speaking with residents who go to and utilize the park expansion of the park, many are satisfied with the current acreage and open space uses the park offers. Additional planning and financial considerations in the future may be warranted if these trees ever become dead, diseased or dying as a part of the emerald ash bore or another type of similar insect or fungus known to wipe out tree populations.

Site Conditions & Analysis Continued

ZONING & TOPOGRAPHY

Bark Lake Park is located in Section 23 of the Village of Richfield. In evaluating its potential use it's important to review the Zoning Map along with the 100 year floodplain maps because of its proximity to Bark Lake. The current parcel V10_0872_00K is zoned and generally stated as:

P-1 Park & Recreation District: This district is intended to provide for areas where the recreational needs, both public and private, of the population can be met without undue disturbance of natural resources and adjacent uses.

And

F-1 Floodland District: This district is intended to preserve in essentially open space and natural use, lands which are unsuitable for intensive development purposes due to poor natural soil conditions and periodic flood inundation and shall include all land and water area lying within the delineated forecast 100-year recurrence interval flood or as delineated on the county shoreland-floodland map.

As previously mentioned, the northernmost portion of the property is where the main park activities take place and the southernmost portion of the property is the area largely unutilized. The unutilized area is covered in trees and marsh/swamp land. Mosquitos and various animals inhabit this marsh land which makes it an undesirable area of the park for those utilizing its amenities.

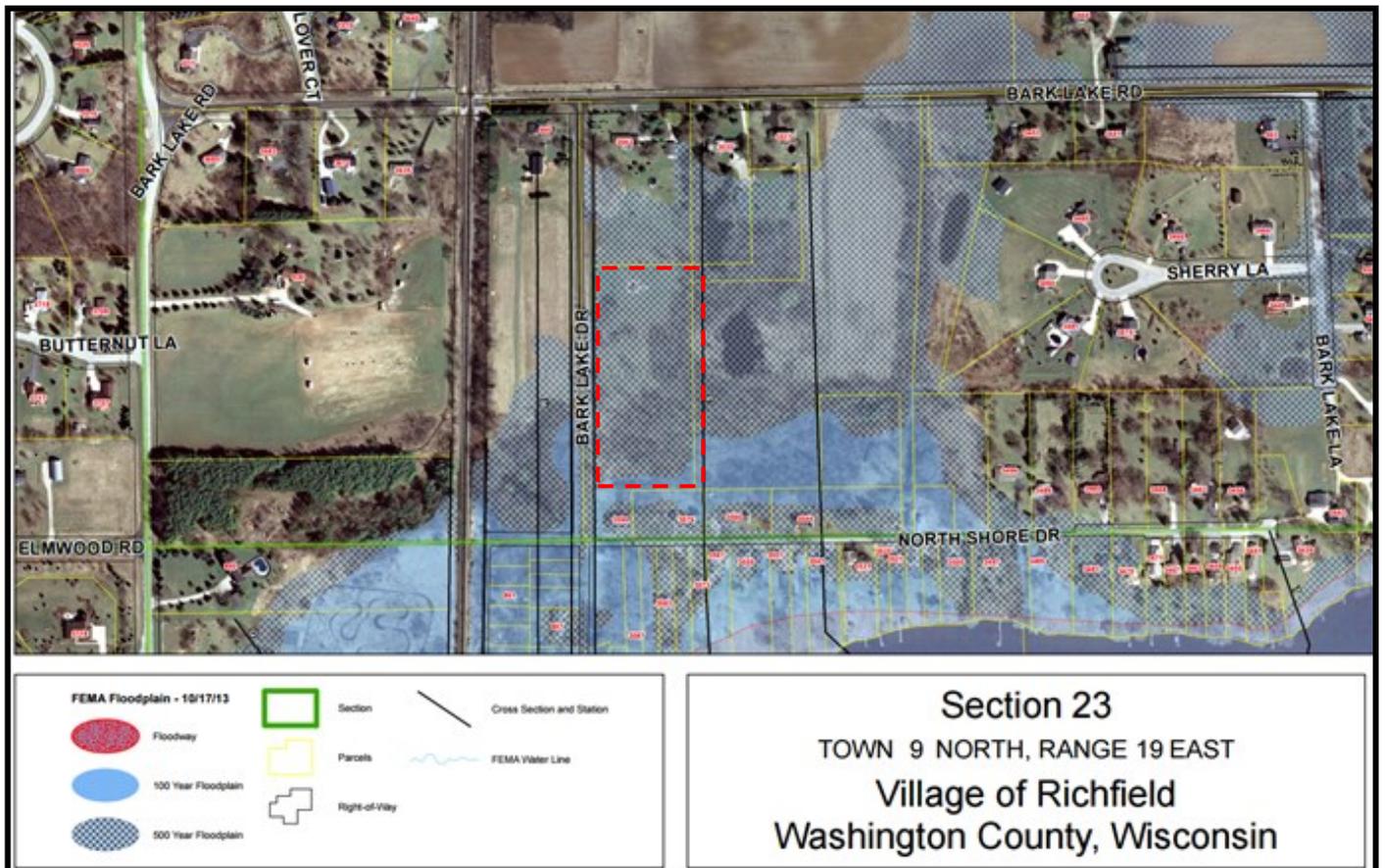
Taking out various trees and undergrowth would be a significant undertaking for the Village. It would alter the natural landscape of the park and could potentially alter the flow of water from the FEMA regulated floodplain areas.



Site Conditions & Analysis Continued

Residents present at the Bark Lake Park Master Planning Public Workshop Meeting were overwhelming not in support of the Village drastically changing the natural landscape of the park for reasons related to recreational use expansion. They indicated the current size and usable area was adequate for their needs.

In the future Staff may explore the feasibility of trail installation throughout this currently unutilized marsh land area with a pervious surface like crushed stone or woodchips. A walking trail leading residents through various potential vantage point locations might be something that could be explored in the future if the Park Commission and surrounding residents were of a mind to support such an installation. At that time an effort would be made to preserve the natural landscape as much as possible and only allow for pedestrian foot traffic much like the trails currently utilized in the Village of Richfield Nature Park.



Site Analysis

The aerial overview below illustrates the existing conditions and site analysis for Bark Lake Park and demonstrates how much park land is occupied by wooded wetland to the southern most area of the park. Issues and opportunities identified through the analysis are as follows:

SITE ANALYSIS MAP

- Parking 
- Open Space Area 
- Playground Equipment 
- Shelter 
- Usable Park Boundry 
- Parcel Outline 



Inventory Features

CONDITIONS OF EXISTING FEATURES AND AMENITIES

A full report of the existing conditions for Bark Lake Park were documented by Village Staff and are included below. Park Amenities were given a classification rating of “Poor”, “Fair”, “Good” or “New”.

FEATURES	CONDITION AND NOTES
Athletics	
Open Space	Fair—holes line the entire park area and make mowing difficult
Play Features	
Playground (1)	Good—Playground equipment was installed in 2007 features include slides, a bridge and rock climbing wall
Sand Digger (1)	Good—This amenity was installed at the same time as the playground equipment still fully operational
Other Amenities	
Picnic Tables (2)	Fair—Usable paint chipping regular vandalism each year i.e. name scraping and spray painting
Bench (1)	Poor—Wooden usable bench
Trash Can (1)	Fair—Barrel garbage can, bee’s, animals and bugs frequent the can
Dog Signs (2)	New—Dog signs were recently placed in the park
No Motorized Vehicle Signs (2)	New—Signs were recently placed in the park
Shelter (1)	Good—Sound structure minor graffiti cleaned up each year
Trees (23)	Good—Pine, Oak and Hickory trees
Lights (4)	Poor—The park currently has four (4) lights none of which are operational, the pavilion also has the potential for one additional flood light
Parking	Good—Parking is along the shoulder of Bark Lake Road
Landscaping Incorporated	Poor—The current flag pole does not have lighting elements so not flag can be displayed because it would not be lit at night and the there is no
Port-A-John (1)	New—A temporary bathroom facility is brought to this location each year

Inventory Pictures



Bark Lake Shelter



Playground Equipment



Picnic Tables (2)



Sanddigger



Park Bench



Dog Waste Signs (2)



No Motor Vehicle Signs (2)



Landscaping

Inventory Pictures



Park Lights



Park Lights



Parking



Open Space



Open Space



Trees



Open Space

Preliminary Proposed Improvements

The preliminary list of potential projects/amenities for the Bark Lake Park is based on the site analysis and needs assessment conducted by Staff in conjunction with feedback from the Bark Lake Park Master Planning Workshop Meeting, the Bark Lake Association, and Community Survey.

POTENTIAL PROJECTS/AMENITIES

During the community workshop meeting held on June 24th, 2015 the residents in attendance considered the following list of potential Park Planning Objectives.

Preliminary Potential Projects/Amenities
Sanitary facility (include bubbler/water fountain)
Fill low spots throughout park
Additional picnic tables
Create an ADA compliant gravel path
Replace lights and include timers on those lights (this may include an update to electricity)
Replace flood light by pavilion
Put a solar light by the current flag pole
Install a sign for time capsule located by flag pole
Install park grills (with charcoal receptacles)
Fixed sealing garbage cans to prevent animal/bug attraction
Swing set feature
Basketball court
Shuffle board
Horseshoe pit
Tennis court
Eliminate wood chips and get rubber ADA compliant padding for play area
Permanent bathroom facilities
More benches
Enlarge the park (take out brush to create more open space)

These potential park projects were then evaluated based on their immediate vs. their future need in Bark Lake Park through a community survey completed by the Bark Lake Association and residents. Staff was then able to prioritize the immediate items or projects to be considered in future years budgets vs. future year capital improvement plans. The preliminary immediate vs. future need list has been provided below.

IMMEDIATE NEEDS	POTENTIAL FUTURE NEEDS
Fill Low Spots Throughout Turf in Park	Swing Set
Additional Picnic Tables (2 more)	Basketball Court
Replacement of Lights/Timers on Lights	Shuffle Board
Floodlight by Pavilion	Horse Shoe Pits
Solar Light by Flag Pole	Tennis Court
Time Capsule (sign)	Eliminate Wood Chips add ADA Tire Surface
Upgrade to Electric	Permanent Bathroom/Sanitary Facility w/ Bubbler
Closing Permanent Garbage Can	
Additional Benches	
Grills (Charcoal Disposal Container)	
Path	

Needs Assessment & Park Goals

During this process, one of the most commonly heard topics for discussion from residents in this area is the ‘potential’ that Bark Lake Park has and how historically, this park has been seemingly undervalued. Make no mistake about it, Bark Lake Park is indeed special and what we’ve come to find out through community input is that the Village is in the position to make immediate financial investments which will dramatically increase the user experience here at this park. Working in concert with accomplishing some of these more immediate needs, Staff also intends to propose the inclusion of larger capital expenditures into the Village’s five (5) year Capital Improvement Plan.

It is understood that the list on the previous page is only meant to help guide discussions about improvements at Bark Lake Park. Ultimately, the decision will be that of the Park Commission and the Village Board, what improvements are considered and implemented long-term. Several years back Bark Lake Park had a baseball diamond. The discussions surrounding this type of use or ones similar to it, such as basketball or tennis, elicited polarizing feedback. Residents were either very much in favor of that type of use coming back to the park or they did not see a need for it at this time. An appropriate balance will need to be determined in future years between what is ‘nice’ and what is ‘necessary’ for more intensive uses at this park.

MOST POPULAR ACTIVITIES

- Picnicking
- Parties in which the shelter is utilized
- Open space recreation use
- Playground equipment use

FEATURES TO STAY

- Playground Equipment
- Shelter

ISSUES

- Lack of general amenities
- Inadequate seating around playground fixtures
- ADA accessibility and defined walking areas
- Maintenance of park features (lights)
- FEMA Floodplains/SEWRPC delineated wetlands

OPPORTUNITIES FOR CHANGE

- Ample amount of open space for additional amenities
- Growing partnerships with the Bark Lake Assoc. and 25 Sportsman’s Club
- Create Attractive Park Entry/Signage to enhance the ‘sense of place’
- Develop a formalized landscaping plan

GOALS AND OBJECTIVES FOR BARK LAKE PARK

1. [Goal #1] Develop an internal strategy to encourage and empower Village employees to point out deficiencies they see while performing routine maintenance in our park system.

[Objective #1] Create seasonal checklist (spring/fall) for general maintenance of current amenities.

2. [Goal #2] Secure funding for playground upgrades.

[Objective #2] Work with various approving bodies to illustrate the need for park improvements during budget time.

3. [Goal #3] Improve communication with Bark Lake Association

[Objective #3] Attend meetings, as requested, to listen to concerns of area residents.

Park Master Site Plan General Budget Estimate

No.	Qty	Units	Item	Unit Price	Total
Playground					
1	1	Each	¹ Swings—Two seats	\$1,040	\$1,040
2	1	Each	¹ Curved Balance Beam	\$450	\$450
3	1	Each	¹ Tetherball Equipment	\$160	\$160
4	1	Each	¹ Early Childhood T-Swing	\$1,810	\$1,810
5	1	Each	¹ Toss-Up Equipment	\$600	\$600
6	2,965	SF	² ADA Accessible Surface—EWF System	\$3.50	\$10,380
Accessible Path & Picnic Area					
7	2,140	SF	² Path—5” concrete & CABC	\$6	\$12,840
8	720	SF	² Picnic Area—5” concrete & CABC	\$6	\$4,320
Sport Courts					
9	1	Lump sum	² Tennis Court	\$55,000	\$55,000
10	1	Lump sum	² Shuffleboard Court	\$3,500	\$3,500
11	1	Lump sum	² Horseshoes	\$500	\$500
Reconfigures/Enlarged Parking Area					
12	1	Lump sum	² Parking Area	\$2,500	\$2,500
Trail Loop					
13	1	Lump sum	Clearing and Grubbing	\$2,500	\$2,500
14	78.5	CY	Common Excavation	\$16	\$1,260
15	157	Ton	Aggregate	\$16	\$2,510
16	950	SY	Restoration	\$3	\$2,850
Site furniture & Landscape					
17	1	Each	¹ Bench	\$750	\$750
18	3	Each	¹ Picnic Table	\$850	\$2,550
19	2	Each	¹ Grill	\$300	\$600
20	6	each	² Shade Trees	\$600	\$3,600
Subtotal					\$109,720
Contingencies (15%)					\$16,500
Eng., Legal & Admin. Fee (10%)					\$11,000
Total Project Cost					\$137,220

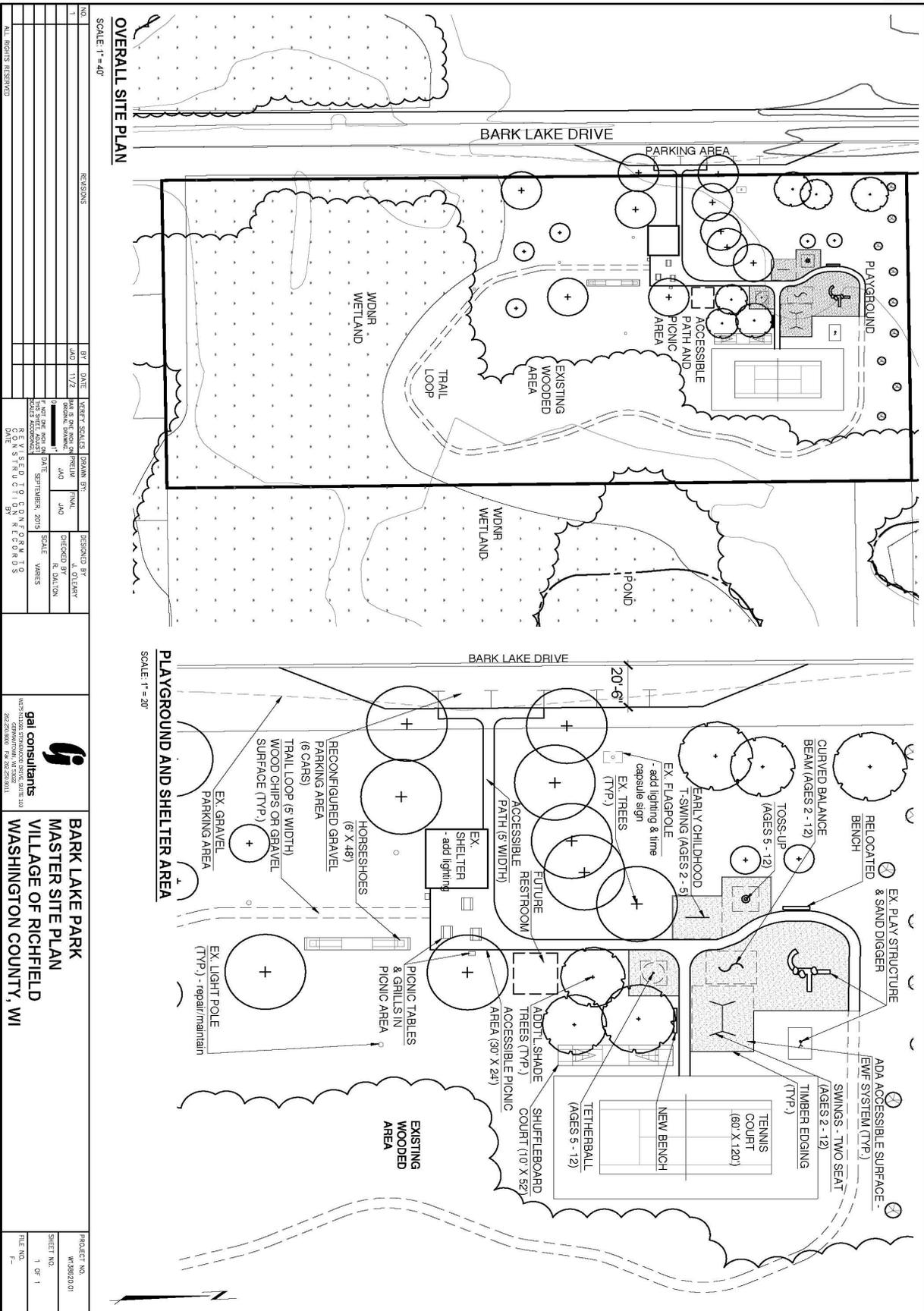
Note: Materials cost only. Shipping and installation not included in estimate

Note: Materials and installation cost

This list is for costing purposes only and does not represent a commitment for implementation. Cost estimates provided by GAI Consultants

Park Master Plan Proposed Concept Map

REVISION/PLOT DATE Design.dwg 11/2/15



NO.	REVISIONS	DATE	BY	VERIFY SCALE	DESIGNED BY
1		JAO	JAO	SCALE: 1" = 40'	WARRS

gal consultants
1625 MIDLAND STRANDBORO ROAD SUITE 300
262-250-0000 Fax: 262-250-0111

BARK LAKE PARK MASTER SITE PLAN
VILLAGE OF RICHFIELD
WASHINGTON COUNTY, WI

PROJECT NO. W13826/01
SHEET NO. 1 OF 1
FILE NO. F-

Proposed Projects and Future Needs

The Bark Lake Park Master Plan not only provides the vision and layout for the park features and amenities, it also suggests a tentative implementation schedule for proposed improvements. The timing of implementation depends on several factors including demand, financial feasibility, and construction phasing. It is important for the Village to know how proposed improvements will impact park budgets and future funding needs. This section includes a summary of anticipated initial capital (construction) cost estimates for park features and outlines a potential phasing strategy for implementation of the proposed improvements.

Page 22 of this document includes the estimated budget of capital costs for park improvements that are common and typical of “neighborhood parks”. These budget numbers will assist Village Staff and decision makers in weighing the various options and prioritizing a phased implementation for the park. The project budget numbers are rough estimates and are not intended to illustrate a commitment in any way for implementation. These numbers are to act as a guide to help convey the actual costs associated with park improvements. If a project is chosen for implementation, a detailed costing plan will need to be developed through a project design process.

MAINTENANCE TO EXISTING FEATURES

These park features are either existing or under construction at the time of master plan completion and will be maintained as part of the park for the foreseeable future.

1. **Grounds.** Purchase sod/soil and focus on filling the “low spots” of the turf throughout the park in order to make mowing and maintenance more manageable for Staff. It also allows for a more evened walking surface for residents utilizing the open space area, a popular feature at the park.
2. **Pole Mounted Lights.** There are a total of four (4) lights located in the park. These lights are no longer operational. On-going maintenance will include the replacement of the lights and a possible upgrade to the electrical wiring.
3. **Pavilion Lights.** In addition to the regular lights, the floodlight located on the pavilion has been disconnected. There has been some discussion about whether the replacement of this is necessary or not. Village Staff will look to determine this in the near future and replace the light or remove it, if necessary.

SMALL ADDITIONS TO/PERMANENT UPGRADES

Several current features in the park have been requested for upgrade for practicality purposes. Those upgrades are listed below and additional smaller amenities may be included in future budgets to bring this small neighborhood park, back up to usable standards.

1. **Picnic Tables.** The pavilion at Bark Lake Park currently has two (2) picnic tables more picnic tables which are in poor condition. Additional seating or the refurbishing of these tables ought to be considered for the benefit of those who use and rent the park pavilion. Village Staff has recently heard stories of families hosting large parties have had to bring their own tables due to lack of seating.
2. **Enclosed or secured waste receptacles.** The wooded land that encompasses a portion of the five (5) acre park is home to many different animals. Having secured waste receptacles will deter animals from tipping over our waste barrels and spreading trash around the park.

Proposed Projects and Future Needs

1. **Signage for Park and Time Capsule.** Bark Lake Park currently lack basic naming signage which could be placed at or around the flagpole/time capsule. Defined signage for parks is considered a ‘best practice’ in Parks and Recreation Management. This is the only Village park not clearly identified with signage. Additionally, much like the time capsule located at Village Hall, which the Village does also does not have a sign or placard, Staff would like to denote this time capsule for future generations so that it is not forgotten. Individuals from the Bark Lake Community have also mentioned an interest in opening the time capsule in 2016 which would be it’s 40 year anniversary so that those who originally helped bury the capsule might still be able to open up and view it’s contents. At that time we would likely look to replace the capsule as well.
2. **Grills.** One of the most popular activities in Bark Lake Park are small family events and parties. One of the most highly requested additions to this particular park has been the installation of park grills so that cooking can be done on site in the park. An additional consideration would be a metal receptacle to place the hot coals or ash.
3. **Benches.** Benches and other forms of seating for this park will be explored and kept on an ongoing list for needs for any Eagle Scouts or other individuals looking for community service projects. The Village is currently in talks with the 25 Sportsman’s Club and could potentially receive two (2) benches as a donation in 2016.
4. **Swing Set.** Swings are some of the most utilized pieces of equipment in Heritage Park. This very basic piece of equipment could be easily installed in this park and may be one of the first additional amenities placed in the park in the near future. Additional playground amenities may also be included in the future such as a curved balance beam, tetherball equipment, and toss up play equipment.
5. **Horse Shoe Pits.** One of the major downsides of this alternative is that residents would be expected to bring their own horse shoes. The Village would not maintain those for residents. Horse shoes left in the grass also pose a danger for mowing for Village Staff.
6. **Shuffle Board.** While nice in theory, it may not be appropriate for our winter climate. Just as a tennis court relies on a smooth surface for playing on, much is the same for this sport. Its success or failure would also rely heavily on our residents owning the equipment and bringing it to the park.
7. **Parking.** The residents and Park Commission believe their gravel drive to be ample parking for the park itself. Additional gravel and the use of old telephone polls to denote parking stalls could be utilized to bring more structure to the parking area and make it more visually appealing.
8. **Landscaping.** The park itself has a large number of trees, but the Village could work the purchase of several trees and shrubs into the budget to develop a more formal landscaping plan. An ideal place for the addition of said landscaping might be around a new park sign or adjacent to the pavilion.

CAPITAL IMPROVEMENT PLANNING AND FUTURE NEEDS

The Village of Richfield has five (5) parks under it’s control which encompasses over 200 acres. That means Staff and Board need to continue to be responsible managers of those parks and utilize all available allocated space under the Village of Richfield’s control to it’s fullest extent. Below is a list of those additional amenities that may be appropriate for this type of “neighborhood park”.

Proposed Projects and Future Needs

- 1. ADA Compliant Play Surface.** While Staff originally thought the installation of ADA compliant rubberized surface would be an ideal upgrade to the park after preliminary cost estimates were received the Park Commission requested additional options be explored. The Village is proposing instead we consider utilizing a material called “EWF System”. It is a new wood surface that would provide an ADA Accessible surface but is also more cost-effective.
- 2. Pedestrian Walking Areas.** The installation of a path leading from the parking area to the pavilion and over to the playground equipment is something that would be nice for those having parties. It also could be utilized as a buffer for the placement of additional play structure. A 5” concrete path or crush gravel path could be considered which may bring more users to the park and provide more ‘curb appeal’ for those passing by. Another one of the ideas mentioned at the Public Workshop Meeting was potentially clearing some of the brush on the southern portion of the park so that more of the park land was usable to residents visiting the Park. Village Staff, residents and Park Commission members were in general agreeance that the implementation of a trail loop into the wooded area would be a potentially desirable future amenity. Clearing and grubbing, excavation, aggregate and restoration will total approximately \$10,000. For this reason the trail loop may be considered in future Capital Improvement Plans.
- 3. Sports Courts.** Several different court options were explored for the park. Tennis Courts were found to be most appealing to users of the Park itself and due to the fact that the Tennis Courts in Heritage Park will soon be removed due to the construction of the new fire station on Village Hall campus, this is an option to be considered. The Village presently has a secondary tennis court at Fireman’s Park which could alternatively be resurfaced to make up for the loss of courts at Heritage Park. Another consideration which may be less than desirable for neighboring property owners is the potential for lighting which is typically installed in conjunction with municipal tennis courts. Additional research and community input will likely be necessary before such a significant financial undertaking is formally proposed.

Proposed Implementation Strategy

Master Plans are meant to provide guidance or a roadmap for Staff and Board members in regards to the future development of a particular area of park land. Included in this plans are typically goals and objectives along with an implementation plan for how the organization can strategically pursue and achieve aspects which are desirable and financially feasible. In future budgets, our Staff will look to utilize the list of Potential Park Projects in the way they coordinate and plan for future expenditures. The first two lists generated in Master Park Planning *In progress/Maintenance to existing features* and *Small Additions to/Permanent Upgrades* are categories that Staff hopes to incorporate into immediate budget planning agendas. As monies become available, we will seek to perform maintenance in the park and keep these items generated as an on-going upgrade list to the park.

The *Capital Improvement Planning/Future Needs* list includes items that the Capital Improvement Planning Committee will look to evaluate each year. This committee evaluates how strong the need for those proposed projects are and then works to evaluate what we should do based on realistic funding levels the Village can provide. A certain amount of funding is regularly set aside for park improvement projects over a \$5,000 threshold. Generally park improvement projects over a \$5,000 threshold are those projects that are saved and planned for over a period of years. The three largest items in the Bark Lake Master Plan Capital Improvement Project list are the ADA accessible surface, the 5" Concrete/Stone aggregate path, and the Tennis Court.

In 2016 the Village will lose two tennis courts when the new Fire Station is built. Tennis courts were included in this plan as a potential way to provide alternative courts for users in another park in the Village. At the present time it is debatable if this type of a use is appropriate for the "neighborhood park" or if our monies are better spent resurfacing the second set of courts the Village has at Fireman's Park.

It is anticipated that going for the Village will coordinate closely with the Bark Lake Association so that any proposed improvements to the park are communicated to the Association in advance. The Village sees the Lake Association as a valued partner and stakeholder in the success of this park so obtaining community 'buy-in' with proposed projects is seen as an important and valued strategic partnership.

Budgeting and Capital Improvement Planning

BUDGET PROJECTS

No.	Qty	Units	Item	Unit Price	Total
Playground					
1	1	Each	¹ Swings—Two seats	\$1,040	\$1,040
2	1	Each	¹ Curved Balance Beam	\$450	\$450
3	1	Each	¹ Tetherball Equipment	\$160	\$160
4	1	Each	¹ Early Childhood T-Swing	\$1,810	\$1,810
5	1	Each	¹ Toss-Up Equipment	\$600	\$600
Sport Courts					
10	1	Lump sum	² Shuffleboard Court	\$3,500	\$3,500
11	1	Lump sum	² Horseshoes	\$500	\$500
Reconfigures/Enlarged Parking Area					
12	1	Lump sum	² Parking Area	\$2,500	\$2,500
Site furniture & Landscape					
17	1	Each	¹ Bench	\$750	\$750
18	3	Each	¹ Picnic Table	\$850	\$2,550
19	2	Each	¹ Grill	\$300	\$600
20	6	each	² Shade Trees	\$600	\$3,600
			Total		\$18,060

CAPITAL IMPROVEMENT PROJECTS

No.	Qty	Units	Item	Unit Price	Total
Playground					
6	2,965	SF	² ADA Accessible Surface—EWF System	\$3.50	\$10,380
Accessible Path & Picnic Area					
7	2,140	SF	² Path—5" concrete & CABC	\$6	\$12,840
8	720	SF	² Picnic Area—5" concrete & CABC	\$6	\$4,320
Sport Courts					
9	1	Lump sum	² Tennis Court	\$55,000	\$55,000
Trail Loop					
13	1	Lump sum	Clearing and Grubbing	\$2,500	\$2,500
14	78.5	CY	Common Excavation	\$16	\$1,260
15	157	Ton	Aggregate	\$16	\$2,510
16	950	SY	Restoration	\$3	\$2,850
			Subtotal		\$91,660
			Contingencies, Eng., Legal & Admin. Fees		\$27,500
			Total		\$119,160

Appendix I: Community Workshop Notice to Residence



June 12, 2015

Village of Richfield
*Forward. Preserving...
A Country Way of Life!*

RE: Notice of Public Meeting for Bark Lake Park Master Planning

Dear Bark Lake Community Residents,

My name is KateLynn Schmitt and I am your Village Administrative Services Coordinator. I'm writing today to notify you that we have been approached by several residents of the Richfield community regarding the development of Bark Lake Park. At our most recent Park Commission meeting various members of the Bark Lake Association and the community came before the Commission to discuss its uses and potential for development. While the Bark Lake Park is the Village of Richfield's smallest park it is still utilized by residents on a very regular basis.

In January of 2014 the Park Commission approved the 2013-2018 Village of Richfield Master Park Plan with the knowledge that each individual Park would then undergo their own separate park planning process to allow for a comprehensive thorough analysis of the Village's entire park system. Given the most recent interest in Bark Lake Park and the Village's intent to complete Master Planning for our Parks Village Staff has chosen to Master Plan for Bark Lake Park next. June 24th, 2015 will be the official launch date of this process and a Public Meeting/Workshop will be held in the lower level of Village Hall from 6:00 PM until 7:00 PM so that residents in the immediate proximity of the park and Richfield community might have an opportunity to offer input and feedback about the current state of the park and it's potential for development.

The Park Commission will be hearing the details of the collected information at the July 8th, 2015 Park Commission meeting which will be held in the lower level of Village Hall at 6:00 PM. It is important to note that no decisions will be made by the Park Commission on July 8th. This information will be presented to them as a 'Discussion Only' agenda item. This is done for the purposes of information gathering by Staff and to give the Bark Lake Community adequate time to provide our Park Commission with pertinent information.

If you wish to provide input to Staff and the Park Commission on this matter but are unable to attend the June 24th meeting you can email me directly at katelynn@richfieldwi.gov or send letters to the following address:

Richfield Village Hall
Attn: Administrative Services Coordinator, KateLynn Schmitt
4128 Hubertus Road
Hubertus, WI 53033

As always, please feel free to also call with any questions, comments, or concerns. I will be happy to help in any way that I can.

Sincerely,

KateLynn Schmitt
Village of Richfield
Administrative Services Coordinator

4128 Hubertus Road — Hubertus, Wisconsin 53033
Phone (262) 628-2260 — Fax (262) 628-2984 — www.richfieldwi.gov

NEEDS

<ul style="list-style-type: none"> ❖ Replacement of Lights/Timers on Lights ✓ ❖ Light on Flag Pole ✓ NO ❖ Paint Shelter (proposed) ❖ Fill low spots on turf ✓ ❖ Time Capsule Sign by Flag Pole ✓ ❖ Sign Stating Bark Lake Park Name ❖ Grills Number and Location ❖ Volleyball Court ❖ Permanent Bathrooms ✓ ❖ Horseshoe Pits ✓ 	<ul style="list-style-type: none"> ❖ Additional Benches ✓ ❖ Additional Picnic Tables ✓ ❖ Trail ✓ ❖ Eliminate Woodchips and get ADA tire rubber ✓ ❖ Pave pull-off area and create parking spots (not needed) ❖ Basketball Court ✓ ❖ Tennis Court ✓ ❖ Baseball Field - no room ❖ Additional Park Equipment (if so what) ✓ ❖ Swingset Features ✓
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-mosquito spraying

IMMEDIATE VS. FUTURE NEEDS (2-3 hour occupancy time)

IMMEDIATE NEEDS	FUTURE NEEDS
<ul style="list-style-type: none"> - Sanitary facility bucket/water fountain - fill low spots on turf - additional picnic tables - Path gravel (Dick Becker) - replacement of lights/timers on light - Floodlight by pavilion - flag pole (solar) - Time capsule - upgrade new electric picnic table (2 more) 	<ul style="list-style-type: none"> Path Grills Swingset Basketball court *Gravel path shuffle board horse pits Swingset Tennis court Eliminate wood AD tire Permanent Bathrooms

Additional amenities more benches.

→ Grills - charcoal receptacle

→ nicer garbage cans

→ ~~Barbecue in wet area~~

Appendix III: Community Survey

TAKE OUR SURVEY!

IF YOU MISSED OUR BARK LAKE PARK MASTER PLANNING MEETING HERE'S YOUR OPPORTUNITY TO PROVIDE INPUT!

The master plan will guide any improvements, changes, or facility upgrades during the next capital improvement planning process. Community input is an important component of the planning process.

If you missed the public workshop, you have an opportunity to provide input on ideas that were generated. Below is a partial list of Master Plan objectives and ideas that were suggested and discussed by workshop participants.

Please review the list and check (some or all) the objectives concepts and suggestions that you support.

PARK PLANNING OBJECTIVES

Immediate Need	Future Need	Potential Projects/Amenities
<input type="checkbox"/>	<input type="checkbox"/>	Sanitary facility (include bubbler/water fountain)
<input type="checkbox"/>	<input type="checkbox"/>	Fill low spots throughout park
<input type="checkbox"/>	<input type="checkbox"/>	Additional picnic tables
<input type="checkbox"/>	<input type="checkbox"/>	Create an ADA compliant gravel path
<input type="checkbox"/>	<input type="checkbox"/>	Replace lights and include timers on those lights (this may include an update to electricity)
<input type="checkbox"/>	<input type="checkbox"/>	Replace flood light by pavilion
<input type="checkbox"/>	<input type="checkbox"/>	Put a solar light by the current flag pole
<input type="checkbox"/>	<input type="checkbox"/>	Install a sign for time capsule located by flag pole
<input type="checkbox"/>	<input type="checkbox"/>	Install park grills (with charcoal receptacles)
<input type="checkbox"/>	<input type="checkbox"/>	Fixed sealing garbage cans to prevent animal/bug attraction
<input type="checkbox"/>	<input type="checkbox"/>	Swing set feature
<input type="checkbox"/>	<input type="checkbox"/>	Basketball court
<input type="checkbox"/>	<input type="checkbox"/>	Shuffle board
<input type="checkbox"/>	<input type="checkbox"/>	Horseshoe pit
<input type="checkbox"/>	<input type="checkbox"/>	Tennis court
<input type="checkbox"/>	<input type="checkbox"/>	Eliminate wood chips and get rubber ADA compliant padding for play area
<input type="checkbox"/>	<input type="checkbox"/>	Permanent bathroom facilities
<input type="checkbox"/>	<input type="checkbox"/>	More benches
<input type="checkbox"/>	<input type="checkbox"/>	Enlarge the park (take out brush to create more open space)

Other Comments/Suggestions:

**Please return all survey's to Administrative Services Coordinator, KateLynn Schmitt at katelynn@richfieldwi.gov or 4128 Hubertus Road, Hubertus, WI 53033 no later than July 8th, 2015.

Appendix IV: Online Submitted Comments from Residents

TAKE OUR SURVEY!

IF YOU MISSED OUR BARK LAKE PARK MASTER PLANNING MEETING HERE'S YOUR OPPORTUNITY TO PROVIDE INPUT!

The master plan will guide any improvements, changes, or facility upgrades during the next capital improvement planning process. Community input is an important component of the planning process.

If you missed the public workshop, you have an opportunity to provide input on ideas that were generated. Below is a partial list of Master Plan objectives and ideas that were suggested and discussed by workshop participants.

Please review the list and check (some or all) the objectives concepts and suggestions that you support.

PARK PLANNING OBJECTIVES

Immediate Need	Future Need	Potential Projects/Amenities
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sanitary facility (include bubbler/water fountain)
<input type="checkbox"/>	<input type="checkbox"/>	Fill low spots throughout park
<input type="checkbox"/>	<input type="checkbox"/>	Additional picnic tables
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Create an ADA compliant gravel path
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Replace lights and include timers on those lights (this may include an update to electricity)
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Replace flood light by pavilion
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Put a solar light by the current flag pole
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Install a sign for time capsule located by flag pole
<input type="checkbox"/>	<input type="checkbox"/>	Install park grills (with charcoal receptacles)
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Fixed sealing garbage cans to prevent animal/bug attraction
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Swing set feature
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Basketball court
<input type="checkbox"/>	<input type="checkbox"/>	Shuffle board
<input type="checkbox"/>	<input type="checkbox"/>	Horseshoe pit
<input type="checkbox"/>	<input type="checkbox"/>	Tennis court
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Eliminate wood chips and get rubber ADA compliant padding for play area
<input type="checkbox"/>	<input type="checkbox"/>	Permanent bathroom facilities
<input type="checkbox"/>	<input type="checkbox"/>	More benches
<input type="checkbox"/>	<input type="checkbox"/>	Enlarge the park (take out brush to create more open space)

monkey bars

Other Comments/Suggestions:

Some older children playsets would be nice - big swings, spider climber, etc.

*Would most like the flagpole updated, w/light, to include light + flag
A Hiking path in the woods would be cool.*

**Please return all survey's to Administrative Services Coordinator, KateLynn Schmitt at katelynn@richfieldwi.gov or 4128 Hubertus Road, Hubertus, WI 53033 no later than July 8th, 2015.

Appendix V: Playworld Cost Estimates

Swings

Freestanding Products



Early Childhood T-Swing AGE: 2-5 &

SWING-7T \$1,195

- Designed especially for younger children
- Two black, slash-proof infant seats with zinc coated chains included
- 7' (2,13m) tall with 3-1/2" (8,8cm) diameter posts



Single Post Swings with Toddler Beam AGE: 2-12 &

SWING-SP8-TOD \$1,809

- Two black belt swing seats and one infant seat with zinc coated chains included
- 8' (2,44m) tall with 5" (12,7cm) outer diameter end posts



Classic Standard Swings AGE: 2-12 &

SWING-S8-6 \$2,669

- 2-3/8" (6,03cm) outer diameter posts
- Slash-proof, black belt swing seats with zinc coated chains
- Priced as shown with the 8' (2,44m) high top rail and 6-seats



Accessible Swing Seat AGE: 2-12 &

- Available in 7' (2,13m), 8' (2,44m) and 10' (3,05m) top rail versions
- Can be used on many of the swing sets shown here

Description	Item Number	Ages	Space Required	Size	Fall Height	Play Events	Child Capacity*	Install Hours	Weight	Compliance				2015 Price
										ADA	ASTM F1487	CPSC Pub. 305	CAHS/CA 2014 CH1176	
Early Childhood T-Swing	SWING-7T	2-5	22' 6" x 20' 4" (6,86m x 6,2m)	10' 11" x 0' 6" x 7' 0" (3,33m x 0,16m x 2,13m)	7' 0" (2,13m)	1	2	2	241 lbs (110 kg)	*	*	*	*	\$1,195
Single Post Swings with Toddler Beam	SWING-SP8-TOD	2-12	31' 8" x 32' 3" (9,65m x 9,83m)	16' 7" x 0' 9" x 8' 6" (5,05m x 0,23m x 2,59m)	8' 0" (2,44m)	1	3	3.75	338 lbs (154 kg)	*	*	*	*	\$1,809
Single Post Swings 2-Seats	SWING-SP8	2-12	24' 0" x 32' 0" (7,32m x 9,75m)	12' 0" x 0' 9" x 8' 0" (3,66m x 0,2m x 2,44m)	8' 0" (2,44m)	1	2	2.5	282 lbs (128 kg)	*	*	*	*	\$1,173
Single Post Swings Add-a-Bay Unit	SWING-SP8-ADD	2-12	+32' 0" Length (+9,75m)	12' 0" x 8' 0" x 8' 0" (3,66m x 2,44m x 2,44m)	8' 0" (2,44m)	1	2	1.5	192 lbs (88 kg)	*	*	*	*	\$895
Classic Standard Swings 2-Seats 8' (2,44m) Height	SWING-S8-2	2-12	27' 9" x 32' 0" (8,46m x 9,75m)	16' 8" x 11' 8" x 8' 0" (5,08m x 3,56m x 2,44m)	8' 0" (2,44m)	1	2	3	228 lbs (104 kg)	*	*	*	*	\$1,039
Classic Standard Swings 4-Seats 8' (2,44m) Height	SWING-S8-4	2-12	38' 4" x 32' 0" (11,68m x 9,75m)	27' 3" x 11' 8" x 8' 0" (8,31m x 3,56m x 2,44m)	8' 0" (2,44m)	1	4	5	377 lbs (171 kg)	*	*	*	*	\$1,854
Classic Standard Swings 6-Seats 8' (2,44m) Height	SWING-S8-6	2-12	48' 11" x 32' 0" (14,91m x 9,75m)	37' 10" x 11' 8" x 8' 0" (11,58m x 3,56m x 2,44m)	8' 0" (2,44m)	1	6	7	523 lbs (238 kg)	*	*	*	*	\$2,669
Classic Standard Swings 8-Seats 8' (2,44m) Height	SWING-S8-8	2-12	59' 6" x 32' 0" (18,14m x 9,75m)	48' 5" x 11' 8" x 8' 0" (14,76m x 3,56m x 2,44m)	8' 0" (2,44m)	1	8	9	674 lbs (306 kg)	*	*	*	*	\$3,484
Classic Standard Swings 2-Seats 10' (3,05m) Height	SWING-S10-2	5-12	29' 0" x 40' 0" (8,84m x 12,19m)	17' 0" x 12' 6" x 10' 0" (5,18m x 3,81m x 3,05m)	10' 0" (3,05m)	1	2	3	251 lbs (114 kg)	*	*	*	*	\$1,136
Classic Standard Swings 4-Seats 10' (3,05m) Height	SWING-S10-4	5-12	39' 6" x 40' 0" (12,04m x 12,19m)	27' 6" x 12' 6" x 10' 0" (8,38m x 3,81m x 3,05m)	10' 0" (3,05m)	1	4	5	412 lbs (187 kg)	*	*	*	*	\$2,008
Classic Standard Swings 6-Seats 10' (3,05m) Height	SWING-S10-6	5-12	50' 0" x 40' 0" (15,24m x 12,19m)	38' 0" x 12' 6" x 10' 0" (11,58m x 3,81m x 3,05m)	10' 0" (3,05m)	1	6	7	573 lbs (260 kg)	*	*	*	*	\$2,880
Classic Standard Swings 8-Seats 10' (3,05m) Height	SWING-S10-8	5-12	60' 6" x 40' 0" (18,44m x 12,19m)	48' 8" x 12' 6" x 10' 0" (14,83m x 3,81m x 3,05m)	10' 0" (3,05m)	1	8	9	735 lbs (334 kg)	*	*	*	*	\$3,752

* Child capacity numbers provided for your reference using our professional judgment as no current industry standard exists.

All play equipment must be installed over an impact-absorbing surface.

Appendix V: Playworld Cost Estimates

Sports Play Freestanding Products



Tetherball AGE: 5-12

- ZZXX1079.....\$155
- Classic game of a ball on a rope that swings around a center post
 - Ball features a recessed rope attachment for extra protection
 - Replacement ball with rope also available



Parallel Bars AGE: 5-12 ♿

- ZZUN5750.....\$1,371
- Builds upper-body strength and stamina



Balance Beams Curved AGE: 2-12 ♿

- ZZXX1020.....\$446
- Made of steel with galvanized steel support legs
 - Available in curved (shown) and straight



Toss-Up AGE: 5-12 ♿

- ZZXX1050.....\$594
- Unique funnel shape with four openings makes it even more fun to guess where the ball will come out
 - Large capacity to receive more than one ball at a time for more fun



The Triple Shoot-Out AGE: 2-12 ♿

- ZZXX1051.....\$2,118
- Adjustable baskets create opportunity for challenge and growth
 - Three baskets opens up the imagination to create new games

Description	Item Number	Ages	Space Required	Size	Fall Height	Play Events	Child Capacity*	Install Hours	Weight	2015 Price				
										ADA	ASTM F1487	CPSC Pub. 325	CA/1163, 2014	
Tetherball	ZZXX1079	5-12	12' 0" x 12' 0" (3,66m x 3,66m)	0' 10" x 0' 10" x 0' 10" (0,25m x 0,25m x 0,25m)	-	1	2	1.5	32 lbs (15 kg)					\$155
Tetherball Replacement Ball with Rope	ZZXX1080	5-12	-	0' 10" x 0' 10" x 0' 10" (0,25m x 0,25m x 0,25m)	-	1	2	0.25	1 lbs (1 kg)					\$25
Parallel Bars	ZZUN5750	5-12	23' 6" x 18' 10" (7,16m x 4,22m)	11' 6" x 1' 10" x 2' 8" (3,51m x 0,56m x 0,81m)	2' 8" (0,81m)	1	3	2	103 lbs (47 kg)	*	*	*	*	\$1,371
Balance Beams Curved	ZZXX1020	2-12	23' 0" x 16' 0" (7,01m x 4,88m)	11' 0" x 4' 0" x 1' 4" (3,35m x 1,22m x 0,41m)	1' 4" (0,41m)	1	2	1	62 lbs (29 kg)	*	*	*	*	\$446
Balance Beams Dura (Straight)	ZZUN6500	2-12	22' 0" x 12' 6" (6,71m x 3,81m)	10' 0" x 0' 6" x 1' 4" (3,05m x 0,15m x 0,41m)	1' 0" (0,3m)	1	2	1	59 lbs (27 kg)	*	*	*	*	\$338
Toss-Up	ZZXX1050	5-12	12' 0" x 12' 0" (3,66m x 3,66m)	3' 4" x 3' 4" x 9' 3" (1,01m x 1,01m x 2,82m)	-	1	8	1	110 lbs (50 kg)	*	*	*	*	\$594
The Triple Shoot-Out	ZZXX1051	2-12	12' 0" x 12' 0" (3,66m x 3,66m)	4' 10" x 5' 3" x 10' 1" (1,47m x 1,6m x 3,07m)	-	1	8	2	309 lbs (141 kg)	*	*	*	*	\$2,118

Appendix VI: Wood Fiber Playground Surface



United States
Department of
Agriculture

Forest Service

Forest
Products
Laboratory

General
Technical
Report

FPL-GTR-154



Stabilized Engineered Wood Fiber for Accessible Playground Surfaces

Installation and Serviceability Results: Governor Nelson State Park, Wisconsin

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Appendix VI: Wood Fiber Playground Surface

Abstract

Playground surfaces of sand, pea gravel, and engineered wood fiber (EWF) provide some level of impact protection for children. However, because these surfaces are soft and uneven, they can be difficult for those who use mobility aids such as wheelchairs and walkers. This study is the third phase of a research and development project in pursuit of a stable, smooth, and impact-attenuating surface based on wood materials to improve wheelchair and walker accessibility for playgrounds. Two EWF stabilizing binders, a non-foaming polyurethane (Vitri-Turf) and an acrylic and polyvinyl acetate polymer emulsion (Soil-Sement), were installed on a working playground at Governor Nelson State Park in Waunakee, Wisconsin. A soft impact-absorbing playground surfacing system was created through the use of a bonded top layer and a thick underlying layer of unbonded EWF. Cost estimates and a step-by-step guide are provided for installing SEWF on a playground.

Keywords: wood, fiber, surfacing, impact, accessibility, ADA, composite, polyurethane, playground, durability, installation, cushioning

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Zeager Bros. Inc. and Beneficial Designs, Inc. (Minden, Nevada), provided the apparatus for the impact test and the rotational penetrometer, as well as training in their use. Thanks to Zeager Bros. Inc. for the donation of EWF and Midwest Industrial Supply (Canton, Ohio) for the donation of Soil-Sement.

Our thanks to the Wisconsin Department of Natural Resources for offering the park playground as a development site for this study. We particularly note the guidance and support of Anthonette Gilpatrick, ADA Coordinator, Renee Lee, Park Manager, and the staff of Governor Nelson State Park for installing and monitoring the playground site. Volunteer groups who helped to install the playground surfacing included the Rotary Club of Waunakee, Madison Chapter of Telephone Pioneers of America, and Edgewood High School students. We could not have performed the study without the support of Steve Schmieding of the Forest Products Laboratory (FPL) and his wife Jane as well as other FPL staff, namely Carl Syftestad, Lloyd Currier, Ben Henderson, Tim Voelker, Vicki Herian, Nancy Keen, Tom Kuster, and Mary Collet.

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Installation and Serviceability Results: Governor Nelson State Park, Wisconsin

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Background

Some engineered wood fiber (EWF) and chipped wood surfaces on playgrounds are difficult for those who use mobility aids, such as wheelchairs and walkers, because the surfaces are soft and uneven. This study is the third phase of a research project in pursuit of a stable, smooth, and impact-attenuating surface, based on wood materials, for playgrounds. In Phase I, processing techniques and material properties were evaluated in small bench-top and full-depth laboratory tests (Laufenberg and others 2003). Phase II involved 6 months of outdoor field testing (Laufenberg and Winandy 2003). In Phase III, reported here, we continued to develop the concept for stabilizing EWF to improve wheelchair and walker accessibility.

Phases I and II demonstrated that our new binder–EWF system can (a) enhance mobility, as related to the provisions of the Americans With Disabilities Act (ADA 1990), (b) meet test requirements for playground surface cushioning to reduce head impact injuries, and (c) perform in an outdoor environment. In Phase III, the two most promising EWF stabilizing binders were installed on a working playground. The concept was to mix a binder throughout the upper surface of EWF to create a stiff (firm) and scuff-resistant (stable) composite. The combination of a top layer of bonded EWF and a thick underlying layer of unbonded EWF creates a soft, impact absorbing playground surfacing system. In this report, the term SEWF refers to “stabilized” EWF and indicates the system with the bonded top layer of EWF.

Phase I

In previous work (Laufenberg and others 2003), numerous processing techniques and binders were evaluated for the development of wood–binder composite playground surfaces. Our goal was to improve accessibility for users of wheelchairs and walkers. Although traditional EWF performs well for nearly all expectations of a play surface, a pertinent shortcoming is the amount of energy required by a wheelchair user to maneuver over the surface, primarily

because it is soft and uneven. Thus, the EWF–binder composite system needed to achieve two seemingly conflicting performance requirements: to promote accessibility and to retain adequate impact-energy absorption to preclude injuries. The composite systems developed consisted of the combination of a binder and EWF in a thin top surface layer over a layer of unmodified EWF.

The effort identified designs using compatible resin (e.g., latex, silicone, and polyurethane) binders and various species and textures of EWF. Adhesive binders were chosen for their inert and non-toxic nature in the playground environment and the retention of a natural look for the surface. Consideration was given to the need to add materials and to the possibility of patching the surfaces after damage from major impact. Use of a play surface for 3 to 5 years was considered adequate time for the binder to fulfill its function. The surface could then be renewed by adding EWF. Composite systems with EWF have not been used before in this application. Therefore, there is no guarantee or warranty that they will function for that extended period.

The preliminary evaluation included laboratory testing of energy absorption and surface stability (firmness) on trial surfaces in 0.5- by 0.5-m (18- by 18-in.) plywood boxes; the surfaces had a uniform depth of 0.3 m (12 in.). Seven systems were identified as having reasonable performance and were recommended for Phase II outdoor field evaluations.

Phase II

Phase II research focused on outdoor evaluation of binder and fiber combinations identified as minimally acceptable and promising in the Phase I evaluations. Seven surface treatments and a control surface were installed in a series of outdoor test beds in Madison, Wisconsin, to gather field experience on long-term performance and durability. The binders evaluated were (a) a synthetic latex emulsion, (b) a low molecular weight silicone, and (c) foaming and non-foaming resilient polyurethane. Systems were evaluated over a 6-month period, from April to October 2002.

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Tests were performed at regular intervals to provide a quantitative measure of accessibility and impact attenuation. An impact test was performed after the 6-month exposure period. The results indicated that all the surfaces passed the existing specifications for impact attenuation of playground surfaces (Laufenberg and Winandy 2003). The results further indicated that 6 months of aging had changed the impact performance of all systems except the unsurfaced (no additive) EWF. The latex binder and both polyurethane binders consistently met the accessibility requirements for playgrounds. However, the foaming formulation produced a hard brittle shell that became even harder with exposure/age and would increase the injury rate for falls on the surface. The silicone system did not maintain adequate integrity during rain/dry cycles in this outdoor test. Moisture measurements indicated that the bonded surface retarded the drying of the underlying EWF. That finding might have long-term implications for the rate of decay for the systems, and alternative treatments might be used to retard decay.

Phase III

In Phase III, a few of the most promising SEWF systems were tested in a working playground. The desired binder-EWF system needed to provide impact safety and appropriate accessibility over a number of seasons. It needed to retain the performance characteristics of impact-energy absorption and surface resiliency. To accomplish this, the first order of business was to objectively assess the field-use requirements of any successful SEWF.

Acceptable SEWF Systems

Because of their reactivity, the stabilizing binders needed to be applied on site or mixed with EWF no longer than 1 h prior to placement on the ground surface. Accordingly, the technical issues considered were (a) cure/set time prior to surface use, (b) range of EWF moisture and temperature conditions acceptable for use, (c) emission of fumes or odors, workable exotherms, and toxic or other chemical release concerns related to the binder/EWF mixture, and (d) any post-installation deleterious effects of SEWF on users.

Any viable field system must meet two primary user needs: impact safety and accessibility. The Americans With Disabilities Act (ADA 1990) states that accessible surfaces shall be stable, firm, and slip-resistant. Each viable SEWF system must also be non-toxic to users. In addition, the SEWF system should be porous, to allow water to drain from both the upper bonded surface and the lower unbonded interior of the mats. This is critical in reducing the biodeterioration potential of the wood fiber and in maintaining the cushioning behavior of EWF during subfreezing temperatures.

Impact safety is quantifiable through the use of the consensus standard ASTM F1292 (ASTM 1999a). Preliminary

portable impact tests provided an indication of the cushioning performance of the stabilizing binder. The ADA criteria for accessible surfaces have not been defined adequately within the ADA accessibility guidelines for quantitative measurement on any specific surface. Currently, the only objective method suitable for assessing the firmness and stability of a playground surfacing system is the rotational penetrometer, a portable measurement device that simulates a wheelchair caster negotiating the test surface. For our study, two cooperators (Zeager Bros. Inc., Middletown, Pennsylvania; Beneficial Designs, Inc., Minden, Nevada) provided the apparatus for the portable impact test and the rotational penetrometer, as well as training in their use.

Playground Study Site

An Access Board solicitation for potential study sites yielded numerous responses. Fortuitously, an accessibility coordinator for the Wisconsin State Parks offered a site close to the Forest Products Laboratory—a sand-surfaced playground at Governor Nelson State Park in Waunakee, Wisconsin.

Design

The playground was originally designed with some structural provisions for accessibility. A transfer point/platform was incorporated in the climbing structure; however, the surface leading to it was fine beach sand. Total fall height was determined to be 3.1 m (10 ft). Discussions with the park staff provided insight to the usage of this area. In response, the staff decided to retain sand on a portion of an adjacent (but not adjoining) playground. The remaining area of approximately 190 m² (2,020 ft²) was converted to a full-depth EWF surface (Fig. 1).

Preparation of Playground Subsurface

Our efforts began by removing the existing sand surface to a depth of 0.38 m (15 in.) (Fig. 2). All roots, stones, and vegetation were removed. Much of the tonnage of sand was moved by two skid-steer loaders, but significant amount required handwork by a dedicated and hardworking volunteer crew from the Waunakee Rotary and a local chapter of Telephone Pioneers of America. The work crew also included employees of the park, the Wisconsin Department of Natural Resources, and the Forest Service. The majority of the clean sand was used to replenish the adjacent beach at the park and the remainder was piled in a wooded site nearby. Approximately 12 h of equipment time and 48 h of personnel time were required to remove the sand.

Installation of Drainage Base

Following industry standard EWF installation practices, we ensured that the excavated surface had a minimum of 1% slope for drainage. A lightweight landscaping geotextile

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Figure 2—Removal of sand from existing playground surface.



Figure 4—Completion of drainage system; second layer of fabric laid over drainage rock.



Figure 3—Placement of drainage fabric and rock on playground subsurface.



Figure 5—Application of engineered wood fiber (EWF).

If the EWF has 20% moisture content, that weight should be subtracted from the EWF weight prior to calculating the weight addition of the binder. The same procedure should be followed for the binder that does not contain 100% solids. The weight percentage should be calculated only on the solids content of the binder. Because the EWF was installed in the fall, we monitored the air temperature; both stabilizing binders required 4°C (40°F) for proper curing. On the date of installation, the overnight temperature had dipped to -2°C (28°F). The crew waited for the temperature to rise before mixing the EWF with the binders, which had been stored at room temperature. When the EWF was mixed with the binders, the temperature of the resultant mixture was well above 10°C (50°F).

A portion of EWF was removed from the play area for stabilization. For the polyurethane binder, 38 mm (1-1/2 in.) of EWF was removed and for the emulsion polymer, 64 mm (2-1/2 in.) of EWF. The EWF was placed in a 160-L (40-gal) portable mortar mixer (Fig. 6). The amount of binder added was determined as a proportion (30%) of EWF dry weight (volumetrically equivalent to 0.041 m³, 1.45 ft³) to 5.3 L (1.25 gal) of Vitri-Turf or 10.6 L (2.5 gal) of Soil-Sement. Weight proportion was 77:23. The EWF and binder were mixed for approximately 3 min. The mixture was transported by polyethylene tray wheelbarrows to the target pad and spread with hand tools to an even thickness (Fig. 7).

The area was then compacted and flattened with a 1.2-m by 1.2-m by 16-mm (4-ft by 4-ft by 5/8-in.) piece of plywood

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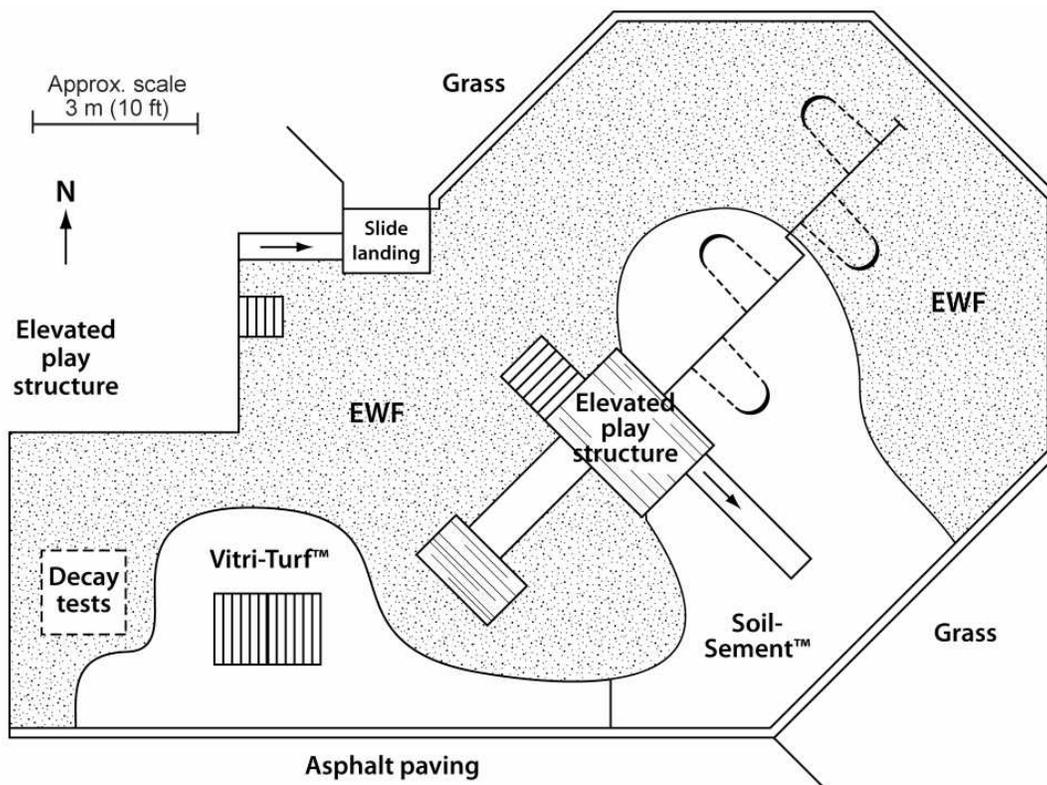


Figure 1—Schematic plan of playground site at Governor Nelson State Park.

fabric was placed on the surface, followed by a 0.08-m (3-in.) layer of 18-mm (3/4-in.) washed, angular drainage rock (Fig. 3). Half the rock was placed using a skid-steer loader and the other half was placed manually using wheelbarrows. All the rock was shoveled and raked by hand to a uniform depth. Another layer of geotextile fabric was laid on top of the rock layer (Fig. 4). Handfuls of rock were thrown on the fabric to keep the wind from blowing it out of place. The layers of geotextile fabric kept soil and fiber from clogging the rock and thus preserved the drainage quality of the rock layer. Approximately 25 metric tons (28 tons) of rock was used. Placing the rock and geotextile required 25 h of manual labor and 3 h of skid-loader use.

EWF Application

Fifty cubic meters (66 yd³) of EWF, donated by a cooperator (Zeager Bros. Inc.), was obtained from BNB Bedding of Oskaloosa, Iowa, and delivered in a 75-m³ (100-yd³) live-bottom trailer (Fig. 5). The EWF was manually applied to a thickness of 0.3 m (12 in.). One week later, after the surface had been further compacted by usage, approximately 40 m³

(53 yd³) of EWF was added and compacted to return the surface to the full depth of 0.3 m (12 in.).

Bonded Surface Installation

Two weeks after applying the EWF, we returned to stabilize the upper surface. Considering that children had used the playground in the meantime, we had hoped the EWF was adequately compacted to support the stabilized layer. Our plan was to treat approximately 30% of the playground with the two binding systems and to leave the remainder as the untreated control (Fig. 1). The two binder systems used to fabricate these systems were

1. an acrylic and polyvinyl acetate polymer emulsion, Soil-Sement (Midwest Industrial, Canton, Ohio), mixed 30% by dry weight of solids to unit weight of dry EWF and applied 63 mm (2.5 in.) thick, and
2. a non-foaming polyurethane (Vitricon), Vitri-Turf (Polymer Plastics Corp., Commack, New York), mixed 30% by weight to unit weight of dry EWF and applied 37 mm (1.5 in.) thick.

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Figure 8—Completed playground looking north: left, Vitri-Turf SEWF; right, Soil-Sement SEWF; top, EWF. Line of demarcation is below wheelchair footrest.



Figure 9—Measurement of accessibility with rotational penetrometer.

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Figure 6—Mixing of binder and EWF in mortar mixer.



Figure 7—Leveling and compaction of binder-EWF mixture.

covered with a polyethylene release sheet. To compact the cushioning pad to the full 0.3-m (12-in.) depth required for unbonded EWF, a 90-kg (198-lb) person slowly stepped on the plywood in each quadrant, applying firm pressure.

The two SEWF surfaces were allowed to cure or bond for 6 days prior to usage. The entire surface was covered with polyethylene sheeting for 3 days to protect it from rain. Within 2 h of placing the Vitri-Turf, the surface was somewhat rigid to slight hand pressure. The Soil-Sement surface did not begin to cure or cross-link until more than 48 h had passed; when the polyethylene sheeting was removed, the surface was still slightly tacky. The area was left open to the air for another 3 days prior to opening the play surface for use. Figure 8 shows the completed surface, with little notable differences between the three surface materials.

Test Procedures

Field Observation Reports

The playground site was not under direct supervision or observation by park staff or other responsible personnel. However, on-duty staff noted any public concerns and changes at the site. Forest Products Laboratory staff visited the site at least weekly for the first 2 months and at least monthly thereafter (if the ground was thawed) to perform the rotational penetrometer test and to observe and annotate any maintenance needs, use patterns, or other issues.

Accessibility Measures

All surfaces were measured with the rotational penetrometer periodically over the first 6 months of exposure (Fig. 9). This device subjects the surface to a low-speed rotational bearing test that simulates the weight and action of a front caster wheel on a wheelchair. The procedures are based on a draft national standard test method for the firmness and stability of ground and floor surfaces (RESNA 2000), which uses an average of five readings. This test provides objective measures of surface firmness and stability and has been correlated to the work measurement of ASTM F1951, “Accessibility of Surface Systems,” for a wide array of surfacing and floor coverings (ASTM 1999b). The RESNA test was performed 1 week after surface installation and as often as once a week in the first 2 months, using the rotational penetrometer and protocol for assessing bearing/rotational surface indentation (Axelson and Chesney 1999). The device was used on test areas selected as representative of the entire surface.

Impact Attenuation Tests

Impact tests were performed by a cooperator (Zeager Bros. Inc.) 7 weeks after EWF installation. ASTM F1292–99 test methods were used at a constant test drop height of 3.05 m (10 ft) (Fig. 10). Maximum *g* levels and head injury criteria (HIC) were measured.

Moisture and Durability

To learn more about biodeterioration of the EWF playground system, we sampled and oven-dried packets of EWF material and buried them in the unsurfaced portion of the playground. Polyolefin geotextile fiber pouches were each filled with approximately 40 oven-dry grams of fiber (Fig. 11). These biodeterioration samples were placed so as to allow circulation of water and air. The EWF surface was excavated throughout its entire 0.3-m (12-in.) depth to determine the moisture profile of the surfacing system. The samples were buried at depths of 100, 150, 200, 250, and 300 mm (4, 6, 8, 10 and 12 in.) (Fig. 11). One-quarter of the samples was removed at 6 months to provide data on wood fiber moisture content and weight loss. After drying and weighing, the removed packets were reinserted and the area was restored.

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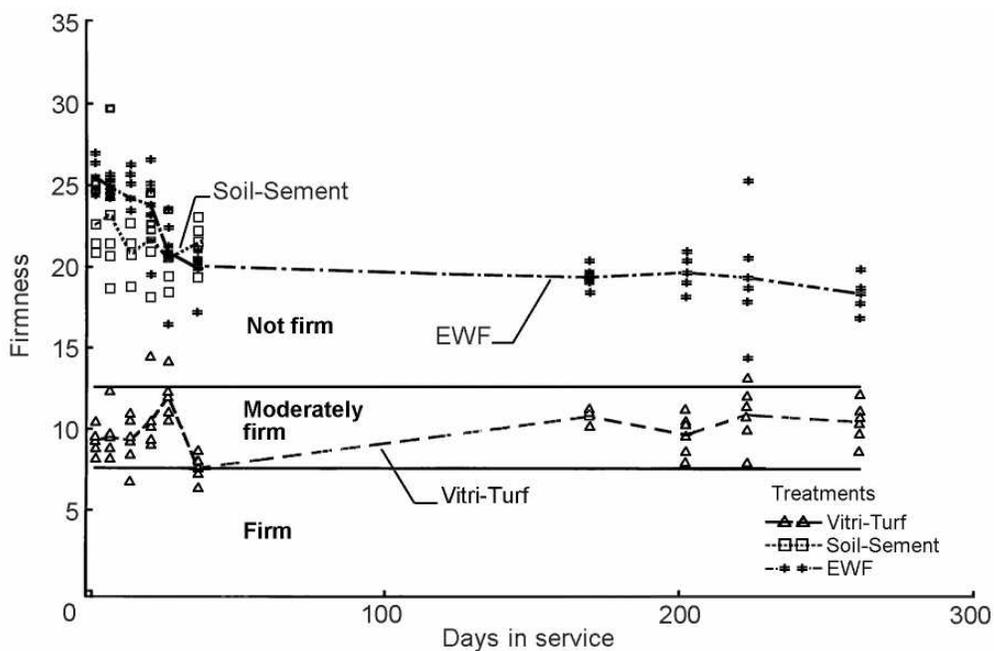


Figure 12—Firmness of playground surface, as measured by rotational penetrometer, over 9-month installation.

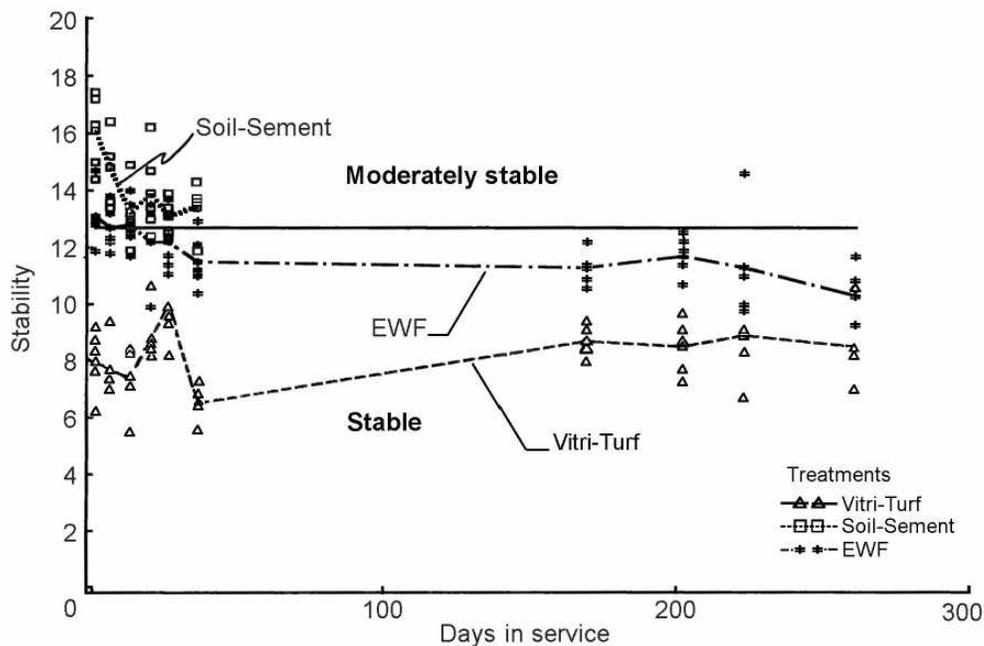


Figure 13—Stability of playground surface, as measured by rotational penetrometer, over 9-month installation.

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Figure 10—Impact test setup for drop height of 3.05 m (10 ft).



Figure 11—Biodeterioration samples on EWF surface.

Observations and Results

Field Observation

The park manager conducted a series of surveys of play surface users within 1 month of installation. Approximately 60 children in grades 4 and 5 (ages 9 to 11) were divided into three groups and then invited to play on each test surface. Feedback was solicited on features while the children performed unchoreographed activities, such as bouncing, running, falling, rolling, and jumping. After playing for several minutes on each surface, the children were asked to stand on the surface they preferred. In all three groups of children, more than 90% chose the urethane Vitri-Turf SEWF surface. The remainder had equal preference for the untreated EWF (5%) and the polymer emulsion Soil-Sement (5%) SEWF. The major comment was that the users liked the stiff bounce obtained from the Vitri-Turf and disliked the attenuation of the EWF and the Soil-Sement SEWF.

Accessibility Measures

During the 10-month period of the test, firmness and stability of the SEWF surfaces were measured with the rotational penetrometer (Figs. 12 and 13, respectively). The Soil-Sement SEWF showed poor binding early in the exposure period, compared to the unsurfaced EWF. Only the Vitri-Turf SEWF showed acceptable performance for accessibility during the entire trial installation.

Impact Attenuation

Impact testing (ASTM F1292) was conducted on the Vitri-Turf SEWF and the unsurfaced EWF 7 weeks after installation. At this time, the Soil-Sement SEWF had not yet cured or cross-linked because of the rainy weather (see following section on durability). Average *g* readings for the second and third drop tests were 92 for Vitri-Turf and 83 for EWF. Average HIC readings were 507 for Vitri-Turf and 413 for EWF. These values are excellent for a play surface, which must have *g* readings of less than 200 and HIC readings of less than 1,000.

Durability

Measures of surface durability are usually quite subjective unless the loss of durability represents a dramatic failure. This was the case for the installation of the Soil-Sement SEWF. Curing, as evidenced by stiffening of the SEWF mixture, was slow and incomplete. Based on our experience with a previous exterior installation (Laufenberg and Winandy 2003), we assume that individual particles of this material had bonded poorly. Within 3 weeks of installation, the Soil-Sement SEWF showed detachment of top surface particles from the overall layer. The lack of stability and firmness of the Soil-Sement surface was reflected in the rotational penetrometer readings as well. When the impact

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Personnel time

Drainage system installation, 25 h @ \$15/h	\$375
Unbonded EWF installation, 60 h @ \$10/h	600
Bonded surface installation, 24 h @ \$15/h	360

Installation of the two surface treatments was completed during one work day. Approximate effort for installation of 300 ft² of each material (600 ft² total) was 24 h (four people for 6 h).

Summary of costs for 0.3-m- (12-in.-) depth surface treatment

Component	Cost (\$/ft ²)			
	Labor	Materials	Play surface	
			Paid labor	Volunteer labor
Drainage system	0.20	0.40	—	—
EWF (0.3 m, 12 in.)	0.30	1.17	2.07	1.57
Vitri-turf (38 mm, 1.5 in.)	0.60	2.10	4.77	3.67
Soil-sement (63.5 mm, 2.5 in.)	0.60	1.87	4.54	3.44

Preliminary Guidelines for Vitri-Turf SEWF Installation

Follow manufacturer's instructions for storage and handling of the binder. Binder materials must be stored indoors in cool dry storage out of sunlight. Observe recommended limits on binder shelf life as reactivity will diminish after that time. Read material safety data sheets carefully prior to opening containers. Wear protective clothing and eye gear at all times. The EWF should be less than 30% moisture content for correct absorption and curing of SEWF.

Mixing of Binder With EWF

1. Mix Vitri-Turf binder with EWF at ratio of 77/23 by weight. This is approximately 1.25 gal of Vitri-Turf binder to 1.8 bushels of EWF (depending on density of EWF particles).
2. Use a mechanical drum mixer to mix binder and EWF. To mix a small batch for repairs, use a trough and hoe. Be sure that EWF particles are thoroughly coated. Adequate mixing takes about 2 min in a typical mortar or cement mixer. Check the mixer at the end of each mix to ensure that binder and fine wood particles are not accumulating on the paddles or drum.

Application of SEWF

1. Transport SEWF mixture to site in a wheelbarrow. Dump mixture onto site and apply binder-EWF mixture to a thickness (uncompacted) of about 75 mm (3 in.) using a screed bar or rake.
2. Compact and smooth the surface using a large trowel or a 1.2-m by 1.2-m by 16-mm (4-ft by 4-ft by 5/8-in.) piece of plywood covered with a heavy-mil sheet of polyethylene as a release. If the material sticks, lubricate the trowel or plywood with kerosene, diesel fuel, or soapy water. Do not saturate the surface with these lubricants. After compaction, thickness will be approximately 40 mm (1.6 in.).
3. Apply a moderate downward pressure onto the surface so that the mixture compacts tightly. If plywood is used to compact the surface, a 90-kg (200-lb) person stepping on the four quadrants of the panel should provide adequate compaction.
4. Allow the surface to cure for a minimum of 24 h.

Cleanup

Clean all tools and surface spots immediately with diesel fuel prior to drying. Once the binder has dried it will be extremely difficult to remove from tools, surfaces, or hands.

General Precautions

- Wear protective clothing and eye gear.
- Provide a minimum of 1% slope for all substrates for drainage.
- Ambient air temperature should be 4°C (40°F) or greater and rising when SEWF is applied. Air temperature remain at 4°C (40°F) or greater for at least 7 days after application.
- Protect surfaces from rain for minimum of 48 h after SEWF application.
- Read all material safety data sheets very carefully. If you do not understand the instructions, contact the manufacturer before applying SEWF.
- If binder accidentally comes in contact with eyes, immediately rinse with water and contact a physician.

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tests were run (7 weeks after installation), the Soil-Sement surface had deteriorated and its performance was similar to that of unsurfaced EWF. Although we had intended to replace the Soil-Sement SEWF, the cold weather of fall and winter interceded, followed by a record-breaking wet spring and summer, which further precluded re-installation. In retrospect, the use of Soil-Sement may indeed be acceptable, but the conditions for such an installation would need to be fairly dry with relatively warm periods. Some dry and warm climates may lend themselves to the use of this binder. The wet and cool climate in southwestern Wisconsin during the fall 2003 to spring 2004 season was not conducive to the installation or curing of Soil-Sement.

The durability of Vitri-Turf SEWF with exposure to weather was good and reflected similar experience with a prior exterior installation (Laufenberg and Winandy 2003). The integrity of the Vitri-Turf SEWF surface was maintained for the first 9 months. We then found that the edge of the Vitri-Turf SEWF had been lifted and the material torn off in large (0.2- to 0.8-m², 2- to 8-ft²) plates and tossed about on the play surface (Fig. 14). This damage occurred at the unprotected and unsecured interface with the unstabilized EWF. It did not occur at the edge of the playground where the Vitri-Turf had bonded to the wood landscape ties that surround the area. Differential settlement of the Vitri-Turf SEWF and the EWF (due to extensive rainfall) was approximately 38 mm (1.5 in.). As a result of the damage, the Vitri-Turf SEWF was removed 9 months after installation. The material showed little evidence of fungal propagation or insect infestation. The thickness of the removed material, measured at 24 locations, was an average of 30.4 mm (1.2 in.).

To test the durability of the EWF playground system, the biodeterioration samples were removed from various depths of the unsurfaced portion of the playground 6 months after installation. The samples were cleaned, oven-dried, and reweighed; weight loss ranged from 1.4% to 1.9%. These values are consistent and reasonable for EWF. In spite of 4 months of freezing conditions above the surface, fungal hyphae were present at all levels (Fig. 15). If the EWF surface is maintained, further results will be gathered from this site at 6-month intervals.

Costs and Personnel Time for EWF Installation

The following summary of costs and time estimates is not meant to be definitive. Markup for contractors or other overhead and profits is not included. No costs were incurred for edging since treated wood edging was already installed. The estimates do not include the significant amount of personnel time required to remove the sand from the playground.



Figure 14—Exposed and torn edge of Vitri-Turf SEWF.

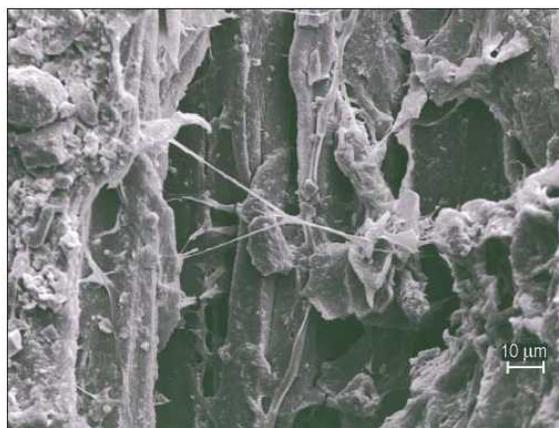


Figure 15—Hyphal growth on surface of wood chip from biodeterioration sample. Fungal growth was present at all depths of EWF surface after 6 months.

Quantity of material

EWF	120 yd ³ uncompacted
Vitri-Turf	35 gal
Soil-Sement	80 gal (45% solids)

Market value of material

EWF	\$21/yd uncompacted (incl. shipping)	\$2,520
Vitri-Turf	\$18/gal (100% solids, 11 lb/gal)	630
Soil-Sement	\$7/gal (45% binder/55% water)	560
Drainage system (rock, geotextile, and drainage)		800
		<u>\$4,510</u>
Equipment and tool rental (market value)		\$1,500

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