

# Chain of Lakes Comprehensive Plan

*With the Future of Water Quality in Mind*

Minneapolis Park and Recreation Board

December 1997



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W i t h   t h e   F u t u r e   o f   W a t e r   Q u a l i t y   i n   M i n d

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The Planning Team

The planning process was conducted through the interaction of the following four groups:  
the Design Advisory Committee, the Technical Advisory Committee, the Staff Advisory Committee and the Citizen’s Advisory Committees

Design Advisory Committee

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Al Wittman, Assistant Superintendent for Planning  
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Consultant Team

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Technical Advisory Committee

Army Corps of Engineers  
City of Minneapolis Engineering Department  
City of Minneapolis Planning Department  
Metropolitan Council  
Minnehaha Creek Watershed District  
Minnesota Department of Natural Resources  
Minnesota Pollution Control Agency

Staff Advisory Committee

Minneapolis Park and Recreation Board  
Recreation  
Environmental Operations  
Forestry  
Maintenance  
Park Police  
Special Services

Citizen’s Advisory Committees

Framework Committee  
(21 members, citywide representation, appointed by MPRB, City Council and neighborhood groups)  
  
Lake Advisory Committees  
Lake Harriet Advisory Committee including representatives from the following neighborhoods:  
Fulton, Linden Hills, East Harriet and Lynnhurst.  
  
and the following subcommittees:  
Pathways, Traffic, Boat Launch and Environmental.  
  
Lake Calhoun Advisory Committee with representatives from the following neighborhoods:  
East Harriet, Linden Hills, West Calhoun and East Calhoun.  
  
Lake of the Isles Advisory Committee including representatives from the following neighborhoods:  
Cedar-Isles-Dean, East Isles, Lowry Hill, and Kenwood  
  
Cedar/Brownie Lake Advisory Committee including representatives from the following neighborhoods :  
Bryn Mawr, Kenwood, and Cedar-Isles-Dean  
  
and Cedar Lake Park Association

## Executive Summary

### Overview

The Chain of Lakes Comprehensive Plan summarizes a year-long public/private collaboration which proposes a strategic framework for future improvements to the historic Chain of Lakes Regional Park in Minneapolis. The core of the study addresses three concerns which are endemic in American parks today. First, both the volume and diversity of recreation within the park have increased tremendously in the last decade. Second, congested parkways and boulevards, overburdened during high-use periods, have compromised and at times threatened the safety of the non-motorized experience of the park. Finally, lakewater quality has declined as a result of stormwater runoff from an entirely urbanized watershed and increased use and development at the lake edges.

The objective of the Comprehensive Plan is to seek an appropriate balance that benefits both the natural environment and cultural demands while respecting the intentions of its designers, H.W.S. Cleveland and Theodore Wirth. The Comprehensive Plan is intended as an overall framework to guide future options and decisions relative to specific problems within the Chain of Lakes system.

The planning process was conducted by the Minneapolis Park and Recreation Board and involved four groups: a Design Advisory Committee comprised of the Minneapolis Park and Recreation Board and the Consultant Team led by Michael Van Valkenburgh Associates; the Technical Advisory Committee, which included representatives of regional, state, and local environmental agencies; the Staff Advisory Committee, comprised of major divisions of the Minneapolis Park and Recreation Board; and the Citizens’ Advisory Committees, comprised of appointed and elected citizens. This process represents the first major attempt to synthetically address problems related to traffic, over-use of recreation facilities, and declining water quality in the Chain of Lakes.

Although the recommendations and implementation strategies suggested by Michael Van Valkenburgh Associates differ at times from those of the Citizens’ Advisory Committees, all participants were in agreement regarding the following goals:

- the importance of water quality
- the reduction of environmental impact
- the importance of aesthetics as a basic function of the open space system
- the need for traffic calming
- the need for better distribution of uses within the park

## Background and Historical Context

The Chain of Lakes Regional Park is considered by many to be the ‘crown jewel’ in the Grand Rounds system of parkways and open spaces which link Minneapolis with the surrounding areas and the Mississippi River. Located southwest of downtown Minneapolis, the Chain of Lakes is comprised of five lakes which cover approximately 80% of the 1500-acre site: Lake Harriet, Lake Calhoun, Lake of the Isles, Cedar Lake, and Brownie Lake. Parkway tightly encircle and link each lake, creating thin strips of land where intense recreational development has occurred.

The site of the Chain of Lakes Regional Park was once a remnant channel of the Mississippi River characterized by hummocks, marshes, swamps, and other inland waterways. H.W.S. Cleveland, a renowned landscape gardener and urban planner, recognized the potential in this landscape to provide relief from the urban environment through passive recreation. He conceived of a continuous system of parks and parkway roads intertwined with natural waterways which would provide a healthy, beautiful, and cohesive framework for urban expansion.

In June 1883, Cleveland appealed to the Minneapolis Park Commissioners for the acquisition of lands for a system of parks and parkways. In his presentation, he emphasized the importance of purchasing land over the need to make immediate improvements. Rather than hurried ornamentation such as “artificial structures . . . fountains, statues, and vases” which would be “out of keeping with the rude condition of the surroundings,” he suggested that trees be planted and that the principal drives be laid out for pleasure driving, viewing, and strolling. Cleveland envisioned the evolution of the natural land in tandem with the cultural growth of the city culminating in “parks and boulevards lined with costly residences and fine public buildings.”

The second and most significant phase of physical development was begun in 1906 with the appointment of Theodore Wirth as Superintendent of Parks. In contrast to Cleveland, Wirth recognized in the existing landscape of interconnected drainageways the potential for creating diverse opportunities for active recreation. During this era, major park planning concepts regarding spatial structure and hydrological concern were established. These concepts yielded the Chain of Lakes Regional Park much as it still exists today.

Constructing the Chain of Lakes Park was a massive civic project. More than one million cubic feet of earth were moved to create the Kenilworth Lagoon, which altered and linked Lake of the Isles and Cedar Lake, and the lagoon which links Lake Calhoun with Lake of the Isles.

As was typical at the turn of the century, Wirth strongly believed in the use of public parks for active recreation. During his tenure, park management policies were significantly altered to encourage the active use of the park landscape, including the removal of “keep off the grass” signs and encouraging park police to inform children to use the hills for sledding. Wirth believed that parks were for everyone, not just the privileged classes, and as such he promoted the active use of parks by all.

To expand the active recreation by allowing continuous movement between the lakes by boat, major hydrological restructuring occurred. This included changing the direction of water flows and water levels and the creation of new riparian connections such as the Kenilworth Lagoon. The drainageway from which Cedar Lake was created originally flowed north into Brownie Lake, while the drainageways which formed Lake of the Isles and Lake Calhoun flowed south through Lake Harriet. As a result of these linkages, water levels at Cedar Lake and Brownie Lake were lowered, and the direction of flow of Cedar and Brownie Lakes was changed to a southward flow. Lake of the Isles and Lake Calhoun were dredged and enlarged, and the creek which connected Lake Calhoun to Lake Harriet was buried in a culvert. Lake Harriet and Brownie Lake were similar in size and shape to what exists today.

In the early 1960s a rise in public concern for the environmental conditions of the lakes, coupled with evidence of declining water quality and its effect on recreation, yielded recognition of the lakes as an important natural resource. This shift in cultural values sparked a new era of change at the Chain of Lakes. In the 1960s it was recognized that the major lake facilities, built in the 1920s, required reconstruction. Planning for the Chain of Lakes began in the late 1960s in conjunction with a comprehensive planning approach for the entire Minneapolis parkway system. The landscape architectural firm of Eckbo Dean Austin and Williams of San Francisco was retained to develop a master plan which addressed the overall decline of the park facilities and contemporary problems such as environmental impact due to overuse.

During the 1970s and 1980s, using the Eckbo plan as a guide, the linear lake edge recreation and parkway systems were renovated. A significant change which occurred as part of this phase was the conversion of parkway circulation in certain areas to one-way to address problems related to increased commuter traffic. Also, the construction of the bandshell and refectory at Lake Harriet represented a major improvement to recreation facilities during this phase.

## The Chain of Lakes System - A Built Landscape (Current Context)

The Eckbo plan partially guided the evolution of the Chain of Lakes until the early 1990s. This plan established a system for designing linear recreation systems relative to their impact on delicate shorelines. However, many problems, compounded by increasing recreation and vehicular demands on the system, remained within the Chain of Lakes. Beginning in the 1970s, growing public interest in health and recreation placed increasing demands on the already-taxed recreation systems at the Chain of Lakes. The emergence of new modes of recreation, such as in-line skating, also placed complex demands on the linear recreation facilities, which currently are separated into two systems: walking/jogging path and cycling path. The Open Space Report published by the Minneapolis Metropolitan Council cites 2,222,100 users of the Chain of Lakes Regional Park during 1995.

Between 1989 and 1993 the Minneapolis Park and Recreation Board conducted a comprehensive diagnostic study of water quality in the Chain of Lakes. The research findings of the study, undertaken by the Chain of Lakes Clean Water Partnership, established a foundation for this plan.

The results of the diagnostic study indicated that stormwater runoff is a major contributor to declining water quality. Although water quality has stabilized in recent years, it became apparent to the Minneapolis Park and Recreation Board that greater intervention was required to improve water quality. Today, all of the lakes are partially infested with Eurasian water-milfoil, and many of the lake shorelines suffer from varying degrees of erosion caused by wind and ice. Erosion is particularly severe along the eastern edge of Lake Harriet and northwestern edge of Lake Calhoun.

Declining environmental conditions are not restricted to the riparian areas of the park. Invasive plant species have colonized the wooded hillsides surrounding lakes Calhoun and Harriet. The narrow strips of land which lie between the lakeshore and recreation paths are severely compacted. High-intensity activity areas, such as the Lake Calhoun and Lake Harriet refectories, are severely degraded due to over-use.

To sum up the physical state of the Chain of Lakes in the mid-1990s, Al Wittman, Assistant Superintendent of Planning at the Minneapolis Park and Recreation Board, has stated that the Citizens of Minneapolis are literally “loving the lakes to death.”

## Five Lakes as Five Distinct Places

Each of the lakes in the ‘Chain’ has evolved a distinctive character and image. This character has developed in response to the ways in which the surrounding neighborhoods interact with ‘their lake’ as a cultural and natural resource.

### *Lake Harriet*

Surrounded by established residential neighborhoods, Lake Harriet is characterized by its community as a ‘family’ lake. This designation is reinforced by the family-oriented activities which take place during the summer months at the bandstand. Other amenities such as the Beard’s Plaisance picnic shelter, boating, playground, and refectory activities support this perception. Lake Harriet and Lake Calhoun support the greatest volume and diversity of water-based recreation, including beaches, swimming, fishing, sailing, and canoeing. Winter recreation at both lakes is also largely water-based, including ice skating, ice fishing, and cross-country skiing. The lake edges vary greatly along the perimeter from the steep, wooded edges along the eastern and western shores to the low-lying wetlands of Roberts Bird Sanctuary along the northern edge.

### *Lake Calhoun*

Lake Calhoun is perceived as an ‘urban’ lake. Its northern and western edges are surrounded by a mixture of commercial and high-rise residential buildings and are bounded by Lake Street, a through-city connector. Encircling the perimeter of the lake, the parkway is lined with mature canopy trees. Wide-open spaces with long vistas of the Minneapolis skyline draw in the distant urban landscape. Favorable summer and winter winds make windsurfing and ice-surfing unique water-based activities at Lake Calhoun.

### *Lake of the Isles*

Lake of the Isles is characterized by sweeping lawns dotted with mature deciduous trees and shrubs and is often referred to as ‘picturesque.’ This open, rolling landscape affords constantly changing vistas of the curving lakeshore juxtaposed with its densely wooded islands. Activities such as canoeing, walking, and cycling take place along the edges of Lake of the Isles. The narrow portion of ‘the north arm’ is the most popular location in the Chain for ice skating. Recently, tree loss and standing water in the north arm has raised concern over the future of the lake edges and the appropriateness of the long-treasured lawn.

### *Cedar Lake*

Cedar Lake is seen by its neighborhood as a ‘wild, natural lake,’ a restful place where one can enjoy nature in the city. To preserve the diversity and extent of natural areas which surround Cedar Lake, the Cedar Lake Park Association was formed. Currently, this group is developing a plan for creating a series of indigenous landscapes and nature trails along the north edge of the lake. Thus, this area will be linked with two major recreation and commuter bicycle trails; the Cedar Lake Trail and Kenilworth Trail.

### *Brownie Lake*

Compared with the other lakes, Brownie Lake is more detached from its surrounding neighborhoods due to the configuration of parkways and adjacencies such as the Target office building on the west side. The parkland surrounding Brownie Lake is characterized by steep slopes and dense woods which have deterred development to date. Brownie Lake is used primarily for fishing and canoeing and is perceived as a natural area. Most citizens agree that Brownie Lake should remain undeveloped, with the exception of increased fishing and the possible addition of a low-impact seasonal trail where bank conditions allow.

## The Chain of Lakes as a System Beyond 1997

The Chain of Lakes Regional Park is one of the greatest urban parks in North America. It was conceived and developed through the foresight of visionary planners, such as H.W.S. Cleveland and Theodore Wirth who recognized the importance of public land to the evolution of a healthy urban environment. Today, the Chain of Lakes is at a critical juncture in its evolution; the grandeur of its tree-lined parkways, classical bridges, and clear lakes is eroding as a result of years of over-use and deferred maintenance.

In 1883 in his “Suggestions for a System of Parks and Parkways,” Cleveland appealed to the Park Commissioners to put aside their ‘present wants’ and look to the future of their cities:

*‘Look forward for a century, to the time when the city has a population of a million, and think what will be their wants. They will have wealth enough to purchase all that money can buy, but all their wealth cannot purchase a lost opportunity, or restore natural features of grandeur and beauty, which would then possess priceless value, and which you can preserve for them if you will but say the word and save them from destruction which certainly awaits them if you fail to utter it.’*

Within the historic context of urban planning that brought Cleveland to Minneapolis, the current consultant team was asked to evolve a contemporary vision for the Chain of Lakes Regional Park. Critical to the success of the Comprehensive Plan and all the work which preceded it is a similar appeal to the citizens of Minneapolis to put aside ‘present wants’ to *reinvest* in their greatest resource, the Chain of Lakes Regional Park.

Public investment must be made on three levels. First, a substantive financial commitment to the long term maintenance, renovation, and restoration must be made. Second, a reevaluation of the way in which the park is used relative to its carrying capacity must be undertaken. Finally, there must be a willingness to make compromises which may be necessary to ensure the long-term health of the park.

The Comprehensive Plan charts a course for the Chain of Lakes which builds upon the strength of what is there, and, more importantly, addresses some of the near-crisis conditions that exist. **This approach to the Comprehensive Plan examines the Chain of Lakes as both a cultural and natural resource with the assumption that regaining and maintaining the hydrologic health of the system must be the primary force guiding all planning decisions.** The structure of the Comprehensive Plan examines problems, ideas, and possible solutions within the context of an interlaced three-tiered system:

- **Water Quality**
- **Recreation**
- **Transportation**

The following are the key principles for a future vision for the Chain of Lakes:

- Identify new solutions which are both ‘low-maintenance’ and jointly address multiple problems.
- Build on those previous planning principles which remain relevant to contemporary issues, such as the hierarchical designation of recreation relative to environmental impact.
- Build on the knowledge gained from previous environmental studies, such as the Clean Water Partnership Program.
- Identify issues and programming that emphasize the unique qualities of each of the lakes while at the same time identifying opportunities that are connective, such as recreational linkages.

Two critical aspects of the Chain of Lakes Regional Park which have greatly influenced the direction of the Comprehensive Plan are the recognition of the Chain of Lakes as a system and as a built landscape.

The Chain of Lakes is a complex system lodged within an urban context, intertwined with cultural and natural systems which are in turn linked to greater systems such as the Mississippi River. Critical problems facing the Chain of Lakes are ‘systemic’ and are linked to one or more of these relationships. For example, environmental problems are linked to traffic problems through quality and quantity of roadway run-off. In turn, these are linked to the way in which cars move around the Lakes; increasing recreation and vehicular demands increases environmental stress on the system. Due to the delicate balance of this system, problems must be solved through integrated solutions which at once address environmental, recreational, and traffic issues.

The Chain of Lakes is a built landscape which requires significant investment. Although some parts of the Chain contain natural areas, particularly along the northern edges of Cedar Lake, no part of the Chain is truly wild. There is no doubt that Lake of the Isles is one of the most beautiful and serene places in the Chain. However, it is important to recognize that there is a significant cost and responsibility that accompanies the decision to restore and maintain a landscape which is counter to the ‘natural’ low-lying condition of Lake of the Isles. As important as accepting the responsibility of maintaining such a cultural landscape is the development of solutions which are ecologically self-sustaining or require minimal external input. It is crucial to create as much as possible a ‘closed ecological system’ within the Chain.

The Chain of Lakes Regional Park is of immense value to Minneapolis and the region. Although it is possible to calculate its effect on real estate, it is impossible to place a value on its contribution to urban life in Minneapolis. Many cities will never have a public park of this scale and beauty, and the era of vision and high-minded civic pride which produced the Chain of Lakes has vanished. Minneapolis has within its reach the vision, financial resources, and community will necessary to restore this crown jewel.

**Citizens’ Advisory Committee**  
**Amended Goals & Objectives, (Adopted February 13, 1996)**

As part of the Minneapolis Park and Recreation Board’s public participation process, a 21-person Citizens’ Advisory Committee known as the ‘Framework Committee’ was appointed by government officials and elected by neighborhood groups. The following list of amended goals and objectives for the Comprehensive Plan was adopted by the Committee:

**Overall**

- Develop unique identities and plans for each lake which, when taken as a whole, fit within the Grand Rounds Parkway System and meet the many conflicting demands on the Chain of Lakes.
- Develop a Chain of Lakes system that promotes water quality and the urban forest, thereby preserving and enriching the ecosystems while enhancing the harmony with the communities that adjoin and use it.

**Recreation**

- Provide recreational opportunities in an appropriate balance with/to their impacts on the environmental setting, aesthetics, and maintenance costs.
- Identify and develop ‘activity areas’ throughout the Chain of Lakes and other strategies that improve their usage and interaction with each other.
- Ensure that people of all ages and abilities, especially children, have safe places to swim and recreate.

**Civic Experience**

- Enhance the quality of design where people gather for activities, such as at the bandstand, refectories, beaches and skating rinks, and ensure that these high-intensity uses do not overburden the lakes system as a whole.

**Maintenance**

- Handle maintenance operations in a cost-effective, aesthetically pleasing and environmentally sensitive manner. (Screening port-a-potties, different trash cans, no large maintenance vehicles driving on the grass, etc.).

**Traffic**

- Reduce the impact of motorized traffic (roadways & parking) on park space and adjacent residential property. Configure the parkways and paths for an effective balance of park users while promoting safe and pleasurable use by all.

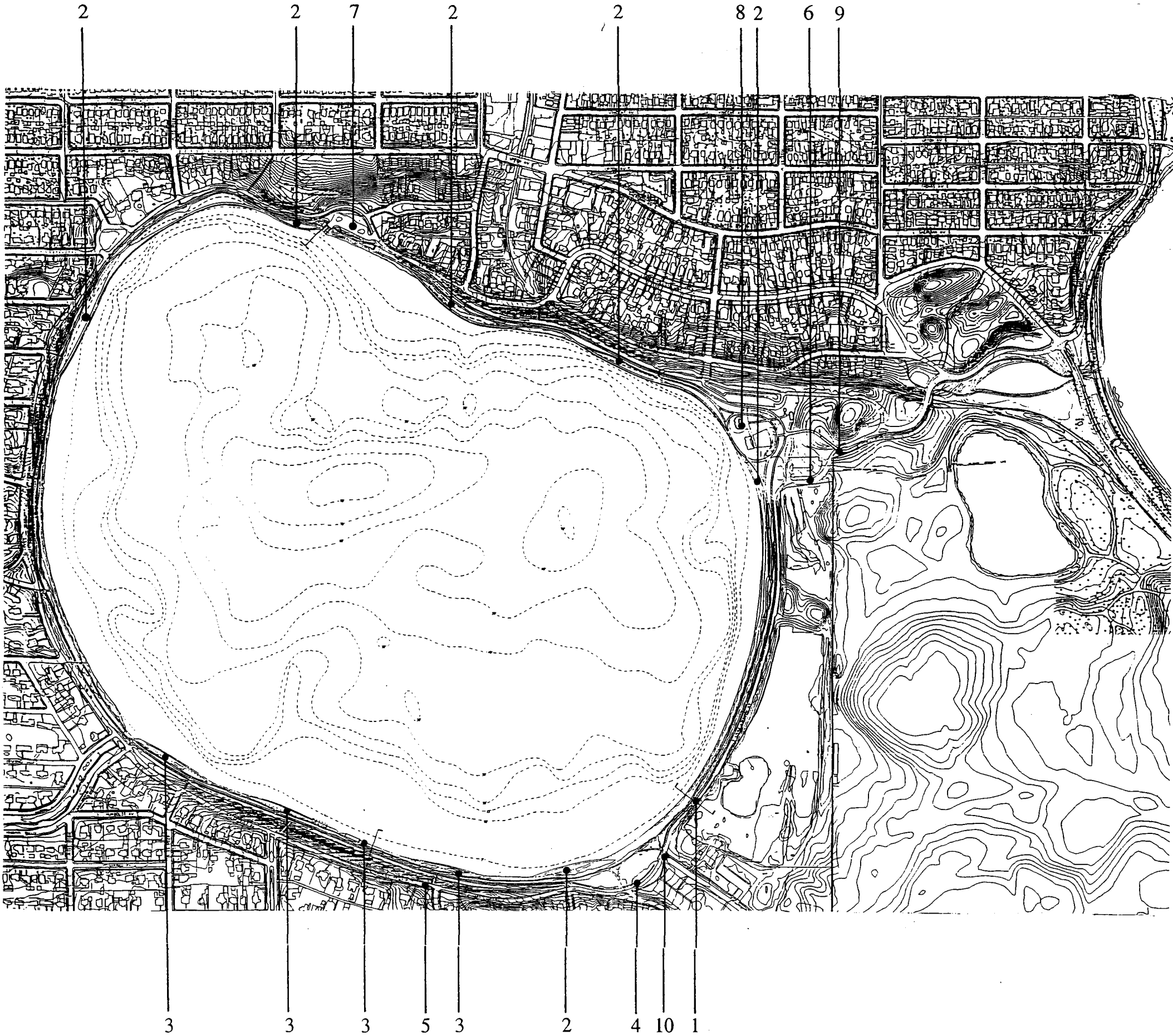
**Neighborhood**

- Protect nearby residential neighborhoods from inappropriate noise, light and significant amounts of motorized traffic and parking not destined for the neighborhood.

**Executive Summary Recommendations**

The following is an outline of the overall recommendations of the consultant team with specific ideas for implementation. Each of these concepts and design recommendations is discussed in more detail in later sections of this report.

- 1. All concepts and solutions should address the Chain of Lakes integrally as a synthesis of an environmental system, a recreational system, and a transportation system.**
- 2. All strategies should promote the improvement of water quality within the entire Chain of Lakes system and should address multiple problems concurrently.**
  - Create linear wetlands which filter urban runoff and create new low-impact recreation paths to seasonally distribute recreation and create a variety of experiences.
  - Establish a vegetative buffer at lakes' edges, particularly at areas of concentrated stormwater discharge, to filter stormwater discharge and address erosion problems.
  - Restore lake edges, stabilize banks, and create wildlife habitat.
- 3. Maintain a continuous motor vehicular circulation system around the Chain of Lakes while adding significant traffic calming to improve safety.**
  - Return all parkways to two-way circulation.
  - Narrow the lanes of traffic to slow automobile speeds.
  - Implement traffic calming techniques on a trial basis to slow speeds on parkways. After successful testing, permanently install traffic calming.
  - Incorporate Class A cyclists onto the parkways.
- 4. Disperse park land areas characterized by intense concentrations of activity by relocating selected high-intensity activities, such as boating, to other, less densely-used park areas.**
  - Relocate one or more activities from the Lake Calhoun Refectory to another area on Lake Calhoun.
  - Relocate one or more activities from the Bandstand/Refectory area of Lake Harriet to another area at Lake Harriet.
- 5. Maintain and improve existing 'linear' recreation corridors such as jogging, biking, walking, and skating.**
  - Reduce the intensity of these activities from within the park land at the lake edge by relocating one or more of these activities, such as Class A biking, to a designated lane on the Parkway.
  - Provide a new 4' soft-surface path along the parkway side of the existing walking path to reduce the tendency of runners to create so-called 'cow paths' for running.
  - Widen the existing bicycle path from 8' to 10.'
- 6. Improve non-motorized recreational linkages between the different lakes. Wherever possible, separate recreational circulation from vehicular circulation.**
- 7. Through a comprehensive city-wide program, promote distribution of non-motorized recreational activity to other urban parks.**



**Water Quality**

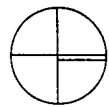
- 1. Lake Edge Type A (see page 21)  
Erosion Control, stabilization  
Proposed along the northern and eastern shorelines in areas vulnerable to wind/ice erosion.
- 2. Lake Edge Type C (see page 24)  
Vegetative Filter, stabilization  
Proposed along the south and southwest shorelines where there is a high concentration of stormwater outlets.
- 3. Lake Edge Type D (see page 26)  
Vegetative Filter, low-impact seasonal path  
Proposed along the eastern shoreline in areas vulnerable to wind/ice erosion and with a concentration of stormwater outlets.

**Transportation**

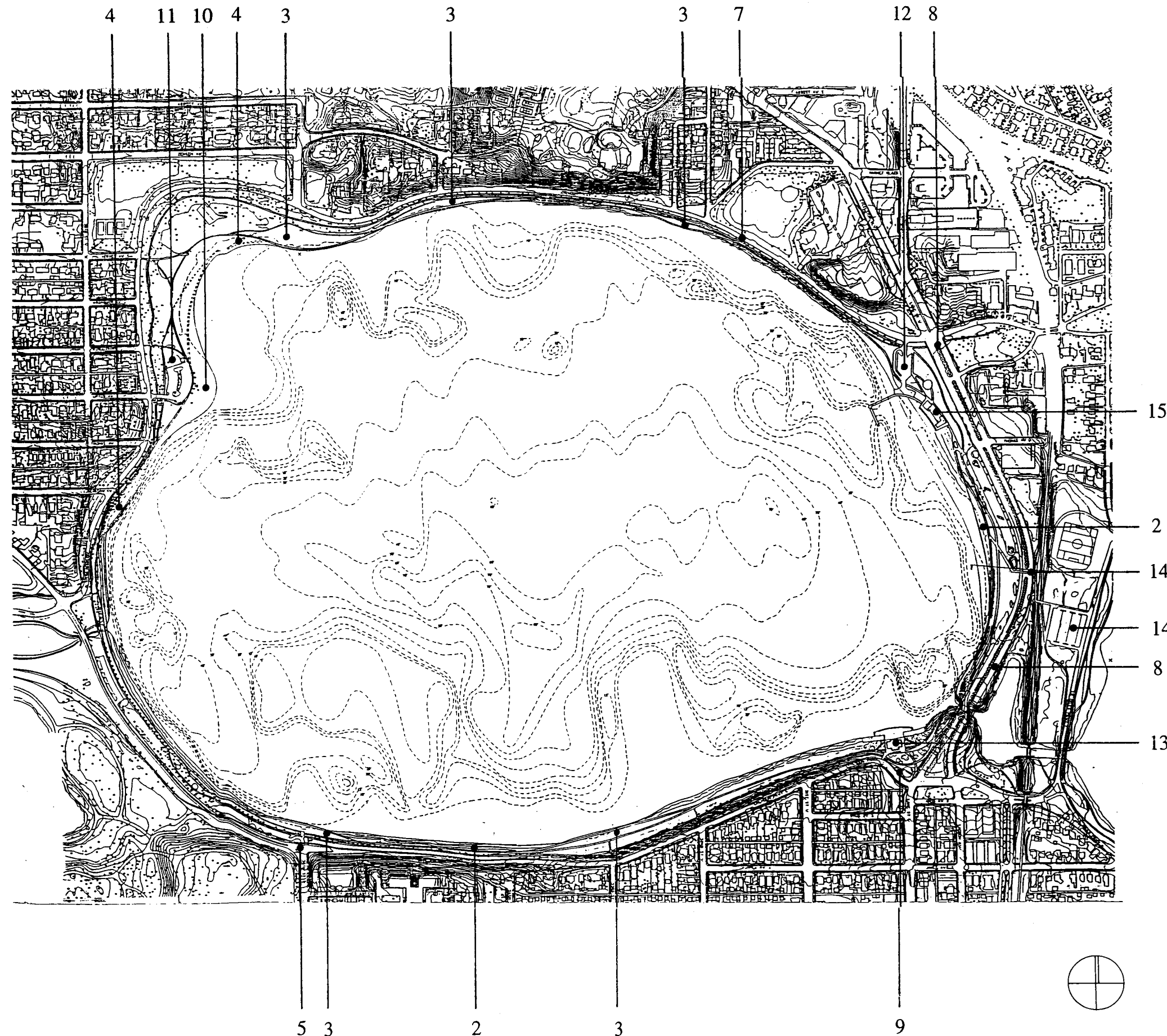
- 4. Realign parkway at Rose Garden (see page 29)
- 5. One-way vehicular circulation with Class A bicycle circulation
- 6. Realign parkway (see page 34)

**Recreation**

- 7. Relocate boat launch to lakeshore near Beard's Plaisance Picnic Area (see page 31)
- 8. Renovate Lake Harriet Refectory and Bandstand area (see page 34)
- 9. Improve non-motorized connections and vehicular circulation between Lake Harriet and Lake Calhoun at William Berry Park (see page 36)
- 10. Reconfigure pedestrian bicycle crossing at Rose Garden intersection (see page 29)



**Summary of Consultants' Recommendations - Lake Harriet**



### Water Quality

1. Lake Edge Type A (see page 21)  
Erosion Control, stabilization  
Proposed along the northern and eastern shorelines in areas vulnerable to wind/erosion
2. Lake Edge Type B (see page 21)  
Erosion Control, low-impact seasonal path at failing bulkhead
3. Lake Edge Type C (see page 24)  
Vegetative Filter, stabilization
4. Lake Edge Type D (see page 26)  
Vegetative Filter, low-impact seasonal path

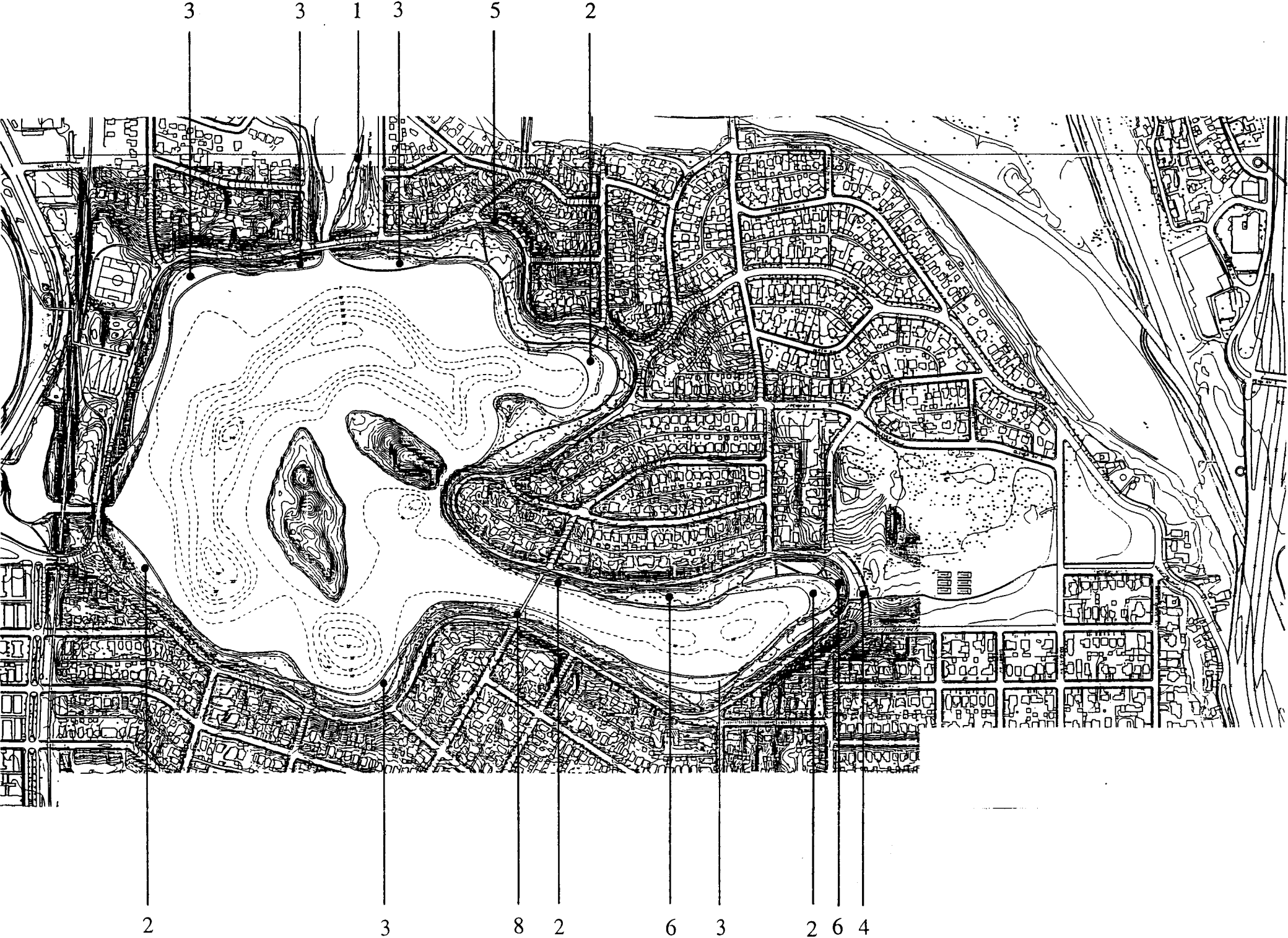
### Transportation

5. Convert Lake Calhoun Parkway to one-way southbound between Lake Street and 36th Street
6. Extend Trolley and Class A Bicycles to Lake Street
7. Two-way vehicular circulation with Class A bicycle circulation
8. Narrow Lake Street to accommodate a planted median and street tree planting on both edges along its entire length
9. Trolley terminus/turn-around

### Recreation

10. Extend Thomas Beach
11. 'Tot Lot' and improved parking at Thomas Beach
12. Relocate sailboat launch from Refectory area. New 'DNR' standard trailer parking, boat launch, and turn-around.
13. Improve Lake Calhoun Refectory
14. Improve non-motorized connection between Lake Calhoun and Lake of the Isles
15. Proposed snack stand, rest rooms, and shade structure

### Summary of Consultants' Recommendations - Lake Calhoun



**Water Quality**

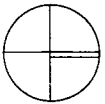
1. Lake Edge Type B (see page 22)  
Erosion Control, low-impact seasonal path at failing bulkhead
2. Lake Edge Type C (see pages 24, 25)  
Vegetative Filter, stabilization
3. Lake Edge Type D (see page 26)  
Vegetative Filter, low impact seasonal path

**Transportation**

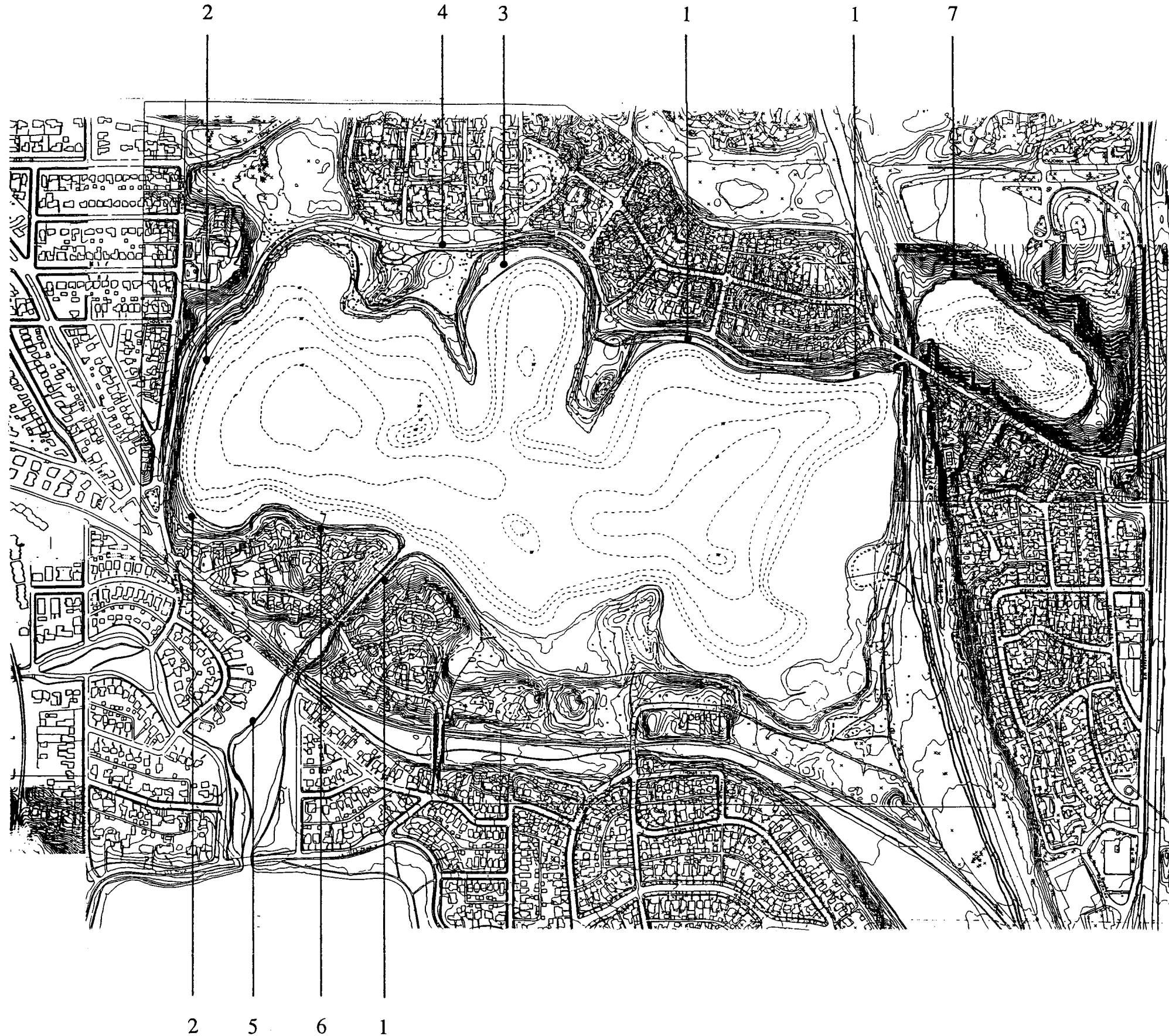
4. Eliminate duplicate roadways to gain more park land. Disconnect Lake of the Isles parkway at north end of north arm, connect to Franklin Avenue West
5. One-way vehicular circulation with Class A bicycle circulation

**Recreation**

6. Restoration of the lawn and trees at the North Arm
7. Improve connection and recreation opportunities between Lake Calhoun and Lake of the Isles
8. Pedestrian Bridge at 26th Street



**Summary of Consultants' Recommendations - Lake of the Isles**



### ***Water Quality***

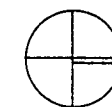
1. Lake Edge Type B (see page 23)  
Erosion Control, low-impact seasonal path
2. Lake Edge Type C (see page 24)  
Vegetative Filter, stabilization
3. Lake Edge Type D (see page 26)  
Vegetative Filter, low-impact seasonal path

### ***Transportation***

4. Two-way vehicular circulation and Class A bicycle circulation

### ***Recreation***

5. Improve connections between Lake of the Isles and Cedar Lake
6. Proposed 'soft surface' walking path along southeast shore
7. Proposed 'soft surface' seasonal walking path along flatter portions of the bank along Brownie Lake



*Summary of Consultants' Recommendations- Cedar & Brownie Lakes*

**Citizen’s Advisory Committee Recommendations**

List of Immediate Recommendations  
To Be Made to the Minneapolis Park and Recreation Board  
(Decided June 25, 1996)

**System-wide on Parkways**

- Paint bike lanes on the parkways.
- Close lakes to motorized traffic temporarily on weekends.
- Use better and more diverse enforcement of noise and speed laws on parkways.
- Paint lane markers on two-way roadways at the lakes.
- Research and test new/better walking and running path materials.

**Lake Harriet**

- Temporarily redesign current boat launch until master plan is implemented.
- Continue to reduce special events, but honor prior commitments.
- Consider alternatives to port-a-potties, perhaps adding permanent facilities.
- Provide a temporary fix for bike/pedestrian crossing at north side until master plan is implemented.

**Lake Calhoun**

- Change timing of lights to reduce traffic build-up/congestion at both William Berry Parkway - Lake Calhoun intersection (add a time cycle here to stop all auto traffic and allow pedestrians, cyclists and skaters to cross), and East Calhoun Parkway - Lake Street (timing on southbound L. Calhoun Parkway should be same on weekdays and weekend) [recently implemented].
- Move refectory dumpsters away from lake and people.
- Implement a temporary bike path away from the refectory by moving it closer to parkway which will reduce congestion and increase safety.
- Move canoes at NE ‘corner’ to North side - similar to Framework Committee member Ward Joyce’s drawing.

**Cedar Lake**

- Put up ‘deep water’ warning signs needed for Cedar Lake Meadows.

**Master Plan Lake Harriet**

**Design Decisions made at Framework meetings**

(Date of decisions in parentheses)

1. Use traffic calming, speed 20 mph (no net loss of green space principle) (5/28)
2. Demarcate bike lane in parkway with one-way traffic. (5/28)
3. Move parking lot near bandshell keeping same # of spaces (flip/flop current configuration). (5/28)
4. Redesign the bandshell seating area (a more defined berm and additional trees). (7/8)
5. Add a bike/pedestrian bridge over roadway north of bandshell. (6/25)

6. Boat Launch: Move to the east side of the bandshell if dredging to provide for sufficient depth for launch of boats is approved by the DNR, there is two-way access from the north side of the bandshell, there is no net loss of green space, and weeds are not a problem. (7/8) Otherwise reconfigure existing space per drawing presented by BRW. (6/25)
7. Landscape Richfield Road with a median between 36<sup>th</sup> and W. Berry Parkway, provided that lane widths are the same as or typical of the rest of the parkway system and net reduction in paving with no loss of trees. (6/5)
8. William Berry Parkway: Retain current configuration of parkway (5/28 & 6/25) but with traffic control options at intersection with Calhoun Parkway/Richfield Road to make crossing safer for pedestrians, cyclists, skaters.
9. Create a lagoon and underpass between Calhoun and W. Berry Parkway. (6/5)
10. Test vegetative filters on an experimental basis; if successful, proceed further. (6/25)
11. Biking path width to remain the same. (7/8)
12. Renovated walking/running path width should include approximately two feet of current “cow path”. (7/8)
13. Explore a variety of running path surfaces and landscaping to keep runners on track with no net loss of green space. (7/8)
14. No additional pathways to be made. (7/8)
15. Keep the lower east road open, eliminate an undetermined number of parking bays to gain green space, but retain handicapped access and ‘drop off’ spaces. (7/8)

**Master Plan Lake Calhoun**  
**Design Decisions Made at Framework Meetings 1996**  
(Date of Decision in Parentheses)

1. Entire lake road should be narrowed and have a delineated bike lane in the Lake Calhoun Parkway that runs clockwise (this means the existing recreational bike path would have to be changed to counterclockwise). (7/8)
2. Northwest side roadway: Leave as is and do not disconnect from Dean Parkway intersection. (7/8)
3. Trolley line eventually to be extended to Lake Street, at grade crossing near 36th Street, and staying on the parkway, rather than going down along the lake. (6/5)
4. At the same time that the trolley is extended to Lake Street, the east side of Calhoun should be one-way between Lake Street and 36th Street to make room for the trolley. (7/8)
5. Landscape Lake Street with a boulevard and trees between Isles and Calhoun. (6/5)
6. Northwest side: put in additional beach and shade structure and yacht club as designed and presented to the Framework Committee. (7/9)
7. Northeast side: serious redesign of refectory and canoe are needed, per the drawings presented by MVVA or Framework committee member Ward Joyce. (7/9)
8. Grade separated crossing at Lake Street to allow recreational users (pedestrians, cyclists, skaters) to make the crossing and that it is to be aesthetically designed to fit into the Grand Rounds system. (7/9)

**Master Plan Lake of the Isles**  
**Design Decisions Made at Framework Meetings 1996**  
(Date of Decision in Parentheses)

1. Preserve the picturesque character of Isles and address sinking on the north side. (7/9)
2. Do not take out the southern road on Isles. (7/9)
3. Do not connect the west side of Isles with Lake Street. (7/9)
4. Do not offer parking at the current Park Board maintenance facility until there is a specific need and at that time design specifics should be considered. (7/9)
5. The north end Franklin disconnect is not recommended, but this issue should be looked at when design options are presented. (7/9)
6. No bridge over the lake. (7/9)
7. Maintain current traffic speed at Isles. (7/9)
8. Put bikeway through Kenwood Park or Parkway to connect with Cedar Lake Trail, pending design specifics that are consistent with no loss of trees and no net loss of green space. (7/9)

**Master Plan Cedar Lake**  
**Design Decisions Made at Framework Meetings 1996**  
(Date of Decision in Parentheses)

1. No design decisions were made; the Framework Committee accepted the Cedar and Brownie Lakes Citizens' Advisory Committee Report (7/9)

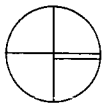
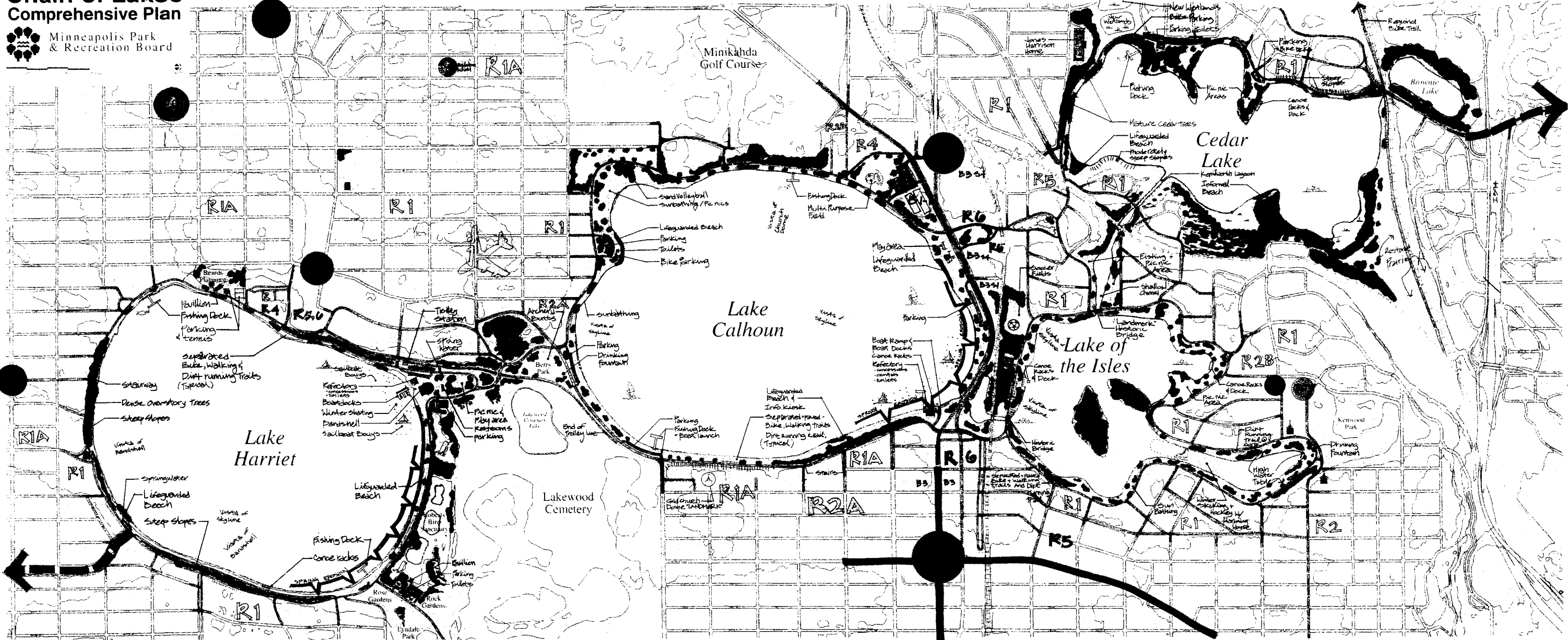
**Process Diagrams**

The site analysis phase of this project is summarized by the three diagrams that follow: Existing Conditions, Use Analysis and Issues. Generated by BRW and the Minneapolis Park and Recreation Board, each diagram highlights information pertinent to the three areas of this study: water quality, recreation, and transportation.

The final diagram outlines ideas generated during a Brainstorming Session involving members of the Minneapolis Park and Recreation Board.

**Chain of Lakes  
Comprehensive Plan**

Minneapolis Park  
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Existing Conditions Diagram

Chain of Lakes Comprehensive Plan, December 1997  
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## LEGEND



## GATEWAYS

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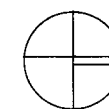
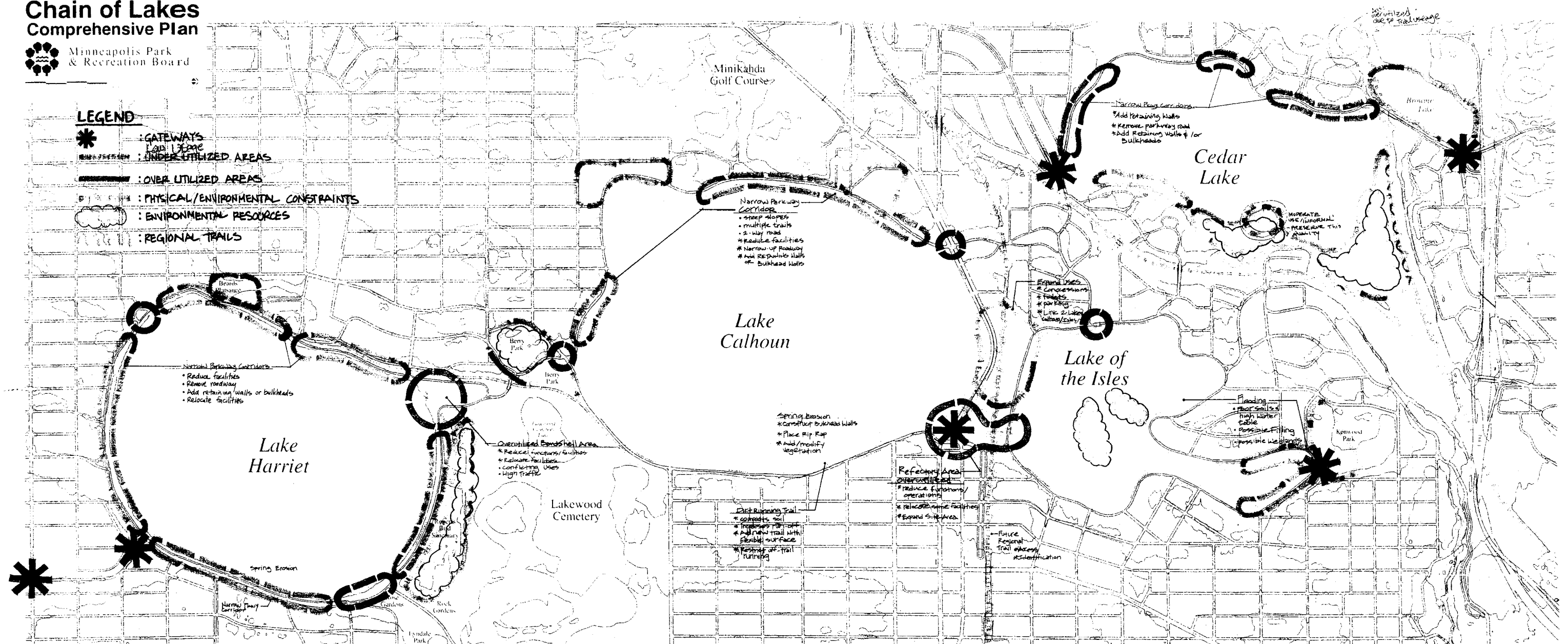
## UNDERUTILIZED AREAS

**OVER UTILIZED AREAS**

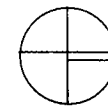
### PHYSICAL/ENVIRONMENTAL CONSTRAINTS

## : ENVIRONMENTAL RESOURCES

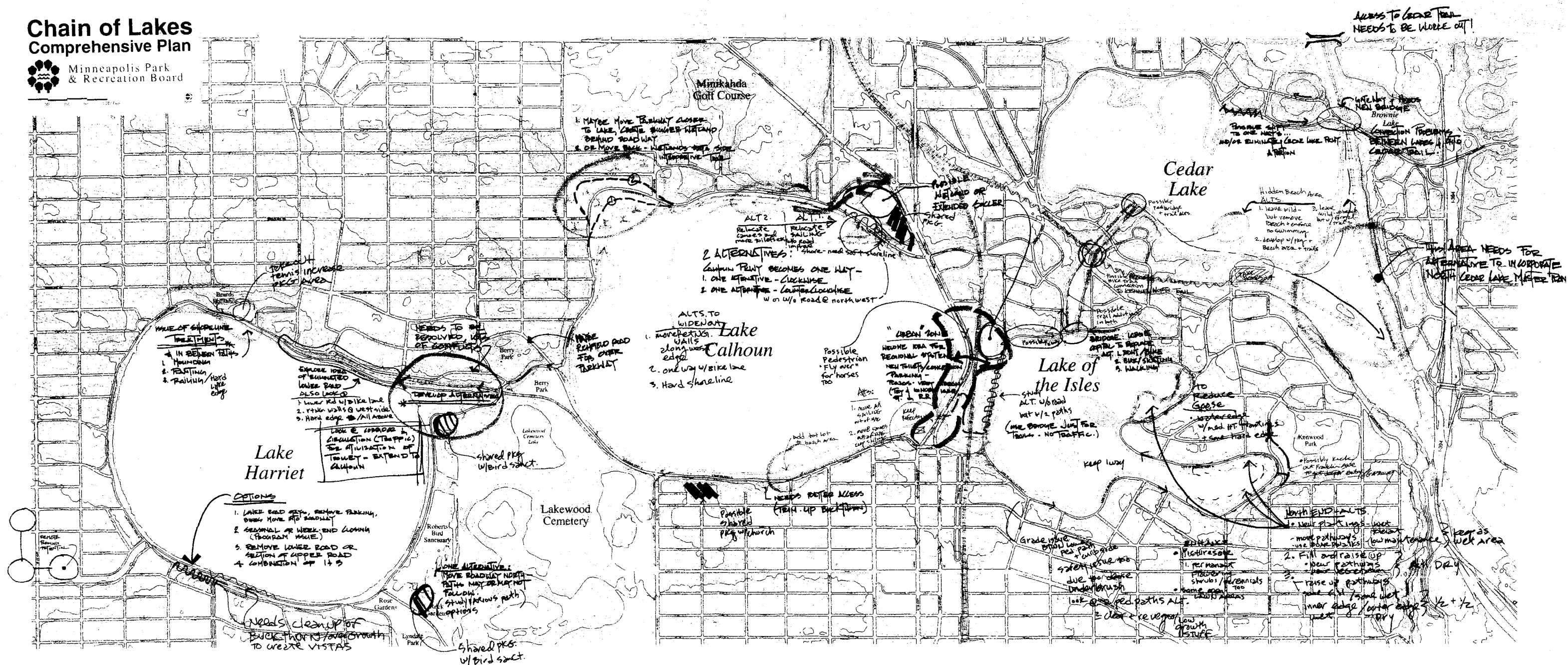
: REGIONAL TRAILS



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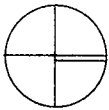
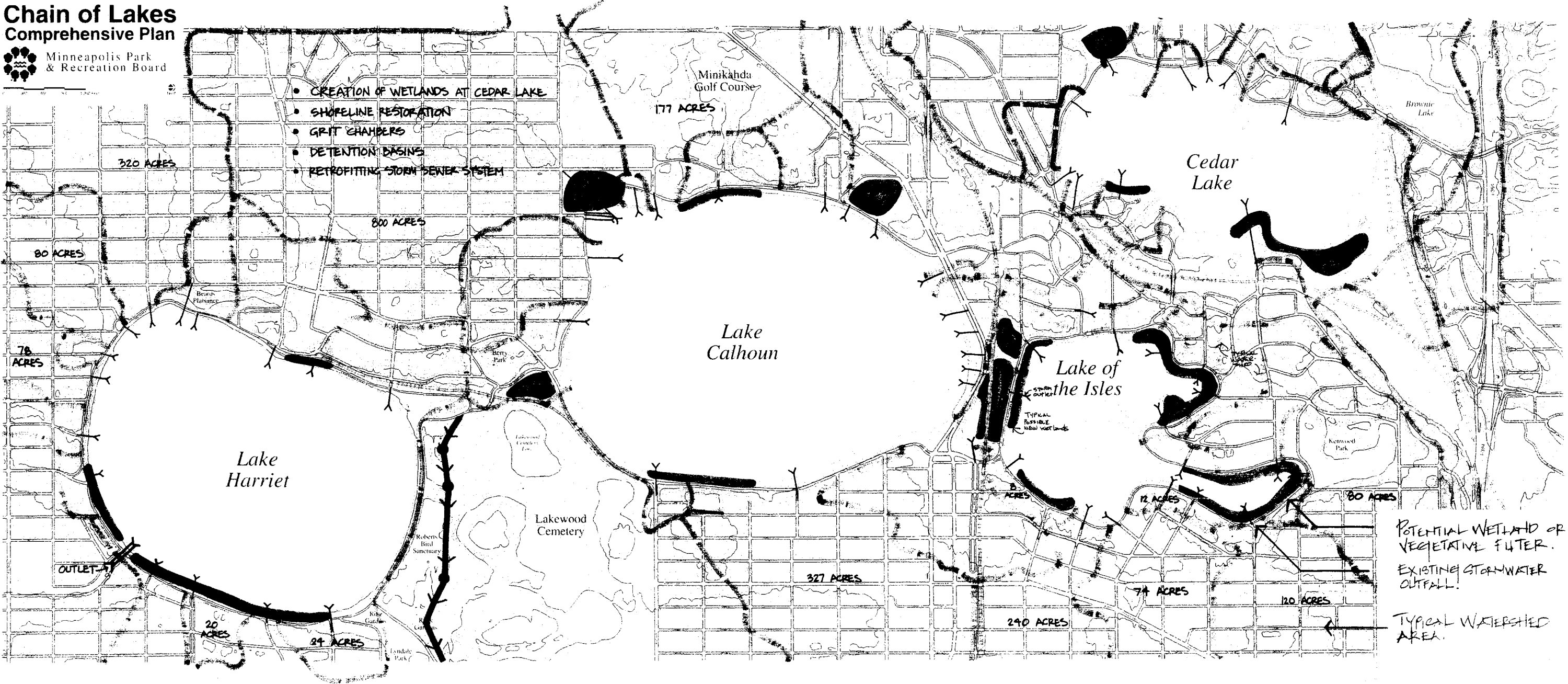
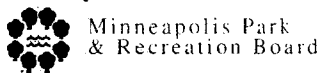
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# Chain of Lakes Comprehensive Plan



Watershed Diagram

# Water Quality

## Overview

The Chain of Lakes watershed measures 7000 acres, 96% of which is residential. Between 1940 and 1970, the Chain of Lakes Regional Park experienced a tremendous decline in water quality, coinciding with construction of the Minneapolis storm sewer system. Results of the Clean Water Partnership Project indicate that urban runoff is the primary cause of declining water quality within the Chain of Lakes.

Water quality varies in each lake, due to the size of each watershed and the size and depth of the water body. However, because the lakes are linked hydrologically, there is a delicate balance which could easily be altered by a change in any one of the lakes. At present, Lake Harriet has the best water quality, primarily due to having the smallest watershed and a large water volume. Lake Calhoun has the second best water quality, due to its large water volume, while Lake of the Isles has the poorest water quality due to its small size and shallow water depth. Cedar Lake has the most rapidly declining water quality, due to more intensive development of its watershed.

## The Chain of Lakes Clean Water Partnership

The Chain of Lakes Clean Water Partnership is one of the largest urban watershed-restoration projects in the country. Begun in 1990, this seven-year initiative is aimed at improving and managing water quality in the Minneapolis Chain of Lakes through a comprehensive watershed approach. Project strategies include wetland construction and restoration, storm sewer improvements, stormwater pond construction; and public education. The project is funded and sponsored by city, county, and state agencies and is based on the recommendations of the Minneapolis Citizens' Advisory Committee on Water Quality Management.

## Recommendations

All strategies proposed in the Comprehensive Plan were developed to promote the improvement of water quality within the entire Chain of Lakes. Where possible, solutions addressed numerous problems at once. Working closely with Jeff Lee, MPRB limnologist, the Consultant Team built on the findings of the Clean Water Partnership Project by developing strategies for improving water quality through modifications to the recreation and transportation systems and the adjacent urban street runoff.

The following outlines specific goals for the improvement of water quality in the Chain of Lakes:

- Restore lake edges, stabilize banks, and create wildlife habitat.
- Create linear wetlands which filter urban runoff and create new low-impact recreation paths to seasonally distribute recreation and to create a variety of experiences.
- Establish vegetative filters at lake edges, particularly at areas of concentrated stormwater discharge, to filter stormwater discharge and to address erosion problems.
- Replace decaying high-maintenance infrastructure, such as bulkheads, with low-maintenance, 'sustainable' infrastructure, such as vegetative filters.
- Stabilize the lake edge zones of high erosion with plantings.
- Reduce impermeable surface area wherever possible, including narrowing of parkways and removing duplicate roadways such as the lower road at Lake Harriet.
- Restore areas of high soil compaction to improve infiltration and to reduce surface runoff.
- Reduce the environmental impact of high-intensity activities by dispersing some of these activities to other lake locations.

## Citizens' Advisory Committee Goals

(From the Framework Committee Amended Goals and Objectives, adopted 13 February 1996)

Develop a Chain of Lakes system that promotes water quality and the urban forest, thereby preserving and enriching the ecosystems while enhancing the harmony with the communities that adjoin and use it.

**Summary of Lake Edge Stabilization Techniques**

Four lake edge stabilization strategies provide the technical foundation for the Chain of Lakes Comprehensive Plan. Each of these strategies primarily addresses the goal of improving water quality while at the same time addressing recreation and transportation goals.

- 1 . Lake Edge Type A**  
Erosion control, stabilization  
Minor regrading and extension of lake edge toe, intensive seeding of native grasses and wildflowers; typical at all eroded lake edges
- 2 . Lake Edge Type B**  
Erosion control, low-impact seasonal path  
Conversion of deteriorating bulkhead walls and steep slopes into a bio-engineered extension of the lake edge.
- 3 . Lake Edge Type C**  
Vegetative filter, stabilization  
Bio-engineered extension of the lake edge toe.
- 4 . Lake Edge Type D**  
Vegetative filter, low impact seasonal path

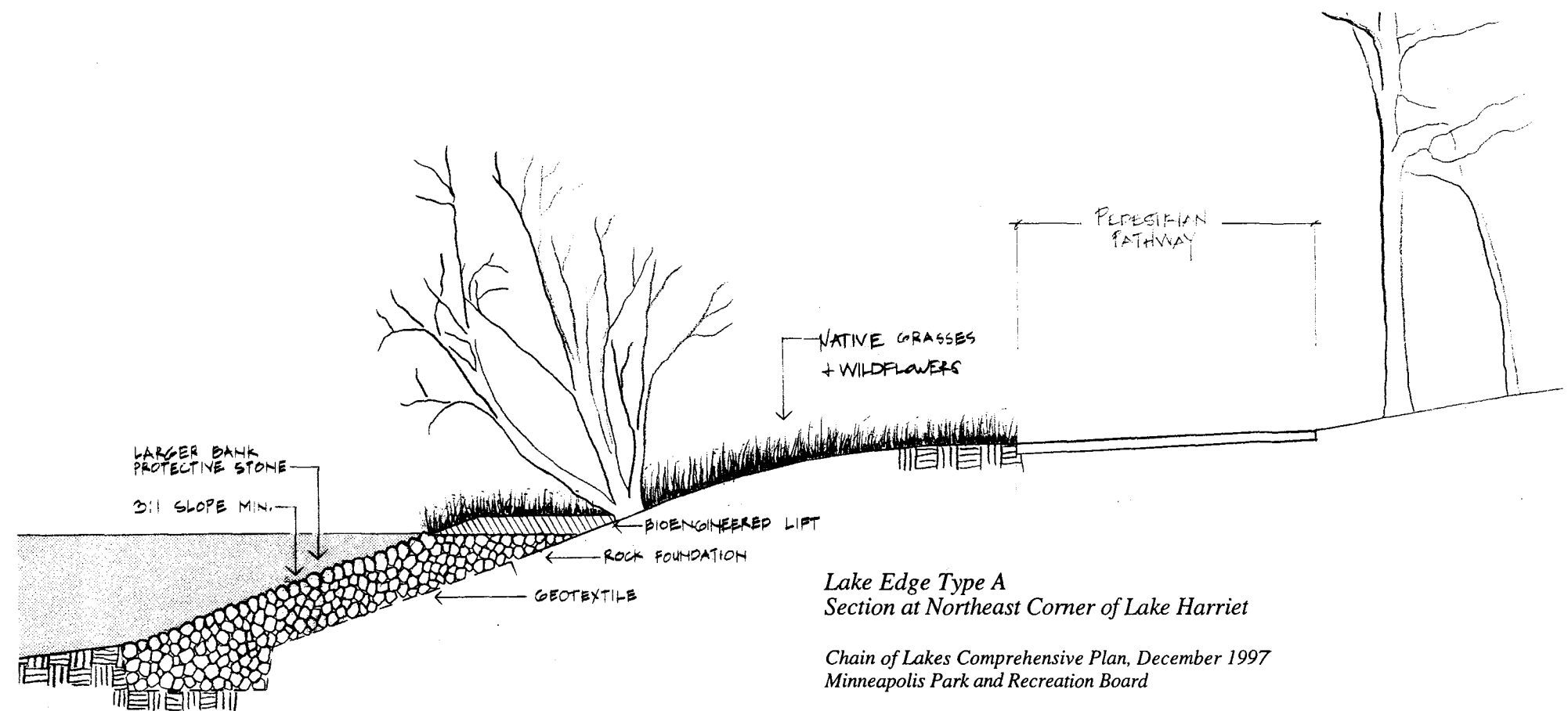
**Application of Lake Edge Stabilization Techniques**

Each of these four approaches is distinguished by function and varies technically with respect to two main components: a stable rock foundation for the toe of the lake edge and established vegetation to provide long-term stability. The stable foundation helps prevent scouring, creates a durable base for up-slope treatments, and deters undermining of the stabilized slopes. Applied to this base is a dense strand of healthy riparian vegetation which is integral to long-term lake edge stability. The soil-binding root systems of this vegetation are extremely strong, flexible, and self-repairing. The exposed leafy and woody structure increases surface resistance to flowing water and decreases water velocities over the lake edge, thereby reducing erosion potential. Third, the branches and leaves of vegetation trap detritus, helping to build a new edge.

**Lake Edge Type A**

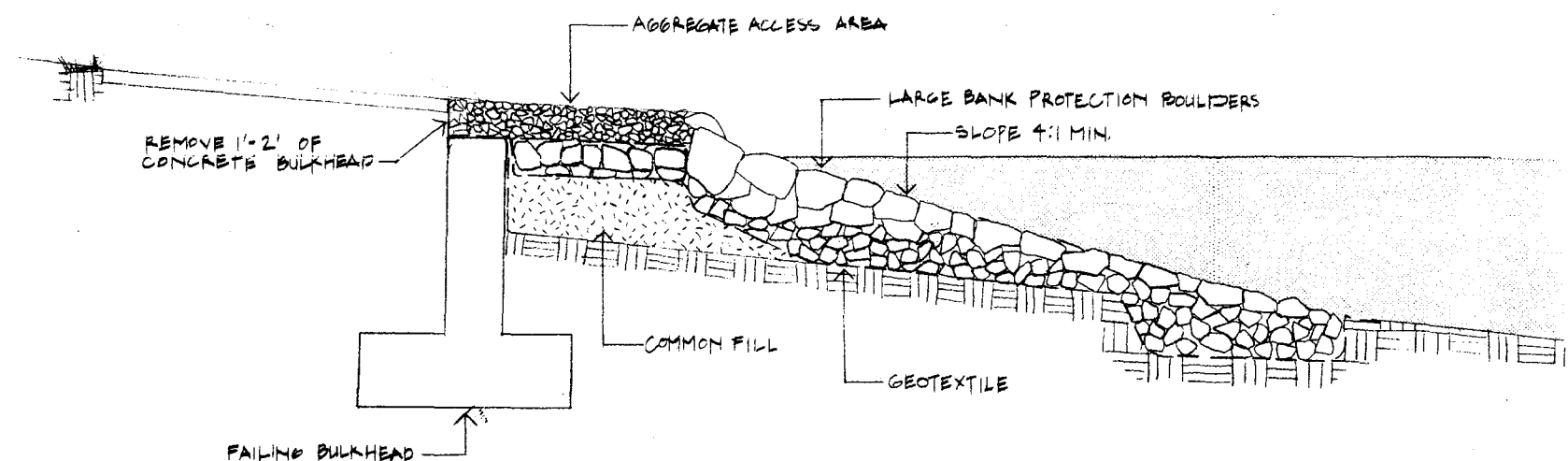
Erosion control, stabilization

Lake Edge Type A is proposed for shoreline conditions characterized by high erosion due to wind and ice. This edge treatment is proposed along the eastern and northeastern shorelines of Lake Harriet and Lake Calhoun (where an existing bulkhead is present and in deteriorating condition, see Lake Edge Type B, below). As shown on the detail, native grasses and wildflowers should be seeded between the shoreline and pedestrian pathway to provide additional stabilization and discourage cow paths.

**Lake Edge Type B**

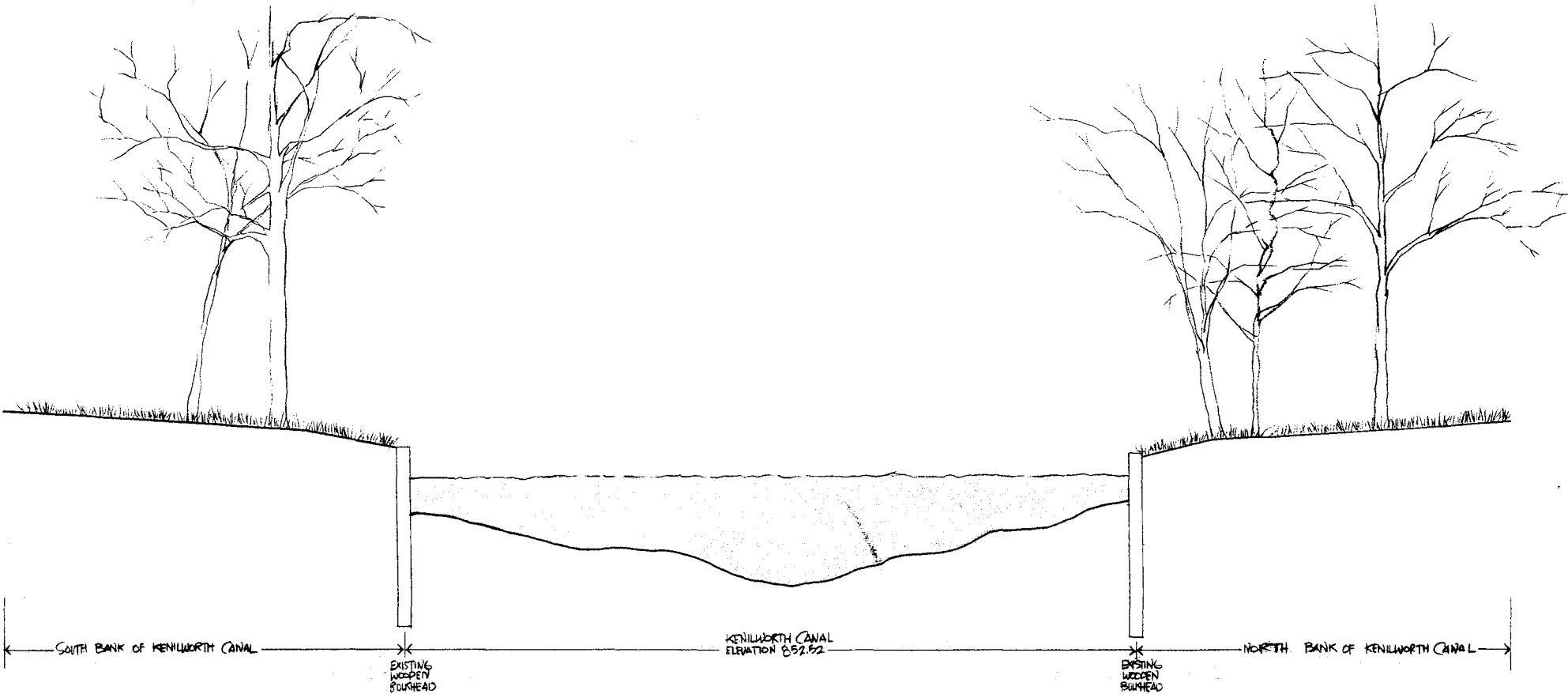
Erosion control, low-impact seasonal path at failing bulkhead

Where existing wooden or concrete bulkheads are failing due to deterioration, Type B proposes the addition of a rock toe and in some cases bio-engineered planting to the lake edge of the bulkhead. At Lake Calhoun, this edge type is proposed for failing bulkheads along the northern and eastern shores.



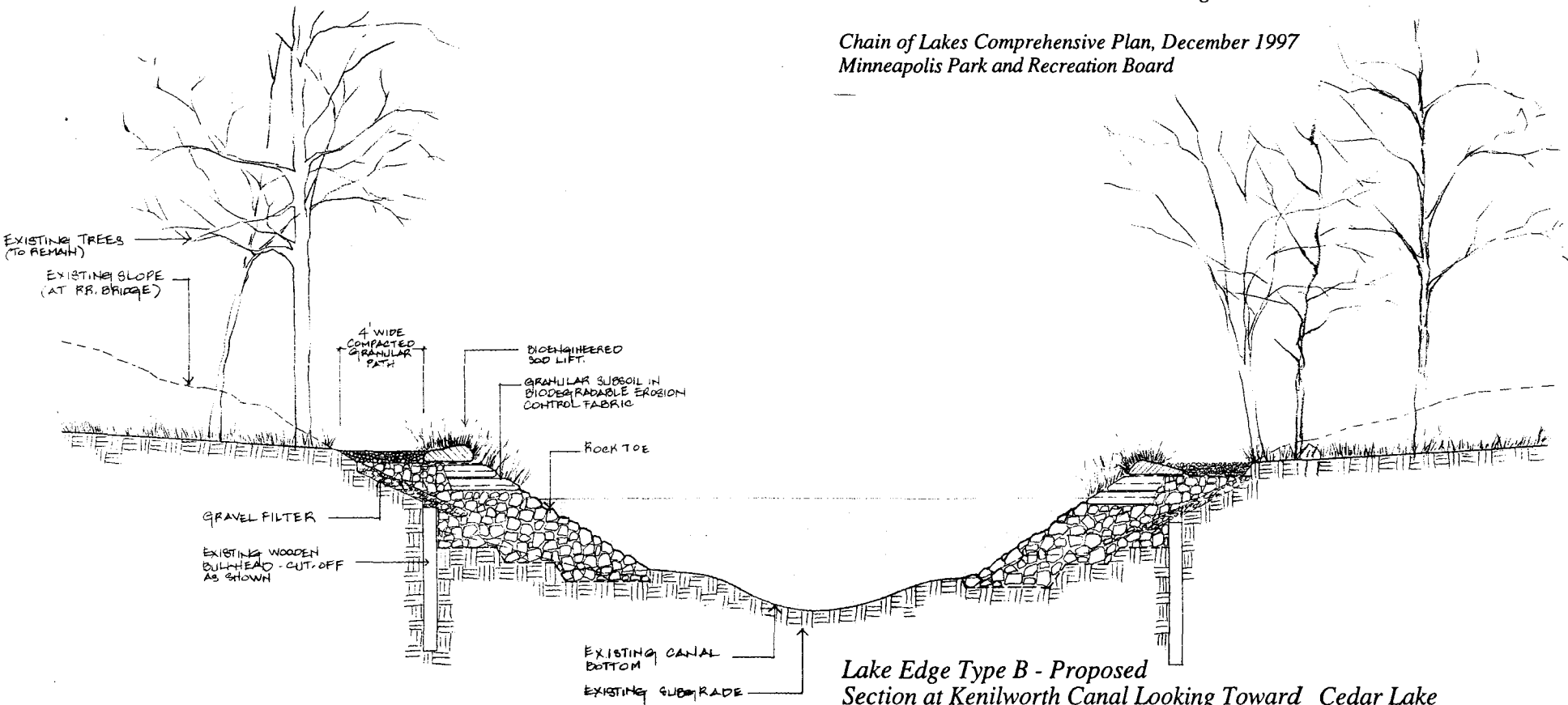
**Lake Edge Type B**  
**Erosion control, low-impact seasonal path**

At the Kenilworth Lagoon, this strategy allows for the addition of a soft-surface seasonal path continuous along both sides of the lagoon. This path will allow pedestrians to walk along the lagoon between Lake of the Isles and Cedar Lake without disturbing fragile slopes and woody vegetation while providing a long-term, low-maintenance replacement for the existing wooden bulkhead.



*Lake Edge Type B - Existing Condition  
Section at Kenilworth Canal Looking Toward Cedar Lake*

*Chain of Lakes Comprehensive Plan, December 1997  
Minneapolis Park and Recreation Board*

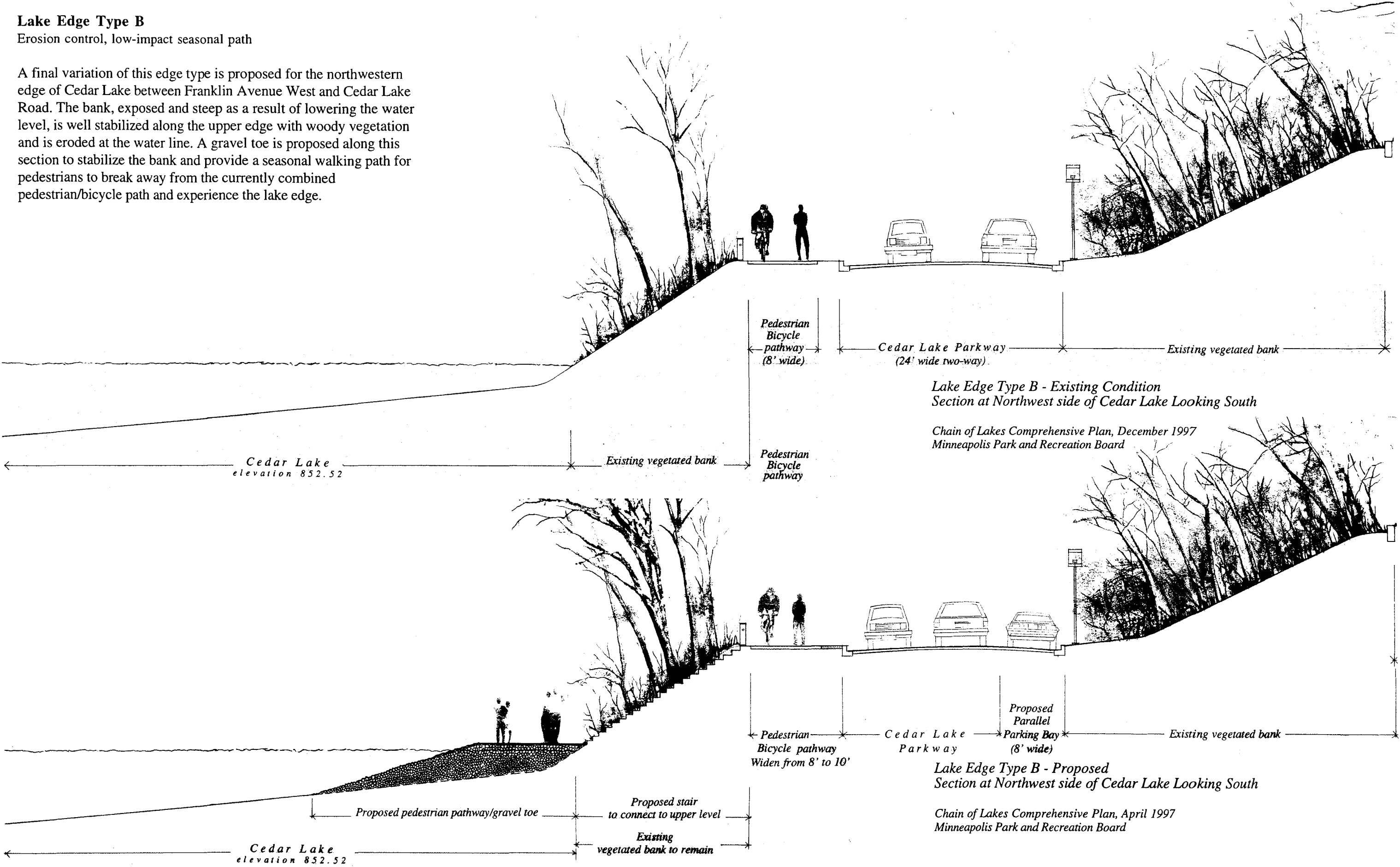


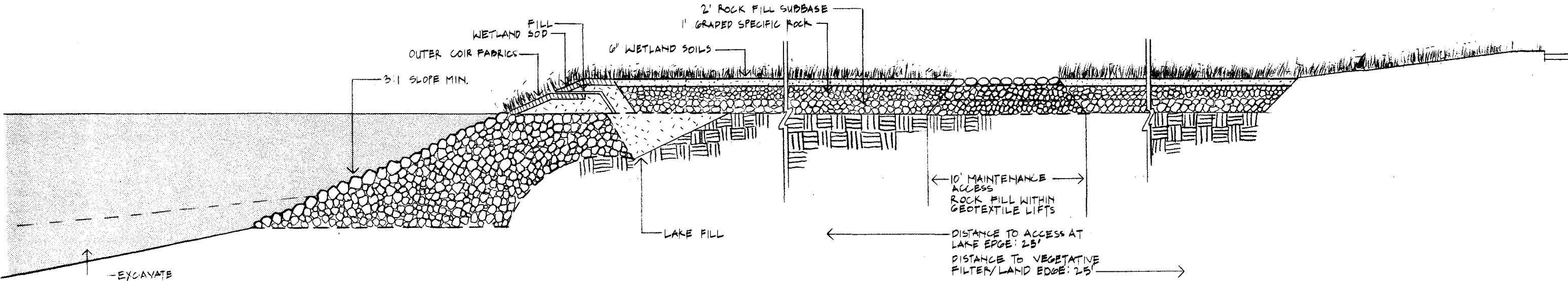
*Lake Edge Type B - Proposed  
Section at Kenilworth Canal Looking Toward Cedar Lake*

*Chain of Lakes Comprehensive Plan, December 1997  
Minneapolis Park and Recreation Board*

**Lake Edge Type B**  
Erosion control, low-impact seasonal path

A final variation of this edge type is proposed for the northwestern edge of Cedar Lake between Franklin Avenue West and Cedar Lake Road. The bank, exposed and steep as a result of lowering the water level, is well stabilized along the upper edge with woody vegetation and is eroded at the water line. A gravel toe is proposed along this section to stabilize the bank and provide a seasonal walking path for pedestrians to break away from the currently combined pedestrian/bicycle path and experience the lake edge.





Lake Edge Type C - Detail Section of Vegetative Filter  
Section through North Arm of Lake of the Isles

**Lake Edge Type C**

Vegetative filter, stabilization

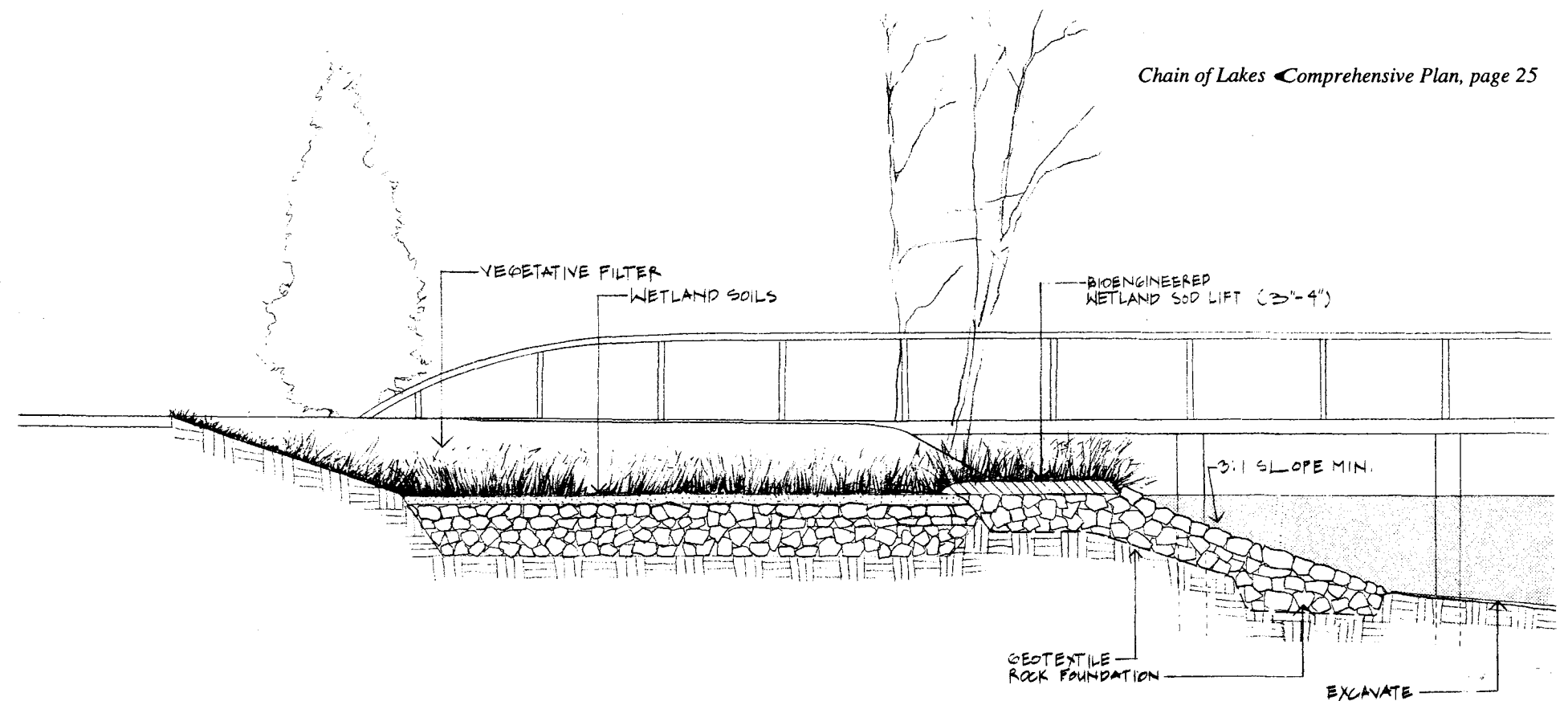
This edge type is proposed primarily as a stormwater filtering device for lakeshore zones with a high concentration of stormwater outlets. A 'vegetative mat' consisting of a dense stand of riparian plant species acts as a filtering device for stormwater entering the lake, slowing down water movement and trapping particulate matter before entering the lake. The 'vegetative mat' also serves as an important lake edge stabilizing mechanism.

At Lake Harriet, a vegetative filter is proposed for the southwest corner where the concentration of stormwater inlets is greatest (not illustrated). This treatment should occur along most of Lake Harriet Parkway West from Thomas Avenue South to the south side of the Refectory (not illustrated).

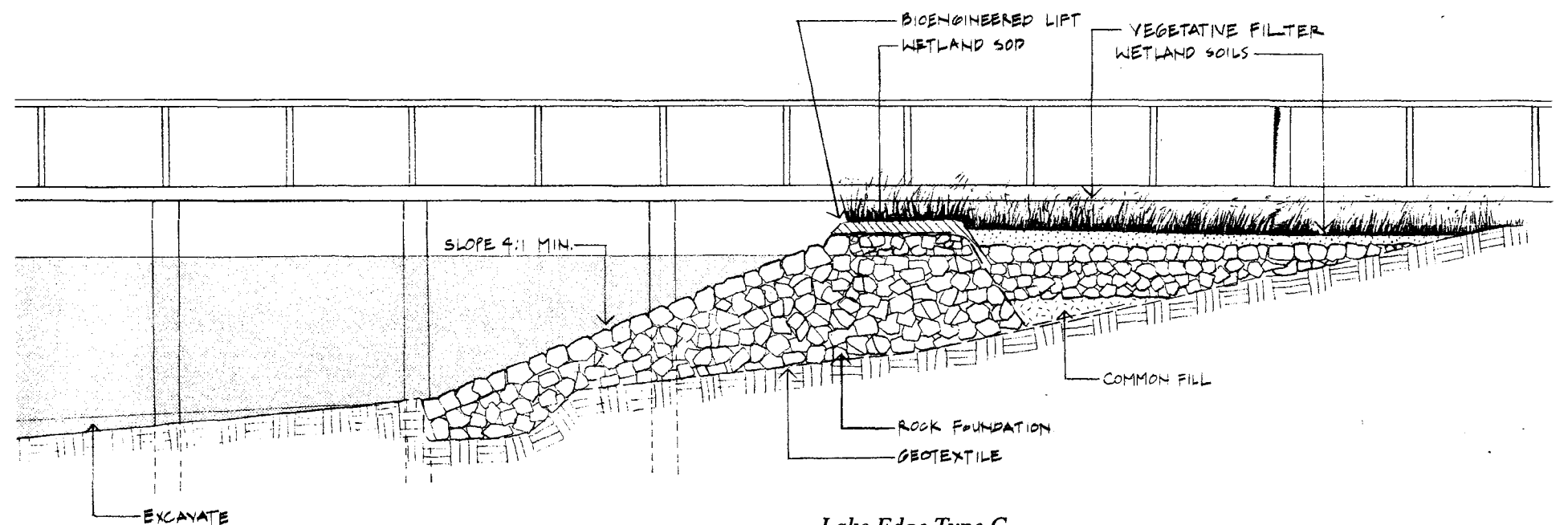
Along the southwest shoreline of Lake Calhoun a vegetative filter is proposed from Thomas Beach west to Rose Lane.

The most extensive use of this edge type is proposed for Lake of the Isles, where stormwater has greatly affected water quality due to the small area and shallow depth of the lake relative to its watershed. At the north arm, where there is a high concentration of stormwater outlets, the use of a vegetative filter is critical (see detail page 24). A vegetative filter is also proposed for most of the southern and western shorelines and the eastern shore between 27<sup>th</sup> Street and Euclid Place. It is important to note that the 'vegetative mat' will not replace the lawn in any of these areas.

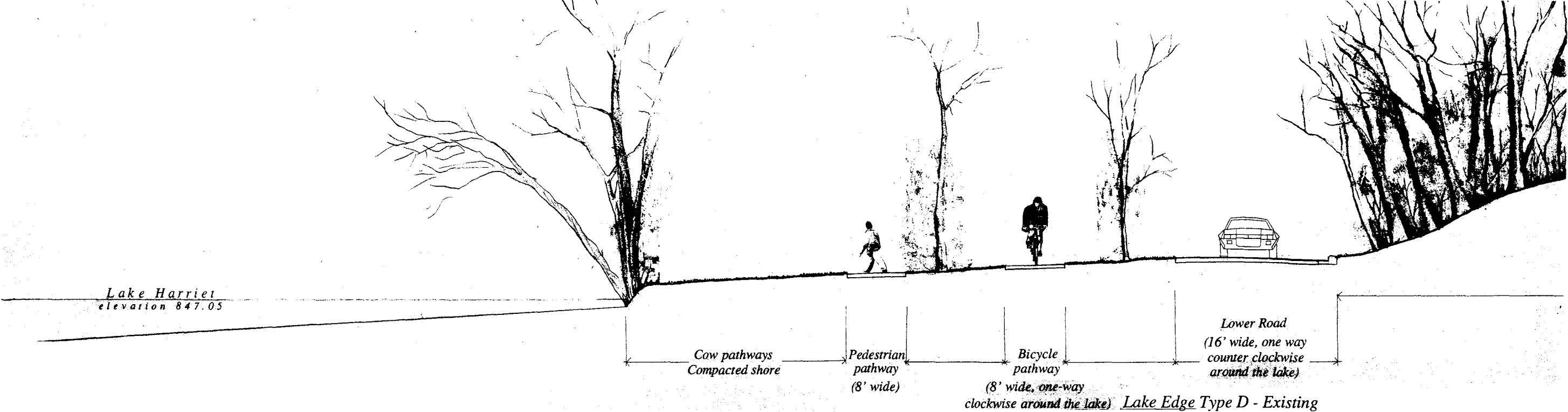
At Cedar Lake, the highest concentration of storm water outlets occurs along the western edge. A vegetative filter is proposed at the southeast corner and the south side at Chowen Avenue (not illustrated).

**Lake Edge Type C**Section at Proposed 26<sup>th</sup> Street Bridge, Lake of the Isles

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Minneapolis Park and Recreation Board

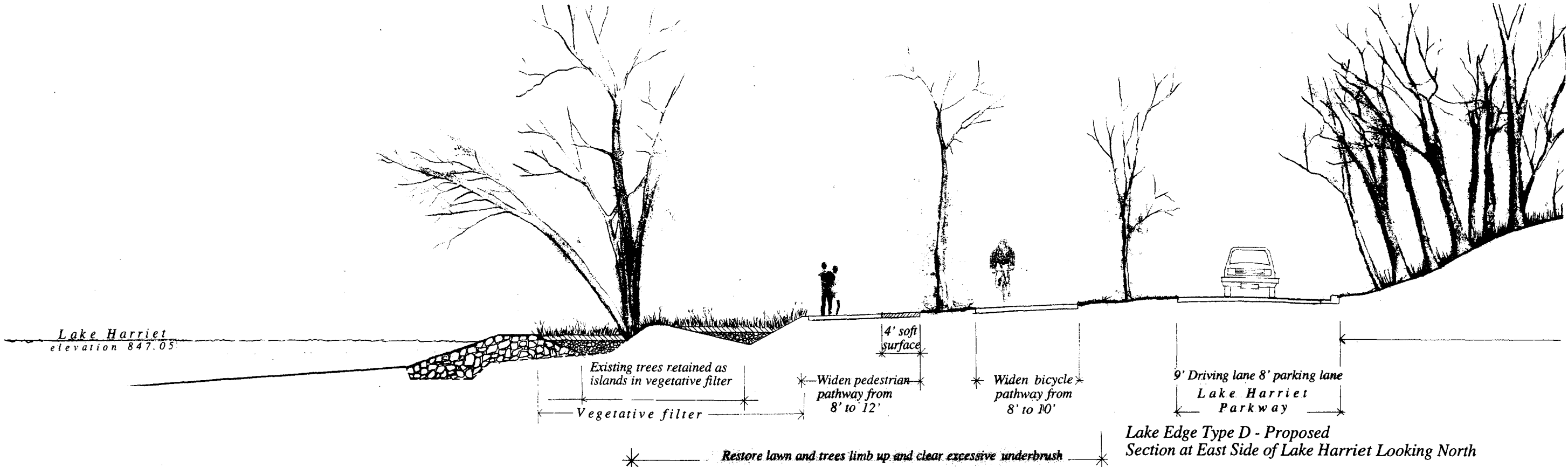
**Lake Edge Type C**Section at Proposed 26<sup>th</sup> Street Bridge, Lake of the Isles

Chain of Lakes Comprehensive Plan, December 1997  
Minneapolis Park and Recreation Board



Lake Edge Type D - Existing  
Section at East Side of Lake Harriet Looking North

Chain of Lakes Comprehensive Plan, December 1997  
Minneapolis Park and Recreation Board



Lake Edge Type D - Proposed  
Section at East Side of Lake Harriet Looking North

Chain of Lakes Comprehensive Plan, December 1997  
Minneapolis Park and Recreation Board

## Implementation - Water Quality

Improvements proposed at southwest Lake Calhoun and east Lake Harriet illustrate hydrological solutions which concurrently address specific problems related to transportation and recreation.

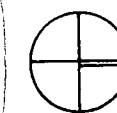
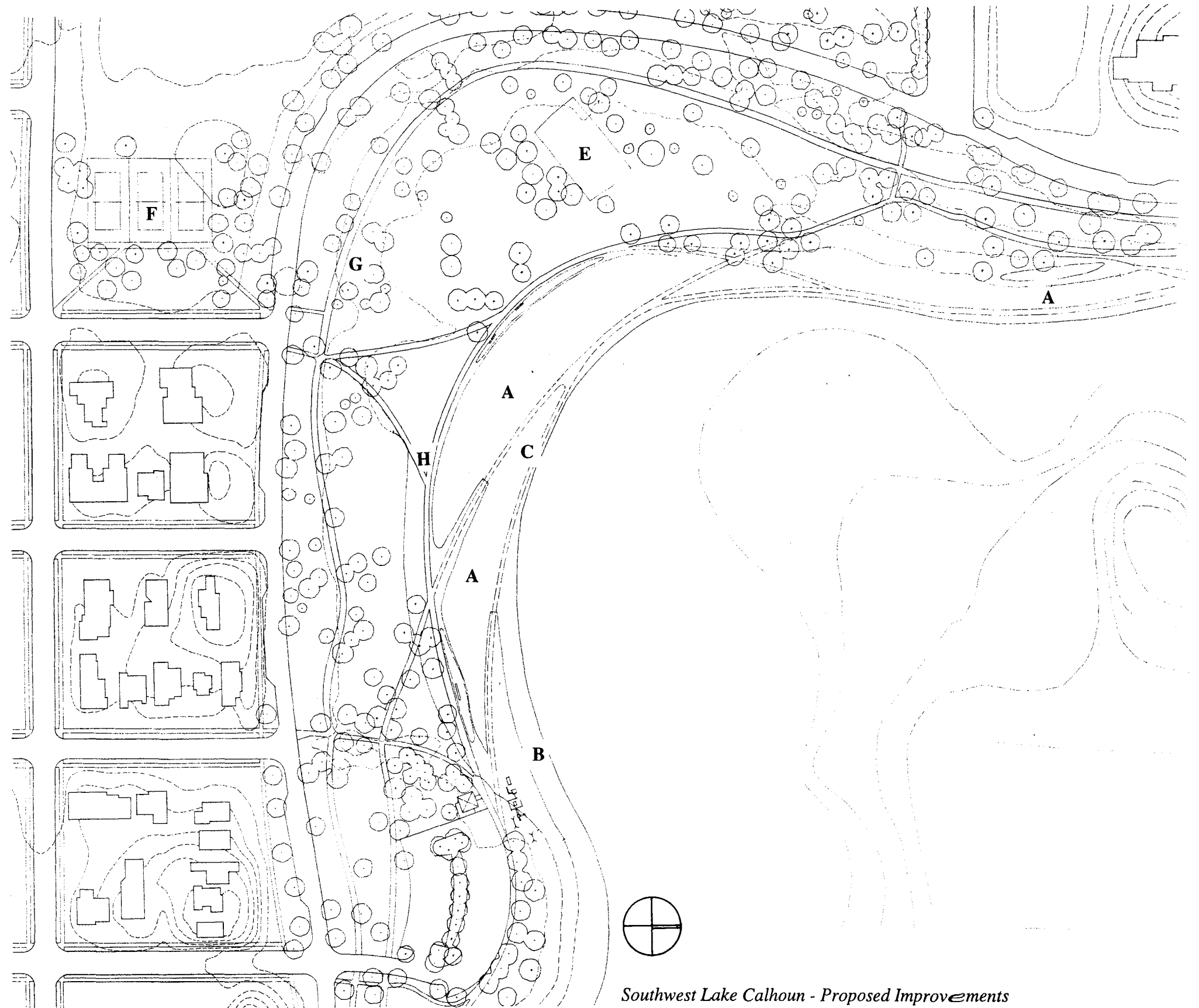
### Improvements at Southwest Lake Calhoun

The stormwater outlets at the southwest corner of Lake Calhoun drain an 800-acre area, the largest watershed which abuts the Chain of Lakes. To improve the quality of water as it enters the lake environment, a series of overlapping vegetative filters are proposed in this area.

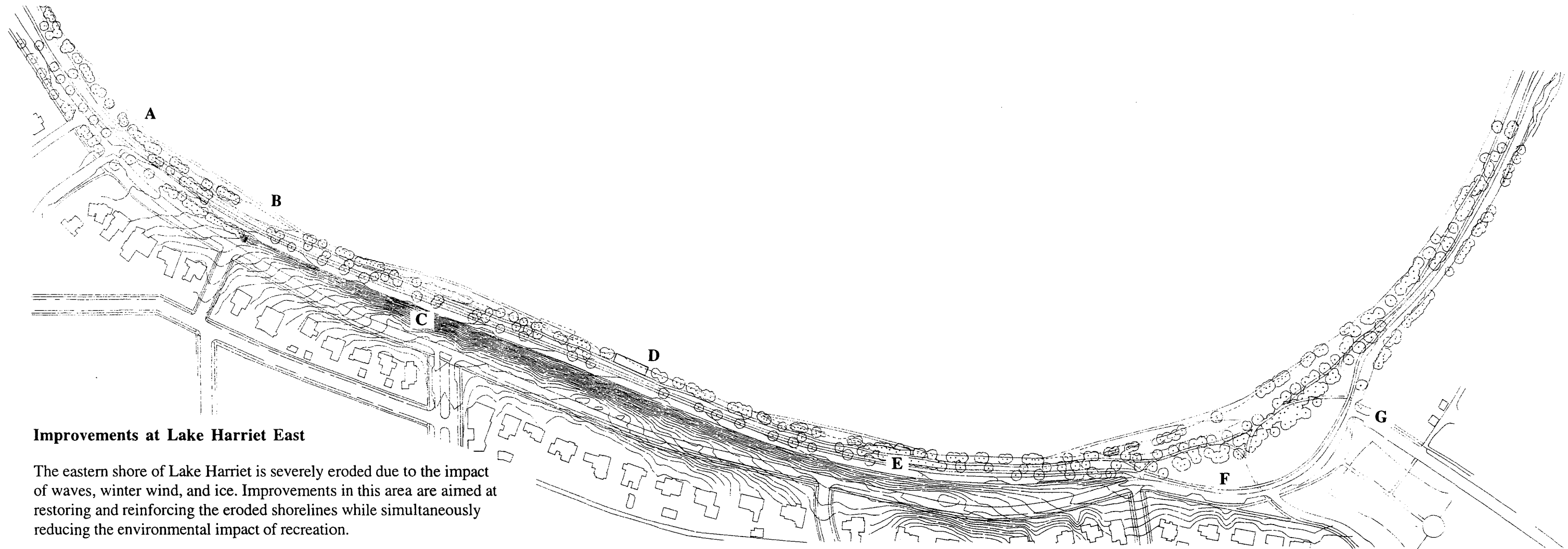
In addition, the Comprehensive Plan proposes to lengthen and to improve Thomas Beach to encourage the dispersal of beach-related activities. Lengthening the beach will also reduce impact at the lake edges, particularly where land area is narrow, such as between Upton Avenue and Sheridan Avenue. Other improvements, such as the addition of a play area and improved parking, will expand recreational possibilities in this area.

### LEGEND

- A. Vegetative buffer
- B. Thomas Beach (lengthened)
- C. Proposed 5' granular service access path to vegetative buffer
- D. Modified parking area at Thomas Beach
- E. Existing sand volleyball court
- F. Proposed tennis court
- G. Widen existing bicycle path from 8' to 10'
- H. Existing walking path with proposed 4' soft-surface jogging path to be added up-slope along side existing walking path



Southwest Lake Calhoun - Proposed Improvements



### Improvements at Lake Harriet East

The eastern shore of Lake Harriet is severely eroded due to the impact of waves, winter wind, and ice. Improvements in this area are aimed at restoring and reinforcing the eroded shorelines while simultaneously reducing the environmental impact of recreation.

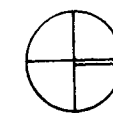
A vegetative filter and low-impact seasonal path (Lake Edge Type D) is proposed at each outfall location. The constructed path buffers the lake edge and existing vegetation against wind and ice erosion while providing an alternate pedestrian route during peak recreation seasons.

An important step in the improvement of this area is realignment of the parkway at the Rose Garden. Shifting the parkway north of its present location will increase the permeable land area immediately adjacent to the lake while creating a new place for passive recreation. Impact to the shore is further reduced by relocating bicycle paths closer to the road edge where they may be better linked to improved crossings at the Rose Garden intersection.

Parkway realignment can be phased with much-needed improvements at the Rose Garden intersection, such as 'necking down' the roadway at the intersection to slow traffic, zebra striping for pedestrian and bicycle crossings, and improved connections to non-motorized recreation paths.

### LEGEND

- A. Reconfigure lake edge at connection to Minnehaha Creek
- B. Vegetative buffer - Typical at each existing stormwater outfall.  
Existing trees to remain on islands within vegetative buffer
- C. Remove invasive exotic plants and selectively prune vegetation to provide views of lake from upper roadway
- D. Relocate canoe dock
- E. Narrow lower roadway to 9' driving lane. Remove lakeside curb. Class A bicycles to use upper roadway
- F. Re-align parkway at Rose Garden to provide a new lakeside picnic lawn. (See detail plan of Lake Harriet Parkway East, page 29)
- G. Reconfigure intersection and pedestrian bicycle crossing at Rose Garden (see detail plans of Lake Harriet Parkway East, page 29)

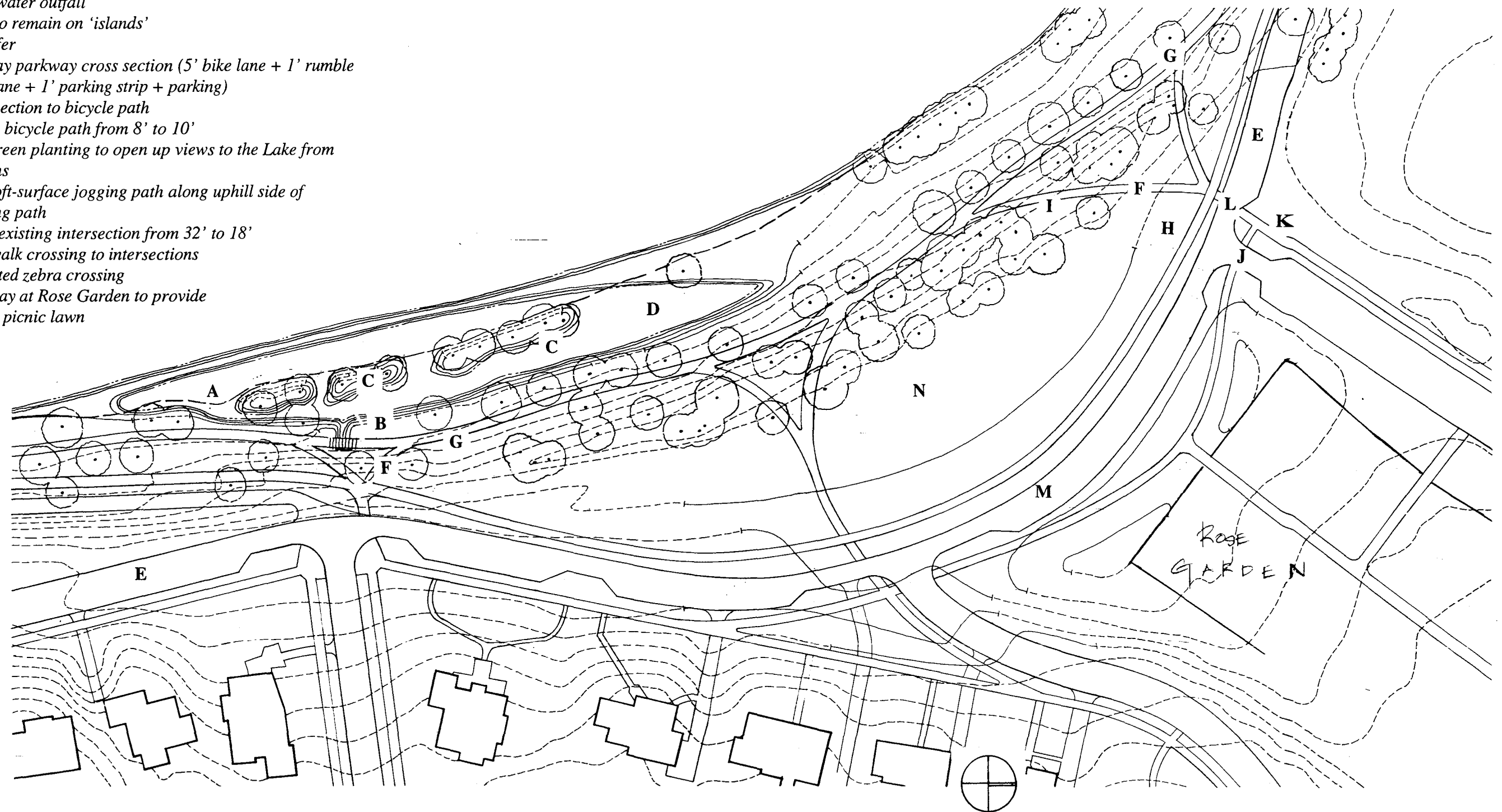


Lake Harriet Parkway East  
Proposed Lake Edge Improvements

Chain of Lakes Comprehensive Plan, December 1997  
Minneapolis Park and Recreation Board

**LEGEND**

- A. Existing shoreline
- B. Existing stormwater outfall
- C. Existing trees to remain on 'islands'
- D. Vegetative buffer
- E. Typical one-way parkway cross section (5' bike lane + 1' rumble strip + 9' car lane + 1' parking strip + parking)
- F. Proposed connection to bicycle path
- G. Widen existing bicycle path from 8' to 10'
- H. Remove evergreen planting to open up views to the Lake from the intersections
- I. Proposed 4' soft-surface jogging path along uphill side of existing walking path
- J. "Neck down" existing intersection from 32' to 18'
- K. Relocate sidewalk crossing to intersections
- L. Proposed painted zebra crossing
- M. Realign parkway at Rose Garden to provide a new lakeside picnic lawn
- N. Picnic lawn



Lake Harriet Parkway East  
Proposed Parkway reconfiguration at Rose Garden

# Recreation

## Overview

With careful planning and management, the Chain of Lakes Regional Park can continue to support the present concentration of activity. To address increasing conflicts and demands placed on the recreation systems at the Chain of Lakes, a combination of strategies is recommended. Critical to the success of these strategies are several assumptions which lie outside the scope of the Comprehensive Plan:

- Zero growth of recreational offerings within the Chain of Lakes.
- Concurrent and equal investment in improving other urban parks within the city to encourage equitable appeal.
- A comprehensive study of the Twin Cities regional park system to identify opportunities for consolidation, linkage, and equal distribution of recreation systems.

In their 1971 report entitled “Minneapolis Parkway Systems,” the landscape architectural firm of Eckbo Dean Austin and Williams addressed the issue of increased complexity and volume of linear recreation within the limited lands available for recreation in the Chain of Lakes. The Eckbo plan emphasized balancing recreational uses by establishing a hierarchy of activity relative to intensity of use which addresses both conflict between different uses and environmental impact. This hierarchy placed the lowest intensity (passive) activities closest to the shoreline and the highest intensity activities furthest from the shoreline and closest to the parkways.

Since the 1970s the MPRB has adhered to the principles outlined in the Eckbo report. Linear recreation such as leisure driving and strolling, key elements in Cleveland’s initial plan, continue to be a vital part of recreation at the Chain of Lakes. Since the 1970s a dramatic increase in biking, jogging, and more recently, in-line skating has strained the existing linear recreation systems.

The Comprehensive Plan builds on the principles of the Eckbo plan while balancing recreational demands with the primary goal of improving water quality within the Chain of Lakes.

## Consultants’ Recommendations

1. Break up concentrated activity areas by dispersing high intensity activities such as boating:
  - relocate the boat launch at Lake Harriet.
  - relocate the boat launch at Lake Calhoun.
  - relocate bicycle paths to the outer perimeter of the congested activity areas at the refectories.
2. Improve critical areas in decline:
  - Renovate Lake Harriet Refectory and Bandstand area
  - Renovate Lake Calhoun Refectory area.
  - Restore trees and lawn at the North Arm of Lake of the Isles.
3. Improve non-motorized recreational linkages between the different lakes. Separate recreation from vehicular circulation wherever possible:
  - Improve connections between Lake Harriet and Lake Calhoun through William Berry Park.
  - Improve connections between Lake Calhoun and Lake of the Isles.
  - Extend pedestrian access at southwest shore of Cedar Lake.
  - Pedestrian bridge at Lake of the Isles at 26<sup>th</sup> Street.
  - Renovate and expand the beach at the north shore of Lake Calhoun.
4. Maintain and improve existing ‘linear’ recreation systems, such as jogging, biking, and walking:
  - Reduce the intensity of these activities at the lake edge by relocating one or more of these activities.
  - Relocate ‘Class A’ cyclists to a proposed designated bike lane on the Parkways.
  - Provide a new 4’ soft surface path along the parkway side of the existing walking path to reduce the tendency by runners to create ‘cow paths’ for running.
  - Widen existing bicycle paths from 8’ to 10.’

## Citizens’ Advisory Committee Goals

(From Framework Committee Amended Goals & Objectives, adopted February 13, 1996.

- Provide recreational opportunities in an appropriate balance with/to their impacts on the environmental setting, aesthetics, and maintenance costs.
- Identify and develop ‘activity areas’ throughout the Chain of Lakes and other strategies that improve their usage and interaction with each other.
- Ensure that people of all ages and abilities, especially children, have safe places to swim and recreate.
- Enhance the quality of design where people gather for activities, such as at the bandstand, refectories, beaches and skating rinks, and ensure that these high intensity uses do not overburden the lake system as a whole.

## Implementation - Recreation

The following describes specific implementation strategies for each of the recommendations which address issues linked to recreation and water quality in the Chain of Lakes Regional Park.

### Lake Harriet Boat Launch Relocation

Relocating the boat launch away from the Refectory and Bandstand is critical to the long-term use and maintenance of the northwest shore of Lake Harriet. During peak periods, daily activities such as boating, biking, jogging, and outdoor eating combined with large-scale events at the bandstand place overwhelming demands on this section of the lake shore. As part of this strategy, the sailboat launch should be relocated as a singular activity to another location on the lake. This would reduce the potential for conflict with other activities and would also provide the land area required for parking, launching, and maneuvering vehicles and boats.

Several options were examined as possible new boat launch locations, including the lakeshore below Beard’s Plaisance, the lakeshore east of the Bandstand, and upgrading the boat launch in its present location.

**Lake Harriet Boat Launch Relocation Option A**

Option A involves relocating the boat launch to the lakeshore immediately downhill from Beard's Plaisance. A significant section of parkland can be incorporated into the lakeshore by realigning the parkway and relocating the existing tennis courts. This arrangement permits a 14-space 'DNR' standard parking area, boat launch, and 'sailor's dock' to be created adjacent to the lakeshore. The bike path will be re-routed around the new parking area to eliminate conflict with pedestrian and boat activities. Vegetative filters will stabilize the adjacent lakeshores while filtering stormwater entering the area. A new ADA-accessible pedestrian path will link the boat launch and parking area with Beard's Plaisance, reconnecting this beautiful picnic area with Lake Harriet.

The primary benefit of Option A is the complete removal of the boat launch from the highly congested northwest shore. The modified Bandstand/Refectory area will be greatly improved and will require less maintenance

With diminished use, and increased open space, both the environmental impact (water quality, soil compaction) and safety hazards in the Bandshell area will be reduced.

This option will require a greater initial capital investment than Options B and C. However, the long-term environmental benefits and reduction in maintenance costs realized through relocating the boat launch will far exceed the initial investment.

**LEGEND**

- A. Proposed relocated boat launch with parking for 11 boat trailers
- B. Realigned segment of Lake Harriet Parkway West
- C. Additional parking for 3 trailers
- D. Proposed realigned bicycle path, separated from boat launch
- E. Walking path control gate
- F. Reconfigure walking/bicycle paths at boat launch area
- G. Realigned intersection
- H. Existing Woodland - limb up trees and clear understory to remove invasive exotic plants and allow summer views of Lake Harriet
- I. Proposed ADA-accessible path to picnic area
- J. Vegetative buffer



Lake Harriet Boat Launch  
Option A: Relocated to Beards Plaisance

**Lake Harriet Boat Launch Relocation Option B**

Option B involves relocating the boat launch to the east side of the Bandstand. Lake Harriet Parkway will be reconfigured to allow an existing parking area adjacent to the Roberts Bird Sanctuary to be linked to the shoreline. The parking area will be re-stripped to accommodate approximately 16 trailer parking spaces.

The main disadvantage of this option is that it relocates the boat launch to an area which is already very congested. Although the boat launch would be further from the refectory, it would be closer to the Bandstand. In addition, existing conditions will not allow the pedestrian and bicycle paths to remain close to the lake shore without crossing the boat launch, thus recreating a similar hazard to that which exists presently.

The primary benefit of this option is minimal initial capital costs by reusing the existing parking area and maintaining all other activities in their existing locations.

**LEGEND**

- A. Existing refectory with expanded outdoor eating terrace
- B. Existing bandstand seating with expanded outline
- C. Proposed shade tree grove
- D. Proposed grass-covered earthform
- E. Relocated men's rest room building
- F. Reconfigured and expanded bicycle path
- G. Reconfigured Lake Harriet Parkway
- H. Modified existing parking lot
- I. Proposed relocated boat ramp with boat trailer turn-around
- J. Existing parking area reconfigured for boat trailer parking
- K. Vegetative buffer
- L. Proposed combined pedestrian/bicycle overpass
- M. Proposed Lowering of L. H. Parkway to facilitate recreation overpass



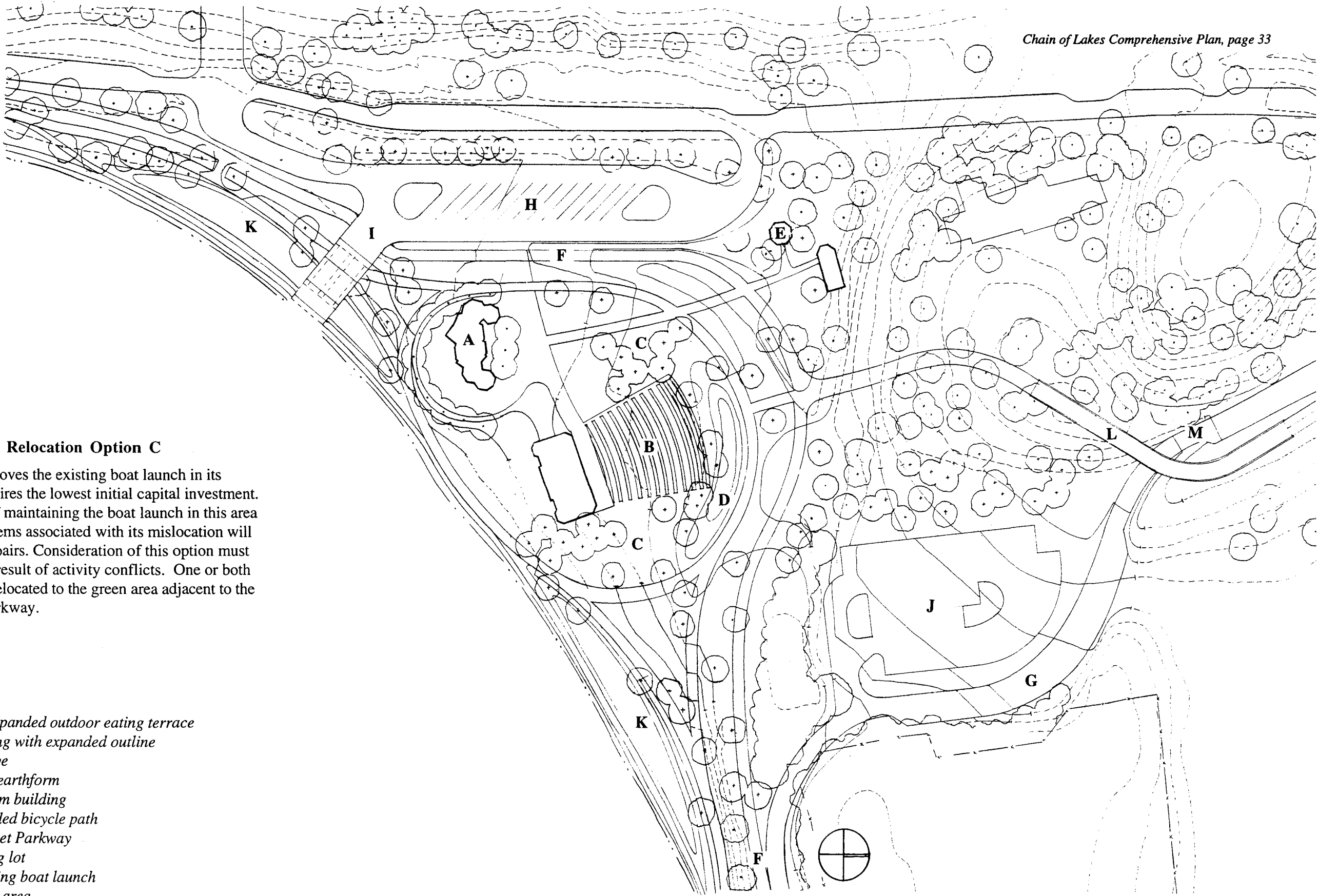
Lake Harriet Boat Launch  
Option B: Relocated to East Side of Bandstand

**Lake Harriet Boat Launch Relocation Option C**

This option maintains and improves the existing boat launch in its present location. Option C requires the lowest initial capital investment. However, the long-term cost of maintaining the boat launch in this area and addressing the many problems associated with its mislocation will far exceed the initial cost of repairs. Consideration of this option must also address safety issues as a result of activity conflicts. One or both linear paths would need to be relocated to the green area adjacent to the parking along Lake Harriet Parkway.

**LEGEND**

- A. Existing refectory with expanded outdoor eating terrace
- B. Existing bandstand seating with expanded outline
- C. Proposed shade tree grove
- D. Proposed grass-covered earthform
- E. Relocated men's rest room building
- F. Reconfigured and expanded bicycle path
- G. Reconfigured Lake Harriet Parkway
- H. Modified existing parking lot
- I. Improve and widen existing boat launch
- J. Improve existing parking area
- K. Vegetative buffer
- L. Proposed combined pedestrian/bicycle overpass
- M. Proposed lowering of L. H. Parkway to facilitate recreation overpass



**Lake Harriet Boat Launch  
Option C: Maintain and Improve Present Location**

**Lake Harriet Bandstand and Refectory**

As discussed earlier, the most critical prerequisite to improving this area is relocating the boat launch. Another important change necessary to reduce activity conflicts and environmental impact at the lakeshore is to relocate the bicycle path to the north side of the bandstand. Regardless of whether the boat launch is moved to the east side of the bandstand, Lake Harriet Parkway should be realigned and slightly lowered to allow for a pedestrian/bicycle crossing. It is also recommended that the men’s rest room be relocated closer to the activity area.

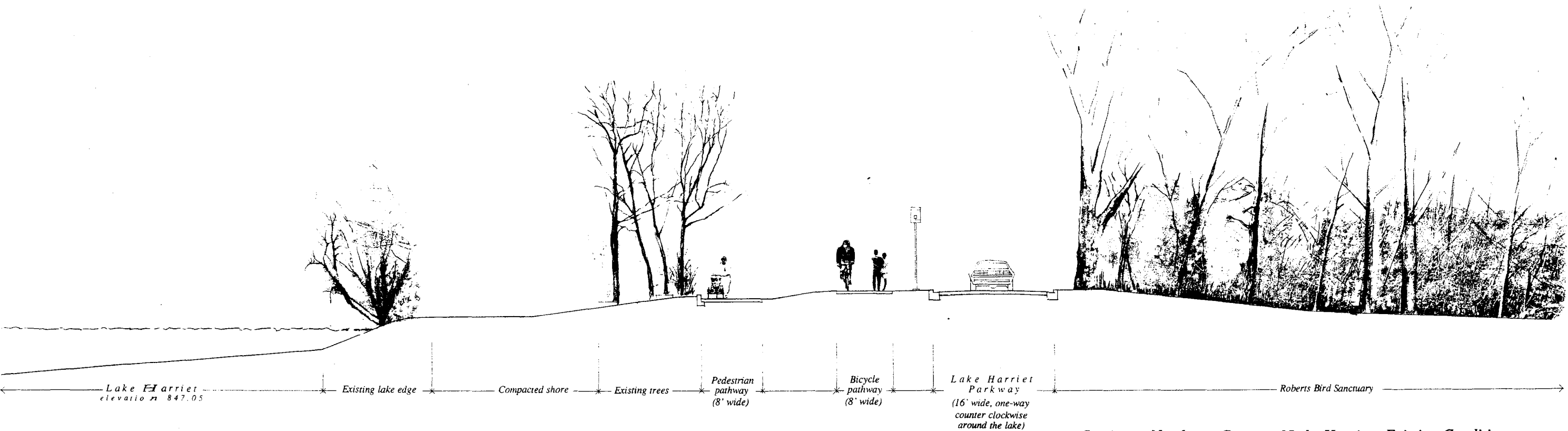
Presently, the refectory and bandstand site is degraded, existing pavement is in serious disrepair, and the condition of lawns and trees indicates extensive soil compaction. A subsurface system which resists compaction should be installed beneath all lawns in this area. A matrix of new canopy trees will unify the entire area and provide shade in the summer. Improvements to the amphitheater include expanded seating and a new grass berm encircling the seating area to provide enclosure, spatial definition, and protection from the adjacent bicycle path.

**LEGEND**

- A. Existing refectory with expanded outdoor eating terrace
- B. Existing bandstand seating with expanded outline
- C. Proposed shade tree grove
- D. Proposed grass-covered earthform
- E. Relocated men’s rest room building
- F. Reconfigured and enlarged bicycle path
- G. Modified existing parking lot
- H. Reconfigured Lake Harriet Parkway
- I. Vegetative buffer
- J. Improved existing parking area
- K. Proposed combined pedestrian/bicycle overpass
- L. Lower Lake Harriet Parkway to facilitate recreation overpass

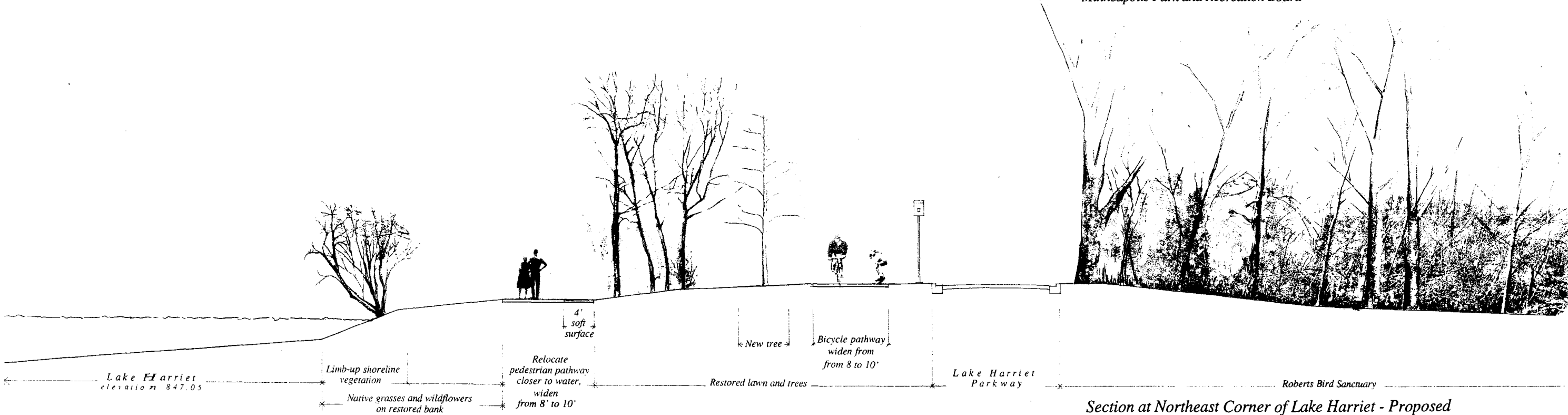


*Renovations at Lake Harriet Bandstand and Refectory*



Section at Northeast Corner of Lake Harriet - Existing Condition

Chain of Lakes Comprehensive Plan, December 1997  
Minneapolis Park and Recreation Board



Section at Northeast Corner of Lake Harriet - Proposed

Chain of Lakes Comprehensive Plan, December 1997  
Minneapolis Park and Recreation Board

### Connecting Lake Harriet and Lake Calhoun

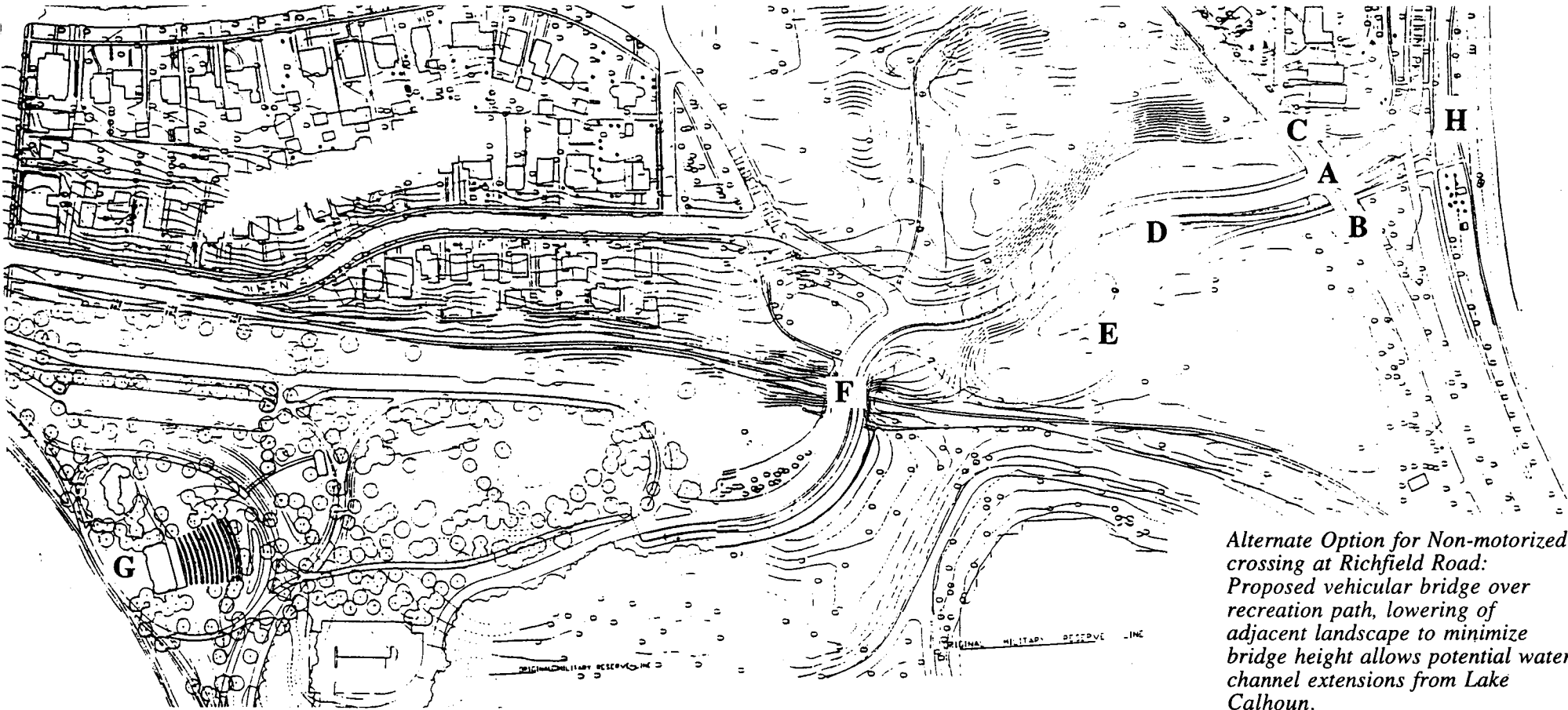
Redesign in several areas would improve non-motorized recreation connections between Lake Harriet and Lake Calhoun through William Berry Park.

William Berry Park occupies the area between the northwest shore of Lake Harriet and the south shore of Lake Calhoun. Although the park appears to be an ideal link between the two lakes, critical connections between linear recreation systems are interrupted at several points by William Berry Parkway and Richfield Road.

Examination of this area is focused on critical areas of conflict between non-motorized and motorized recreation. At Lake Harriet Parkway south of the intersection with William Berry Parkway, a grade-separated crossing for bicycles and pedestrians is proposed. Crossings at William Berry Parkway and Richfield Road could be significantly improved through intersection realignment, traffic calming strategies, and signalized pedestrian/bicycle crossings.

Other suggestions include improving connections around the Lake Harriet Bandstand area allowing recreation 'through-traffic' to bypass this high-intensity area and reducing the potential for conflict with other activities.

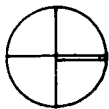
Finally, the proposed extension of the trolley line from its present terminus at the south shore of Lake Calhoun to the Lake Calhoun Refectory will offer recreational users greater options for public transportation between the lakes, thereby reducing recreational traffic on the parkways.



*Alternate Option for Non-motorized crossing at Richfield Road: Proposed vehicular bridge over recreation path, lowering of adjacent landscape to minimize bridge height allows potential water channel extensions from Lake Calhoun.*

### LEGEND

- A. Reconstructed intersection of William Berry Parkway and Richfield Road
- B. Proposed boulevard treatment of Richfield Road including 10' median
- C. At-grade pedestrian/recreation path crossings
- D. Two-way bicycle path
- E. Wet meadow landscape
- F. Narrow car lanes to 9' to accommodate two-way bicycle and pedestrian path along north side of Parkway bridge
- G. Bandstand area improvements
- H. Proposed bicycle connection



Connecting Lake Harriet and Lake Calhoun

Chain of Lakes Comprehensive Plan, December 1997  
Minneapolis Park and Recreation Board

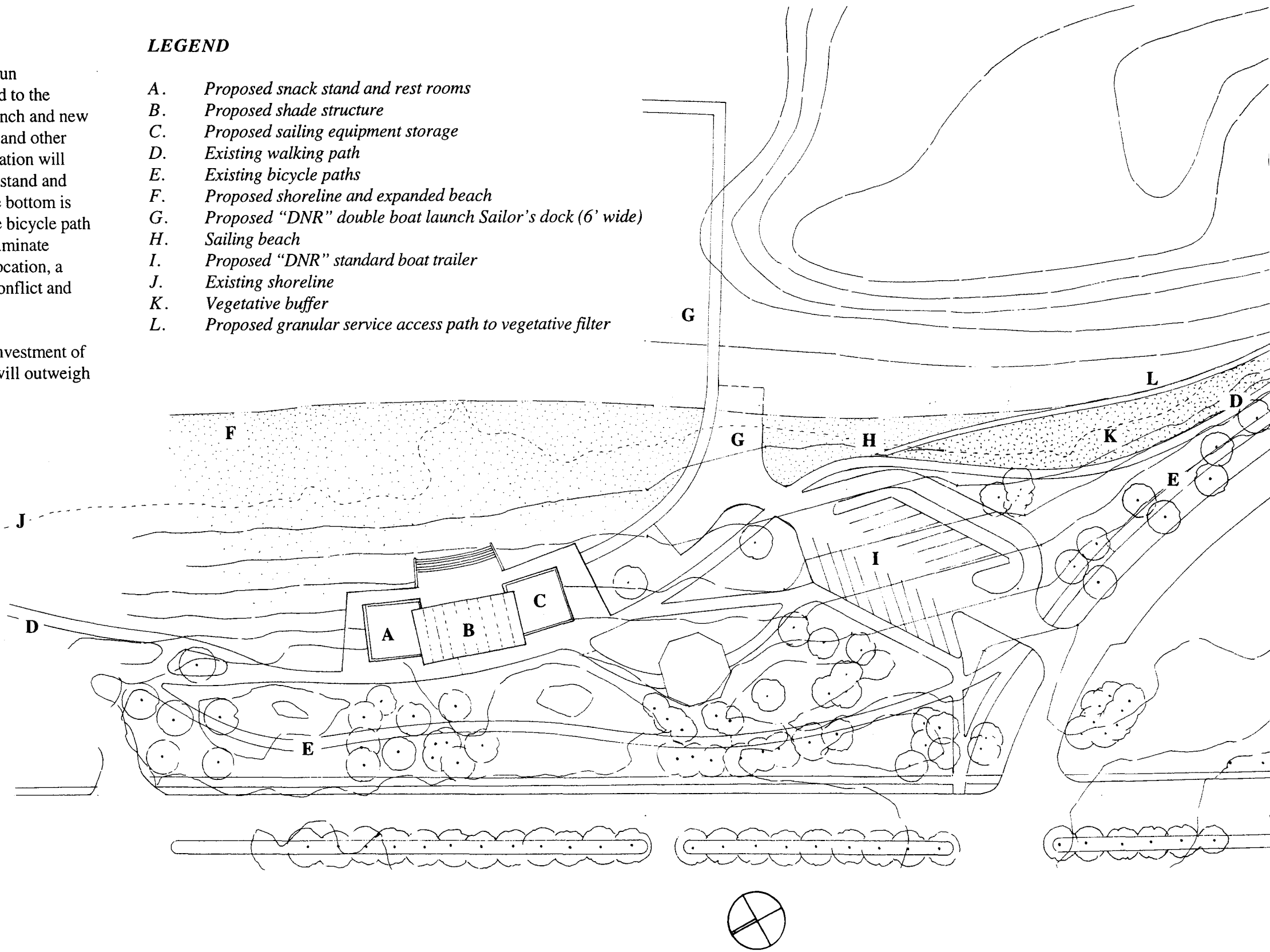
### Lake Calhoun Boat Launch Relocation

Due to the high concentration of activity at the Lake Calhoun Refectory, we recommend that the boat launch be relocated to the northwest corner. This location allows for a large boat launch and new trailer parking area with a storage shelter, a sailor's dock, and other amenities. Conveniently accessible to Lake Street, this location will also be adjacent to new beach facilities, including a snack stand and rest rooms. The boat launch will be located where the lake bottom is already deep and will therefore require little alteration. The bicycle path will be relocated to the outer edge of the parking area to eliminate conflict with launching. As with the Lake Harriet boat relocation, a major benefit of this option is a reduction in recreational conflict and environmental impact at the existing refectory area.

The disadvantage of this scheme lies in the initial capital investment of building new facilities. However, the long-term benefits will outweigh the initial cost.

### LEGEND

- A. Proposed snack stand and rest rooms
- B. Proposed shade structure
- C. Proposed sailing equipment storage
- D. Existing walking path
- E. Existing bicycle paths
- F. Proposed shoreline and expanded beach
- G. Proposed "DNR" double boat launch Sailor's dock (6' wide)
- H. Sailing beach
- I. Proposed "DNR" standard boat trailer
- J. Existing shoreline
- K. Vegetative buffer
- L. Proposed granular service access path to vegetative filter



Lake Calhoun Boat Launch Relocation

**Renovations at Lake Calhoun Refectory**

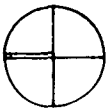
As recommended at Lake Harriet, renovation of this area assumes the relocation of the sailboat launch to another location on the lake. The most significant change proposed is the transformation of the lake edge at the refectionary to take advantage of the lakeshore views. An outdoor dining terrace will extend the refectionary to the lakeshore. Two small new structures will flank the refectionary, enclosing a new large dining terrace and providing shelter for rental boat storage.

The future extension of the trolley line will terminate in this area. Extended pedestrian paths and carefully placed bicycle paths will connect the trolley to Lake Calhoun, recreation, and links to other lakes.

Additional improvements include renovation of the lawn and adjacent lakeshore and street tree planting at Lake Street.

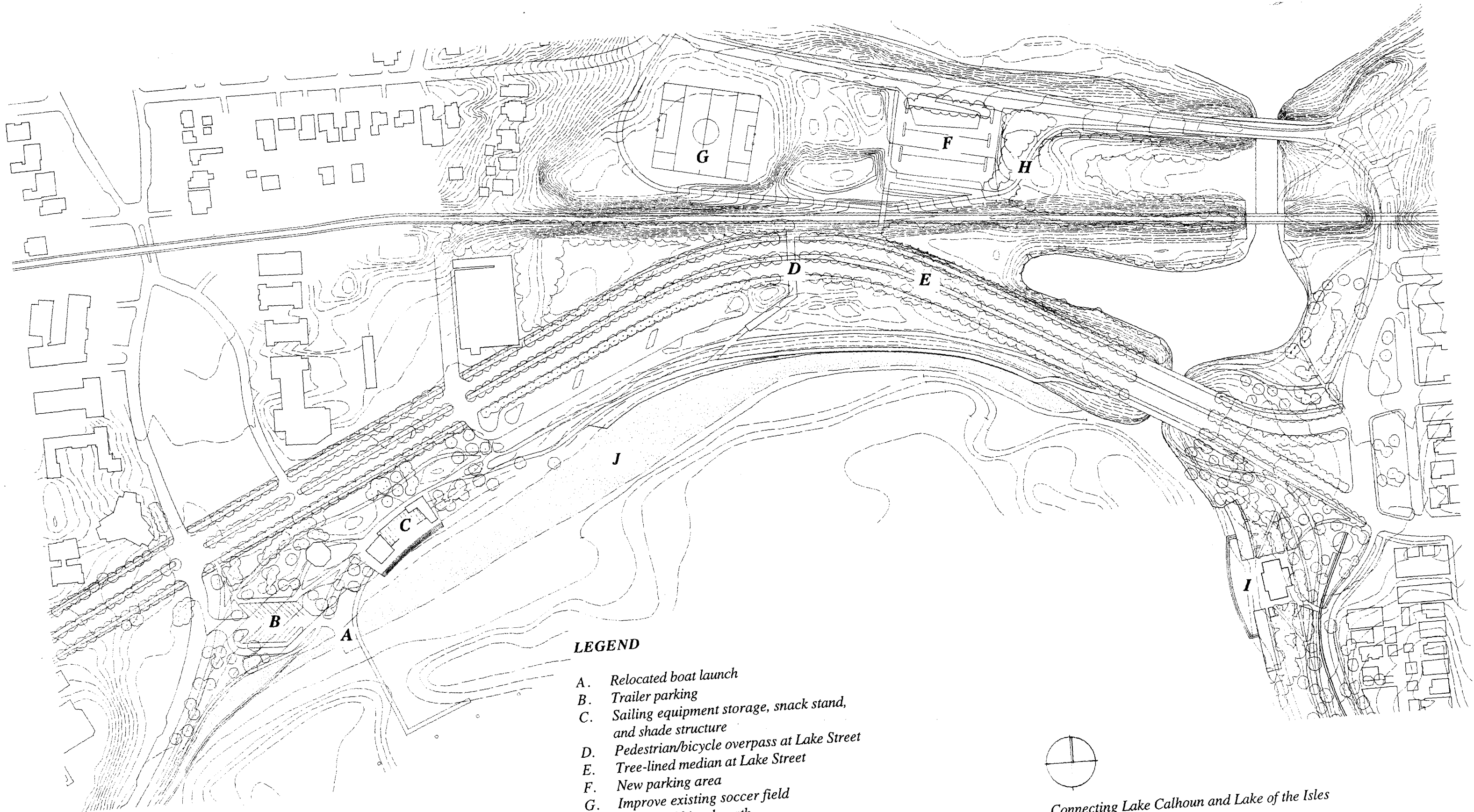
**LEGEND**

- A. *Proposed lakeshore dining terrace*
- B. *Relocated rental boat storage*
- C. *Re-aligned walking and bicycle paths to reduce conflict with refectionary activities*
- D. *Proposed trolley termination point*
- E. *Reconfigure Calhoun Parkway East (one-way southbound, see typical street section page 52)*
- F. *Proposed street tree planting along entire length of Lake Street, both sides*
- G. *Proposed median with street trees along entire length of Lake Street*



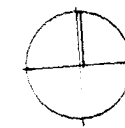
*Renovations at Lake Calhoun Refectory*

*Chain of Lakes Comprehensive Plan, December 1997  
Minneapolis Park and Recreation Board*



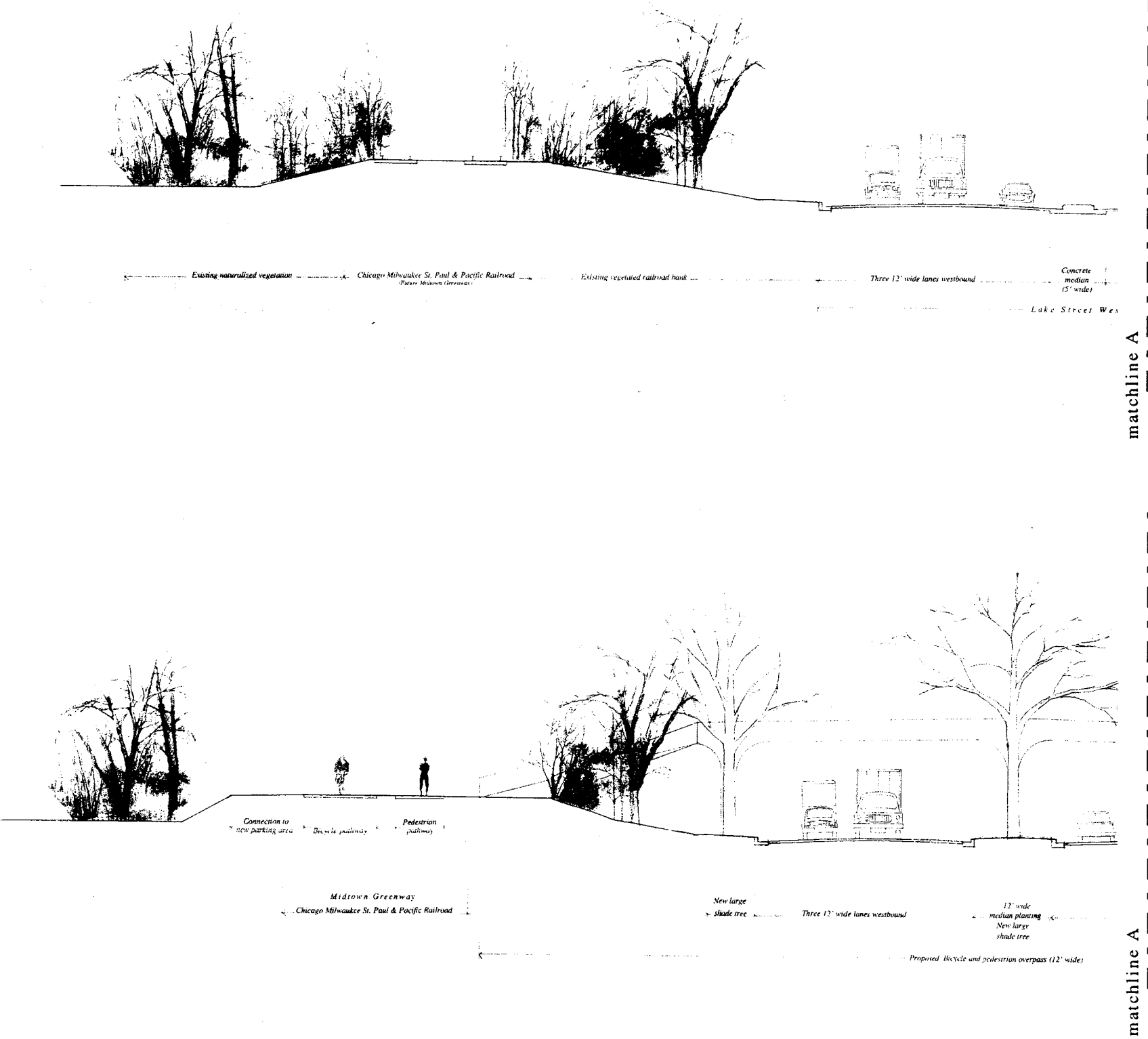
**LEGEND**

- A. Relocated boat launch
- B. Trailer parking
- C. Sailing equipment storage, snack stand, and shade structure
- D. Pedestrian/bicycle overpass at Lake Street
- E. Tree-lined median at Lake Street
- F. New parking area
- G. Improve existing soccer field
- H. Expanded bicycle path
- I. Improve refectory
- J. Expanded beach along the north shore



Connecting Lake Calhoun and Lake of the Isles

Chain of Lakes Comprehensive Plan, December 1997  
Minneapolis Park and Recreation Board



matchline A



Section, Lake Street/Lake Calhoun - Existing Condition

Chain of Lakes Comprehensive Plan, December 1997  
Minneapolis Park and Recreation Board

matchline A



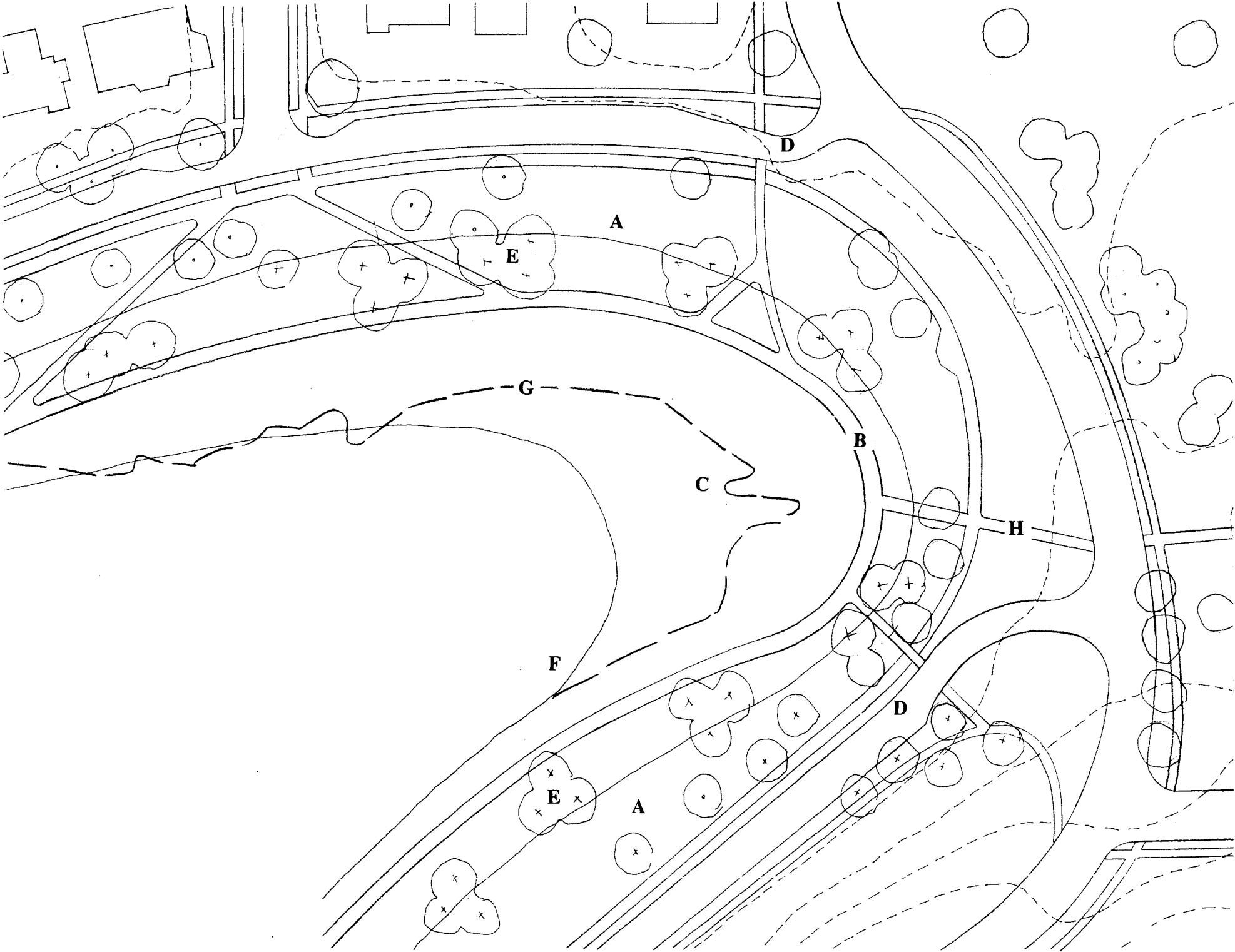
Section, Lake Street/Lake Calhoun - Proposed Overpass

Chain of Lakes Comprehensive Plan, December 1997  
Minneapolis Park and Recreation Board

**Rejuvenation of the North Arm at Lake of the Isles**

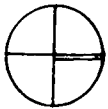
The lawn at the North Arm of Lake of the Isles, prized for its pastoral beauty, has steadily declined for the past several years. A 1992 investigation by Wenck Associates revealed that subsidence and standing water along the north arm and northwest corner are caused by elevated groundwater levels and poorly drained underlying soils. The Comprehensive Plan recommends that the lawn be fully restored. The scale and cost of such an undertaking will be considerable. A sectional study (see page ) describes the recommended new cross section. This will require overexcavation of the existing bank, installation of a subsurface drainage system, replacement of topsoil and some subsoils, reseeding, and new tree planting. This strategy assumes that many of the existing trees will be removed for this work.

Additional improvements envisioned for this portion of the lake include vegetative filters at the lakeshore where stormwater outlets occur and the extension of pedestrian paths to connect neighborhood sidewalks with lakeshore recreational paths.

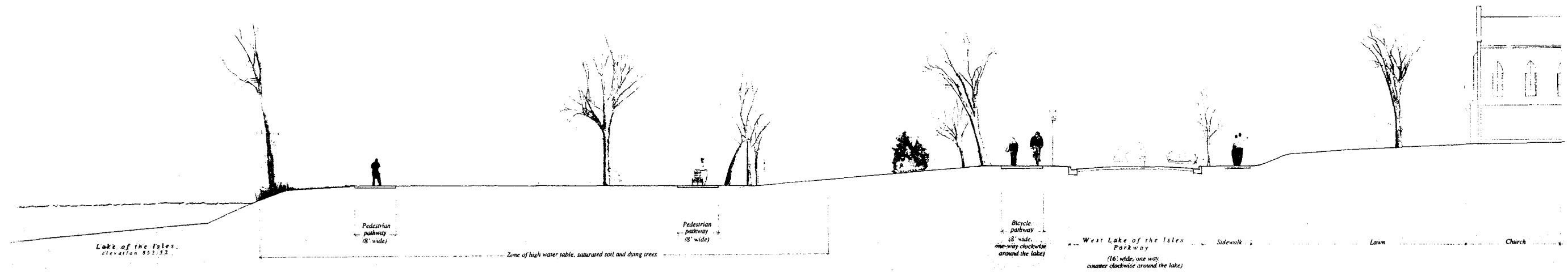


**LEGEND**

- A. Reconstructed and filled lawn area
- B. Re-aligned walking path
- C. Vegetative buffer
- D. Reconfigure Lake of the Isles Parkway
- E. Proposed flood-tolerant shade tree planting
- F. Proposed shoreline
- G. Existing shoreline
- H. Proposed bicycle connection

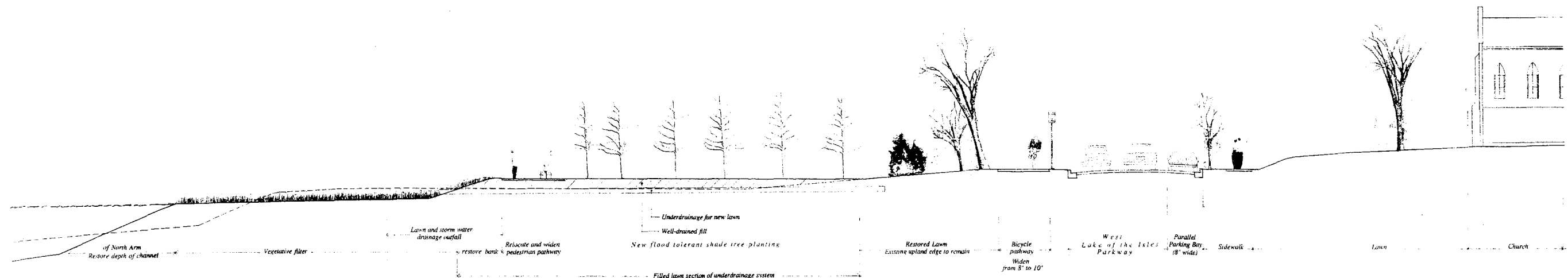


*Rejuvenation of the North Arm at Lake of the Isles*



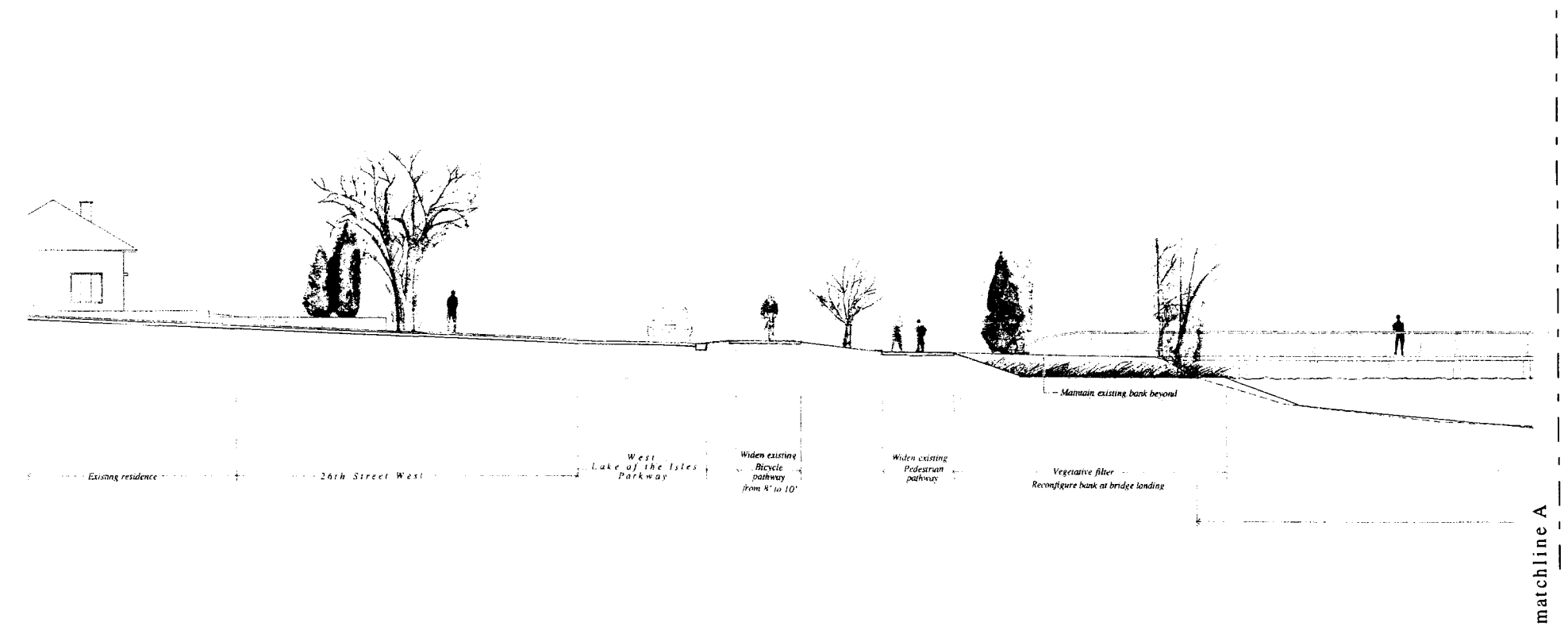
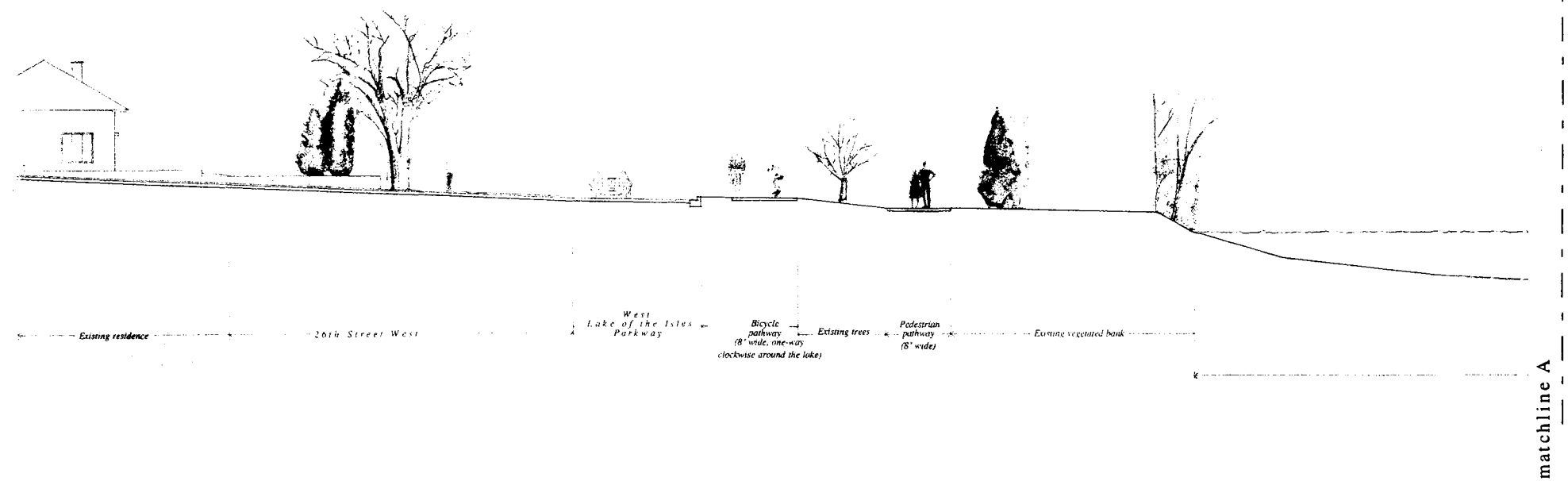
Section at North Arm at Lake of the Isles - Existing Condition

Chain of Lakes Comprehensive Plan, December 1997  
Minneapolis Park and Recreation Board



Section at North Arm at Lake of the Isles - Proposed

Chain of Lakes Comprehensive Plan, December 1997  
Minneapolis Park and Recreation Board



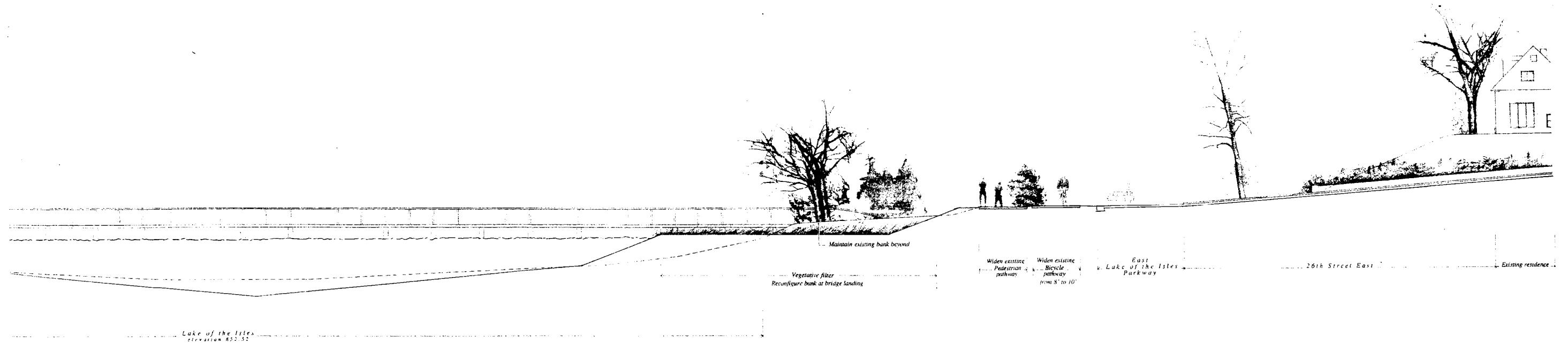
matchline A



Section Across Lake of the Isles at 26<sup>th</sup> Street  
Existing Condition

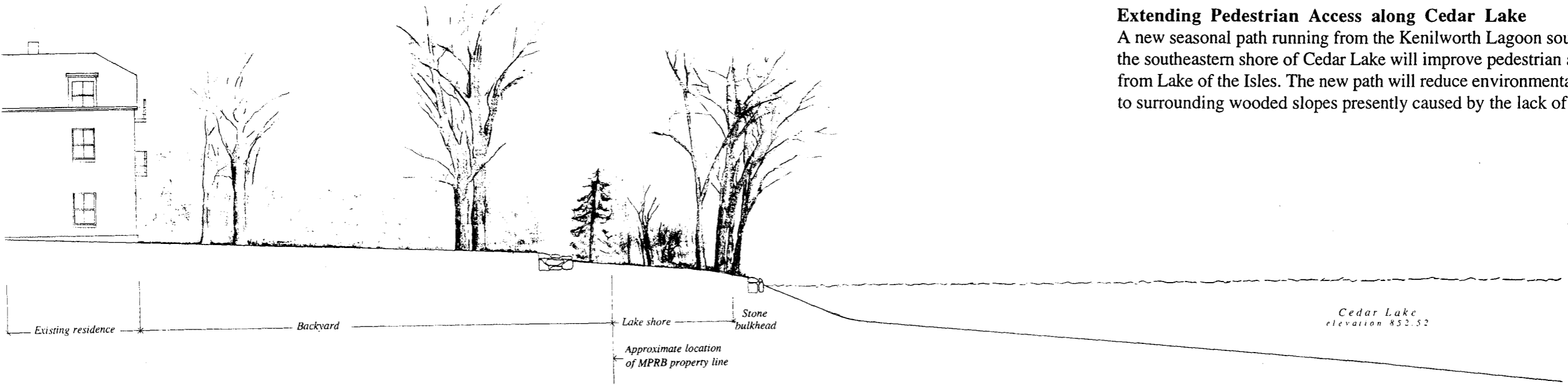
Chain of Lakes Comprehensive Plan, December 1997  
Minneapolis Park and Recreation Board

matchline A



Section Across Lake of the Isles at 26<sup>th</sup> Street  
Proposed Bridge

Chain of Lakes Comprehensive Plan, December 1997  
Minneapolis Park and recreation Board

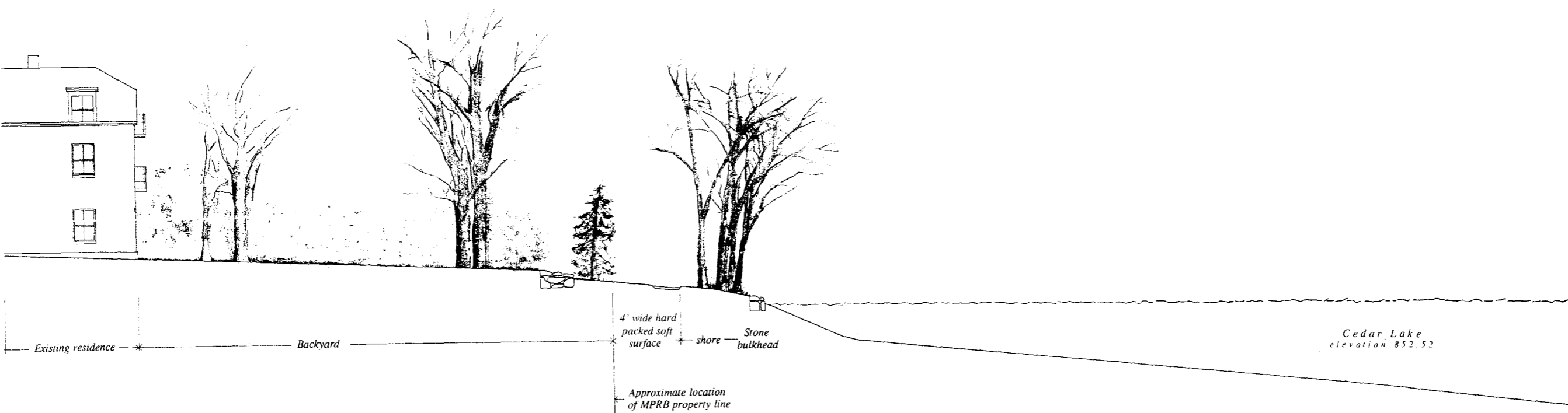


**Extending Pedestrian Access along Cedar Lake**

A new seasonal path running from the Kenilworth Lagoon south along the southeastern shore of Cedar Lake will improve pedestrian access from Lake of the Isles. The new path will reduce environmental impact to surrounding wooded slopes presently caused by the lack of a path.

*Section at Southeast Side of Cedar Lake - Existing Condition*

*Chain of Lakes Comprehensive Plan, December 1997  
Minneapolis Park and Recreation Board*



*Section at Southeast Side of Cedar Lake - Proposed*

*Chain of Lakes Comprehensive Plan, December 1997  
Minneapolis Park and Recreation Board*

# Transportation

## Overview

The parkways are an integral part of the recreational experience at the Chain of Lakes Regional Park. They are the threads that weave together neighborhoods, the lakes, and the surrounding parkland. Conceived as carriage paths by H.W.S. Cleveland, the parkways continue to be used by many citizens for pleasure driving, due to their nearly continuous water views. In addition to the variety of recreation users that the parkways serve, they are important corridors for both local and commuter traffic.

Changes in the way parkways are used and increasing conflicts between motorized and non-motorized recreation users, commuters, and adjacent neighborhoods have intensified the need to reexamine the current and long-term relationships among the parkways, parklands, and their diverse users.

The following issues were considered in reevaluating the future of the parkways within the changing dynamic of the Chain of Lakes Regional Park:

- Safety issues relative to one-way vehicular circulation
- Traffic engineering studies relative to one-way versus two-way vehicular circulation
- Increase in local recreation traffic
- Commuter and Class A cyclists

Since the 1960s, the Minneapolis Park and Recreation Board has been converting the parkways which surround the Chain of Lakes from two-way to one-way circulation. Currently, Lake Harriet and Lake of the Isles are one-way, while Cedar Lake and Lake Calhoun are two-way, with plans being discussed to partially convert Calhoun to one-way.

There are two reasons why the Minneapolis Park and Recreation Board sees converting parkways from two-way to one-way circulation as an important change:

- reduction of impermeable pavement area adjacent to the edges of the lakes; and
- discouraging commuter traffic by cutting off through routes in both directions.

Traffic engineering studies have shown that one-way vehicular circulation can have the following negative impacts on the surrounding neighborhood fabric:

- Reduced safety due to the tendency of vehicles to exceed the posted speed limit. This is caused by the absence of the perceived danger of oncoming traffic.
- Creation of traffic patterns which are inconvenient to local traffic flow.

The Comprehensive Plan reexamines the relevance of converting parkway circulation to one-way given the potential negative impacts outlined above and the fact that recent surveys conducted show that traffic problems within the Chain are largely due to seasonal recreational traffic. At Lake Harriet, for example, statistics show that most parkway users are not suburbanites but rather city residents who live south of Minnehaha Parkway.

An important consideration further complicating the way in which the parkways are used is the recent trend in commuter cycling. Evidence gathered in studies conducted by the City indicates that 2.5% - 2.9% of the population in Minneapolis commute to work by bike.

Minneapolis Public Works is currently working on strategies to meet the public demand to accommodate commuter and recreational bicyclists. Several crucial cross-town trails have been established with links to the Chain of Lakes Regional Park. Cedar Lake Trail, a three-mile bicycle trail spanning from the Mississippi River to western suburbs, opened in 1995. Several other trails, including Bassett's Creek, the Midtown Greenway, and the Kenilworth Trail are being designed.

The Chain of Lakes Regional Park and its surrounding parkways are an important link in an expanding system of commuter bicycle trails. The Comprehensive Plan proposes that designated lanes be added to all parkways. In most cases this can be accomplished without widening the existing roadbed.

The success of this portion of the study lies in the thoughtful dialogue and healthy controversy which it produced. Although consensus was not reached, issues which are critical to better understanding the complexity of the transportation dynamic at the Chain of Lakes were defined. All agreed that future study and field testing of ideas are required.

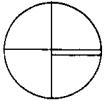
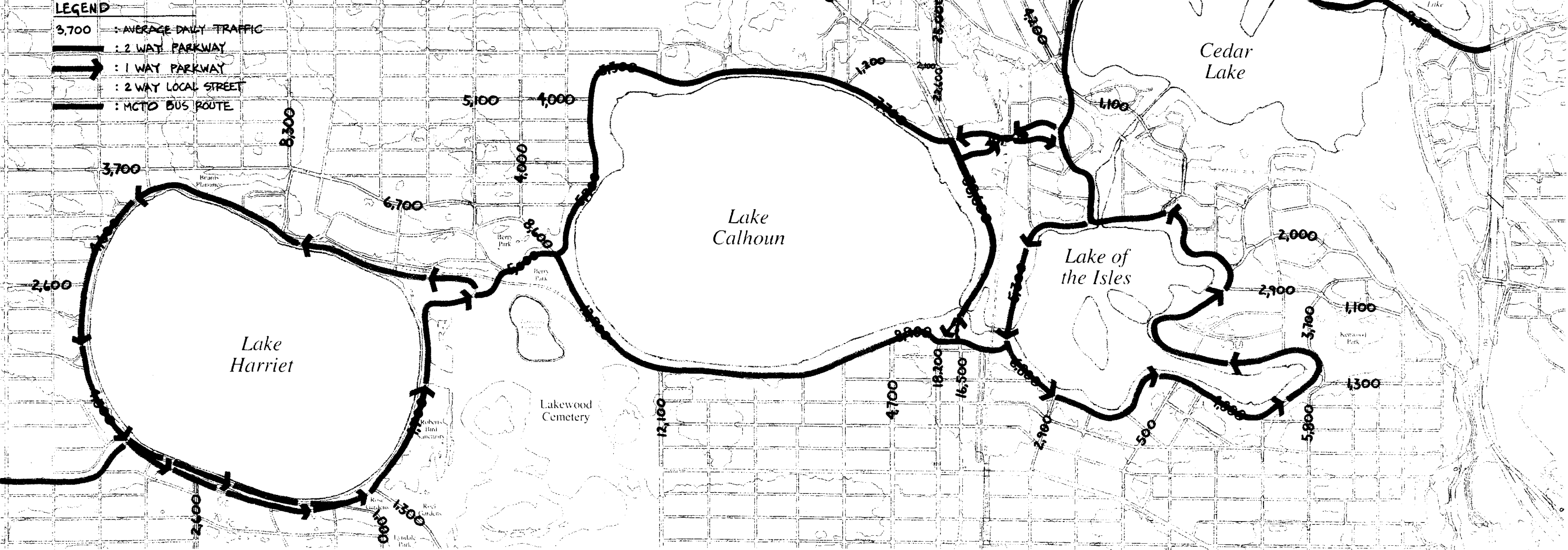
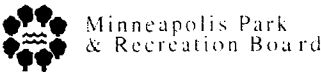
## Parking

While parking issues were not a significant part of this study several aspects of parking were discussed. The primary neighborhood concern regarding parking is that a reduction in available parking within park areas will force people to search for parking in surrounding neighborhoods.

The following creative solutions for serious consideration emerged from the process:

- Maintaining parking within the existing roadway cross-section will effectively narrow the perceived width of the roadway, thus reducing speeds and increasing safety for other park users.
- Potential areas for 'satellite' recreational parking should be located. Recreation links to the Chain of Lakes should be established so that users can cycle, walk, jog, or in-line skate to main recreation trails.

Chain of Lakes  
Comprehensive Plan



Traffic Analysis Diagram

### Consultants' Recommendations

#### Optimal Recommendation

A phased return of all parkways from one-way to two-way circulation is recommended. To accomplish this, lane widths do not need to be increased; in fact, narrowing of lanes will reduce the design speed of roads. Concurrent implementation of traffic-calming measures is vital to ensure that a maximum speed limit of 25 mph is self-enforced.

While the consultant team agrees with the goal of reducing paved area around the Lakes, conversion of the parkways from two-way to one-way greatly compromises overall safety by encouraging faster driving. Studies show that without the 'perceived element of friction' of oncoming traffic, cars moving one-way have an increased tendency to exceed posted speed. Reports have shown that commuter volume in some areas has been reduced due to inconvenient patterns created by one-way circulation. However, studies also indicate that local recreational traffic is the source of recent increases in volume. Therefore, the reduction in commuter traffic due to the conversion of parkways to one-way would not offset the reduction in safety to non-motorized users of the park and parkways.

#### Accepted Recommendations

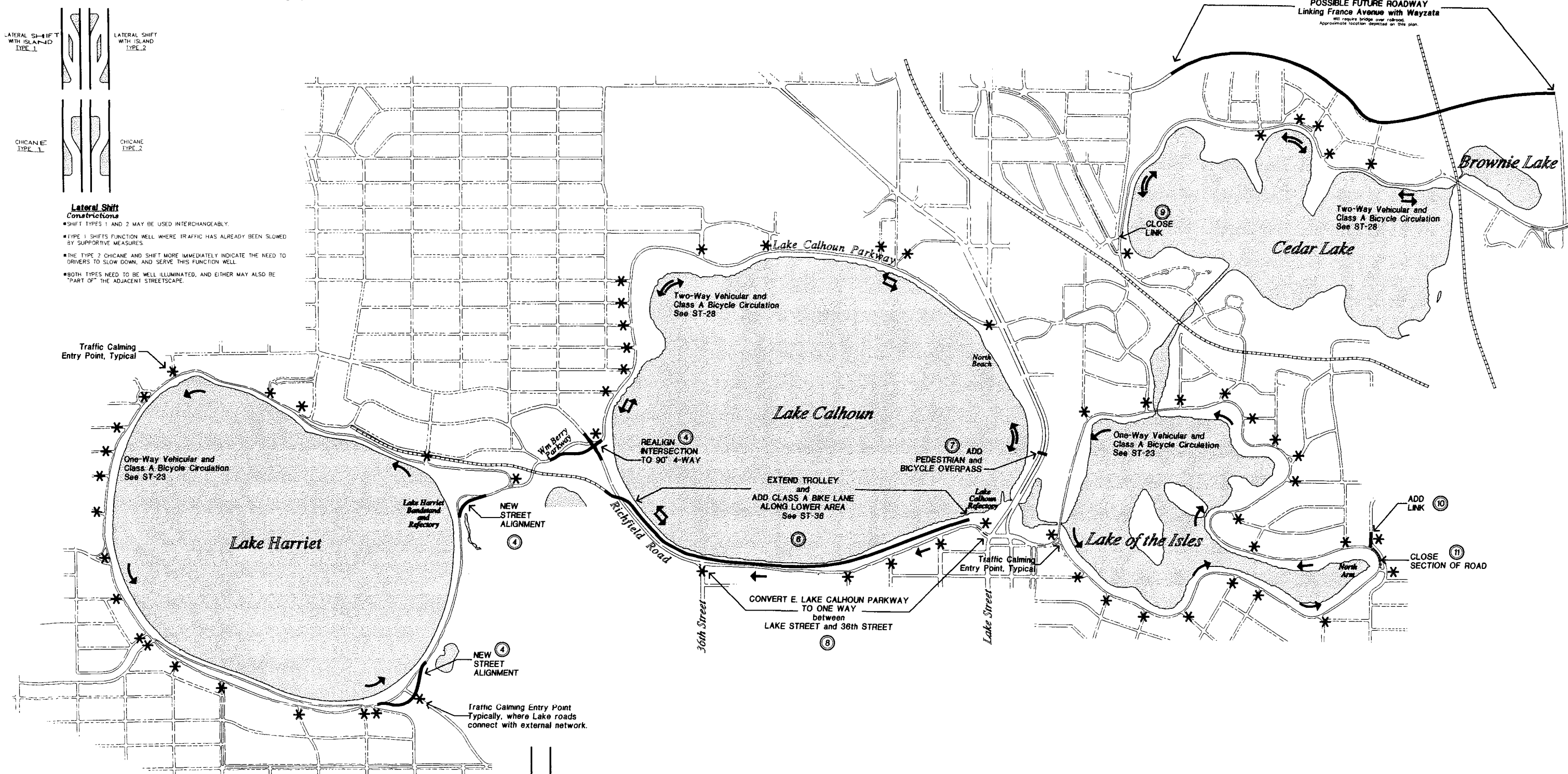
The following recommendations have been accepted but not endorsed by the MPRB, given a political environment that is not receptive to reconversion of the existing one-way parkways.

- Maintain existing one-way vehicular circulation at Lake Harriet.
- Maintain two-way vehicular circulation along Lake Calhoun Parkway, except at East Lake Calhoun Parkway, as described below.
- Convert East Lake Calhoun Parkway between Lake Street and 36<sup>th</sup> Street to one-way. *(This recommendation is still under discussion including the direction of traffic flow)*
- Extend trolley line from Lake Harriet to Lake Calhoun Refectory. Locate trolley in existing roadbed of East Lake Calhoun Parkway.
- Maintain existing one-way vehicular circulation at Lake of the Isles
- Maintain two-way vehicular circulation at Cedar Lake. *(This recommendation is still under discussion including the potential for a one-way pair with Ewing)*
- Implement traffic calming measures as recommended at each lake in the 'Calming Plan.'
- Add Class A bicycle lane(s) to all parkways.

### Citizens' Advisory Committee Goals

(From the list of Framework Committee Amended Goals and Objectives dated 13 February 1996)

Reduce the impact of motorized traffic (roadways & parking) on park space and adjacent residential property. Configure the parkways and paths for an effective balance of park users while promoting safe and pleasurable use by all.



**LEGEND**

CIRCULATION

TRAFFIC CALMING ENTRY POINT

SECTION OF ROAD PROPOSED FOR CLOSING

NEW TRANSPORTATION ALIGNMENT

EXISTING RAIL/TROLLEY

THIS PLAN IS A PART OF A GROUP OF TRANSPORTATION CONCEPTS AND "TRAFFIC CALMING" TECHNIQUES. THE "TRAFFIC CALMING" TECHNIQUES ARE FURTHER DETAILED IN THE "TOOLKIT" THAT IS INCORPORATED BY REFERENCE.

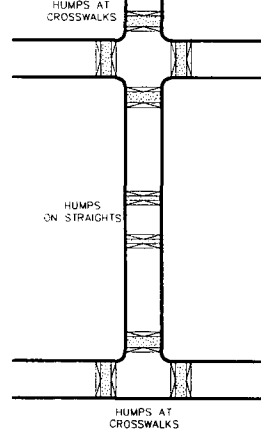
AT THE PRESENT TIME (JULY 1996), CERTAIN DESIGN ELEMENTS HAVE BEEN SETTLED UPON, SUCH AS THE PREDOMINANTLY ONE-WAY VEHICULAR CIRCULATION PATTERN AROUND EACH OF THE LAKES. THE RESPONSIBLE AUTHORITIES ARE ANTICIPATED TO SELECT FINAL TRAFFIC CALMING TECHNIQUES FROM AMONG THOSE DEPICTED IN THE TOOLKIT AND THEN FINAL DESIGN PLANS WILL BE PREPARED FOR IMPLEMENTATION.

CHANGING PRIORITIES MAY BE ESTABLISHED FROM TIME TO TIME FOR NON-MOTORISTS BY THE ADDITION OR DELETION OF TRAFFIC CALMING ELEMENTS AND/OR CHANGES IN THE CIRCULATION PATTERNS. IF SUCH CHANGES ARE CONSIDERED, THE THEN-EXISTING VEHICULAR SPEEDS AND VOLUMES OF ALL OF THE VARIOUS MODES OF TRAVEL SHOULD FIRST BE DOCUMENTED AND THIS DATA THEN INCORPORATED INTO THE DESIGN PROCESS AT THAT TIME.

THIS IS NOT A DESIGN PLAN FOR CONSTRUCTION PURPOSES.

**NOTES**

THIS PLAN HAS BEEN PREPARED FROM A DIGITAL FILE PROVIDED BY BOW AND THE PARK BOARD. BECAUSE SEVERAL FILES WERE USED, THE PLAN MAY CONTAIN SOME DISCREPANCIES. THESE ARE NOT CONSIDERED AS ERRORS, BUT ARE THE RESULT OF THE DESIGN PROCESS. IF ANY DISCREPANCIES ARE FOUND, THE DESIGNER'S INTENT SHALL BE THE FINAL AUTHORITY. IF ANY DISCREPANCIES ARE FOUND, THE DESIGNER'S INTENT SHALL BE THE FINAL AUTHORITY.



**Vertical Shift Humps**

- ROAD HUMPS ARE RAISED PORTIONS OF THE ROADWAY LAID AT RIGHT ANGLES TO THE DIRECTION OF THE TRAFFIC. CAN BE EITHER ROUND TOP OR FLAT TOP.
- WHEN INTEGRATED WITH A CROSSWALK, A FLAT TOP HUMP IS PREFERRED TO ASSIST IN CROSSING MOVEMENTS. PEDESTRIANS AND WHEELCHAIRS CAN CROSS THE STREET WITHOUT ANY CHANGE OF LEVEL.
- FLAT TOP HUMPS NEED CAREFUL CONSIDERATION OF DESIGN FOR THE VISUALLY HANDICAPPED AS THEY MIGHT EXPECT TO FIND A CURB. A REDUCED HEIGHT CURB CAN BE USED EFFECTIVELY WITHOUT HINDERING WHEELCHAIR ACCESS.
- USUALLY BUILT FROM CURB TO CURB BUT CAN BE TAPERED TO RETAIN DRAINAGE CHARACTERISTICS OF EXISTING CHANNELS.
- HUMPS MAY BE CONSTRUCTED IN MATERIALS DIFFERENT FROM OR SIMILAR TO THE SURFACE OF THE STREET. A CHANGE OF MATERIAL WILL BE VISUALLY HELPFUL AS WELL AS USEFUL IN THE SPEED REDUCTION EFFORT.
- WHERE THE STREET IS RAISED TO THE CURB LEVEL, VERTICAL ELEMENTS SUCH AS BOLLARDS, STREET LAMPS AND TREES MAY BE REQUIRED TO HELP KEEP VEHICLES OUT OF THE PEDESTRIAN AREAS.
- SHOULD BE USED IN COMBINATION WITH SUPPORTING MEASURES (e.g., PRECEDING SIGNS AND STREET MARKINGS, STREET LATERAL SHIFTS, VERTICAL FEATURES) TO BE MOST EFFECTIVE AS A SPEED REDUCTION MEASURE.
- ROAD HUMPS CAN BE UNPOPULAR WITH BUS OPERATORS.
- APPLICABLE TO MOST STREET LOCATIONS.

**Traffic Calming Notes**

- BOTH THE VERTICAL SHIFT (HUMPS) AND THE LATERAL SHIFTS MAY BE USED TOGETHER OR APART TO ACHIEVE AVERAGE RUNNING SPEEDS OF 15 TO 25 MPH.
- TO ACHIEVE 15 MPH SPEEDS, 4" PARABOLIC HUMPS ARE RECOMMENDED 200' APART.
- TO ACHIEVE 20 MPH SPEEDS, 3" HUMPS AND LATERAL SHIFTS MAY BE USED SPACED AT 250'.
- TO ACHIEVE 25 MPH SPEEDS, 3" HUMPS SHOULD BE SPACED AT 275'.
- FOR THE ONE-WAY NETWORKS, VERTICAL HUMPS ARE RECOMMENDED.
- LAKE ROADS TO BE CALMED BETWEEN CALMING ENTRY POINTS IN SECTIONS NOT SHORTER THAN 800'.
- SEE TRAFFIC CALMING TOOLKIT FOR ADDITIONAL SUPPORTIVE MEASURES THAT MAY BE USED IN CONJUNCTION WITH THE MEASURES DEPICTED HEREON.

**CALMING PLAN**

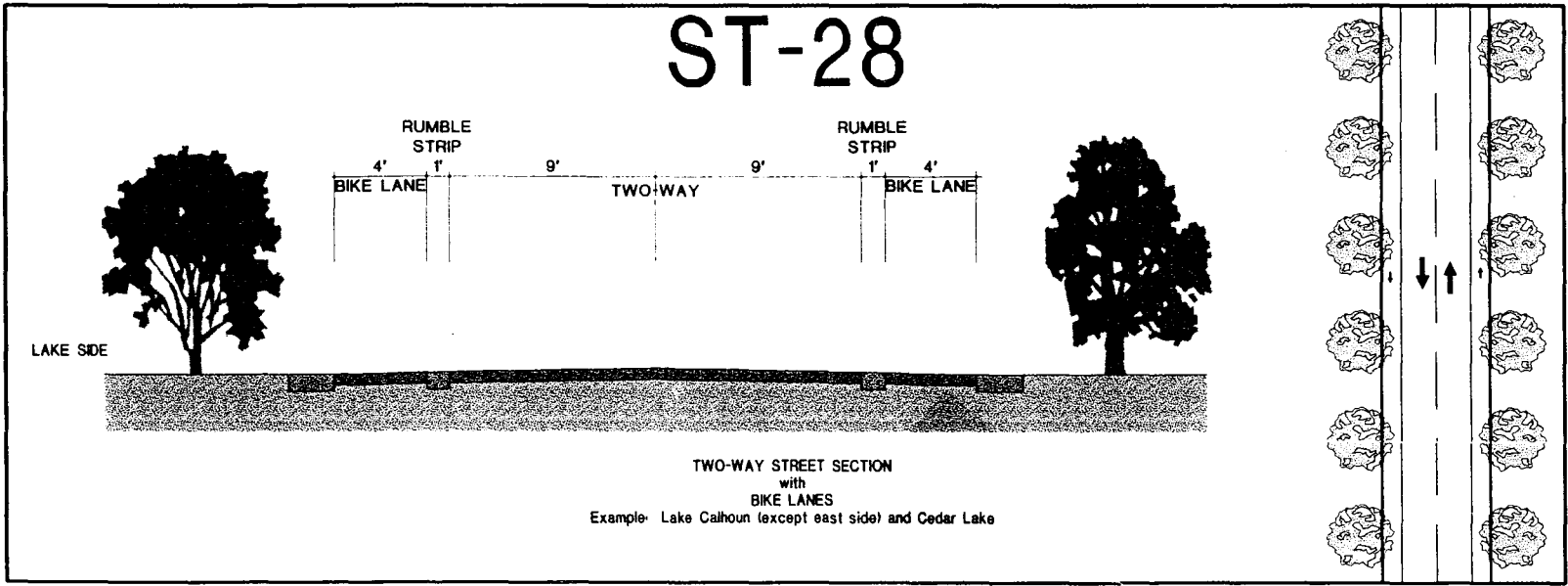
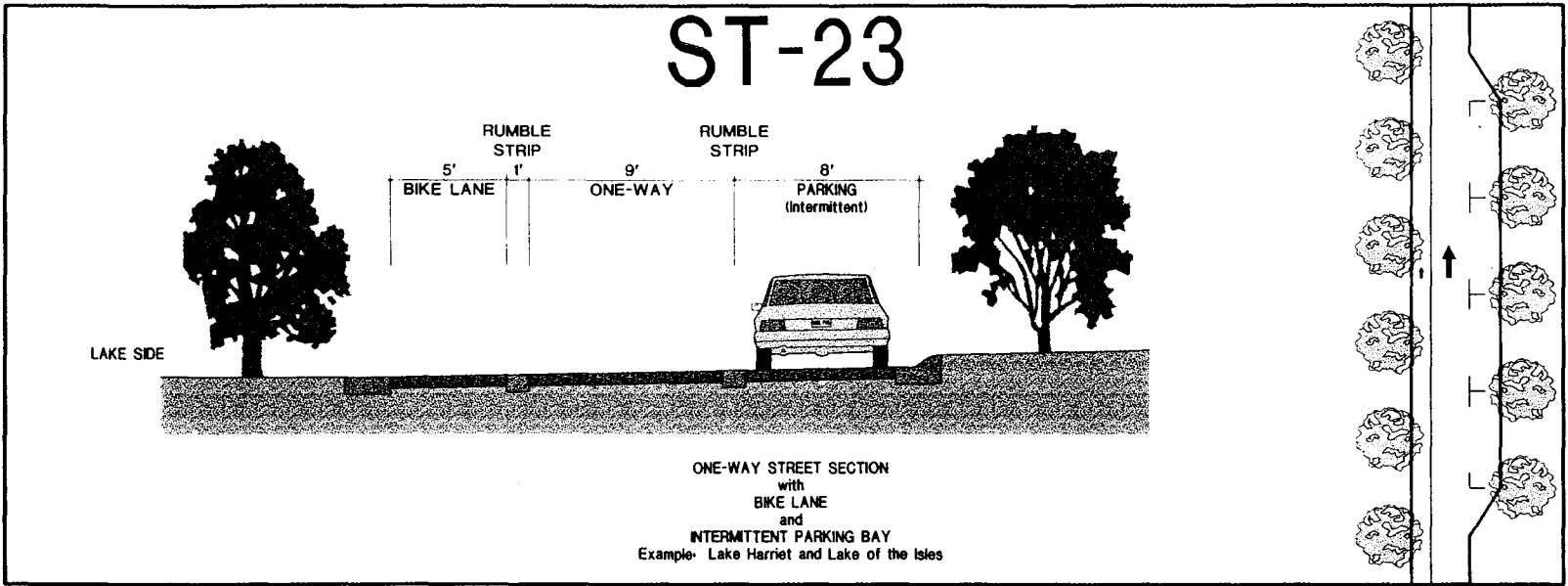
**CHAIN OF LAKES**

**COMPREHENSIVE PLAN**

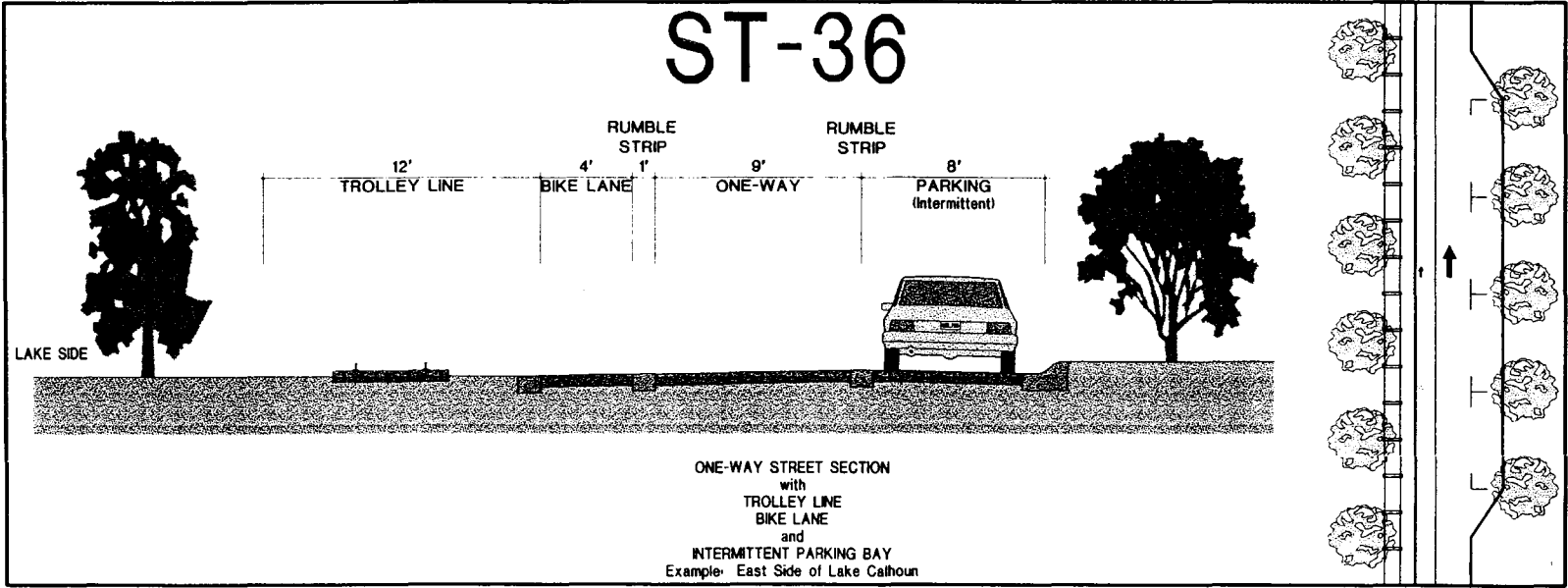
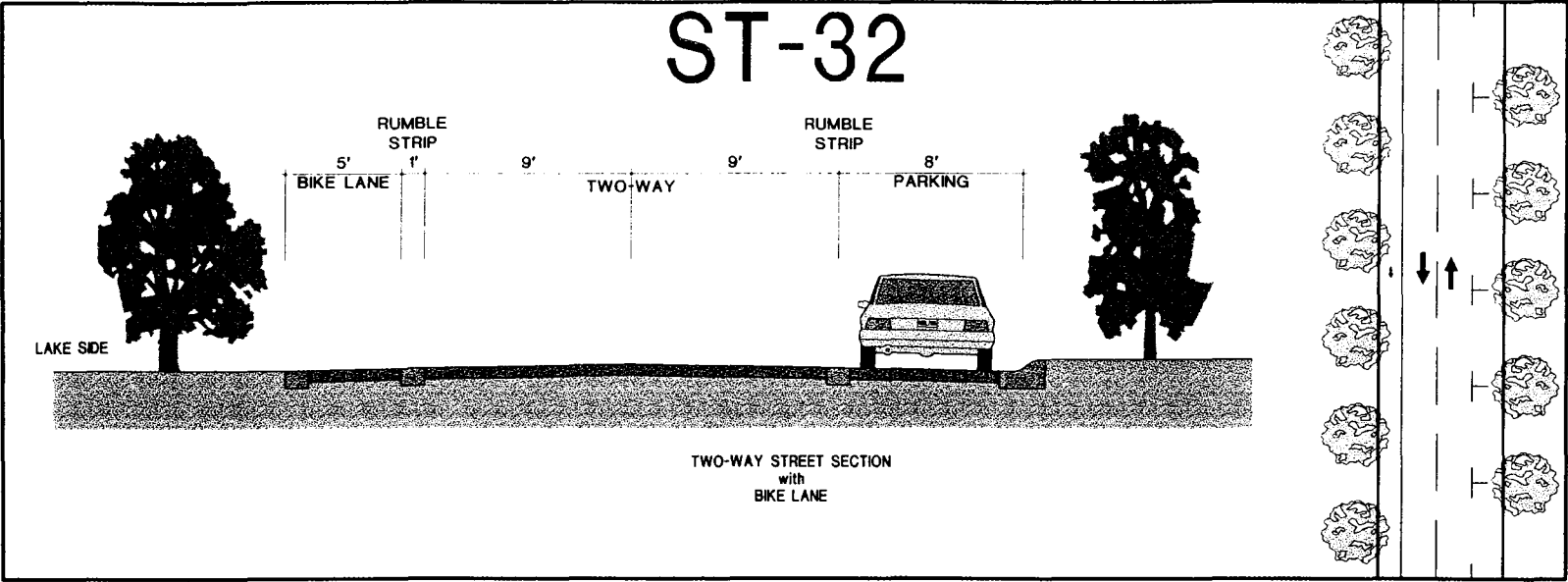
**TRAFFIC and TRANSPORTATION**

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THESE STREET SECTIONS HAVE BEEN PREPARED BY THE  
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