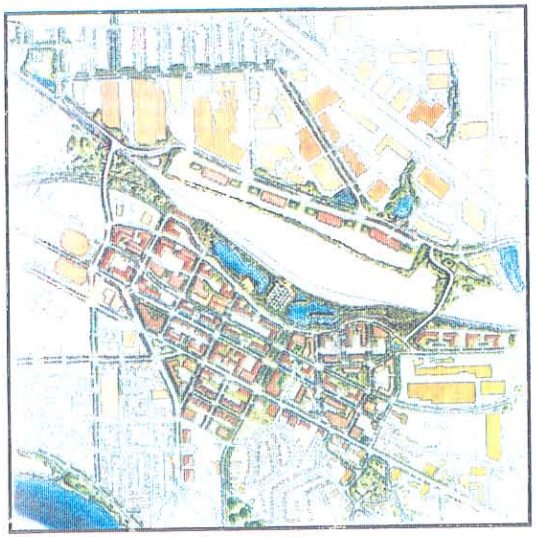


URBAN DESIGN PLAN

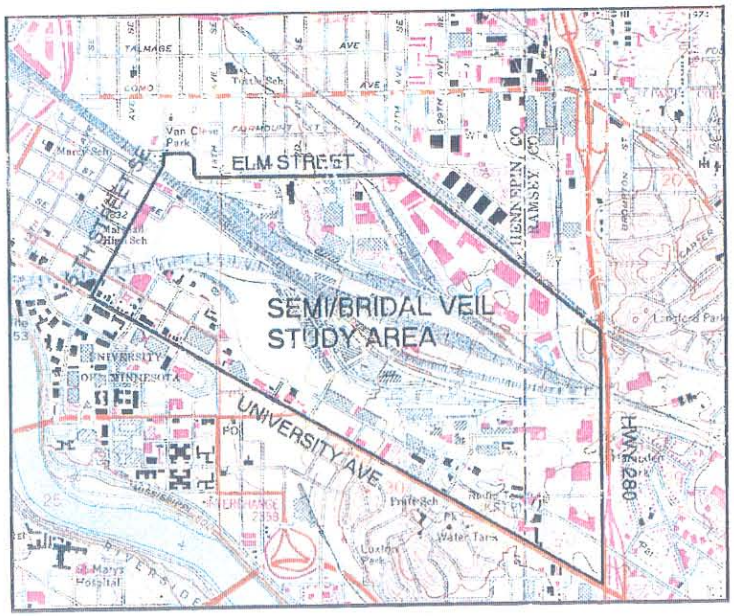
Southeast Minneapolis Industrial (SEMI)/Bridal Veil Area Minneapolis/Saint Paul, Minnesota

ALTERNATIVE URBAN AREAWIDE REVIEW (AUAR)

May, 2001

BRIDAL VEIL FALLS POSTCARD, CIRCA 1920

STUDY AREA MAP OVERLAID ON USGS QUADRANGLE MAP



VOLUME 3
REFINED MASTER PLAN

Prepared for:

City of Minneapolis, Minneapolis Community Development Agency (MCDA), and Southeast Economic Development (SEED) Committee

Reference:

MCDA Professional Service Agreement #11544 with PEER Bridal Veil Collaborative, dated 6/12/97

Southeast Minneapolis Industrial (SEMI) / Bridal Veil Refined Master Plan

May, 2001

Prepared for:

City of Minneapolis
Minneapolis Community Development Agency (MCDA)
Southeast Minneapolis Economic Development (SEED) Committee

Prepared by:

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Peer Environmental and Engineering Resources, Inc.
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This document, Southeast Minneapolis Industrial (SEMI) / Bridal Veil Refined Master Plan (herein referred to as the SEMI Refined Master Plan), is intended to be a "stand alone" document. This document is, however, only one portion of a larger effort, the SEMI Bridal Veil Alternative Urban Areawide Review (AUAR). The AUAR report consists of the following volumes:

Volume 1:	Executive Summary
Volume 2:	Minnesota Environmental Quality Board Required Items
Volume 3:	SEMI Refined Master Plan
Volume 4:	Appendices

Historical Resources Inventory
Stormwater Management Framework Plan
Map Atlas
Hydrology report for Existing Conditions
Hydrology report for Proposed Conditions
Transportation / Traffic Evaluation
Environmental Inventory
SEMI Refined Master Plan

Volume 5:	Response to Comments

Throughout this document there will occur references to several of the above listed documents.

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Planning Context

The City has long had an interest in SEMI's 700 acres of obsolete railroad property, elevators, industrial properties, polluted soils, buried creek, threatened housing, and retail uses. For quite some time, the Minneapolis Community Development Agency (MCDA) worked closely with an advisory committee to develop an overall project plan for the Southeast Minneapolis Industrial (SEMI) area. This advisory committee, termed the Southeast Economic Development (SEED) Committee, includes representatives from the four residential neighborhoods in the area — Como, Prospect Park, Marcy Holmes and St. Anthony Park — the business community, The Minneapolis City Council, and the University of Minnesota. Several years ago, the Minneapolis City Council and Mayor approved "Guidelines and Criteria" and "Design District Framework" for the SEMI Area. The documents call for the following:

- SEMI should include dense industrial development and functional open space, both within an intensely urban environment.
- The architecture shall contribute to the overall quality and be humanly scaled.
- The design should encourage public visits through pathway connections and enhanced landscaping.
- The roadway system should reduce effects of industrial uses on residential areas and encourage pedestrian, transit and bicycle use.
- Lighting, except for signs, should be high pressure sodium or "color-improved lamps."
- The guidelines state that to the extent possible, "roadways will anticipate a bikeway and pedestrian connection between Stinson Boulevard and East River Road, and allow for a 'Dinkytown Bypass' connecting Kasota Ave. and Southeast Second Street."
- Reestablish elements of the natural ecosystem.

The City and SEED Committee used the "Guidelines and Criteria" and the "Design District Framework" as a

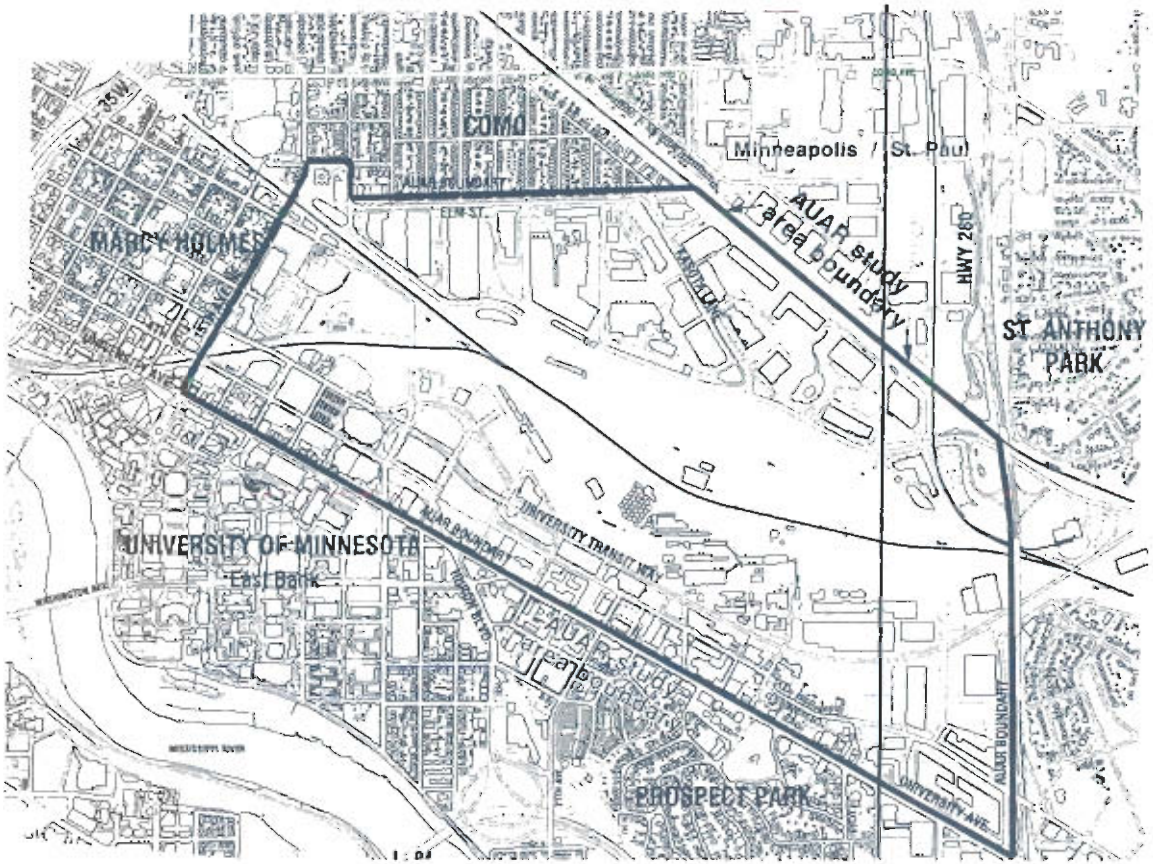


Fig. 1: Existing conditions: The SEMI AUAR Study Area is located between several healthy neighborhoods and directly east of the University of Minnesota. It also includes some University of Minnesota land. Its location and regional access renders that land very valuable for a variety of uses.

base to develop a long term Master Plan for the redevelopment and revitalization of the SEMI area. After several years of work by the City, SEED Committee and the City's consultants, BRW Inc., the Minneapolis City Council and the Mayor approved the Master Plan in 1997. The Plan, entitled "Bridal Veil Southeast Industrial Park" (herein referred to as the "original Master Plan"), provided the first comprehensive look at the SEMI area. It included an examination of land use, transportation, urban design, environmental concerns, utilities, market opportunities, and housing potential. The report highlighted SEMI's advantage as being one of the most centrally accessible areas in the region. It described how this centrality created rich opportunities for redevelopment through the appropriate mixing of uses while creating a built environment that incorporates urban characteristics. However, the master planning effort was underfunded and insufficient for all City needs. Therefore the City chose to develop an Alternative Urban Areawide Review (AUAR) and a refined master plan for the area.

Purpose of Refined Master Plan

The SEMI Refined Master Plan is included as a component of the AUAR. The SEMI Refined Master Plan focuses on coordinating the urban and natural systems into a single coherent strategy that will assure orderly, incremental growth patterns that reflect the needs of the City, the neighborhoods, and the needs of investors in the area.

The original Master Plan, prepared by BRW Inc., identified the major land use components and the importance of establishing connections between the north areas and those south of the rail yards. The original Master Plan was conceptual as it regards the design of individual parcels and blocks. The Plan also omitted a critical site development consideration: that stormwater management would require the creation of large ponding areas, which also reflected the southerly flow of waters towards the Mississippi River and the low lying areas of the AUAR Study Area. In addition, the intervening years since its original formulation have significantly altered the market demand for the areas south of the yards as well as for those north of the rails. These factors have led to the creation of the SEMI Refined Master Plan.

The SEMI Refined Master Plan is a vehicle for predicting, guiding and accommodating change in a specified area. It is not intended to propose a final end state build-out, but rather is a general framework that outlines the major land uses and infrastructure interventions required to accommodate growth. The recommendations are general, not specific. They have been analyzed for physical feasibility and plausibility. In the design development and implementation phases of the project, specific road alignment, park design, and street design decisions will be made.

This Refined Master Plan incorporates by reference the original Master Plan elements of the "Bridal Veil Southeast Industrial Park Plan" (pages 34-80) and the "Guidelines for Environmentally Friendly Design." Whenever these documents conflict with the Refined Master Plan, the Refined Master Plan supercedes.

This Refined Master Plan is consistent with other plans adopted by the City of Minneapolis, including the City's comprehensive plan, the *Minneapolis Plan*.

Consistent with the *Minneapolis Plan*, the Refined Master Plan endorses the design principles known as "New Urbanism," and the principles of sustainability.

OPPORTUNITIES AND CONSTRAINTS

The Southeast Minneapolis Industrial (SEMI) Area is strategically located adjacent to major regional transportation routes, major transit (bus and rail) routes, a nationally renowned research and teaching institution, and several vibrant residential neighborhoods. Just beyond these neighbors within a mile of SEMI are additional valuable resources (downtown Minneapolis, the Mississippi River, and expanded access to the interstate system) that suggest much of SEMI is not developed to its highest and best use.

The central location of SEMI poses several opportunities, however, its scale and history pose significant constraints. This planning and design effort is directed at reconciling the constraints of land use patterns, topography, multiple ownership, and limited public resources in order to realize the latent opportunities in the land.

Environmental

As a rail yard and intense manufacturing area, the site has significant and documented environmental contamination. (Details on environmental remediation issues are contained in Volume 4, Appendices, Environmental Inventory.) These environmental issues pose significant site assembly constraints. The Refined Master Plan recommends developing the land incrementally, block by block. A strategy that organizes the land via standard-sized blocks will permit development to occur coherently and in an orderly way.

Scale

The large scale of the SEMI area and intense rail use has rendered it a barrier and impediment to many public initiatives and needs. SEMI has remained a relatively isolated entity, integrating itself minimally with the surrounding communities. The isolation has created certain problems. Most notably, with no means of traversing SEMI, there exists a disconnect between the portions of the City north and south of the area (Prospect Park and Como Neighborhood). This north-south disconnect also makes emergency services more difficult to provide in the area. This disconnect effects more than the immediate neighborhood. The Grand Rounds, a critical component of Minneapolis' famed park system, has a missing link through the SEMI area.

Existing Structures

Fig. 2: existing grain elevators

SEMI contains several large grain elevators and silos that would require demolition and removal for redevelopment to occur. These structures contain inordinately deep foundations and hardened walls that are expensive to remove. Pre-development costs such as these will pose constraints to redevelopment. It is important to note that several of the elevators, silos and buildings throughout the study area are of potential historical significance (refer to Volume 4, Appendices, Historical Resources Evaluation). Further research is required on several of these structures to determine their historical value.

Natural Systems

Crossing SEMI is the historic route of Bridal Veil Creek. The Creek exists as a stream and surface pond in the northern portions of the AUAR Study Area. However, as an above-ground feature it disappears in the area of the rail yards. Historically, the area was a wetland, feeding Bridal Veil Creek and then leading to the Mississippi River and Bridal Veil Falls.

Fig. 3: Bridal Veil Falls

Master Plan as Mitigation Plan

The SEMI Refined Master Plan provides the following:

- a comprehensive and regional stormwater management plan;
- a clear definition of size, intensity and purpose in the use of parcels and blocks in the areas south of the rail yards;
- organization of truck traffic to better serve the large industrial users in the northern areas while minimizing the negative impacts of the trucks on the surrounding residential areas;
- provisions for direct traffic access to the area's major arterials; and
- a development plan for a more intense mix of buildings and uses which will naturally reinforce the importance of University Avenue in the life of the City.

By developing a clear pattern of streets and blocks, the SEMI Refined Master Plan also provides for increased access to each parcel and integrates new development with existing uses. Finally, at the heart of the SEMI Refined Master Plan is a plan for a significant public amenity of parks, open space and water as detailed in Volume 4, Appendices, Stormwater Management Framework Plan.

State environmental rules require AUARs to include a Mitigation Plan that addresses the anticipated environmental impacts. The Refined Master Plan component of the AUAR coordinates several of the individual components (traffic, stormwater, utilities, land use) into a physical plan that predicts, accommodates, and designs for the likelihood of significant growth and redevelopment. By coordinating these elements, the SEMI Refined Master Plan constitutes part of the AUAR. The SEMI Refined Master Plan includes plans and policies for new roads and bridges, intersections, transit, stormwater management, and integrated land uses in order to address and balance the potential externalities of redevelopment.

The SEMI Refined Master Plan, if implemented, will do more than mitigate the impacts of the proposed redevelopment. Upon build-out, the resources and systems will work more efficiently and effectively than existing conditions.

Fig. 4, on the following page, illustrates the complete Refined Master Plan. This map describes potential redevelopment of SEMI as it relates to the surrounding areas of Minneapolis and St. Paul. The Plan illustrates conceptual block layouts, parks, stormwater accommodation, and potential building footprints. Individual aspects of the plan are illustrated in subsequent figures and text.

Illustration of Bridal Veil / Southeast Minneapolis Refined Master Plan: Potential Build-Out

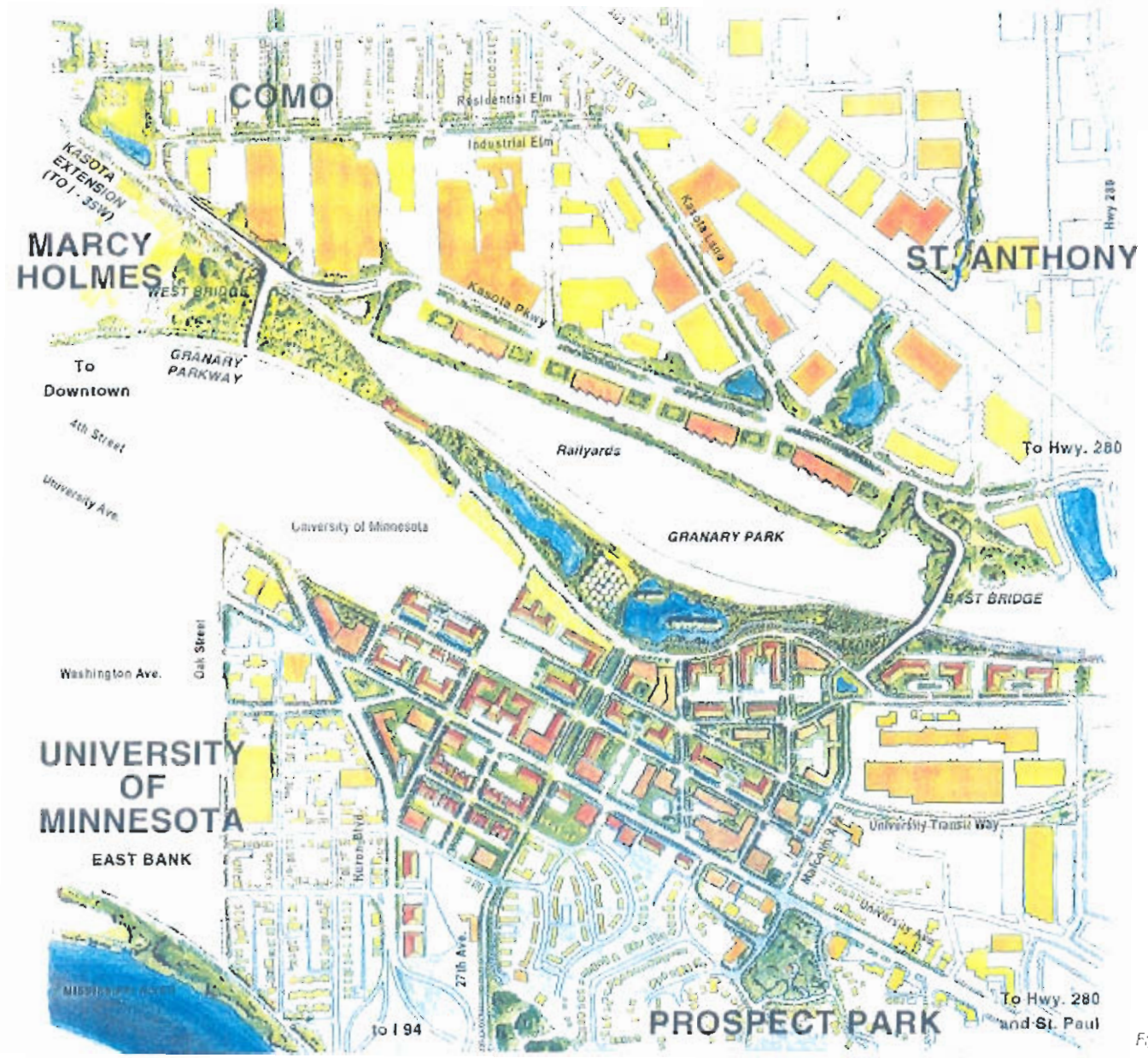


Fig. 4: SEMI Refined Master Plan

At the outset of the SEMI / Bridal Veil process, the Southeast Economic Development (SEED) Committee adopted goals for the redevelopment of the area. The SEMI Refined Master Plan is a blueprint for this redevelopment.

The SEED Adopted Goal is to create a major new industrial area that...

- **provides for some mixed use,**
- **creates living wage jobs,**
- **greatly enhances the tax base,**
- **is compatible with nearby neighborhoods and**
- **establishes elements of the natural ecosystem.**

... provides for some mixed use

While the SEMI Refined Master Plan preserves one of the largest industrial areas within the City of Minneapolis (North and Central Redevelopment Areas, refer to Fig. 5), the Plan promotes the majority of the area south of the rail lines to be developed with mixed uses comprised of light industrial, commercial (office and limited retail), research and housing. Middle-density mixed uses will help create a vibrant urban neighborhood befitting of the area's location adjacent to the University of Minnesota.

... creates living wage jobs

The Plan reserves nearly two thirds of the overall redevelopment area for light industrial and light manufacturing uses. These uses tend to require skills that garner living-wage jobs. The SEMI Refined Master Plan also envisions a substantial portion of the Study Area to house private research and University-related facilities. These uses will likely also yield living wage jobs.

... enhances the tax base

The majority of all land in the redevelopment area will be tax generating property. While developable land in the western portion of the area south of the rail lines will be related to the University, it should not be tax exempt.

... is compatible with nearby neighborhoods

The urban design aspects of the SEMI Refined Master Plan assure the plan is also a "mitigation plan" as it regards state environmental review requirements. The SEMI Refined Master Plan eliminates conflicting impacts between the industrial area and the residential neighborhoods by reconfiguring Elm Street, increasing buffers, and providing increased access from the regional system directly to the SEMI area. In addition, the SEMI Refined Master Plan organizes traffic between the areas north of the tracks and those south of the tracks with new bridges and parkways, and by calling for a loop circulation system. This loop directs traffic away from the neighborhoods and creates more direct access to the regional systems.

... establishes elements of the natural ecosystem

The SEMI Refined Master Plan creates a green infrastructure that completes and repairs several natural and recreational systems. The connection between Bridal Veil Pond and Bridal Veil Falls is improved with Granary Park and the 27th Blvd. Wetlands. This system is further enhanced by developing bioretention swales and rain gardens throughout the project area.

The *Minneapolis Plan* (adopted by City Council and Mayor in March 2000) established city-wide goals which all planning efforts should strive to achieve. The SEMI Refined Master Plan is an example of how the process of creative and inclusive planning can forward many of these goals. Summarized below are several of the goals and how they are addressed in the SEMI Refined Master Plan.

Goal:
Increase the City's population and tax base by developing and supporting housing choices city-wide through preservation of existing housing and new construction.

The SEMI Refined Master Plan recommends the development of market driven new housing in the South Redevelopment Area. The SEMI Refined Master Plan identifies appropriate residential sites south of University Avenue where the fabric of Prospect Park can be strengthened, and sites north of University where a new community can be formed.

Goal:
Create strong and vital commercial corridors city-wide through mixed use development, including a variety of businesses and creative housing.

The SEMI Refined Master Plan intentionally expanded beyond the AUAR Study area in order to address University Avenue as a complete entity. The SEMI Refined Master Plan recommends strengthening University Avenue with a series of urban uses, including housing, commercial and retail.

Goal:
Improve public transportation to get people to jobs, school and fun.

The SEMI Refined Master Plan supports current transit and recognizes the potential for light rail transit (LRT) along University Avenue as well as commuter rail service parallel to the Burlington Northern main line. The SEMI Refined Master Plan also develops a bikeway through the area to facilitate commuter cycling to the University and to downtown. The predominant development pattern of small blocks and mixed use that characterizes the South Redevelopment Area is generally complementary to transit, bicycles and walking.

Goal:
Preserve, enhance and create a sustainable natural and historic environment city-wide.

The SEMI Refined Master Plan supports the development of a "green infrastructure" that integrates both natural and recreational systems throughout the area. The result is a seamless network of publicly owned recreational paths, stormwater amenities and open space that assures maximum long term values of the area. This network will assure stakeholders in the area that their investments will remain competitive for years to come. The result is an efficient, effective and sustainable urban environment.

Goal:
Strengthen our city through infrastructure investments.

The SEMI Area needs major infrastructure investments in order for redevelopment to occur. A primary feature of the SEMI Refined Master Plan is the integration of both urban and natural infrastructure systems. Investments in roadways, bridges and parkways as well as open space and stormwater amenities will be required to create investment opportunities. These investments however, will serve the entire city because they will stitch together natural, recreational and urban systems.

The Minneapolis Community Development Agency (MCDA) established goals and objectives for developments as part of its mission statement. These are:

Goals:

Increase the city's economic competitiveness, and extend the benefits of the growing economy to all Minneapolis residents.

The MCDA will focus on assisting developments that create living wage jobs and ensuring that residents have access to those jobs. The MCDA will also collaborate with regional partners to help ensure that the Twin Cities metropolitan area enjoys a competitive position in the global marketplace.

Objectives:

Create an environment that provides expanded opportunities for living-wage jobs.

- Attract and expand new and existing services, infrastructure, developments and employers that position Minneapolis and the region to compete in the economy of the 21st century.
- Expand and diversify the Minneapolis economy.
- Promote employment of unemployed and underemployed workers in publicly assisted construction projects.
- Develop wealth and asset ownership within the city for Minneapolis residents. Increase the city's property tax base and maintain its diversity.

Goals and Principles:

The University of Minnesota, in its 1996 Master Plan, set forth the goal of fostering a Livable Campus, and with this a series of values:

- To create a richly layered and safe urban environment that is thoroughly integrated within its physical context;
- To ensure coherent and inspiring public spaces;
- To respond to the diversity of access needs;
- To realize the full worth of natural and built assets.

This goal informs the 1996 Master Plan through the following guiding principles:

- Instill a genuine sense of community;
- Identify, preserve and enhance natural features;
- Create a cohesive system of open spaces;
- Achieve balanced systems for movement and access;
- Promote optimization and rationalization of campus facilities;
- Increase the mix of uses on the campus, including housing;
- Develop connections;
- Foster accessibility and a sense of safety and security;
- Promote architectural integrity;
- Preserve historic buildings and landscapes;
- Facilitate and ensure healthy collaborative ventures.

Redevelopment Areas

The SEMI Refined Master Plan responds to the different physical and market cualities of the study area and then organizes SEMI into three distinct Redevelopment Areas (Fig. 5). The North Redevelopment Area and Central Redevelopment Area are located north of the rail yards. The South Redevelopment Area is located south of the tracks.

There exists substantial land outside the defined redevelopment areas and within the AUAR Study Area. This land is currently developed with a variety of uses. For the purpose of this study it is assumed this land will remain developed at its current use and intensity. The lands that are recommended to change land use or intensity over the next 20 years are identified within the Redevelopment Areas.

There are several parcels recently developed within the South Redevelopment Area. Whereas they are included in the block calculations and development scenarios, it is not recommended for these developments to be removed or changed.

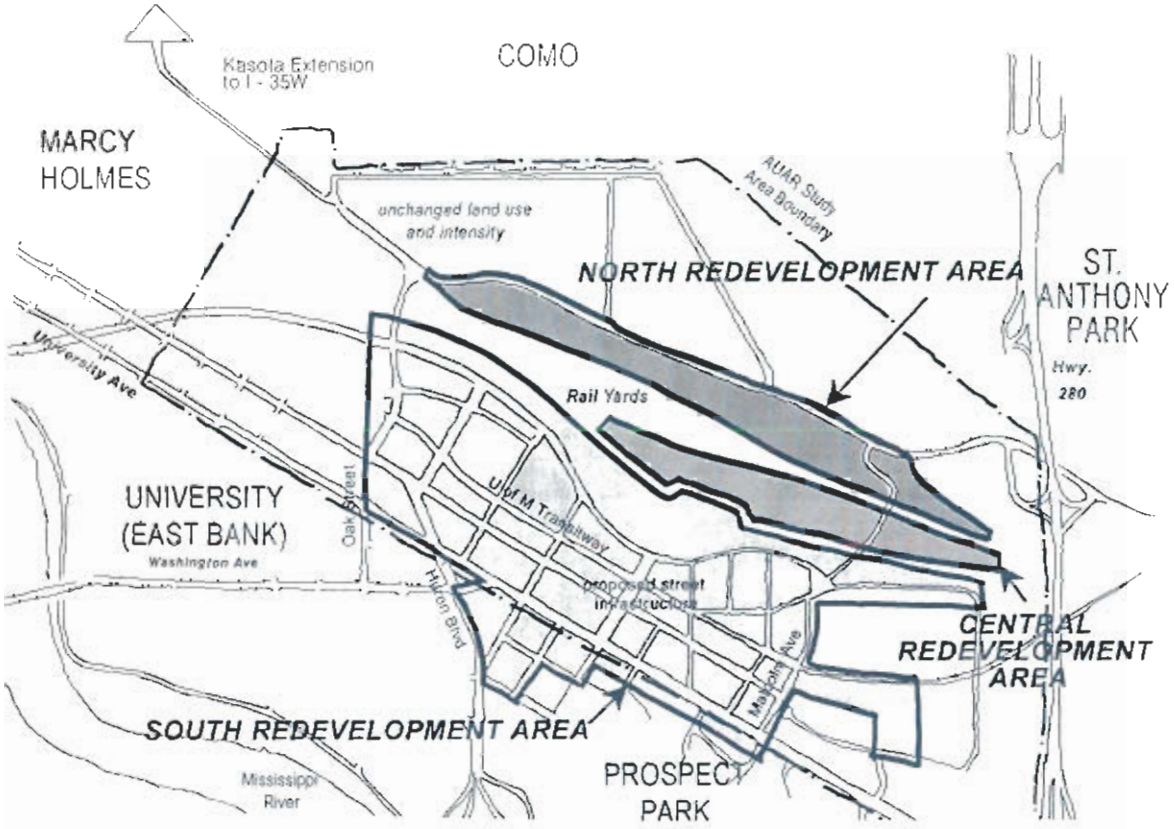


Fig. 5: Redevelopment Areas

North Redevelopment Area

The North Redevelopment Area is bound on the north by the proposed Kasota Parkway, on the west by 15th Ave. SE, on the east by Minnesota Hwy. 280 and on the south by the Burlington Northern rail yards. The area is an extension of and shares many of the attributes with an existing industrial / manufacturing area directly to the north.

Redevelopment of this area will be made possible by the creation of the Kasota Parkway, which will provide access to property and connect with Kasota Drive and Elm Street to complete a circulation loop through the area.

It is therefore recommended for the North Redevelopment Area to continue as an industrial area with larger floor plate buildings housing industrial uses as permitted by Minneapolis' industrial zoning categories, distribution centers, and other users requiring exceptional trucking access. Buffering of adjacent residential neighborhoods needs to be improved and maintained. The Refined Master Plan recommends buffering the Como Neighborhood by maintaining and enhancing the existing Elm Street right-of-way into a split boulevard that separates residential traffic from industrial traffic.

South Redevelopment Area

The South Redevelopment Area differs greatly from the North Redevelopment Area in character. It is proximate to University Avenue, possesses a semblance of street and block network, is adjacent to the University, and will in the future be bound by a major green space: Granary Park.

Because of the South Redevelopment Area's access and proximity to the University, to a major mixed use corridor / arterial (University Avenue), and to residential neighborhoods, the general character and land use should change from one dominated by manufacturing and industry to one of balanced mixed uses (light industrial, office, research, medium-to-high density residential and limited retail/service uses). Development will be relatively dense and consist primarily of three- to five-story buildings.

The area will benefit from the creation of a street and block system that will be used to distribute traffic as well as to provide street addresses. The block and street system will be an extension of the existing street system, extending north from Prospect Park. The street network would provide multiple connections from University Avenue and Prospect Park to the Proposed Granary Parkway.

Central Redevelopment Area

If redeveloped, the Central Redevelopment Area (currently occupied by the Burlington Northern Santa Fe and Union Pacific railroads) should be done in a similar manner to that of the North Redevelopment Area. The current land owners of the Central Redevelopment Area have made no indication of their willingness to redevelop the land. Therefore, the planning horizon for the Central Redevelopment Area is 20 to 50 years.

Land Use and Zoning

The SEMI Refined Master Plan establishes appropriate land uses according to impacts, access, and overall design strategy (Fig. 6). In many areas, the land uses are flexible, with several types of development being appropriate. Flexibility is important because implementation and regulation should be driven not by *use*, but rather by *form and impact*.

The land use designations follow the organization of the Redevelopment Areas. The North Redevelopment Area will be redeveloped in a manner similar to the existing conditions. Light industry and light manufacturing uses as defined by the Minneapolis Zoning Code are the preferred types of development for this area.

The South Redevelopment Area contains a Core area as well as districts to the east and west. The Core area is defined by the development opportunities approximately one and a half blocks on either side of a proposed 27th Blvd. SE. Because of the proposed boulevard and wetland amenity, this area should be developed with concentrated, mixed use including office, research, medium-to-high density residential and limited retail/service. The northern half of the Core area is also appropriate for light industrial. Flanking the Core area there exists opportunity for more office and research uses. Residential should be promoted only where it already exists or where it is not in conflict with other uses. A critical mass and physical proximity are important to developing a residential neighborhood, therefore it is recommended to utilize 27th Boulevard and the Granary Parkway as addresses for high quality residential, office and research uses.

The land uses prescribed in the SEMI Refined Master Plan are not a reiteration of the current zoning code. The mapping process of the City's zoning code did not prescribe change. Rather the process the City used to revise its zoning code assumed current land uses and avoided "legal nonconforming" situations. Therefore, the Master Plan assumes that rezoning may be required in order to achieve redevelopment as envisioned by this Plan.

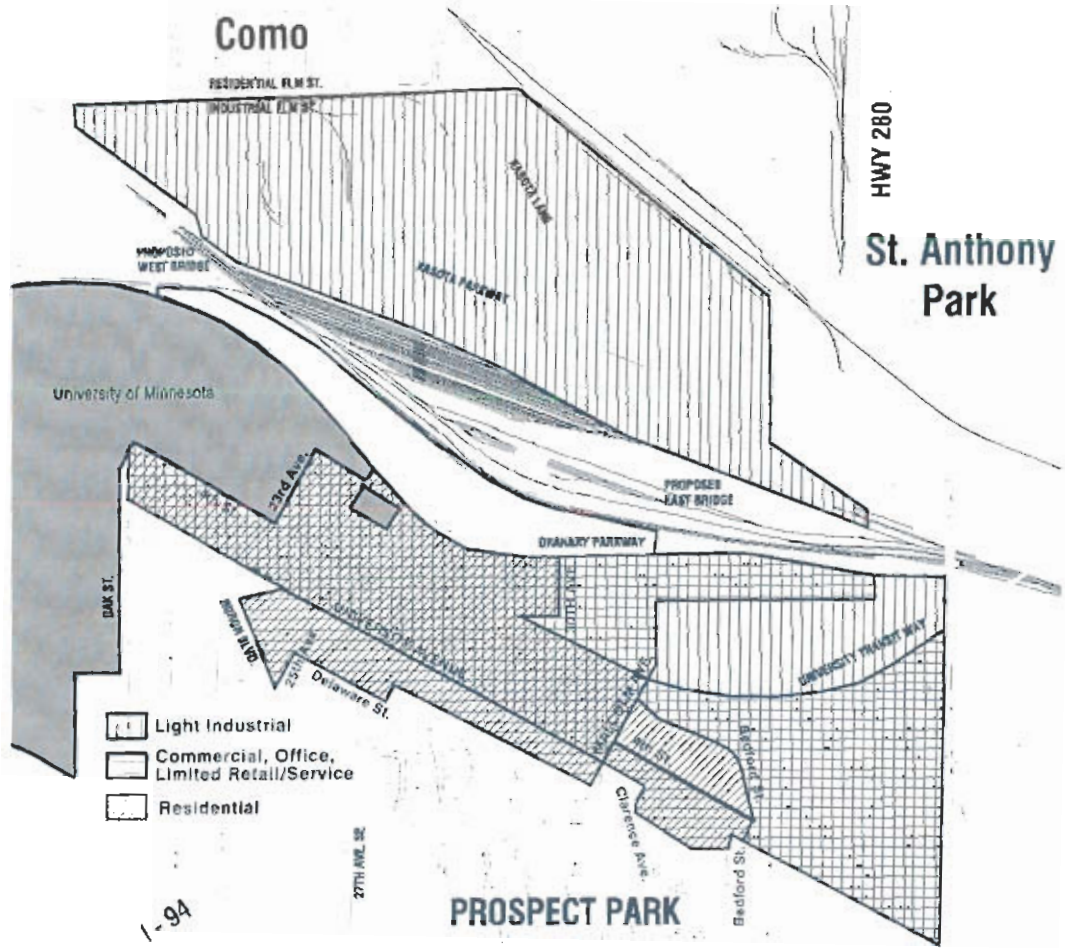


Fig. 6: Recommended Land Uses

Figure 7 includes the zoning in the AUAR study area. Most of the area is zoned industrial. There are several zoning districts within SEMI:

- **I2: Medium Industrial District**
- **I1: Light Industrial District**
- **OR 1 & 2: Office Residence District**
- **C1: Neighborhood Commercial District**
- **R5: Multi-Family Residence District**
- **R1A: Single-Family Residence District**

The I1 and I2 Districts allow a wide variety of uses including industrial; commercial and offices; food and beverage; automobile services; commercial recreation, entertainment, and lodging; medical; transportation; educational, institutional, and public; social, cultural, charitable, and religious uses (refer to Table 550-1 in the Minneapolis Zoning Code). The Refined Master Plan maps areas appropriate for the mixing of certain land uses. A development that is consistent with the Land Use Plan map may not be consistent with the zoning codes of the two cities. In this case, the private developer may have to apply for rezoning to proceed. The most flexibile zoning district for mixing uses in the Minneapolis Zoning Code are the industrial districts when they are overlain by an Industrial Living Overlay District (ILOD). An ILOD over an I1 District would permit the mixing of appropriate light industrial use with a wide range of office, retail and service uses; and residence with a density up to 48 dwelling units per acre (which is considered high density). The establishment of an ILOD is the same process as for a rezoning.

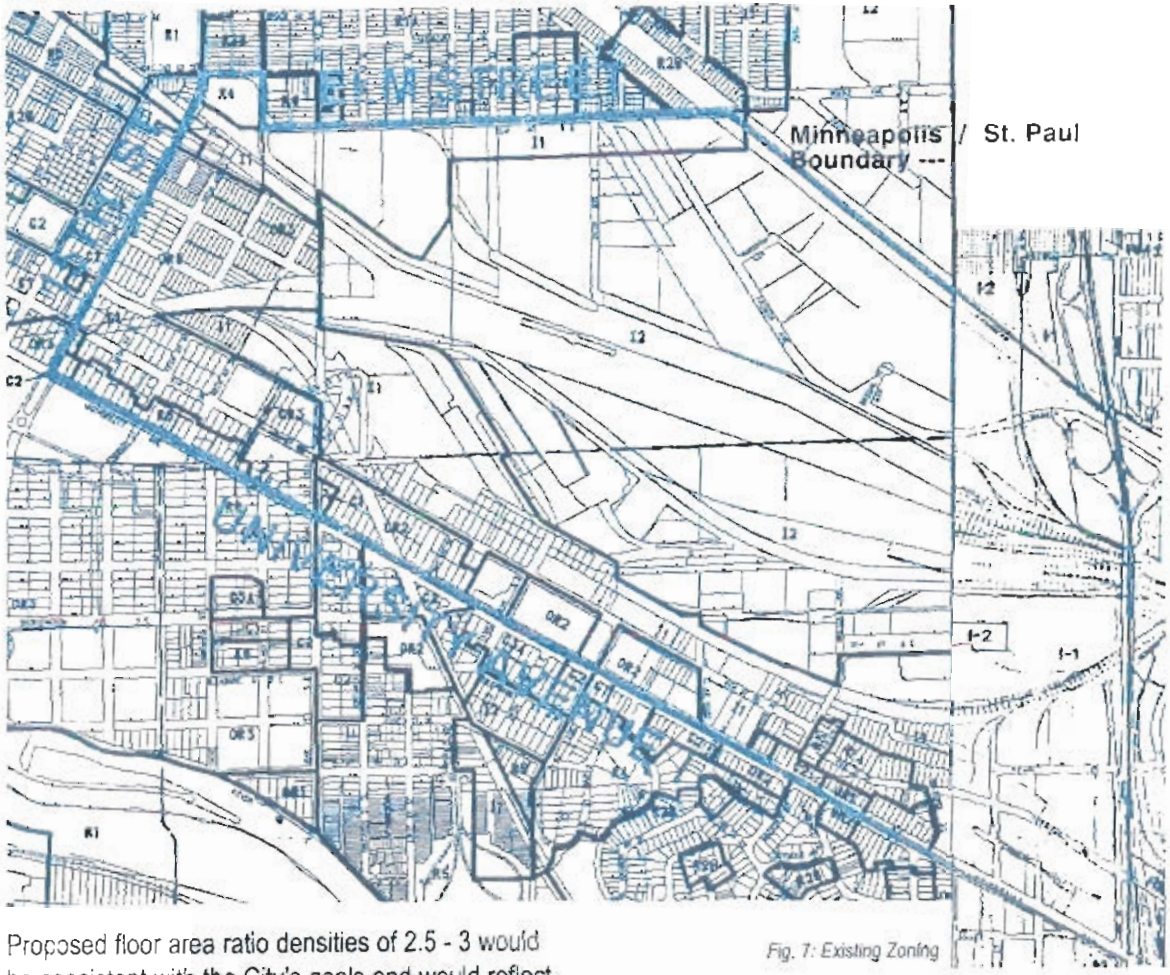


Fig. 7: Existing Zoning

Proposed floor area ratio densities of 2.5 - 3 would be consistent with the City's goals and would reflect the capacity of existing infrastructure. These densities would encourage buildings compatible in scale and character with similar office/retail (OR) and residential (R) districts to the west. They would also encourage the use of public transit (bus, LRT and commuter rail).

Redevelopment Scenarios

The table to the right, Fig. 8, quantifies the approximate redevelopment potential of the three redevelopment areas. The AUAR and the SEMI Refined Master Plan calculate three potential development scenarios: "low," "medium," and "high." The quantities described in the table are the approximate net (land less right of way) developable land based on desired level and type of redevelopment. They are not based on actual development proposals. The values in the table were used in Volume 4, Appendices for determining environmental impacts and mitigation strategies.

The following guidelines were used to generate the "low, medium and high" development scenarios.

- "Low" development is based on surface parking only for each site. This will yield buildings of one to two story height.
- "Medium" development is based on surface parking plus underground parking for typical office or light industrial uses. This will yield buildings of between two and three stories (with one level of underground parking).
- "High" development is based on shared parking ramps and one level of underground parking on each site. This will yield buildings in the three- to five-story range (on average) for office and light industrial uses. Although taller buildings are theoretically feasible, this scenario has been developed around the prevailing scale of research buildings of five floors, typical for this area of the city.

Residential parking requirements have been computed on the basis of an average of 1.5 cars per dwelling unit (although the zoning requires only one car per dwelling unit). The higher development densities also assume a five-story average height and shared parking. This assumption is consistent with prevailing market demands and readily accessible mass transit (and LRT service in the future).

Whereas the City of Minneapolis has set forth development standards for I1 and I2, which set as a goal 1.5 jobs per 1000 square feet of development, recent market trends suggest new, higher density uses that are sympathetic to those traditionally found

Summary Totals for Development Scenarios

Scenario	sq.ft. of land	acres	total bldg. sq.ft	commercial	lt. industry	industry	residential	# of housing units	total parking spaces	# of jobs
low	9,541,000	219	2,131,100	642,300	306,450	365,600	816,750	681	5,252	1,697
med	9,541,000	219	3,490,900	1,694,500	340,566	548,400	907,500	908	9,766	3,499
high	9,541,000	219	5,144,950	3,477,750	255,375	731,200	680,625	851	13,666	6,254

Summary: Low Intensity

Development Areas	sq.ft. of land	acres	total bldg. sq.ft	commercial	lt. industry	industrial	residential	# of housing units	total parking spaces	# of jobs
South	5,885,000	135	1,765,500	642,300	306,450	-	816,750	681	4,886	1,331
North	2,167,000	50	216,700	-	-	216,700	-	-	217	217
Central	1,489,000	34	148,900	-	-	148,900	-	-	149	149
TOTAL	9,541,000	219	2,131,100	642,300	306,450	365,600	816,750	681	5,252	1,697

Summary: Medium Intensity

Development Areas	sq.ft. of land	acres	total bldg. sq.ft	commercial	lt. industry	industrial	residential	# of housing units	total parking spaces	# of jobs
South	5,885,000	135	2,942,500	1,694,500	340,566	-	907,500	908	9,218	2,950
North	2,167,000	50	325,050	-	-	325,050	-	-	325	325
Central	1,489,000	34	223,350	-	-	223,350	-	-	223	223
TOTAL	9,541,000	219	3,490,900	1,694,500	340,566	548,400	907,500	908	9,766	3,499

Summary: High Intensity

Development Areas	sq.ft. of land	acres	total bldg. sq.ft	commercial	lt. industry	industrial	residential	# of housing units	total parking spaces	# of jobs
South	5,885,000	135	4,413,750	3,477,750	255,375	-	680,625	851	12,935	5,523
North	2,167,000	50	433,400	-	-	433,400	-	-	433	433
Central	1,489,000	34	297,800	-	-	297,800	-	-	298	298
TOTAL	9,541,000	219	5,144,950	3,477,750	255,375	731,200	680,625	851	13,666	6,254

Fig. 8: Redevelopment Scenarios

in OR1 & OR2, and C1. This in turn would foster densities in the 2.5 to 3 floor area ratio range, with a simultaneous increase in the number of jobs. It is the intent of this plan to encourage these new uses and higher densities in the South Redevelopment Area (see Fig. 5).

Using Networks to Address Traffic and Circulation

The Refined Master Plan organizes vehicular traffic and circulation throughout the study area by proposing to complete a variety of *networks*. Implementation and subsequent completion of these networks will put local traffic on local roads, collector traffic on collector roads, and regional traffic on the regional highway and freeway system.

Figure 9 depicts the networks at local, subregional and regional scales. The SEMI Refined Master Plan completes the local network by extending the regular pattern of four-sided blocks along University Avenue. This pattern creates multiple access points to University Avenue and does not burden any one intersection.

The subregional scale network is completed by connecting north and south, east and west through SEMI with a loop system consisting of the East and West Bridges, and the Kasota and Granary Parkways. This loop system and its extensions (Kasota Extension, West Granary Parkway / Dinkytown Road, Oak Street, Huron Boulevard, Kasota / Energy Park Drive) provide appropriate access to the regional roadways (I-35W, I-94, and Hwy. 280). The shaded routes also serve trucks.

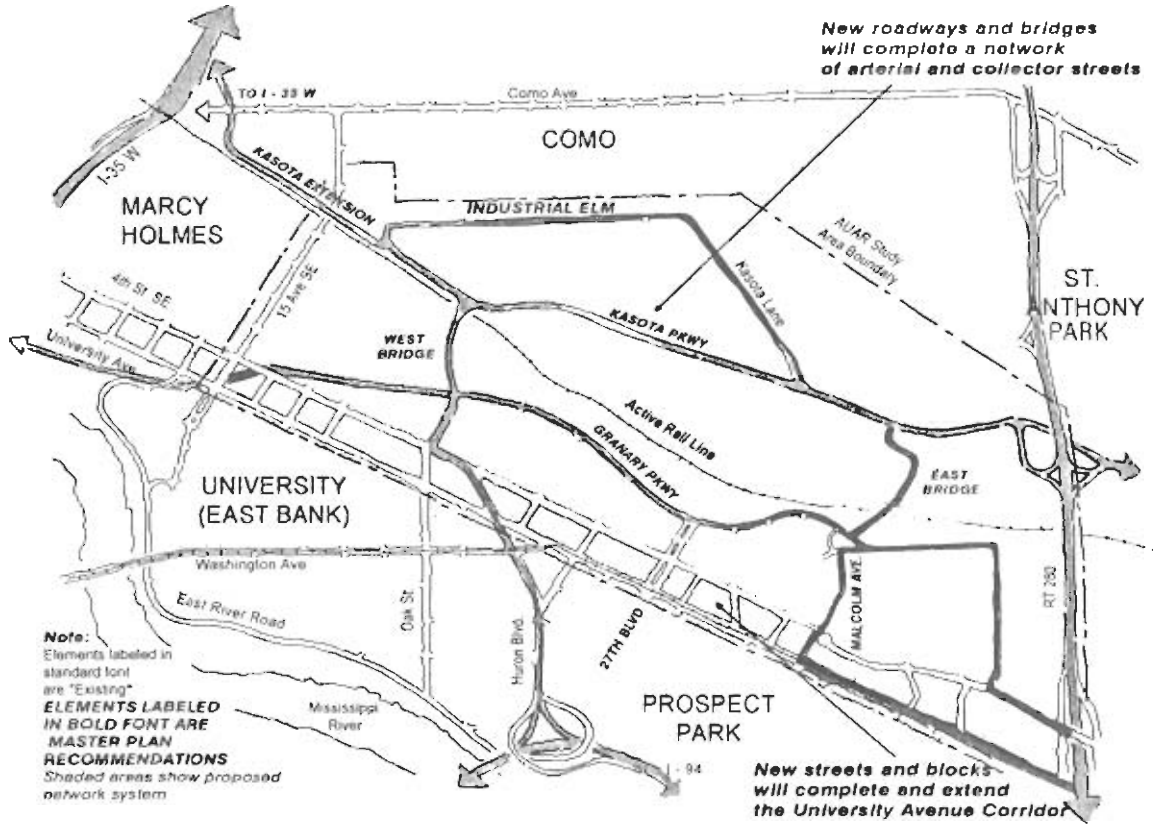


Fig. 9: Networks. The SEMI Refined Master Plan recognizes the different scale of circulation networks required to facilitate movement among the redevelopment areas as well as connection to the greater community and the region. Bridges and Parkways create a loop system around the rail yards and improve access to regional systems, while streets and blocks reinforce the existing pattern of incremental urban development along University Avenue.

Infrastructure Investments

Several new strategic infrastructure investments are required to facilitate redevelopment and intensification of the area. These infrastructure improvements will achieve the public needs and responsibilities of:

- Providing initial impetus for development;
- Mitigating impacts of development;
- Improving connections (vehicular and recreational) within the project area and from the surrounding neighborhoods;
- Improving existing stormwater quantity and quality; and
- Providing amenities and public realm improvements required for high quality addresses for development.

The image to the right, Fig. 10, illustrates all of the new transportation infrastructure recommended throughout SEMI. Each element completes a network, extends a network, or creates a new network. None are isolated elements in themselves.

The following pages outline the priority infrastructure investments required to implement the Urban Design component of the SEMI Refined Master Plan.

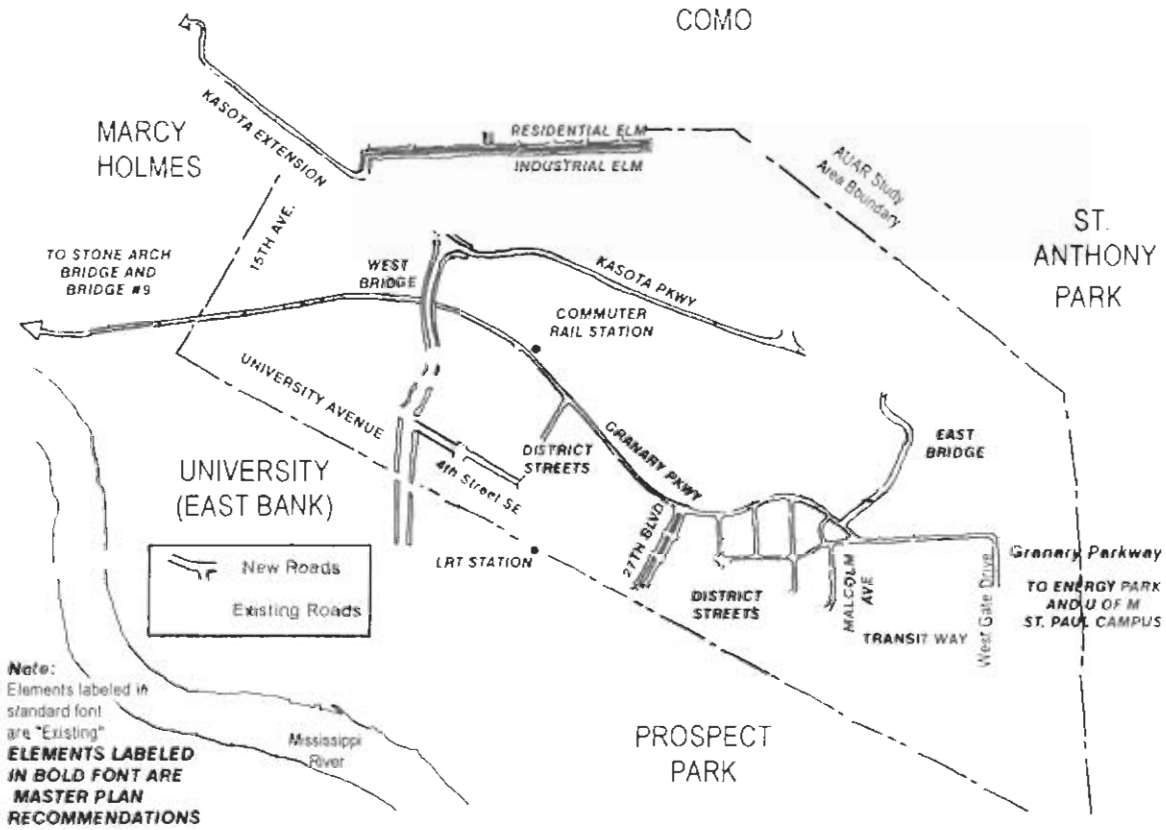


Fig. 10: Infrastructure. A variety of new pieces of infrastructure (streets, bridges, transitways, intersection modifications) are required throughout the SEMI area in order to create a redevelopment area that works seamlessly with the rest of the City. This image describes all the recommended road and bridge infrastructure recommendations. The light lines illustrate existing roadways.

Blocks and Streets

The SEMI Refined Master Plan recommends creating a street and block grid system extending north from Prospect Park to the proposed Granary Park. A street and block system will organize redevelopment in an incremental manner, assuring the urban fabric remains continuous and legible throughout all phases of redevelopment.

Key components to the creation of a block and street system north of University include the following (Fig. 11 & 12):

- Extension of streets north of Fourth Street to proposed Granary Parkway;
- Extension of 27th Avenue SE north as an amenity boulevard from Prospect Park to Granary Parkway;
- Extension of Fourth Street SE to Oak Street.

The above infrastructure improvements will create a framework for development of the South Redevelopment Area. It will create recognizable and coherent urban blocks that will facilitate incremental development able to respond to different market conditions over time. In addition, the new roadways will maximize access to the proposed Granary Park for the South Redevelopment Area.

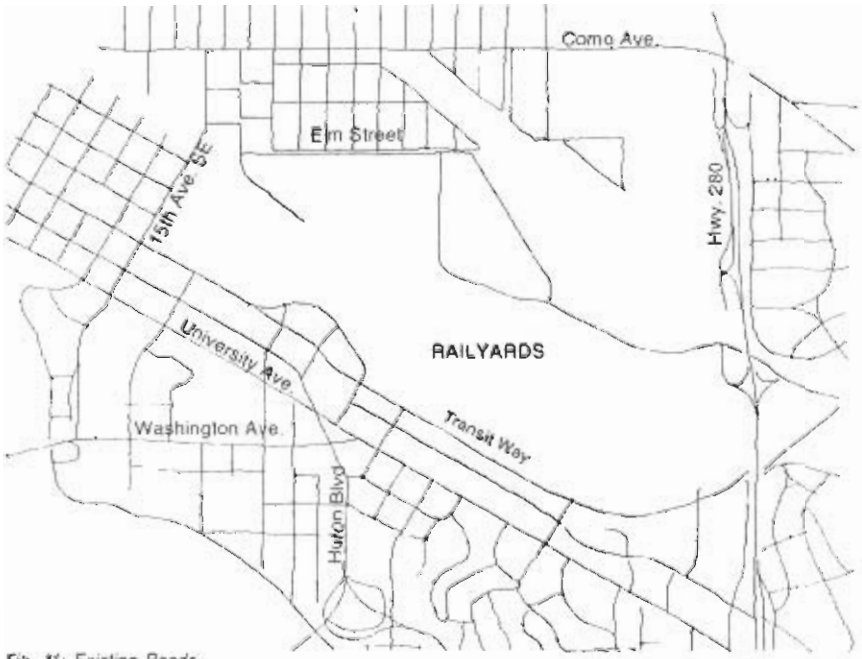


Fig. 11: Existing Roads

Fig. 12: Proposed Roads

Fig. 11 & 12: The SEMI Refined Master Plan proposes to reconnect neighborhoods to the north and south of the study area with bridges crossing the rail yards. The new block and street patterns south of the rail yards will be an extension of existing streets and blocks.

Block sizes and shapes should generally resemble others in the immediate area. The Refined Master Plan recommends one possible design for a street network. Final design may vary, however, several guidelines should be considered. For example, where existing streets should be extended, block areas should not exceed 4.5 acres; block perimeters should not exceed 1,900 lineal feet (approximate range of mixed use blocks throughout Minneapolis). Consistent with the City's subdivision regulations, the short sides of each block should not be less than 600 feet and not more than 1,500 feet There exists substantial flexibility to create a variety of block patterns within these parameters.

Creating a Loop System to Connect North and South, East and West

Another major component of the Refined Master Plan is the re-connection of the community across the existing rail yards. Only one connection currently exists between the Como neighborhood and the Prospect Park neighborhood. This connection, 15th Avenue SE, is utilized by trucks, bikes, autos and pedestrians. It is not adequately designed, nor can it be adequately designed to accommodate all the competing needs. Therefore, the Refined Master Plan provides several recommendations for improving connections between the north and south sides of the railyard, including the following (Fig. 12):

- Build *East Bridge* and the *West Bridge*
- Build *Kasota Parkway* on the north side of the rail yards
- Develop *Granary Parkway* South of the rail yards
- Extend *Granary Parkway* through the Dinkytown trench to the Stone Arch Bridge and Main Street
- Develop *Kasota Extension* to I-35W

East Bridge and West Bridge

The East and West Bridges will provide principal north-south connections within the redevelopment area. They will complete the loop circulation around the railroad tracks and will provide needed relief to 15th Avenue SE and to the University Avenue / Franklin Avenue / Hwy. 280 Interchange. The East Bridge will also permit truck traffic to directly access Hwy. 280 at Kasota.

The West Bridge is proposed to be a "T" bridge (Fig. 9). The ramps to the bridge are located in the left lane of east or west bound traffic on Kasota Parkway. The ramp ascends to a controlled "T" intersection. At this intersection, users continue to ascend across the rail yards.

The East Bridge ascends from Kasota Parkway and Granary Parkway. The southern toe of the bridge is located at a small park that terminates the extension of Malcolm Avenue. The SEMI Refined Master Plan organizes traffic flow such that Malcolm is not the preferred route. Rather, traffic bound for University Avenue and Hwy. 280 will use Granary Parkway and Westgate Drive.

It is important for the design of the bridges to accommodate all users. The bridges across the rail yards can be a Grand Rounds route and therefore must be able to be traversed comfortably by pedestrians, children, bikers and runners.

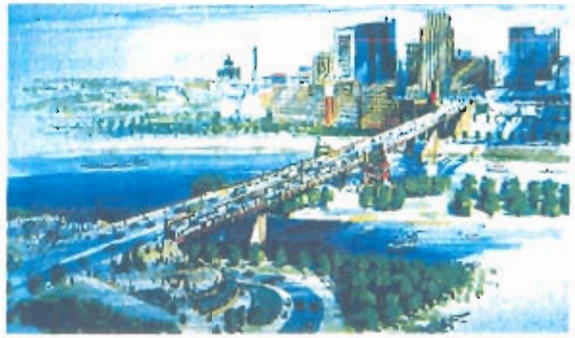


Fig. 13: Wabasha Bridge in St. Paul
source: St. Paul on the Mississippi River Framework Plan

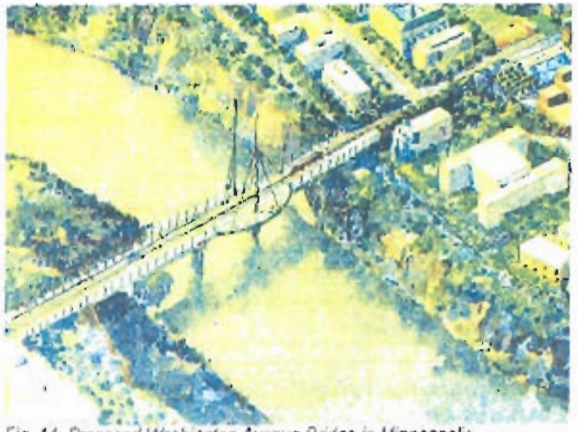


Fig. 14: Proposed Washington Avenue Bridge in Minneapolis
source: University of Minnesota Master Plan

Bridges should be sensitively designed to accommodate all users - not just more automobiles and trucks. Opportunities exist to celebrate the view created at the top of the bridge and the bridge heads. Bridges can become gathering places, destinations and landmarks. The Wabasha Bridge in St. Paul and proposed Washington Avenue Bridge in Minneapolis are designed to accomodate bicyclists, pedestrians and other non-motorized vehicles.

Kasota Parkway

Completion of Kasota Parkway, currently under construction, will provide local access to all parcels in the North Redevelopment Area. The roadway will also provide connections between the East and West Bridges. Kasota Parkway will become primarily a local road serving the redevelopment area (Fig. 12).

Kasota Extension

The Kasota Extension to I-35W will provide direct access to the SEMI Area from I-35W by utilizing the right of way of abandoned rail lines (hence by running west over the 15th Avenue viaduct) and will be able to join I-35W (through Johnson Street to the west, onto the I-35W service road). Currently, access to the area from I-35W utilizes 4th Street, University Avenue and Como. The Kasota extension will provide relief to these roadways as well as to Como Avenue and Hennepin Avenue (Fig. 12, 15). This extension will not be implemented until the connection to I-35W is established at or near Como Avenue.

Granary Parkway

Granary Parkway will complete the circulation system between the East and West Bridges and link through the Dinkytown trench to the Mississippi River, Stone Arch Bridge, 2nd Street, and Main Street. It will also permit vehicles to access I-35W via 8th Avenue SE (to go south) and 11th Avenue SE (to go north). This new roadway will also provide relief to University Avenue between 11th Avenue and Oak Street, as it will carry the local traffic to the South Redevelopment Area (Fig. 12, 13).

At key intersections, traffic calming features should be included in the design of Granary Parkway. These features would include traffic circles, landscaping, bicycle lanes and separated pedestrian paths, and pavement changes.

Granary Parkway will provide direct access to 5th Street at 18th Avenue. This will allow automobiles and bicycles to access Dinkytown businesses.

A bicycle and pedestrian slip ramp will connect Granary Parkway to the interesection of 15th Avenue and 5th Street.

Bicycle and Pedestrian Accommodations

Equally important to movement of vehicles throughout the area, the SEMI Refined Master Plan provides for movement of pedestrians and bicyclists. All new streets shall contain sidewalks with street trees and lighting. All new roads, except District streets, will include striped lanes for the commuter (Class A) bicyclists. The proposed Granary Parkway will contain a path for pedestrians and a bike lane connecting the Stone Arch Bridge and Bridge # 9 to points east.

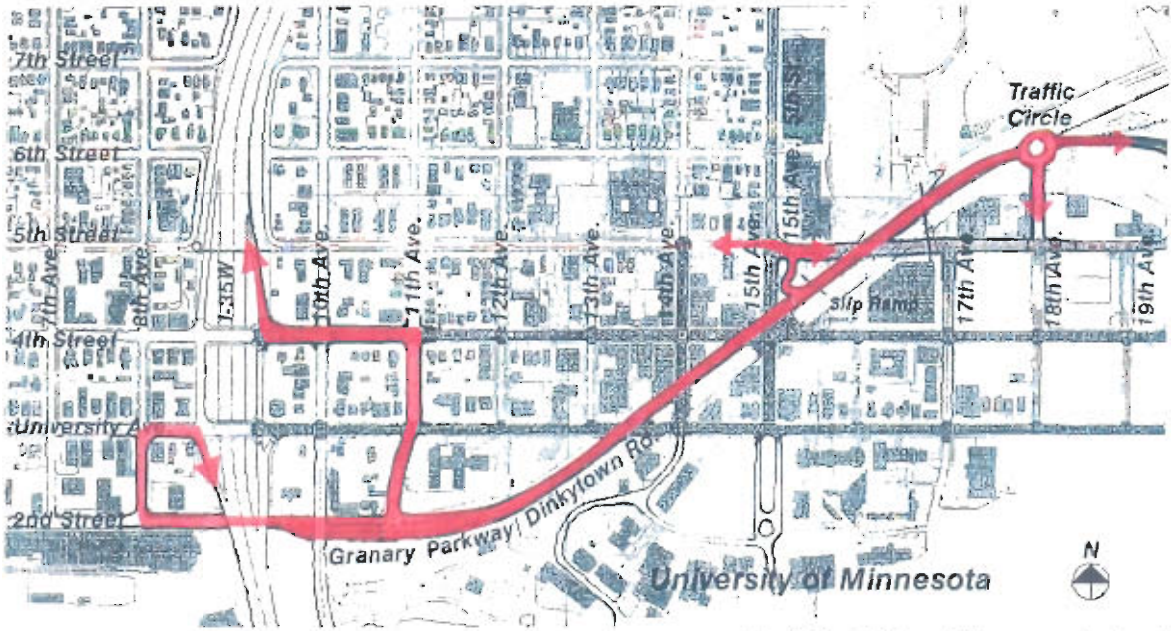


Fig. 15: Study of Granary Parkway expansion through Dinkytown Trench (source: City of Minneapolis)

Recommended Street Sections

The SEMI Refined Master Plan recommends several new roadway connections and improvements. The design of these streets is critical to the overall design of the district.The recommended street sections consider both the quality and the quantity of traffic that must be accommodated on the roadways.The streets will balance the needs of vehicles (cars and trucks in specified locations), pedestrians, bicyclists, property owners, and daily users of the area. By balancing these needs, the streets can perform multiple functions and provide overall increased investor confidence in the area.

The recommended street sections include general specifications that further define the character of the roadway. Movement category, curb radius, design speed, pedestrian crossing time, pavement width and parking type all contribute to the overall character of the roadway. Consistent design of the physical elements that exist between building facades on opposite sides of the street will result in a high quality public environment.

27th Boulevard SE

The 27th Boulevard SE is an extension of the existing 27th Avenue SE, north of University Avenue.The bouldvard is proposed to be an amenity street with water storage and movement accommodation in the center boulevard. The roadway shall incorporate short term parallel parking adjacent to generous sidewalks. Street trees should be located every 30 feet (Fig. 33,34).

27th Blvd. SE	
Movement Category:	*free*
Design Speed:	*25 MPH*
Curb Radius:	*10 feet*
Pavement Width:	*26 feet and 26 feet*
Pedestrian Crossing:	*12 seconds pavement*
	12 seconds median
Parking:	*on-street both sides, short-term*
Bikes:	*striped lane on roadway*

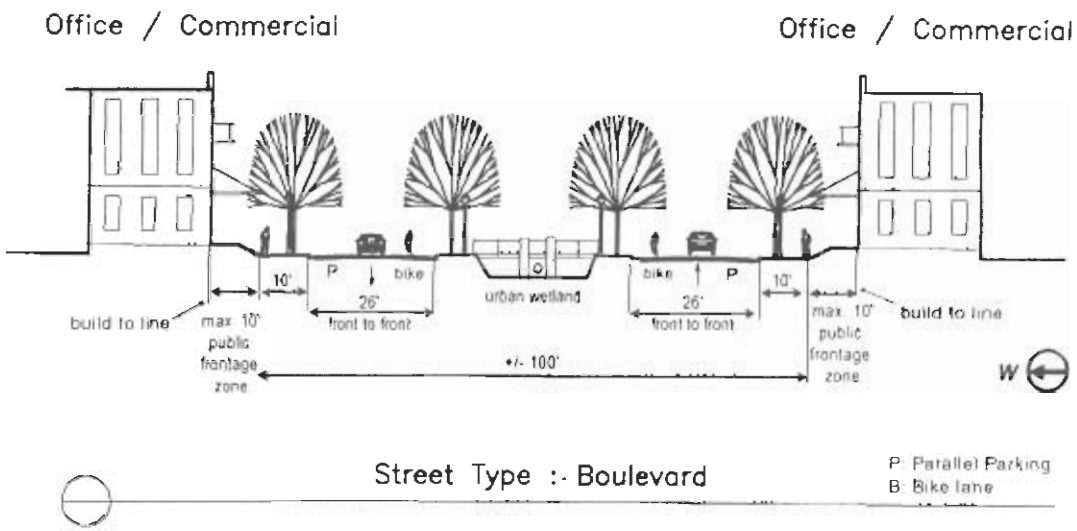


Fig. 16: 27th Boulevard SE Street Section

District Streets

The District Streets are recommended to be two-way streets with short term parallel parking on both sides. Sidewalks should be provided on both sides of the street. Street trees should be located a minimum of every 30 feet.

District Streets	
Movement Category:	slow
Design Speed:	25 MPH
Curb Radius:	10 feet
Pedestrian Crossing:	15 seconds
Pavement Width:	44 feet
Parking:	off-street, on-street, short-term
Bikes:	on-street unmarked, mixed with traffic

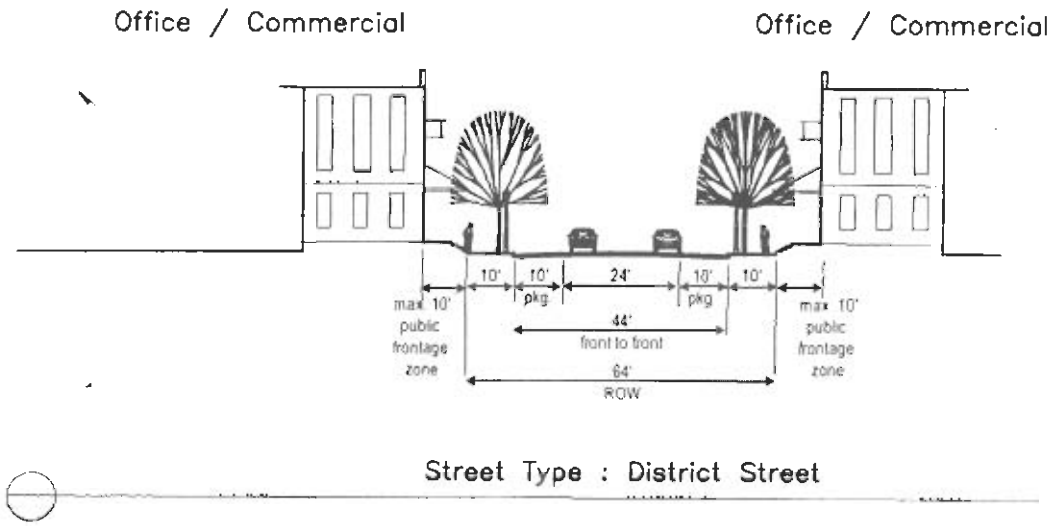


Fig. 17: District Street Street Section

Kasota Parkway

Located north of the rail yards, Kasota Parkway is intended to accommodate significant truck traffic. It is recommended to create a 30-foot wide street with no on-street parking. The south side of the street should accommodate biofiltration strips for stormwater runoff from the adjacent properties.

Kasota Parkway

Movement Category:	*free*
Design Speed:	*30 MPH*
Curb Radius:	*25 feet*
Pedetrian Crossing:	*10 seconds*
Pavement Width:	*30 feet*
Parking:	*off-street*
Other:	*biofilter swale located on south side*
Bikes:	*striped lane on roadway and off-street path*

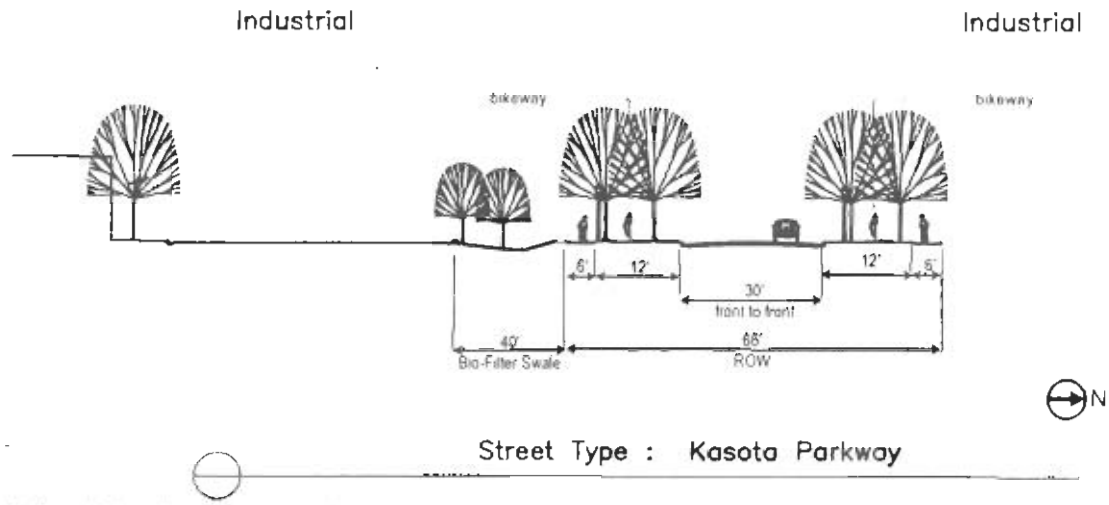


fig 18: Kasota Parkway Street Section (note: Kasota Extension should have a similar street sections without the biofilter swales)

Granary Parkway

Granary Parkway is located on the south side of Granary Park. The roadway will be used for both trucks and local users. The roadway is adjacent to a park and therefore the movement of vehicles should not be considered "free," rather the movement should be "slow." Roadway curves are generous but speeds will be kept slow due to a relatively narrow roadway of 26 feet. Short and medium term parking should occur on the park side of the street in designated parking bays.

Granary Parkway

Movement Category:	*slow*
Design Speed:	*25 MPH*
Curb Radius:	*10 feet*
Pavement Width:	*26 feet*
Pedetrian Crossing:	*8 seconds*
Parking:	*pkg. bays, one side, med. term*
Bikes:	*off-street dedicated lane in the park and off-street path east and west of park and striped lane on roadway*

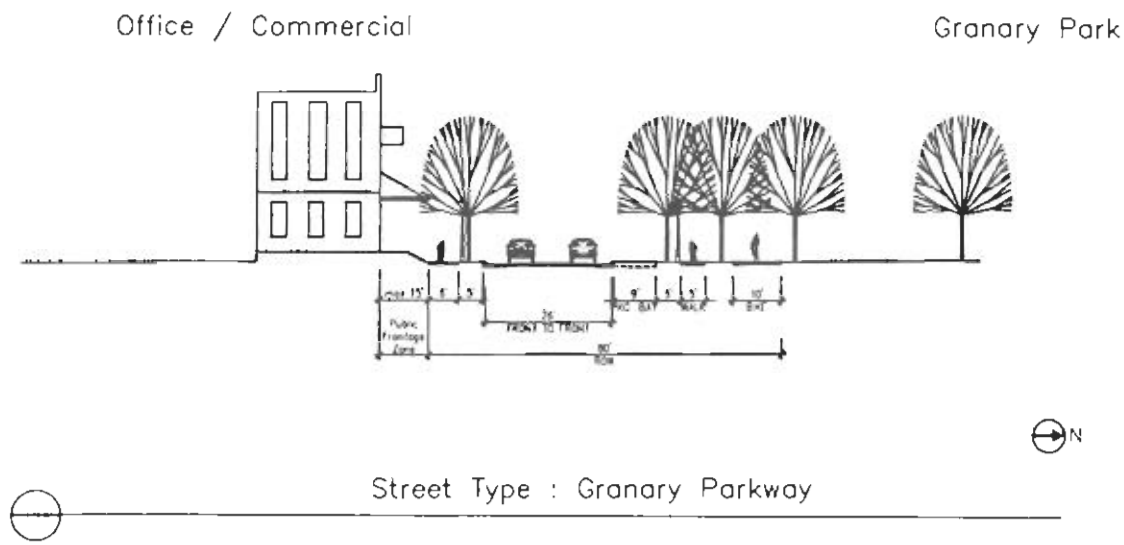


Fig. 19: Granary Parkway

Elm Street

The SEMI Refined Master Plan recommends reconfiguring Elm Street by utilizing the current right of way. Currently Elm Street is a 40-foot roadway serving the industrial properties to the south. There also exists a local access road north of Elm Street that serves the residential properties in Como Neighborhood. The transition and buffering between the two uses is minimal and abrupt. It is therefore recommended to narrow the Elm Street roadway and widen the median. A bike path and sidewalk should be added to the south side of "Industrial Elm." Additional planting should be added to the north side of Residential Elm, thereby further buffering the homes from the truck traffic on Industrial Elm.

Industrial Elm

Movement, Category	*slow*
Design Speed:	*25 MPH*
Curb Radius:	*25 feet*
Pedestrian Crossing:	*10 seconds*
Pavement Width:	*26 feet*
Parking:	*off-street*
Bikes:	*off-street in path on south side of roadway and striped lane on-street*

Residential Elm

Movement, Category:	*yield*
Design Speed:	*15 MPH*
Curb Radius:	*5 feet*
Pedestrian Crossing:	*8 seconds*
Pavement Width:	*20 feet*
Parking:	*off-street*
Bikes:	*on-street striped, mixed with traffic*

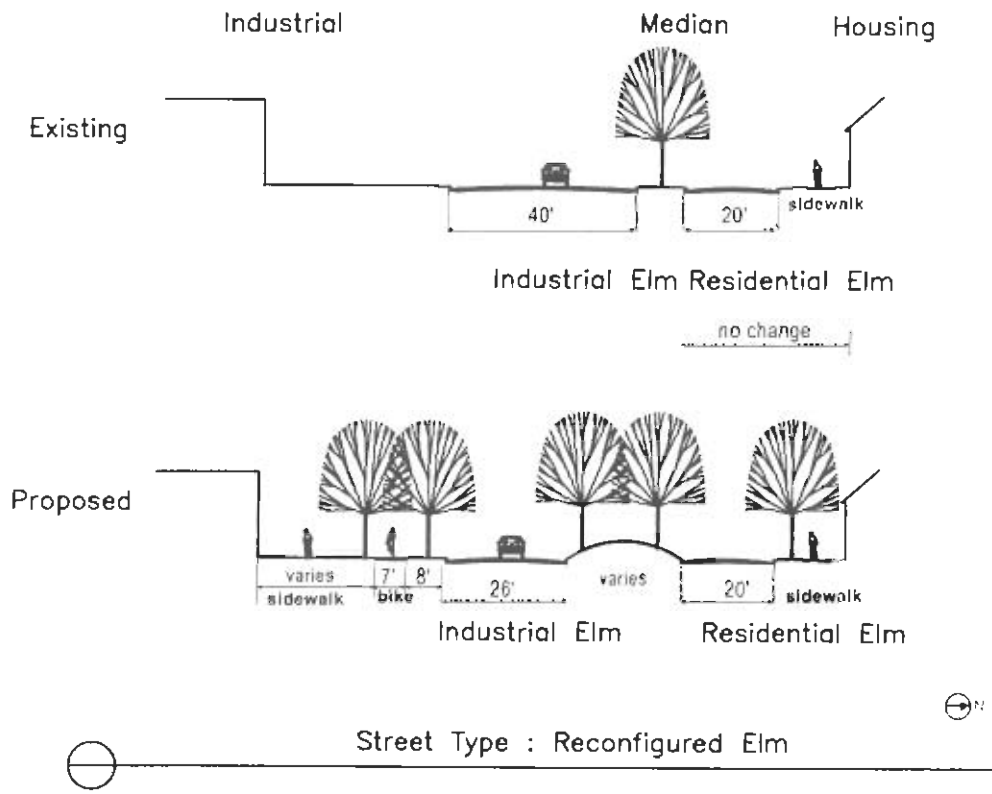


Fig 20: Elm Street Section

Fig 21: Elm Street is currently a divided roadway with minimal buffering between residential and industrial uses. It is proposed to increase the buffer between the two uses by increasing the median. In addition, the proposed Kasota Extention will greatly reduce truck traffic in the neighborhood.

Integrating the Natural and Recreational Systems

The Refined Master Plan recommends implementing a *green infrastructure* as a means for preventing and mitigating several environmental impacts of the inevitable development while at the same time providing a civic open space structure. The green infrastructure takes advantage of the existing natural systems and park system to accommodate stormwater runoff and provide for recreational connections. By coordinating these systems, they act as development amenities for private investments. The City has proposed a greenway linking north and south. We believe that this linkage can serve to complete the Grand Rounds. The primary components to the recommended green infrastructure include:

- Connection to the Grand Rounds,
- Granary Park,
- 27th Boulevard Urban Wetlands,
- 4th Street Urban Wetlands, and
- On-site bioretention and infiltration systems.

These green infrastructure investments will make possible the collection and cleansing of stormwater runoff, routing of recreational trails throughout the site, celebration of historic structures, and overall creation of desirable addresses for development.

Contained on the following pages are descriptions of the above features. Detailed calculations and descriptions are contained in Volume 4, Appendices, Stormwater Framework Plan.

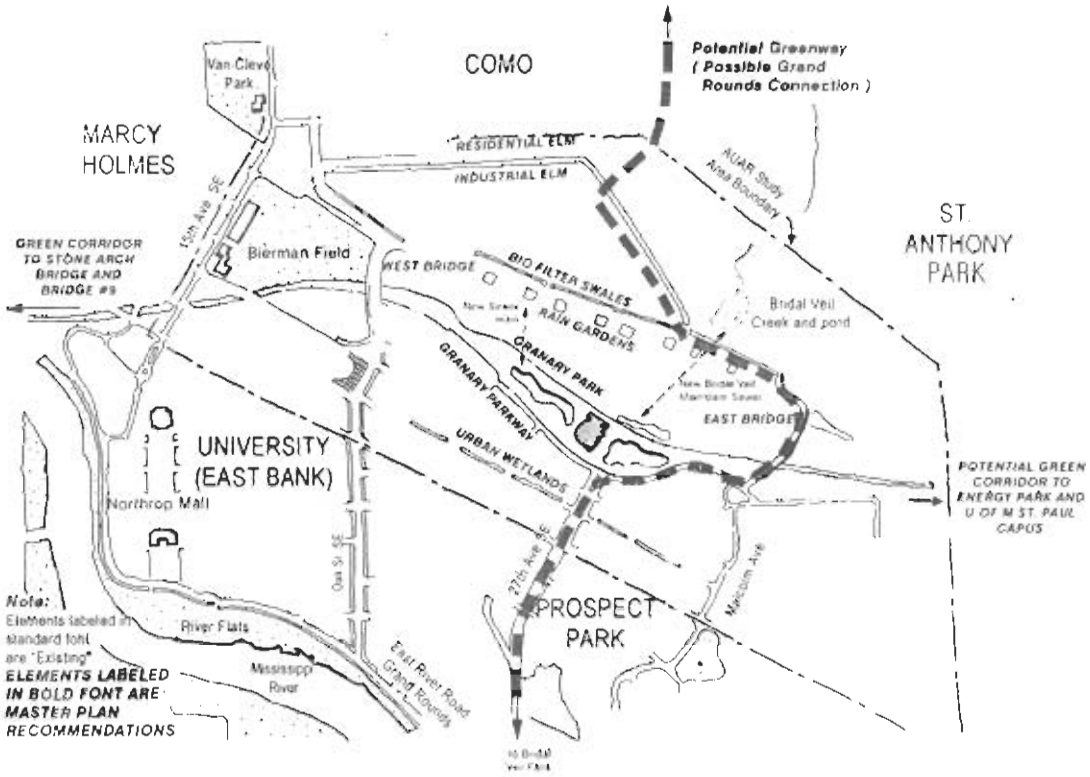


Fig 22: Natural and Recreational Systems. Implementation of Refined Master Plan recommendations will assure the recreational and natural systems are seamlessly woven into the greater fabric of the City.

Contribution to and Completion of the Grand Rounds

The famed Grand Rounds in Minneapolis is not completed due to a missing link between East River Road and Stinson Boulevard in Minneapolis. The completion of this linkage will require close coordination between the University of Minnesota and its plans with those of the City and neighboring communities.

The University of Minnesota's Master Plan recommends Oak Street be utilized as a combined bicycle and vehicular connection of the Grand Rounds. This plan also recommends separating the recreational path (bikes and pedestrians) from automobiles at Hennepin Avenue.

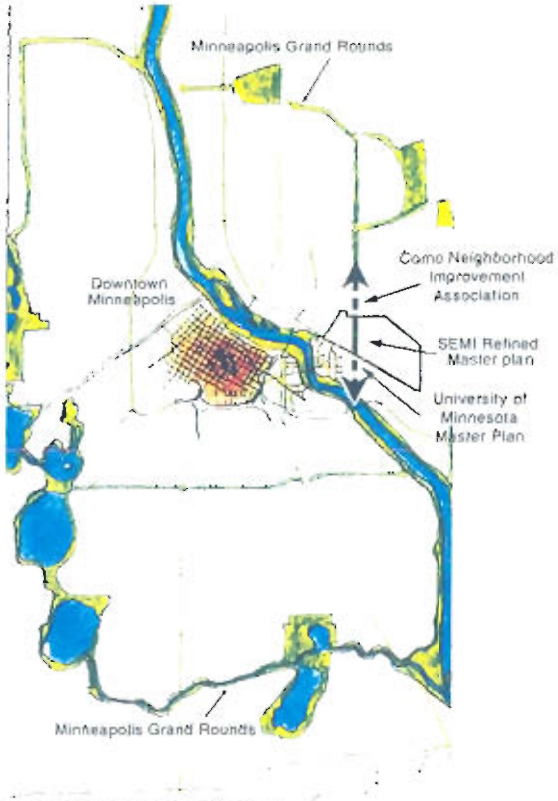


Fig. 23: Minneapolis Grand Grounds

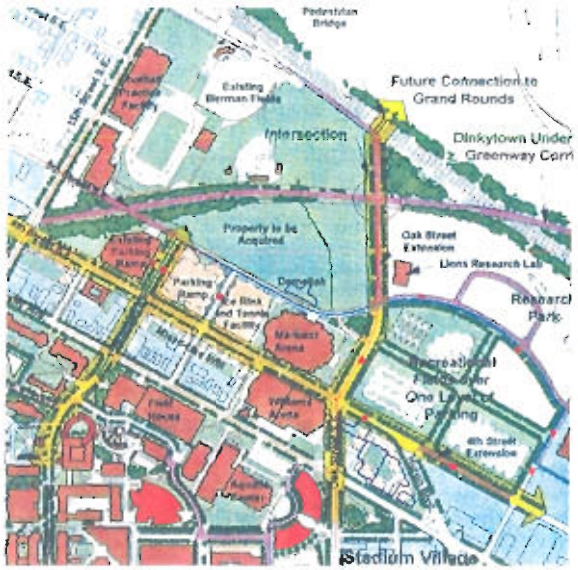


Fig. 24: University of Minnesota Master Plan (source, University of Minnesota)

Fig 24 and Fig 25: A missing link in the Grand Rounds exists between Northeast Minneapolis and the Mississippi River. The SEMI Area and the University of Minnesota represents a portion of this missing link. This Plan and the recently completed University of Minnesota Master Plan recommend a route to facilitate completion of the Grand Rounds for vehicles, bikes and pedestrians.

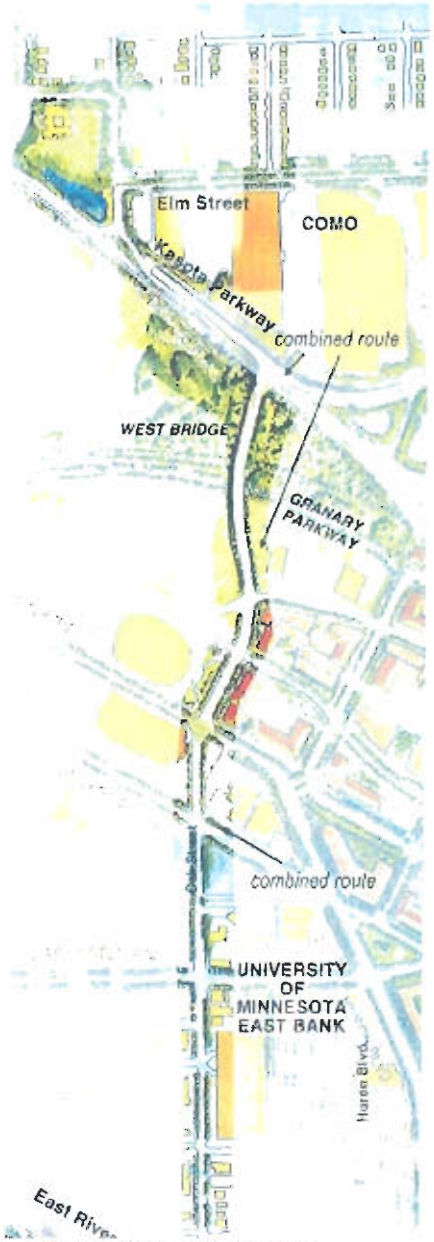


Fig. 25 Bicycle and Greenway Corridors.

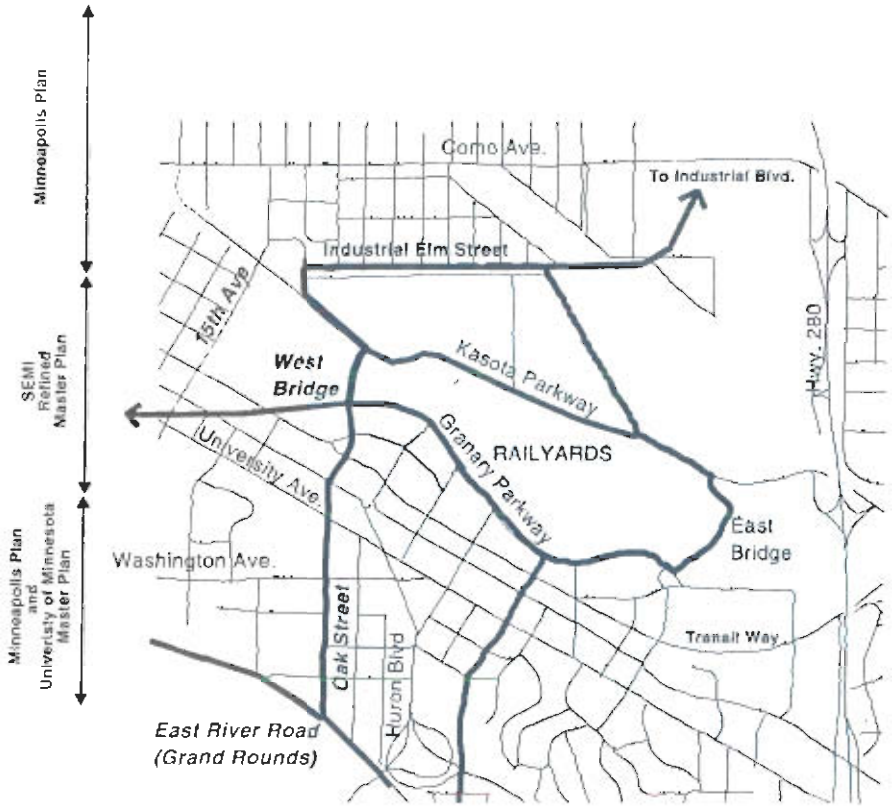


Fig. 26: Potential Grand Rounds Routes

The SEMI Refined Master Plan allows for the auto, bike and recreational connection to East River Road in order to complete the Grand Rounds. Fig. 26 shows several possible routes for a Grand Rounds designation.

As a Grand Rounds connection, particular concern must be given to the design of the bridges. The bridge deck and cross section must provide adequate space and protection for all recreational users (bicyclists - both recreational and commuter, pedestrians, and roller bladers.) Inclines should be gentle, and overlooks and rest stops must be provided. The bridges will be one of the final links in the Grand Rounds, and therefore a pedestrian and bicycle friendly design is critical.

Granary Park

The SEMI Refined Master Plan recommends developing a major park with ponds and recreational amenities at the natural low elevation point in SEMI.

This park, "Granary Park," should become dedicated public space to be used for stormwater collection and cleansing, historic celebration, and recreation. The plan reinforces that a number of alternative scenarios in the development of the park and reuse of existing buildings and elevators are possible.

One of the park scenarios is to focus on the Peavey Electric Elevators and the existing array of grain elevators located immediately to the east. The feasibility of maintaining and celebrating the Peavey

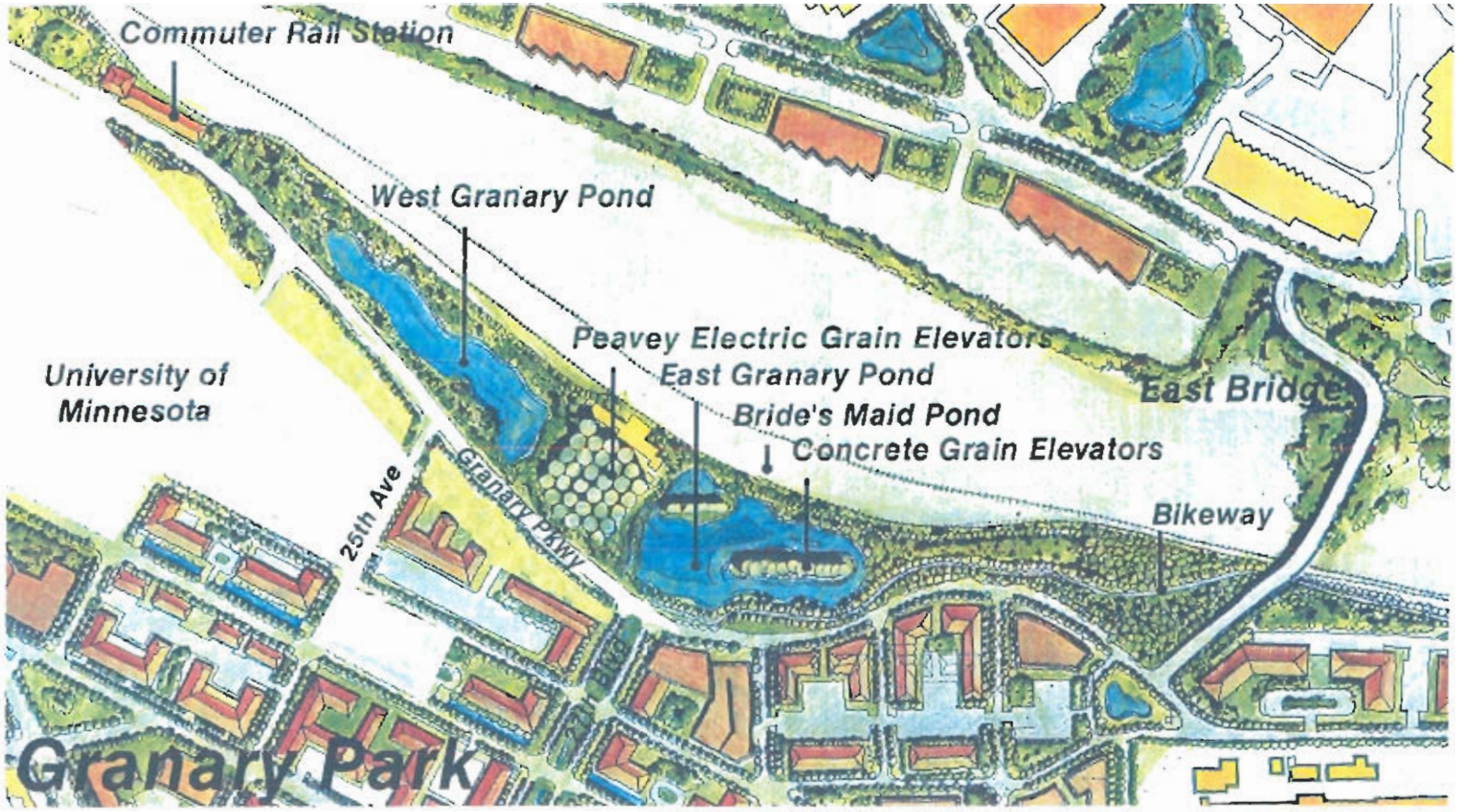


Fig. 27: Granary Park

Electric Elevators should be studied. Ideally, when these elevators are abandoned, they could be stabilized and maintained, to be saved and celebrated as ruins. The land around the elevators should be excavated to create a pond. The result will become a picturesque "ruin" of these "castles of industry" floating on islands in Granary Pond and silhouetted against the skyline of the City. The "ruins" would remain the tallest buildings in the district, and they would be visible from University Avenue as well as the new streets extending north from University Avenue

The ponds will be filled by water flowing from the Bridal Veil mainstem north of the rail yards, thereby creating ponds that echo Bridal Veil Pond located north of Kasota Parkway.

West Granary Pond, located to the west of the Peavey Elevators, will be developed as a new stormwater detention facility. This pond will perform stormwater cleansing functions as well as providing a foreground reflecting pool and preserving a field of view of the Peavy Electric Elevators. (Detailed calculations of areas and capacity of all stormwater features are included in Volume 4, Appendices, Stormwater Management Framework Plan.)

Alternative Granary Park Scenarios

The following drawings, Fig. 28, illustrate three approaches to reconfiguring Granary Park to accommodate additional development sites while maintaining the ponding required to serve the drainage and retention needs of this portion of the SEMI / Bridal Veil area, as well as maintain the drainage and stormwater management capacity on a system-wide basis. In these alternatives, the amount of stormwater retention is constant. The variables are in the location of the ponds and the inclusion or elimination of selected buildings.

Alternative 1. This alternative assumes the removal of the Lighthouse Bay building. A developable site of approximately 4.8 acres is created to the west of the park area. However, because of the natural slopes and elevation of this new development area, only 2.8 acres of the site will drain into the pond. The remaining areas, 2.0 acres, must be drained into an on-site pond.

Alternative 2. By retaining the Lighthouse Bay building, but eliminating the Peavey Electric Elevators, a development site of approximately 5.0 acres is created to the west of the pond and park. However, only 3.0 acres of this new site can be drained into the main pond, and the remaining 2.0 acres will require on site-ponding.

Alternative 3. This alternative assumes the removal of both the Lighthouse Bay building and the Peavey Electric Elevators. A development site of approximately 8.5 acres is thereby created. Of this, about 6.5 acres can be drained into the pond, while the remaining 2.0 acres must drain to an on-site pond.

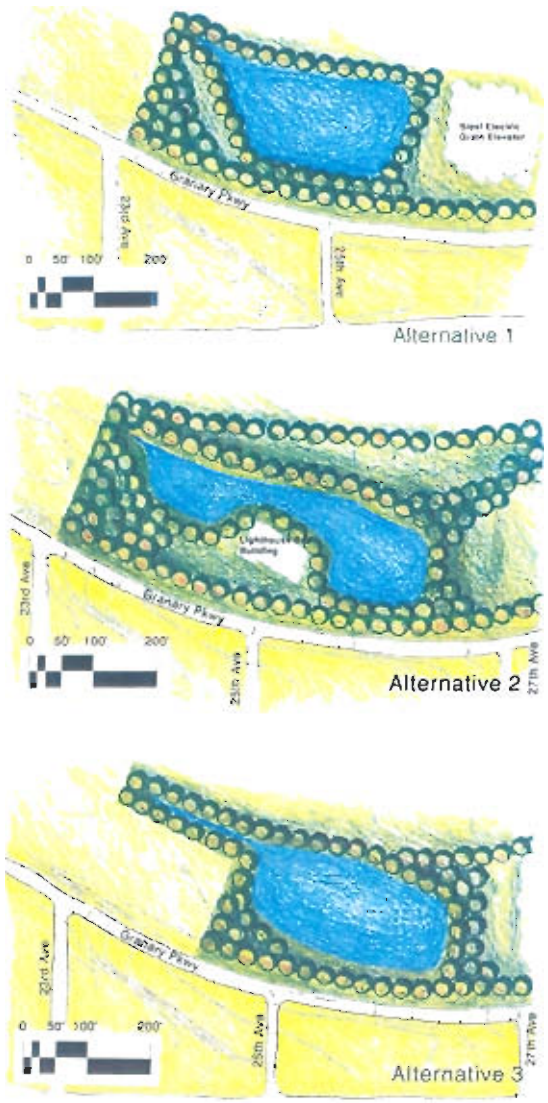


Fig. 28: Alternative Granary Park Scenarios

The Refined Master Plan assumes the following regarding reuse and demolition of existing buildings:

1) Provided a building contains a use consistent with the Refined Master Plan, it should continue;

2) If a building is underutilized or vacant, it should be adapted for a new use consistent with the Refined Master Plan; or

3) If no appropriate reuse can be found, the building could be demolished to allow for a new use on site that is consistent with the Refined Master Plan. All federal, state and local regulations regarding historic preservation must be followed.

Fig. 29: Existing concrete elevators in SEMI

Fig. 30: Peavey Electric Elevators

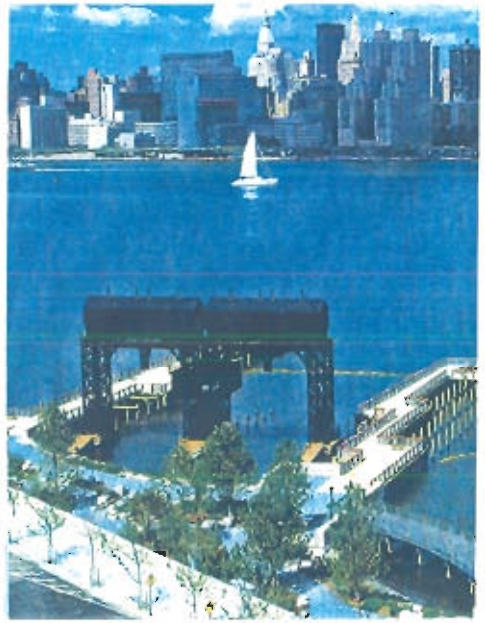


Fig. 31: Gantry Plaza State Park

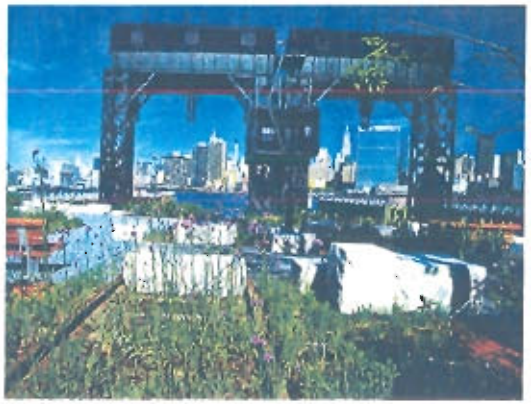


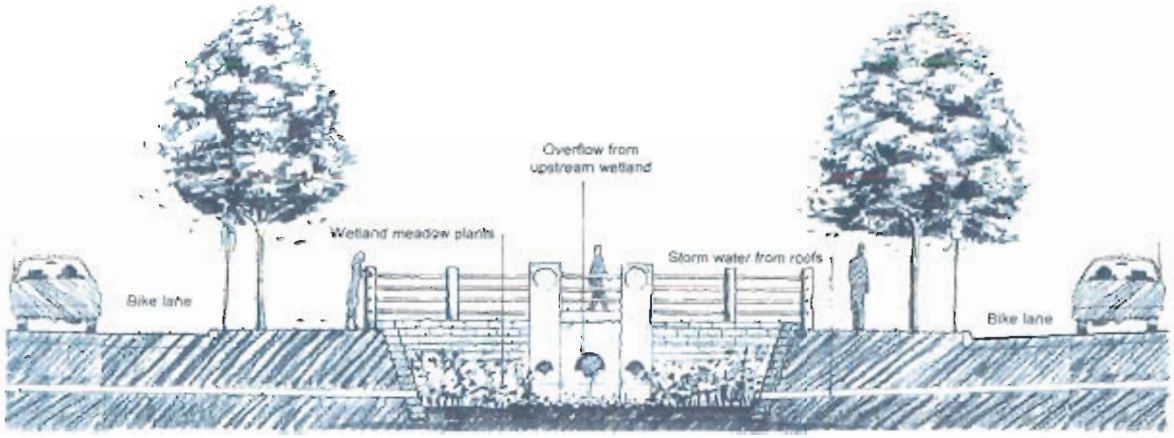
Fig. 32: Gantry Plaza State Park

Fig. 29-32: Granary Park will celebrate the history of the area. Gantry Plaza State Park on Long Island, New York also celebrates the history of the area by salvaging the 130-year-old gantries that tell a story of the area.

27th Boulevard SE Amenity Link

The proposed 27th Boulevard is an extension of the existing 27th Avenue SE. The alignment of the new boulevard follows the alignment of the existing and proposed storm sewers connecting the Bridal Veil Creek to the Bridal Veil Falls. It is proposed to create a separated boulevard connecting University Avenue with Granary Park. This boulevard would contain a constructed wetland amenity located in between the north- and south-bound lanes of traffic. These urban linear wetlands would give key expression to the Bridal Veil Creek main stem, marking on the surface the flow of creek in the pipes beneath the street.

The Boulevard link would be constructed concurrently with a new Bridal Veil main stem which is in need of replacement. The linear wetlands located in the boulevard link will provide a recreational, visual and wildlife amenity to the area as well as improve the quality of the water which eventually makes its way to the Mississippi River.



Drawing by R. Sykes, Land and Water Design Institue, S.C.

Fig. 33: 27th Boulevard Urban Wetland

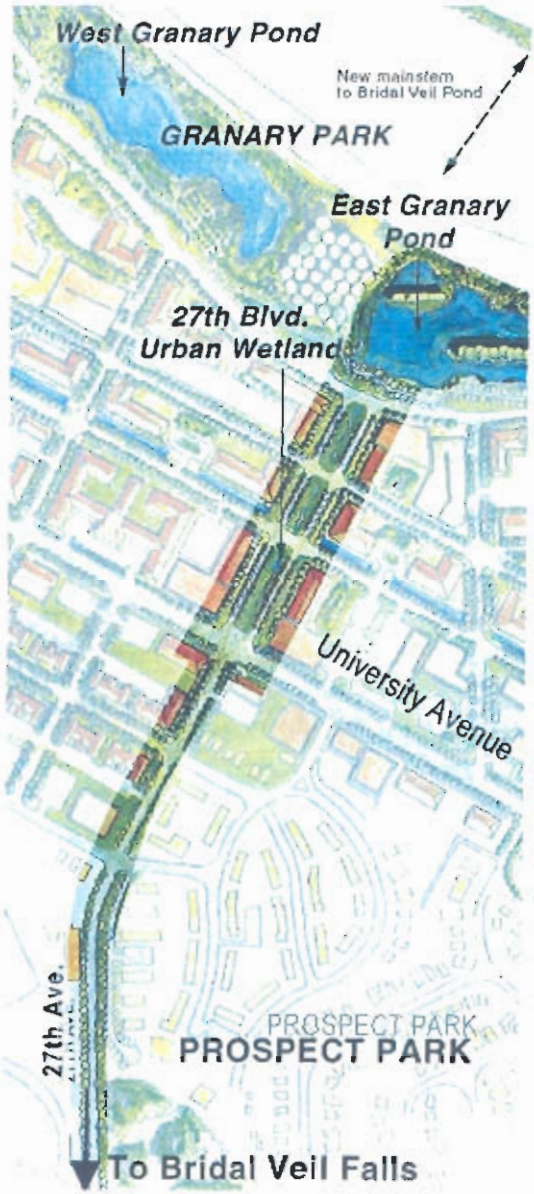


Fig. 34: Connection between Bridal Veil Falls and Bridal Veil Pond

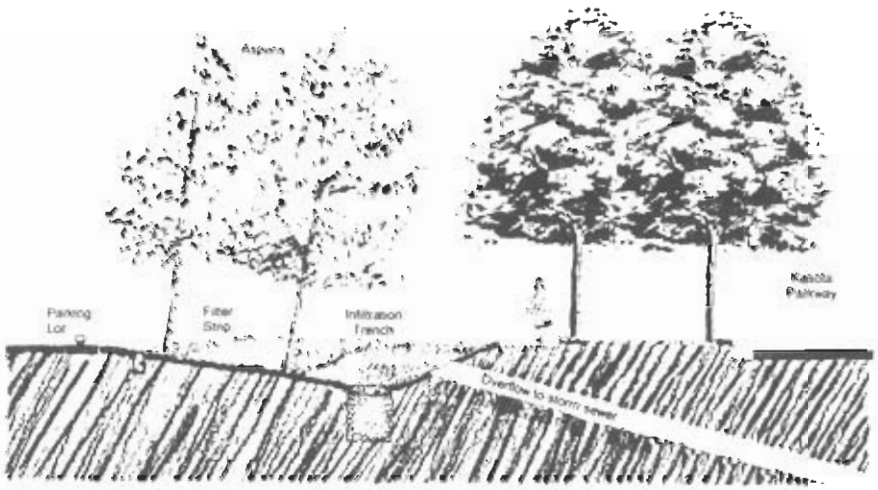
Additional Stormwater Management Strategies

The Stormwater Management section of the AUAR recommends the provision of several private on-site stormwater management techniques such as bioretention rain gardens and biofilter strips and urban wetlands and bioretention swales. These stormwater management techniques will increase the use of natural systems to clean and manage stormwater throughout the study area.

Biofiltration Swales and Raingardens

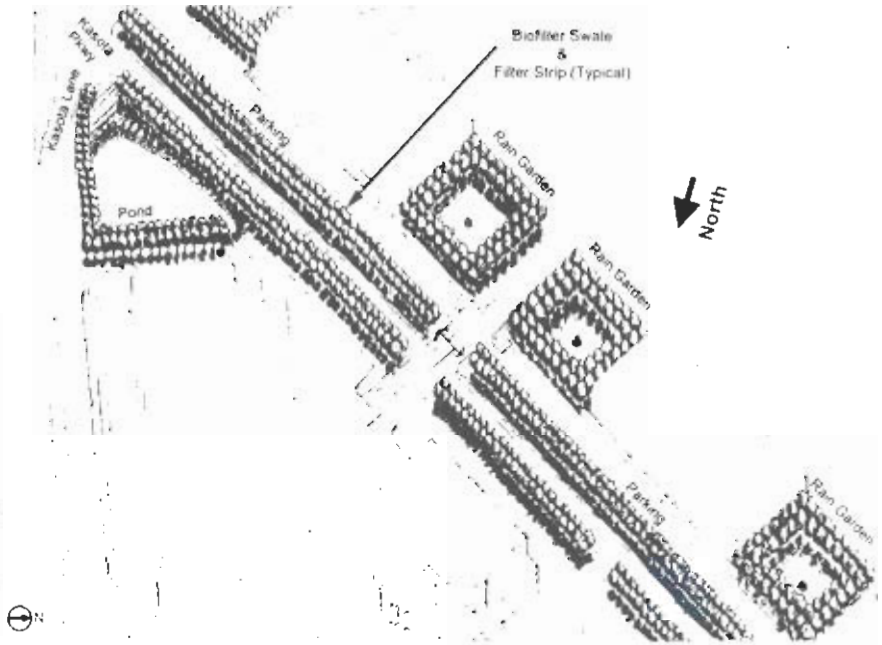
Biofiltration swales and rain gardens are proposed in the North Redevelopment Area. The swales will be located in a 40-foot easement located on the south edge of the proposed Kasota Parkway. The swales will be a few feet deep and lined with Aspen trees. The swales collect and clean water originating from parking areas and roadways. The bottom of the swales are constructed as infiltration trenches. The swales infiltrate the first flush of runoff. Excess water flows into the storm sewer set beneath the pavement of the new Kasota Parkway.

Rain gardens are proposed for the required open space areas on each building parcel. They are also known as bioretention ponds. Although dry most of the time, these elements are designed topographic depressions that gather runoff from surrounding roofs and pavements. The bottoms of the depressions have constructed soil profiles designed to support a carefully selected flowering plant community and to infiltrate the first flush of runoff. Excess water overflows through sculptural drains into adjacent biofilter swales and storm sewers.



Drawing by R. Sykes, Land and Water Design Institute, S.C.

Fig. 35: Biofilter Swales along Kasota Parkway



Drawing by R. Sykes, Land and Water Design Institute, S.C.

Fig. 36: Axonometric drawing of Kasota Parkway

4th Street Urban Wetlands

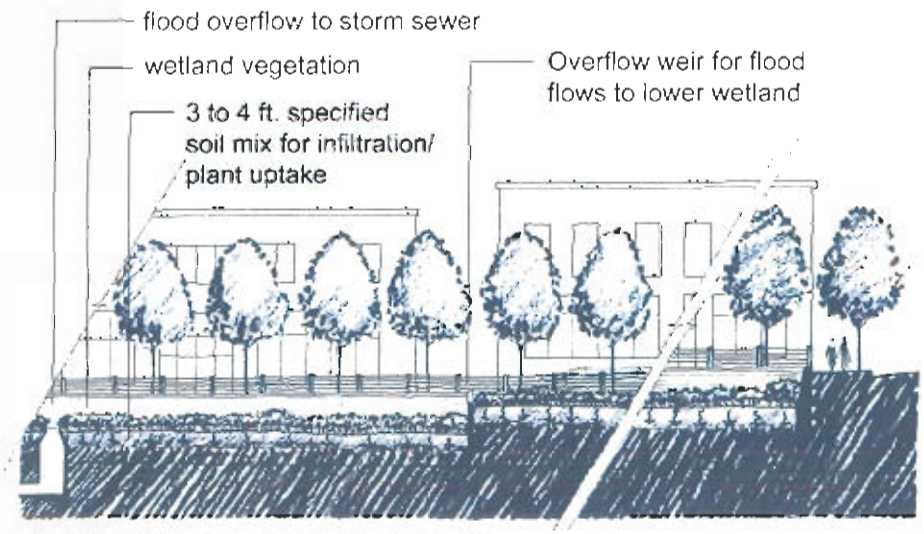
Additional linear urban wetlands are planned along the north edge of 4th Street SE. Figures 37 and 38 show the wetland locations. These wetlands will receive runoff from roofs only, or roofs and land surface areas. Like the 27th Boulevard linear wetlands, they will infiltrate the runoff from a water quality volume storm (a 1.25" rainfall) into the ground. As the water moves downward through the specified soil volume, it will be cleansed by the filtering quality of the soil and taken up by wetland plants in the bottom of the linear basins. Water in excess of the water quality volume will overflow into adjacent city storm sewers.

Fig. 37: 4th Street Wetlands

Reestablishing Elements of the Natural Ecosystem

In Chapter 3 of their book, *Landscape Ecology*, Richard Forman and Michel Godron define the concept of "patch" as a fundamental unit of natural ecosystems. The Refined Master Plan uses the strategy to create systems of small landscape patches wherever possible to reestablish elements of the natural ecosystem throughout. This approach is constrained by four important criteria: topographic, hydrologic, spatial and economic feasibility. The four general types of patches that could be created in this way are parkway urban forests, parkland, ponds and wetlands. By focusing on the concept of patches, the Refined Master Plan allows for the systematic integration of habitat improvements in an incremental way as future development proceeds.

The system of ponds and wetlands is designed to re-



Drawing by R. Sykes, Land and Water Design Institute, S.C.
Fig. 38: Schematic profile section of the 4th Street wetland

call the system of wetlands that were located approximately 40 feet below the existing grades of the railroad yards that were part of the Bridal Veil Creek flowage in the 19th century. Because of the heavy urbanization and deep fills that occurred since then, actual restoration of these wetlands is not feasible. Instead, the Plan provides for the creation of new, urban systems of wetlands of various types by providing two basic characteristic landscape ecosystems (as defined by Forman and Godron):

- Provide a landscape structure appropriate to sustaining small urban landscape patches. Specifically this meant providing appropriate space, size, shape and location for patches relative to the highly disturbed overall hydrogeologic structure of the area. In other words, provide the spaces for habitat in reasonable places.

- Provide the functional essentials for sustaining the landscape patches. This effort focused on providing the appropriate nutrient regimes (primarily water) and soil conditions needed to support plant communities and the habitat they provide.

Specifically, the green infrastructure includes four general systems of small landscape patches:

- Rain Gardens. These are moderate sized, isodiametric patches (a landscape ecology term referring to a roughly circular or square shape) of designed wetlands to be located in the required open space of the parcels developed along the south side of Kasota Parkway. Runoff water to supply these wetlands is to be harvested from the proposed buildings and parking areas and fed to shallow earth basins with constructed soil profiles designed to support wetland plant communities.

- Biofilter Swales With Urban Forest Edge. These are small, elongated patches (a landscape ecology term referring to a long, roughly rectangular shape) of plant communities and water systems to be located in the right-of-way and required setback areas along the south edge of Kasota Parkway. Water to supply these patches should be harvested from the proposed buildings and parking areas.

- Constructed Ponds. These are isodiametric patches located in Granary Park and will provide permanent open water surface, together with associated riparian and upland plant communities. They will be sustained by harvested runoff water and will contribute to cleaning up urban runoff water by biological and mechanical means.

- Systems of Linear Urban Wetlands. These are two chains of small, elongated patches of constructed wetlands. Water is harvested variously (depending on location) from roof runoff and surface runoff to support and maintain the wetlands. This variation in runoff water quality allows for the use of a range of wetland community types by matching type to the local nutrient flow. Where rooftop runoff is the only source of water, high quality plant communities should be sustainable.

Within the development areas, habitat connectivity is provided to the extent feasible by locating the individual landscape patches in systems or chains, placing them in close physical proximity to each other wherever possible. In many cases, the need to maintain continuity of the urban matrix required the construction of roadways between the patches. In these cases, culverts (dry most of the time) provide a means for small mammals and amphibians to move from patch to patch within each complex of similar patches without conflict with vehicular traffic.

The Refined Master Plan develops a comprehensive and regional stormwater management plan, differentiates size, intensity and purpose in the use of parcels and blocks in the areas south of the yards, organizes truck traffic to better serve the large industrial users in the northern areas (while minimizing the negative impacts of the trucks on the surrounding residential areas), provides for direct traffic access to the area's major arterials, and develops a more intense structure of buildings and uses.

By developing a clear structure of streets and blocks, the Refined Master Plan also provides for increased access to each parcel and integrates new development with existing. Finally, the Plan is structured around the provision of a significant public amenity of parks, open space and water formed around and in response to the stormwater management plan.

The Refined Master Plan coordinates several of the individual componenents (traffic, stormwater, utilities, land use) into a physical plan that predicts, accommodates, and designs for the likelihood of significant growth and redevelopment. By coordinating these elements, the Refined Master Plan doubles as a mitigation plan. New roads are recommended, intersections are improved, transit is supported, stormwater is treated, and land uses are integrated in order to address and balance the potential externalities of redevelopment.

The Refined Master Plan, if implemented, will do more than mitigate its impacts. The Refined Master Plan and its various components positively impact the area by contributing - not just mitigating - the city's and region's various systems and resources. Upon buildout, the resources and systems will work more efficiently and effectively than existing conditions.