

MASTER PLAN for BUFFALO BAYOU and BEYOND

AUGUST 2002



PREPARED FOR:

BUFFALO BAYOU PARTNERSHIP
CITY OF HOUSTON
HARRIS COUNTY
HARRIS COUNTY FLOOD CONTROL DISTRICT

BY

THOMPSON DESIGN GROUP INC. / EcoPLAN



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August 20, 2002

Anne Olson, President
Buffalo Bayou Partnership
1113 Vine Street, Suite 200
Houston, Texas 77002v

Dear Ms. Olson:

Buffalo Bayou has played a vital role in our city since its founding in 1836. Today, the Bayou can once again serve as a catalyst for new economic and cultural growth. The Buffalo Bayou Master Plan offers a compelling vision and solid framework for converting abandoned and underutilized waterfront property into a vibrant waterfront - alive with new residential neighborhoods, cultural destinations, commercial development and outdoor recreation. As a result, our city will experience increased tourism, employment and economic prosperity. Most importantly, the Buffalo Bayou waterfront will unite residents and visitors alike in discovering all that Houston has to offer.

As with past Buffalo Bayou development efforts, the city of Houston, Harris County and Buffalo Bayou Partnership will form a strong public-private partnership to implement the master plan's recommendations. Together, with significant collaboration with the business, civic organizations and the philanthropic community, we can transform Buffalo Bayou from marginal use and neglect into a position of public activity and private investment.

Sincerely,

Lee P. Brown
Mayor

Council Members: Bruce Tatro, Carol M. Galloway, Mark Goldberg, Ada Edwards, Addie Waisman, Mark A. Eitz, Bert Riefer, Gabriel Vasquez, Carol Alvarado, Annise D. Parker, Gordon Guan, Shelley Sekula-Rodriguez, M.D., Michael Berry, Carol G. Robinson, Controller: Sylvia R. Garcia



ROBERT ECKELS
COUNTY JUDGE

August 27, 2002

Harris County is proud to play a role in the development of Buffalo Bayou. The County has been a long-time partner and supporter of the Buffalo Bayou Partnership's effort to plan, coordinate, and complete amenities along Buffalo Bayou, creating an outstanding asset for our community. The Buffalo Bayou Master Plan, developed by Thompson Design Group/ EcoPLAN, incorporates already completed elements into a comprehensive long-range plan that will create an active and vibrant destination for Harris County residents and visitors.

In addition to trails, parks, and recreational and commercial opportunities from Downtown through the East End, an important element of the Master Plan is flood management. Harris County anticipates working with the City of Houston and Buffalo Bayou Partnership to implement the recommendations in the plan that will help to reduce the potential for flooding in Downtown and in the upstream communities bordering on Buffalo and White Oak bayous.

As Harris County Judge, I am pleased to offer my support for the Buffalo Bayou Master Plan and to provide my assistance in bringing it to fruition.

Robert Eckels
County Judge, Harris County, Texas



August 21, 2002

Buffalo Bayou is Houston's oldest feature and greatest natural resource. It is a reflection of our city's history and its rich diversity, a place where all residents can find a common meeting ground. Houston was founded on Buffalo Bayou's banks in the 19th century, was reinvented by the dredging of the Bayou for an inland port in the 20th century, and now in the 21st century, Houston once again can be transformed by making Buffalo Bayou a central element in the life of the city.

It is not surprising that official photos of Houston often depict our dramatic skyline with Buffalo Bayou in the foreground. The juxtaposition suggests a balance of nature with commerce. And, indeed, balancing environmental stewardship, economic development, and community integrity is the hallmark of the *Buffalo Bayou and Beyond* Master Plan. Houston will have a lively waterfront, a 10-mile linear park to anchor the city and to create an iconic sense of place. Within this pedestrian-oriented corridor the plan proposes 850 acres of new parkland, an expanded cultural and residential district rich in entertainment and retail opportunities, and major floodwater conveyance improvements. Prime mixed-use development sites are identified, neighborhoods are linked to the Bayou by greenways, and the Bayou is in turn linked to the larger ecosystem of our region. It is a vision that evolved out of community workshops. Participants recognized that bold solutions were needed to address quality of life concerns, to preserve natural resources for future generations, and for Houston to remain competitive in the 21st century.

Buffalo Bayou and Beyond has been co-sponsored by the City of Houston, Harris County, and Harris County Flood Control District. Our thanks go to the enlightened leadership of our co-sponsors, to our funding partners, and to the many individuals, civic groups, and governmental representatives who came together to share their thoughts and visions for the Bayou. The consultant team has listened, assimilated, tested and given cohesive form to those ideas. The result is an ambitious and visionary conceptual plan to guide us over the next two decades. It will require a continuing partnership of civic and political leadership to refine and implement the concepts. By working together to realize the vision, we can make "the Bayou City" a sobriquet that invokes pride for all Houstonians.

Toni Beauchamp
Chair, Board of Directors
Buffalo Bayou Partnership

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PREFACE

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The 2002 Master Plan, “Buffalo Bayou and Beyond,” is sponsored by Buffalo Bayou Partnership (BBP), and representatives of Harris County, Harris County Flood Control District (HCFCD) and the City of Houston. The Plan builds upon one of Houston’s great traditions and competitive advantages: the willingness of citizens to pull together to overcome virtually any obstacle to create great results for their city. The Plan also builds on the substantial achievements of the Buffalo Bayou Partnership since its founding in 1986 to improve Buffalo Bayou, and change the way Houstonians see and appreciate this waterway. During an 18-month planning process, hundreds of concerned citizens, business leaders, and residents of adjacent neighborhoods were heard from and listened to. In a sense, this really is a people’s plan, developed by Houstonians with a vision for the Bayou and a deep concern for the future of this city.

Mandate for a Master Plan

This Plan stands on the broad shoulders of Houston citizen groups who facilitated previous farseeing Bayou enhancement proposals. In 1986, the Buffalo Bayou Task Force issued conceptual recommendations about Bayou preservation and improvement, which were themselves a reevaluation of earlier plans by Charles Tapley Associates (1980-81). The report recommended new public amenities in conjunction with needed flood and erosion control improvements.

Both studies built on the philosophical foundation of Arthur Coleman Comey’s Planning Report of 1913 for the Houston Park Commission. Comey envisioned a linear park system along the city’s waterways, foreseeing that “its bayous or creek valleys intersect the city and surrounding country to furnish opportunity for parks of unusual value within a short distance of most residential areas, those of the future as well as the present.”

The Challenge Now

In its Request for Proposals in November 2000, seeking a new Master Plan for Buffalo Bayou, the BBP set forth specific objectives for the west sector, Downtown sector, and east sector. Each agenda was built on revitalization efforts and initiatives already underway, signaling the active and latent energies ready to be coordinated and harnessed to meet the next larger objective. That objective is defining the Buffalo Bayou's 10-mile waterway corridor as a restored park system that joins land and water to become the green heart of Houston. It is the opportunity to "put the Bayou back in Bayou City," with an important new waterfront presence to unite Houston with its past in all its diversity.

The Master Plan team, in conjunction with the Buffalo Bayou Partnership, has framed the Master Plan to combine these spheres: rehabilitation of the waterway's utilitarian functions as part of ecological systems and improved water conveyance capacity, redevelopment of scenic, leisure, and recreational resources, and economic revitalization of neighborhoods around the Bayou, to yield a humane city with nature integrated with new urban vitality.

Today's goals have been summarized as "Balancing Conservation and Development." That goal is being pursued by integrating past and current planning proposals, reviewing ideas already in circulation about Houston's future and its examination of Quality of Life issues; by coordinating the Master Plan with development projects in progress throughout the three sectors; and by integrating the recommendations defined by three major stakeholder workshops and countless focus group sessions.

From those platforms, the Master Plan Team has articulated visions to be realized in the foreseeable future, and strategies by which vision may be accomplished. Translated into specific plans, these ideas are presented in chapters addressing urban development and design, environmental quality and the eco-region, flood management, landscape, Bayou access and transportation, and water-based activities. The Report then addresses financing, implementation, and

strategic considerations guiding development of this unique 10-mile district containing 6400 acres of potential new uses and pleasures.

Buffalo Bayou Partnership and the team want to express appreciation to the project's co-sponsors, Harris County and the City of Houston; to the Steering Committee and Board of Directors of Buffalo Bayou Partnership, to the continuing collegial collaboration of Central Houston and the guiding council of the Greater Houston Partnership. The many organizations and individuals that have sustained this effort with interest and ideas are recognized in the Credits list.

The Master Plan team commends the many participants for devoted and detailed contributions to the planning process, and extends special appreciation to the sponsoring Buffalo Bayou Partnership for inviting us to participate in this visioning of the Next Houston.

Jane Thompson, AICP
for the Master Plan Team
Thompson Design Group, Inc./ EcoPLAN



OVERVIEW

SHAPING THE NEXT HOUSTON

This report summarizes an 18-month process to prepare a new long-range Master Plan for Buffalo Bayou. It calls for Buffalo Bayou's transformation. In a larger sense, it also calls for Houston's transformation, by refocusing the City on the waterway that gave birth to it. This proposal is both a citywide and a regional vision.

The plan identifies ways that Buffalo Bayou can become a central feature in the life of the City and of every Houstonian. It sets forth specific proposals to:

- Create 850 acres of new park land that will transform the Bayou into a recreational and scenic focal point for Houston;
- Define key sites that will make the Bayou a focal point for greater Houston's future development;
- Reduce potential for flooding in Downtown Houston and upstream communities bordering on Buffalo and White Oak Bayous;
- Build a network of trails and public sites to promote access to the Bayou, and to reconnect communities to their waterway;
- Reclaim former industrial sites and repair damaged environmental resources to make Buffalo Bayou a national model;
- Create public access to the Bayou views and edges, from streets, trails, neighborhoods, and all areas of Downtown.

The Bayou's Central Place in Houston's Past and Future

Buffalo Bayou has been a focal point in the Bayou City's history since the Allen Brothers founded Houston as a trading center in 1836. Houston developed because of this water access and the connections it afforded with the USA and the world. The city's early success was driven by commerce made possible by the Bayou. When coastal shipping was eclipsed by the railroads a century ago, other port cities, such as Galveston, were bypassed. Anticipating this trend, in the early 20th century Houston reinvented itself as one of the great entry ports in the world, a center of petrochemical industries, when it transformed the lower reaches of the Bayou into the Houston Ship Channel.

And now, Houston is once again poised to reinvent itself by transforming Buffalo Bayou – this time into a great 21st century world center – with the waterway as focal point for its development and

livability. Through this process, Houston can secure a worldwide reputation for exemplary quality of life, and a stronger, more resilient and more diversified economy less prone to the boom and bust cycles of the mid- and late 20th century. The Bayou will play a central role in this new image and economy, as Houston's great "iconic" public space – the feature people recall when they think of the "New Houston".

Great Cities Have Great Waterfronts

Successful 21st century cities will be those that attract and retain creative entrepreneurial people who drive knowledge-based industries – the new global economy. And they, in turn, will gravitate to places that offer the best quality of life. That special quality is now associated with nature and urbanism, and urbanism in nature.

Throughout America, people are heading for cities. About 80 percent of the U.S. Population now lives in metropolitan regions, and this figure is moving towards 90 percent. Downtowns are the location of choice as they become safer and more desirable places to live. Conversely, as more people occupy and refurbish old urban areas, these naturally become safer, livelier and better served with conveniences and amenities.

Obviously, the livability of cities is the critical factor driving decisions by people and businesses to decide on relocation. That is why, all over the world, great cities are reinventing themselves around their waterfronts. Think of New York's Harbor, Chicago's lakefront, Baltimore's Inner Harbor, San Francisco's Bay, Barcelona's seafont, Paris' Seine riverfront, and London's South Bank and Docklands. As the global economy shifts from moving goods to generating ideas, great cities are rediscovering their under-productive waterfront lands, transforming them from manufacturing, warehousing, and shipping points, to focal points in their new economies: places for living, recreation and new forms of production in the knowledge-based economy. For the same reasons Buffalo Bayou's new role will depend not on its potential to move goods, but rather on its unique potential to attract people and improve Greater Houston's quality of life and leisure. This transformation will change the way Houstonians look at the city and the way the world looks at Houston.

In the next several years, Houston will renew and redefine itself for the next century. Now 'places for people' rank as high on the

economic agenda as 'accommodation of goods'. Because of these global shifts in the competitive value system, this is the moment to recalibrate ecological and urban goals, to rejoin land and water, and to establish an identity for Houston extolling the harmony of its built and natural environments. This 21st-century outlook establishes Houston's Master Plan theme that has emerged as both important and achievable: Balancing Conservation and Development.

Though it is clear that quality of life is a priority issue for Houston's next decade, the words are not yet clearly defined. The question remains: which qualities, what commitments? It implies a search for a city that balances environment, economics, and community – forces that will move it up the lists of most livable cities in the nation. This is without question the ultimate priority concern of this Master Plan.

There are countless steps and decisions along the way to the ultimate goal, which is quality of life for all. To chart that course, the Master Plan team has transformed visions into a strategic plan that foresees many scenarios for utilizing Houston's extraordinary resources, to achieve competitive advantage together with evolving greatness. The peak scenario describes cumulative impacts of multiple projects phased over 5, 15, and 20 years. The scenarios also explain why the Master Plan team has taken a multi-disciplinary approach to fashion a plan for Houston's entire landscape, waterfront and waterway.

A Strategic Plan

This plan is strategic in envisioning specific changes and additions, coordinated in implementable steps to achieve the city's potential for vitality, with the Bayou as its central organizing force. It estimates costs and probable returns at many levels to assess the value and viability of changes. Finally, it lays out key issues in implementing projects in cooperation with a variety of departments and institutions, including principal sponsors of the plan: Harris County, Harris County Flood Control Department, The City of Houston, and Buffalo Bayou Partnership. One might call it a pragmatic plan, as it views ideas and achievement as a continuum, assuring that different steps for different purposes have a reality check – an initial review of feasibility.

Conceptually, this plan recommends creating two major new elements for Houston: 1) A linear park, one mile wide and ten miles long,

containing a usable waterway, with at least half of its 6,400 acres being water-fronting land; 2) A world-class waterfront in a renewed downtown, center of this park. The apex of the plan is the confluence of the Bayou and Main Street/CBD; the park invades the city, and they merge. This city can be a park! Successfully uniting the forces of Houston's dual nature - the natural and the urban - will create a city that the urbanist William H. Whyte termed "The Humane Metropolis."

Environmental and Landscape Features

Rehabilitation of the Bayou - along major stretches of the waterway both west and east, and of the compact urban center and downtown waterfront has been a multi-pronged task. The Master Plan team has worked with a large and varied toolbox. No single stencil applies to downtown revitalization issues and to ecosystem conservation issues, except the shared drive to rebuild and repair. Each of these zones has its own imperative, and these have been observed, without "either/or" choices or weighted judgments. Both exist for their contributions to life, both merit sensitive improvement, and they must coexist harmoniously.

As envisioned, the 10-mile linear park is a system of linked parks, new and existing, along the Bayou from Memorial Park to the Turning Basin. The power of traditional downtown parks is recognized as a prototype of Houston's enhanced greenbelt winding through the entire Bayou corridor. Individual open spaces in all neighborhoods can be linked to larger parks, in a grid of easy connections between linear trails and cross-paths to schools, parks, and neighborhoods.

Enrichment of wildlife habitat will be achieved by widening the flood plain within the Bayou corridor, increasing the surface water area, creating large marshes, connecting habitats to enable species to migrate, and taking a full watershed approach to managing flood volumes and water quality.

It is apparent that filtering of storm water before discharge will improve Bayou water quality, but efforts must expand into a broad-based sanitation campaign, in which citizens both demand and assist in achieving a higher antipollution standard. Bayou embankment stabilization and recreated wetlands, acting as natural filters for runoff throughout the watershed, will restore Buffalo Bayou waters

to a state more acceptable for wildlife. Environmental improvement will also come if car usage is reduced by public transportation integrated with pedestrian links to residential zones. This issue is addressed by proposed transit extensions into development areas.

Achieving a Downtown WaterView District

The Plan envisions a world-class WaterView district stretching from the Post Office site on the west to York Street on the east, flanking both sides of the Bayou. From the Post Office to El Mercado landing, the WaterView district restores the quality of the historic town area, reminding us that Allen's Landing was the first front door to the city. And it can now relive that role as front door, a welcoming center of street-facing shops, galleries, and sidewalk cafes, a place of historic scale, a magnet for city destination seekers. It remains perfectly positioned in its geography (junction of bayous), and its access (head of Main Street Metro Rail) and public activity (Theater District, Arts District, Civic Center). Many of the new potentials along Commerce Street and throughout WaterView will spring from renewed activity around Allen's Landing, a place conveying the same central significance in the city plan that the Allens recognized in choosing their first town site. It is still in the right place!

As envisioned, WaterView describes an area of key relationship to the waterfront. It sets a new downtown mood and scale with its transformation of Commerce Street as a promenade opened along the water edge, with new bank treatments, pedestrian-oriented bridges, and outdoor amphitheaters at both ends - at Gable Street Landing, and at Festival Place (Post Office site). The new focus on an accessible waterfront will pull a regional audience to diverse attractions: cultural events, sporting events, water and street festivities. With the anticipated increase in attendance at Convention Center events, WaterView will become a target destination for national tourist audiences.

Realizing this revival of the old downtown waterfront depends on rationalizing the transportation network, to uncover the Bayou and to make it visible from sidewalks and moving vehicles. Visibility of banks, contours and water flow can be accomplished by road consolidations and some bridge removals that also improve floodwater conveyance. Specific review of I-45 improvements, now under study

by the Texas Department of Transportation, can consider public recommendations to liberate the west edge of Sam Houston Park from the invasive highway structure, whose removal would reveal the original park in its full glory.

Expanding residential capacity in Downtown is key in this revitalization plan. It is supported by a national trend of Americans moving by choice from suburbs back into cities. Houston's residential demand, already ahead of supply, will be a force in future economic development. The growing market for urbane residential choices is already propelling residential activity in and near Downtown.

East and west of Downtown, many undervalued sites will be in demand when the Bayou is perceived as an asset-rich location. This Plan predicts that the north bank of the Greater East End will invite a new wave of economic diversification, offering ample opportunity for high tech facilities, clean technologies and knowledge industries, coming into modern industrial parks planned with nearby housing communities. Extending Metro Rail connections eastward, on both banks, will open up extensive areas of now marginal land. Precedents of major industrial reclamation in the Germany's Ruhr Valley among other places indicate that large-scale land-use recycling brings strong financial returns to both the City and private sector.

Overall, the plan predicts dramatic environmental upgrades with consequent commercial and community benefits and returns. The Bayou corridor has potential to become a national environmental landmark represented both by the restored land and water areas and extension of the larger eco-region as an ecological preserve reaching as far as Galveston Bay.

Addressing the Flood Factor

Immediately following Tropical Storm Allison in June 2001, Harris County Flood Control began a collaborative study with the Master Plan team, to determine the flood management potentials of floodwater conveyance improvements, planned in conjunction with revitalization of the downtown waterway and adjacent areas.

Eight months of testing quantified cumulative benefits from various measures proposed to ease flood water movement, including a canal

diverting White Oak Bayou storm water just above its junction with Buffalo Bayou, and another diverting flow from its east corner at Commerce and Crawford streets to a Jensen Drive outfall, and main channel improvements to Buffalo Bayou from Main Street to the Turning Basin. A reduction of as much as 8.5-feet in flood water levels for a 100-year storm event could be seen at Main Street as a result of these measures. The Plan proposes to create new development spines using these proposed flood control investments to provide benefits measurable by reduced flood damage, and by enhanced City revenues. The tax revenue base will increase from new private investment drawn to land near these amenities.

Implementation

The Plan anticipates expansion of the Buffalo Bayou Partnership's functions and authority to manage intergovernmental funding, to coordinate open space and public improvements, and to package redevelopment opportunities within the proposed Buffalo Bayou and WaterView districts. Design coordination would be applied to building heights, setbacks, street layouts and landscapes within the District, to achieve a strong natural character and identity. Development would still rely primarily on the private sector to respond to investment opportunities created by a series of dramatic public improvements – tapping into that increment of new value added to sustain continued growth, maintenance, and management of the Bayou corridor.

With a Buffalo Bayou District defined and recognized in this plan, integration of proposed improvements in keeping with its vision can be implemented over time. The Partnership's efforts can be directed to coordinating restoration upstream and downstream and helping create Downtown of human scale, with buildings, public places, and dynamic physical environments that are conducive to recreation, socializing, shopping, walking, talking, and people-watching. All in all, the scenario foresees Houston's opportunity to transform the Bayou waterfront into that of a world class eco-city over the next 20 years.

These are the visions and strategies illustrated in the Master Plan for Buffalo Bayou.

BUFFALO BAYOU PARTNERSHIP OBJECTIVES

At the outset of the Master Plan process, the Buffalo Bayou Partnership identified a number of objectives for the project scope area. These were organized by geographic sector and include:

Buffalo Bayou West Sector (West End)
Shepherd Drive to Sabine Street

- Conduct site specific planning to upgrade the greenway – providing for improved landscaping and placement of amenities such as park benches, trash receptacles, public art and decorative lighting.
- Evaluate and assess the bayou’s natural setting in relationship to the growing trend of hosting special events and festivals along the bayou’s banks.
- Link bayou to adjacent neighborhoods that are experiencing growth.
- Improve access to bayou’s banks.

Buffalo Bayou Downtown Sector (Downtown)
Sabine Street to McKee Street

- Establish Buffalo Bayou as one of the unifying urban design element for downtown development projects.
- Identify areas for commercial development
- Secure consensus on whether the bayou should be controlled, as is the San Antonio River.
- Improve access to the downtown waterfront.
- Identify open space and recreational improvements, including bikeways, boating facilities, outdoor performance spaces, and other activities such as a farmer’s market.
- Identify specific features that can serve as focal points and signature elements for Buffalo Bayou in downtown.

Buffalo Bayou East Sector (East End)
McKee Street to Port of Houston Turning Basin

The vision outlined in the 1993 Buffalo Bayou East Sector Redevelopment Plan is now becoming a reality. The Plan needs to build on this evolving revitalization along Buffalo Bayou’s eastern sector.

- Identify increased opportunities for residential development along the bayou.
- Conduct site specific planning to improve underutilized and undeveloped parks along this bayou segment.
- Link bayou to adjacent neighborhoods.
- Develop ideas for the reuse of historic industrial properties.
- Create signature features and focal points highlighting the unique history of this bayou segment.

PROCESS

CITIZEN INVESTMENT IN CONSENSUS-BASED PLANNING

The Master Plan for Buffalo Bayou has evolved from an intense and multi-staged, yearlong participatory process. Three large consensus-building public workshops were held in March, July, and October 2001. Workshop participants representing neighborhoods, schools, organizations, agencies, and constituencies interested in conservation, recreation, and Houston's development, worked together in groups to identify problems and opportunities for the area and region. Each working-group formulated goals and objectives for the planning area, outlined and sketched plans, and developed and summarized visions for the Bayou and its banks (See Appendix for a list of participants).

Numerous focus group meetings were held with community leaders and implementers throughout the February 2001 to February 2002 planning period. Some issues were raised time and again: long-term and regional concerns, such as Houston's image and quality of life; and short-term and local desires, such as the need for immediate improvements currently missing in downtown life. As stakeholder goals and desires were formulated, simultaneous inputs were solicited from implementation agencies, and issues of long-term coordination between City, County, and private interests were addressed.

STAKEHOLDER GOALS

The consensus envisions a Buffalo Bayou functioning again as a healthy system, restored to its place at the core of Houston's identity and quality of life.

Stakeholders concluded that this larger vision can be achieved by:

- Revitalizing the waterway, Downtown, and all Bayou neighborhoods
- Providing a continuous and safe public amenity, with access for all
- Protecting life and property by managing flood impacts
- Increasing the effective synergy of government and businesses through a lasting public-private partnership

The natural outcome from the achievement of these goals will include:

- Growth in the city's economy with increased job opportunities
- An improved quality of life for Houston's residents
- New businesses and residents attracted to the city
- A new image for Houston as a destination for cultural and ecological tourism



A pre-workshop bus tour visited all areas of the Bayou corridor.



Stakeholders reviewed quality of life issues along the Bayou.



Participants recorded ideas and plans in break-out sessions.



A VIEW FROM THE BAYOU

Scramble down 20 or 30 feet of embankment to reach the water edge, climb into a canoe or flat bottom skimmer, push off, and you enter another world, a nether world of transforming possibilities.

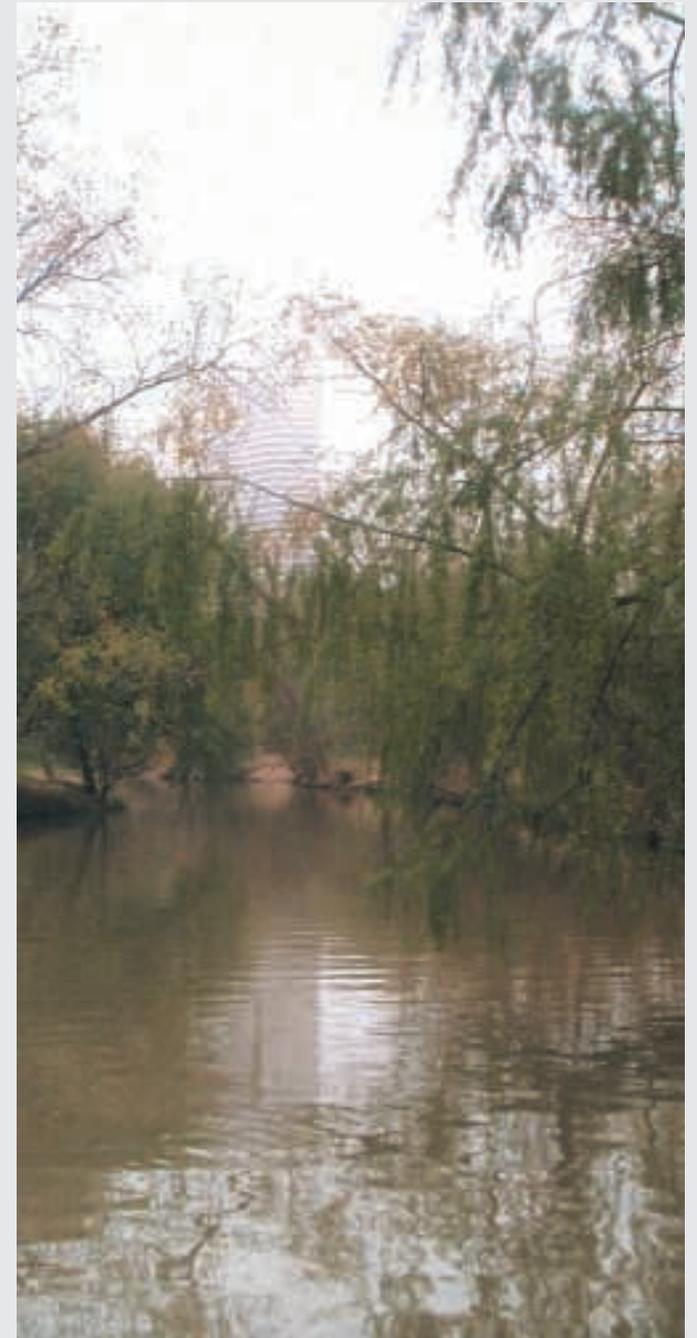
If you launch at mid-Bayou, at Sesquicentennial Park or at Allen's Landing, heading upstream through the West End, you move through caverns framed by highway pylons, on water that soon becomes a shallower winding stream. It is framed by soft banks, alternately green and brown, draped in shaggy brush and weedy grasses beneath toppling tree trunks. You move in a calm silent tunnel, feeling deliciously detached, up the stream that draws ever more intimately around you with clawlike overhanging branches and steep-rising banks, thick with random green. The jungled stream-bed finally narrows and sometimes fades to a thin trickling brook.

Beached, glancing up, you are alone with nature, like an explorer probing the headwaters of the Amazon. But – wait. High in the haze overhead, the outline of a tower breaks through, misty and remote. It must be a false vision – how can a city be so near? You have reached world's end determined to relish this escape from civilized pressures. There in a deep private ravine, who is to say otherwise?

Unkempt and unwelcoming to the eye, Buffalo Bayou becomes a magical waterway carved into the earth over time. It invites you in – deeply in – to touch the stones, sand and soil of the ages, disturbed but not yet destroyed by centuries of urban habitation. It is a river of many moods and abundant memories, and some of its stories are still revealed in soil atop its banks and beneath its waters.

There are almost as many views from the Bayou as there are viewers, each one capturing some of the half-hidden dimensions. If you finally choose to reverse course and to flow eastward, through the city onto the broadening passage to the Gulf, you will discover other secrets. The Bayou remains a force within the City, neglected and misused as a drainage ditch, asserting itself in periodic floods in rebuke for overpaving of flood-prone plains. Yet people are again recognizing this as a uniquely undervalued asset that the city cannot spare. As they begin to see the Bayou anew, they want it revealed, revered, used and enjoyed by generations to come.

The Bayou invites a new try at cohabitation – city with open space, urbanity within nature. Together they are far greater than the sum of their parts. Balancing Conservation and Development expresses aspirations toward a green environment as a model of 21st Century thinking – the Eco-City, both urban and natural.



EXISTING CONDITIONS AND EFFORTS

1



Buffalo Bayou is a significant resource for Houston, Harris County, and the southeast Texas Gulf Coast. It is significant in the historical development of Houston, and in the region's current and future vitality. The Bayou serves public safety as a major channel of floodwater conveyance. Within the natural ecology of Galveston Bay, it is a special resource for the region. It also has many problems for which coordinated solutions must be found.



The Story of the Port of Houston

View of Allen's Landing, Houston's first port, at the foot of Main Street



The Story of the Port of Houston

Steamboat Lizzie loads cotton at Allen's Landing.



The Story of the Port of Houston

Buffalo Bayou once flowed as a clear idyllic stream.

EXISTING CONDITIONS AND CONCERNS

The Master Plan's primary focus extends 10 miles, west to east, along the course of Buffalo Bayou, reaching from Shepherd Drive to the Turning Basin. The corridor stretches approximately one half-mile into each north and south bank, and includes a number of existing neighborhoods.

Environmental Quality and the Eco-region

While the Plan addresses a large area, its efficacy, especially with regard to environmental quality, can only be established if planning principles and policies are applied to the Bayou's larger watershed. The Bayou watershed is large, covering nearly 500 square miles, and includes a number of tributaries, including Greens Bayou, Halls Bayou, White Oak Bayou, Langham Creek, South Mayde Creek, Brays Bayou and Sims Bayou (See Technical Appendix A: Environmental Quality and Eco-Region).

A number of factors impact the environmental quality of Buffalo Bayou:

Hydraulic Destabilization: Eighty percent of the Buffalo Bayou watershed is urbanized. Urbanization that introduces large areas of impervious surfaces (asphalt, concrete, etc.) causes stormwater from rainfall in the watershed to reach the Bayou faster than under normal or natural conditions (See Technical Appendix A). Water that reaches the Bayou too quickly results in erratic and rapid water level changes. Houston continues to sprawl with little restraint, rapidly adding impervious urbanized areas to Bayou's watershed, so the problem escalates. (See table below).

USA's Top Sprawlers - Urbanized Areas with Greatest Sprawl, 1970 - 1990

Urbanized Area	% Growth in Per Capita Land Consumption	% Growth in Population
1. Atlanta, GA	42%	84%
2. Houston, TX	26%	73%
3. New York City, NY-NJ	24%	-1%
4. Washington, DC-MD-VA	41%	36%
5. Philadelphia, PA-NJ	48%	5%
6. Los Angeles, CA	-8%	37%
7. Dallas-Fort Worth, TX	15%	59%
8. Tampa Street Petersburg-Clearwater, FL	13%	98%
9. Phoenix, AZ	-18%	132%
10. Minneapolis-St.. Paul, MN	21%	22%

Source: US Department of Commerce, Bureau of the Census

Rainfall in the Buffalo Bayou watershed is high, between 48-52 inches per year. The geographic area within the watershed is flat and low-lying, adjacent to Galveston Bay and the Gulf of Mexico. Flooding is frequent under these conditions. With inadequate retention available, this urbanized watershed contributes greater quantities of stormwater to the Bayou than it is now capable of handling.

This increased quantity was once accommodated on a floodplain; however, this floodplain no longer exists. As a result, over-bank flooding occurs along with bank erosion. Bank erosion in turn removes vegetation and habitats, adds sediment, and threatens adjacent infrastructure. The increased flood water is directed to the Bayou and this in turn brings more erosion.

Poor water quality: Stormwater and non-point industrial discharges feed directly into the Bayou without treatment. Many non-point sources of pollution in the watershed ultimately accumulate in the Bayou. High levels of sediment released into the Bayou waters reduce water clarity. This affects the Bayou's visual character, as well as animal species' utilization of the water. For example, sight-feeding fish have a difficult time finding prey in murky water.

Sediments from storm events come from three sources: upstream bank failures, stirring up sediments at the Bayou bed, and bare ground areas. A tremendous amount of debris accumulates in the Bayou as a result of flood events, and from poor maintenance and clean-up following these events. In addition, many areas, including construction sites, regularly discharge sediment into the Bayou.

Unremediated Brownfields: Industrial point source discharges and unremediated brownfield sites are persisting problems. A number of sites with varying degrees of pollution have been identified (See Technical Appendix A).

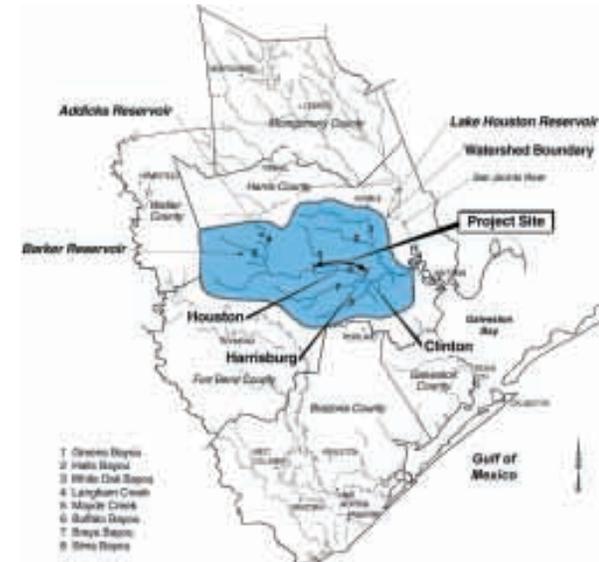
Lack of habitat and prevalence of invasive species: The natural condition of the Bayou has been altered. Little habitat remains; what does remain is in poor condition. The diversity and abundance of native vegetation and wildlife necessary to a healthy ecological system are no longer found. The Bayou, once contributing vital fresh water inflows and providing a habitat for fish, is no longer able to provide enough sustenance and support to regional wildlife, or to support Bayou recreational and commercial fishing. Ecologically valuable native species integral to the viability of the natural ecosystem have been replaced by introduced and invasive species.

Competing demands of human habitation and wildlife habitat: Increased urbanization has reduced native habitat and wildlife. Further, the industrial use of the Bayou disturbs the wildlife and habitat that survive.



Collection of J.D. Bartel

Historic postcard showing a clean serene Buffalo Bayou.



Turner Collie and Braden

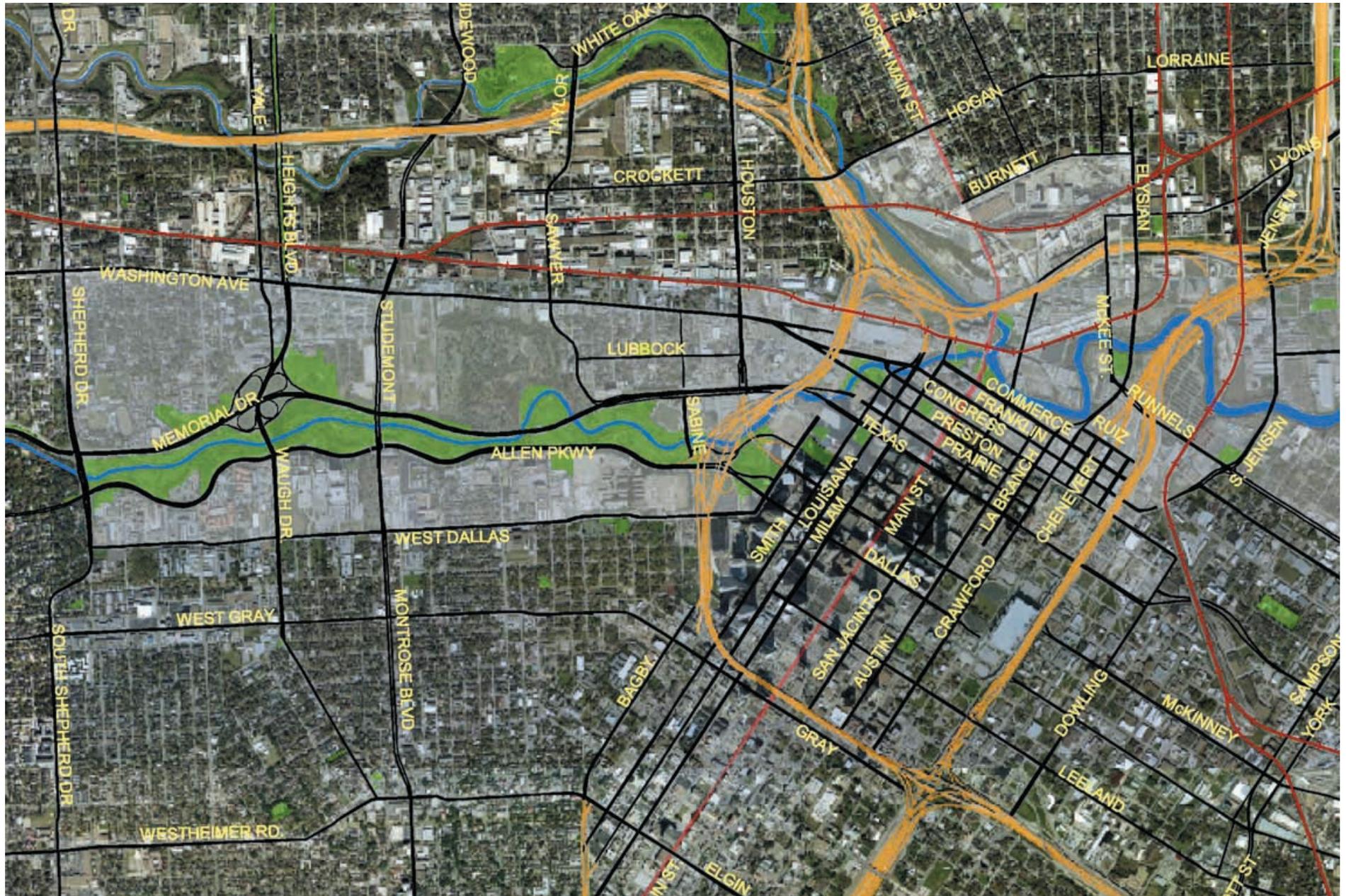
The Buffalo Bayou Watershed covers nearly 500 square miles.



Turner Collie and Braden

Today, after floods, trash clings to banks and trees along the Bayou.

Buffalo Bayou Master Plan -- Project Scope Area





Legend

- Study Area
- Bayou
- Parks
- Railroads
- Freeways
- Major Streets
- Main Street





Houston Chronicle Website

Tropical Storm Allison caused widespread downtown flooding in June 2001.



Guy Hagstette, Downtown Management District

Buildings in the Bayou flood plain: Downtown in the aftermath of Allison.



Turner Collier and Braden

Structures in the Bayou impede flow of floodwater through Downtown.

Flooding

Frequent flooding of the Bayou in Houston’s downtown results in substantial property damage and occasional loss of life. Tropical Storm Allison caused nearly \$5 billion in damage regionally. These impacts are largely the result of urbanization in the natural flood plain that has interfered with the Bayou’s ability to drain stormwater. The impacts of Tropical Storm Allison brought awareness of the urgent need to manage the floodplain of the Buffalo Bayou, and to address problems that have contributed to flood damage.

Several factors contribute to flooding. In the downtown area, flooding is the result of numerous constraints to the flow of an enlarged volume of water:

Confluence of White Oak with Buffalo Bayou: White Oak Bayou flows into Buffalo Bayou at a constricted confluence near Allen’s Landing, creating a critical floodwater bottleneck that further exacerbates the constrained flow of floodwaters through Downtown.

Encroaching Buildings: Floodwater constraints arising from constrictions that limit the carrying capacity of the water channel are most acute in a critical reach in the downtown area from Fannin Street downstream to Austin Street. Building encroachments in the flow area further constrict the natural floodway.

Impeding Bridges: Several bridges cross Buffalo Bayou in the downtown area, many of them causing impedance and resulting head loss to floodwater flow because their supporting structures constrain the flow of water in the channel. Bayou channel constrictions between San Jacinto Bridge and McKee Bridge, including San Jacinto Bridge, are particularly problematic.

A High Proportion of Impervious Surfaces in the Floodplain: Impervious surfaces – asphalt, concrete, and similar non-absorbent surfaces – as well as upstream development that ignores the technical requirements of building in a flood plain, have combined to increase and accelerate stormwater runoff.

Urban Development and Land Use

The character of the Bayou and its neighborhoods vary in each of the three geographic areas:

West End: (Shepherd Drive to Sabine Street) West End is largely residential with a well-used public park – Eleanor Tinsley Park – straddling Buffalo Bayou.

The Downtown Bayou-front area: (Sabine Street to McKee Street) Institutional sites largely comprise the downtown Bayou-front area. To the south lies Houston’s Central Business District identified by its distinctive Skyline District. To the north lies the Post Office, a number of county detention facilities, and the University of Houston Downtown.

The North Downtown area houses an arts community in and among historic warehouses. A number of underutilized parcels border the Bayou, including many parking lots. These limit pedestrian access and waterfront use. Currently, few retail and recreational activities enliven the waterfront.

East End: (McKee Street to Turning Basin) East End is largely industrial along the Bayou banks. Residential neighborhoods, including the Second Ward on the south, and the Fifth Ward on the north, are separated from the waterfront by industrial sites. Many of these sites are presently underutilized.

Project-wide areas of concern include:

The Public Realm: Present concerns about public safety along the Bayou have persisted over time. As a result, new private developments are predisposed to take the form of gated communities, that might lead to a strong demarcation between public and private realms. An inadequate community process in shaping redevelopment often results in incompatible neighbors and uses.

Equity Concerns: Equity issues remain largely unaddressed. Concerns include retaining public access to the Bayou as private sector developments “privatize” the Bayou’s banks. Housing affordability often decreases as neighborhoods expand.

Historic Preservation: Efforts to preserve historic neighborhoods and their integrity as communities, such as the arts community in North Downtown and Old Sixth Ward in the West End, are challenged by the dictates of an unpredictable market economy.



Industrial uses line the Buffalo Bayou banks in the East End.

Turner Collie and Braden



Multiple roadways crossing Buffalo Bayou make it largely invisible Downtown.

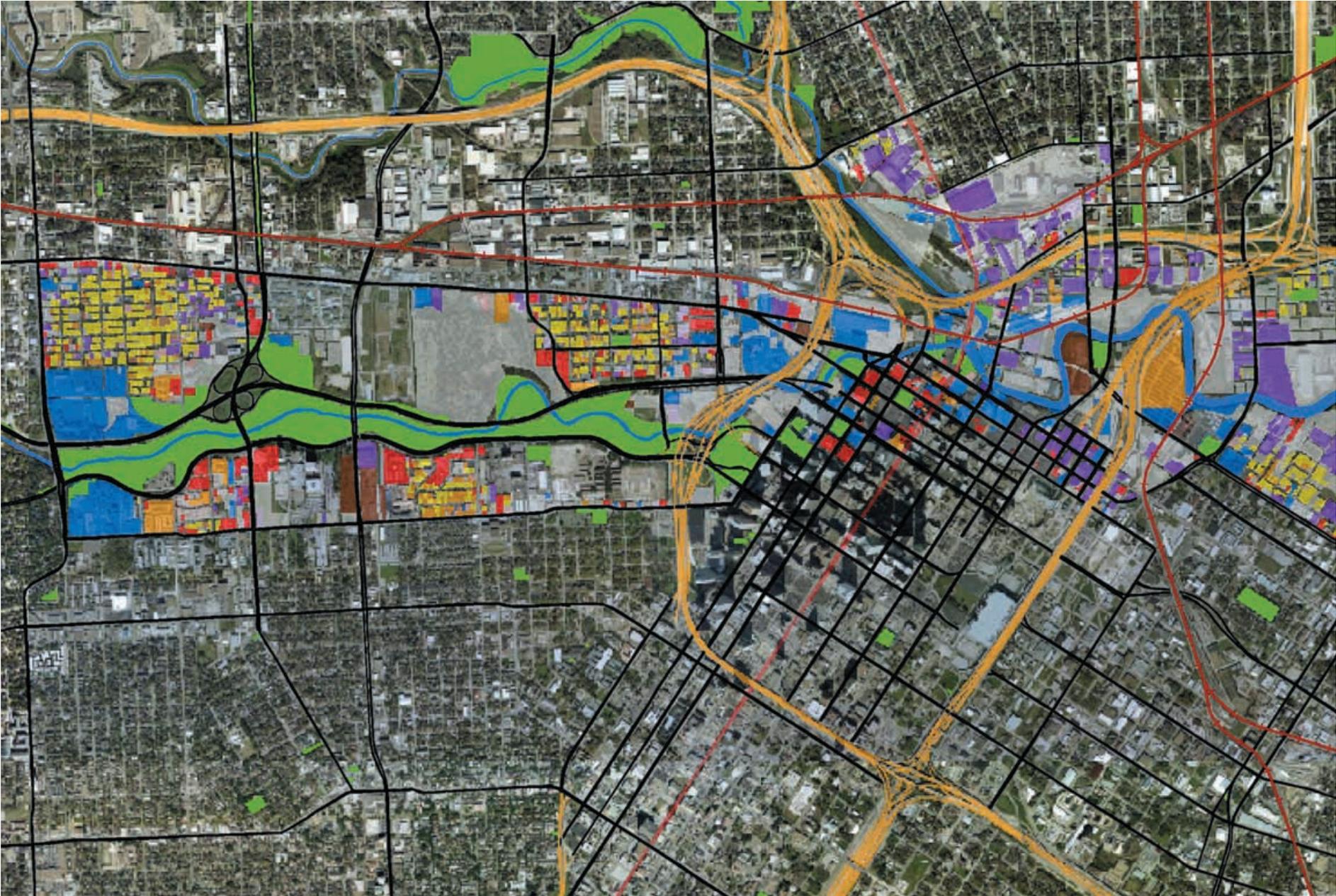
Aaron Tuley, Buffalo Bayou Partnership

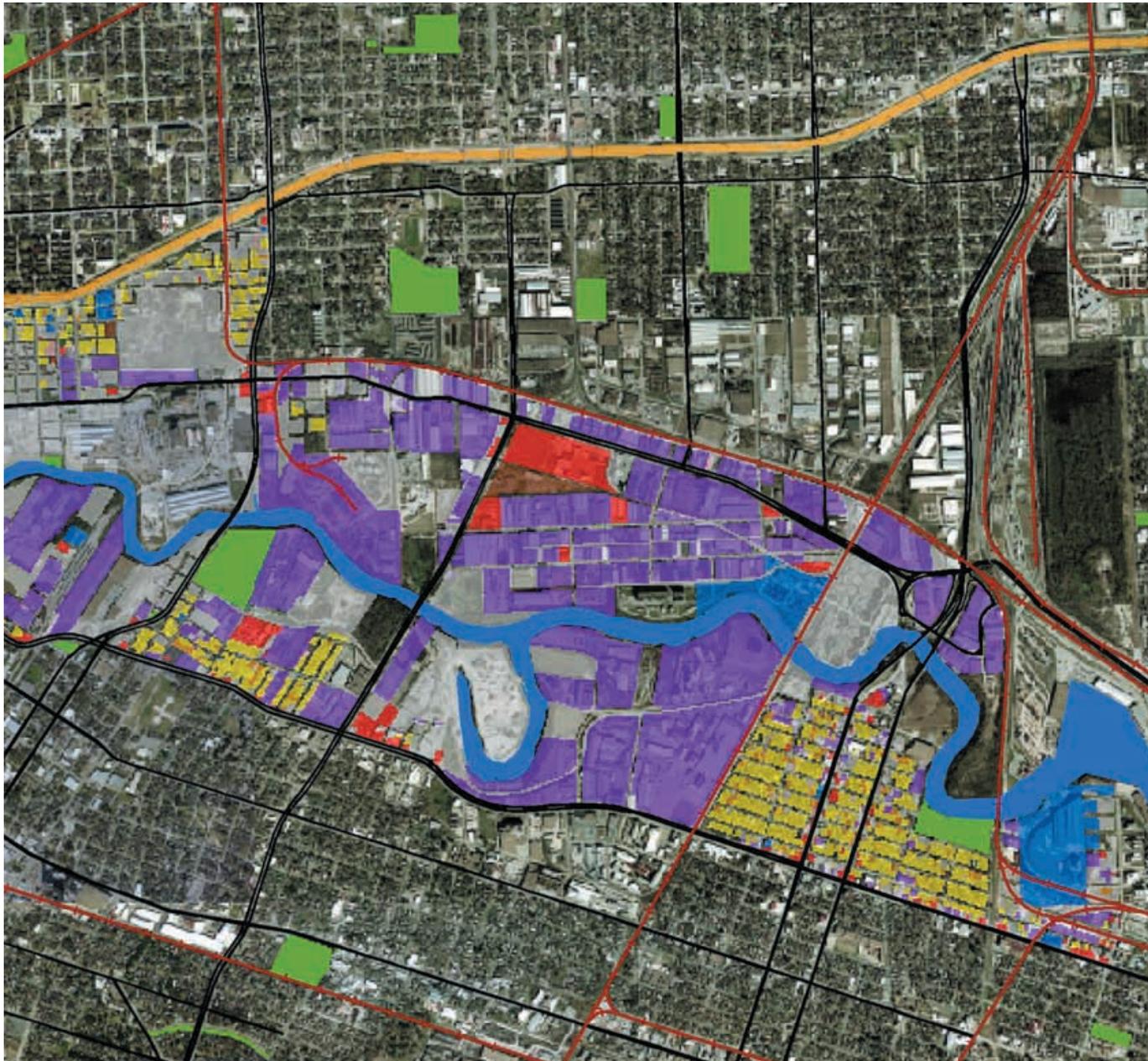


A scrap metal yard represents industrial activity continuing at the water's edge.

Turner Collie and Braden

Existing Land Use



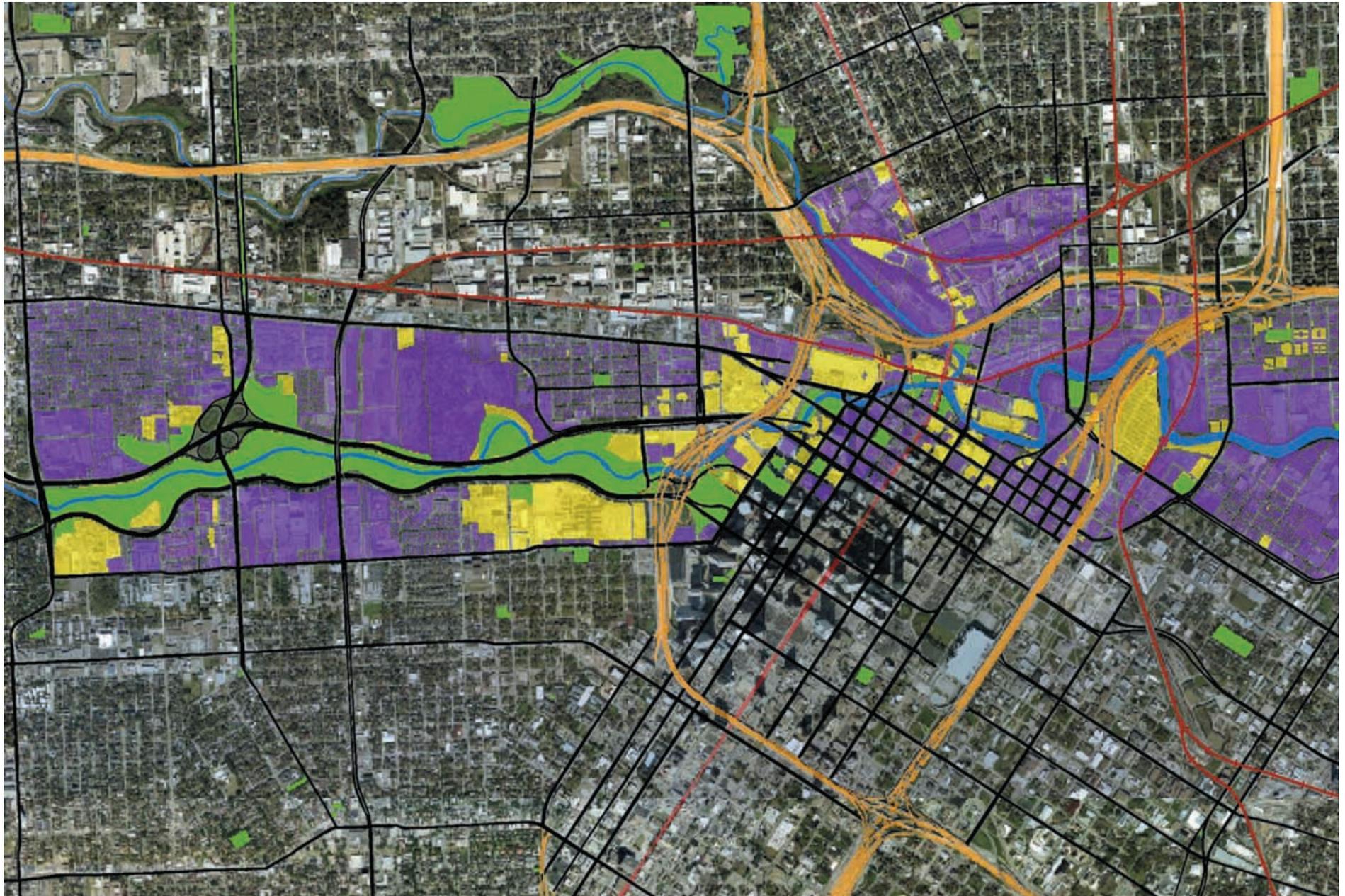


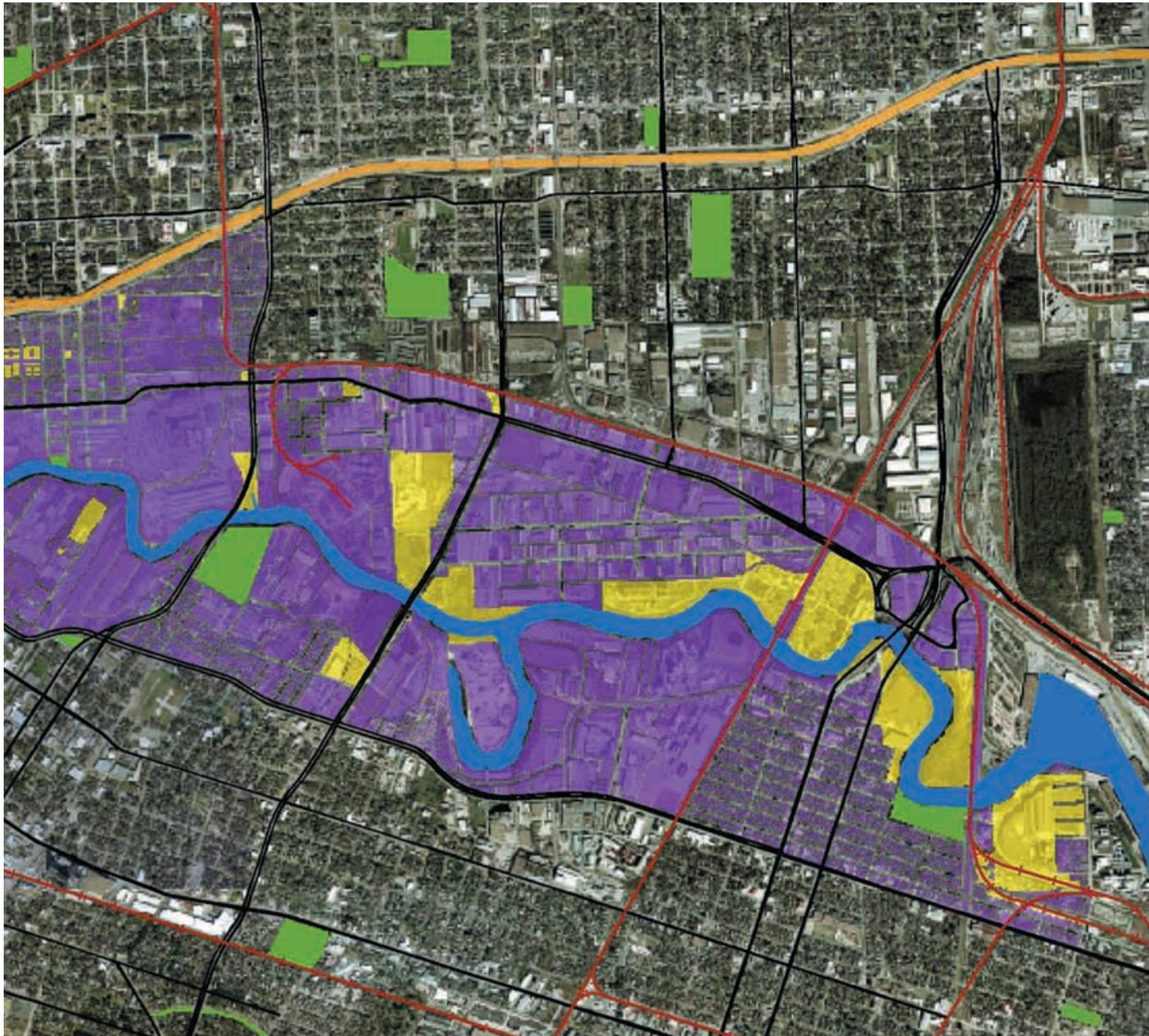
Legend

- | | | |
|-------------------------------|------------------------------|-----------------------|
| Land Use | | |
| Residential- 1 Family | Residential- Multi-Family | Residential- 1 Family |
| Unsound Residential Structure | Mixed Commercial/Residential | Commercial |
| Industrial | | |
| Institutional | Utilities/Services | Right of Ways |
| Aux. Improvements/Structures | New Construction | Parking |
| Vacant Land/Exempt Land | Bayou | Parks |
| Railroads | Freeways | Major Streets |
| Main Street | | |



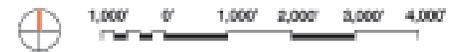
Existing Land Ownership





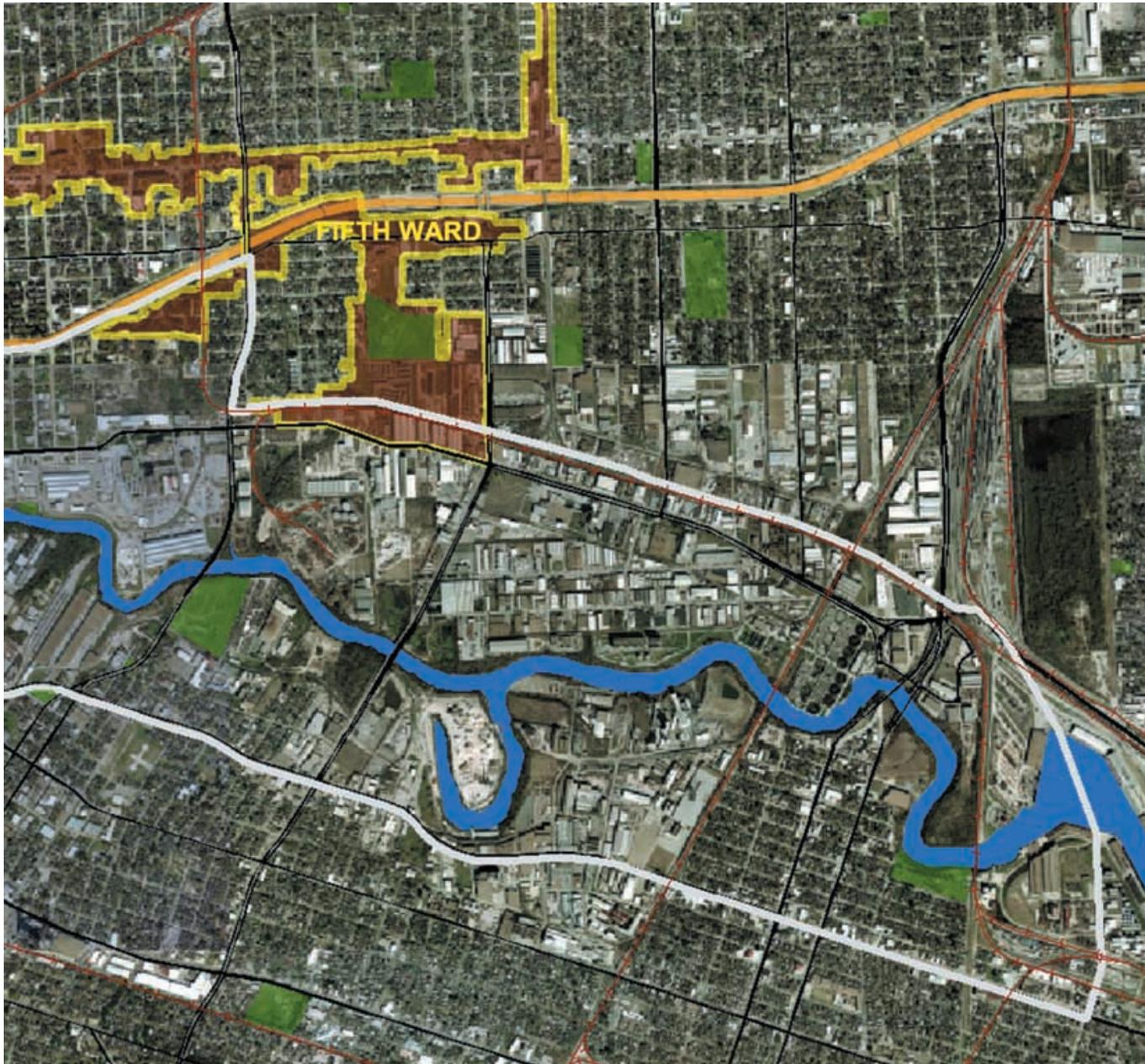
Legend

- | | | |
|------------------|-----------|---------------|
| OWNERSHIP | Bayou | Freeways |
| Public | Parks | Major Streets |
| Private | Railroads | Main Street |



Existing Jurisdictional Districts





Legend

-  Tax Increment Reinvestment Zone (TIRZ)
-  Historical Districts
-  Main Street/ Market Square





Turner, Colie and Braden

Stretches of the waterway are still sylvan in the Bayou's West End.



Downtown bikers are seen on new water-edge trails near Wortham Center.



Buffalo Bayou Partnership

Popular festivals and regattas are bringing families back to the Bayou.

Landscape

Several reaches of the Bayou are infrequently visited or enjoyed due to a poor public image and lack of physical access to the water. Problems include:

Poor Visual and Environmental Quality: In the past, careless backfilling within the Bayou, and inadequate maintenance of eroding Bayou banks, have contributed to poor visual quality. Trash frequently finds its way into the Bayou. Industrial pollution, air, noise, and water pollution in the East End, and noise pollution from highway crossings contribute to Downtown environmental degradation. In Sam Houston Park, noise from I-45 can be oppressive.

Limited Pedestrian Amenities: Waterfront areas lack basic pedestrian amenities – benches, lights, and signs – especially in Downtown and East End.

Discontinuous Public Open Space: The waterfront trail system is incomplete and disconnected. There is limited public open space along the Bayou. Incompatible uses, such as waterfront parking lots and underutilized industrial sites, also present visual and physical barriers.

Waterfront Access

Pedestrian access is poor along the waterfront, even though new hike and bike trails are beginning to address the problem. Existing arterial crossings of the Bayou have inadequate sidewalks. A number of potential development sites in the East End are handicapped by poor access. Extension of the downtown street network as a series of one-way streets across the Bayou has resulted in a heavy overlay of at-grade crossings, effectively reducing its attractiveness to pedestrians and reducing public visibility of the Bayou.

Recreational Use of the Bayou

The Bayou's potential is slowly being recognized. Efforts of the Buffalo Bayou Partnership in promoting and fostering water-based events and recreational boating programs, such as the Best of Buffalo Bayou tours, regattas, and the Dragon Boat Festival, draw increasing interest. Despite these activities, the Bayou still remains an underutilized – even undiscovered – recreational resource. Infrastructure to support such initiatives still lags behind, with few boating landings and no public boathouses in place. The few existing landings need upgraded access from the banks to the water-level.



Improvements to Allen's Landing make it a Houston landmark once again.

KEY EFFORTS AND INITIATIVES

A number of initiatives, committed and underway, directly and indirectly assist the revitalization of Buffalo Bayou. Current initiatives include:

Allen's Landing Improvements

Led by the Buffalo Bayou Partnership, a coalition of community groups and governmental agencies have planned and are now revitalizing Allen's Landing, Houston's birthplace and original port. The project includes bulkhead rehabilitation, promenade and embarcadero construction, hike and bike trail development, landscaping, interpretive signage and public art.

Greater Allen's Landing Lighting/Public Art Program: Design of a comprehensive lighting/public art program has recently been completed, with bridge illumination proposals by Stephen Korns/ L'Observatoire. Lighting and public art are considered a unified design and programming initiative, addressing the Bayou and its relationship to the city during the day and at night.

Theater District Initiatives

Sesquicentennial Park: Completed in 1998 under the guidance of the BBP and Central Houston Civic Improvement, the 10-acre award-winning waterfront park is a key element of the downtown Theater District.

Bayou Place: A major expansion of Bayou Place, a \$23 million entertainment center across from Sesquicentennial Park is planned, including new program space and pedestrian amenities to bring additional life to the waterfront.

Hobby Center for the Performing Arts: A new \$90 million facility has two performance halls with seating for 3000 and a theatrical school, which opened in May 2002.

Landry's Aquarium Restaurant: Landry's is scheduled to be completed and open for business by December 2002, creating a destination on the north bank.

Primary Downtown and East Sector Buffalo Bayou trails

Shepherd to Sabine Recreational Trail: The realignment of this trail system is in design development. It is due for completion in December 2003.

Northside Trail (Sesquicentennial Park to University of Houston, Downtown): The trail project is scheduled for completion in Fall 2002.

Southside Trail (Sesquicentennial Park to Allen's Landing): Detailed planning is scheduled to commence shortly.



Water Fire celebration activates at Sesquicentennial Park during the 1998 opening.

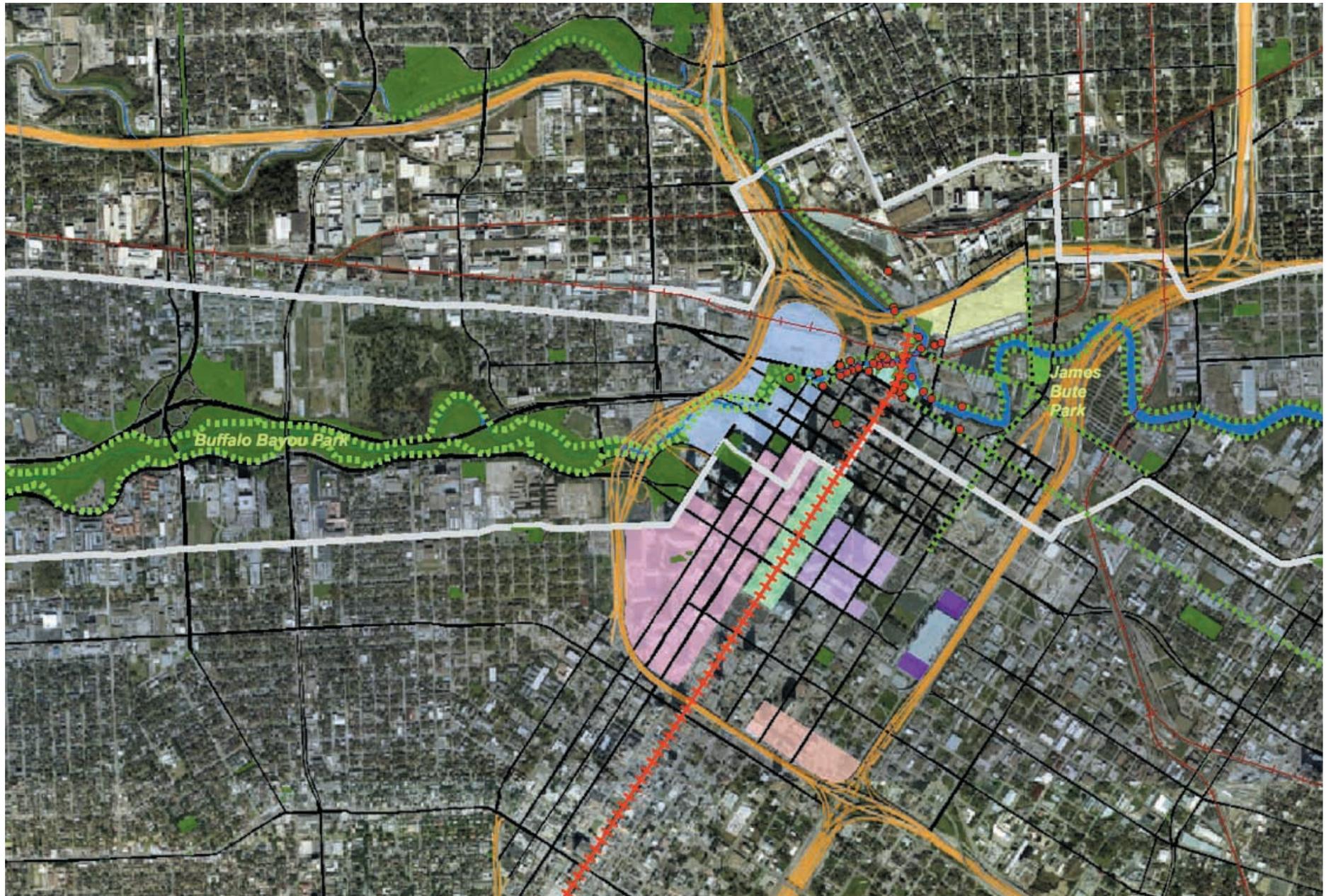


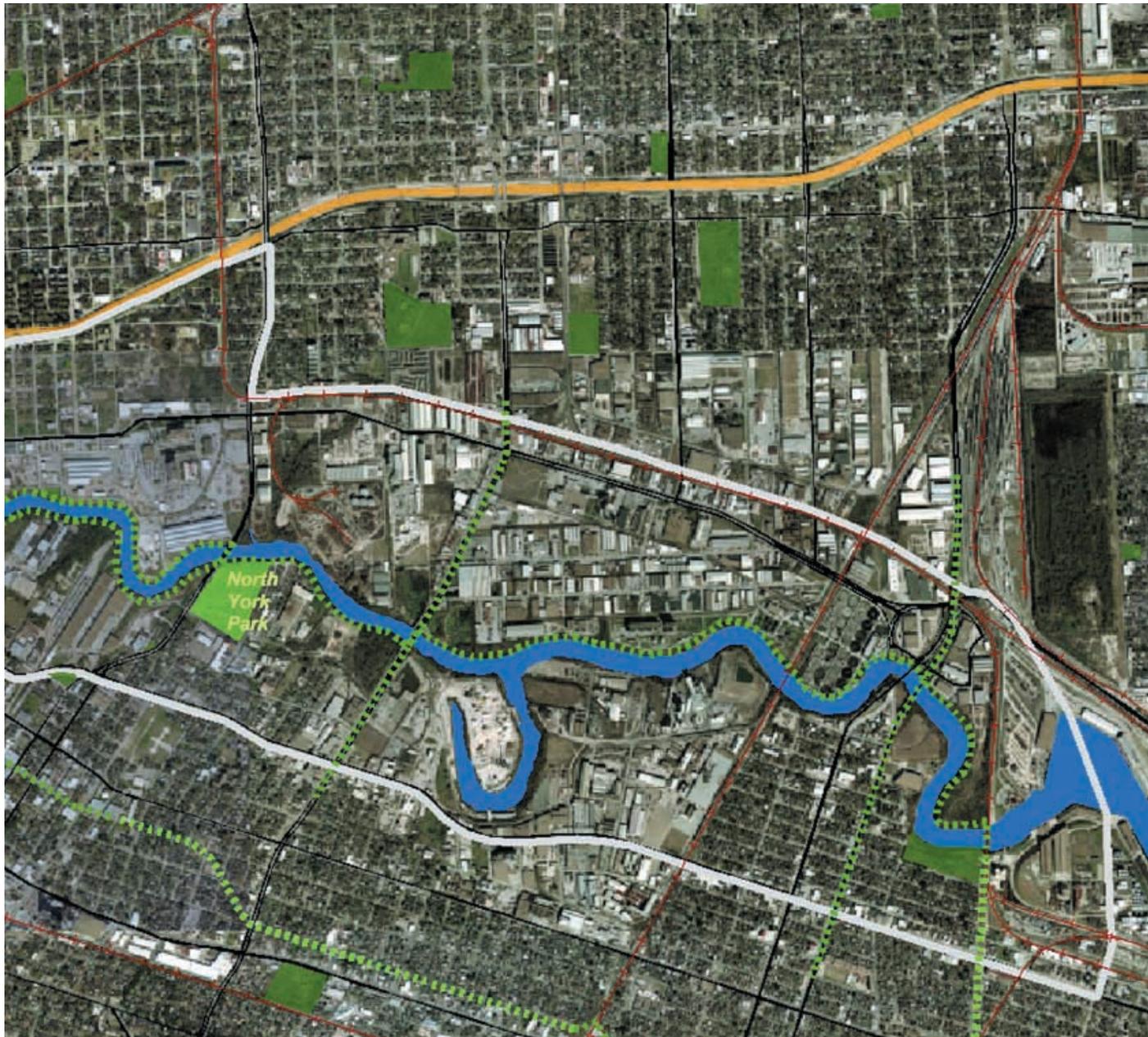
New Hobby Center for the Performing Arts creates another Downtown destination.

Downtown Management District

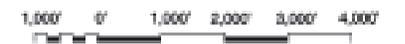
Downtown Management District

Initiatives and Improvements Currently Underway





CURRENT INITIATIVES





Completed Sabine Lofts bring a new residential community to the Bayou edge.

Sabine to Bagby Landscape Enhancement Project

This \$15 million landscape enhancement project is scheduled for completion in 2003. Program elements include landscape planting, extensive grading and drainage improvements, lighting, and a pedestrian bridge spanning the Bayou from the Hobby Center to parking lots on the north side.

Tony Marron Park Enhancement Project

The Park People, a nonprofit citizens' organization, has begun planning work on the development of Tony Marron Park, a 19-acre underutilized space along the Bayou in the East End. In partnership with the City of Houston Parks and Recreation Department, The Park People plan to add playing fields, trails and picnic areas, children's play areas and many trees to the park.

Sam Houston Park Master Plan

A multi-phased master plan for Sam Houston Park, sponsored by the Heritage Society, was recently completed.

University of Houston-Downtown Expansion

Campus improvements consolidating the institution's presence along Buffalo and White Oak Bayous include the adaptive reuse of the Willow Street Pump Station and the development of a new classroom building.

Cotswold Project

This \$58 million streetscape improvement program focuses on creating pedestrian walkways and on-street parking along downtown streets. The project includes some Bayou access improvements.

New Waterfront Housing

Sabine Street Lofts: This recently completed 200-unit residential development is located east of the Sabine Street Bridge along the Bayou.

Alexan Properties: Trammell Crow Residential with Perry Homes has begun construction of an adaptive reuse residential complex at El Mercado, which will include 244 lofts. Perry Homes will construct 73 town homes with 47 units in the first phase. Construction will be complete by Summer of 2003.

Main Street Improvement Program

Urban Land Institute Guidelines for Main Street Area: Public workshop was held in May 2002 to present the proposed Guidelines. Work continues on the Guidelines document.



Downtown Management District

Cotswold District improvements make Prairie Street pedestrian-friendly..



Central Houston Civic Improvement

Light rail along Main Street will connect Downtown to the Texas Medical Center.

METRO Light Rail Construction and Streetscape Renovation: Stage I construction, linking UH Downtown to the Astrodome, is scheduled for completion January 2004. Project includes a station and public plaza at Main Street Square.

Market Square Tax Increment Reinvestment Zone (TIRZ)

The Market Square TIRZ, created in 1995 as a nine-block area, and expanded in 1999 to add approximately 50 blocks, intends to create and support an environment attractive to private investment in the central business district, while encouraging a mix of complementary uses, including residential, hotel, and retail businesses.

Convention Center Expansion

The Convention Center expansion includes a Hilton Hotel, basketball arena, and a parking garage with associated skywalk, all to be completed in December 2003.

Minute Maid Park (Astros Field)

The \$265 million home of the Houston Astros is a major new downtown destination already stimulating residential development in its surrounding area.

Municipal Courts Master Plan

A new master plan for the Municipal Courts Complex is currently being prepared for the City of Houston Building Services Department.

Harris County Justice Facilities Master Plan

Harris County Justice Facilities will be consolidated in a campus centered on the south bank around a new Courthouse Square on Franklin Street.

Federal Reserve Bank of Dallas, Houston Branch

A new facility is planned off Allen Parkway in the Fourth Ward between Gillette and Taft streets. The plan for the 13-acre property proposes approximately 286,000 gross square feet of operational, office, common and support space on four floors.

National Heritage Corridor

In addition to the many projects underway, a key initiative with regional scope has passed the House of Representatives and awaits hearing in the Senate. The National Heritage Corridor initiative authorizes the Secretary of the Interior to study the suitability and feasibility of establishing the Buffalo Bayou National Heritage Area in East Houston. The House bill was introduced by Congressman Gene Green, the Senate Bill is sponsored by Senator Kay Bailey Hutchison.



Harris County justice facilities are centered around new Courthouse Square.

Harris County facilities and property management



VISION 2022

2



The Buffalo Bayou running through Houston has long been a significant landmark, slicing the city into north and south banks, into east and west zones. In the postwar decades it has become a neglected and well-hidden dumping ground, the back door of downtown. Now, envisioned as a vital integrated District defined by a continuous central spine with revitalized edges, it again becomes the front door to all parts of the city.

***The new Buffalo Bayou District is a place reclaimed –
a place sustained once again by the flowing waters of the Bayou.***



Downtown Management District, 2000

Downtown 2000.



View of Buffalo Bayou District envisioned by the Plan.

A place that manages the impacts of flooding, protecting its people and assets from random acts of nature.



North of the Bayou today.



View of proposed North Downtown.

A place that maintains the Bayou as a public resource, offering its banks and waters as a safe, clean, visible, and accessible amenity for all to enjoy.

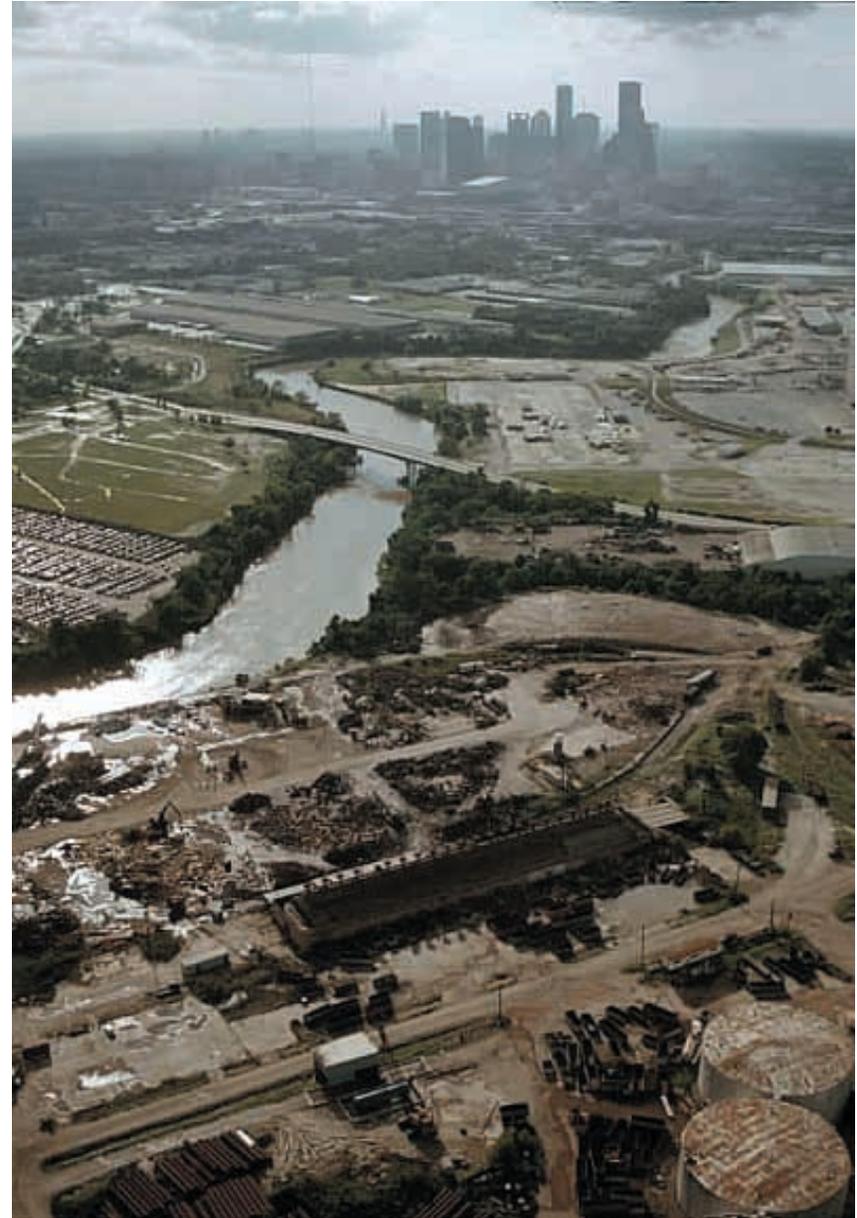


West End at Waugh cloverleaf today.



View of West End 2022.

A place transformed in sympathy with nature and community, enriching its citizens' quality of life and daily experience.



East End today.



View of proposed East End.

***A place that captures a region's pride –
central to Houston's identity and a model for future green cities.***



Theater District today.

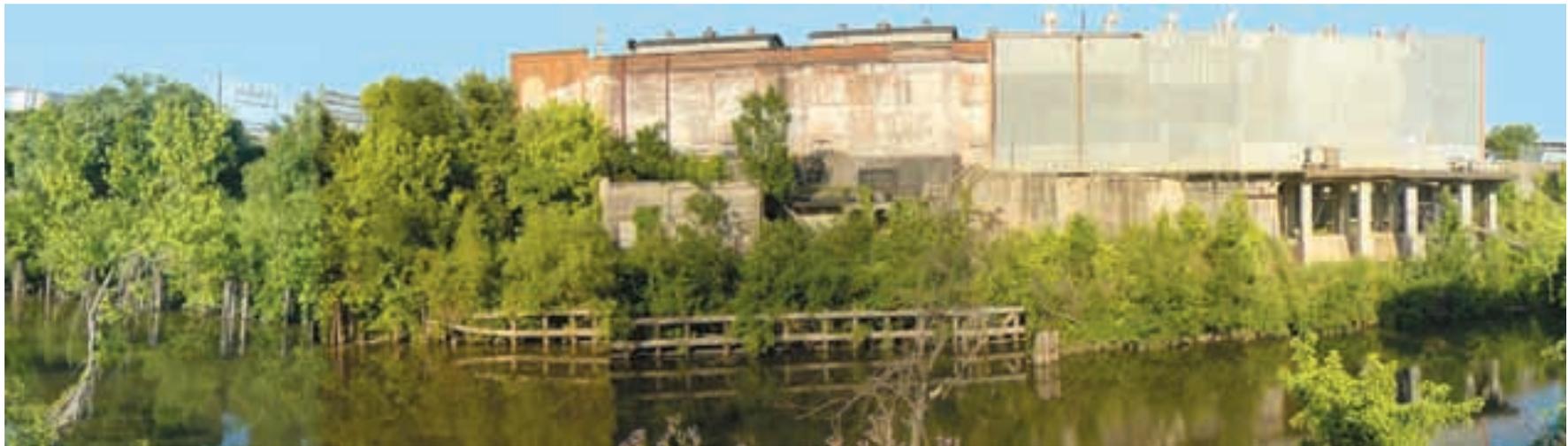


View of proposed Theater District with mixed-use redevelopment.

A place busy with people, drawing residents and visitors to enjoy its destinations and neighborhoods, its commerce and culture along the rediscovered waterfront.



Gable Street Power Station today, looking eastward from above Harris County detention facilities.



Gable Street Power Station today, looking eastward across the Bayou from Harris County detention facilities.



View of Bayou Promenade from Gable Street Power Station site, looking south toward Crawford Street.



AN INTEGRATED REGIONAL PLAN

In a plan that seeks to Balance Conservation and Development, Houstonians are exploring a deeper relation between Nature and the City than has been considered possible for at least a century. Houston does, after all, have parks throughout city neighborhoods, and unbuilt space occurs randomly throughout the metropolis. Isn't this the best possible, given the demands of sustaining a large modern city in the 21st century?

In fact, professionals in both development and conservation view *as essential* the balanced integration of nature and the built environment – to repair and sustain a habitable planet as the way to produce livable cities. This reminds us that the 21st century marks a new start, welcoming the introduction of nature into urban environments as the desired outcome for healthy communities and economies. Concern for land, water, atmosphere, and living things is now gaining equal status with economic and functional efforts required to sustain a livable city.

As Houston begins to look at its surroundings with fresh eyes, a change of perception and practice may also happen here: manicured landscapes can become low-maintenance wildflower meadows. The “regenerative capacity” of landscapes can be our measure of contributions to the survival of bio-diversity – an essential role once played by raw, uninhabited, and undeveloped land.

Nature is not a decoration or an amenity; it is an essential system. It builds new value into the urban economy; it builds a better quality of life to sustain present and future residents, in a new equilibrium that celebrates the landscapes, wetlands and waterscapes beautifully integrated throughout the City of Houston.

The integrated plan for Buffalo Bayou Corridor is a concept of many parts that works for many constituencies in all zones of Houston, not just within its boundaries. Flood control measures protecting downtown also effect major flood protection upstream and along White Oak Bayou, bringing substantial benefits to the region and all Houston suburbs. Those residents will also enjoy the features – including parks and trails – extending East from Memorial Park into a much larger recreational zone. Improvement of water quality, boating areas, play fields, and water edge access are open to all downtown and local residents, whether or not located near the Bayou. And international visitors' image of Houston can move beyond Energy and Commerce – showing a lively and environmentally-aware city with a “green heart” and an exciting Bayou waterfront. The Plan's integration of open space, green corridors, waterfront and pedestrian edges, new residential construction, flood control, cultural institutions, and revitalization of Downtown, is both a city-wide and regional program for the 21st century. It is about new ways of nurturing, using, and redesigning life in Houston's Bayou-Lands.

BALANCING CONSERVATION AND DEVELOPMENT: TWO THEMES

Multiple purposes – of open land *and* of urban land

In conservation: unbuilt land within urban areas must serve multiple purposes: providing recreation, amenity, hydrological benefits, scenic corridors, erosion control, and flood prevention. Urban wetlands, as in Buffalo Bayou, make multifunctional contributions, including stormwater filtration, waterfowl habitat, and irrigation water for municipal needs.

In development: multiplicity means that plans for Bayou-fronting sites can respond to conservation principles as well as market needs, if considered from the outset. Section 4 explains many ways to achieve urban integration and serving diverse urban functions efficiently, by providing *mixed use*. This is really bio-diversity translated into the multiple patterns of city life. The presence of variety, contrast, and choice through a mix of uses in areas all along the Bayou will prove to be a self-reinforcing benefit and survival tool for underutilized lands

Connectivity – of natural habitats *and* of environments for people

The Master Plan has focused on the connectivity principle – both among wildlife habitats and among people-populated places. The principles can be reinforced by conscientious planning for land connectivity, for urban connectivity through space networks and centers, and social connectivity through lively and interactive gathering places, both built and natural.

SNAPSHOTS OF AN INTEGRATED PLAN

3



Following are snapshots of selected proposals in the Master Plan, fully described in Chapter 4. These illustrate solutions to problems ranging from flood control and environmental rehabilitation to Downtown development areas, expanded waterfront activity, and new residential communities. Designed for connectivity, the proposals show many points of integration and positive mutual impact, often achieving multiple efficiencies and widespread benefits that spring from a single investment in Bayou improvement.

Proposed Flood Control program can be integrated with recreational and waterfront uses.



The new North Canal invites design of multilevel structured edges to provide flood protection, as well as areas for outdoor seats, tables, and kiosks.

Stepped canal edges hold and accommodate Bayou overflow while upper levels remain usable, and walkable.

The flood management plan introduces a new supplementary canal opening up waterfront development just south of the North Downtown neighborhood. To divert stormwater convergence that occurs at the White Oak junction, the new canal branches east across north Downtown behind Harris County facilities, rejoining Buffalo Bayou near McKee Street. For maximum water conveyance, a proposed second South Canal will divert the flow near the east corner of Commerce Street at Crawford Street. The channel's proposed route is along Guadalupe Plaza and the former El Mercado site to an outflow near South Jensen bridge.

These two supplementary surface channels can significantly increase flood water conveyance and provide regional relief from a high percentage of downstream floods, with predictable economic benefits and a more flood-protected downtown.

A more stable Bayou offers transportation potential that, in addition to recreational movement, can be translated into regular commuter travel between the East End Turning Basin and Main Street/Allen's Landing with connections to Metro Light Rail, and the possibility of reviving longer excursion routes as far as Galveston Bay.



Water edge of the River Seine in Paris has levels to accommodate rising waters.



Bayou Island is framed on the north side by the new North Canal, a new frontage with expansion possibilities for the Arts District.



Junction of Bayou and North Canal that diverts stormwater from White Oak Bayou.

A 2,500-acre West–East park system connects schools, parks and neighborhoods to Downtown.



Historic Sam Houston Park, which remains an idyllic green retreat, is impacted by I-45 and deserves a friendlier interface and prouder presence on all its City edges.

Connectivity of places and open spaces will come with completion of linked trails on both banks, with frequent foot bridges.

The Plan proposes the restoration of a continuous natural corridor and seeks to create special public places as well as new home sites and industrial/business centers along the Bayou spine.

Within the 10-mile integrated park system, Buffalo Bayou trails will lead to diverse events and destinations. Hike-bike fans and casual strollers will enjoy visual and actual contact with the water's edge, and boaters will have multiple landings to launch their craft and view water festivities and events. At special points are opportunities for art parks, rest stops, and family picnic and gathering places.

The different characters of the park system correspond with the West, Downtown, and East sectors of the Bayou corridor. Active/passive recreational uses in the west zone can occur on open, landscaped fields sloping to the waterway. Along the eastern reach, where steep banks rise to protect against high water one can climb down steps and terraces to access landings at the water's edge.

Sam Houston Park, grandfather of the city's open spaces, will be the keystone of the Bayou's linked park system. Land in the Bayou Corridor will work as a linear park under special management, and will physically and administratively tie together all the City park properties within the corridor by a network of paths, green edges, and promenades.

Emphasis in the West End is on upgrading the Bayou environment by grading back its sloping banks, improving habitat, and expanding the water body to make it more accessible for boating and usable for diverse unprogrammed activities. It can be a memorable episode in the regional greenway, a place where the sustainable environment works for sustenance of the human spirit.

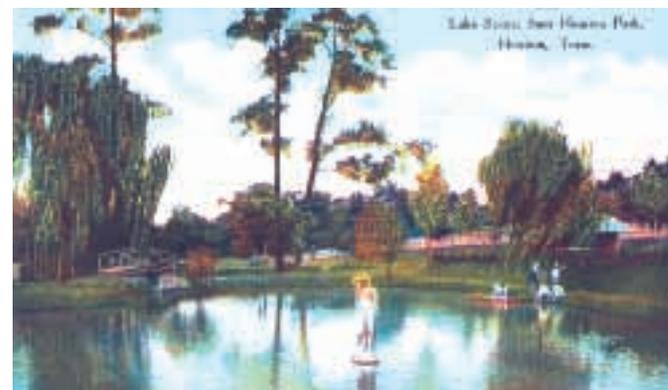


Harris County Flood Control District

North-south foot paths from schools and parks will tie into east-west trails.



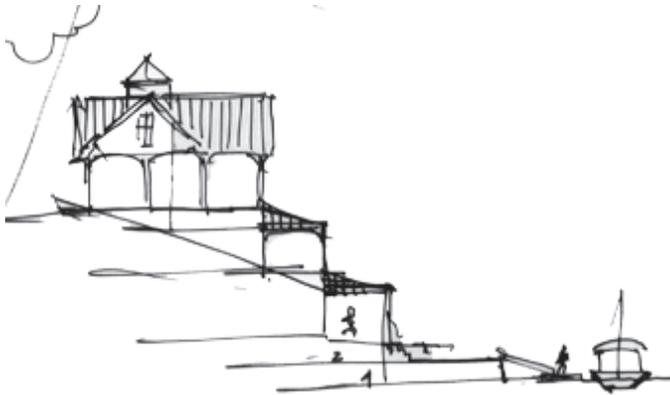
Users are finding new Bayou-edge hike/bike trails that continue through Downtown.



Collection of J.D. Bartel

Historic postcard: Sam Houston Park in the last century.

West End Bayou rehabilitation will rebuild natural systems and expand water-edge access.



Boathouses at key landings can offer rentals, food service and activity space.

Refreshing embankment landscape between Shepherd and Sabine Streets, the plan suggests replacing the Waugh/Memorial interchange with regraded banks to form a Bayou cove that becomes a constructed wetland pond with riparian habitat. A boathouse on the cove can offer daily boat rentals on the lower level, with space for a restaurant incorporating club meetings or functions above.

Three boat drop-off areas are planned along Memorial Drive and nearby parking is proposed by a change along Allen Parkway. The eastern half of Allen Parkway is seen as being reconfigured to include angled parking along a wide public promenade by moving the roadbed over to the existing service road, and converting the current outbound lane into parking, pedestrian and bike use.

The upgrading of existing pedestrian bridges is recommended at Sawyer, Houston, and Austin Streets, providing access to the Bayou and to the South Bank. Improvements in the natural landscaping and continuous trails will make this western zone of the greenway system more inviting, more accessible, and more of a valuable asset for the residents on both sides of the Bayou.



Reconstructed wetlands will filter and cleanse stormwater near Waugh Drive overpass.



On-street parking can be provided by lane changes along Allen Parkway. Circles indicate boat access locations.

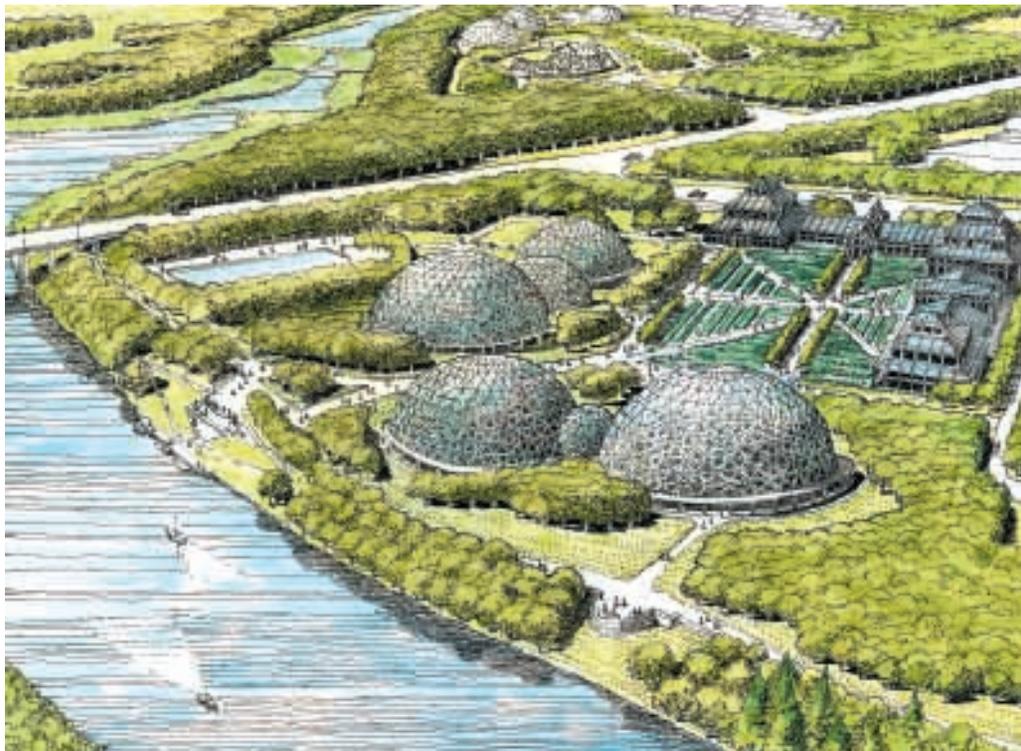
Re-use of East End industrial sites offers potential for open-air attractions such as botanical gardens and a regional ecology park.

Among new destination possibilities, the City of Houston's northside treatment facility can be adapted as a horticultural or botanical exhibition of flowers, gardens, fountains, and greenhouse pleasures. The remaining infrastructure of obsolete filtration basins, circulation systems, and unused land (43 acres) can be transformed into a regional and local destination with public, educational, and leisure benefits. The larger surrounding quarter (approximately (170 acres) between York and Lockwood Bridges suggests imaginative reuse as a natural de-pollution system and demonstration ecology center, possibly used for commercial gardens offering trees, shrubs, and flowers.

Currently a concrete recycling plant fills the Lockwood Oxbow. In the future, if returned to its old island formation, the Cove can become a useful public amenity as a boat launch and marina basin. A place for spectators along the race course is also proposed for this Bayou reach.



Lockwood Oxbow, once known as Turkey Bend, could be restored as an island, with an enlarged boat basin and landing accessible from Navigation Boulevard.



Reused City treatment plant gives form to glass-enclosed and open public gardens. The site extends across Lockwood Drive.



Cement operations have built a rail bridge over channel.

Green space provides urban connectivity to make a harmonious and welcoming Downtown.



New development sites are broadly distributed throughout the greater Downtown, inviting residential and commercial projects with potential to meet many new market needs.

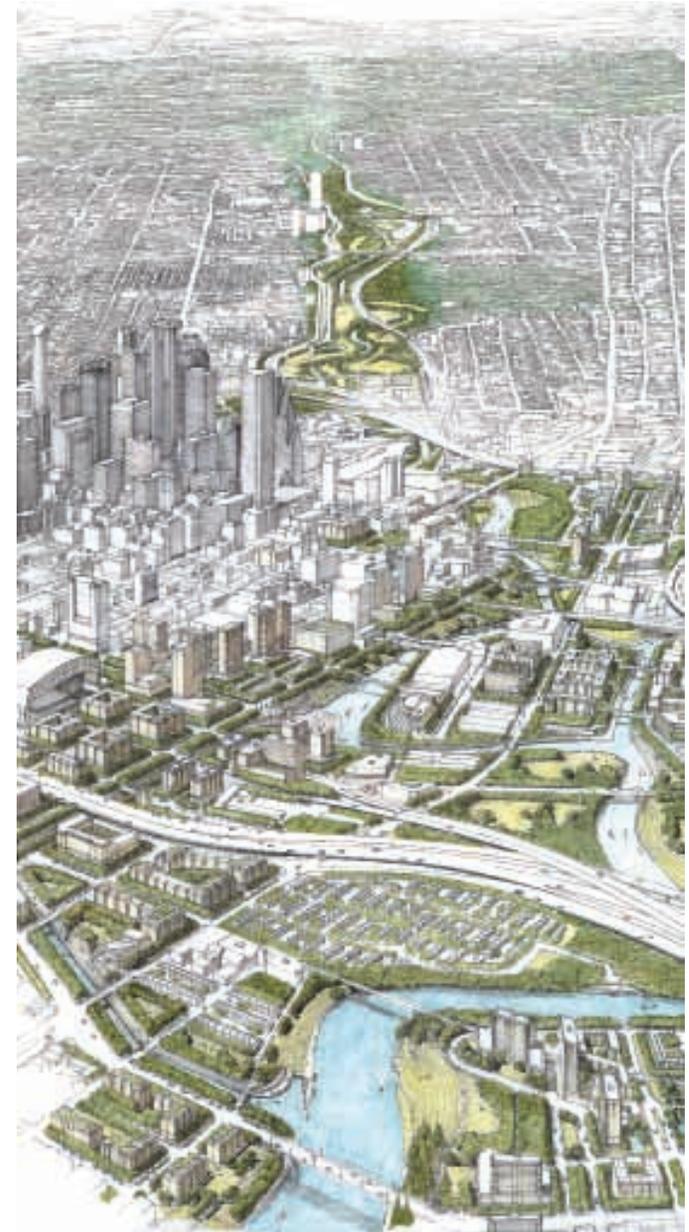
Downtown buildings, streets, and open spaces can be interwoven around the great communal open space... Buffalo Bayou.

A downtown of unified character and functionality is one whose building sites are coordinated in their impact on each other, on streets and open space, and on the infrastructure and circulation systems on which they mutually depend. These complex relationships are made simpler by the integrating force of natural elements, such as the great communal open space and green corridor of Buffalo Bayou. The result is a kind of synergy, a larger urban ambiance that answers market demand and human needs at the same time.

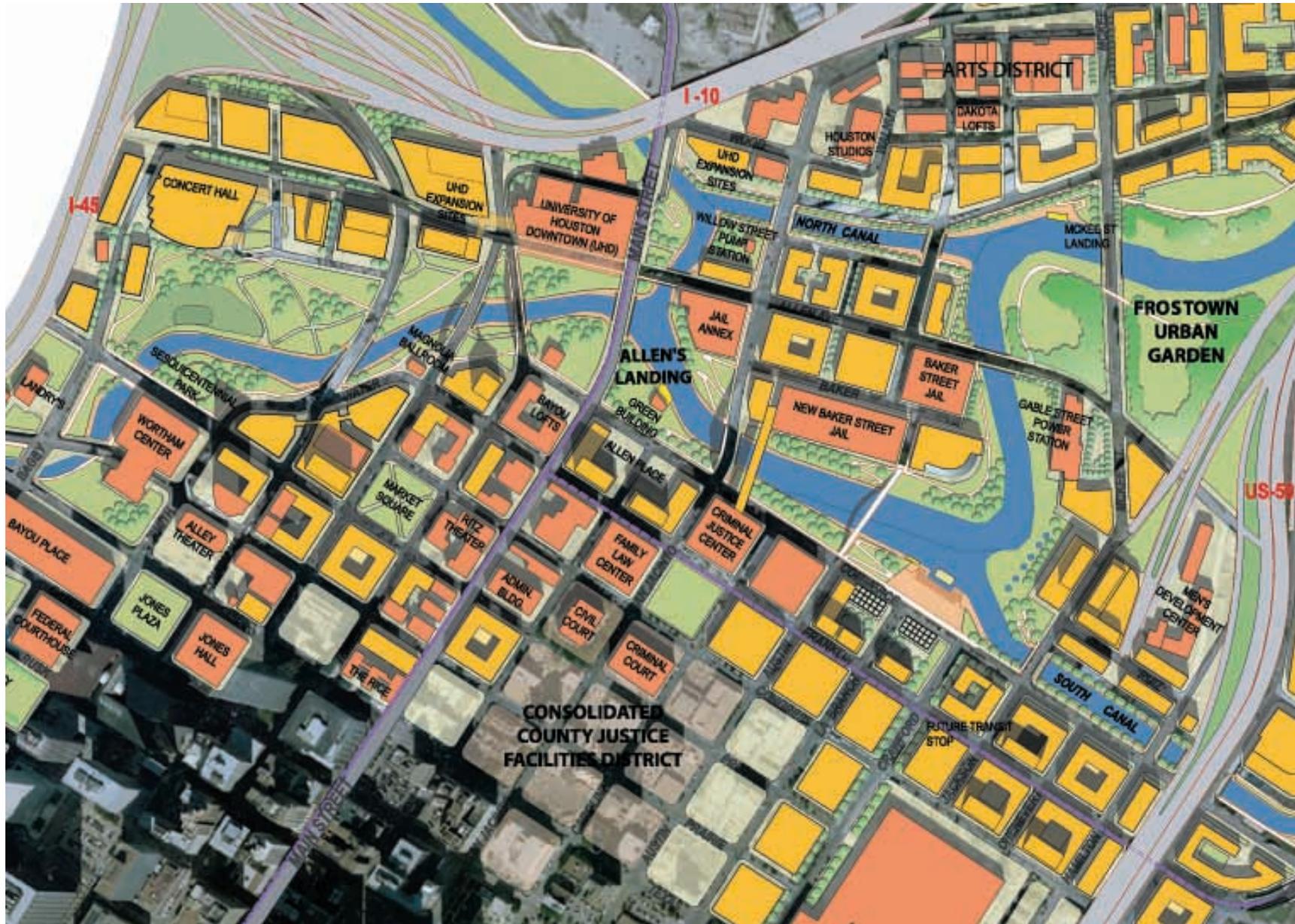
Each new project or investment in public improvement, though individually conceived, creates multiple impacts on the city around it. It contributes its own functions and adds value to adjacent parcels. If land or structures are undervalued, a nearby project or an infrastructure improvement – such as a green corridor – stimulates investment in upgrading. A group of well-redeveloped sites will create a zone of recognized desirability, raising value on all sides, increasing the tax base, boosting City revenues and translating into a lighter tax load for taxpayers. Such cohesive development processes, if based on District Guidelines, can coordinate an overall vision that achieves user convenience, urban efficiency, rational street linkages, and connectivity to nature, and pays for itself by increasing values.

New Key Destinations in WaterView:

Festival Place	Mixed-use development on Post Office site.
North Canal Neighborhood	A new neighborhood facing the North Canal, south of the Arts District in North Downtown.
Commerce Street Promenade	A grand promenade along the water that connects Allen's Landing to Gable Street Landing.
Allen Place	A significant site that could be a signature address for institutions or corporations at the head of Main Street. An open courtyard overlooking Allen's Landing has retail potential with the unique identity of a midsize Rockefeller Center.
Gable Street Landing	Bayou portal leading to Minute Maid Field and Convention Center.
Festival Street Network	The downtown Bayou district is planned to host popular ethnic food festivals in a welcoming layout of walkable streets fanning out from Allen's Landing. Street markets and street performances of all kinds will enhance tourist interest in Downtown while drawing suburban and regional residents back to the WaterView District and its center at Allen's Landing.



Downtown WaterView is a vital mix of residential, business, and retail development.



The Downtown WaterView plan envisions the continuing expansion of a unique and dynamic water-oriented community, recentering the Bayou while reducing the danger of flooding.

Houston's expanded waterfront is defined by grand promenades along the Bayou edge from Bagby Street to Jensen Street.

WaterView District is planned to extend along the Bayou edge as the low foreground of Houston's dramatic Skyline District – the re-emerging center of town as vibrant as in the days of settlement around Allen's Landing. It can be as fresh and appealing in its human dimensions and detail. With low and mid-scale buildings on mid-sized blocks it can be popular as a pedestrian-oriented, richly diverse place to be, to work, shop, live – and visit.

WaterView describes an amalgam of residential, live-work, cultural, and recreational opportunities along lively streets, where passages and cross-block arcades will invite window shopping and exploring on foot. Anchored in regional destinations, from Gable Street Place to Sam Houston Park, WaterView will open new possibilities of retail growth intermixed with cafes, restaurants, galleries, and gathering places.

There is considerable residential capacity to attract well-scaled developments on these now-underutilized blocks, using apartments and studios above street level shops. The WaterView plan expands the Historic and Theater Districts with a new mix of attractions, and it looks out toward Bayou Island where, behind the County Court campus, there is space to accommodate an expanding Arts District.



Gable Street Landing and Promenade are envisioned as a north-south axis looking toward the ball park and Convention Center.



On the grand promenade at Gable Street Landing, the view south looks down Crawford Street toward Minute Maid Field, home of the Houston Astros, and beyond to the Convention Center. Gable Street Power Station, visible in the foreground at left, has potential for restoration. The site opposite, at the end of Baker Street (currently warehousing) would offer a prominent and visible location for a cultural institution.



Gable Street Power Station, visible but rarely seen from end of Baker Street.

Diverse housing neighborhoods can achieve medium density in compact site-conserving plans.



WaterView East between Jensen Drive and York Street shows a mix of housing types including affordable units, and a waterside performance area created by a channel cut to form a long straight crew-racing course.

A sizeable proportion of affordable housing within new projects builds the stable workforce that business depends on.

Mixed-use and mixed income neighborhoods

Just as neighborhood quality benefits from ecologically-sound development on Bayou-fronting sites, balanced neighborhoods include a range of mixed income housing types and sizes at varied prices. There are national models of subsidized housing units integrated into, and indistinguishable from, market rate residential units. Diverse housing with units of different scale can fit in and reflect the traditional scale of familiar neighborhoods along the Bayou on the west, north, and east.

New housing communities on underutilized industrial sites

On the linear bluffs east of Jensen Drive, with exceptional views, a street-based town-house plan is a model that fits the site. The sketch of Richardson Park (with reference to the well-know model community in Oak Park, Ill.,) demonstrates an urban layout for single and multifamily units with many advantages. All units have landscaped front yards with rear alleys for parking and service. Some units face Clinton Drive with rear-window views of the Bayou and skyline. Water-facing units have a bluff foreground looking toward the lower Bayou. Pedestrian paths extend through the site down to the water's edge. A linear central green lawn with trees, planting and outdoor seating unifies the residential area with a western vista (to West Jensen), where a different style of housing retains the view of the city skyline. Some existing mid-rise buildings are retained at the York Street entrance as part of a corporate center, possibly with a hotel and retail services. Also shown on the plan is an open-air Symphony Pavilion, with facilities for resident and visiting performers.



Richardson Park is envisioned with an office center, homes, apartments, retail services and an environmental science campus.



On the South bank, multifamily blocks can combine affordable and market housing.



Richardson Park townhouses face a long central tree-shaded commons .

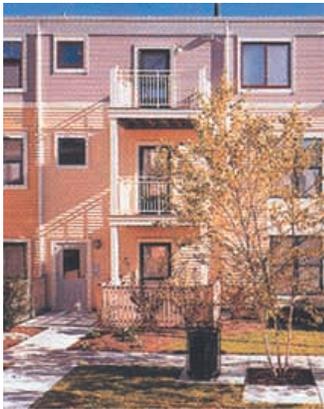
Conversion and infill development reinforces community cohesion in streets and neighborhoods



A street of homes shows individuality unified by harmonious scale.



Row homes have common space around a shallow basin preserving stormwater.



Communal gardens replace backyards.



Loft studio enjoys light and space.

Encourage diverse housing types

The difference between a development “project” and a naturally evolving neighborhood – no matter what the target market – is the latter’s diversity. Starting with variety in existing building stock in an old neighborhood, cities evolve housing in sizes small to large, in varying conditions, at different rent or price levels, in single family and multifamily formats. This translates into variety in the resident population by accommodating young people starting independent living, families of differing sizes, older couples and singles in smaller units, as well as artists living in their working lofts and merchants living over their stores. That’s what an urban neighborhood is – a random sample of the world at large, rarely homogenous or self-selected. This is one key to an appealing “urban dynamic” that is now causing Americans across the country to move back into city downtown areas.

Developments planned near and in the Bayou District can be enriched by the time-honored urban neighborhood model of diversity, while avoiding the cookie-cutter model that has dominated (and oversimplified) suburban tract development. Any project on lands abutting the Bayou starts with advantages of natural beauty and amenity. Except for small infill sites, any project in this area should plan for and welcome the social variety attracted by housing that offers choice of size, style, type and price.

Expand housing stock by infill development

Infill housing on numerous vacant sites within the fabric of existing neighborhoods will further increase near-downtown housing stock. Infill housing promises to strengthen streets and neighborhoods, increasing both foot traffic and safety. It can introduce multifamily affordable housing in dispersed patterns throughout the community. HUD’s Hope-VI program has been a model for integrating a proportion of subsidized-rent housing into conventional market-rate developments, often with marked success.

Encourage adaptive reuse of historic buildings

The Plan’s contemporary approach to adaptive reuse and the preservation of important historic buildings emerges in recommendations for revitalizing whole industrial neighborhoods – notably in the North Downtown and East Sector – by conversion of sheds and warehouses (including abandoned schools, clubs, and churches) to serve residential, business, technical, cultural and scientific activities.

New industries and related housing will be drawn to East Sector sites by investment in an extended public transit system.

East sector development along transit corridors

Development of the East Sector, which has the most ample supply of potentially redevelopable land, will be increased if proposed transit corridors are extended east from Main Street to the Turning Basin on both banks of the Bayou. Probable routes will be Clinton Drive on the north, and Navigation Road or Harrisburg Boulevard on the south. East End residents, particularly those on the south bank, will benefit from development of regular water transportation via shuttle between the Turning Basin and Allen's Landing. Downtown will also benefit from their increased participation in daily life and work, facilitated by public transit.

The northeast industrial sector reclaimed

On the north bank the Northeast Sector invites intensification of industrial development to raise economic return from large, low-density land areas, particularly if transit penetrates the lands beyond Lockwood Drive. (Sites east of Lockwood remain viable for water-dependent manufacturing and construction uses along the commercial corridor where barge and rail access is established.) With planning, new industries can comfortably occupy zones that include many other uses. Co-existence is the theme. The result would be a major zone of opportunity for environmental rehabilitation and reestablishment of wetlands and prairie habitats.

Targeted development of new technologies, such as "Clean Technologies" medical manufacturing, can anchor value-added transformation of the East Sector into supportive industrial clusters. Facilities can be appropriately designed to relate to neighbors on adjacent sites, offering amenities and public facilities plus nearby housing in convenient proximity that could accommodate a substantial workforce.

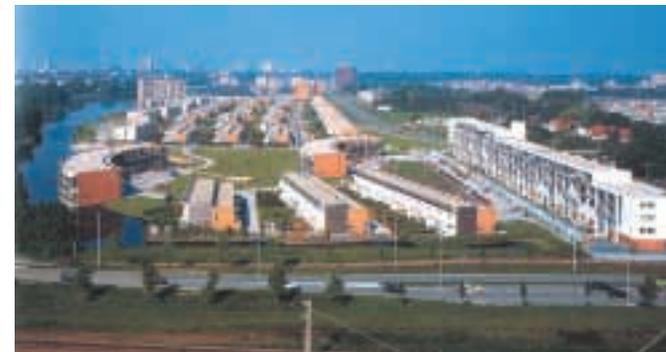
Market lofts as a versatile building type for revitalization

The loft as a building type for conversion and new construction has already caught on in the local development community (i.e. Sabine Lofts, Bayou Lofts, Dakota Lofts) even as major opportunities for industrial conversion are being undertaken by other developers (i.e. Alexan, transforming the former home of El Mercado into 244 units.) The trend holds great promise for revitalization of the key Downtown areas in which many unused yet solid industrial structures are still standing, awaiting a new life. Good neighborhood planning and concurrent development of shops, services, and amenities will contribute significantly to strengthening the downtown population, with a vitality that also respects the area's history.



Central Houston Civic Improvement

Development in the East Sector will accelerate if transit corridors are extended.

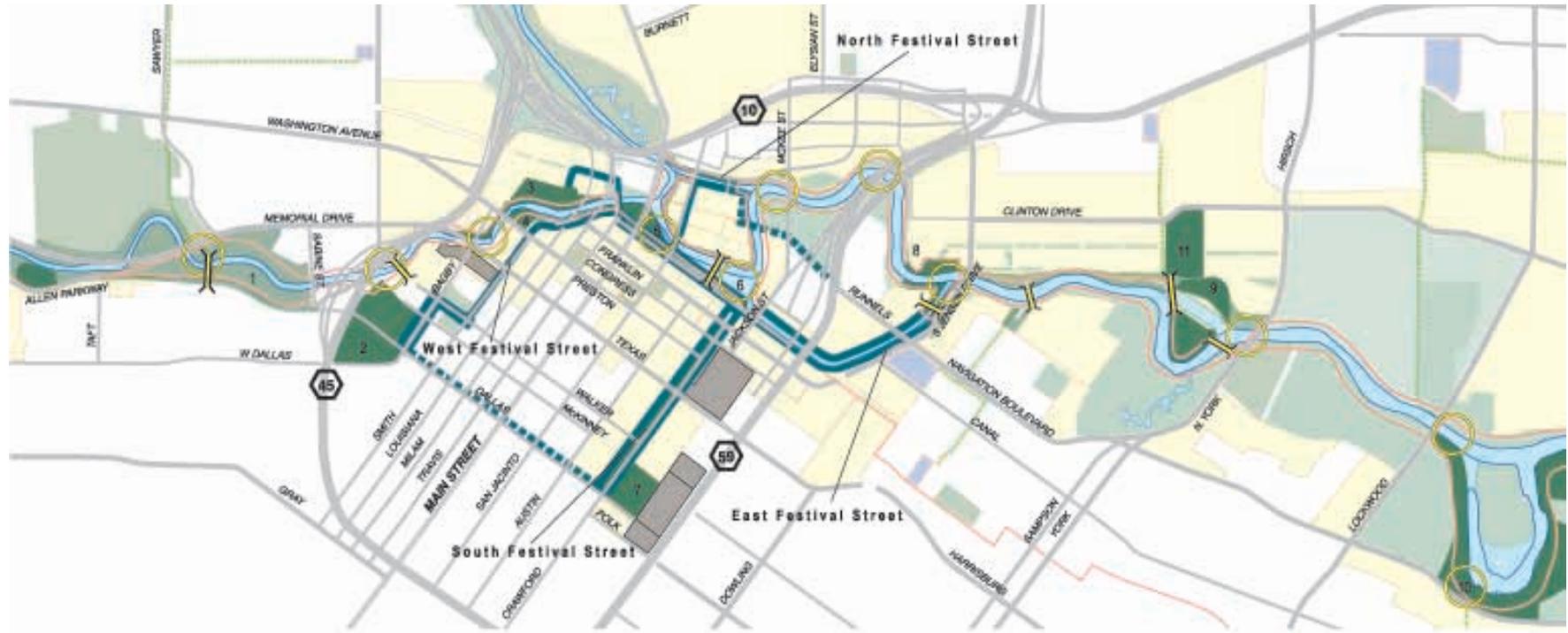


Clean industrial operations can provide workforce housing in convenient proximity.



Bayou Lofts: A significant recent loft conversion provides downtown living in Houston.

Programmed around a network of destinations, Bayou becomes a stage for participatory events.



www.buckdog.net

Bayou events are opportunities to celebrate Houston's tradition of diversity.

KEY

1. Eleanor Tinsley Park
2. Sam Houston Park
3. Festival Place
4. Sesquicentennial Park
5. Allen's Landing
6. Gable Street Landing
7. Convention Center Park
8. Bayou Vista - Guadalupe Plaza Landing
9. Symphony Island Performance Center
10. Navigation Landing
11. Richardson Park Village Green

- Programmed Destinations
- Festival Street
- Redevelopment Areas
- Hike & Bike Trails
- Parks
- Existing Schools
- Green Street School Links
- Proposed Pedestrian Bridges
- Proposed Bayou Landings

Trails, bridges, landings and streets become part of the park system where casual and celebratory activities happen.

Leisure activities related to the Bayou, whether spontaneous or programmed for individuals, families, or groups, are a central purpose of Bayou revitalization. They offer a significant means of amplifying recreational benefits throughout the City and County, through good management of many venues with special potential. .

Leisure resources added in the Master Plan

COMMUNITY BOATING/LANDING -LAUNCHING LOCATIONS

Shepherd Drive	Gable Street Landing
Waugh/Montrose	McKee Street
Sawyer Street	Mercado/Jensen Drive
Hobby Center	North York Park
Sesquicentennial Park	Lockwood Drive
Allen's Landing	Hidalgo Park and Turning Basin

DOWNTOWN WATERFRONT ACCESS

Commerce Street water edge:	For promenading, sitting, people watching
Allen's Landing and eastward:	For shuttle boats and excursion boats
Festival Streets and Plazas:	For activities, fairs, and celebrations
Trail pull-offs, art parks:	For family rest spots, picnics and festivities

TRAILS AND PATHS, WALKING, JOGGING AND BIKING

Continuous well-linked trails on both banks, to accommodate both strollers and sports enthusiasts, are currently being extended from Sabine Street to Shepherd Street. East of Jensen Drive, some trail easements have been obtained, others will be sought to build a comprehensive network system on both banks. Destination sites can be planned to integrate use of the Bayou Corridor across district lines, as a unified territory for all users on foot, on bikes, in boats, or on streets.

CONNECTIONS AND BRIDGES

New footbridges across the Bayou are recommended at seven points:
Between Sabine and Bagby, at Austin, near Montrose, two bridges between Jensen and North York, at Hobby Center, and at Hidalgo Park.

Bridge improvements at Waugh add a pedestrian crossing lane. Connections among neighborhoods, public connections between Memorial Park and Shepherd Drive include trails, routes, easements, and rights of way. From Sabine to Bagby, public paths now connect the West End to Downtown.



Harris County Flood Control District

Easy connections on wheel and on foot, on paths along the Bayou...



...and across the Bayou on more frequent footbridges...



...leading down to the water edge.

The Houston story and cultural heritage can be showcased as an “On-Bayou Experience”.

Broward County Performing Arts Center, Florida



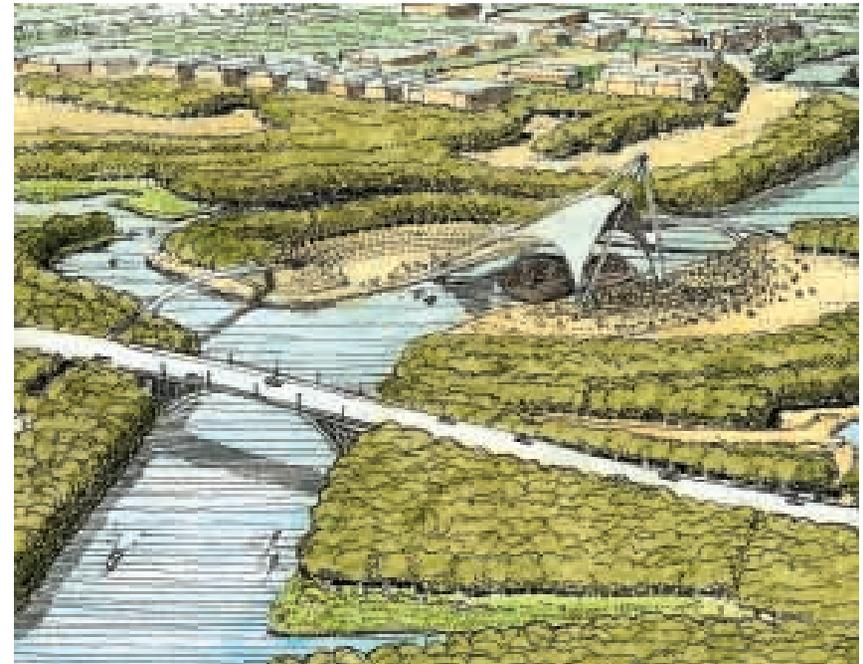
Entertainment attractions can be expanded by new development facing the Theater District.



Festival Place (Post Office Site) can enlarge the Theater District's performance facilities across the Bayou.



Open-air concerts, such as those staged by the Boston Pops, bring music to a wide audience.



Amphitheaters may feature floating stages at Gable Street Landing, Festival Place, and Symphony Island.

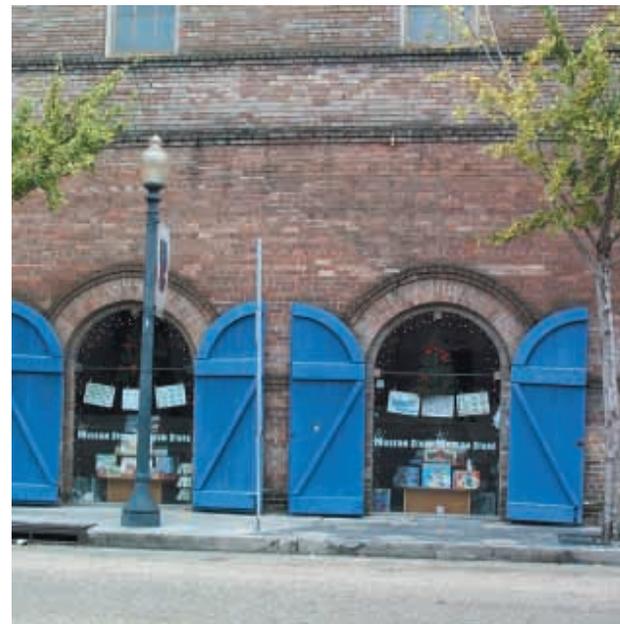
Houston visitors can enjoy the city as a cultural park that includes an urban art park presenting outstanding artists, productions, and collections.

Along Downtown street networks, one can find many locations for new buildings as well as new homes for institutions in old buildings. From City Hall to the Cotswold District to the Convention Center, there is space for museums, academies, and galleries, as well as schools of art, craft, and performance, to cluster together to create a critical mass of cultural happenings. As a visible part of the streetscape of a revitalized Downtown, all the arts and their products will attract special followings.

The center of this cultural rebirth, the new WaterView District, is seen as a mixed-use amalgam of residential, live-work, cultural, and recreational development in blocks now open or underbuilt. A substantial infusion of residential units as part of rebuilding throughout the Historic and Theater Districts will significantly enliven the area throughout the day and evening, keeping pedestrians on streets, in shops and cafes. Resident-based street life will build tourist appeal, and encourage other culture-based enterprises such as culinary, fashion, and theatrical attractions and services to cluster and evolve into a boutique area on many blocks of traditional scale around new Main Street, from Texas Avenue to the Bayou's grand promenade.



Clustering design industries and personal collections creates a marketing story that builds a following of local and regional customers, collectors, and viewers.



Specialized and local museums are favorite visitor venues. True local character is sought out in neighborhoods where street-visible galleries, studios and workshops fast become window-shopping destinations.



MASTER PLAN FOR REVITALIZING BUFFALO BAYOU

4



The Master Plan for Buffalo Bayou is a multifaceted plan integrating aspects of conservation and development. Leadership from disciplines with complementary expertise must come together to detail and implement the Plan's many aspects. These include urban development and design, environmental quality and the eco-region, flood management, landscape, Bayou access and transportation, and water-based activities; all are addressed and outlined here in a framework for action.

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PLAN STRATEGIES

The Plan is a place-based vision. Its themes can be carried out through the following strategies. The strategies form an underlying framework; they must be integrated with City and County policies for the watershed and region in order to see the long-term benefits proposed. The strategies weave their way through all sections of the Plan.

Plan strategies are:

1. *Rehabilitate the Bayou as an Ecologically Functional System*: Restore to Buffalo Bayou its natural functions, including water retention and drainage, sustenance of wildlife habitat, cleansing of stormwater, and ability to maintain water quality.
2. *Increase Floodwater Conveyance Capacity*: Address regional flooding impacts by effectively increasing the Bayou's floodwater conveyance capacity – with new supplementary channels, bank treatments, and removal of obstructing structures in Downtown.
3. *Promote Low-impact Development*: Encourage new and infill development that responds to the ecology of the Bayou watershed with conservation-minded planning and engineering.
4. *Increase the Visibility of the Bayou*: Reshape the Bayou banks to promote natural habitat and recreational use, to ease user access, and to make it visible from streets and sidewalks.
5. *Increase Residential Opportunities Downtown*: Expand the waterfront residential community to build a dedicated constituency that works to preserve the unique resources of the Bayou and Downtown.
6. *Ensure Equity of Access along the Bayou*: Ensure public access along both Bayou banks and on the waterfront through planning and design standards, .
7. *Maintain Affordability*: Anticipate future benefits of investment in Bayou improvements to ensure that increasing appeal of the Bayou waterfront does not cause displacement of residents of existing neighborhoods.
8. *Encourage Mixed-use Redevelopment*: Leverage the appeal of the waterfront with mixed use development and innovative programming to attract jobs and revenue to downtown, from tourism, increased retail activity, and growing public participation in waterfront events
9. *Promote Joint Public-Private Development*: Develop an integrated implementation plan that combines the expertise of both public and private sectors, and builds their continuous collaboration.



Section across the widened Bayou near Crawford Street shows bank ledges and steps transitioning to the water edge. A new pedestrian bridge at Austin increases access to both Bayou banks.

DEFINITIONS

The Buffalo Bayou Eco-Region (restrictions-driven) covers nearly 500 square miles and includes the larger watershed of the Bayou. The strategic framework outlined herein needs to be reflected in policy for the watershed to promote environmentally-sound development.

The Buffalo Bayou District (based on guidelines) covers the entire 10 square mile project area. Development within the overall district will be regulated not by zoning or land use laws, but by district-specific guidelines. The guidelines will promote the intentions of the Master Plan through development responsive to the environmental health of the Bayou.

WaterView (project-based) covers nearly 500 acres and is the mixed-use center of the Buffalo Bayou District. A set of key project sites have been identified for joint public-private development. Local area plans or Planned Unit Developments (PUDs) will be required to create these planned developments. In the downtown area; some key projects fall within existing TIRZ boundaries. A new TIRZ is considered as the framework for East End projects – a priority 315-acre WaterView East TIRZ.

KEY PROPOSALS OF THE PLAN

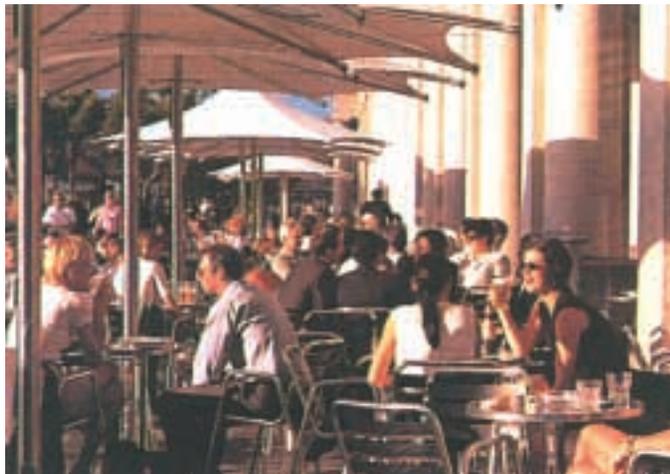
The proposed Buffalo Bayou District is a vital core for Houston: a “super” neighborhood that is structured and defined by the dynamics of Buffalo Bayou. In an easy coexistence with nature, it brings the West End, Downtown, and the East End to the Bayou, joining land and water.

The Plan highlights the following key actions and improvements:

- A 25 million SF expansion of Downtown as a mixed-use WaterView district focused on a grand waterfront promenade along Commerce Street.
- A 2500-acre linked park centered on Buffalo Bayou is the first step towards a landmark regional eco-preserve.
- Flood capacity improvements integrated with waterfront growth protect Downtown: 100-year flood levels can be reduced by an estimated eight feet.
- 850 acres of new park and 20 miles of trails connect a continuous public realm along both sides of Buffalo Bayou in the center City.
- New investments improve mobility in the East End and connect nearby neighborhoods to an accessible Bayou and to each other.
- 14 accessible boat landings at key destinations activate the waterfront: a high-quality multi-service boat operation creates a regional recreational destination.
- New residential neighborhoods on key sites along the waterway will bring life to the Bayou, offering homes and workplaces in close proximity to the rehabilitated Bayou. The Plan anticipates a growth of up to 12,000 new residents in the Buffalo Bayou District, and 15,000 new jobs within 20 years.

These and other related improvements are elaborated in detail in the following sections:

- A. Urban Development and Design**
- B. Environmental Quality and the Eco-Region**
- C. Flood Management**
- D. Landscape**
- E. Bayou Access and Transportation**
- F. Water-based Activities**



Gable Street Landing offers a vantage view of the Bayou.

The Architectural Review

East Circular Quay, SYDNEY

A. URBAN DEVELOPMENT AND DESIGN



Buffalo Bayou is the largest figural element in downtown Houston. The settlement pattern of Bayou lands is instructive in understanding its state today and indicative of the Bayou's crucial transformative potential in the evolution of a 21st century Houston.

Houston was founded on the banks of the Bayou and its urban form – the streets, buildings, and infrastructure – were developed in response to it. The Bayou was the transportation artery of 19th century Houston engendering industrial uses on its banks, with Main Street springing landward from the original Allen’s Landing. Major streets to the water (such as Main Street) housed important civic and commercial uses. West and East of Downtown, historic neighborhoods, set back from the flood plain of the Bayou, were organized in a similar manner.

When the ship channel was dredged, it spurred heavier industrial use of Bayou lands east of Downtown. Some of Houston’s most distinctive residential neighborhoods were established on the Bayou at about the same time, including great civic amenities like Sam Houston Park and Memorial Park.

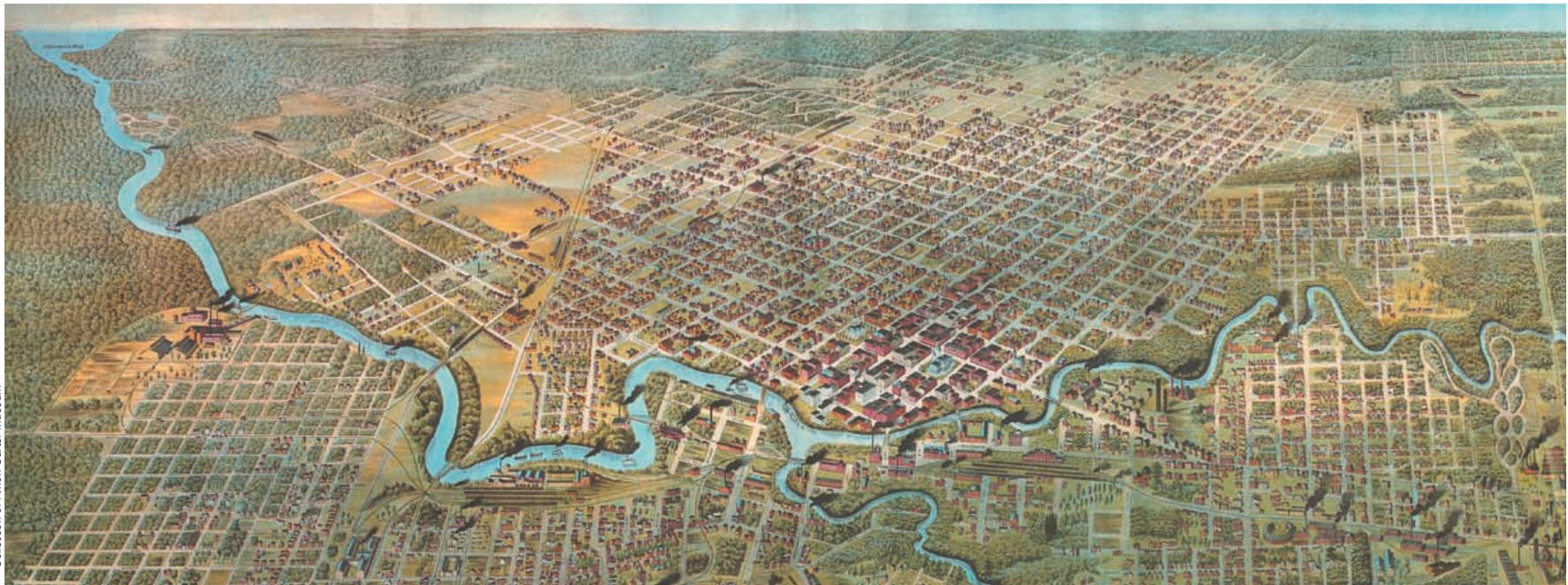
As the Downtown economy became less dependent upon the Bayou, development turned its back on it, leaving the Bayou as an impediment to be crossed over but seldom visited. In the past few

decades waterfront industry has slowly been marginalized, though its workforce still resides nearby within Houston’s most historic and diverse neighborhoods.

Functionally, at the end of the 20th century, the historic front door of the City had largely become its back door.

Notable open space efforts in the last decades preceding the 21st century have brought back Bayou-side public spaces to the City at Eleanor Tinsley Park, Sesquicentennial Park, and most recently Allen’s Landing. These civic improvements have resulted in increased recreational use of Bayou trails and spurred initial investment in mixed-use development along its banks, hinting at the great environmental, economic, and social transformations possible if a string of such amenities could be realized in Houston.

The revitalization of Buffalo Bayou presents a unique opportunity to rediscover the Bayou as a potent amenity – a powerful impetus for high quality development.



Houston in 1891 was a city defined and sustained by Buffalo Bayou at its center. District street patterns responded individually to local alignment with the Bayou edge.

Collection of Amon Carter Museum

The Plan proposes new destinations and development sites along the Bayou, “places” that will transform central Houston’s neglected waterfront into an active and vibrant center, enriching the lives of its residents, and attracting visitors from the region and beyond.

PRINCIPLES

A place-based approach to Urban Development and Design is key:

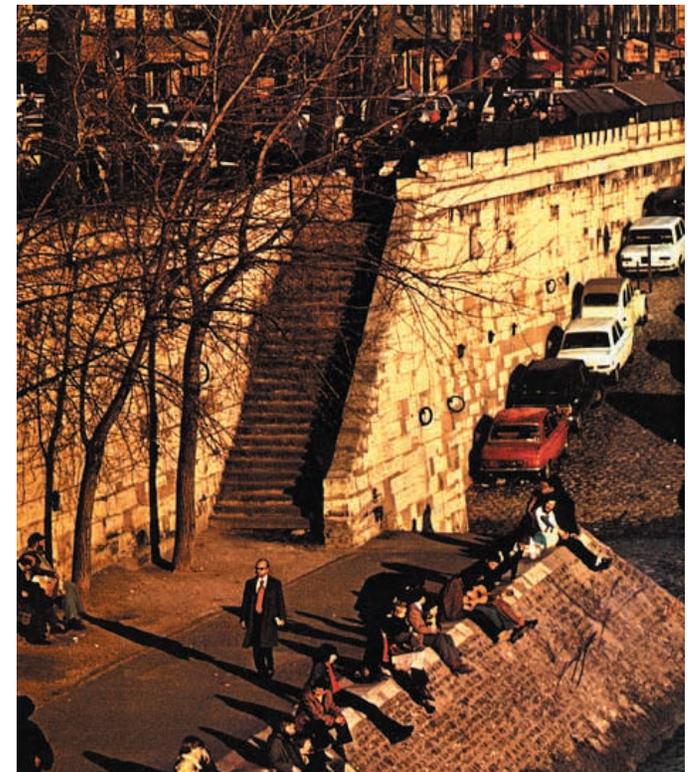
- Bayou lands are a heterogeneous mix of neighborhoods, calling for a recognition of context and area-specific actions.
- Projects that are mixed-use, rather than isolated single-use developments, create a sense of “place” for different kinds of users, allowing synergistic and diversified markets to evolve.
- Place-based thinking allows a focus on users’ needs and experiences, rather than a narrow focus on providing physical infrastructure.

The Urban Development and Design Plan is based on the following principles:

- Populate the waterfront by encouraging new housing, especially in Downtown and the East End.
- Encourage the diversity of urban residential opportunities – a variety of sizes, types and price points.
- Activate the waterfront by programming a system of linked destinations and special events.
- Create seamless connections to all neighborhoods and through Downtown via interrelated streets, sidewalks and walking trails.
- Coordinate waterfront development with new high quality urban infrastructural investments and amenities.
- Preserve historic assets – the City’s collective memory – through adaptive reuse.



Parisian Cafe illustrates orientation to activity on the street – or on the Bayou.



Despite steep banks, life on the Seine River thrives at the river edge and above.

Illustrative Plan - Project Reach

See:

Pages 68-69 for West End Illustrative Plan

Pages 72-73 for Downtown Illustrative Plan

Pages 80-81 for East End Illustrative Plan





US-59

EAST END

75th Street

PROPOSALS

Proposals for the Buffalo Bayou District respond to the widely varying conditions and requirements in each of the three areas – the West End, Downtown, and the East End. Specific proposals for each area are described below.

West End: A PARK WITH MANY MOODS

(Shepherd Drive to I-45)

Proposals for the West End comprise three broad initiatives:

- Improve Bayou Access
- Undertake Incremental Park Enhancements
- Encourage Compatible Bayou-front Development



Eleanor Tinsley Greenway incorporates and expands existing Parks in the West End.

Improve Bayou Access

(See Illustrative Plan, pg. 68-69).

The key concern inhibiting the use of this reach of the Bayou is limited and poor access to the existing greenway.

The Plan recommends prioritization of access to the Bayou park system from the historic Fourth and Sixth Wards, as well as from the park areas along Allen Parkway and Memorial Drive.

The following actions will improve access to the Bayou:

Provide Better Vehicular Access and Increased Parking:

- *Slip-off parking areas and drop-offs* on Memorial Drive near Shepherd Drive and Waugh Drive, and on Allen Parkway from Taft to Sabine.
- *A new five-acre lot* in the northwest quadrant of reconfigured clover leaf intersection at Waugh Drive, near Spotts Park.
- *New Municipal Parking* off Sabine Street located east and west of the Sabine Street Lofts.

Ensure Safe Pedestrian Access to the Bayou park system:

- *Shaded "Green" Streets*: These are streets connecting schools to the Park System on either side of the Bayou, through the neighborhoods they serve. In the West End these are: Shepherd Drive, and Durham and Sawyer Streets.
- *Pedestrian overpasses*: Historic neighborhood connections to the park trail system are recommended over the Bayou or over the Memorial and Allen parkways at Kane, Sabine North, Barber, and Taft Streets.
- *Extension and connection of the park trail system* is recommended from the Bayou to Spotts Park, Cleveland Park and Sam Houston Park.
- *Widened sidewalks and crosswalks* are recommended on all existing bridge crossings. Ramps and stairs connecting the bridge level sidewalks to the park trails are also recommended at Shepherd, Waugh, Studemont/Montrose, Taft and Sabine streets.

Strengthen Access from Future Bayou-side Developments: Currently, new projects are underway such as the New Federal

Reserve Bank. These and future Bayou-fronting projects offer an opportunity to provide safe and generous pedestrian access to the Bayou integrated into these developments. Inclusion of publicly accessible (shared) parking in such projects should also be considered.

Undertake Incremental Park Enhancements

(See Illustrative Plan, pg. 68-69).

A great urban park system provides a variety of settings for active and passive recreation. The existing greenway has community importance, which is diminished by the fact that existing amenities and treatments cater to a limited and divided (albeit growing) audience. Several incremental improvements are suggested to make the unique stretch of the Bayou a sequence of varied park places with amenities and moods ranging from active recreation, large and small gathering places, quiet introspective places, and wetland wilderness areas.

Key recommendations are:

Expand West End Park Areas:

- *Reconfigured intersection at Waugh and Memorial Drive:* About 17 acres can be added to park land with a redesign of the existing clover-leaf intersection. While the northwest quadrant (5 acres) can accommodate parking for park users, the northeast quadrant (4 acres) can be added to Spotts Park for active recreation, the southwest quadrant (4 acres) can be treated as expanded wetlands, and the southeast quadrant (4 acres) is envisioned as a new boat house and a widened cove for boating.
- *Study the feasibility of converting the capped municipal facility, west of Sabine Street (9 acres) into playing fields and parking for park users.*

Connect Adjacent Open Spaces to the Greenway and Trail system:

- *Strong pedestrian connections* to active recreation fields – Spotts Park and Cleveland Park (39 acres).
- *New pedestrian bridges* connect park trails on either bank of the Bayou, linking to the Police Memorial, another crossing the Bayou within Eleanor Tinsley Greenway, and a third reusing an abandoned rail bridge over the Bayou east of Montrose and

Studemont streets. A bridge near Walker Street, connecting the north bank trail with Sam Houston Park allows the municipal parking facility to be used by visitors to both Bayou banks.

Enhance Contact with Water:

The following improvements may be made incrementally to the park:

- *Small boat landings coordinated with parking/drop-offs* (See 4F: Water Based Activities) are proposed east of Shepherd Drive in Eleanor Tinsley Greenway, and at Sam Houston Park near the Hobby Center. In addition, a boat house and dockage is proposed east of Waugh Drive.
- *Expanded Wetlands* (See 4D: Landscape) are proposed along laid back banks at bends in the Bayou, including pockets of native habitat along less maintained banks, with boardwalk-decked trails skirting the bends.
- *Reintroduce historic drainage ways*, where possible, along with trail heads to the Bayou (See 4B: Environmental Quality and the Eco-region) as suggested on the north bank, between Shepherd and Waugh Drive.

New Park Concessions:

All park structures can house amenities for park users, such as boat rentals, art stalls, food concessions, public restrooms, ranger stations, interpretive stands and signage, and first aid posts.

Encourage compatible Bayou-front development

(Refer to Illustrative Plan, pg. 68-69; Chapter 7 - Next Steps: Guidelines and Local Area Plans).

Eleanor Tinsley Greenway has few vacant or undeveloped sites along its banks. While the major site for development is listed below, the plan recommends that each new project fronting the Bayou attempt to relate physically, and through its program, to this great civic space.

Redevelopment of the East Montrose site at the corner of Allen Parkway and Montrose Street offers opportunities to promote live-work use, and office space. Shared neighborhood facilities including structured parking are recommended for inclusion in the development program. The parking facility can be used on weekends for regional Bayou events along the Eleanor Tinsley Greenway.

Illustrative Plan - WEST END





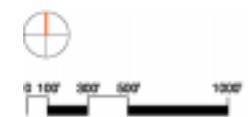
KEY

WEET END PLAN

- A. Improve Bayou Access
 1. Slip-off parking areas and drop-offs
 2. Shaded "Green Streets" connecting schools and neighborhoods to the Bayou
 3. Historic neighborhood connections to the park trail system
 4. Extend/connect park trail system from along Bayou to adjacent parks and cemeteries
 5. Widened sidewalks and crosswalks on existing crossings
 6. Ramps/stairs connecting bridge level sidewalks to park trails

- B. Undertake Incremental Park Enhancements
 1. Parking for park users
 2. Active recreation areas
 3. Expanded wetlands
 4. New boathouse and expansion of Bayou for boating
 5. Convert capped municipal facility to playing fields and parking
 6. New/improved pedestrian bridges
 7. Small boat landings
 8. Reintroduce historic drainage ways to Bayou

- C. Encourage Compatible Bayou-front Development
 1. East Montrose Redevelopment





A public promenade is proposed on the now-inaccessible edge of Bayou Island. Viewers look across Austin Street footbridge back toward Commerce Street.



Festival Streets are pedestrian streets on event weekends.

Downtown: AN ACTIVE MIXED-USE WATERFRONT

(I-45 to US-59)

Key concerns limiting the potential of nearly 400 acres of land along the Bayou's Downtown reach as a residential, retail, leisure, and work environment, include:

- Frequent damage to property as a result of flooding.
- Uses incompatible with the active use of the waterfront, such as parking lots and underused or vacant sites.
- Few vantage points to view the Bayou or identify its course through the City.
- Limited public access to the banks and edges along the waterfront.
- Frequent crossing of the Bayou by roadways, effectively reducing its attractiveness to pedestrians, and reducing the visibility of the Bayou itself.
- Poor access and context to potential development sites.
- Limited retail and recreational options along the waterfront.

New Downtown infrastructure needs to be addressed in a uniquely urban way, as each recommended improvement is interrelated. For instance, a project improving floodways also impacts the quality of pedestrian and vehicular access, both of which in turn directly affect the development potential of adjoining tracts, and indeed the image of all downtown. The recommendations listed below emphasize the need for each investment in Downtown to be multipurpose, tailored to the larger vision of a high quality public waterfront, a great place to live, visit, and work.

Key proposals for Downtown are contained within four broad initiatives, to:

- Create a high amenity urban waterfront with distinctive bank treatments and visible water channels, with ample landings for water activity.
- Build a pedestrian-friendly street network.
- Promote high quality mixed-use development along the improved Bayou-front.
- Promote adaptive reuse and restoration to reinforce historical associations of the Bayou and tell the "Bayou Story".

Create a high-amenity urban waterfront with distinctive bank treatments and visible water channels

(Refer to Illustrative Plan, pg. 72-73. Also, sections 4C and 4D).

Plan improvements are likely to result in a significant reduction in flood impacts when completed. At Main Street, a future 100-year storm event (similar to Tropical Storm Allison), would hold the peak water level nearly 8.5 feet below that seen

during Allison in 2001 (See section 4C: Flood Management.) This additional safety margin promises not just local but metropolitan-area flood benefits. Rising floodwater upstream on White Oak Bayou can be conveyed without deterrence through the Downtown area, thus reducing flood impacts in these upstream neighborhoods, thereby contributing to a more effective regional stormwater drainage system.

The distinctive urban places proposed below will simultaneously result in improved flood ways (by increasing conveyance capacity, reducing head-loss and channel constrictions):

Provide sloping Bayou-fronting parks that permit generous access to the water's edge and improve conveyance capacity during storm events:

- *Festival Place (Theater District Expansion North):* A new eight-acre park is proposed across the Bayou from Sesquicentennial Park fronting the existing Post Office site. Festival Place Park, with its grass-banked and live oak-shaded amphitheater will frame the memorable Downtown skyline as a backdrop. The expansive bowl will encompass Sesquicentennial Plaza across the Bayou in its most generous reach. Festival Place, a new outdoor venue for the Theater District and a central site for Houston's international festivals, will enhance and enrich street life and celebrate the City's diversity.
- *Sesquicentennial Park:* Plans for Festival Place build upon the first major Bayou-front improvement in Downtown at Sesquicentennial Park. Facing each other on the Bayou, together they will form the new center of the Theater District, surrounding Buffalo Bayou.
- *Allen's Landing:* The historic Bayou gateway to the Skyline District and the Main Street Corridor, Allen's Landing, will be once again a key destination for Houston. The restored Sunset Coffee Building is proposed as the central Visitors Center for Buffalo Bayou, and can house amenities such as boat rentals, art stalls, food concessions and public restrooms.
- *Championship Park:* Existing parkland around the historic Willow Street Pump Station is envisioned as the University of Houston Downtown's (UHD) eastern extension into the Arts District. The park's new treatment can respond to improvements related to the new Allen's Avenue bridge (which replaces the existing railroad right of way) to the south, and the North Canal quay to the north, at the confluence of White Oak Bayou. The park will be ideal for holding outdoor gatherings for UHD, which will also reuse the Pump Station building.



Broward County Performing Arts Center, Florida

Theaters illuminate the city and water edges at night.



WaterView, set dramatically against the backdrop of Houston's skyline, is a destination featuring recreation and entertainment on the streets and on the waterfront.

Illustrative Plan - DOWNTOWN



KEY

DOWNTOWN PLAN

- A. Create a High Amenity Urban Waterfront with Distinctive Bank Treatments and Visible Water channels
1. Festival Place
 2. Championship Park
 3. McKee Street Park
 4. Commerce Street Promenade
 5. Gable Street Landing
 6. North Canal
 7. South Canal
 8. New wide-span Bayou Bridges
- B. Build Pedestrian Friendly Street Network
1. Reconfigure Highway ramps into Downtown Streets
 2. New Frontage Streets ensure "front door" access to water fronting sites sites on channels
 3. West Festival street
 4. North Festival Street
 5. Crawford "Super" Boulevard
- C. Promote High Quality Mixed-Used Development along the improved Bayou-front
1. Theatre District expansion
 2. Allen Place
 3. North Canal Neighborhood
 4. South Canal Neighborhood
- D. Promote Adaptive Reuse and Restoration to Reinforce Historical Associations of the Bayou
1. Sunset Coffee building
 2. Historic District
 3. Arts District
 4. Industrial Artifacts

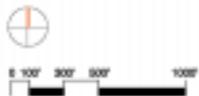
- *Frostown Urban Garden (James Bute Park)*: With the removal of the aging Elysian Viaduct that bisects it, the 12-acre Frostown Garden affords promontory views westward over the new North Canal quays, and back to the Gable Street Landing and the Downtown skyline. The garden is imagined to be a dramatic opportunity for the outdoor exhibition of art, sitting as it does at the threshold of the Downtown Arts District to the north. Its steep banks can be stabilized and planted to accommodate greater flows in storm events at the confluence of the North Canal and the main channel.
- *McKee Street Park*: A sloping seven-acre neighborhood park on the Bayou's north bank at the head of Elysian Street, across from the Frostown Garden, is pictured as an intimate neighborhood park for the Arts District and the Elysian neighborhood community.
- *White Oak Wetlands Park*: This new 12-acre park can anchor habitat restoration efforts along White Oak Bayou above the junction with Buffalo Bayou, and provide a waterfront recreational amenity for the Near Northside neighborhood.

Create Urban Terraces to permit activities responsive to varying water levels in constricted reaches:

- *Commerce Street Promenade*: The Bayou reach immediately downstream of the confluence of the White Oak and Buffalo Bayous is the most constricted flood channel in Downtown. By eliminating some damaged existing structures and eroded parking lots on the north side of Commerce Street, Downtown's presence on the Bayou can be significantly improved.

The new live-oak shaded planted slope forms the north side of the half-mile long Commerce Street Promenade which will be the focus of the Downtown Festival Street network, a connector but also a destination in its own right. Wide and spacious, offering a continuous vantage overlook of the Bayou Downtown, it connects two key Bayou portals, Allen's Landing – gateway to the Skyline District and the Main Street Corridor – and the ne Gable Street Landing, gateway to the Convention Center District. Commerce Street Promenade, with a range of street-level retail along its southern edge, is planned to provide an activated link between these new regional destinations.

- *Gable Street Landing*: As the Bayou gateway to the Convention Center District, Gable Street Landing will overlook Buffalo Bayou at its widest reach. This key location at the head of Crawford Street forms an inviting link between the





Gable Street Landing reveals a new view of the Bayou's Downtown frontage.

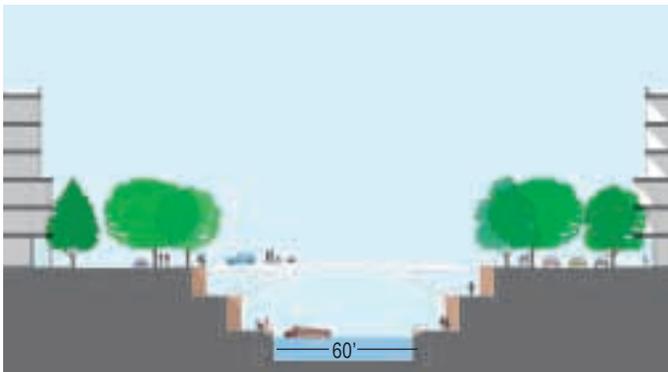
waterfront and the Convention Center District. Gable Street Landing is programmed as a second regional destination to complement Allen's Landing (gateway from the waterfront to the Theater District and Main Street). The bank edge is treated as a flight of great urban steps (such as the Spanish Steps in Rome) linking the street level to the mean water line 35 feet below. The resulting landing faces north aligned with a bend in the Bayou, offering a natural landing also creates a transition from the Bayou channel to a possible future South Canal. A microclimate may be created by an array of fountains cooling the air and mitigating highway traffic noise.

An adaptive reuse of the Gable Street Power Station creates an entertainment anchor to the north on the east bank of Buffalo Bayou. A civic use such as a Downtown museum, opposite on the west bank, creates a new visitor destination on Bayou Island. Two bridges near Gable Street Landing, one at Austin Street and another at new Allen's Avenue bridge to McKee Street (replacing the existing railroad bridge), would permit pedestrian circulation all around the Bayou elbow.

Create Supplementary Channels with quays that enlarge conveyance capacity at the confluence of the White Oak and Buffalo bayous:

New canals will provide supplementary floodwater capacity to Buffalo Bayou, offering new protection from traditional flooding hazards. It is recommended that the proposed alignments be reserved to accommodate future canals while implementation steps are taken. As a sensitively designed amenity, the supplementary channels minimize flood risks Downtown, in addition to creating new urban edges that form recreation and activity spines within vital waterfront neighborhoods.

- *North Canal:* The 1,300-foot long alignment runs through an existing bus staging area. The canal section is a three-tiered quay connected by a system of stairs and ramps. The hardscape is envisioned as treated with high quality stone finishes that age and weather gracefully, suitable to the central urban reach of Downtown. The terraces would be finished with high quality streetscape, lighting and artwork, to accommodate temporary, seasonal, and permanent pedestrian amenities including cafes and restaurants, open-air markets and exhibitions.
- *South Canal:* The 4,000-foot long and 200-foot wide alignment runs from Gable Street Landing through Guadalupe Plaza to Guadalupe Landing, along Jensen Drive. The canal section varies along the reach to maximize use of road frontage on the east side and the reconfigured Guadalupe Park along the west side of the canal. A sheltered docking edge is proposed at Guadalupe Landing for small craft.



Typical section through North Canal.

Build new wide-span Bayou Bridges to eliminate floodwater head-loss from existing bridge structures and to minimize covering of the Bayou :

- *Distinctive new bridges*, with generous sidewalks and lighting, are imagined to replace existing bridges at Louisiana, Milam and Travis and San Jacinto Street (Refer to section 4C: Flood Management, and 4E: Transportation). In addition, two new bridges (replacing existing railroad bridges) are proposed for the new Allen Avenue, and a new pedestrian bridge from Austin Street to the Bayou Island at the Commerce Street Promenade.

Build a pedestrian-friendly street network

(Refer to Illustrative Plan, pg. 72-73, section 4E: Transportation, and 4D: Landscape).

Mixed-use shaded streets expand upon the Cotswold District program currently being implemented. Wide tree-lined pedestrian-oriented boulevards connect the Skyline, Theater, and Convention Center Districts and the Main Street Corridor, bringing people to the City's new focal point for recreational activity along a series of waterfront promenades. Shaded waterfront promenades provide a seamless link from Sesquicentennial Park to the new Festival Place and from a revitalized Allen's Landing to the new Gable Street Landing – the Bayou gateway to the Convention Center District.

Key recommendations include:

Reconfigure highway ramps into Downtown streets before they cross the Bayou:

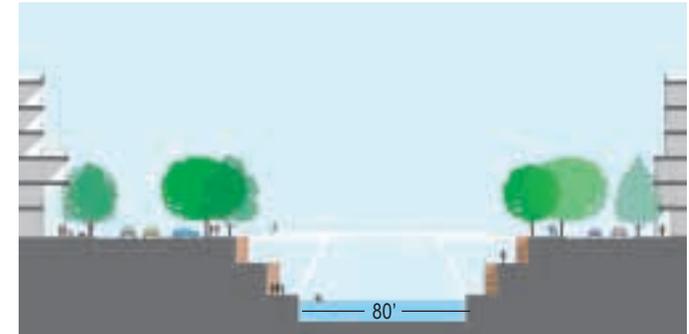
In order to extend the Downtown street grid and permit high quality street-fronting development on both sides of the Bayou, it is recommended that the following highway ramps be targeted for physical and operational reconfiguration to become important downtown streets:

- *Highway ramps that land/take off from:* Smith, Louisiana, Travis, Milam, Jackson, Chenevert and Hamilton Street.

New frontage streets ensure “front door” access to water fronting sites on both sides of all water channels:

The following frontage streets are recommended to be built/improved in order to create a supportive hierarchy of streets on both sides of proposed water channels:

- *New Allen Avenue* (replacing the existing railroad ROW).
- *Commerce Street Promenade* (remove parcels on its north side).
- *New Water Street* (connecting Smith, Louisiana, and Milam Streets on the south side of the Bayou).



Typical section through South Canal.



Festival Place and a festival street network host international festivals.



Water Street is a promenade in the original Allen Brothers' plan for Houston, reactivated in the revival of the Bayou waterfront.



Section through Crawford "Super" Boulevard.



Covered streets: Galleria of Milan.



Canvas shaded streets, Seville.

- *New Wood Street and New Willow Road* (on either bank of North Canal).
- *Ruiz Street and Commerce Avenue* (on either bank of the South Canal).

Destination Festival Streets enliven the waterfront:

A network of select streets connects the main destinations of the downtown waterfront to the Theater District, the Skyline District, the Convention Center, and the new North Canal neighborhood in North Downtown. Shaded and inviting to walk, these "preserves for the pedestrian" can be occasionally closed to traffic, even a few lanes at a time, serving as a stage for impromptu street theater and such regional gatherings as international celebrations and special conventions (Page 78).

- *East Festival Street:* stretches from Allen's Landing to Crawford along Commerce Street; to South Festival Street from Gable Street Landing down Crawford past the Ballpark to the Convention Center.
- *West Festival Street:* runs from Allen's Landing along the "new" Water Street, itself revived from the original Allen Brothers Plan (See illustration), to Sesquicentennial Park and on to a restored and expanded Sam Houston Park located to its south, and across the Bayou to Festival Place to its north.
- *North Festival Street:* connects Commerce Street Promenade and Allen's Landing to the North Canal Neighborhood and existing Arts District beyond.
- *Crawford "Super" Boulevard:* Beginning at Gable Street Landing, the Bayou portal to the Convention Center District, the wide and tree-lined "super" boulevard can feature live-oak shaded pedestrian malls on either side of a bi-directional street leading inland to the Convention Center. At its head near Gable Street Landing, an arching parabolic system of mechanical awnings is envisioned to herald the Bayou and the Convention Center District in either direction, enclosing and shading the boulevard with retractable canvas shades. The archway would hover over a new retail destination, reminiscent of the remarkable Galleria Vittorio Emanuele II in Milan, or the billowing canvas awnings shading the streets of Seville, Spain.

Promote high quality mixed-use development along the improved Bayou edge

The Plan envisions a new 24-hour Buffalo Bayou District encompassing the project scope area with a mixed-use WaterView district, at its center. In contrast to the business focus of the downtown Skyline District, the mixed-use WaterView district offers recreation and entertainment on the streets along the historic waterfront, set dramatically against the high backdrop of Houston's unique skyline.

New redevelopment can be coordinated with new infrastructural investments and amenities through careful design. Growing concerns about flooding along Buffalo Bayou's banks downtown have largely prevented high-quality development from activating the waterfront. Plan solutions addressing flooding include supplemental flood channels that will carry floodwaters from Buffalo Bayou and White Oak Bayou through their downtown reaches without flooding the banks (See Section 4C: Flood Management). The Plan proposes a design for these water channels that is sympathetic to both development and nature, providing a recreational resource for residents and visitors, and refuges for water-based life.

As these new high-amenity waterfronts are created, new redevelopment will be drawn to sites near their banks – neighborhoods that can be both intimate for residents and stimulating for visitors. The key Downtown development sites are as follows:

Theater District Expansion: Enlarging the Theater District across the Bayou will create a cohesive arts and cultural destination for local and regional visitors, an important step in raising the tourist profile of the City, and enhancing its attractiveness as a convention destination. Two key areas are identified for redevelopment on either side of Buffalo Bayou. The Theater District expansion to the north centers on redevelopment of the Post Office site as a new high-amenity mixed-use Quarter. A new concert hall is possible on this site, complemented by a range of uses including varied residential types, creating the potential for a strong new downtown neighborhood.

The Theater District expansion to the south offers contiguous growth of the existing District along a new Water Street. Significant open-space improvements centered on Buffalo Bayou create a signature address for complementary mixed-use redevelopment.

Allen Place: There is potential for a mixed-use landmark project at the head of Main Street overlooking Allen's Landing, terminating the commercial axis of the Main Street Corridor. This high-value location at the intersection of the Buffalo Bayou and Main Street has been earmarked for academic expansion by the University of Houston. To utilize its key location, retail opportunities on lower floors combined with a range of public amenities should be possible, starting with a generous public plaza facing Commerce Street. This mixed-use vitality could benefit the users of the University facilities and visitors to the waterfront.

Gable Street Landing: Gable Street Landing, at the head of Crawford Street where it intersects with Commerce and Franklin streets, and close to the Ballpark, is already the site of a proposed new housing development. As the Bayou gains in vitality, it will accordingly attract more residents.



LONDON

Theater District can offer a vibrant face to the Bayou along Water Street.



Allen Place and Gable Street Landing can have courtyards opening to Commerce Street, for a public ambiance suggestive of Rockefeller Plaza, New York.



Stepped-back edge on North Canal accommodates urban activity.

North Canal Neighborhood: The new supplementary floodwater North Canal creates a water frontage in the North Downtown area, also forming the new Bayou Island. The canal's urban edge defines a development spine, offering a range of residential, retail, and live-work development opportunities on its banks.

South Canal Neighborhood: A second supplementary floodwater canal flows east from Commerce Street bend and rejoins the Bayou west of Jensen Street east of US-59. It defines a key development spine providing an elusive link, leading development and employment opportunities from the growing Ballpark neighborhood to undervalued sites in the East End. The South Canal will provide a continuous spine of urban amenities and treatments from Commerce Street Promenade, under highway I-59 into the East End, to create 120 acres of new downtown waterfront property.

Elysian Park: This site located along Elysian Street on the north bank of Buffalo Bayou offers opportunities for adaptive reuse of existing warehouses as live-work and business incubator space. Waterfront sites across the Bayou from James Bute Park are suited to redevelopment as mid-rise condominiums, taking advantage of excellent views of the water and the Downtown skyline.

Promote adaptive reuse and restoration to reinforce historical assets of the Bayou

Houston's historic district follows its waterfront, reflecting the city's historic connection to Allen's Landing. Many of its historic assets, however, are dispersed throughout the future Buffalo Bayou District. Indeed, many historic assets have been lost, and some of those that remain are in danger, as they lose the battle against competing demands for advantageous locations. In the North Downtown area, adaptive reuse, by converting historic warehouses to loft apartments and studios, has preserved these buildings for the present. Consolidating this entrepreneurial theme is key to preserving these resources for the future. Other more visible examples of civic-minded entrepreneurship abound: the new Ballpark incorporates the historic Union Station into its design, offering it pride of place, and activates it with a new program.

In general the Plan proposes preservation of key historic and community resources, favoring adaptive reuse where appropriate. It recommends a community process that defines value and selects its choices for preservation, and offers ideas for adaptive reuse. It also recommends a development process that incorporates and encourages such a community process into its design and development framework. Specifically, the Plan offers ideas for the following:



Minute Maid Field incorporates historic Union Station as its main entry.

The former Sunset Coffee Building This historic building is among the few surviving from Allen's Landing's glory days as a commercial gateway to the City.

Historic District: Houston's downtown historic district has the noted Market Square at its center. New infill development that relates to the scale of its venerable neighbors, while extending its program through adaptive reuse of the old building stock, will activate the historic district, bringing both residents and services in to the area, and turning it into a vibrant destination and cultural mecca.

Gable Street Landing: This new public area incorporates the Gable Street Power Station; its existing electrical infrastructure is relocated nearby.

Arts District: The historic warehouses of North Downtown have been primarily populated by artists and the community that serves them. Pioneers in the artists' community have attracted others, and a thriving arts culture now pervades the area, offering a destination for the present and future city. The Plan proposes the conservation of the Arts District and urges the City and the resident community to work together to consolidate this symbiosis.

Industrial Artifacts: The Bayou is replete with sculptural remnants of earlier heavy industry, which should be preserved or modified as industrial icons within parks along the Bayou between Downtown and the Turning Basin. It is also recommended that an historical inventory of existing structures be created, and that artists and architects be invited to compete for their potential reuse and stabilization.

East End: NEIGHBORHOOD REVITALIZATION

(US-59 to 75th Street)

Key concerns limiting this area's desirability as a residential, retail, leisure, and work environment, include:

- Uses incompatible with the active use of the waterfront, such as underutilized industrial sites throughout the East End.
- Few vantage points to view the Bayou or identify its course through the City.
- Limited public access to the banks and edges along the waterfront.
- Poor access to potential development sites.
- Limited retail and recreational options along the waterfront.



Houston's Magnolia Ballroom gives human scale to the Market Square block.



COPENHAGEN

Historic preservation on waterfronts increasingly turns to residential uses.

Illustrative Plan - EAST END





KEY

EAST END PLAN

- A. Develop Diverse Neighborhoods in WaterView East
 1. Live Oak Park
 2. Richardson Park
 3. West Jensen/ Bayou Vista Development
- B. Expand Buffalo Bayou park system eastwards to the Turning Basin incorporating Regional destinations and Institutional Anchors
 1. Symphony Island Performance Center
 2. Reconfigured Guadalupe Park
 3. Environmental Science Center
 4. Botanical Gardens at Lockwood
 5. Turkey Bend Ecology Park
- C. Improve Historic Neighborhood Connections to Bayou
 1. "Green Streets" to the Water
 2. White Oak Wetlands Park
 3. Kennedy Street Neighborhood Park
 4. Richardson Mall and Richardson Village Green
 5. "Green Streets" to the Water
 6. Enlarge Hidalgo Park with connections to the New Turning Basin Overlook Park
- D. Revitalize Industrial Parks in the East End
 1. Eco-Industrial Park



View of Richardson Mall, the shaded centerpiece of a diverse community.



Residential development can be designed to capitalize on water and skyline views. Richardson Park stretches along the north bank and Live Oak Park on the south bank of the Bayou.

New transit corridors along Clinton and Navigation Boulevards can be the force to guide new development eastward, extending the impetus from Main Street. Improved transit, beginning with dedicated bus-ways and light rail in the future, will provide a powerful incentive to eastward location of businesses seeking to meet residential requirements to attract workstaff.

A large proportion of new development is expected in the central area of the Buffalo Bayou District, in its mixed-use WaterView district. A number of high amenity neighborhoods bring vitality to both banks of Buffalo Bayou within the WaterView East District. The key proposals for the East End are contained within four broad initiatives, to:

- Develop diverse neighborhoods in the WaterView East District.
- Expand Buffalo Bayou park system eastward to the Turning Basin incorporating regional destinations and institutional anchors.
- Improve historic neighborhood connections to the Bayou.
- Revitalize industrial parks in the East End emphasizing high-tech and bio-tech companies and offering related new housing neighborhoods.

Develop Diverse Neighborhoods

New additions to neighborhoods must respect Houston’s diversity and blend with the old. Diversity enriches our lives, builds pride in our cultures and sub-cultures, and invites others to join in its celebration. Houston’s unique racial and ethnic diversity is visible everywhere – as its waterfront becomes more vital, its new neighborhoods will further its spirit and expression.

Mixed-income and mixed-use development will be encouraged in every neighborhood. These diverse neighborhoods will expand to the Bayou in the East End and Downtown on underutilized industrial sites, providing public amenities and access to the Bayou for their residents and visitors. Developers on Bayou sites must work with residents of adjoining neighborhoods to create expanded communities that are economically, racially and physically integrated, while providing amenities and services to all local residents.

Live Oak Park: At the end of North Live Oak Street, this site on the South Bank, converting underutilized industrial sites bordering the Bayou, can potentially offer low-rise multifamily apartments in a park setting.

Richardson Park: This key site across from Live Oak Park on the north side of Buffalo Bayou, serves as the gateway to the Bayou for the Fifth Ward. When all or some of this sizeable site becomes available, an appropriate design for a housing

community can be envisioned, including wide tree-lined green pedestrian mall laid along Richardson Street, parallel to the Bayou, forming a new axis linking sites on the east and west along the mall's length.

West Jensen/Bayou Vista Redevelopment: This area located West of Jensen Drive on the North bank of Buffalo Bayou is expected to be largely redeveloped as medium density housing. The northern part of the site may be best redeveloped as loft housing with a significant percentage of live-work units. The southern part of the site is well sited to capitalize on the views of the Skyline and the Bayou, encouraging mid-rise condominium and apartment buildings lining the waterfront. A consolidated open space and landings on the waterfront will be the focus of the southern grouping of buildings.

Alexan Redevelopment: Ongoing development projects, including Alexan Redevelopment at the former El Mercado location, need to establish open space linkages with the proposed Bayou park system and surrounding neighborhoods.

Expand Buffalo Bayou park system eastward to the Turning Basin incorporating regional destinations and institutional anchors.

(The improvements summarized below are discussed in detail in section 4-B: Environment; 4-D: Landscape; and 4-E: Transportation.)

Unique topographical areas have been earmarked for special destination uses with a regional draw, to be developed in concert with adjacent landward redevelopment:

Turkey Bend Ecology Park: Houston's gift to future generations will be the gradual regrading and naturalization of 340 acres of Bayou-fronting land, currently occupied by marginal or polluting industrial uses. Like Kew Gardens on the banks of the Thames, or indeed Memorial Park upstream on Buffalo Bayou, this reserve can be Houston's contribution to a continuous regional park system.

Texas and the greater Galveston Bay eco-region is now the largest bird-watching destination in the country, which generates \$1.5 billion in tourism dollars annually. The lands surrounding the Oxbow are ideal for creating wetlands and reservations of natural species, which provide an attractive Bayou ecology for naturalists, just a few miles from Downtown.

Botanical Gardens at Lockwood: The City's derelict Northside sewage treatment facility can be transformed into a botanical garden of regional importance. Within a series of greenhouses and shelters, the facility can house diverse flora and fauna as a centerpiece of an ecological reserve along the Bayou.



Enlarged habitat areas are a step toward a regional Eco-park



Turkey Bend Ecology Park integrates a set of unique parks into a regional destination.



Outdoor performances will draw people to the scenic setting of Symphony Island.

Symphony Island Performance Center: Programmed for audiences up to 25,000, this open-air but sheltered performance venue promises a scenic setting for outdoor performances and events during Houston’s temperate winter. Music performances including classical, jazz, and popular music, and the occasional dragon boat festival, crew race, and regatta, will draw people to this vantage location set with view of nature and water.

Improve historic neighborhood connections to the Bayou

Street and trail improvements and neighborhood parks have been identified to provide better pedestrian connections to the Bayou from residential neighborhoods.

Green Streets provide access to the water: It is essential that safe access to the open space amenities of the Bayou corridor be signaled by extensive street tree planting and bike path and sidewalk improvements. In the East End, the “Green Streets” connecting existing schools to the Bayou are: Lockwood, Hare and Leslie Streets (to Wheatley and Pugh Schools), 71st Street (to Edison School), Portland Street (to Burnes school), and Bringhurst Street (to Bruce School). In addition, boulevard improvements are suggested for Clinton Drive and Navigation Boulevard, and the head of the Sunset Trail along Hedrick Street.

Expanded Guadalupe Park: Guadalupe Plaza can be expanded and reconfigured when the South Canal flows through this area, making it more central to its neighborhood life. Graded banks at the Bayou with grassed amphitheater seating will create a Bayou-side viewing area for water-based events near the more linear park. Landings on both sides of the Bayou, with improved access up to bank-level amenities and parking, will attract greater recreational use of the Bayou.

West Jensen Landing/Bayou Vista Park: This new park lies across from the Guadalupe Park Landing on the Bayou’s north bank, and will connect new neighborhoods on the north bank to the Bayou.

Kennedy Street Neighborhood Park: Located along Kennedy Street, a new four-acre neighborhood-oriented park is proposed for the existing community north of Navigation Boulevard between Jensen and York.

Richardson Mall and Richardson Village Green: The redevelopment of Richardson Park is imagined as a system of street-defined open spaces for community use, which also link inland neighborhoods with the water.

Turning Basin Overlook Park: Imagined as a gateway to the Turning Basin, this proposed park will connect the existing Port Visitors Center with an enhanced Hidalgo Park. A new pedestrian bridge would connect new park areas on the



COPENHAGEN

Splashing pond adds water focus and fun to a neighborhood.

north bank to Hidalgo Park and the head of the Sunset Trail on the south bank. The combined Turning Basin Overlook Park would thus straddle the unique topography of the Bayou at the Port. Boat landings are imagined on both banks of the Bayou, serving both visitors and the residential community nearby.

Revitalize industrial parks in the East End

The Plan applies its key guiding principle of balancing conservation and development to all geographic sectors of the Buffalo Bayou District (See Strategic Plan 2022, pages 58-59). Existing industry in the East End is a vital source of employment to its residents, and must grow and evolve over time to meet the challenges of the new knowledge economy. A new Eco-Industrial Park is proposed for the East End, accommodating a mix of uses to support the lives of its workers, offering housing, recreation, and entertainment in conjunction with new industrial installations, while adding jobs, value, and competitive edge to regional participation in the knowledge economy.

Environmental Science Center: Specialized educational and research institutions make an important contribution to regional economies. Houston's Texas Medical Center, the largest in the world, is a key part of Houston's economy. A new Environmental Science Center, located at the eastern end of the Richardson Park site, can be an intellectual nucleus spurring the value-added transformation of the East End. As a pioneering institution focusing on green technologies, such a center might be constituted as a collaborative venture among local intellectual power centers, such as Rice University and the University of Houston. As a center for innovation, the Environmental Science Center can be the core of a larger Environmental Science Campus, inviting collaboration from corporate leaders, and attracting specializing industries to its environs, while offering a springboard for innovative start-up businesses and bio-tech enterprises.

PHASING

A number of key sites will anchor the revitalization of the Buffalo Bayou District. While concrete steps need to be taken now to define and launch the process of redevelopment of these sites, their build-out will occur as a gradual process. As a general guide, key

environmental and infrastructural moves catalytic to specific neighborhoods will generally need to occur two to five years before these newly developing neighborhoods acquire residents and reflect appreciable vitality. The time-line for activation of specific sites in the development plan can then expect to follow roughly the time-line for related environmental and infrastructural inputs by five years.

While a general timeline for the activation of key sites is listed below, detailed planning, a sequenced mobilization of resources for infrastructural inputs, and the process of reservation of land for development, infrastructure, and open space, need to occur in the immediate future – in the first two to five years. Peripheral lots within key sites may be redeveloped according to independent timelines, provided their redevelopment does not depend on infrastructural and environmental inputs necessary to activate the majority of lots within these sites.

Priority (5-10 years)

Houston Design Center
 Commerce Street Promenade
 Live Oak Park
 Richardson Park
 West Jensen Redevelopment/ Bayou Vista
 East Montrose Redevelopment
 Festival Place (Theater District Expansion North)

Medium-Term (15 years)

North Canal Neighborhood
 Elysian Park
 Symphony Island Performance Center
 Gable Street Landing
 South Canal Neighborhood
 Crawford "Super" Boulevard
 Theater District Expansion South
 Allen Place
 Environmental Science Center

Long-Term (20 years)

East End Eco-Industrial Park



B. ENVIRONMENTAL QUALITY AND THE ECO-REGION



Buffalo Bayou is a significant resource for Houston, Harris County, and the southeast Texas Gulf Coast. As an integral component of the natural ecological system of Galveston Bay, it is a critical resource for Houston's economy and recreation. For numerous environmental problems now apparent in all zones of the Bayou, The Master Plan proposes that a set of advanced and effective environmental solutions can come along *with* new growth and development.

Map of the Buffalo Bayou Watershed



- KEY
1. Green Bayou
 2. Halls Bayou
 3. White Oak Bayou
 4. Langham Creek
 5. Mayde Creek
 6. Buffalo Bayou
 7. Brays Bayou
 8. Sims Bayou

The existing environmental conditions of Buffalo Bayou bear little resemblance to its pre-settlement or native condition. Very little native wildlife habitat has survived.

Key concerns include:

- Hydraulic destabilization
- Poor water quality
- Unremediated brownfields
- Inadequate and inappropriate vegetated cover along Bayou banks, with invasive species displacing more ecologically valuable native species.
- Competing demands of recreation and wildlife habitat
- Urban heat-island related issues

The Environmental Plan proposes significant environmental quality improvements through a set of sequenced steps. The Plan does not propose that the Bayou can be restored to its native, pre-urbanized state. It does propose creating areas of environmentally rich habitat that are integrated into a regional system.

By minimizing environmental impacts of flooding, improving water quality, and increasing habitat, the Bayou – and the great increase in wildlife it will attract – will be key factors in drawing people back to the Bayou environment

PRINCIPLES

The Environmental Plan is based on the following principles:

- Moderating the time required for stormwater to reach the Bayou, and the quantity of stormwater put into the Bayou.
- Modifying the Bayou size to accommodate anticipated stormwater quantities.
- Addressing non-point sources of pollution throughout the watershed and at points of entry to the Bayou.
- Addressing point sources of pollution along the Bayou.
- Eliminating erosion along Bayou banks.
- Improving water quality.
- Providing habitat for migratory and resident species.
- Increasing diversity of native plant species along the Bayou.
- Creating habitats that are responsive to the urban hydrology of the Bayou.

Environmental Plan



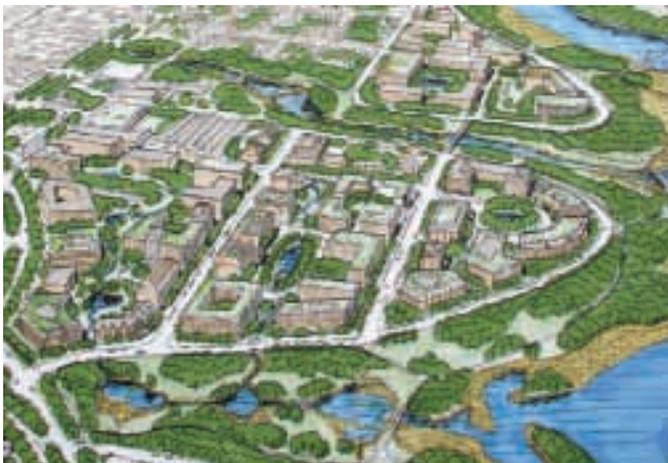
KEY

1. Green Fingers
2. Bio-engineered Bayou edges
3. New parks on underutilized industrial land
4. Low impact development techniques
5. Expanded wildlife habitat
6. Potential Bayou stabilization demonstration site





A proposed "Green Finger" contains a stream to channel runoff stormwater, a stilling pond to filter pollutants and catch silt, and a weir that contains the pond and aerates the cascading water. The edges of pond and stream are marsh with emergent wetlands vegetation such as cattails and sedge. The slowing runoff also purifies water and benefits wildlife.



"Green Fingers" hold and filter stormwater before discharge into the Bayou.

PROPOSALS

Master Plan proposals include:

1. Creating major and minor Green Fingers that apply passive techniques (such as treatment wetlands) to detain, filter and cleanse stormwater before it discharges into the Bayou, and to provide habitat, open space, and visual amenity.
2. Addressing bank erosion by reducing the factors that cause erosion, and by bio-engineering in areas requiring extra protection.
3. Establishing a coordinated approach to reducing trash accumulation in the Bayou with educational programs, debris traps at inlets and a regular trash pickup.
4. Converting remediated brownfields to parks.
5. Promoting the use of low-impact development techniques, using a variety of small-scale techniques to reduce and purify stormwater at the site level.
6. Expanding wildlife habitat by expanding and creating habitat areas, including new marsh areas, and replacing invasive species with native plants.
7. Initiating priority demonstration projects to test long-term impacts on Bayou morphology.
8. Expanding rehabilitation efforts to the regional scale by initiating a Regional Eco-Park.

Improve ecology and hydrology of the Bayou by creating "Green Fingers"

Historic research has shown that the Bayou once had many tributaries extending into the surrounding uplands. These are referred to as "Green Fingers." Proposed minor Green Fingers are approximately 25'-75' wide; major Green Fingers are 250'-1000' wide, and more. By rehabilitating these tributaries - and creating new ones - Houston can enhance access to the Bayou, reduce flooding of poorly drained areas, improve recreation, and create a system for stormwater retention and purification.

By greatly extending the edges of the Bayou, Green Fingers provide opportunities for parks and adjacent real estate development, thereby enhancing the potential value of surrounding properties. The wetland and riverbank (riparian) habitat of the Green Fingers will provide shelter for a variety of aquatic, wetland and upland plant and animal species. Trails and boardwalks will allow the Green Fingers to be important connections to the main Bayou.

Wetlands improve water quality: Improving the water quality of the Bayou is a central element of the Environmental Plan. Ideally, water quality improvements can address pollution at three points: at the source, along the drainage route, and at the end of the Bayou where it meets the Bay. Existing drainage outflows drain directly into the Bayou. Treatment wetlands created along the Bayou and new Green Fingers perpendicular to the Bayou will help filter pollutants from the water.

Constructed wetlands, combined with catch basins at stormwater inlets, sediment basins, and plunge pools, enhance water quality by removing certain nutrients and suspended solids and by reducing fecal coliform bacteria. Excessive nutrients, suspended solids, fecal coliform and tremendous amounts of coarse debris contribute to poor water quality in the Bayou.

Constructed wetlands can be integrated into other plans for the Bayou. These wetlands can include vegetated shallow and deep ponds and marshes, seasonally flooded and intermittently flooded wet and dry meadows and prairie areas. These constructed wetlands can also serve important aesthetic and habitat functions and provide recreational benefits including bird-watching and improved fishing.

Different types of wetlands reflect or respond to changes in the hydrologic regime of the Bayou. A wetland can be wet for as little as 14 consecutive days and have only saturated soils, such as a wet prairie. Or, a wetland can be permanently flooded with as much as three feet of water to support submerged, floating and emergent vegetation.

Beneficial bacteria associated with aerobic and anaerobic activities in the wetland provide important water quality treatment. Initial settling is the primary mechanism for water quality treatment. Soluble pollutants within the water column as well as coarse debris and sediments can be removed through extended retention in various ponds, pools, and wetlands. The utilization of various biological processes takes place by beneficial bacteria located on vegetation leaves and stems. The bottom sediments of constructed wetlands also provide a location for pollutant absorption.

New wetlands created along the Bayou and along the Green Fingers will help filter pollutants from the water. The roots, stems and leaves of wetland plants remove pollutants such as nitrogen, phosphorous, hydrocarbons and bacteria. Some sediments are trapped in wetlands plants, though care needs to be taken in areas of excessive sediment loading.

In protected areas such as the Turkey Bend Oxbow, water from the main Bayou channel can be filtered through the complex system of constructed wetlands, marshes and ponds in the Oxbow Wildlife Refuge to help reduce pollutant levels. Depressed dissolved oxygen can be another component of poor water quality.



Turner Collie & Braden

Prairie Slough - a prototype for new marsh areas along the Bayou.



Turner Collie and Braden

New wetlands areas will again provide rich wildlife habitat typical of a south Texas river in its natural unspoiled state.



Sediment deposits, often swept downstream after floods, require a regional solution.



Erosion of banks is a source of sedimentation, and a continuing concern for owners whose land abutting the Bayou is steadily disappearing.

High temperatures, excessive nutrients, and algal growth contribute to dissolved oxygen problems. Shading the water surface can help. Shading can be accomplished using floating aquatic plants, such as duckweed (*Lemna Sp.*), overhanging trees and shrubs, or even awnings and canopies.

A combination of measures addresses sedimentation: The heavy loads of sediments in the Bayou result from the region's erodible soils, constricted sites, intense storms and the extreme nature of its urban hydrology. Some of these problems can be addressed by regional approaches to erosion control, low- impact development, and stormwater management, while others are harder to solve. High levels of sediment can be expected in the Bayou for the foreseeable future.

Removing sediments from the Bayou water requires sediment basins on an enormous scale throughout the system. The size and impact of building and maintaining these basins would overwhelm the study area. Periodically removing thousands of tons of sediment from these basins would cause even greater disruption.

While the Green Fingers, Low-Impact Development and strict enforcement of National Pollution Discharge Elimination System (NPDES) standards will reduce sediment loads, they cannot eliminate them for the time being. A clear Bayou should be a long-term goal of physical and policy changes.

Sedimentation will pose a continuing problem for the Port of Houston, U.S. Army Corps of Engineers (USACE), and Galveston Bay users if the physical attributes of the Bayou are not carefully redesigned. A key strategy has been to maintain the existing channel while creating new wetland and riparian habitat zones in adjacent areas. Islands and peninsulas can separate the main channel from these new areas of wetlands and ponds. This will ensure that the bulk of the sediment flow continues to be directed down the main channel instead of being deposited in the new wetland areas. Extreme floods will inundate the new wetlands, but the proposed wetland plants are capable of growing through intermittent sediment deposits. Frequent, lower intensity floods and their sediment loads will stay in the main channel.

Further study and the construction of demonstration projects will be necessary to determine exactly how new riparian areas, wetlands and ponds should be designed to avoid the problem of excessive sedimentation.

With limited space along the Bayou, incorporating constructed wetlands, debris traps, plunge pools, and sediment basins at all inlets will provide incremental water quality improvements.

In areas such as Turkey Bend, water from the main Bayou channel can be diverted

and filtered through the complex of constructed wetlands, marshes and ponds to help reduce pollutants.

Water purification measures will work mainly during periods of normal Bayou flow. During floods, water purification will not work, but polluted water will be rapidly carried downstream. As in the low impact development and trash reduction programs, natural water purification in the Bayou will not solve the watershed's larger water pollution problem. But the educational and public relations role of these measures will help spread these techniques throughout the watershed, where they can begin to have a significant impact.

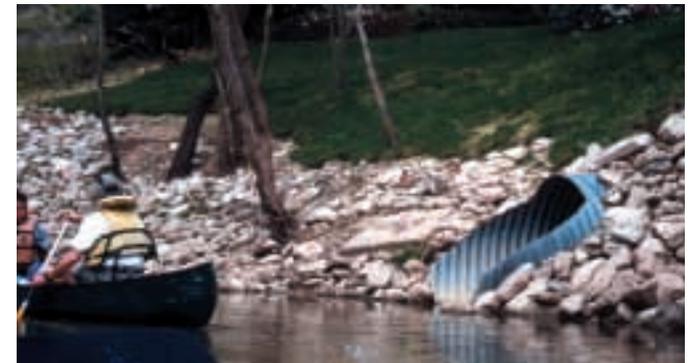
Mitigate flood impacts through bank-edge improvements

Stormwater runoff from existing and new sources can be rerouted into the upper reaches of the Green Fingers (see illustration on page 117) through surface canals, swales or stormwater pipes. In some cases, the water will flow 30 feet down to the Bayou through a series of stilling ponds, waterfalls, weirs and constructed wetlands. A series of stepped ponds created by weirs will allow the water to be filtered through wetland and for some of the sediment load to be deposited. The first several ponds in each series can be designed as sedimentation basins with mechanisms for periodic sediment removal. Later ponds can be more natural and feature submerged and emergent wetlands and overhanging bottomland trees. This series of pools would also aerate the water.

The Green Fingers will act to increase floodplain area, retain stormwater, and provide a measure of flood storage. The Green Fingers are an important part of the low impact development strategy for reducing the intensity and rapidity of runoff into the Bayou. New development runoff should be routed through the Green Fingers.

The primary sources of erosion on the Bayou are the amount of water flow and abnormal and rapid fluctuations in water level that scour the steep banks and erode the soils. Grading back the steep banks and addressing flood flows of the Bayou will reduce the Bayou's ability to erode away large amounts of soils exposed in steep cut banks. Less erodible soils, such as topsoil, in regraded areas will help reduce erosion by encouraging the growth of riparian plants and by buffering underlying sediments and clays.

Even though the proposed changes to the Bayou will greatly reduce erosion, some areas will need protection from high velocity flood currents. Locations such as the outer edges of meanders and sensitive areas such as wetlands will require erosion control protection. Bioengineering techniques using plants and natural techniques to stabilize erodible banks can applied to prevent erosion in these areas. This will



Efforts by individual landowners to stabilize eroding banks are only temporary solutions. Extreme water level fluctuations caused by release of reservoir surplus cause destabilization of trees, vegetation, soils, and even protective bank surfaces.



Reclamation of Bayou banks can combine environmental and recreational restoration with brownfields remediation to create new usable sites and open space.



Trash is a highly visible problem on the Bayou, exacerbated by floods.



Trash boom in Paris' Seine River catches floating debris in a removable trap.

Mike Garver

avoid expensive and damaging artificial cladding using riprap, steel pilings or concrete mats. Bioengineering is especially suited to this Bayou restoration strategy because it relies on plants with strong roots, grading, soil preparation and the use of biodegradable structural products to achieve erosion control goals.

In areas where structural bank stabilization is required, it should be applied with care and concern for its visual and environmental impacts.

Improve Bayou's visual and water quality through a regular trash pickup regimen

Trash is a serious and visible problem on the Bayou and must be addressed before it can become a popular public amenity. Many have agreed that the solution lies in a multi-pronged program actively involving both city and public entities, with a strong goal-oriented information program spearheading a community-wide effort.

Addressing trash requires a number of steps:

- Trash pickup programs must be initiated to remove existing garbage in and along the Bayou.
- Both increased public sector maintenance and community volunteer efforts must be in place with teams of trash removers in boats, along shorelines and in treetops, with elements stretched across the Bayou to remove floating trash.
- Efforts to stop trash at its source should include increased regional recycling, and placement of grates and catch basins at stormwater inlets.
- Leaf blowing into street inlets must be prevented.
- Fines for littering should be enforced.
- Physical devices such as floating booms at key trash influx areas, like large storm water outfalls, can work if staff is available to clean and maintain these sites.
- Awareness programs in schools can train young people to avoid trashing habits.
- Awareness programs among vendors of takeout products can communicate cleanup goals to consumers.

Fundamentally, the trashing of the Bayou will change when the Bayou is "owned" by more people. Increased residential activity adjacent to the Bayou will produce an ownership attitude that will work as an incentive for people to clean up trash in "their" Bayou. Houston's volunteer "trash bash" already in place could be strengthened through additional funding.

Region-wide enforcement of NPDES standards will also help reduce trash, pollution and sediments because the structures and techniques mandated by this program will make it more difficult for trash, pollutants and sediments to find their way into the Bayou. A clean Bayou must be the priority goal at all levels of action.

Add new park space through a prioritized brownfields remediation program

Many sites in the study area, especially in the East End, are likely to contain residues from past industrial use. Instead of treating this problem on a site by site basis, an opportunity exists to deal with the problem comprehensively. And, because the transformation of the Bayou banks requires the removal of large amounts of fill, a brownfields remediation program can easily be integrated into the process. Material excavated to flatten the profile of the banks can be treated to neutralize hazardous wastes before it is used as fill in other locations.

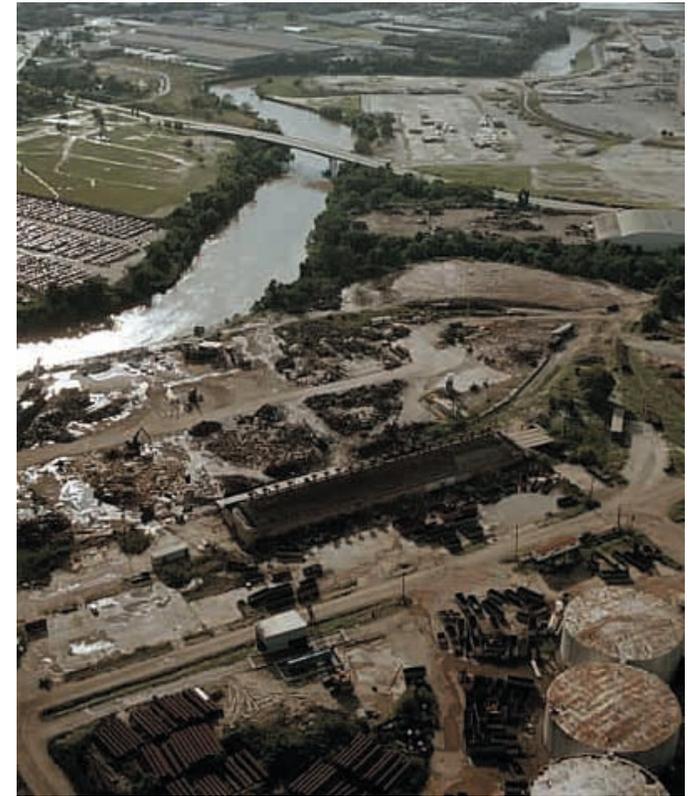
Rehabilitating brownfield sites offers an opportunity to deal with pollution problems on a large scale, in an efficient manner, and in conjunction with other benefits such as environmental rejuvenation, recreational development and flood mitigation. Coordinated by the City of Houston's Brownfields Program, federal and state resources can be important sources of funding and expertise for the Bayou renovation project. Remediated brownfields provide a unique opportunity for reuse as parks, thereby contributing new park space to the Bayou open space system.

Reduce impacts on the watershed through Low-impact development techniques

Low-impact development strategies rely on small, place-specific incremental techniques that together produce great effect. Environmental "low-impact development," for example, means managing water runoff locally through site, building, and landscape design, as well as through major and minor infrastructure. While each individual technique is small in relation to the watershed, the sum of their effects totals a significant change: "A Thousand Points of Water."

This Plan's low-impact development strategies advocate a variety of techniques to reduce and purify stormwater runoff at the source. By changing the way buildings, pavement and landscapes are designed and built, stormwater can be retained on site to reduce the intensity and volume of urban runoff into the Bayou. Rooftop gardens absorb stormwater and slow its flow to drainage structures at ground level. Underground storage cisterns store stormwater and slowly release it, reducing the volume and speed of urban runoff. Vegetated swales slow stormwater runoff and filter out pollutants. Porous pavement allows a portion of stormwater into underground detention basins. Bio-filters channel stormwater runoff from roads, parking lots, plazas, and pedestrian spaces below buildings into swales filled with plants where stormwater can be purified before draining into underground cisterns.

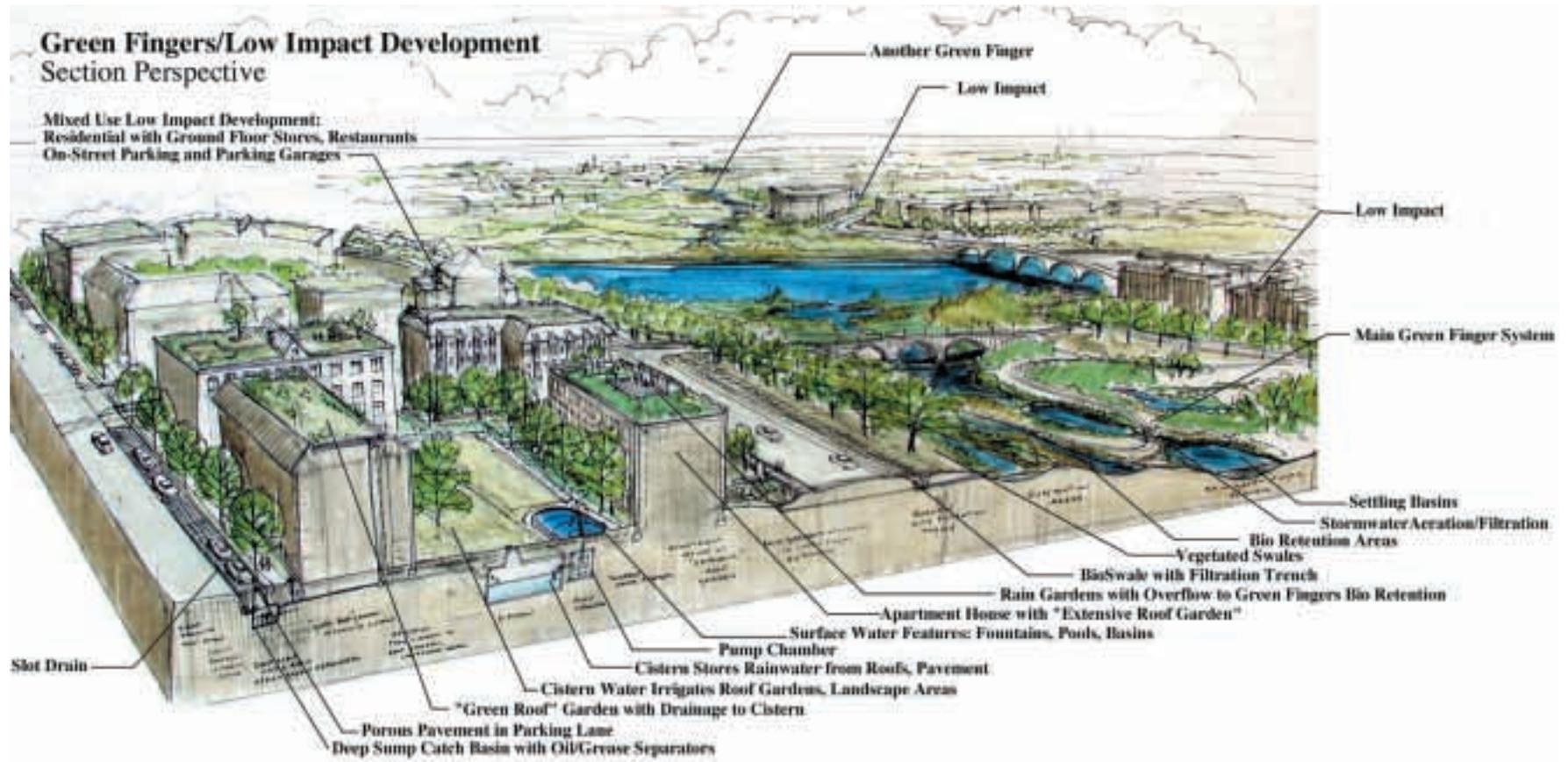
In Houston, treeless areas are often baking hot from April until October. For a large City in such a hot, humid region, downtown Houston is remarkably devoid of trees. The Master Plan supports ongoing efforts to correct this problem by undertaking

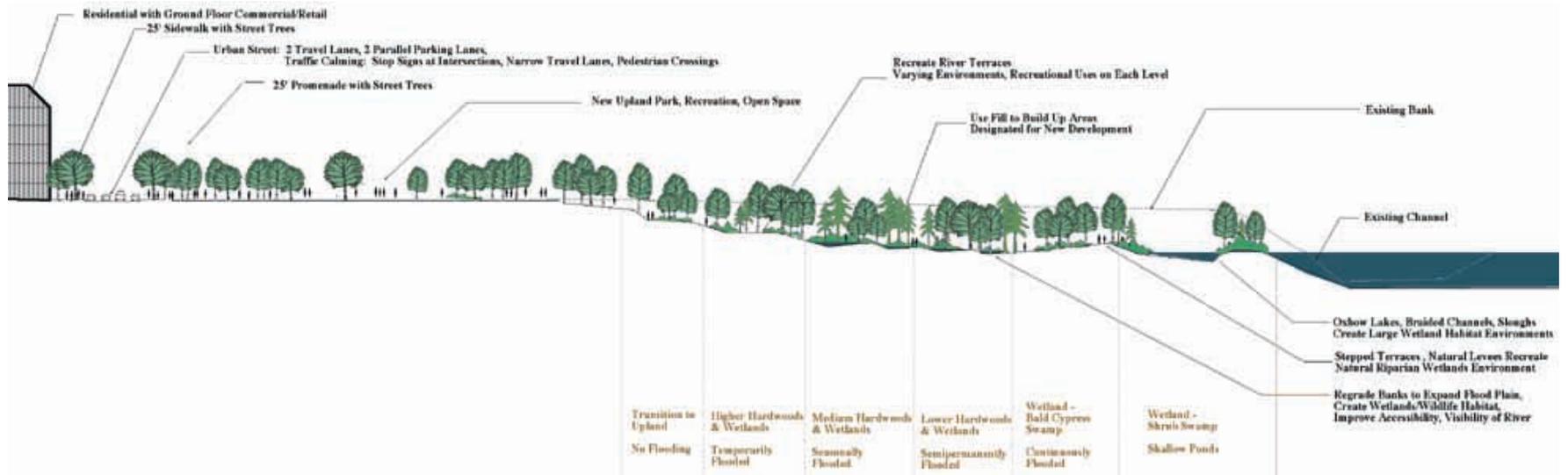


Many sites in the East End require environmental assessment and cleanup.



A rooftop garden on a Philadelphia school achieves "low -impact" water retention.





The varied ecological zones that once flourished on the Bayou can be recreated through reclamation, regrading and restoration of effective vegetation on the river's steep, sterile banks.



Stormwater detention and purification in an urban setting in Berlin, Germany (Potsdamer Platz, Herbert Dreiseitl).



Stormwater recycling in a town square, Hannoverisch-Munden, Germany (Herbert Dreiseitl).



Live Oaks provide shade and help mitigate the urban heat island problem.

an ambitious program of street tree planting (See Landscape Plan). The moderation of temperatures outside buildings can also be achieved through low-impact development techniques such as by planting roof gardens on all new structures. These gardens will reduce heat gain caused by dark roof surfaces while also retaining and purifying stormwater runoff. Reducing the amount of paved surfaces by using porous grass paving for parking lots, increasing wetlands and forested areas, and incorporating low-impact development measures in urban sites will help mitigate the urban heat island effect. Where rooftop gardens are not possible, light-colored roofing materials will reduce urban heat gain. Shade elements can also include awnings, vines around buildings, and covered arbors over parking areas.

Extensive use of fountains, waterfalls, cascades, pools and ponds will also help reduce urban temperatures. The problem with rainfall is the timing. Ideally, water can be stored during rains and released during hot weather. While causing an increase in local humidity, cool spraying water can create an important physical and psychological cooling effect. Designing outdoor spaces to encourage air flows recognizing prevailing wind directions can bring cooling breezes to outdoors.

Expand and enhance wildlife habitat by creating new habitat areas

Proposed improvements to the Bayou will create hundreds of acres of new riparian habitats for birds, aquatic species and mammals. The existing steep banks of the Bayou are relatively barren of wildlife habitat value. Grading back banks and creating new wetlands, terraces, ponds, and riparian vegetation will greatly increase the environmental diversity of the Bayou. (See Technical Report A: Environmental Quality and the Eco-region for current and potential wildlife species in the Bayou).

The Master Plan recommends creating large and small areas of diverse native habitats with ponds, oxbows and other Bayou wetland features. These habitat areas will shelter existing Bayou wildlife and attract more of the species that historically lived in and along the Bayou. The Bayou today still has considerable wildlife along the main channel. As recreational activity increases, wildlife that currently lives in or uses the main channel will need new, quiet, sheltered areas to escape human intrusion.

The Master Plan calls for the creation of relatively inaccessible wetland and riparian areas for such wildlife displaced by recreational activities in the main channel. Removing invasive plant species, creating physical conditions that healthy species need to survive, and planting native riparian and wetland plants, will enhance habitat value for wildlife. Improving water quality, reducing sedimentation and trash, and limiting nighttime light and noise pollution will help wildlife utilize the Bayou. Installing



Rainwater reflecting pool has cooling effect, on the whole street. (Copenhagen) Denmark.

nesting boxes, planting species rich in wildlife food and shelter value, and limiting human access to certain areas, will also help wildlife. Conditions along the Bayou in urban areas – such as the proposed flood control infrastructure – can be modified in a way that provides fish habitat.

Ample shade can be provided through plantings of riparian trees in areas where this will not interfere with boating and flood control. All areas of standing water can be deep and adequately circulated enough to support populations of species, like dragonflies and fish, that eat mosquito larvae. Mosquitoes are already in the area; there will not be a noticeable increase in mosquitoes as a result of these recommendations.

Balancing the needs of wildlife and people will be more challenging in the downtown sector. Narrow banks, high intensity of human use, bright lights and flood concerns will make it difficult to create extensive new riparian habitat in this area.

The Plan recommends keeping existing forested edges in downtown and incorporating more edges using native riparian vegetation into planted embankments and waterfront areas. Some new wetland habitats can be incorporated in hard-edge bank treatments as shown in the Landscape section. Wetlands plantings can be incorporated in hard-edge urban treatments, and native plants and habitats can be created on terraced slopes where human activities are less intense.

As Bayou banks are reconfigured, areas along the edges of the Bayou can be converted to low open marshland. Vegetation in these areas would consist of rushes, reeds and wetland grasses found in existing Prairie sloughs and other relatively undisturbed areas in the region. The advantage of the Bayou marsh is that it provides wildlife habitat without the trees and large shrubs that cause concern to flood control experts. The marsh also provides the visibility to the Bayou, allowing the Bayou to become a visually prominent open space feature in the landscape.

The Bayou is currently plagued by invasive trees and shrubs that choke its banks, reduce wildlife habitat value, and force out more productive native plants. These species can be removed and replaced with native plants (See Technical Report A: Environmental Quality and the Eco-region). Some of this removal can be achieved during the regrading of the Bayou banks to expand the floodplain and riparian area. Other areas not proposed for regrading will need to have invasive nonnative species incrementally removed. Non-invasive introduced species should be allowed to remain, since they do not pose a threat to the Bayou environment.



Turner Collie and Braden

Productive and attractive wildlife habitats and recreational areas can be expanded by reconstructing marsh land with native growth.

Address long-term stabilization by an evolving program.

An effective Plan will reduce the Bayou's extreme urban hydrology while adapting environmental rehabilitation efforts to realistic urban conditions, creating areas of environmentally rich habitat that fit into the modern dynamic of the Bayou system.

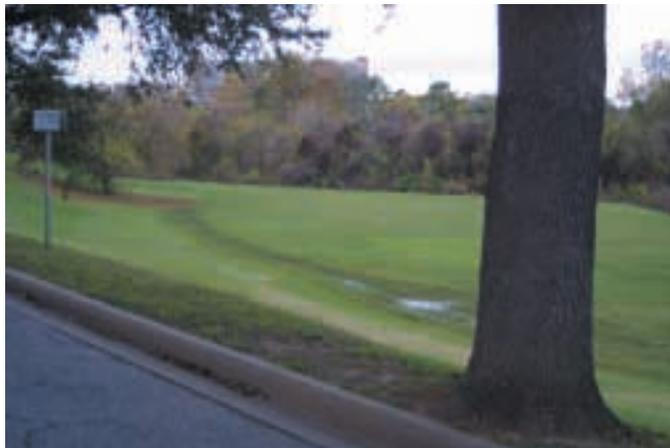
Strategies for creating a measure of the Bayou's former environmental richness and diversity – including expanding wetland and riparian habitat areas, restoring tributaries and ponds that have been filled in, improving water quality, reducing trash and improving the Bayou's hydrology – are all interrelated. The spine of these interrelated strategies is the Bayou itself. Its dynamic behavior over time will play a central role in the success or failure of environmental rehabilitation efforts.

Balancing wetlands and riparian habitat creation with more active human use areas is important. Plazas, terraces, waterfront landings, grassy meadows and active playing fields are proposed in high use areas with less potential for environmental restoration. New wetland habitat areas are proposed in areas that originally contained wetlands or tributary streams and in areas more removed from the downtown core. Abandoned industrial lands and brownfield sites are well suited to environmental restoration because a major reshaping of the land is possible.

The enhanced environmental quality of the Bayou – and the great increase in wildlife it will attract – will become a key factor in attracting people to the Bayou. A watershed management plan is essential in addressing issues of water quality and habitat.

Future changes to the Bayou need to be based on a thorough understanding of forces that shape the Bayou over time. If alterations run counter to the dynamics of the Bayou, they will not be successful – areas will erode or fill with sediment. The Bayou will shape its floodplain as the physics of the Bayou dictate. On the other hand, a successful restoration of the Bayou based on an understanding of the dynamic Bayou morphology will create a system adapted to the new urban hydrology of the Bayou and responsive to today's environmental, flood management and recreational needs. While fundamentally stable, this system can be designed to accept and encourage gradual evolution and flexibility based on the forces that make all bayous dynamic, evolutionary features.

Additional studies need to determine the exact effect these changes would have based on a detailed classification and assessment of the Bayou's morphological characteristics. Demonstration projects to experiment with various restoration techniques are recommended to test proposals in real-life conditions.



A potential riparian demonstration site seen from Allen Parkway.

Demonstration Projects: A demonstration project will help determine the feasibility and effectiveness of techniques that are, as yet, unproven on Buffalo Bayou. It is assured that the ideal site will consist of several acres on a parcel of publicly-owned land.

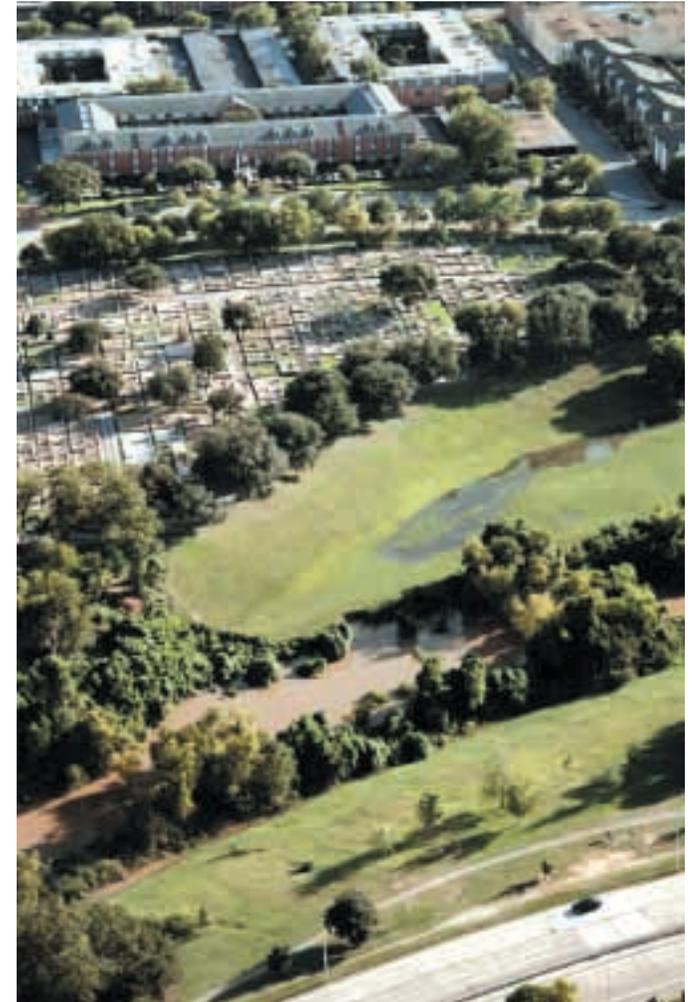
The demonstration project might consist of lowering the banks of the Bayou, creating constructed wetlands, new riparian habitats and ponds in natural water retention and treatment. Existing stormwater pipes can be channeled through the testing area in order to demonstrate the effectiveness of pools and ponds in natural water retention and treatment. The effects of erosion, sedimentation, and revegetation can be tested and monitored.

Educational Working Laboratories: As part of a larger public education effort, several sites can also be showcased as working laboratories for creating and refining “low-impact development,” as applied locally and throughout the entire Houston region.

The laboratory will conduct research and engage in education and public outreach. This allows the Bayou rehabilitation to become a catalyst for the spread of low impact development techniques throughout the region, creating the possibility for it to become a national model.

Ideally, the laboratory will be established along one of the new Green Fingers or at one of the riparian habitat rehabilitation sites. Elements featured may include the restoration of native Bayou wetland habitats, the use of sedimentation basins and stepped ponds to slow and purify stormwater, the use of bio-filters and vegetated swales to cleanse and slow runoff, demonstration roof gardens, cisterns, aeration waterfalls, and any number of other tools and techniques.

Exhibits would encourage visitors to return to their neighborhoods inspired to change the way their communities treat stormwater.



Aerial view of possible demonstration site for testing restoration techniques.



Environmental improvements require a regional approach.

A Larger View: Initiate a Regional Eco-park to expand rehabilitation efforts in ecosystems surrounding the Bayou

The task of preparing a Master Plan for Buffalo Bayou in Houston provides a framework and direction that recognizes and preserves the Bayou as an important resource for many functions – flood control, recreation, and environment. The Plan recognizes the Bayou’s important location as a spine for city parks, and as the threshold between open space corridors, west and east of the city. They represent a vast expanse of prairie, woodland, wetland, and open water habitats.

Physically linking the Buffalo Bayou project site to these major ecosystems offers a tremendous recreational opportunity as it establishes vital environmental linkages that serve to improve environmental quality and wildlife habitat of Buffalo Bayou.

A conceptual eco-region plan: The ecosystem west of Houston is associated with the Brazos River Complex. The ecosystem east of Houston is comprised of habitats associated with the San Jacinto River Complex. These ecosystems are of international and national importance because of their habitat diversity, quality, sheer size, and relative landscape position to the Central Migratory Flyway.

The Central Migratory Flyway is one of four major North American flyways. The others are the Atlantic, the Mississippi, and the Pacific. Birds generally migrate in a north-south direction as species travel between wintering grounds in South and Central America and breeding grounds in the United States and Canada. Houston sits under the Central Migratory Flyway. At least 237 bird species can be observed moving through this area. Annual population counts of 28 million individual birds are not unusual, species significant to commercial, recreational, and ecological interests. Therefore, this area is located within the Texas Mid-Coast Initiative of the Gulf Coast Joint Venture of the North American Waterfowl Management Plan.

Describing this region’s topography as flat and featureless is not technically accurate. The coastal prairie includes scattered low-lying wetlands, or prairie potholes, and scattered ridges dotted with trees – relative low and high areas representing subtle yet important variations in the local topography. There are also changes as dry upland prairies to the north transition through wet prairies of the south. These subtle topographic changes are reflected in changes in the region’s vegetation communities and habitats.

A significant vegetation community of this region is the Katy Prairie, part of the much larger Gulf Coast Bluestem Prairie. The vast inland prairie supports not only a diversity of birds but also plants with roots that extend six to eight feet deep. These



A regional park linking Houston’s ecosystems could be a world-class destination.

deep-rooted plants capture and infiltrate much of this region's high rainfall amounts. With an infiltration capability of several inches of rain per hour, it is likely that these prairie grass complexes once absorbed much of the water that fell on them.

The Katy Prairie, a vast open grassland, also contains streams and creeks such as Cypress Creek on the north and Oyster Creek on the south. These habitat areas contain open water areas of sloughs and oxbows, and meandering wooded floodplain areas that transition to the Brazos River. The Brazos River has a vast extent of upland and bottomland floodplain woods. It is this interface of open grassland and woodland that is a critical ecological feature.

A unique woodland habitat associated with the Brazos River is known as the Columbia Bottomlands, now officially named Austin's Woods. As a 170,000 acre-wooded corridor, it is approximately 50-miles wide as it extends from US-59 and the Katy Prairie to the Gulf of Mexico. The Katy Prairie, Oyster Creek, Brazos River, and the Austin's Woods Complex connect south to the Gulf Coast marshes and the Gulf of Mexico and create one large ecosystem. Portions of this ecosystem are preserved within the Brazos State Park and the San Bernard and Brazoria National Wildlife Refuges. Two significant factors that make this complex ecologically important are the biotic diversity of this entire system of open inland prairies, wooded habitats, and coastal marshes, and their location to the migratory flyway.

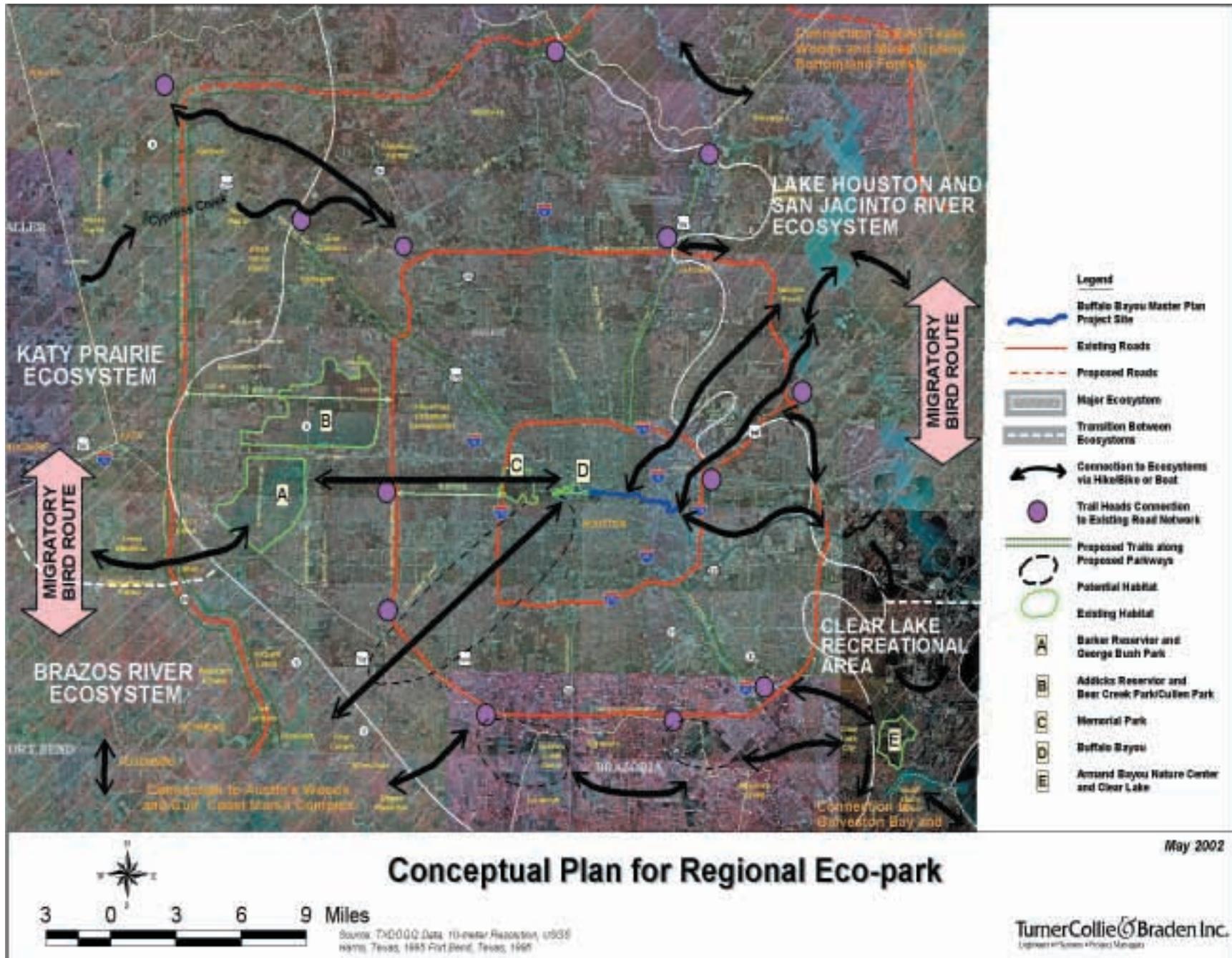
The pine and mixed bottomland hardwood forests of the northeast portion of the Houston area are a different type of wooded habitat from that found on the west side of the City. The San Jacinto River Corridor and Lake Houston are located in another vegetation zone. This zone transitions to the much larger mixed pine and hardwood deciduous forests that extend into the Big Thicket and beyond.

The Big Thicket is where the U.S. southern forest meets western and eastern forests, thereby creating 10 different ecological units all of which are contained within the Big Thicket. This area has more than 1000 species of flowering plants, 200 species of trees and shrubs, 300 species of birds, and 50 species of reptiles. Jones State Forest is an example of an accessible site where the endangered Red-cockaded Woodpecker can be observed.

Just east of the San Jacinto River corridor is the Trinity River Complex. This area, as with the San Jacinto River corridor, supports 189 species of trees and shrubs, 42 woody vines, 75 grasses, 800 herbaceous plants, 48 plant species of concern, 500 vertebrate species, and 273 bird species. Because of this rich diversity of plants and animals, the US Fish and Wildlife Service has a land acquisition program for the Trinity River National Wildlife Refuge.



Restored prairie grasslands can absorb rainwater and slow runoff that causes floods.



Both the Brazos and San Jacinto River Complexes flow through a vast extent of Coastal Marsh Complexes situated along the perimeter of Galveston Bay and the Gulf of Mexico.

The coastal marshes are essential in supporting healthy productive estuaries, the Bay, and the Gulf. They provide habitat for juvenile finfish and shellfish. From Sabine Lake (east of Houston) through to Matagorda Bay on the far west, the coastal marshes occupy roughly 680 square miles. Galveston Bay alone supports 13 species of shrimp, 17 species of crab, 150 species of finfish, and 139 bird species. According to Texas Parks and Wildlife, the Bay generates more than \$900 million in recreational economic benefits annually.

The landscape of the region and Houston's central location between these natural resources is a source of pride, and can be a center for ecological preservation and restoration, as well as an ecological destination of regional, national, and international importance.

The Plan proposes connecting the San Bernard and Brazoria National Wildlife Refuges through the Columbia Bottomlands/Austin's Woods, Brazos State Park and Brazos River – Oyster Creek Complex, through the Katy Prairie and Cypress Creek over to Spring Creek and into the San Jacinto River bottomlands and Lake Houston area, to the Trinity River System and into the coastal marshes of the National Wildlife Refuges and Galveston Bay – with the City of Houston and the Buffalo Bayou Master Plan project site at its heart.

Interpretation and Education

The renovated Bayou offers many opportunities to tell the story of the river's history, natural environment, culture, industry and folklore. Interpretive plaques and exhibits at key points such as bridges, overlooks, waterfront access points, pavilions, and terraces can describe the history, culture and environment of each site. Interpretive plaques can be incorporated on the exterior of new buildings and pavilions.

Interpretation will be an important element of guided boat tours. Exhibits relating to the Bayou's rich commercial history could include exhibits, sculptures or living recreations of the busy 19th century waterfront. Special events and festivals could mark the anniversaries of key Bayou events.

Interpretive and educational exhibits will not only attract visitors to the Bayou, but will raise consciousness of the Bayou's historical role as Houston's "front door" and its continuing value as an environmental resource to all of Houston's residents.

Prototypes for Accomplishing Large-Scale Improvements: A "City Conservation Corps"

The necessary improvement of the many orders of problems along the Bayou adds up to a program of enormous magnitude. While the whole community of the City of Houston and the metropolitan region has a stake in bettering the environmental quality of its principal waterway and its transformation into an attractive and usable public amenity and source of enjoyment, there remains the obvious question:

Who will lead the transformation, and who will actually do it?

This transformation can take place over time as a civic conservation project on the scale of historic, important American public works projects that have engaged both conservation leaders and corps of volunteers working together. Major engineering, infrastructure, and land-moving preparations are usually undertaken by Public Works and Parks Departments under City authorization. Following up, crews of volunteers could work in Task Force groups to assist qualified environmental scientists, naturalists and team leaders in the numerous tasks of restoration and replanting.

From such involvement, volunteers gain both direct knowledge – of effective hydrology design, plant forms, habitats, and best environmental practices for restoring ecological functions – and the satisfaction of being part of a dedicated "City Conservation Corps" making lasting changes towards a sustainable city. Task Force volunteers can be organized through various organizations and institutions. Company service groups, clubs, churches, schools, and colleges all have vested interests in a better Bayou. A large and willing labor resource is available, as other urban experiments have proven.

For example, in St. Paul, Minnesota, the replanting of the Mississippi bluffs as well as the entire Harriet Island in the river between east and west downtown has been accomplished this way. Since 1995, 35,000 sapling trees and native shrubs have been planted by 10,000 volunteers, working under supervision in program segments prepared by the Parks Department. This "Great River Greening" stewardship program is ongoing in St. Paul in 25 restoration projects, with plantings of trees, shrubs, wildflowers and grasses continuing along river banks and on prairies. Houstonians' pride and investment in their own region could lead to even greater accomplishment in Texas.

PHASING

Priority (2-5 years)

- Pick up trash along the Bayou.
- Install coarse debris traps at Bayou inlets.
- Address watershed debris source with field efforts, education, etc.
- Establish a non-point source enforcement program as a city and county initiative.
- Address point sources of pollutants along Bayou, such as brownfields.
- Address bank erosion, to begin minimizing sedimentation and creating habitat.
- Integrate with stormwater management, i.e. reducing quantities and flow velocities.
- Establish a plan for the overall Bayou; implement it in feasible, affordable phases.
- Initiate a demonstration project.
- Improve existing habitat.

Medium-Term (5-15 years)

- Address stormwater management. Develop a watershed management plan integrated with erosion control and habitat.
- Increase floodplain, flood conveyance and flood detention areas.
- Decrease quantity and velocities of water.
- Begin creating new habitat.
- Create “Green Fingers,” one at a time as areas (i.e. brownfields) redevelop.
- Coordinate improvements for medium-term parks.

Long-Term (15+ years)

- Clean up water quality to make it fishable and swimmable.
- Expand treatment wetlands and other features.



C. FLOOD MANAGEMENT PLAN



Frequent flooding of the bayous in the urbanized core of Houston results in substantial property damage and even loss of life. Tropical Storm Allison caused nearly \$5 billion in damage regionally. These impacts result from urbanization that has encroached on the naturally absorbent flood plain, reducing the bayous' ability to drain stormwater swiftly. The Plan addresses flood protection of both upstream and Downtown.

Table 1: CRITICAL BRIDGES ANALYSIS

Bridge Groupings listed in order of decreasing impact on flood levels

Group 1

- Houston Belt and Terminal R.R. – upstream of Jensen Drive
- McKee
- San Jacinto

Group 2

- South Pacific R. R. - upstream of McKee
- Fannin
- Preston
- Congress
- Capitol

Group 3

- Louisiana-Franklin Intersection
- Bagby
- Memorial Drive – East Bridge

Group 4

- Travis
- Milam
- Smith
- Prairie
- Rusk
- I-45 North Houston Street Exits and Downtown Ramp
- Sabine

Group 5

- All other bridges

Notes:

Bridges were identified using various flow conditions on Buffalo Bayou and only the reach upstream of Jensen Drive was considered (1% probability flow is in banks downstream of Jensen). Energy grades were used to evaluate head losses instead of water surface elevations.

Flows from White Oak Bayou cause a large backwater effect on Buffalo Bayou, bridge and channel head losses are minimal downtown. To analyze bridge losses, two conditions were assumed for White Oak Bayou –

- 1) No flow from White Oak, and
- 2) A bypass channel carries part of the White Oak flow to upstream of McKee St.

The bridges in each group are listed from downstream to upstream order. The benefits of bridge improvements are magnified when combined with channel improvements.

The impacts of Allison have brought urgency to the long-felt need to manage the flood plain of the Buffalo Bayou, encourage responsible waterfront development, and to address problems that have contributed to flood damage (See Technical Report A: Hydrology & Hydraulics) Research shows that today’s flood levels will be exceeded by tomorrow’s flood levels - and costs.

Key concerns include:

- Problematic confluence of White Oak with Buffalo Bayou at Allen’s Landing.
- Floodwater impedance and resulting head loss caused by bridge crossings on the Bayou.
- Constriction of the natural floodway and building encroachments in the flow area from Fannin Street downstream to Austin Street.

PRINCIPLES

The Flood Management Plan for the Buffalo Bayou District is based on the following principles:

- Provide adequate floodwater capacity in the Bayou District to address rainfall events up to and including the 100-year frequency without causing increases in downstream flood levels.
- Increase conveyance capacity of Buffalo Bayou in the critical reach, from the confluence with White Oak downstream to McKee Street.
- Reduce present flood impacts caused by problematic bridge crossings.
- Restrict development within the 100-year flood plain.

PROPOSALS

The Plan aims for a significant reduction in flood impacts. The Flood Management Plan will reduce the impact of a future 100-year storm event, similar to Tropical Storm Allison, by 8.5 feet at Main Street. (See Technical Report A). This additional safety margin promises metropolitan as well as local flood benefits. Additional floodwater upstream on White Oak Bayou can be conveyed without impact through the downtown area to reduce flooding impacts in these upstream neighborhoods,

thereby contributing to a more effective regional stormwater drainage system. The Flood Management Plan is based on a three-pronged approach:

1. Direct floodwater flow carried by Buffalo Bayou and White Oak through Downtown by creating supplementary channels that bypass problematic flood-causing configurations of the two bayous.
2. Consolidate bridge crossings of Buffalo Bayou to reduce impedance to the flow of floodwater, eliminating crossings and reconstructing bridges where necessary.
3. Increase the conveyance capacity of Buffalo Bayou in the critical reach from Allen's Landing to McKee Street by widening and channeling the Bayou banks.

Significant infrastructural moves are required to achieve the purposes of the Flood Management Plan:

The preferable alignment for the northern supplementary channel (North Canal) in the North Downtown area will require the relocation of a METRO facility that stores commuter buses in off-hours, plus METRO's Police Department, and their Traffic and Risk Management departments. In addition, the North Canal will be assisted by the relocation of the northern of two South Pacific railroad lines running eastward from the Amtrak Station through North Downtown. This rail line presently follows the south edge of the METRO facility and crosses I-10 along Maffitt Street.

Widening Buffalo Bayou between Fannin and Crawford Street will require three buildings north of Commerce Street to be abandoned. Two of these buildings are currently being used by Harris County. According to the Harris County facilities Master Plan, their program could be relocated to adjacent County buildings.

Highway access ramps connecting I-10 and I-45 to Smith, Louisiana, Travis and Milam Streets, which tunnel under the rail line on the Post Office site, will need to be reconstructed above the rail line to ensure that they do not continue to function as floodways during storm events (See image). These de-facto floodways are likely to carry floodwater from White Oak to a Buffalo Bayou point upstream of the proposed North Canal, thereby compromising potential flood benefits from the North Canal. Raising these highway access ramps above 100-year flood levels and closing their tunnels under the rail line will be key to ensuring the efficacy of the North Canal as a flood management measure.

Channel conveyance improvements downstream of McKee Street to the Turning Basin will likely be necessary to ensure that flood levels do not increase from the channelization downtown.

Table 2: CRITICAL CHANNEL REACHES ANALYSIS

Critical Reaches listed in order of impact on flood levels

Reach 1 – McKee to Main Street

Reach 2 – Smith to Walker

Reach 3 – HB & T Railroad to McKee

Reach 4 – Main Street to Smith

Notes:

The effects of the channel and the bridges on the energy grade line are difficult to separate as there are many bridges. Therefore, all head losses were considered in evaluation of the channel reaches. The four reaches listed above have the highest head losses, so conveyance improvements would have more benefit compared to reaches not listed.

Conveyance improvements may be necessary to offset other flood level reduction measures.



I-10 and I-45 ramps to Smith, Louisiana, Travis and Milam, currently function as floodways during storm events.

Steve Fitzgerald, Harris County Flood Control District.

Flood Management Plan





A. New Supplementary Floodwater Channels

1. New North Canal
2. New South Canal
3. METRO Bus Facility Relocation
4. Relocation of railroad line from North Downtown area
5. Raising/ Realignment of Smith/ Louisiana and Milam/ Travis Highway Access Ramps

B. Consolidated Bridge Crossings

1. Elysian Viaduct crossing of Buffalo Bayou relocated
2. Fannin Bridge eliminated
3. Smith and Louisiana bridge crossings eliminated
4. Bridge crossings at Milam and Travis reconstructed to create new "Signature Bridge"
5. Franklin, Congress, and Commerce Street bridges eliminated
6. Houston Belt and Terminal railroad bridge near Jensen reconstructed
7. South Pacific railroad bridge rebuilt as new bridge for new Allen Avenue extension to Runnels along existing railroad ROW
8. San Jacinto and McKee bridge substructure improvements completed
9. Preston Street bridge rebuilt
10. Capitol, Bagby/ Memorial Drive East bridges reconstructed

C. Increased channel conveyance capacity of Buffalo Bayou

1. Buffalo Bayou channel widened from Allen's Landing to Gable Street Landing at Crawford
2. Buildings on the south bank of Buffalo Bayou between Fannin and Crawford along the north side of Commerce Street eliminated
3. Buffalo Bayou channelization extended to Jensen
4. Conveyance improvements from Allen's Landing to Sabine Street
5. Conveyance improvements from Jensen to the Turning Basin

Legend

Expressways	
Key Existing Roadways	
Active Rail Lines	
Bayou	
Proposed New Channels	
Conveyance Improvements	
Removal and New Roads and Bridges	
Open Space	
Existing Buildings	
Proposed Buildings	

PHASING: Flood Control

The Plan proposes the phased completion of the following elements to enable the implementation of the Flood Management Plan:

Priority (2-5 Years):

- Eliminate Elysian Viaduct crossing of Buffalo Bayou.
- Eliminate Fannin Bridge.
- Shift railroad lines across Post Office Site and North Downtown north to connect to new Intermodal Center at Hardy Rail Yard.
- Relocate METRO Bus Facility.
- Eliminate buildings on the south bank of Buffalo Bayou between Fannin and Crawford along the north side of Commerce Street.

Medium-Term (5-15):

- Complete north and south supplementary canals.
- Eliminate Smith and Louisiana bridge crossings.
- Reconstruct bridge crossings at Milam and Travis to create new "Signature Bridge".
- Complete San Jacinto and McKee bridge substructure improvements.
- Rebuild Preston Street bridge.
- Widen Bayou channel from Allen's Landing to Gable Street Landing at Crawford.
- Extend Buffalo Bayou channelization to Jensen.
- Initiate conveyance improvements from Allen's Landing to Sabine Street.
- Eliminate Franklin, Congress, and Commerce Street bridges.
- Reconstruct Houston Belt and Terminal railroad bridge near Jensen.
- Rebuild South Pacific railroad bridge as new bridge for new Allen Avenue extension to Runnels along existing railroad right of way.
- Eliminate conveyance impediments from Allen's Landing to Sabine Street: Franklin, Congress, and Commerce Street bridges.



D. LANDSCAPE



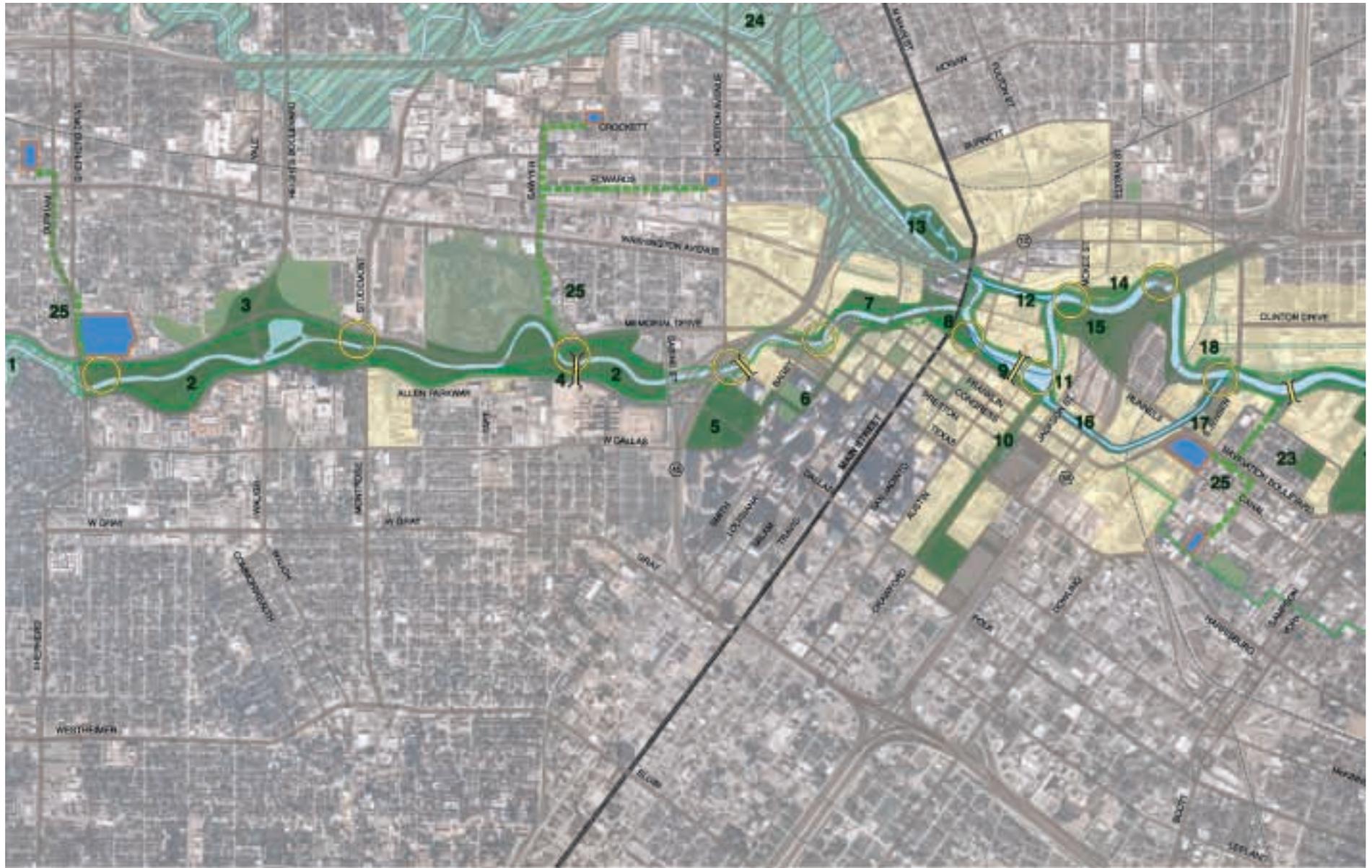
Today: View of Buffalo Bayou from the Turning Basin looking East.



Vision: Buffalo Bayou with simulated greening of banks, fields and landscape.

The Landscape Plan reclaims Buffalo Bayou as a recreational spine. The current public image of the Bayou is often a negative one: a polluted, trash-filled, muddy, industrial channel that periodically causes disastrous floods. Due to this poor public image and lack of physical access to its edges, the Bayou is infrequently visited or used. The Landscape Plan looks to the remarkable rewards of reclaiming Buffalo Bayou.

Landscape Plan



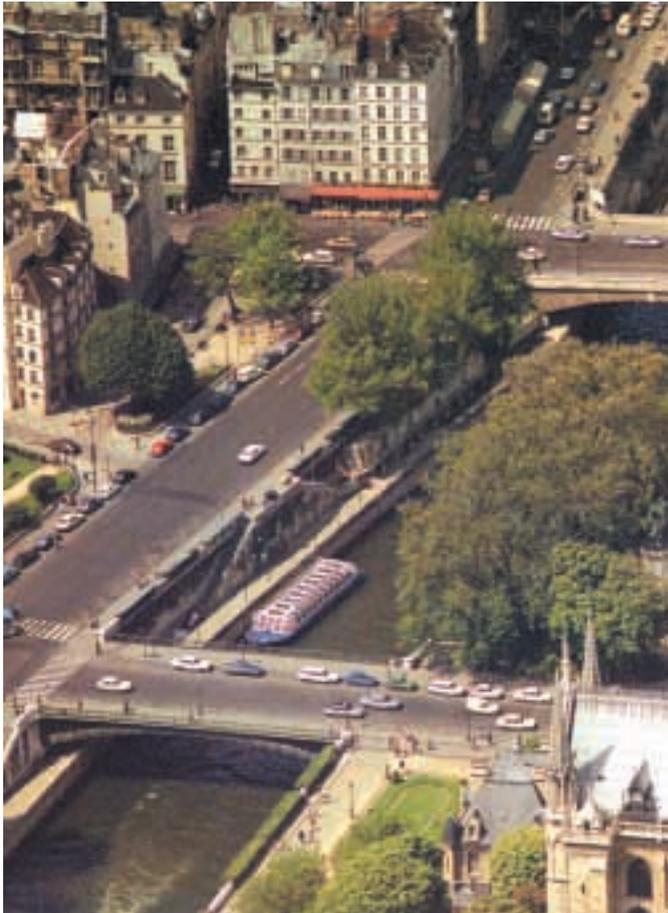


PROPOSED and ENHANCED PARKS

1. Memorial Greenway
2. Eleanor Tinsley Park and Greenway
3. Expanded Park Areas at Memorial and Heights
4. Allen Parkway Redesign from Taft to Sabine
5. Sam Houston Park Expansion/ Restoration
6. Festival Street West: Sam Houston Park to Allen's Landing
7. Festival Place Park
8. Allen's Landing
9. Commerce Street Promenade
10. Crawford Super Boulevard
11. Gable Street Landing
12. North Canal Promenade
13. White Oak Wetlands Park
14. McKee Street Park
15. Frostown Urban Garden
16. South Canal Promenade
17. Guadalupe Plaza Redesign
18. Bayou Vista Park
19. Turkey Bend Ecology Park
 - a. Buffalo Bayou Wetlands Park at Navigation and York
 - b. Symphony Island Park and Performance Center
 - c. Richardson Park Village Green
 - d. North York Park Improvements
 - e. Botanical Gardens at Lockwood
 - f. Nature Preserve at Turkey Bend
 - g. Navigation Landing
 - h. West Lockwood Park
20. Turkey Bend Park Expansion Areas
21. Turning Basin Overlook Park
22. Turning Basin Overlook Park Expansion Areas
23. Kennedy Street Neighborhood Park
24. White Oak Greenway
25. Green Street School Links

LEGEND: LANDSCAPE PLAN

- Proposed "Green" Transitional Areas 
- Proposed Pedestrian Bridges 
- Proposed Bayou Landings 
- Hike & Bike Trailway System 
- Green Street School Links 
- Redevelopment Areas 
- Existing School Sites 



Parisian model: A flood-prone river lined with pedestrian-friendly streets, trees, parks and beautiful mid-rise mixed use neighborhoods.

Key Landscape concerns include:

- Lack of park space and usable, people-friendly open space.
- Limited visibility of the Bayou due to steep eroded banks, and frequent Bayou crossings by the Downtown street grid, obscuring the Bayou below.
- Poor visual quality and inadequate maintenance of eroding Bayou banks.
- Industrial air, noise and water pollution in the East End.
- Noise pollution from highway crossings of the Bayou Downtown.
- Limited recreational use of Bayou waters due to poor water quality and limited boating amenities, including landings and related access to the water level.
- Poor pedestrian amenities in the waterfront area.
- An incomplete discontinuous trail system.
- Visual and physical barriers presented by incompatible uses, such as waterfront parking lots and underutilized industrial sites bordering the waterfront.

Coordinating environmental and open space planning with urban design and development is critical to creating a landscape actively used by people. What would the River Seine be, if not surrounded by the parks, boulevards, and promenades of Paris, edged by the vibrant and intimate neighborhoods of that unique city? Houston's challenge is to revitalize both the Buffalo Bayou corridor *and* the surrounding urban setting, creating a unified urbane new Buffalo Bayou District, where nature is an integral part of the new urban vitality.

PRINCIPLES

The Landscape Plan is based on the following principles:

- Providing continuous and public pedestrian access and trailways on both banks of Buffalo Bayou.
- Integrating landscape amenities with flood management infrastructure.
- Creating a linked system of recreational destinations in a park setting, including parks, promenades, and play areas.
- Integrating Bayou neighborhoods into the waterfront open space system, using "Green Streets" linking schools to the Bayou, and creating neighborhood greenways or "Green Fingers".
- Encouraging public use of the Bayou by providing improved access and recreational amenities, including Bayou landings, integrated trails, and street lighting.
- Extending the system of linked parks throughout the city and region.

PROPOSALS

The Master Plan for Buffalo Bayou proposes an addition of 850 acres of new park space to create a 2500-acre linked park system with Buffalo Bayou as its centerpiece. Buffalo Bayou can become the focal point of Houston's vital new urban district. Buffalo Bayou's rehabilitated ecosystems, pathways, and waterfront parks will serve as a magnet for the residences, shops, restaurants, offices and civic institutions that will line the revitalized Bayou corridor.

The Bayou's new image will be partly based on addressing flooding, trash, and pollution problems. It will also be based on a change in its visual appearance. Opening up the banks of the Bayou will make it more visible. Providing paths, trails, landings and related amenities will allow people to safely come to the water's edge. Creating more ponds will create more surface water for people to see and enjoy. Shallower banks with more wetlands and riparian areas will create a greater diversity of wildlife to watch. Large expanses of open marsh will create dramatic vistas up and down the Bayou. Over time, clearer water resulting from basin-wide mitigation measures will create a more visually appealing Bayou. Construction of carefully designed and appropriately scaled buildings will provide an attractive urban edge. And people in boats and on the Bayou's banks will signal that it is an inviting, safe, clean place to be – and this in turn will generate more use. Changing the visual appearance – the image – of the Bayou, can bring about a major change in people's perception and use of the Bayou and its banks.

A Continuous Public Bank Edge

The Bayou can be readily accessible to pedestrians, cyclists, boaters, festival-visitors and other users of this great natural resource. Public use of the Bayou is key to its revitalization. Paths, promenades, sidewalks and trails can allow continuous pedestrian access to its length, and along both banks as a general approach. The Plan recommends a public setback of at least 150' from the waterline. In addition, a targeted land acquisition program by public and private nonprofit conservation groups is recommended to assure setbacks and easements.



Terraced bank in Providence, RI., serves many purposes, civic and personal.



Regrading the Bayou banks to create terraces will allow new wetlands and riparian zones to thrive along with recreation, hiking and jogging trails.



The Seine, Paris : 25' stone flood wall, an attractive walkway and street trees.



Houston can connect its beautiful parks, dramatic districts, and neighborhoods to the Bayou, using tested urban elements in a Houstonian spirit.

Landscape treatments proposed for the public bank-edge vary with changing bank edge conditions, but also responds to flooding and environmental factors with respect to providing greater floodwater storage capacity and increased habitat:

West End Bank Edge: New ponds shaped like the oxbow meanders that once lined the Bayou can be created to provide additional wildlife habitat, boating areas, and visual interest. All new water bodies should be designed to be sustainable with sufficient depth and flows to support fish and other organisms that prey on mosquito larvae, so that increasing wetlands does not increase the mosquito population.

Downtown Bank Edge: Terraced bank edges provide for increased access and use. Moderately steep and constricted bank edges can be transformed with terraces, retaining walls, ramps and stairs. These terraced bank-edges provide effective transitions between the steeper edges of the proposed canals and the terraced, stepped, sloped and naturally vegetated banks of the downtown waterfront. Providence, Rhode Island, has recently successfully adopted a similar terraced treatment on its downtown riverfront.

In constrained urban areas, terraces can be hard-surfaced, incorporating paths, plazas, and promenades. In less developed areas, terraces can be earthen and planted with wetland, riparian, and upland plant species. An advantage of terraces in urban areas is that they provide alternative sites for human use when flooding occurs. While lower terraces may be inundated, upper terraces can still be used. An advantage of terraces in less developed areas is that they provide a sequence of vegetation and habitat types ranging from fully inundated to seasonally inundated to upland (See Technical Report B: Environmental Quality and the Eco-region). A “quay” or waterfront walkway can provide continuous access along the waterfront, similar to the Parisian section. Larger terraces and plazas can be created at various elevations to provide for outdoor seating, special events, cafes and restaurants. Subject to flood management requirements, waterfront trees can provide shade.

East End Bank Edge: The Bayou banks in the East End are frequently steep, environmentally challenged, and eroding. Grading back the banks into a shallower cross section will produce flatter areas that can support riparian habitat, including wetlands, ponds and marshes, providing opportunities for plant species, birds, amphibians, and aquatic species. Increasing the vegetated cover of the banks through enhanced habitat will stabilize erosion. Selectively widening the Bayou banks will slow water flow through the channel, reducing erosion. And widening the Bayou at select locations will turn a waterway mostly hidden in a narrow trench into a highly visible focus of the vital Buffalo Bayou District.

Wide promenades at the top of the wall planted with double or triple rows of trees provide shaded public access and views of the waterfront. This will be similar to most of the Parisian waterfront, where wide public promenades enliven the tops and bottoms of 20' – 30' high Bayou walls. Houston promenades should be between 15' and 25' wide. The North Canal and South Canal Promenades will form the recreational spines of the North Canal and South Canal neighborhoods.

Landscaped Flood Infrastructure

In the case of the Bayou in Downtown and the proposed canals, where bank edges are very constrained, steep banks and retaining walls are often necessary, but they can be redesigned to create an urban amenity. Renovating or reshaping these retaining walls, facing them with stone or masonry, fitting them with ramps and stairs, and providing a water's edge promenade, as seen in Sesquicentennial Park, can entirely transform the character of the Bayou's banks, while still effectively moving stormwater through the Bayou.

New and Enhanced Public Parks

In addition to improved accessibility and visibility, waterfront activities and open space destinations are needed to draw people down to the Bayou. The Plan proposes to add approximately 850 acres of new park space, while enhancing 250 acres of existing park space, to create a 2500 acre linked park system connecting Memorial Park to the Turning Basin.

New and expanded parks include (Refer: Landscape Plan for locations):

Expanded Park Areas at Memorial and Heights: The redesign of the Waugh Memorial Interchange (See 4A: Urban Development and Design, and 4E: Bayou Access and Transportation) will allow the consolidation of park areas adjacent to Eleanor Tinsley Park and Greenway, adding several acres of new park space to the West End. A proposed new pond with a boathouse anchors a new recreational destination for the West End.

Eleanor Tinsley Greenway: The entire 150-acre Eleanor Tinsley Park and Greenway stretches from Shepherd Drive to Sabine Street, and will incorporate a number of active and passive recreational spaces, including Eleanor Tinsley Park – a performance destination near Sabine Street. The Plan assumes execution of the now-planned upgrading of the existing park.



Restored Allen's Landing reemerges as the vital center of Downtown and WaterView.



DeCordova Museum, Lincoln, MA

Art parks and urban gardens are places to rest, observe, and play along the trails.



The Plan joins parks as a continuous north-south park system centered on the Bayou.

Allen Parkway is usually closed to traffic during special performance events, creating a pedestrian friendly destination. Parking demands during events at this destination place strain on the local neighborhood. Shared structured parking located in the East Montrose Redevelopment, and the redesign of Allen Parkway from Taft to Sabine, will provide additional parking and open space for recreational users along this stretch of the Bayou.

Sam Houston Park: Proposed acquisition of an additional 20 acres south of existing Sam Houston Park, north of West Dallas Street and West of Bagby Street, combined with landscape enhancements, will allow Sam Houston Park to once again be a key recreational destination for the City. The Plan supports upgrading this park.

Allen’s Landing: Historic Allen’s Landing has been reborn as a city landmark as a result of the committed efforts of the Buffalo Bayou Partnership. The restored Sunset Coffee building can house a boat facility on its lowest floor, while the landscaped grounds around it provide a tranquil, but actively-used refuge. The Plan calls for continuing upgrade of this historic site for use as a demonstration project and a focus of waterfront activity.

Gable Street Landing: As the new focus at the East End of the Commerce Street Promenade, a new Gable Street Landing could form the Bayou Gateway to the Convention Center District (See Urban Development and Design Plan).

Festival Place Park: A redeveloped Post Office site offers the opportunity to build on the success of Sesquicentennial Park by expanding open space efforts to the north bank of Buffalo Bayou. A new grass-banked amphitheater set in an eight-acre, Live Oak-shaded park can create a vital locale for international festivals.

Festival Streets: A network of streets currently link key downtown destinations. These include the Commerce Street Promenade, the Crawford “Super” Boulevard, with links to Festival Place, Sam Houston Park, and the North Canal. The Plan calls for making these streets shaded and pedestrian friendly, featuring distinctive signature landscaping. They would be closed to traffic for special events.

Frostown (James Bute) Urban Garden: The Frostown Urban Garden commemorates historic Frostown, while offering a site for permanent and rotating works of environmental art. This Plan proposes an expanded 12-acre waterfront park that incorporates the existing James Bute Park into a larger open space.

McKee Street Park: Located across from the Frostown Urban Garden, the seven-acre McKee Street Park can be a waterfront refuge for the new Elysian Park neighborhood, and can incorporate a new boat landing at the foot of McKee Street on the Bayou's north bank.

White Oak Wetlands Park: This new 12-acre park can anchor habitat restoration efforts along White Oak Bayou north of its junction with Buffalo Bayou, and provide a waterfront recreational amenity for the Near Northside neighborhood.

Guadalupe Park: The Plan recommends that Guadalupe Plaza be expanded and reconfigured. As the South Canal flows through this area, it will create a new park feature and development spine. Graded banks along the Bayou with grassed amphitheater seating will create a Bayou-side viewing area for water-based events. Landings on both sides of the Bayou with improved access up to bank-top amenities and parking will attract greater recreational use of the eastern Bayou.

West Jensen Landing (Bayou Vista Park): This new park lies below a development site across from the Guadalupe Park Landing on the edge of Bayou's north bank. Regraded landscaped banks, together with the sloped banks of Guadalupe Park Landing to the south and the Symphony Island amphitheater further downstream, will create a series of key vantage points to view competitive rowing and regattas on the Bayou.

Kennedy Street Neighborhood Park: Located along Kennedy Street, a new four-acre neighborhood-oriented park is proposed for the existing community north of Navigation Boulevard between Jensen and York. This new park may be created in conjunction with the development of the new Live Oak Park neighborhood.

Turkey Bend Ecology Park: Given the historic name of the oxbow at Lockwood Drive, the proposed 340-acre Turkey Bend Ecology Park can be a regional destination that incorporates multiple recreational and ecological sites. Key sites include:

- *Botanical Gardens at Lockwood:* Located on the site of the former City of Houston's Northside Treatment Facility, the new 33-acre Botanical Gardens at Lockwood can create a new amenity and regional destination for the East End. This Plan proposes that existing cylindrical sewage tanks be reused, and enclosed with elegant glass domes to house rare and endangered plant species from varied climates and habitats.



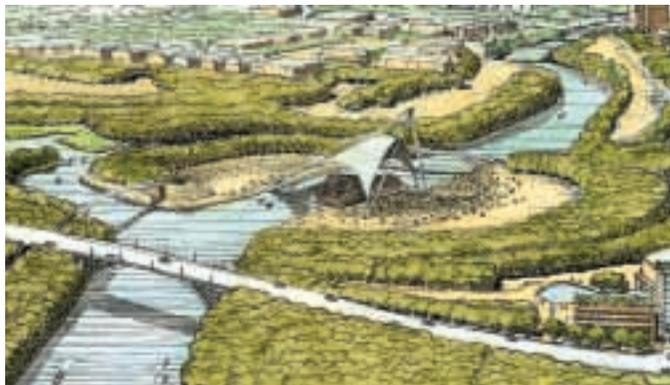
Turkey Bend Ecology Park: Former industrial island site can be transformed into a wetlands park within the oxbow, surrounded by a waterway, boating cove and landing, and wildlife preserve. The proposed Botanical Garden on the North bank reuses infrastructure of the former sewage treatment plant, suggesting a destination combining greenhouse structures and dome-covered and open environments, with the regional appeal of such outdoor gestures as London's Kew Gardens on the Thames, National Arboretum on the Anacostia River, Audubon Park on the Mississippi, New Orleans.



Turner Collier & Braden

Shallow banks, wetlands, rich habitat – the natural state of a southeast Texas river.

- *North York Park (Tony Marron Park):* The landscape enhancements proposed for Tony Marron Park under a separate but integrated initiative, will revitalize an existing park to create a key active recreational destination for the East End.
- *West Lockwood Park:* Located on the south bank of Buffalo Bayou between Tony Marron Park and Lockwood Drive, the proposed 52-acre West Lockwood Park can be a key Bayou destination and an important open space linkage to the components of the Turkey Bend Ecology Park.
- *Nature Preserve at Turkey Bend:* The Plan proposes recontouring Turkey Bend Oxbow to be an island with controlled access: a 28-acre protected preserve for reintroduced native species and a permanent refuge for those that have survived.
- *Navigation Landing:* A key waterfront destination in the East End, Navigation Landing will be located where the Lockwood Oxbow brings the Bayou to its closest point to Navigation Boulevard and to existing neighborhoods on its south. Expansion of the channel to the south of the oxbow will create an enlarged water surface; a protected lake ideal for boating. The 133-acre Navigation Landing Park's high-visibility location and its easy accessibility from Navigation Boulevard will enhance its attraction as a recreational destination.
- *Symphony Island Performance Center:* Programmed for large audiences on grassy amphitheater-type seating, this proposed open-air performance venue promises a sylvan setting for outdoor performances and events during Houston's temperate winter.
- *Buffalo Bayou Wetlands Park at Navigation and York:* Creating stepped, landscaped terraces to passively clean stormwater, the 63-acre proposed park includes both upland areas at the existing bank level and wetland areas, where water could cascade down regraded banks to the Bayou.



Symphony Island is formed by the canal cut for crew racing. Seating is on slopes.

Turning Basin Overlook Park: A new 18-acre city park that straddles a key location at the gateway to the Turning Basin, the Turning Basin Overlook Park would offer a privileged view of the workings of Houston's famous Port.

Bayou Neighborhoods Integrated into the Park System

The integration of new and existing neighborhoods into the Bayou park system is a priority of the Plan.

“Green Streets”: Perpendicular pedestrian connections linking the Bayou to surrounding neighborhoods can be created along existing or new streets with wide sidewalks. Lined with street trees, attractive lighting and other pedestrian amenities, these pedestrian-friendly “Green Streets” will link Bayou schools and their adjacent communities to the Bayou.

“Green Fingers”: To extend the ecological richness and natural beauty of the rehabilitated Bayou outwards into the surrounding City, as well as to provide passive filtering of stormwater, a system of smaller greenways or “Green Fingers” will radiate out into surrounding neighborhoods from the Bayou corridor. Extensive street tree planting, streams and ponds linked to new urban parks, trail systems and Green Fingers or corridors can extend out from the main Bayou area into the urban neighborhoods created along the edges of the Bayou. Houston’s new landscape can thus weave its way into the life and character of the new City.

Generous Recreational Amenities at Landings and along the Banks

It will be possible to boat or walk from Shepherd Drive to the Turning Basin, stopping for refreshment, entertainment or shelter from the heat, cold or rain at a network of boat landings. Floating restaurants, amusements, and concert venues on barges or large boats can be moored at these landings to draw people down to the Bayou.

Bayou Landings: A system of waterfront activity and landing areas is proposed along the entire length of the Bayou. The system includes major landings, secondary landings and small access points for canoes and small boats. In addition to the access points, large portions of the Bayou will be accessible to pedestrians and boaters via a system of trails, walkways, and boardwalks along the Bayou’s edge (See 4F: Map of Landing Locations, Pg. 156-157). Key landing locations include Shepherd Drive, Waugh/Memorial Drive, Eleanor Tinsley Park, Sam Houston Park, Sesquicentennial Park and Allen’s Landing. Additional boat access points will be located at Gable Street Landing, US-59, Jensen Drive, Symphony Island, the Turkey Bend Oxbow and Hidalgo Park. Major access points will require vehicular access, off-site parking, boat storage, docking facilities and concessions. Selected major access points could have boathouse facilities. Secondary access points require access to the waterfront for small boats and a stable launching platform that can include either concrete steps or docks and a concrete boat launching ramp. Minor access points require only limited vehicular access and trail access to the Bayou edge. At the

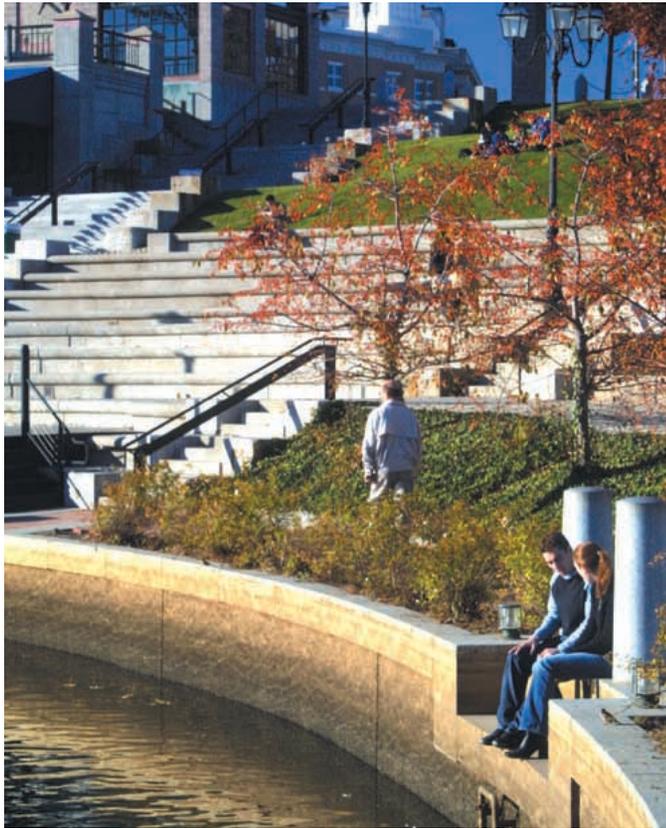


Charles River, Boston, MA

Recreational and competitive boating adds vitality to urban rivers.



The Bayou can become more boating-friendly, with places to arrive, to see, to land.



Providence, RI

Pavilions can house cafes, exhibits, public restrooms, and places to sit and watch.



Historic bath house on Buffalo Bayou reminds us that people once swam here.

larger access points adequate lighting, clear signage and other pedestrian amenities such as seating areas, shade trees and temporary storage facilities will be provided.

Key elements of the landscape design include the provision of safe and convenient access for boats and pedestrians, allowing vehicle access and parking without degrading the natural Bayou experience. Vehicle access to boat launches and landings can be for drop-off and pickup only. Vehicle parking will be located away from the Bayou and, if possible, outside the Bayou park area. Bayou Landings will be located in areas sheltered from main flood flow volumes and velocities. Launches and landings can be equipped with high pressure water hoses to remove silt from ramps after flood events. Concessions or small restaurant/cafes at landings will add interest and activity to these areas and provide an extra measure of security.

Boat Houses: New boathouses can accommodate Bayou vessels, offer food and refreshments to boaters and visitors, provide locker rooms, shower facilities, and offices for park and concessionaire staff. Attractively designed boathouses could also serve as visual landmarks celebrating access to and enjoyment of the Bayou. Boat houses can be located at the Waugh/Memorial interchange and/or Sam Houston Park and at the Turkey Bend Oxbow. The Sunset Coffee building at Allen’s Landing can also perform some boathouse functions including boat storage and administration. The proposed boathouses will provide major boat access and storage facilities at the beginning and end of Bayou boat trips. The Turkey Bend Oxbow boathouse can accommodate rowing crews holding practice and competition events on the lower Bayou.

Boat houses can be designed to have multiple levels. The tops of the boathouses can have ornamental towers festooned with banners and flags to announce accessibility to the water. Upper floors built above flood elevation can provide access at street level. Lower levels of the boathouses can reach near water level and be designed to be resistant to flood damage, providing flow-through capacity for flood waters. These lower levels can be used for boat storage and other uses easily evacuated in case of flooding. Some food service, café and beverage service can occur on the lower levels and on outdoor terraces at water level. Actual food preparation facilities should be located on upper levels with food and beverage service to lower levels by dumb waiter.

Pavilions: Park pavilions can be located at key points throughout the Bayou. Small pavilions can provide shelter, information and limited refreshments to park visitors. Larger pavilions can contain more elaborate food and beverage concessions, offer outdoor seating in the shade of trees, umbrellas or pergolas and accommodate restroom facilities. Like boathouses, some pavilions can be multilevel structures

with upper floors at street level and lower floors at the level of Bayou terraces. Pavilions can become prominent landmarks for access points to the Bayou and visual symbols of Bayou recreation and restoration. As terminal focal points for Cotswold streets, pavilions can announce the presence of the Bayou greenway. Pavilions can contain bulletin boards and kiosks with information on Bayou events and activities. Concessions in kiosks and pavilions can provide food and beverage services at locations closer to main streets. Mobile food service vehicles can provide food and beverage service to more remote terraces.

Street Furniture: Street furniture that encourages sitting and relaxing should be installed along the Bayou in the form of benches, seating walls and movable chairs and tables at concessions and restaurants. A low (15"-24") retaining wall can double as a seating wall, while a higher wall can include an 18" seating ledge at its base.

Parking: To ensure continuous access along the waterfront, adequate parking must be provided in garages, along streets and in well-designed surface parking lots, small and scattered near strategic locations. Large, unsightly, heat-absorbing parking lots along the Bayou can be avoided by incorporating parking in garages with ground floor retail and commercial spaces. Parking can also be accommodated in basements in areas above the flood plain. Where surface parking is required, it should be screened behind buildings or shielded from view by berms, fences, hedges or trees. Ample planting strips provided for street trees also become infiltration areas for stormwater runoff. Compact urban layouts, walk-to-work neighborhoods, and transit and bike trails will help reduce the demand for parking in newly developed areas of the Bayou. On-street parallel or angle parking can help reduce the demand for off-street spaces and buffer pedestrians from auto traffic on the streets. Programs to use public or private support to subsidize the construction of attractively designed parking structures could be pursued, to ensure that large surface parking lots do not mar new development along the Bayou. Parking for access to the West End parks can be achieved by closing roads such as Allen Parkway on weekends, building new parking lots and incorporating parking for park access in new developments.

Pedestrian Bridges: New pedestrian bridges will enhance access to the Bayou and provide a dynamic, visually interesting way to see the Bayou. New pedestrian bridges, innovatively designed, can create new connections between neighborhoods that the Bayou now isolates. New development along the Bayou can be designed to incorporate pedestrian bridges at points where the development approaches the Bayou. New pedestrian bridges are proposed across the Bayou at Sawyer Street near the Police Memorial, at Austin Street downtown, at Middle Street next to the existing Montgomery Ward property, just upstream of the proposed Symphony



Wide tree-lined promenades with street furniture motivate people to walk.



Canopy of trees, reflective roofs, flow-through ventilation make outdoors cooler.



Attractive pedestrian bridge signals a crossing over the Rhone, Lyons, France.



Providence, RI

Ramps provide handicapped accessibility and can enhance waterfront character.



Stephen Kornis/LObservatoire

Light design program for Bayou bridges will increase public safety.

Island, from North York Street to Symphony Island, and from Hidalgo Park to the proposed Overlook Park. Existing arterial crossings of the Bayou need to be redesigned to accommodate pedestrian sidewalks.

Handicapped Accessibility: The Americans with Disabilities Act (ADA) requires that all facilities open to the public be accessible to the disabled. This can be achieved on the Bayou by providing ramps to all major waterfront destination areas. These ramps can double as access ways for emergency, service and special events vehicles, and should be integrated into the overall design. In many cases, the 30' depth of the Bayou channel will require ramps ranging from 400-600 feet in length. Ramps should be between 10 and 15-feet wide with a maximum gradient of 5 percent for walks and 8 percent for ramps with landings. In heavily used locations, bank areas between ramps can be planted with grass and shade trees. In more secluded areas, they can be planted with native riparian vegetation. Switch-back landings, planted embankments, retaining walls and planters reduce the monotony of long, linear ramps. Areas for the disabled to access boats, to observe wildlife, and to fish can also be included. Surfaces such as stabilized gravel can provide accessibility in more remote areas without the need to introduce asphalt or concrete.

Public Safety and Security: The key to perceived and real safety and security is the presence of people at all hours. Large numbers of people having fun, sitting, watching, observing and strolling makes it more difficult for criminals to operate. An active waterfront draws people and helps discourage criminals and petty thieves. More people living near the Bayou will result in more people watching the Bayou, thus increasing safety by what urban sociologist Jane Jacobs called the "eyes on the street" phenomenon. Proper lighting, especially of dark and inaccessible areas, is also important. Grading back the Bayou's banks, removing invasive vegetation, and creating terraces and plazas will create greater visibility and enhance safety. Finally, Bayou patrols by police or security personnel will help, especially late at night when public activity has quieted down.

Lighting: Urbanized and heavily used areas of the Bayou can be carefully and creatively illuminated to create a safe, inviting nighttime atmosphere. Lighting proposals for the Allen's Landing area (commissioned by the Buffalo Bayou Partnership as a separate study) offer important recommendations and guidelines for lighting this area. Lighting can be designed to avoid glare caused by unshielded light fixtures. Directly exposed light sources, especially high intensity discharge (HID) features, can be prevented, to ensure that glare does not damage the character and quality of the nighttime Bayou. Exterior lights with a color balance approximating tungsten lighting can be used to create an attractive nighttime lighting character.

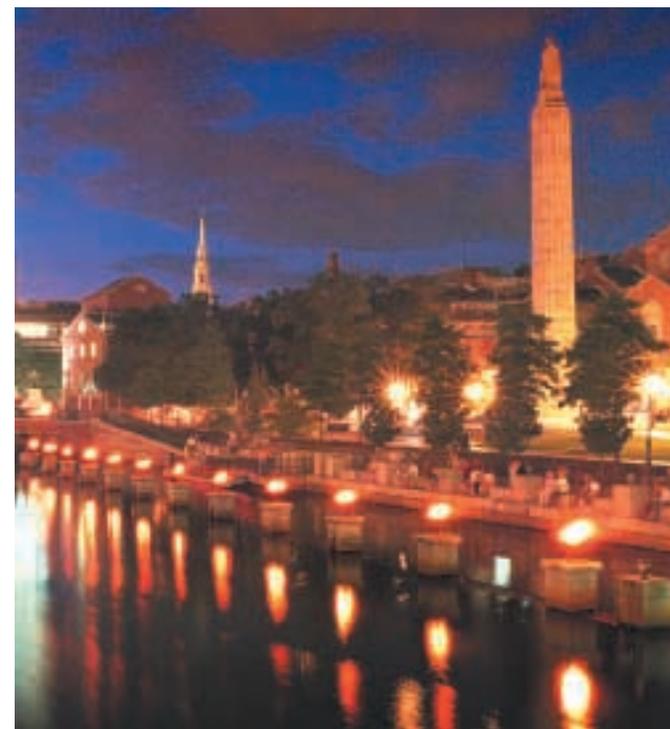
Light fixtures in flood prone areas should be specially designed to be water resistant. Lighted bollards and luminaires can be used along paths and ramps to create an inviting and safe walking experience. More remote, natural areas of the Bayou dedicated to wildlife habitat or more passive uses can be left dark at night to ensure that nocturnal species are not driven away. Excessive illumination of these areas can destroy their value as wildlife habitat. Efforts can be made to create a dark corridor along the entire length of the Bayou for species that migrate at night.

Public Restrooms: A major recreational facility serving the public needs to offer comfortable, clean restroom facilities. On the Bayou, these can be located in the proposed pavilions, in the boathouses and at major water access points. Food and beverage concession facilities can also provide public restrooms. Buildings fronting the Bayou or on streets facing the Bayou can be encouraged to offer public restrooms at restaurants, cafes, bars, and other areas of public accommodation. Providing space and utility access for portable restroom facilities during larger events needs to be planned.

Cool havens: A major impediment to active use of the Bayou is the high temperatures and humidity of the summer months. The revitalized Bayou can offer both natural and air conditioned havens where park visitors can escape the heat. These can be located in the boathouses, larger boats, pavilions and concession facilities located within the greenway, as well as within restaurants, cafes, galleries, and other public accommodations in buildings adjacent to the park. Natural air cooling techniques can include flow-through building design, shaded pergolas, fountains and waterfalls, waterplay fountains, swimming holes and dense shade tree plantings. When it gets too hot and humid for natural cool areas to work, air conditioned pavilions and buildings can be available for refuge.

Fountains: The Bayou can be animated by a variety of fountains. Fountains provide visual interest, cool the air, and aerate the water. Computer controlled fountains with multiple jets allow fountains to be programmed to music, theatre and other special events. Fountains can serve to increase the visibility of the Bayou by projecting water high in the air as a visual signpost for the presence of the Bayou.

Fountains located at the ends of Cotswold streets and other public ways leading to the Bayou can produce terminal focal points of water to signal the presence of the Bayou hidden below. Strategic points such as the intersection of the Bayou and the South Canal can have large fountains, similar to Geneva's "Jet d'Eau," creating dramatic vertical accents that focus attention on the Bayou. Other fountains can be smaller, serving various functions relating to aesthetics, aeration and cooling of air.



Frewater, Providence, RI.

Lighting can dramatically enhance the waterfront experience of place.



Geneva's iconic Jet d'Eau has become a symbol of the city.



Trees provide shade and are an effective way to combat the urban heat island effect.



Sam Houston Park today is an idyllic retreat deserving protection.

Waterfalls: The 30-foot drop from street level to the Bayou can provide numerous opportunities for falling, cascading, and tumbling water. Waterfalls can be created at existing stormwater outfalls to further aerate water and reduce the ugliness of exposed pipes and concrete headwalls. Routing stormwater along the proposed Green Fingers also provides many opportunities for incorporating riffles, falls, cascades and chutes. Weirs can create small ponds and wetlands and allow water to cascade down to lower levels. Waterfalls provide visual interest, create a pleasant sound, aerate the water, and create habitat for aquatic species.

Trees: One of the most useful ways of combating the oppressive heat island effect in Houston is to plant massive numbers of shade trees. Though large, open, grassy areas can be useful for large gatherings, most parks and open spaces along the Bayou can be densely planted with shade trees to provide as much protection from the sun as possible. Historic accounts of the Bayou describe a continuous, dense canopy of trees lining the banks and overhanging the water. While development and flood control concerns make this impossible in certain areas today, many opportunities exist for recreating dense groves of trees lining the upper banks of the Bayou. Dense, tightly spaced groves and bosques of trees should be planted along the banks of the Bayou as well as along streets and plazas leading to the Bayou. This tree planting strategy can also give form to streets, squares and plazas.

There are six vegetative zones suitable for tree planting along the Bayou fully identified (See Technical Report B). In upland areas (Zone VI) shade trees such as live oak, southern magnolia, red oak, ash and hickory will prosper. In higher areas of the flood plain (Zone V), oaks, magnolias, hickories and some species of pine (such as loblolly pine) will also do well. In middle areas of the flood plain (Zone IV), trees such as laurel oak, green ash, American elm, and sweetgum will tolerate the periodic flooding and wetter soils. In frequently flooded areas of the lower flood plain (Zone III), black willow, cottonwood, water hickory and overcup oak will proliferate. In the almost continuously flooded areas of the lower flood plain (Zone II), plants such as bald cypress, water tupelo and buttonbush will thrive.

Connections to Metropolitan and Regional Greenway Networks

The regional greenway network can consist of protected wetlands, protected farmland, woodlands and recreational open space areas. It would connect the Bayou to surrounding wildlife preserves and public park lands.

Links to Memorial Park: Memorial Park anchors the upper western reaches of the Bayou and is an integral part of the Bayou's ecological, recreational and hydrological systems. Existing links between Memorial Park and the Bayou study

area should be strengthened and new links should be established. An expanded canoe and kayak launching area in Memorial Park, which will allow canoeists and kayakers to paddle from the Park to Downtown, is also recommended (See Technical Report D: Water-based Activities). Connections for pedestrians can be strengthened along existing roadways and on new trails. Purchasing trail easements from existing landowners can be explored as a means of establishing new connections along the Bayou between Memorial Park and Downtown for hikers, joggers, and cyclists. Restoration of eroding Bayou banks in Memorial Park and upstream of Shepherd Drive will help improve the Bayou environment by reducing erosion and siltation and improving water quality.

I-45 Redesign at Sam Houston Park: Redesigning I-45 in the region of Sam Houston Park offers an opportunity to significantly enhance Houston's oldest park. Tunneling I-45 as it crosses Buffalo Bayou, or designing a new "signature" bridge that consolidates crossings of the Bayou, offers the possibility of relocating highway ramps and structures, and re-linking the landscape of Downtown and the West End. The redesign of I-45 could also address noise reduction and environmental pollution that impact the park's peaceful environment.

The Turning Basin and Port: Current Port of Houston policy prevents conversion of vacant port facilities at the Turning Basin to non-marine uses. In the long term, however, alternative uses can be considered for abandoned or underutilized land and buildings in this area. The existing Port visitor's center can be improved by expansion. A range of water-related commercial and recreational activities can occur, bringing greater public awareness of the Port and its role in the Houston economy. Vacant dock and warehouse buildings can be converted for use as exhibit spaces, interpretive facilities, cultural and entertainment spaces, or incubator clusters for new businesses and artists. Old ships could be converted into floating museums, restaurants or educational facilities. Mixed use development, including housing, is also recommended to reinvigorate abandoned or underutilized portions of the Turning Basin.

Extended Park System with National Eco-Tourism Potential

Regional greenways offer the opportunity to extend the system of linked parks to encompass the city and the region.

Regional Trail System: There are many smaller ecological jewels within the Houston area, such as the Texas Nature Conservancy's Atwater Prairie Chicken Refuge in Texas City. These smaller and larger ecologically important areas, along with existing city and county parks and habitats within the Barker and Addicks



Tunneling I-45 along Sam Houston Park could reconnect downtown to the West End along the Bayou, opening a lost vista of the City's signature park.



Integrating the Port of Houston into a regional network can generate greater public awareness of its role in the Houston economy, and an interesting destination.

Reservoirs, can be linked into a cohesive system of hike and bike trails. Given Houston's present conditions, existing and proposed road networks can be utilized to provide transition from car and bus to a hike and bike trail system. In some cases, there may be opportunities for canoe and tour boat access from the city to these natural resource areas.

Regional Eco-Park: The rehabilitated Bayou can be linked to a larger greenway system connecting downtown Houston to the region's parks, reserved lands, greenway corridors, conservation easements, wildlife preserves, and coastlines. These might include the Katy Prairie, Sam Houston National Forest, the Big Thicket National Preserve, and Galveston Bay National Estuarine Reserve. The network is also recommended to consist of protected wetlands, protected farmlands, woodlands, recreational areas and wildlife habitat connected to the Bayou and downtown Houston by networks of trails, waterways and protected corridors. The greenway is also recommended to link the three major ecosystems that converge in the Houston area: the East Texas Upland Piney Woods, the Gulf Coast Bluestem Prairie, and the Coast Marsh Complex.

Achieving the distinction of a National Heritage Corridor and offering new learning experiences and environmental pleasure, all Bayou parks can be part of an integrated ecologically functional system, an achievement of national importance. This could become a significant destination, attracting national and international eco-tourism to Houston.

PHASING

The Landscape Plan recommends reserving approximately 850 acres of land for public open space. In many cases, public land acquisition may be the only way to preserve these lands in perpetuity for parks and preserves. Landscaping, environmental remediation, and habitat enhancements, will require additional substantial investments, that while large, can have a transformative effect for Houston's quality of life.

The Plan suggests a prioritized sequencing of open space initiatives coordinated with related infrastructure investments.

Priority (2-5 years)

- Expand park areas at Memorial and Heights (Waugh Cloverleaf).
- Redesign Allen Parkway from Taft to Sabine.
- Create Festival Street West (Sam Houston Park to Allen's Landing).

- Initiate Allen's Landing Phase II.
- Create McKee Street Park.
- Support construction efforts underway at Frostown Urban Garden.
- Initiate land acquisition for Turkey Bend Ecology Park.
- Create Buffalo Bayou Wetlands Park at Navigation and York.
- Create North Jensen – York Village Green.
- Support North York Park improvements.
- Initiate Botanical Gardens at Lockwood.

Medium-Term (5-15 years)

- Enhance Memorial Greenway.
- Upgrade Eleanor Tinsley Greenway.
- Create Festival Place Park.
- Create Commerce Street Promenade.
- Create Crawford "Super" Boulevard.
- Create Gable Street Landing.
- Create North Canal Promenade.
- Create White Oak Wetlands Park.
- Create South Canal Promenade.
- Redesign Guadalupe Plaza and locate Landing .
- Create Bayou Vista Park and Landing.
- Continue Turkey Bend Ecology Park.
- Create Symphony Island Park and Performance Center.
- Create Nature Preserve at Turkey Bend.
- Create Navigation Landing.
- Create West Lockwood Park.
- Expand and renovate Turning Basin Overlook Park.
- Create Kennedy Street Neighborhood Park.
- Create Green Street School Links.
- Initiate Regional Eco-Park.

Long-Term (15+ years)

- Expand and renovate Sam Houston Park along with integrated I-45 improvements.
- Continue Turkey Bend Park expansion areas.
- Continue Turning Basin Overlook Park expansion areas.
- Create White Oak Greenway.
- Extend Regional Eco-Park.



E. BAYOU ACCESS AND TRANSPORTATION



Automobile access to Downtown Houston reflects a high level of service unmatched by other modes of transportation. Providing better access to Bayou landings, hike and bike trail systems, and future waterfront promenades and foot bridges, is a key priority of the Plan, which will improve access and travel convenience for all who want to live, work and participate in the growing Downtown that Houston will become.



The Plan focuses on Bayou access while maintaining existing access across it.

Steve Fitzgerald, Harris County Flood Control District



Existing tunnels become problematic floodways during severe floods.



Existing bridges, impeding floodwater flow through Downtown, can be raised.

Key Transportation concerns include:

- Bus, bicycle, and pedestrian access to downtown is difficult.
- Automobile and pedestrian access to the waterfront is limited and inadequate.
- Pedestrian access to the Bayou and to Bayou bridge crossings is poor, and pedestrian safety at these locations is a pressing concern.

As the Buffalo Bayou District grows and evolves, absorbing a projected \$5.6 billion of private and public investment over the next 20 years (See Chapter 5: Financing the Plan), the need to evaluate present transportation priorities against changing demographics and land-use imperatives is critical. As downtown waterfront living becomes increasingly attractive, more residents can be anticipated. Public transit will be increasingly important to ensure convenient access to work, residential, and recreational destinations for Buffalo Bayou District residents – as well as Houstonians overall - as they go about their lives in a revitalized city center.

PRINCIPLES

The Bayou Access and Transportation Plan proposes a more efficient balance between modes of transportation in the evolving Buffalo Bayou District. The Plan is based on the following principles:

- Providing adequate highway, arterial, and local vehicular access to accommodate the present and future needs of the Buffalo Bayou District.
- Reducing present impacts on floodwater flow caused by problematic Bayou bridge crossings.
- Freeing up recreational open space and opening up the Bayou waterway to the sky by addressing bridge redesign where feasible in the downtown area.
- Maximizing development opportunities along Buffalo Bayou by providing adequate access to priority sites.
- Providing a connected system of hike and bike trails along both banks of Buffalo Bayou within the Bayou Buffalo District.
- Addressing automobile, pedestrian, and bicycle access to Bayou landings, and providing safe pedestrian crossings across the Bayou at these access points.
- Linking schools and their neighborhoods in the Bayou District to recreational opportunities at the Bayou, along designated “Green Streets.”
- Providing incentives for eastward development along Buffalo Bayou by creating well-served transit corridors.
- Coordinating access proposals for the Buffalo Bayou District with present Downtown initiatives, including Main Street Light Rail, the Metro Mobility 2025 Planning Studies, and the Cotswold project, to keep traffic flowing more effectively.

PROPOSALS

Plan proposals are likely to have far reaching impacts in refocusing development in the Buffalo Bayou District. New destinations along the waterfront, drawing a significant residential population, promise a dramatically expanded downtown constituency with a vested interest in enjoying recreational access to an improved Bayou.

The Plan proposes a set of phased improvements coordinated with the development of the Buffalo Bayou District, as shown in the Access and Transportation plans (Pg. 146-148).

Priority (2-5 Years):

Automobile:

- Upgrade Kennedy and links to Navigation as a collector road between Jensen and York on the south bank of Buffalo Bayou.
- Convert Waugh/Memorial cloverleaf interchange to a compact diamond interchange to create expanded park areas.
- Eliminate Elysian Viaduct crossing of Buffalo Bayou; complete McKee Street enhancements.
- Eliminate Fannin Bridge; Upgrade San Jacinto Bridge to accommodate two-way traffic.
- Improve access to Bayou landings at Montrose/Waugh, Jensen, York, and Lockwood, coordinated with parking provisions.
- Review Allen Parkway design between Taft and Sabine for feasibility of parallel parking on north side, better pedestrian access to the Bayou, and an improved intersection at Taft.

Transit:

- Shift railroad lines crossing Post Office Site and North Downtown north to connect to new intermodal center site at Hardy Rail Yard.
- Extend METRO rail north from University of Houston Downtown to new intermodal center at Hardy Rail Yard.
- Relocate METRO Bus Facility to allow development of the North Canal.
- Upgrade bus transit along Clinton and Navigation transit corridors; evaluate feasibility of future light rail extensions along these transit corridors.



Roadway improvements allow park expansion on the north bank of Festival Place, offering a shaded amphitheater facing Sesquicentennial Park and Wortham Center.



A reclaimed Allen's Avenue serves as a new East-West collector along the Bayou's north bank. Its future alignment along an existing railroad track, passing under the University of Houston Downtown and Main Street Bridge, is shown above.

Transportation and Access Plan





PROPOSALS: AUTOMOBILE

- A1. Waugh Memorial Interchange redesign
- A2. Allen Parkway redesign from Taft to Sabine
- A3. Raising and realignment of I-10 ramps at Smith/Louisiana
- A4. Raising of I-45 access ramps at Milam/ Travis
- A5. Elimination of Congress/Franklin Bridges
- A6. New Water Street to connect Franklin and Smith
- A7. Pedestrian Bridge reconstruction
- A8. New City Street connection Bagby to Travis
- A9. Fannin Bridge eliminated
- A10. Elysian Viaduct eliminated
- A11. McKee Street enhancements
- A12. Allen Avenue reclamation; Extension to Runnels
- A13. Kennedy/Links to Navigation upgrades
- A14. New collector along existing RR ROW
- A15. Clinton extension West to North Downtown
- A16. Upgraded local street network on Bayou Island/North Downtown
- A17. Upgraded local street network in East Sector
- A18. Improved access to Bayou Landings
- A19. Review of I-45 design from Washington to Dallas

PROPOSALS: PEDESTRIAN

- P1. Hike and bike trails extended to both sides of Bayou
- P2. Green Street Bayou links
- P3. Pedestrian access improvements to Bayou landings
- P4. New pedestrian bridges
- P5. Pedestrian improvements at key arterial crossings

PROPOSALS: TRANSIT

- T1. Railroad lines across Post Office site shifted to connect to new Intermodal Center at Hardy Rail Yard
- T2. Main Street Light Rail extended to new Intermodal Center
- T3. Metro Bus facility relocated
- T4. Upgraded transit along Clinton and Navigation transit corridors
- T5. Light Rail spur extended East
- T6. Water based Transit options reviewed

LEGEND: ACCESS

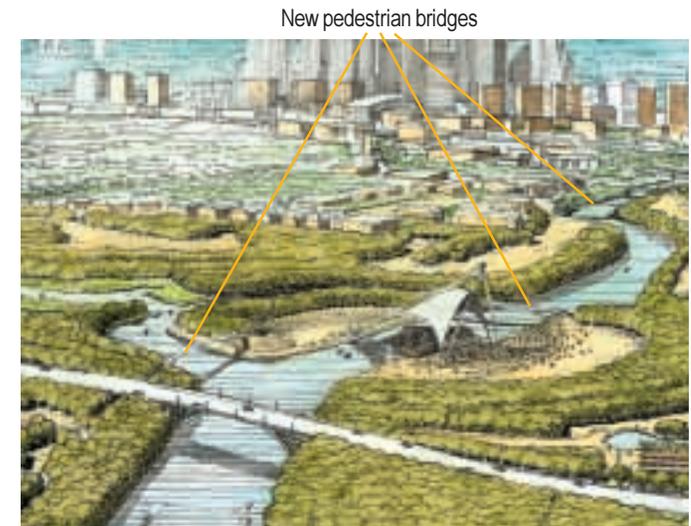
Expressways	
Key Existing Roadways	
Active Rail Lines	
Proposed New Road Links	
Hike & Bike Trails	
Proposed Transit Ways	
Proposed Pedestrian Bridges	
Proposed Bayou Landings	
Green Street School Links	
Existing School Sites	
Existing/Proposed Parking Facilities	
Key Existing Parking Lots	

Pedestrian:

- Extend hike and bike trails along both sides of Buffalo Bayou.
- Designate “Green Street” links from Bayou District schools to the Bayou and undertake improvements.
- Initiate access improvements at Montrose/Waugh, Gable Street Landing, Jensen, York, and Lockwood.
- Provide new pedestrian bridges at the Montgomery Ward/ Halliburton site and Symphony Island (See illustration).
- Create pedestrian improvements at priority arterial crossings of the Bayou.

Medium-Term (5-15):**Automobile:**

- Extend new collector road west of Jensen from Clinton along waterfront to north downtown under US-59.
- Provide new collector road on abandoned railroad right of way (ROW) between York and Lockwood on south bank of Buffalo Bayou.
- Shift I-10 highway access ramps presently located at Smith and Louisiana to connect to Washington/Preston, immediately west of I-45.
- Eliminate Bayou crossings at Franklin and Congress.
- Redirect Franklin south along south bank of Buffalo Bayou to connect to Smith, along new Water Street.
- Reconstruct Preston to minimize obstruction to floodwater flow, and widen to accommodate additional downtown traffic from new I-10 ramps connecting to Washington.
- Raise and reconstruct I-45 highway access ramps at Milam and Travis to create new “Signature Bridge” rising over Buffalo Bayou. Raising Milam and Travis ramps above their present railroad alignment and closing the underpasses which serve as de-facto floodways at Milam, Travis, Smith and Louisiana, would prevent the flow of White Oak Bayou through these underpasses during flood events. If these underpasses are allowed to remain, flood improvements from the North supplementary canal might be subverted as White Oak flows into Buffalo Bayou upstream of the new North supplementary canal.
- Connect new Allen Avenue on railroad right of way from Bagby east to Travis, and on to San Jacinto, crossing White Oak on reconstructed bridge.



New pedestrian bridges connect key East End sites to Symphony Island.



Clinton Drive is upgraded to a transit corridor with an expanded right of way (ROW), and a reserved median for dedicated transit.

Proposed Downtown Street Network



LEGEND

-  Traffic flow
-  Transit Corridor
-  Accessible Walkways to Waterline



- Reclaim Allen Avenue from present Union Pacific railroad alignment, and extend a new bridge over Buffalo Bayou to Runnels on existing railroad ROW. Create new Allen Avenue to connect San Jacinto to Runnels and provide improved connectivity between North Downtown, the East Sector, and the Gable Street Landing area.
- Create new access roads on Bayou Island, and in the North Canal neighborhood.
- Upgrade street network in East Sector from Lockwood to the Turning Basin, and closely coordinate with redevelopment.

Transit:

- Extend METRO rail east to East End Eco-Industrial Park (EIP) along Franklin, Jensen, Clinton, and railroad alignment, connecting the Texas Medical Center to new clean technologies medical manufacturing at the industrial park EIP. New transit eastward can be expected to add value and attract private investment to both banks of the Bayou at Jensen (including priority redevelopment sites at Live Oak Park, West Jensen), and eastward on the northern bank of the new transit corridor along Clinton.

Pedestrian:

- Provide Bayou access improvements at Montrose.
- Create new pedestrian bridges across Buffalo Bayou at Sawyer, Houston, and Austin.
- Provide pedestrian improvements at all arterial crossings of Bayou.
- Provide new pedestrian bridge across Buffalo Bayou from Hidalgo Park to Turning Basin Overlook Park.

Long-Term (15-):

- Explore water-based transit options in the Buffalo Bayou District.
- Rationalize I-45 design between Washington and Dallas to minimize present impacts on Buffalo Bayou, Sam Houston Park, and the connectivity of the downtown and west sectors.



A new Allen Avenue will connect Navigation Boulevard through Downtown and west to Festival Place and Bagby St., a much-needed link through the north side.



F. WATER-BASED ACTIVITIES



Venice Past and Present, Marcello Bertinetti/Archivio White Star

The Buffalo Bayou is a critical component of Houston's identity, and should be promoted fully. It enjoys a strong historic role in the evolution of Houston, allowing a "Houston Story" to be told. It has many destination points that will support and stimulate water-based activity.

Story of the Port of Houston



Historic pleasure cruise on Buffalo Bayou under the Main Street Bridge.

www.buckdog.net



Allen's Landing is the focus once again of water-based events.

www.buckdog.net



Chinese dragon boats race near Allen's Landing.

Buffalo Bayou is already recognized as a major water feature within the City of Houston, and should be preserved, enhanced and promoted as a recreational choice for visitors and citizens alike. The Water-based Activities Plan adds to this work already done.

Boating enthusiasts already access the Bayou at several locations. These “at will” boaters should be able to enjoy improved roads, parking lots and appointed access points with safe ramps and docks. Excursion tours, charters, and rental fleets will offer both visitors and local residents a diverse choice of activities by which to enjoy the Buffalo Bayou. (See Technical Report D: Water-based Activities).

Key concerns inhibiting water based recreational use of the Bayou are:

- Flooding of the Bayou.
- Poor public image of the Bayou, including perceived lack of safety.
- Inconsistent and occasionally poor visual quality along the Bayou, including discontinuous scenic areas with eroding Bayou banks.
- Industrial air, noise, and water pollution in the East End.
- Poor water quality.
- Inadequate maintenance and uncontrolled “trashing” of the Bayou and its banks.
- Limited Bank-edge development and activity centers on the Bayou.
- Limited access to the Bayou and along its banks.

Many of these issues have been previously addressed but bear repetitions regarding the appeal of this activity venue.

PRINCIPLES

The Water-based Activities strategies for the Bayou District are based on the following principles:

- Developing an economically self-sustaining multi-service boat operation.
- Sequencing operational components in coordination with bank-edge developments, and population density.
- Maintaining a high quality operation with client-centered management and team-based marketing.

PROPOSALS

A revitalized Buffalo Bayou has the potential to create a destination of great interest, with its blend of history, culture, commerce, and recreation. The Water-based Activities Plan proposes developing an environment that places people on the water in direct relationship to nature, and in doing so, contributes to the overall quality of life for Harris County and the City of Houston.

Water-based activities on the Bayou can include the development of new and improved infrastructure that supports the safe and appropriate utilization of the Bayou by casual enthusiasts. These enthusiasts include rowers, kayakers, and canoeists, utilizing private non-powered craft.

The Plan recommends developing economically self-sustaining multi-service boating concessions. Initially, water-based services can include excursion boats for those wishing a narrated tour via a piloted craft, and electric-powered cruisers and non-powered rental craft for those wishing to experience the Bayou at their own speed. Primary ticketing for the excursion vessel and powered cruiser rentals can be at Allen's Landing while the non-powered rental fleet can initially use Eleanor Tinsley Park as its primary operational headquarters.

In the long term, commuting possibilities on the Bayou can be explored as new mixed-use destinations along the waterfront are activated, and as new residential areas along the Bayou's East Sector are completed.

New and Enhanced Bayou Landings

New landings will need to be developed from which groups and individuals can access the Bayou by privately owned or rental boats. A total of 12 new landings are proposed, along with the upgrade of two existing landings at US-59, and at the former El Mercado on Jensen Drive (See Landscape Plan). In addition, an "At Will" landing beyond the project scope area at Memorial Park is proposed.

Improved Access to Existing and Proposed Bayou Landings

Access to existing and proposed Bayou Landings will need to be improved to support and encourage recreational canoeing, kayaking and rowing.

Professional Excursion Service Stations

Professional stations will need to be developed at which groups and individuals can access professionally piloted excursion boat services. Initial stations should be located at Allen's Landing and Gable Street Landing. Other stations can be located in a phased manner.



Waugh at Memorial: A boat house provides boat rental, storage, and docking areas.

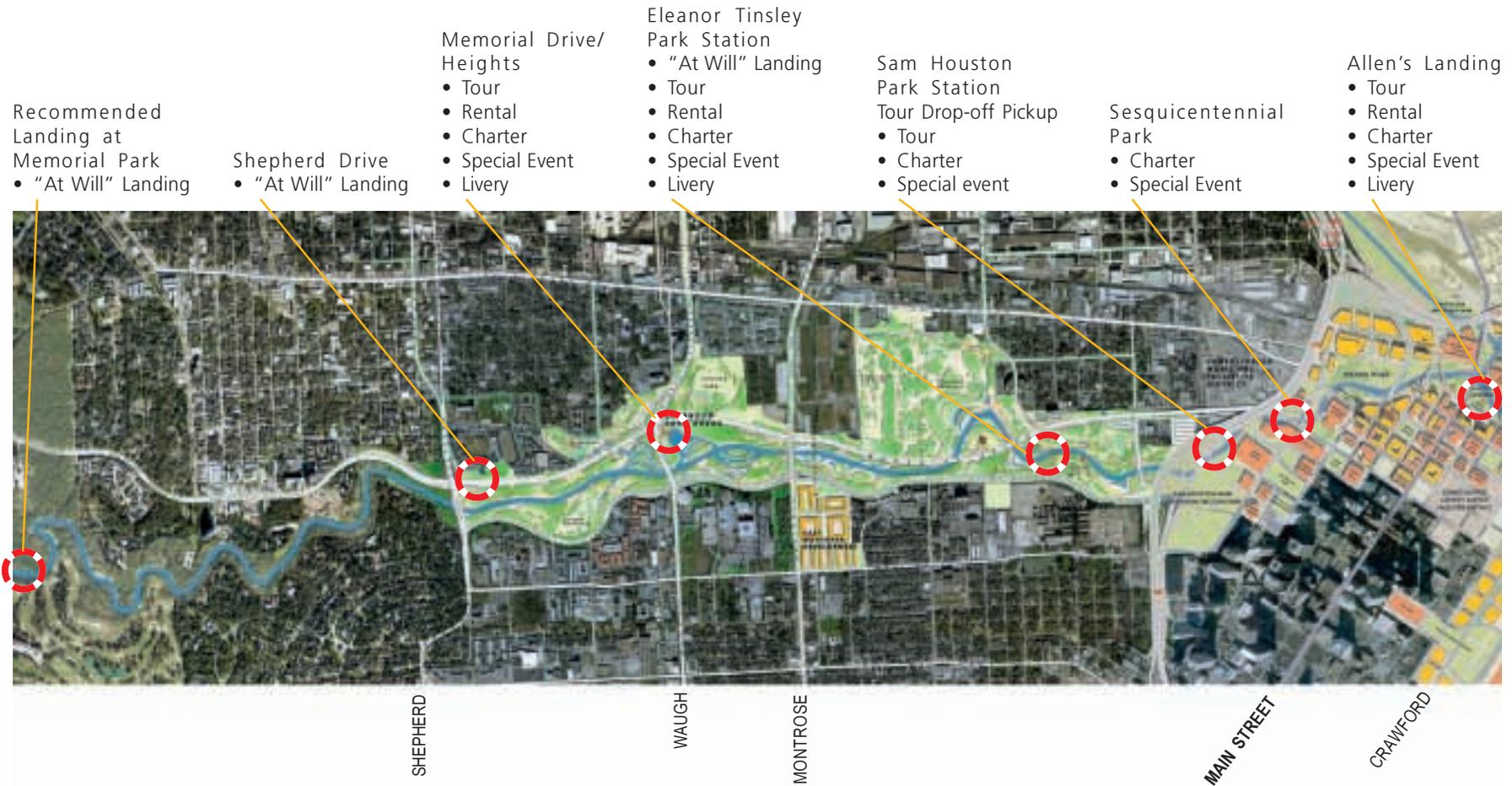


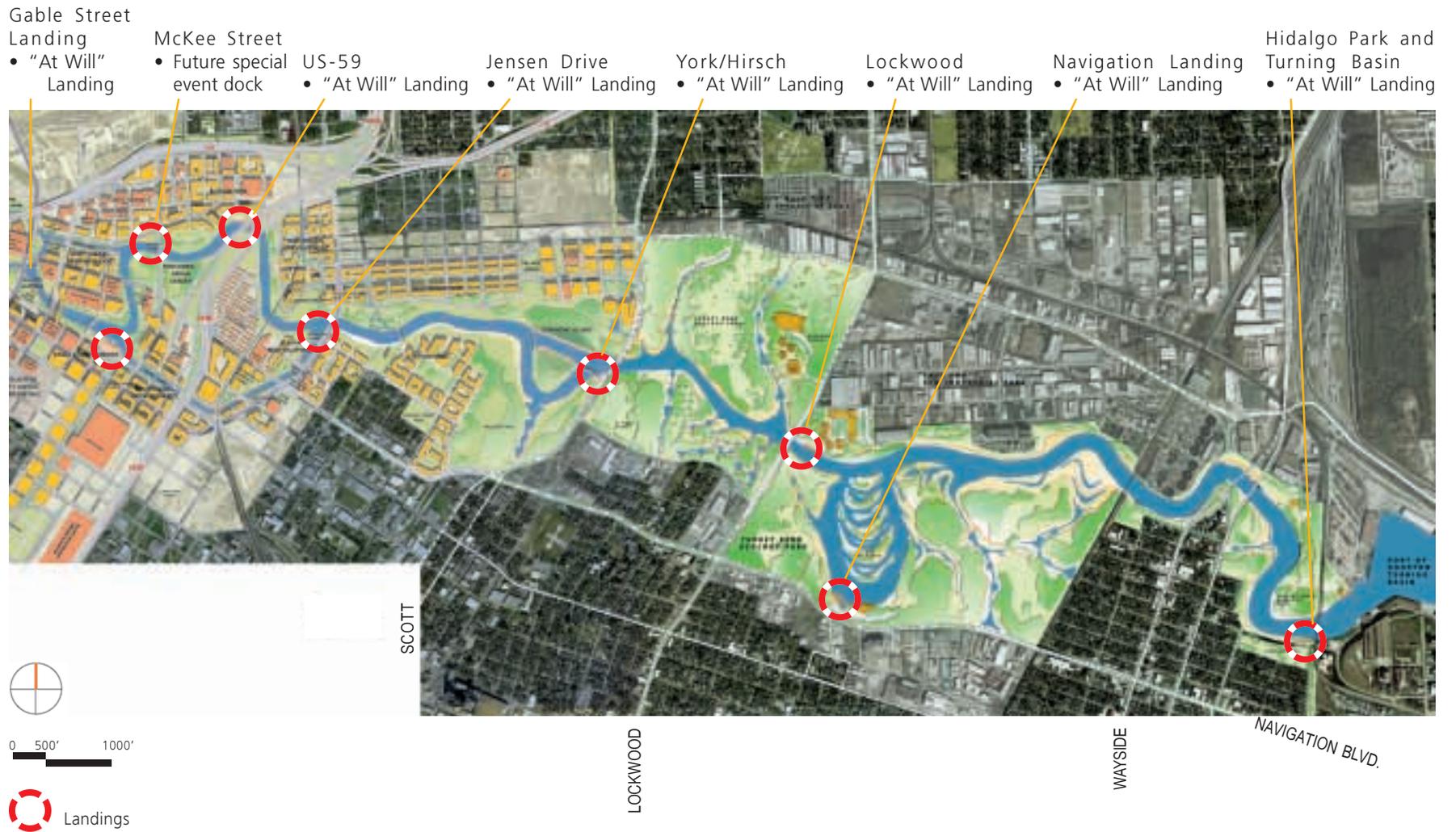
Stepped landing from Commerce Street goes to water's edge at Gable Street.



A graded bank creates steps and ramps to landings below Lockwood Avenue.

Proposed Landing Locations





Water-based Activities Plan





Varied Pleasures: Boat races Downtown while naturalists explore the less travelled western Bayou by canoe.



www.buck.dog.net

Close coordination and clear assignment of roles is key to success of water events.



International Waterfront Group

Simple landings are envisioned at Sam Houston Park and Sesquicentennial Park.



Victoria Harbor, BC: Bank-edge landscaping invites strollers and spectators.

Collaborative Maintenance, Operations, and Promotion

The Plan recommends that various aspects of the boating services operations be handled by a private third-party concessionaire. Third-party involvement may aid in providing the necessary capital for fleet acquisition and greater operational expertise. This operational format enables the supervising authority to have oversight capabilities, while reducing day-to-day management responsibilities and potentially providing reduced capital and operating expenditures. Towards furthering a collaborative operation, the Plan recommends developing a “Memo of Understanding” or formal contractual agreement – a collaborative organizational working agreement between the City of Houston and a supervising authority (possibly the Buffalo Bayou Partnership), through which all water-based activities could be operated, maintained, programmed, and promoted.

The overall philosophy of the boat program can be one that supports existing commerce and encourages new development. One primary goal is improved public perception. In support, initiatives that minimize flood impact, introduce regular Bayou maintenance, provide incentives for bank-edge development and advocate special events featuring the Bayou will all contribute to advancing water-based activities (See Landscape and Environmental Quality Plans).

Low-level flooding of pedestrian amenities and public improvements will remain a continuing concern for water-based activities along Buffalo Bayou. Design standards and operational policies must be developed to mitigate and minimize the effects of these debasing circumstances (See Flood Management Plan).

It is anticipated that the proposed multiuse boat operation will depend initially on the recreational components of the operation. Generally, however, all operational components are expected to grow in direct proportion to density of development along the Bayou’s banks. Initially, the operation may be economically marginal. Leaders will require patience and understanding that the boat operation – like the Buffalo Bayou Corridor – will take decades to fully evolve and achieve a widely recognized identity.

PHASING

The Water-Based Activities Plan proposes phased development in conjunction with bank-side and other infrastructure improvements. The general sequencing recommended is as follows.

Priority (2-5 Years):

During the initial years, the Plan anticipates continued increase of use for the powered and non-powered recreational rental fleet and additional demand for excursion vessel services. Recreational rentals will continue to be the anticipated primary profit center for water-based activity businesses. Current projects underway and recommended development projects will allow better Bayou access and set the stage for recognizable increases in private and dining charters. Therefore the first aspect for implementation is:

- Completing selected area-wide improvements to waterfront access to provide direct and indirect enhancement to the entire operating environment envisioned on the Bayou.

Medium-Term (5-15 Years):

As more steps are taken towards managing flood impacts on Buffalo Bayou, water-based to land-based activities will be integrated. Consequently a more effectual operating environment will be created. As a result of physical and regulatory improvements anticipated for completion during this period, a significant patron increase is expected.

- In order to meet the increased revenue forecast, the excursion component of the business will require an additional six vessels, the powered rental fleet will require an additional eight electric cruise vessels and the non-powered rental fleet will require an additional 25 craft.
- Understanding the issue of program interaction between recreational and professionally piloted vessels will become critical.
- It is anticipated that a stand-alone tour operation will be required. The decision to depart from the initial tour/livery concept will be based primarily on increased safety for all patrons. Operational hazards must be considered because of the interface of non-powered craft in an environment of limited space and increased traffic expected in the Downtown area. These operational modifications will be



Appropriate programming of bank-edges activates the waterfront.

International Waterfront Group: San Antonio

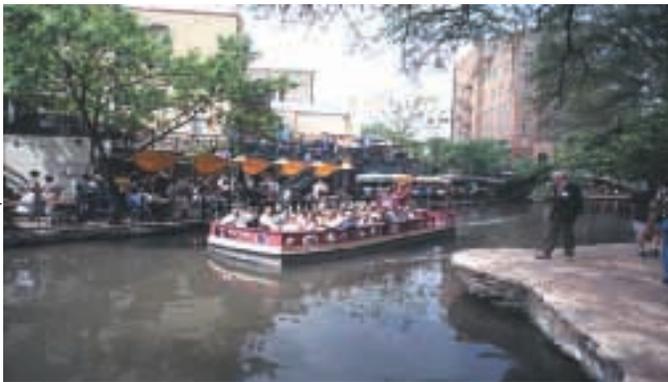


A well maintained and landscaped waterway is critical to attracting new audiences.

International Waterfront Group: San Antonio



14 landings will encourage recreational boating on the Bayou.



Water-based activities enhance visual experience of patron and pedestrian alike.



Riverwalk cafes in San Antonio sit at the water's edge, far below the street level.

International Waterfront Group: San Antonio

San Antonio Coordination and Visitor Bureau.

further justified as risk management professionals recognize the increased liability to both the operator as well as the authority of jurisdiction.

- Rental operations modifications will be required. Once the stand-alone tour operation is implemented, it is recommended that the non-powered rental operation be relocated from Eleanor Tinsley Greenway to a location upstream. Eleanor Tinsley Greenway would become the downstream “take out” location for rental patrons and return livery would be provided via rubber-wheeled shuttle. “At will” users of the Bayou would be encouraged to either utilize the western reach of the bayou (Memorial Park to Eleanor Tinsley Park) or the eastern reach (Jensen to the Turning Basin).
- Assuming relocation of industrial businesses currently along the eastern sector, this reach of Buffalo Bayou becomes an area of limitless potential. Given this dramatic change, the area between Jensen Drive and the Port of Houston Turning Basin avails itself for numerous rental locations that can provide powered and non-powered craft as well as light-duty sail craft.
- Public access points will be made available from which “at will” and collegiate enthusiasts could access the bayou during most hours of the day.
- “Aqua Shuttle” water-based public transportation such as the “Park and Sail” and “Kiss and Sail” facilities will be viable. This service would require pickup and drop-off locations along the eastern portion of the Bayou at which patrons could utilize parking facilities or be dropped-off to use a morning and evening commuter vessel. This “Aqua Shuttle” might be a craft generally in the 50-55 foot class with a passenger payload capacity of 100-plus.
- Based on the growth projections described above for the tour and rental components of the business coupled with the introduction of the “Aqua Shuttle” service, the operation will require the development of a full service marina. Although it is still envisioned that the rental and excursion fleets could utilize overnight mooring births at Allen’s Landing and at the operation’s upstream headquarters, the need for direct access to higher capacity fueling and major repair and maintenance warrants the development of the facility. The facility is envisioned to be located in the eastern reach of the Bayou, connecting via light rail along Navigation or Clinton to Main Street. This combination of water transit and light rail on Main Street with possible extensions, north and east, will make the future Downtown a truly multi-modal center.

Long-Term (15- years):

Examples worldwide stand as testimony to the potential and economic upside of long-range thinking. A comparable example is San Antonio's River Walk. That urban setting started much like the humble beginnings of Houston's Buffalo Bayou. Over the years, San Antonio has experienced much of the prosperity that could come to the City of Houston as a result of previously discussed improvements.

The major improvements envisioned will result in a "one of a kind" urban environment in Houston. The boat operations on the Bayou will eventually rival the millions of passengers utilizing the tour, charter and dining services offered in San Antonio or any other city with a popular destination waterfront, and the traveller's experience will be focussed on a story and environmental experience unique to Houston – the colorful history and qualities of the multifaceted Buffalo Bayou.



International Waterfront Group: San Antonio

Some tour boats run on compressed natural gas.



International Waterfront Group: Tempe, AZ

Electric vessels are reliable, safe and environmentally appropriate.



International Waterfront Group: Tempe, AZ

Electric boats can now provide shuttle and transportation services.



5 FINANCING THE PLAN

A revitalized Buffalo Bayou will bring an array of economic benefits. These benefits will derive not only from what happens within the corridor itself, but also from how the Bayou influences the regional distribution of economic activity, and how it affects Houston's overall competitiveness for jobs and households.

ECONOMIC BENEFITS OF A REINVIGORATED BAYOU

Economic benefits are achieved at two scales: the region and the city. In addition, the revitalization of the Bayou corridor has the potential to draw significant new investment into metropolitan Houston. When this happens, all the metropolitan jurisdictions win. Moreover, the City of Houston may begin to capture a greater proportion of new regional growth in jobs and households. If the city is able to capture a proportion closer to its fair share, it will mean substantial fiscal benefits for the city.

At its simplest: enhanced property values and attendant fiscal benefits

Just as a golf course adds value to nearby lots, the improvements proposed in this plan will enhance the value of adjacent properties, as well as properties with access to and views of the Bayou. The magnitude of the value-added will vary with distance, and with the type of use. Industrial uses may see only marginal gains from the amenities, but may benefit greatly from enhanced access and flood-control improvements. Residential uses will command higher potential rents and sales prices, enhancing the feasibility of new development. Certain recreational and entertainment uses would not otherwise occur but for the parks and other place-enhancing elements of the plan. In each such instance, the various taxing jurisdictions involved will see incremental increases in their revenues as a direct result of higher overall assessed values within the corridor.

PROPOSED OVERALL FINANCIAL STRATEGY

We propose a five-pronged approach to financing the revitalization of the Buffalo Bayou corridor:

1. Use general obligation bonds backed by the incremental new fiscal revenue associated with the investment anticipated in the corridor.
2. Seek funding through the Harris County Flood Control District for those major improvements related to flood control that form the armature for the strategic reconfiguration of the Bayou.
3. Mount a campaign to generate the maximum amount of intergovernmental funds from a broad array of federal and state sources, including both existing programs and special appropriations.
4. Create or expand the responsibilities of existing management districts funded by a special assessment on real property in the corridor to fund ongoing management, supplemental services, maintenance, and marketing of the corridor.
5. Employ a regional assessment earmarked for Bayou-related infrastructure, parks improvements, and land acquisition. This could be a sales tax, a transfer tax, a dedicated property tax assessment, or a similar mechanism.

Mitigation of future flood impacts

While not quantified in this report, the improvements will mitigate a portion of the kind of flooding that occurred in June 2001. Allison produced an estimated \$5 billion in damages in the region. Much of this was unrelated to Buffalo Bayou or occurred outside the downtown area (some 40% of the damage was in the Texas Medical Center alone). However, some of the highest-impact damage, because of the intensity of use and the concentrated nature of the real estate investment, occurred near the central part of the Bayou corridor, at the confluence of White Oak and Buffalo Bayous. The supplemental channel proposed in this Plan, by alleviating this backup at the confluence, will potentially save millions of dollars by avoiding future flood damages.

A more efficient regional development pattern

Houston is well-known for its propensity to spread out. The urbanized area of Houston sprawls at a relatively low density of 522 persons per square mile (compared to Chicago at 1,436 or Miami's 1,000.)

This pattern no doubt reflects a combination of factors, including relatively low barriers to greenfield development, a propensity to concentrate transportation improvements in surface highways, and a general preference for low-density development. One key problem with this pattern is that it consumes a lot of land and is an inefficient use of in-place infrastructural investment. It also hastens the decline of existing neighborhoods.

The resurgence of Midtown and the continued health of some central neighborhoods suggests, however, that exceptions to this pattern exist. Buffalo Bayou can emerge as a dramatic, positive influence for the redevelopment of central Houston, and in the process create a model for efficiency in the entire region.

Stronger potential support of transit and reduced auto dependence

While the total impact may be relatively small, a more compact region may help to ultimately reduce Houston's dependence on automobile trips. To the extent that the Bayou captures a stronger proportion of potential regional growth, the rate of growth in total regional passenger miles traveled in cars may be reduced, with attendant benefits to air quality, fuel consumption, and safety. In addition, the land use pattern proposed for the corridor itself encourages a mix of uses, a better pedestrian environment, a network of bikeways, waterways, and links to existing and planned transit routes.

The larger promise of "enhanced quality of life"

Civic and business leaders in Houston have recognized that the region's competitiveness increasingly depends on a host of factors broadly related to "quality of life." Houston has always stood for economic opportunity and entrepreneurial energy. Many of those interviewed during the course of this Plan suggested that the region's economic health in the future will be more strongly related to the kind of vibrancy, neighborhood quality, regional amenities, and sense of place offered by places like Seattle, Boston, Denver, and San Francisco. These places have had especially high rates of job growth

in coveted knowledge-based industries, economic sectors upon which Houston's economic fortunes are increasingly based. These industries depend on attracting highly educated and highly mobile workers. A number of academic studies and evidence from major corporate-relocation decisions suggests that quality of life factors are decisive in where these employees, hence these firms, wish to locate.

What many of these competitive cities have is a central, regional-scale amenity that helps to create a vivid impression of the place and that offers tangible opportunities for recreation, entertainment and urban living. The Bayou offers such promise for Houston.

Tourism and visitation

Tourism is the world's largest industry. Houston now generates annual tourism revenues of about \$235 million, according to State of Texas data. The community has made a substantial recent investment in its convention center, and in a related headquarters hotel. Generating an appropriate return on this investment will require the city to compete effectively for the convention business. In determining where to locate these events, Meeting Planners are interested in a handful of major variables. The most important, typically, are those related to the meeting facility and the supporting sleeping rooms. Second is air service and local transportation. Third are the supporting elements: shopping, dining, entertainment – all the things that make up a high-quality convention destination. Houston has effectively addressed the first two requirements, and is approaching the full destination potentials in this Master Plan. In this it will join other prime convention cities that have maximized the visitor appeal of their waterfronts – New Orleans, Chicago, San Antonio, and Baltimore.

Buffalo Bayou, particularly in its focus on WaterView, with its shopping and dining along walkable streets and water-edge promenades, offers the opportunity to greatly enhance the appeal of downtown Houston as a convention destination.

Tourism, however, extends beyond the convention business. By combining urban amenities, cultural amenities, and destination-quality environmental assets, a revitalized Bayou can play an important role in boosting Houston's tourism business, with significant additional economic benefits.

The “connective tissue” in the downtown development strategy

A final consideration relates to the long-standing efforts to keep improving downtown Houston as a place of business, as a neighborhood, as a visitor destination, and to reconnect the heart of the city with its surrounding neighborhoods. One stakeholder has noted that if “Main Street is Houston’s spine, then the Buffalo Bayou is its broad shoulders.” Buffalo Bayou can form an important connection between Downtown and several surrounding neighborhoods and can complement related Downtown investments in sports facilities, urban design enhancements, cultural destinations, transit, and housing. The Bayou can help to extend and amplify the benefits of these improvements, and its revitalization should be viewed as an initiative that reinforces, rather than competes with, downtown Houston.

THE POTENTIAL COSTS OF THE NEW BUFFALO BAYOU

Capital improvements: flood control, park improvements, infrastructure, and land acquisition

The expected costs to revitalize the Buffalo Bayou corridor fall into several categories. First are the up-front public sector capital improvements required to mitigate flooding, to provide access, and to help “create the address” required to attract private investment. As noted elsewhere, an important component of the implementation strategy, especially key in zoning-free Houston, is land acquisition, the costs of which are also considered to be in this “up-front” category. These costs may require significant intergovernmental approaches, potentially including state and federal sources for flood mitigation, brownfields cleanup, and transportation initiatives.

Economic incentives: participation in development initiatives

The second cost category involves an array of potential financial incentives to enhance the feasibility of strategic public-private partnerships. These are site-specific initiatives with either a public or a private sponsor that advance the objectives of the plan. Some are known now (See Chapter 7: Next Steps). Others will be opportunistic, responding to the place-creating moves made over the next several years. The objective of the plan is to gradually reduce the need for development incentives.

Ongoing costs: maintenance, management, marketing

The successful experience of management districts in Harris County suggests that a third cost category will be the ongoing need to effectively manage the development, maintenance, programming and marketing of the Buffalo Bayou corridor. This will require a stable and predictable funding stream. Usually these costs are directly related to efforts that increase the value of the real property in the district, and are linked to a special assessment mechanism.

Optimizing the relationship between benefits and costs in the long term

Much of the challenge in implementing an ambitious redevelopment program lies in balancing costs and benefits in a way that sustains the initiative’s political support. The appropriate policy should seek to satisfy two important principles. First, costs can be borne by those who derive benefits from the improvements. Second, the magnitude of public investment can be proportional to the resulting private investment and the public investment should be a precondition for the private development.

The experience of public-private development partnerships across the country suggests that a realistic expectation is that public costs should leverage private investment on a basis of about three to one; that is, every public dollar invested can generate at least three dollars in private investment. Houston’s potential for leveraged benefit is significantly higher 5:1. (See page 172).

In reality, measuring what is public and what is private can be complex. Should just local-government dollars count, for example? If a non-profit generates capital funds by selling bricks, is that public or private? Still, as a general planning criterion this guideline is useful. Ensuring an appropriate private-investment response to public expenditures helps to maintain the public support necessary to sustain a multi-year redevelopment effort.

OPTIONS FOR FINANCING THE CORRIDOR REDEVELOPMENT

Local v. Regional Funding

The Buffalo Bayou is an asset with regional importance and regional impact. Just as the airports and the port are funded on a regional (and state and federal) basis, the Bayou too can serve a regional role. Many of the benefits identified above – a more efficient development pattern, or an enhanced tourism economy – accrue to the region. As such, following the principle (identified above) that those who benefit must bear the cost, we recommend a regional and intergovernmental funding approach for the up-front capital requirements for infrastructure, parks, and land acquisition. The following discussion covers several distinct approaches.

Bond financing

One approach can use bond financing backed by a dedicated assessment on property taxes, similar to the hospital district tax levy in Houston. Another could earmark a portion of the sales tax produced in the region to back a bond issue. According to the Trust for Public Land, sales tax is the second largest source of income for most governments and typically the most popular tax among voters. As a result, regional transportation and parks initiatives are frequently funded through sales tax increases endorsed by voters. Sales taxes can be general or specific in form, with general sales taxes levied on the sale of goods or services at the retail level, and specific taxes imposed on selected items such as gasoline. Incremental revenues can be captured and earmarked for specific projects. One challenge in Texas is that the lack of an income tax places a relatively heavy burden on the sales tax; the rate in Houston for example, at eight and a quarter percent, is one of the highest in the nation.

In 1985, The Maricopa (Arizona) Association of Governments (MAG) developed Proposition 300 – a proposed one-half percent sales tax for freeway construction – to finance a regional network of 320 miles of freeways and expressways by 2005. Bond sales, the Arizona and federal governments, and a portion of Arizona gasoline tax revenues provided additional funds. Between 1988 and 1992, the Phoenix area increased freeway and major street capacity by more than any other urbanized area in the US, dramatically reducing

congestion. In 1987, the first full fiscal year the tax was in place, revenues exceeded \$94 million, and were projected to increase by 10 percent annually through the project's 20-year timeline. Actual annual growth rates were closer to one to two percent during the subsequent recession; as a result, MAG scaled back its long-term regional transportation plan in 1994. The tax generated \$264 million in FY 2001, and is projected to generate \$300 million in the final year of the tax, 2005. Total revenues are projected at \$3.8 billion, approximately 60 percent of the total project cost.

Real estate transfer tax

A real estate transfer tax is a tax levied on the sale of certain classes of property – residential, commercial or industrial – that is usually a percentage of the sales price. Tax revenues may be directed to a given government's general fund, or, increasingly, to dedicated funds for natural resource protection and mitigation, and parks and open space.

As another, long-lived example, in 1934 the East Bay Regional Park District was created with a one-half percent assessment on real property in a two county area near San Francisco. The district now owns and operates 53 parks and 92,000 acres and has an operating budget of over \$60 million. Total operating and debt service funds for 2001 are approximately \$86.8 million, 76 percent of which is generated by property tax revenues from the special assessment district (1,745 square miles in Alameda and Contra Costa counties). The remainder is generated by fees for services, rents, and interest. In 1982, the Colorado state legislature ended direct financial support for Denver's four regional institutions: the Denver Art Museum, the Denver Botanical Gardens, the Denver Museum of Natural History, and the Denver Zoo. While the City of Denver continued its public support, residents of the surrounding suburbs and state accounted for a large percentage of visitation. In 1988, voters in a seven-county (Adams, Arapahoe, Boulder, Broomfield, Denver, northern Douglas, and Jefferson) region approved a 0.1 percent sales and use tax within the Scientific and Cultural Facilities District (SCFD), to provide consistent funding to these four institutions, as well as other area scientific and cultural organizations.

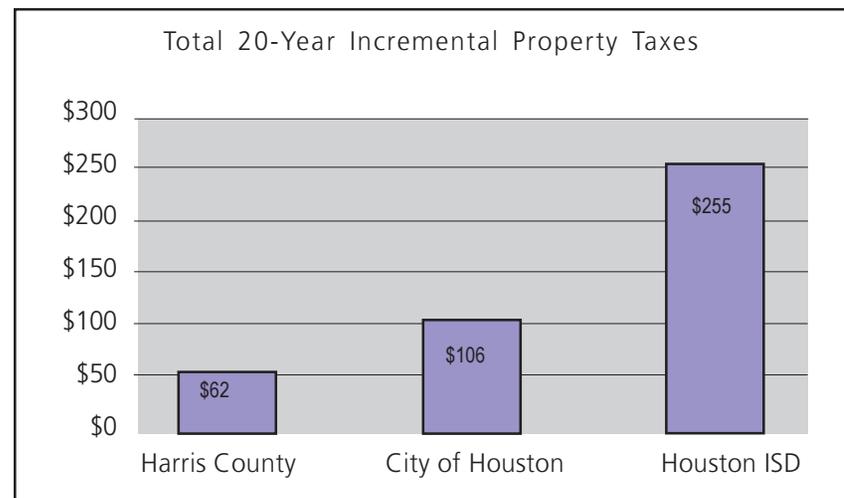
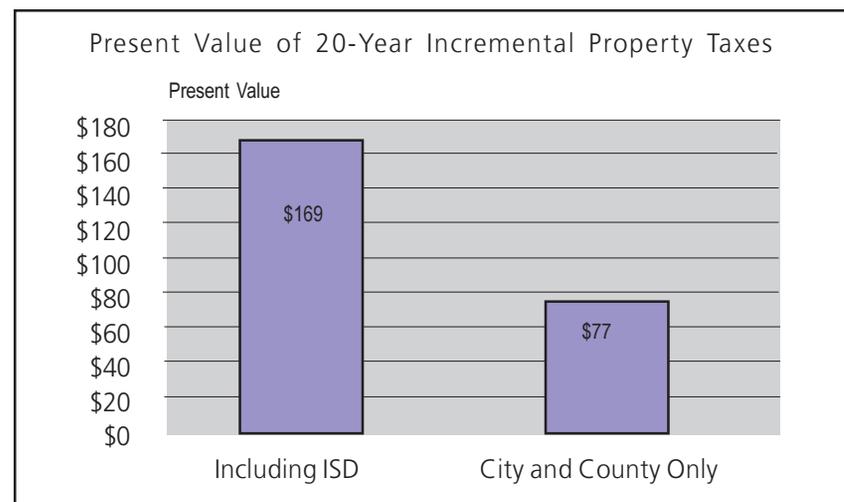
With an approximate \$14.58 per capita contribution, the tax produced \$37 million in 2000. By statute, Denver's SCFD recipients qualify for funding based on a tiered system. Tier I (\$22.5 million in 2000) includes the four regional institutions. Tier II (\$10.6 million in 2000) includes 20 sub-regional organizations that have operating incomes of \$858,290 or more. Tier III (\$5 million in 2000) is comprised of over 280 local organizations such as small theaters, orchestras, and art centers.

Denver voters reaffirmed their support of the SCFD tax in 1994. The current tax ends in 2006, but the legislation to extend it will go before voters in 2004. Should it be approved, annual SCFD revenues are projected to reach \$58.3 million by 2020.

A recent example exists in Dallas. General obligation bonds were issued to partially fund the Trinity River Project in Dallas, Texas. The project was first conceived by a group of Dallas citizens who produced a multi-objective vision for the Trinity River Corridor. Overarching goals of the project are to create new recreational opportunities, encourage economic development, improve transportation, and reduce flood damage reduction along the entire river corridor. Specific projects include a 1400-acre floodway extension, construction of a six-mile levee, construction of the 8-lane Trinity Parkway, and the Great Trinity Forest Park and Equestrian Center.

General obligation bonds, backed by the full faith and credit of the municipality, in this case Houston or Harris County, may be the most straightforward and efficient way of capitalizing the initial stages of the project. A bond issuance may require voter approval, legislative approval, or both.

In 1998, Dallas citizens approved a \$246 million Capital Bond Program for the city share of the 10-year Trinity River regional program. Other agencies will provide approximately \$975.0 million in matching funds for a total project cost of over \$1.2 billion.



Intergovernmental funding

The array of benefits discussed above – and in particular the potential flood-control benefits – is the nucleus of a strong case for state and federal funding. The major applications of intergovernmental funding are likely to revolve around mobility, flood control, and environmental remediation. Some of these funds, including funds for brownfields cleanup and redevelopment, have already found their way to city coffers, and can be employed in the Bayou corridor in the near term.

The riverfronts in Providence, Rhode Island, and in Indianapolis are good examples of the application of federal funds. In both cities the major federal source was the U.S. Army Corps of Engineers’ funding to deal principally with flood control issues. The common thread, and the relevant lesson for the Bayou, was the integration of flood control and surface water management into a system of parks and other public amenities.

For the Indianapolis Central Riverfront, the Corps of Engineers picked up \$52 m, or just under half the project’s \$113 m cost. State and local sources funded the rest.

Sources of intergovernmental funds for Bayou-related projects include the TEA-3 federal transportation program and the Land and Water Conservation Fund (LWCF).

TEA-3: In 2003, Congress is expected to reauthorize federal funding for transportation projects. The five year authorization bill is called “TEA-3”. This authorization will include hundreds of billions of dollars for important transportation improvements. These can be made available to roadway, bridge, trail and related projects, such as the Buffalo Bayou improvements, either through categorical grants or through earmarks in the TEA-3 legislation. Many of the most

<i>Years</i>	<i>0-5</i>	<i>6-10</i>	<i>11-15</i>	<i>6-20</i>
<i>Expected Tax Impact (Average Annual Revenues)</i>	<i>\$1.6 m</i>	<i>\$3.9 m</i>	<i>\$7.1 m</i>	<i>\$11.1 m</i>
<i>Capitalized Value of Incremental Revenue (at 8%)</i>	<i>\$20.0 m</i>	<i>\$49 m</i>	<i>\$89 m</i>	<i>\$139 m</i>
<i>Supportable Public Investment (at 50%)</i>	<i>\$10.0 m</i>	<i>\$24.5 m</i>	<i>\$44.5 m</i>	<i>\$69.5 m</i>

important transportation projects in the nation since 1991 have been funded through earmarks. Houston could request that one of its members of Congress or Senators earmark funds for these purposes. Alternately, Houston could work through the Texas Department of Transportation to receive funds for these projects through regular appropriations.

Land and Water Conservation Fund: The LWCF, administered by the US Department of the Interior, provides funds through the states for land conservation and park development. \$140 million were provided for these purposes in 2002.

TIRZ and other value-capture approaches

Tax-increment reinvestment zones (TIRZ) are a popular tool in Houston for channeling incremental tax revenue back into an area’s redevelopment. The TIRZ essentially earmarks the new tax revenue as a source of funding improvements designed to enhance the value of the zone’s real estate. In Houston TIRZ’s are often linked to and administered by management districts, which employ a special assessment on real property to fund district-related supplementary services, including marketing, management, security, and physical improvements. A TIRZ is a value-capture mechanism. It captures a portion of the new value created by the improvements.

Because of the scale of the anticipated Bayou improvements, TIRZ is an unlikely vehicle to fund a large proportion of the cost, particularly in the near term. Those close to the process have pointed out that bond underwriters are skeptical of anticipated revenues in what they view as a highly cyclical real estate market. Still, TIRZ remains an important tool; its use, however, may be delayed until the prospects for development is closer to the horizon.

The management district structure for funding ongoing costs

Special assessment districts or management districts are distinct units of government that manage resources within defined boundaries. Districts vary in size, and may be established by local governments or by voter initiative. As self-financing legal entities, special assessment districts can generate predictable revenue streams from taxes, user fees, or bonds, directly from the people who benefit from the services.

THE NUMBERS: ILLUSTRATIVE DEVELOPMENT ECONOMICS

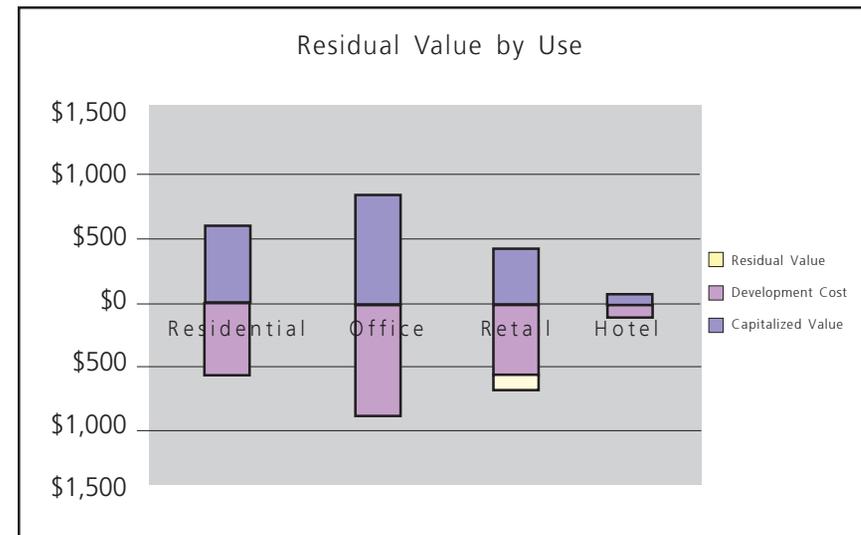
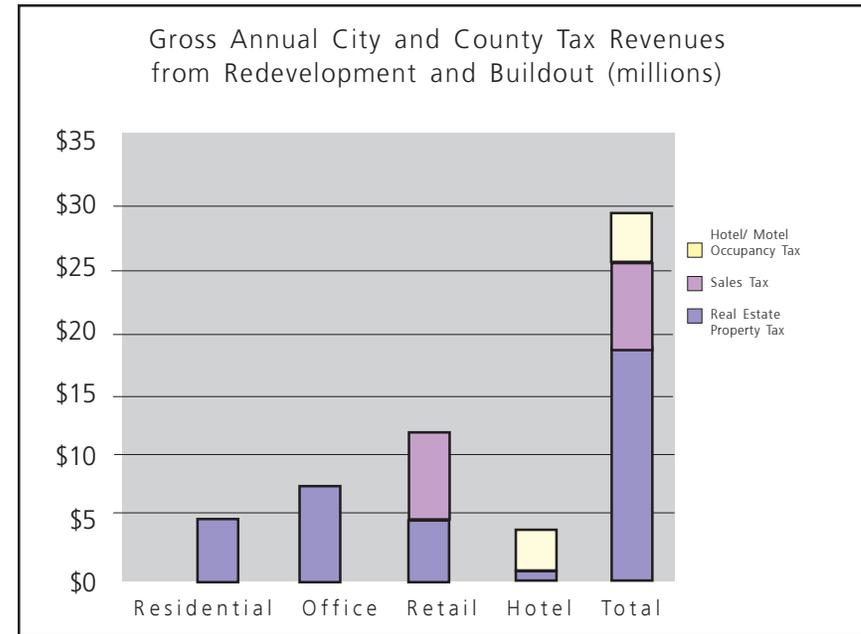
How much money could these sources represent, and how do these revenue streams compare to the likely costs of the redevelopment program? The supportable investment for the quantities of uses identified has been estimated. With the mechanisms outlined above, how much could the sponsors of the effort afford?

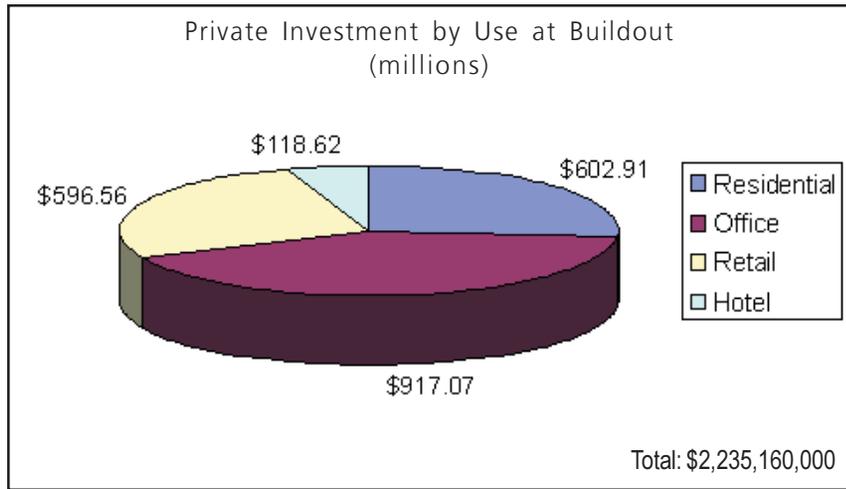
City of Houston Public Financing

Assume for the purposes of analysis that 50 percent of the expected development value in the corridor is uniquely attributable to the kind of capital improvements, identity creation, marketing impact, and other elements envisioned in this Master Plan. This may justify a significant public investment in the form of general obligation bond financing as part of the city's ongoing capital improvement program.

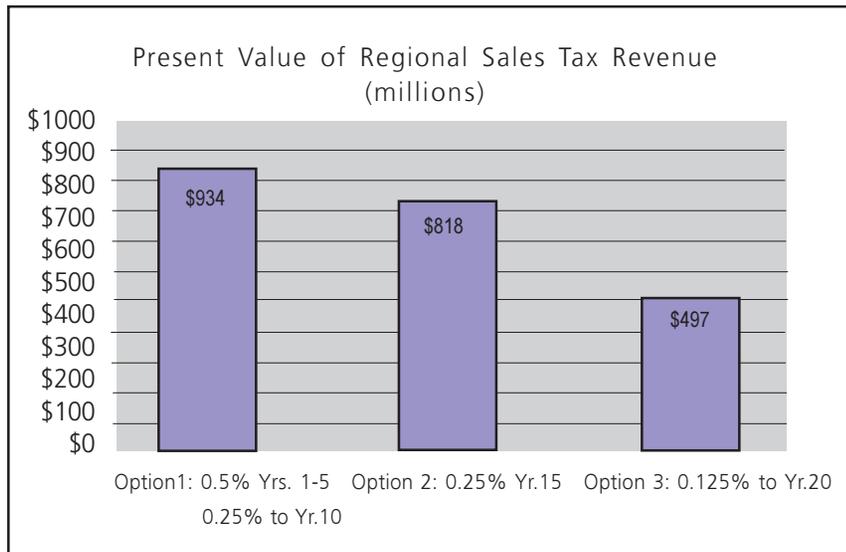
What kind of investment might be justified using this approach? The following chart identifies the revenue-generating potential of a series of general obligation bonds issued based on the expected new investment (and growth of the tax base):

Clearly, this approach has the potential to generate substantial revenues. The results shown above suggest that the supportable city investment in the corridor can be conservatively estimated to be in the range of \$150 million, based on incremental property tax growth. There are several caveats. First, the question of how rapidly the tax base will grow is dependent on a host of macroeconomic factors. Second, the degree to which the investment is truly "net new" to the city or the region is not known, and will depend on the nature of the households and jobs who eventually locate in the corridor. Ultimately, the process is a political one, of allocating the city's resources as a means of investing in the future.





Key Downtown Sites: Estimated private downtown investment totals over \$2 billion. Value of total investment return from development of Buffalo Bayou corridor is estimated at \$5.6 billion – a return of five to one.



County Revenues

The Harris County Flood Control District represents a logical source of county funding. The District is funded by a special property tax levy, and has substantial resources to devote to the critical task of managing floodwaters in Houston and Harris County. Officials estimate the amount of total funding capacity over the next six to ten years at about \$500 million. A significant portion of these funds can be applied to the Buffalo Bayou corridor, devoted to projects with demonstrable flood-control benefits. One obvious priority would be the supplemental channels in the White Oak Bayou/Allen’s Landing area, which show very strong benefits relative to costs.

A Regional Sales Tax Approach

For analysis purposes, an assumed sales tax levy can fund the initial “place-making” and potential flood control improvements, as well as land acquisition. This assessment has been limited to Harris County, though as noted in the Denver and Bay Area examples cited above, other jurisdictions could be part of the levy if they could be shown to benefit.

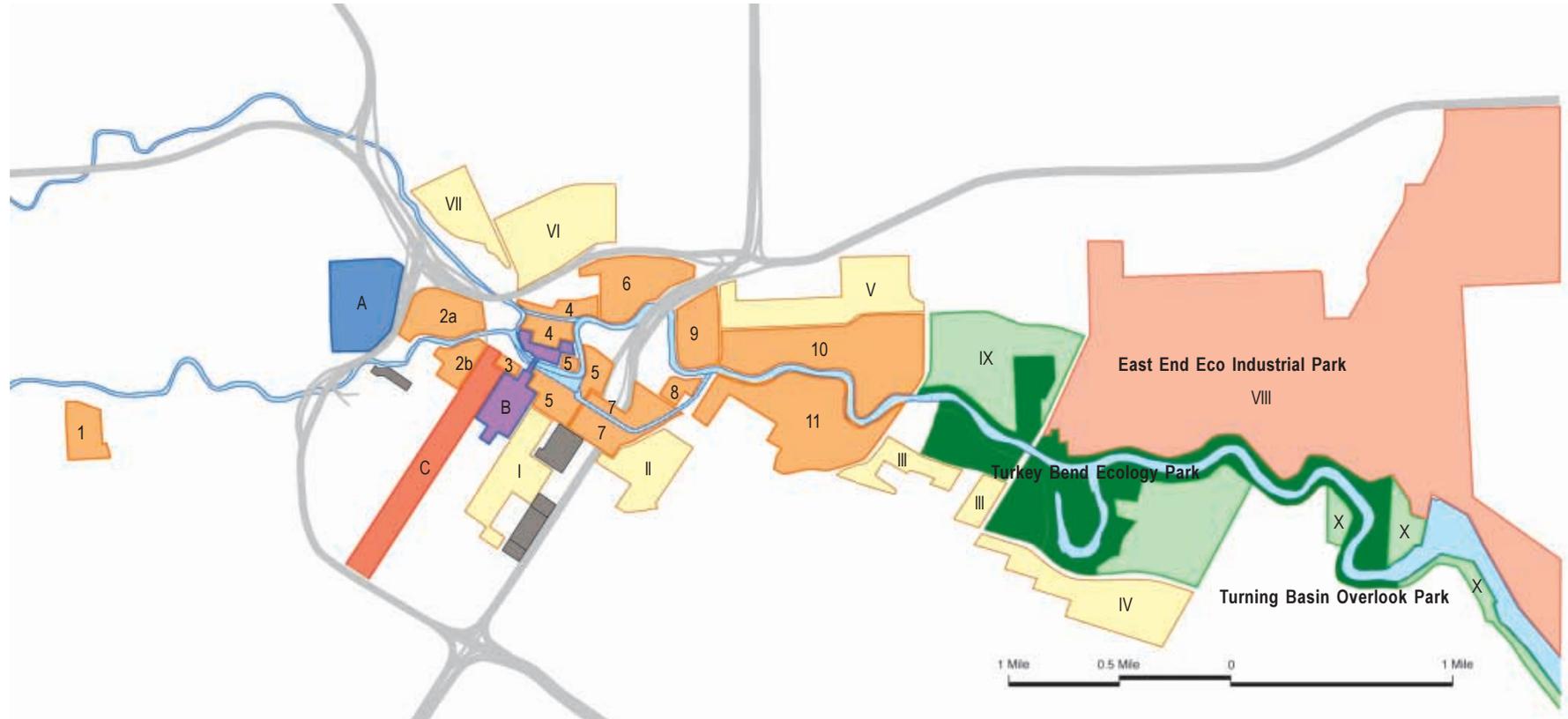
Using assumptions based on the recent volume of retail sales in Harris County, consultants have estimated how much revenue a sales tax would generate, under three different scenarios.

- A modest dedicated sales tax levy of one-eighth of a cent on Harris County retail sales could generate over a 20-year period a present value of approximately \$500 million.
- If the assessment were one-quarter of a cent, but were in place for only 15 years, the sales tax approach could generate a present value of \$818 million.
- A third approach might assess county retail sales at a declining rate, and over a shorter period of time. With a rate of one-half cent in the first five years, and one-quarter cent over the next five years, this approach would generate a present value of \$934 million.

As noted above, options besides a sales tax allocation exist. Because Texas municipalities depend heavily on sales taxes, the rate in Harris County is already quite high. This analysis is intended to make the important point that large-scale public investments anticipated by the Plan are most achievable - and justifiable – with a regional approach. The whole region benefits.



KEY SITES: Development opportunities and transitional sites



DEVELOPMENT SITES

- 1. East Montrose Redevelopment
- 2a. Theater District Expansion North (Post Office)
- 2b. Theater District Expansion South
- 3. Allen Place
- 4. North Canal Neighborhood
- 5. Gable Street Landing
- 6. Elysian Park
- 7. South Canal Neighborhood
- 8. Alexan Redevelopment
- 9. West Jensen Redevelopment/ Bayou Vista
- 10. Richardson Park
- 11. Live Oak Park

TRANSITIONAL MIXED-USE SITES

- I. Crawford Redevelopment
- II. Jensen South Transitional Area
- III. York-Lockwood Transitional Area
- IV. Navigation South Transitional Area
- V. Clinton North Transitional Area
- VI. East North Main Transitional Area
- VII. West North Main Transitional Area

TRANSITIONAL INDUSTRIAL SITES

- VIII. East End Eco-Industrial Park

GREEN TRANSITIONAL AREAS

- IX. Turkey Bend Expansion
- X. Turning Basin Overlook Park Expansion

OTHER DISTRICTS

- A. Consolidated Municipal Facilities District
- B. Consolidated County Justice Facilities District
- C. Main Street Commercial Corridor

6 IMPLEMENTING THE PLAN

A range of land-planning prototypes have been studied to help in formulating policies that will assure restoration and maintenance of the entire ten mile Buffalo Bayou corridor, providing for clean water, good trail design, event areas, parks, small boat landings, visitor services, nature and history study zones, and special destinations.

Also under study have been programs for protection of land edges, for universal access to the water's edge, and for achievement of environmentally harmonious development on all adjacent sites. An allied objective has been to maximize the development stimulus generated by an improved Buffalo Bayou corridor and the opening of Allen's Landing, leading to increased land values and incentives for related commercial growth in the WaterView District, Theater District, and near-Downtown centered on Main Street, and to provide for affordable housing and the integrity of existing neighborhoods.

In approaching the implementation of the Buffalo Bayou Master Plan, we initially proposed several principles that have proven helpful in evaluating alternative approaches and models:

- First, a concern for effectiveness in achieving the full potential of the elements contained within the Master Plan;
- Second, a concern for the integration of environmental values with urban development goals;
- Third, and not least, a concern for equity and the full participation of all of Houston's citizens in the benefits of a revitalized Bayou.

Implementing this Master Plan will require the continued leadership of the Buffalo Bayou Partnership working in tandem with private sector interests and public agencies. These include but are not limited to the City Parks and Planning Departments, Public Works, Texas Department of Transportation, Metro, and the Harris County Flood Control District. On an ongoing basis there will be intersection with the Mayor's Office and City Council and with other City and County Departments.

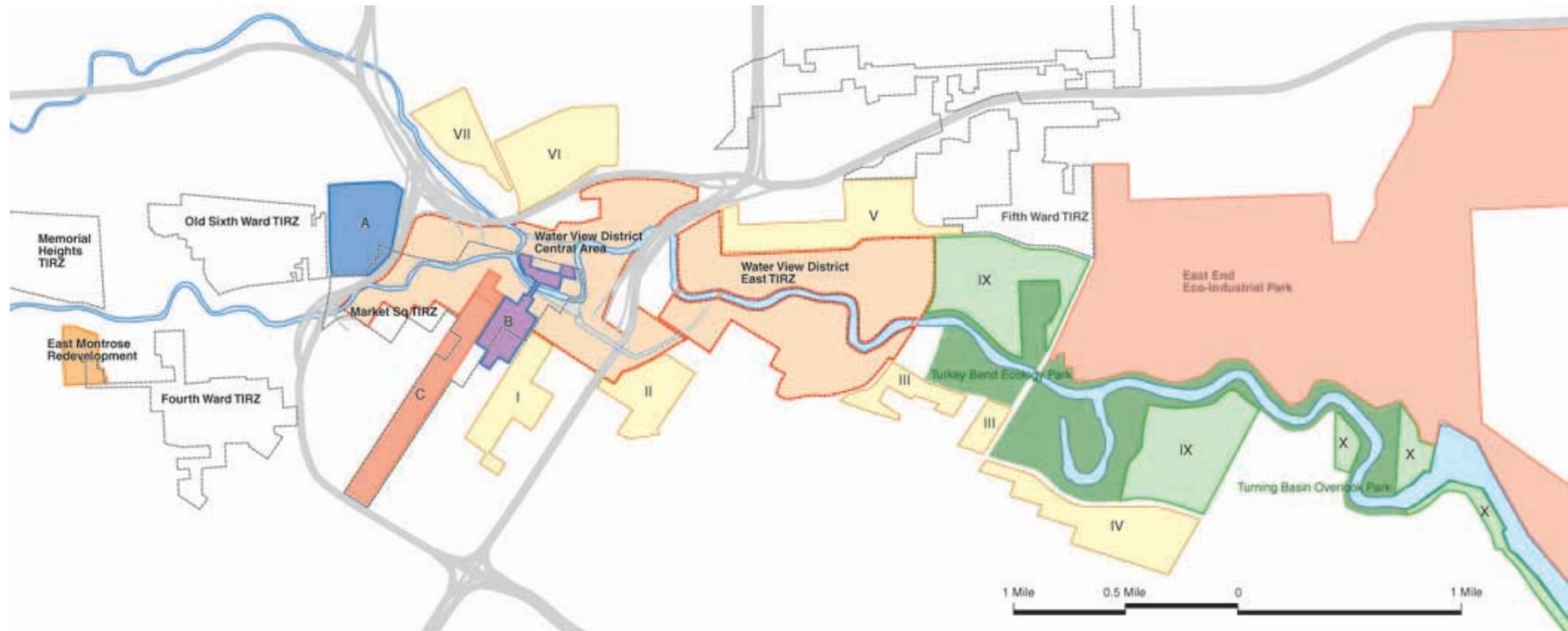
A STRUCTURE FOR IMPLEMENTATION

Of the several models considered for implementation of the Master Plan, the most suitable appears to be a structure based on a Buffalo Bayou-wide special district, containing within it a new TIRZ on the East End. (A second TIRZ area in central downtown might become incorporated in one of the existing TIRZs.) It can be a petitioned TIRZ with land use controls. This is justified by the need for predictability in development outcomes in the face of major anticipated ownership and land use changes within the zone. Outside the Eastern TIRZ, a consistent standard of development will be sought through the application of guidelines within the rest of the Buffalo Bayou Special District.

The Partnership in its current configuration enjoys a broad mandate to implement the recommendations of the Buffalo Bayou Task Force of 1986. Still, the effective completion of this Master Plan will require an evolution of the role and possibly the structure of the Partnership commensurate with the changes to Buffalo Bayou it envisions. For example, although the Partnership in its current form can continue to collaborate with other organizations and build on its role as an advocate for the Bayou, an inability to assemble significant land holdings, set the pace of redevelopment, or implement development standards will result in "development as usual," accompanied by a continued degradation of the quality of place. Equity will continue to suffer as well, with further reductions in public access to the Bayou and mounting concern about housing affordability.

Accordingly, we have recommended that the Partnership organize its work under two principal operating divisions: a non-profit Buffalo Bayou Development Division, and a Buffalo Bayou Conservation Division. The Conservancy would pursue a program of park improvements and maintenance, the Development Division would acquire land and pursue redevelopment projects consistent with the mission of the Partnership. A third activity, conceived as a Design Center, will provide public outreach and public information, as well as technical assistance and design services throughout the corridor.

IMPLEMENTATION PLAN: EXISTING & PROPOSED TIRZs



TRANSITIONAL MIXED-USE SITES

- I. Crawford Redevelopment
- II. Jensen South Transitional Area
- III. York-Lockwood Transitional Area
- IV. Navigation South Transitional Area
- V. Clinton North Transitional Area
- VI. East North Main Transitional Area
- VII. West North Main Transitional Area

TRANSITIONAL INDUSTRIAL SITES

- VIII. East End Eco-Industrial Park

GREEN TRANSITIONAL AREAS

- IX. Turkey Bend Expansion
- X. Turning Basin Overlook Park Expansion

OTHER DISTRICTS

- A. Consolidated Municipal Facilities District
- B. Consolidated County Justice Facilities District
- C. Main Street Commercial Corridor

Priority Plan projects, such as redevelopment of the Post Office site, can be accomplished by the Buffalo Bayou Development Division in collaboration with a private developer. The Partnership, with the availability of financial resources on the scale described in the preceding chapter, can option the site in coordination with city and federal interests; then development can be launched in a joint venture with one or more private developers. In such associations, the Partnership will be able to motivate a Bayou-wide transformation.

The Partnership's Development Division, conceivably a major equity partner or landowner, can play a lead role in the establishment of the petitioned Eastern TIRZ. In both the Central and Eastern TIRZs, new capital will become available for the provision of place-enhancing amenities. The profits of compatible, limited development activity, possibly through joint ventures with private sector developers, will be used to create affordable housing and to partially underwrite the costs of parkland acquisition, restoration, and maintenance.

A Buffalo Bayou Design Center will further the implementation of the Buffalo Bayou Master Plan by providing technical assistance and design services to development projects in the District and education about the broad design objectives of the Master Plan. Further, it could provide recognition and visibility for exemplary development projects within the District.

By these means, fundamental change in the character of the Bayou District would be achieved through an ambitious suite of projects and greater control of development results, under BBP leadership.

IMPLICATIONS OF A NEW TIRZ IN THE WATERVIEW AREA

The Eastern TIRZ described above can provide a special tax assessment which over time will finance part of the costs of reclaiming the Bayou and adjoining redevelopment sites. The present value of the increment of new assessed value of this TIRZ, in combination with value added to other TIRZs taken together, has been calculated as \$770 million, which, net of tax revenues earmarked for the Houston Independent School District, will yield \$330 million to finance improvements.

The new TIRZ will join several TIRZ districts that already line the Bayou. As mentioned above, a petitioned Eastern TIRZ will require the support of landowners (representing 50% of property value in the zone), and will provide not only a source of funds, but also land use control powers that could be applied toward implementing the Master Plan. The Partnership can take the lead in recruiting support from fellow landowners in the zone, and can play a substantial role in its ultimate management, initially by seeking representation on its Board of Directors through Mayoral appointment.

One model for a possible Partnership/TIRZ relationship may be found in the initial interlocking relationships of Central Houston, Inc., the Downtown District, and the Main Street/Market Square Redevelopment Authority. In that case, the Authority was the operating entity for the TIRZ, with its board, appointed by the Mayor and approved by the City Council, identical with that of the TIRZ. The Authority, along with the TIRZ, contracted with the Downtown District for administrative support. The District itself was staffed under contract with Central Houston, Inc. In the Buffalo Bayou case, the Partnership could be a provider of technical and management services under contract to the TIRZ as well as playing a policy role through representation on their boards.

The feasibility of establishing the new TIRZ will revolve around several variables:

- Compatibility with the numerous existing TIRZs (including, but not limited to boundary-drawing issues, as the physical boundaries of TIRZs may not overlap);
- Acceptability to existing property owners, especially in the case of the petitioned TIRZ, which may be a function of the net value added by Buffalo Bayou improvements over the impacts of development constraints imposed under the TIRZ;
- Revenue-generating potential (quantified above). Of course, these revenues will need to be associated with a compelling package of improvements.

Management Implications of the Development Division, Parks Conservancy, and Design Center

In addition to the potential new TIRZ, the Buffalo Bayou Partnership, as stated, is proposed to play an expanded role by redefining its responsibilities in its two operating divisions: 1) a Conservation Division (based on the Central Park Conservancy in New York City), to pursue an aggressive program of park improvements; 2) a robust, non-profit Development Division (perhaps in the manner of River Valley Partners, successors to The River City Co. in Chattanooga), to pursue redevelopment projects, and a design center focused on the Buffalo Bayou District, modelled after several of the more recent environmentally based centers established around the U.S.

The two divisions can be managed as arms of the existing Partnership. A principal advantage of this approach will be the continued integration of conservation and development goals, as has been a hallmark of the Master Plan. Where conflicts between these goals arise, as they may be expected to, the Partnership will be able to provide a vehicle for their harmonious resolution. The Partnership would thus be pursuing a joint program of conservation and development, permitting the profits of compatible development activity to partially underwrite the costs of land acquisition, restoration, and maintenance.

Implementation Alternatives and Caveats

Should the petitioned Eastern TIRZ fail to win support, it may be possible to achieve some of the same land use control benefits through the Houston City Planning Department:

- *Platting streets*: The City can plat streets in the Bayou corridor and require that developers finance street improvements consistent with the City's official street layout;
- *Subdivision approvals*: The City can utilize its subdivision powers to require that street layouts and development proposals follow the Bayou Master Plan;

- *Site plan review*: Defining the Bayou as a District on the model of the Main Street Corridor, the City can adopt a site plan review ordinance regulating setbacks, heights, roadway and parking layouts, landscaping and other features of development. A set of performance standards can be included, regulating glare, noise, dust and other noxious activities. This program can be especially important in preserving the scenic attributes of lands adjoining proposed park areas.

There are other options for developing and managing new park spaces. Perhaps the most straightforward alternative would be for the City of Houston or Harris County to assume responsibility for developing and managing the park as an addition to their existing park systems. This approach will, however, create major new management and financial obligations for City or County Park authorities. Further, these organizations do not currently have authority or expertise in managing or promoting development or redevelopment projects adjoining the Bayou.

With respect to the BBP Development Division, it should be noted that development work in a brownfields context will bring potential liabilities that need to be addressed as part of a well thought-out legal and risk management strategy. This approach should be extended to address liability with respect to water-based activities as well. This is not to negate the potential value of reutilized brownfield sites, which have many applicable uses if remediation is coordinated with the City's Department of Brownfields Management.



NEXT STEPS: GUIDELINES AND LOCAL AREA PLANS

7



The Master Plan for Buffalo Bayou will take many years to realize. Combined and separate actions by the various implementers and promoters must unfold in a sequenced progression of moves, directed by the coordinated Master Plan.

The Plan has identified key development and conservation sites, and has presented a set of actions organized by priority. These prioritized efforts intend to leverage targeted public investments by sowing the seeds for wider benefits through successive private revitalization efforts.

Typical Street Section at Crawford “Super” Boulevard looking South



New private development projects can, however, compromise the larger public purposes of the Plan, if they infringe on public access to the Bayou and its linked open spaces, or are not responsive to the character of their neighborhoods. This section places concerns relating to compatible development in the realm of public discussion and recommends a framework for guiding development in the Bayou neighborhoods.

Key aspects of a development guidance system should include:

- A new Buffalo Bayou District introducing guidelines for development within the influence area of Buffalo Bayou.
- Local Area Plans for key development sites.
- A priority WaterView East TIRZ.
- Plans for transitional sites.

BUFFALO BAYOU DISTRICT GUIDELINES

Guidelines prescribing development compatible with the public purposes of the Master Plan need to be developed and given regulatory authority. This effort outlines a framework for development guidelines and the issues that need to be addressed. Actual guidelines for the Buffalo Bayou District must be developed through a dedicated public process, with regulatory and jurisdictional support from the City. The ULI guidelines for the Main Street Corridor are a useful foundation on which to develop guidelines that overlay the specific concerns of the Buffalo Bayou District.

Buffalo Bayou District guidelines need to address:

- The Bayou Waterway
- Streets and Street Edges: Festival Streets, Green Streets (School Links to the Bayou), and Neighborhood/ Local Streets
- Environmentally Sound Development (Low Impact Development)
- Neighborhood Scale and Quality of Development
- Shared Facilities, such as Shared Parking
- Signage/ Wayfinding and area specific guidelines for lighting

The Bayou Waterway

The Bayou and its banks are an important public resource, and critical to the environmental health of the region. Special considerations must be applied to the development of the Bayou's banks. In order to address flooding and water quality, a development-free corridor can be maintained along the edges of the Bayou. It is recommended that development be set back 150-feet from the waterline, or beyond

Guideline Issues

A STREET - BASED PLAN FOR BAYOU LANDS

Definition:

An open civic street-based plan – without gated developments – is the best means for cities to connect people and neighborhoods in an urban spirit around public streets and sidewalks.

- It orients streets to promote public frontage facing the Bayou.
- It organizes sites to interface with the street and its combination of public and private activity.
- It is built-out to achieve consistent scale and character among different buildings and times, which unifies individualized architecture and brings different heights and scales into a varied but harmonious whole.

Guideline Issues

A GOOD “LOW IMPACT “ PALETTE FOR THE BAYOU

In addition to ecological considerations, “Low impact” means building at efficient and economical densities.

Density has impact on economies and population.

Physical density is the amount of built space and human occupancy on a square foot or an acre of land .

Too-low density wastes land and resources.

Human density has impact on local markets, city revenue, street activity and on urban security.

Commercial density produces revenue for both the city and for the maintenance of more open space and amenities.

Benefits of a Low-Impact Design Palette:

- Promotes “soft surface” urban fabric (reduced asphalt and concrete) that respects climate and ecosystems. This includes block plans that feature courtyard buildings, roof gardens, pervious (absorbent) parking surfaces, streets with medians drained into grassy swales (absorbent ditches).
- Seeks development using high quality materials, workmanship, and design.
- Local vernacular for sub-tropical climates includes semi-open plans (“green buildings”) for natural ventilation, with the generous ceiling heights found in lofts.
- Building types include street-based townhouses, apartments above; ground floor retail, midrise, and highrise construction if it has a friendly street level design and observes eco-technology standards.

Typical Street Section for Transit Corridor at Clinton Boulevard



the 100-year flood line, depending on whichever is greater. It is also recommended that the banks within this set-back area be held under common ownership or control, in order to provide consistent maintenance, and continuous public access.

Streets and Street Edges

Streets within the Buffalo Bayou district are important to establishing continuity and connections between key destinations. Wide, tree-lined sidewalks will help to invite walking in a humid and car-oriented city. Pedestrian traffic translates directly into purchasing power. In a city of goods and services, people who walk are people who buy, eat and drink, support culture, and who socialize, keep watch over public safety, and draw more people to the streets and increase public investment in the city. In Houston, as evidenced by the Cotswold streets project, as in other cities that are drained by sprawling suburban growth, there is growing awareness of the importance of pedestrianization as key to downtown revitalization. Guidelines for the Buffalo Bayou District need to apply this pioneering effort to greater and targeted impact. Key connections, such as Festival Streets proposed in Downtown, can have guidelines for street frontages to create a synthetic and high-interest pedestrian environment. Retail and cultural opportunities, including culinary, night and day entertainment events, shops, restaurants and services, can be encouraged at street level. Apartments and lofts, along with business and professional offices, can be accommodated on higher floors, to maintain a mixed-use character to these key streets.

Environmentally Sound Development

Environmentally sound development, or Low Impact Development, advocates a variety of techniques to reduce and purify stormwater runoff at the source. By changing the way buildings, pavement and landscapes are designed and built, stormwater can be retained on site to reduce the intensity and volume of urban runoff at the Bayou. Rooftop gardens absorb stormwater and slow its flow to drainage structures at ground level. Underground storage cisterns store stormwater runoff and slowly release it, reducing the volume and speed of urban runoff. Vegetated swales slow stormwater runoff and filter out pollutants. Porous pavement allows a portion of stormwater runoff to filter back into the soil or, in the case of impermeable soils, into sand filters and underground detention basins. Bio-filters channel stormwater runoff from roads, parking lots, plazas, and pedestrian spaces below buildings into swales filled with plants where stormwater is purified before draining into underground cisterns. All of these approaches alleviate flooding.

Other low-impact development methods provide a range of environmental benefits (See 4B: Environmental Quality and the Eco-Region, pg. 97-100).



Rooftop garden at a supermarket in Germany cools and absorbs rainwater.



Bioretention landscape in a parking lot in Maryland slows runoff.

Key Redevelopment Sites



KEY

1. East Montrose Redevelopment
2. Theater District Expansion
 - a. North Site (Post Office)
 - b. South Site
3. Allen Place
4. North Canal Neighborhood
5. Gable Street Landing
6. Elysian Park
7. South Canal Neighborhood
8. Alexan Redevelopment
9. W Jensen Redevelopment/ Bayou Vista
10. Richardson Park
11. Live Oak Park

Neighborhood Scale and a Quality of Development

The restored Buffalo Bayou needs to become integral to the Bayou neighborhoods. This can be accomplished by combining imaginative open space planning, environmental restoration and landscape architecture with the urban planning. An existing example in Houston of a well-scaled community includes the Heights Neighborhood.

Shared Facilities

Creative siting and design of parking structures and parking lots can ensure that the restored Bayou and its banks are readily accessible by automobiles, without the associated aural or visual intrusions that are usually associated with such utilitarian structures.

Lighting/ Signage/ Wayfinding

Lighting, signage, and wayfinding standards and guidelines are useful tools to establish visual continuity and help to define “place”. It is recommended that the key neighborhoods and destinations identified in the Plan have theme-based guidelines that establish their unique identity, while maintaining a sense of continuity throughout the Buffalo Bayou District.

LOCAL AREA PLANS FOR KEY SITES

The WaterView area covers nearly 500 acres, and is the mixed-use center of the Buffalo Bayou District. A set of key projects critical to activating both banks of Buffalo Bayou have been identified for joint public-private development. Local area plans or Planned Unit Developments (PUDs) will be required to create these planned developments. Development capacities for these key sites are illustrated in the Development Capacities table in this chapter. Illustrative plans for these sites are included in Section 4A: Urban Development and Design Plan. Detailed feasibility studies for these sites will be required before they are developed, to adjust to evolving local ownership and market conditions.

Some key waterfront development sites identified here fall partly or wholly within existing TIRZs whose primary mandate and focus has not been the revitalization of Buffalo Bayou and its bank-edge sites. If the boundaries of existing TIRZs are expanded to incorporate key new sites, some readjustment of priorities and redirection of expanded revenues reflecting the enlarged mandate of these TIRZs will be required to achieve the responsible and coordinated development of both banks of Buffalo Bayou.



Parking structures can blend into neighborhoods (Garage, Rochester, NY)

Guideline Issues

WHAT'S GOOD ABOUT DENSITY?

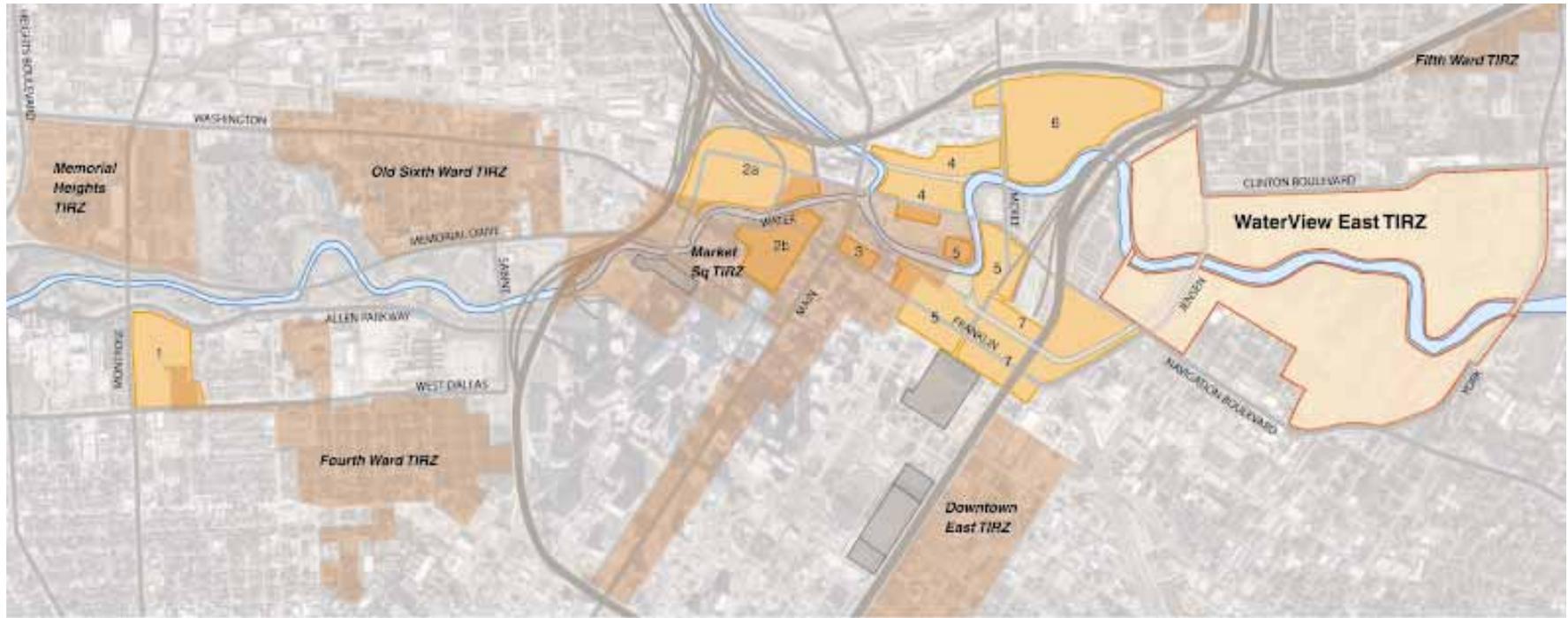
A city of measurably low density, like Houston, is paying for extensive networks of infrastructure sprawled over large areas – roads, utilities, and public services – that can support more people than are there to pay for them. The consequence of low density is lower tax revenue to carry city budgets, which translates into higher taxes spread among the existing users.

In every downtown Houston neighborhood, there are areas where the rhythmic fabric of homes and buildings is interrupted by vacant lots, parking lots and abandoned structures. This contributes to low density, unsafe streets, poor pedestrian activity, and above all low revenue return to the City, which burdens all other taxpayers in their share of city expenses.

INFILL OPPORTUNITIES

Seizing opportunities for infill residential development on such sites – and stimulating them by incentives – will benefit both community coherence and quality. This applies to commercial and residential lands, where infill building can have major impact at the neighborhood level and on the service of the city as a whole. Increased density need not be related to height at all. It is often the result of simply activating vacant sites, filling voids, making more compact designs, and accommodating more uses on currently underbuilt sites. The Plan envisions increased density that does not require high-rise building, that does not violate historic character and scale, that does not dominate the scenic Bayou landscape, and nonetheless makes downtown Houston a richer, more rewarding and more vital place to live, work, and spend leisure time.

Existing and Proposed TIRZs



KEY

- 1. East Montrose Redevelopment
- 2. Theater District Expansion
 - a. North Site (Post Office)
 - b. South Site
- 3. Allen Place
- 4. North Canal Neighborhood
- 5. Gable Street Landing
- 6. Elysian Park
- 7. South Canal Neighborhood

- KEY REDEVELOPMENT SITES
- EXISTING TIRZs
- PROPOSED NEW TIRZ
- KEY SITES AREAS WITHIN EXISTING TIRZs



Key Redevelopment Sites: Potential Development Capacity								
Site Area (Acres)			Proposed Redevelopment Program (GSF)					
Total			Residential	Office	Retail	Hotel	Inst./ Cultural	
1	East Montrose Redevelopment	25.8	1,639,600	1,059,800	302,800	151,400	0	0
2	Theater District Expansion							
	a. North Site (Post Office)	25.6	2,818,400	1,471,520	0	323,130	197,750	575,000
	b. South Site	23.5	1,341,500	670,400	0	671,100	0	0
3	Allen Place	2.9	560,000	168,000	224,000	56,000	0	0
4	North Canal Neighborhood	26.7	1,868,400	1,158,780	223,650	184,670	0	60,800
5	Gable Street Landing	18.8	1,676,900	785,400	224,400	330,600	229,600	121,500
6	Elysian Park	30.5	2,400,200	1,363,640	966,560	70,000	0	0
7	South Canal Neighborhood	32.4	4,406,300	3,038,020	518,110	370,810	0	42,200
8	Alexan Redevelopment							
9	W. Jensen Redevelopment/Bayou Vista	30.7	1,896,800	1,658,480	222,520	15,800	0	0
10	Richardson Park	136.8	5,830,850	2,503,350	2,142,000	22,500	238,500	686,000
11	Live Oak Park	121.4	3,078,200	2,949,200	64,500	64,500	0	0
Total		474.1	27,517,150	16,826,590	4,888,540	2,260,510	665,850	1,485,500

WaterView East TIRZ: Illustrative Plan



WATERVIEW EAST TIRZ

A priority 315-acre WaterView East TIRZ is proposed as a framework for the development of sites in the East End. The priority WaterView East TIRZ is proposed with jurisdictional boundaries that exclude areas already included in existing TIRZs. The WaterView East TIRZ comprises four discreet sites on the north and south banks of Buffalo Bayou located East of US-59 and Clayton Homes, and bordered on the East by Hirsch and York Streets. A TIRZ including these sites can help to draw redevelopment to the East Sector, creating a new high quality neighborhood with Buffalo Bayou at its center. This priority project, to be developed by a joint public-private partnership, can help to demonstrate the key objectives and strategies of the plan and spur the revitalization of the East End, with its enormous land resources.

The sites proposed for the WaterView East TIRZ include:

Richardson Park

This 137-acre key site on the north side of Buffalo Bayou is bounded by Jensen Street on the West, Clinton Street on the North, and Hirsch Street on the East, and is comprised of two major holdings: the Halliburton site (formerly Brown & Root), and the Montgomery Ward site. As a gateway to the Bayou for the Fifth Ward, public open space leading to the Bayou can be a key element structuring the plan for this area. The conceptual plan for the area, if available, (See WaterView East TIRZ: Illustrative Plan), proposes a community Village Green, a multi-purpose open space with a focus on neighborhood-level gatherings, markets, and fairs, and the occasional overflow parking for special events on the Bayou.

Live Oak Park

On the south bank of Buffalo Bayou facing the Richardson Park, this 121-acre site includes a combination of smaller holdings along the Bayou. These holdings are largely under-utilized industrial sites on potentially prime waterfront property. The conceptual plan for this area proposes a neighborhood park along Kennedy Street for the existing community to the site's south, while providing public access to the waterfront along North Live Oak Street.

Alexan Redevelopment

The Alexan Redevelopment (formerly El Mercado) is presently slated for redevelopment as housing, and includes two properties, the Alexan Lofts, an adaptive reuse of the old Mercado building, to be developed by Trammel Crow, and new town-homes to its East, to be developed by Perry Homes (See Chapter 1: Existing Conditions and Efforts, page 18).

West Jensen/Bayou Vista Redevelopment

This 31-acre site located west of Jensen Street on the north bank of Buffalo Bayou is comprised of two key holdings, both presently slated for redevelopment as housing. One of the two holdings is presently being planned for medium density housing under the name Bayou Vista. The conceptual plan for the WaterView East TIRZ (See WaterView East TIRZ: Illustrative Plan), proposes loft housing along the northern part of the site with a significant percentage of live-work units. The southern part is well sited to capitalize on the views of the Skyline District and the Bayou. Mid-rise condominium and apartment buildings are proposed around a consolidated open space facing the Bayou. Framing these redevelopment sites are a set of public open spaces which include:

Symphony Island Performance Center

Programmed for audiences up to 25,000: up to 10,000 on grassy amphitheater-type seating, and an additional 15,000 on lawn seating, this open-air performance center is a new venue for outdoor performances and events, a “Tanglewood of Texas.”

Buffalo Bayou Wetlands Park at Navigation and York

This 63-acre park is a key element of the proposed 343-acre Turkey Bend Ecology Park (See 4D: Landscape Plan). This site groups presently underutilized industrial holdings, some of which have already been acquired under the Buffalo Bayou Partnership’s program of land acquisition for public open space.

A Reconfigured Guadalupe Park

Conceptual plans for the South Canal (See 4C: Flood Management Plan) propose the expansion and reconfiguration of Guadalupe Plaza. It should be extended on City-owned land between the Alexan site and the Bayou, to provide graded banks along the Bayou with grassed amphitheater seating. Similar landscaping on the north bank of the West Jensen redevelopment called Bayou Vista, will create a Bayou-side viewing area for water-based events. Landings on both sides of the Bayou with improved access up to bank-level amenities and parking are proposed to attract greater recreational use.

WaterView East TIRZ Illustrative Pro Forma

The following Illustrative Pro Forma for the WaterView District East TIRZ relies on these key assumptions:

- Exclusion of off-site trunk infrastructure costs.
- Exclusion of demolition/brownfield clean-up costs.

- The ability of the area to generate rent premiums over time based on new public investment.
- The ability of the area to capture the entire estimated residential market potential and half of the office potential for the Bayou over the next 20 years.
- Substantial public investment in the area to offset development costs in the order of \$85 million.

The analysis clearly indicates that with substantial public investment the development economics are favorable, with an Internal Rate of Return of around 10 percent. In addition to the pro forma analysis, the Plan also conducted an analysis of the anticipated fiscal revenues attributable to the development. These are summarized in the chart on the next page. The chart indicates that the development is capable of generating substantial public revenues, which the Plan conservatively estimates at around \$85 million. To place this in context, total 20-year development costs are estimated at around \$900 million.

The public investment line item included in the pro forma (next page) approximates the values in the chart. However, as the Plan has previously indicated, funds could be from a number of sources, most notably Harris County Flood Control, Federal and/or State special appropriations, special bonding, and a regional assessment for Bayou-related infrastructure.

This analysis is necessarily conservative, in that it bases a long-term future on relatively short-term market and economic trends. As has been seen before in large-scale urban redevelopment planning, improvement of the Bayou corridor has the potential to alter the marketplace fundamentally. A more optimistic economic future could mean a stronger private-sector response that would likely lessen the need for public investment.

WaterView East TIRZ Supportable Investment

City of Houston Incremental Property Tax Revenues and Supportable Investment				
	Yr. 0-5	Yr. 6-10	Yr. 11-15	Yr. 16-20
Expected Tax Impact (Avg. Annual Revenues)	\$1.2 m	\$3.1 m	\$4.4 m	\$5.1 m
Capitalized Value of Incremental Revenue (at 8%)	\$14.5 m	\$38.2 m	\$54.6 m	\$63.3 m
Supportable Public Investment (at 50 percent)	\$7.3 m	\$19.1 m	\$27.3 m	\$31.7 m

PLANNING FOR TRANSITIONAL SITES

A number of areas surrounding the identified key development sites can be expected to be activated as investments in key sites are made, and the benefits of area-wide environmental and infrastructural improvements are seen. While the activation of these sites can be expected to take many years, possibly beyond the 20-year horizon of this Master Plan, plans for development, followed by the reservation and acquisition of lands for infrastructure and open space, need to be made in the present time frame, to allow for value-added development in the future.

WaterView East TIRZ: 20-year Development Pro Forma

In Current Uninflated Dollars (000's)

Variable	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
<i>Development Costs</i>											
Office	(\$29,147)	(\$29,147)	(\$29,147)	(\$29,147)	(\$29,147)	(\$29,147)	(\$52,464)	(\$52,464)	(\$52,464)	(\$52,464)	(\$52,464)
Residential	(\$8,580)	(\$8,580)	(\$8,580)	(\$8,580)	(\$8,580)	(\$8,580)	(\$20,592)	(\$20,592)	(\$20,592)	(\$20,592)	(\$20,592)
Retail	\$0	\$0	\$0	\$0	\$0	\$0	(\$2,708)	(\$2,708)	(\$2,708)	(\$2,708)	(\$2,708)
Hotel	\$0	\$0	(\$57,600)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Sub-Total	(\$37,727)	(\$37,727)	(\$95,327)	(\$37,727)	(\$37,727)	(\$37,727)	(\$75,764)	(\$75,764)	(\$75,764)	(\$75,764)	(\$75,764)
<i>Net Revenues (1)</i>											
Office	\$0	\$2,630	\$5,656	\$9,120	\$13,071	\$16,748	\$20,600	\$27,449	\$34,628	\$42,149	\$50,024
Residential	\$0	\$88	\$189	\$304	\$436	\$586	\$756	\$1,138	\$1,572	\$2,066	\$2,625
Retail	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$556	\$1,140	\$1,753	\$2,395
Hotel	\$0	\$0	\$0	\$6,426	\$6,522	\$6,620	\$6,720	\$6,820	\$6,923	\$7,026	\$7,132
Sub-Total	\$0	\$2,718	\$5,844	\$15,850	\$20,030	\$23,954	\$28,075	\$35,963	\$44,263	\$52,994	\$62,176
Public Investment	\$7,000					\$19,000					
Net Operating Income	(\$30,727)	(\$35,008)	(\$89,482)	(\$21,877)	(\$17,697)	\$5,227	(\$47,689)	(\$39,801)	(\$31,501)	(\$22,770)	(\$13,588)
<i>Variable</i>											
	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20	Total
<i>Development Costs</i>											
Office	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	(\$437,200)
Residential	(\$20,592)	(\$20,592)	(\$20,592)	(\$20,592)	(\$20,592)	(\$25,740)	(\$25,740)	(\$25,740)	(\$25,740)	(\$25,740)	(\$386,099)
Retail	(\$5,000)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	(\$18,542)
Hotel	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	(\$57,600)
Sub-Total	(\$25,592)	(\$20,592)	(\$20,592)	(\$20,592)	(\$20,592)	(\$25,740)	(\$25,740)	(\$25,740)	(\$25,740)	(\$25,740)	(\$899,441)
<i>Net Revenues</i>											
Office	\$58,267	\$59,723	\$61,216	\$62,747	\$64,315	\$65,923	\$66,912	\$67,916	\$68,935	\$69,969	\$867,997
Residential	\$3,256	\$3,967	\$4,766	\$5,663	\$6,667	\$7,790	\$9,212	\$10,804	\$12,582	\$14,566	\$89,032
Retail	\$3,069	\$3,775	\$3,869	\$3,966	\$4,065	\$4,166	\$4,229	\$4,292	\$4,357	\$4,422	\$46,053
Hotel	\$7,239	\$7,347	\$7,458	\$7,569	\$7,683	\$7,798	\$7,915	\$8,034	\$8,155	\$8,277	\$131,665
Sub-Total	\$71,830	\$74,812	\$77,309	\$79,945	\$82,730	\$85,679	\$88,269	\$91,046	\$94,028	\$97,234	\$1,134,747
Public Investment	\$27,000					\$32,000					
Net Operating Income	\$73,238	\$54,220	\$56,717	\$59,353	\$62,139	\$91,939	\$62,529	\$65,306	\$68,288	\$71,494	\$665,221
Net Present Value @ 10%											\$6,338

(1) Revenues inflated by 7.5% years 1 through 3, 2.5% years 4 through 15, and 1.5% thereafter.



APPENDIX

Supplemental Technical Reports detailing the findings of the Master Plan Report available on request from Buffalo Bayou Partnership.

TECHNICAL REPORTS

- A. Environmental Quality and the Eco-region (Turner Collie & Braden)
- B. Hydrology & Hydraulics (Turner Collie & Braden/ Harris County Flood Control District)
- C. Bayou Access and Transportation (Sunland Engineering)
- D. Water-based Activities (International Waterfront Group)

List of Participants

Through a series of major workshops, neighborhood focus groups, and one-on-one meetings, the Buffalo Bayou master plan consultant team has secured input about Buffalo bayou's redevelopment from a cross section of the Houston community. Among the civic groups, governmental agencies, and other entities that have participated in the planning process are:

American Institute of Architects/Houston Chapter
 Art & Environmental Architecture
 Asia Society
 Bayou Preservation Association
 B.O.N.D.
 The Brown Foundation
 Buffalo Bayou Artpark
 Center for Houston's Future
 Central Houston
 Clark Pines Civic Club
 Country Club Place Civic Club
 DaCamera
 Denver Harbor/Port Houston Super Neighborhood Council
 DiverseWorks
 Downtown Houston Association
 Downtown Historic District
 East End Super Neighborhood
 East Sunset Heights Civic Club
 Eastwood/Broadmoor Area Community Development Corporation
 Eastwood/Lawndale/Wayside Super Neighborhood
 Fifth Ward Community Redevelopment Corporation
 First Ward Civic Council
 FotoFest
 Greater East End Management District
 Greater Heights Alliance
 Greater Houston Partnership
 Greater Houston Preservation Alliance
 Gulf Coast Institute
 Harrisburg/Manchester/Magnolia/Pineview Super Neighborhood Council

Harris County Extension Service
 The Heritage Society
 Hobby Center Foundation
 Houston Audubon Society
 Houston Canoe Club
 Houston Downtown Management District
 Houston Endowment
 Houston-Galveston Area Council
 Houston Homeowner's Association
 Houston Parks Board
 Houston Seminar
 Houston Quality of Life Coalition
 Idylwood Civic Club
 International Study for the Study of Environmental Problems
 Lindale Park Civic Club
 Livable Houston Initiative
 Main Street/Market Square Redevelopment Authority
 Memorial Drive Presbyterian Church
 METRO
 Mitchell Center
 Mother Dog Studios
 Museum of Fine Arts, Houston
 Navigation Area Business Association
 Neighborhood Centers
 North Montrose Civic Association
 Northside Management District
 Northside Redevelopment Center
 Northside Village Super Neighborhood Council
 Oaklawn/Fullerton Civic Association
 Old Sixth Ward Association
 Old West End Association
 The Park People
 Pleasanthill Community Development Corporation
 The Powell Foundation
 Rice Design Alliance
 Rice University Rowing Club
 Rice University School of Architecture
 Rockwell Fund

San Jacinto Historical Commission
 San Jacinto Museum of History
 Second Ward Residents Association
 Shady Acres Civic Club
 Silverdale Civic Club
 Sixth Ward Tax Increment Reinvestment Zone
 Texas Executive Women
 Theatre District Association
 The Metropolitan Organization
 Timbergrove Manor Civic Club
 Trees for Houston
 Scenic Houston
 Sons of the Republic of Texas/San Jacinto Chapter
 Talento Bilingue de Houston
 2012 Foundation
 University of Houston-Downtown
 University of Houston School of Architecture
 Washington Avenue Coalition
 Washington on Wescott
 White Oak Bayou Association
 Wildlife Habitat Council
 The Wortham Foundation

Governmental Agencies

City of Houston Brownfields Program
 City of Houston Building Services Department
 City of Houston Convention & Entertainment Facilities Department
 City of Houston Historic and Archeological Commission
 City of Houston Municipal Arts Commission
 City of Houston Parks & Recreation Department
 City of Houston Planning & Development Department
 City of Houston Public Works & Engineering Department
 Cultural Arts Council of Houston/Harris County
 Harris County Flood Control District
 Harris County Flood Control Task Force
 Harris County Public Infrastructure Department
 Housing Authority of the City of Houston

Port of Houston Authority
 U.S. Natural Resources Conservation Service

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 Sara Kellner, DiverseWorks
 Yolanda Navarro, Navigation Area Business Association
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Bibliography

Beatley, Timothy. *An Introduction to Coastal Zone Management, Ecology of Place*. Island Press.

Beauchamp, Toni. *Good*. Houston, December 2000.

Emmott, Sarah H. *Memorial Park-A Priceless Legacy*. Houston, Texas. Herring Press 1992, pp. 1-62

Fox, Tom A. *Monograph Series. Real Estate Values*. New York. Neighborhood Open Space Coalition. March 1992, pp.1-48.

Houston Environmental Center. *Environmental Resource Guide*. Houston's Citizens' environmental Coalition. Houston, 2002, pp.3-107.

Harnick, Peter. *Inside City Parks*. Washington DC: Urban Land Institute, 2000.

Flink, Charles A, Kristine Olka, Robert M. Searns, and Peter Harnik. *Trails for the Twenty-First Century*. Washington, DC. Island Press, 2000 (2nd ed.).

Gobster, Paul H. *Restoring Nature*. Island Press.

Harnik, Peter. *Inside City Parks*. Urban Land Institute.

Hiss, Tony. *The Experience of Place*.

Hiss, Tony and Terry Evans. *Disarming the Prairie (Creating the North American Landscape)*. Johns Hopkins University Press.

Johnson Craig L. and Man, Joyce. *Tax Increment Financing and Economic Development: Uses, Structures, and Impacts*. Albany: University of New York Press, 2001.

Kaplan, Rachel. *With People In Mind: Design and Management of Everyday Nature*. Island Press.

Katz Eric, Andrew Light and David Rothenberg. *Beneath the Surface: Critical Essays in the Philosophy of Deep Ecology*. MIT Press.

Kayden, Jerold. *Privately Owned Public Space: The New York City Experience*. John Wiley & Sons.

Little, Charles E. *Dying of the Trees*. Penguin USA.

Light, Andrew. *Social Ecology After Bookchin*. Guilford Press.

Light, Andrew and Eric Katz. *Environmental Pragmatism*. Routledge.

Light, Andrew and J. M. Smith *Philosophies of Place*. Rowman & Littlefield.

Light, Andrew and J.M. Smith *The Production of Public Space*. Rowman & Littlefield

O'Neill, David J. *The Smart Growth Tool Kit: Community Profiles and Case Studies to Advance Smart Growth Practices*. Washington, DC: Urban Land Institute. 2000.

Platt, Rutherford H. *Land use and Society: Geography, Law and Public Policy*. Island Press.

Platt, Rutherford H. *The Ecological City: Preserving and Restoring Urban Biodiversity*. University Press.

Porter, Douglas R. *The Practice of Sustainable Development*. Washington DC: Urban Land Institute, 2000.

Project for Public Spaces, How to Turn a Place Around. New York, 2000, Pp: 122

Project for Public Space, Public Parks, Private Partners, NYC, 2000.

Satterthwaite, Ann. *Going Shopping: Consumer Choices and Community Consequences*. New Haven: Yale University Press.

Rome, Adam Bulldozer. *In The Countryside*. Cambridge: Cambridge University Press.

Sauer, Leslie Jones. *Once and Future Forest*. Island Press.

Urbanska, Krystyna. *Restoration Ecology and Sustainable Development*. Cambridge. University Press.

Whyte, William H. *The Last Landscape*. University of New York Press.

Reports/ Pamphlets

- City of Houston Dept: Finance & Administration Strategic Purchasing Division; *Request for Proposal. Doc: No; TC-1-0411-37-12927*, Jan 2001, pp.1-44.
- Coleman Comey, Arthur, *Houston: Tentative Plans for Its Development; Report to the Houston Park Commission*. Boston: Press of Geo. H. Ellis, 1913.
- Cultural Arts Council of Houston/Harris County. *The Houston Framework*. 1997, pp.1-18.
- Cultural Arts Council of Houston/Harris County. *The Houston Framework; Community Vision and Initiatives for Civic Art and Design in the Houston/Harris County Region*. Houston, 1997.
- Ehrenkrantz Eckstut & Kuhn Architects. Clark Condon Associates. Anna Mod Preservation Services. *Main Street Corridor Master Plan*. Client: Planning & Development Department City of Houston and Main Street Coalition, August 2000, pp.1-85.
- Forum of Civics*. Report of the City Planning Commission Houston. 1929, pp.1-135.
- Guest Informant, L.L.C. *The Warwick. Houston*, pp.1-12.
- Gulf Coast Institute. *Economy Community Environment*. Houston Texas: Gulf Coast Institute. Feb 7th 200, pp:3-54.
- Harris County Flood Control District. *Riding the Waves of Change 60 years of service*, Texas,1997, pp:1-28.
- Houston Downtown Management District. *Downtown District*, Summer 2000. pp.1-5.
- Crompton, John L. *The Impact of Parks and Open Space on Property Values and the Property Tax Base*. Ashburn, Division of Professional Services, National Recreation and Park Association, 2000.
- Houston Downtown Management District. *News on the Downtown District*, Houston, Summer, 2000.
- Houston's Heritage Corridor: Buffalo Bayou East Sector. Redevelopment Plan*. Buffalo Bayou Partnership & East End Area Chamber of Commerce, 1992.
- "IBA Emscher Park" in *Urban Design Quarterly, International*, no. 56, October 1995.
- International Waterfront Group. *Energizing the Worlds Waterfronts: Planning, Design and Boat Operations*. San Antonio.
- Llewelyn-Davies Sahni. *The Theater District Master Plan, for Conventions & Entertainment Facilities, for the City of Houston*. Booklet, pp.1-20.
- Mahler, Richard. "Source of Inspiration," *Land & People*, The Trust for Public Land Annual Report, Fall 2001, pp.20-24.
- Neuman, Michael. *Planning the City Without a Plan*. Department of Landscape Architecture and Urban Planning. A & M university. MS 3137, pp:2-27.
- Riverfront Recapture, Inc. Annual Report 1997-98*. Hartford Conn, pp.1-17.
- Spitzer, Morrow Theodore and Hilary Baum. *Public Markets and Community Revitalization*, Washington, DC: ULI-the Urban Land Institute and Project for Public spaces, 1995, pp.1-119.
- The Story of Houston*. Sutton & Associates. *Artspace*, 20th Anniversary Report of Progress. Minneapolis.
- Texas Department of Transportation, Houston District. *Green Ribbon Project Corridor Aesthetics and Landscape Master Plan*, 1999.
- Trust for Public Land; Land & People. *Annual Report: Commitment to the Chesapeake: Restoring the Nation's Largest Estuary: Volume 13-2*:pp. 1-55.
- The Unknown City*, 1836-1946.
- Vernon G. Henry & Associate. *Parks and Recreation Master Plan*.
- Draft for Parks & Recreation Dept., City of Houston. Nov. 1999. pp.1-6.



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