TRINITY RIVER CORRIDOR PROJECT

Designing Improvements to the Dallas Floodway

Briefing to the Dallas City Council

September 17, 2003

CDM

TRINITY RIVER CORRIDOR PROJECT

Designing Improvements to the Dallas Floodway

Optimizing Flood Control, Environmental, and Recreational Assets

While Encouraging a Stronger Environmental Ethic

CDM

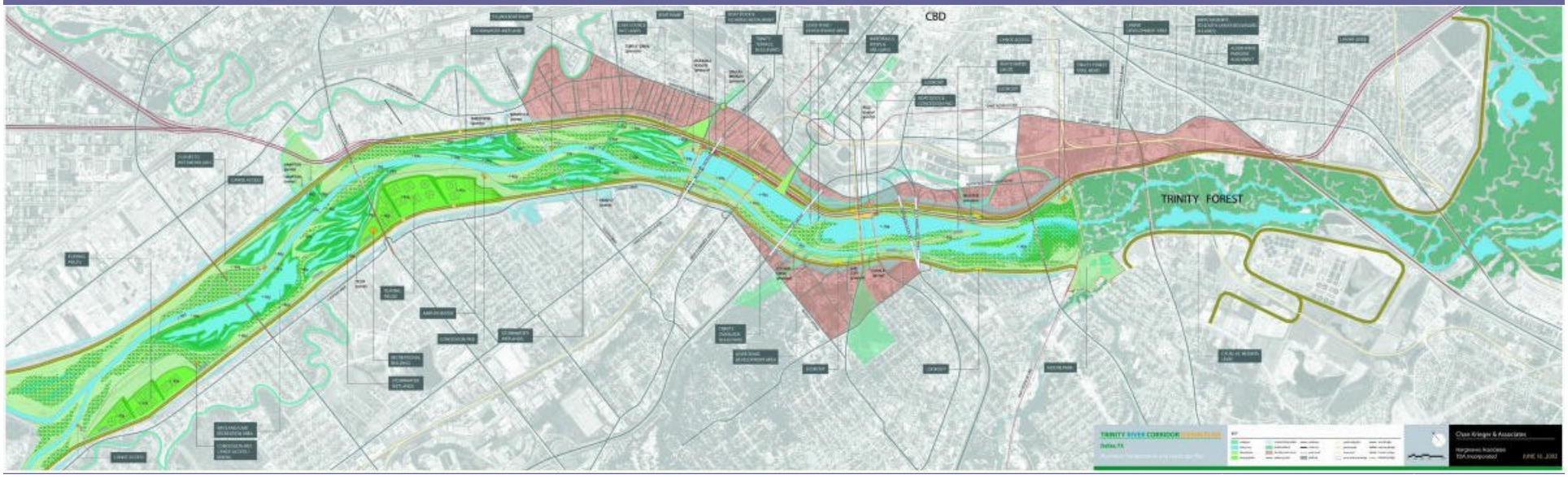
Purpose of Briefing

- City Council approval is requested at this time to continue with the CDM Lake Study to advance the Urban Design Study for the Dallas Floodway water resource components
- Remaining CDM contract amount is about $175,000 of the previously approved $400,000 contract
- By January 2004, City Council could replace the water resource components of the MIP within the Dallas Floodway with those of the Urban Design Study

Content/Agenda

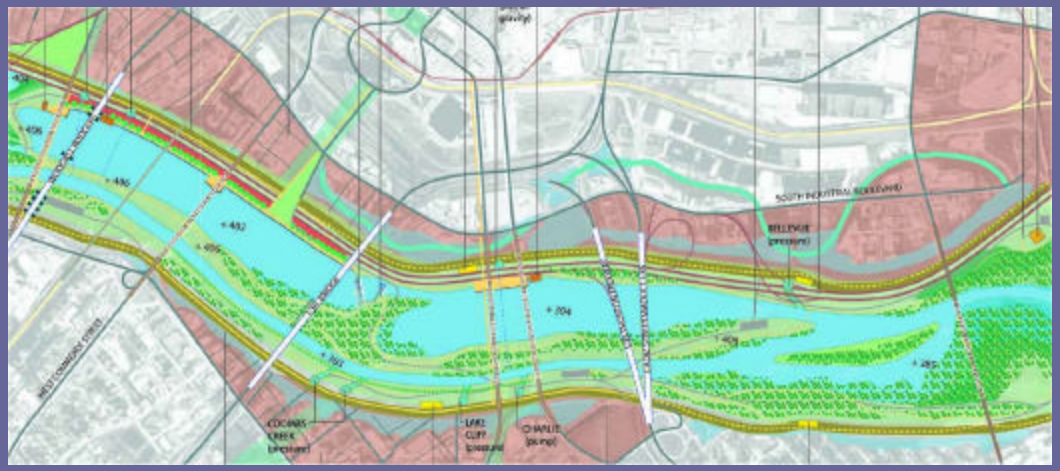
Overview of Urban Design Study

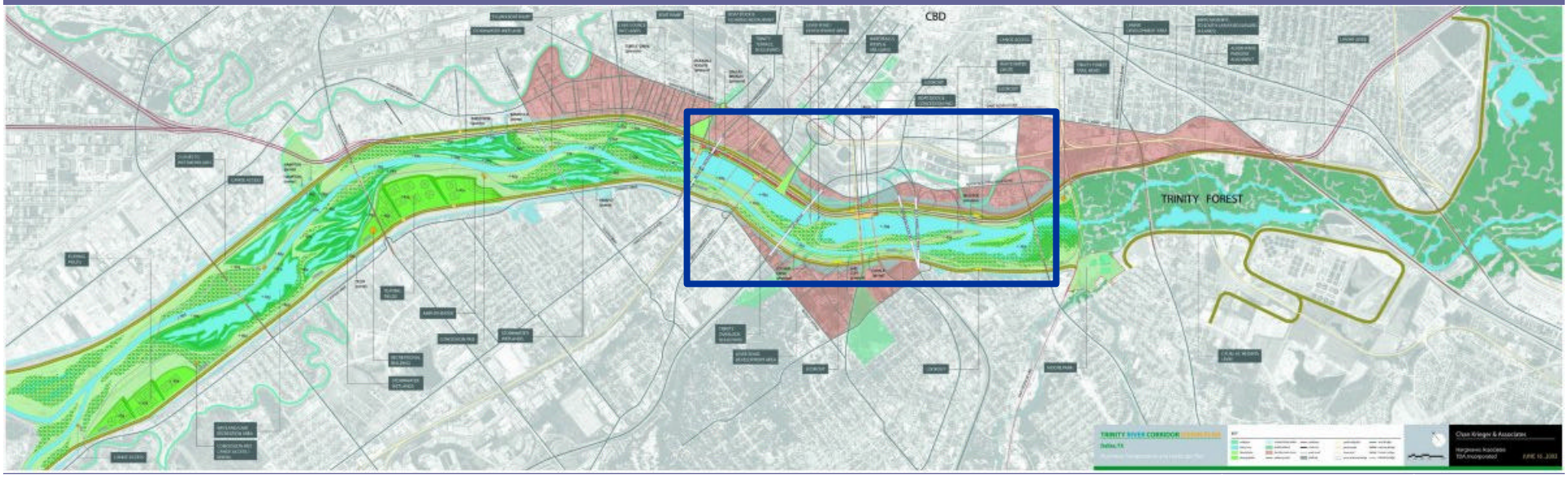
- Private Study Developed by Chan Krieger & Associates and Hargreaves & Associates through The Dallas Plan
- In Concert with the Dallas Chapter of the American Institute of Architects and the Dallas Institute of Humanities and Culture
- In collaboration with the Trinity River Corridor Project Office and CDM



Overview of Urban Design Study

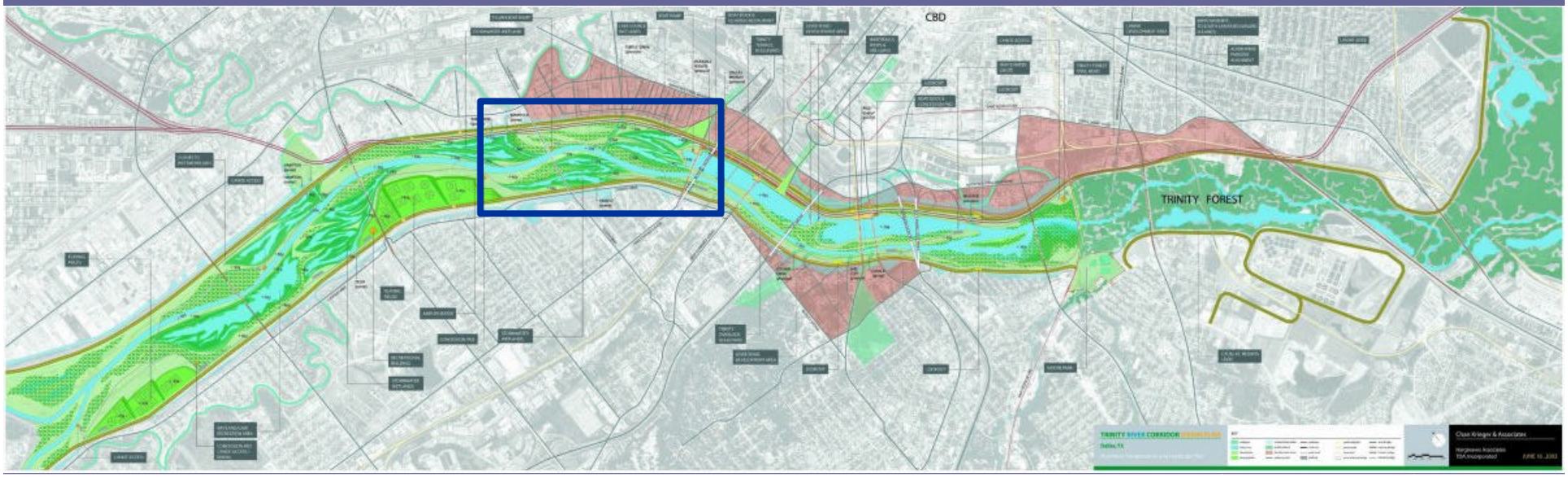
- Two off-channel lakes next to downtown that drain to the river





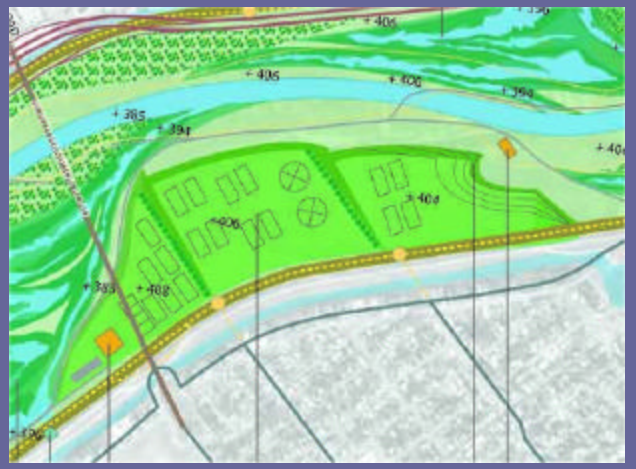
Overview of Urban Design Study

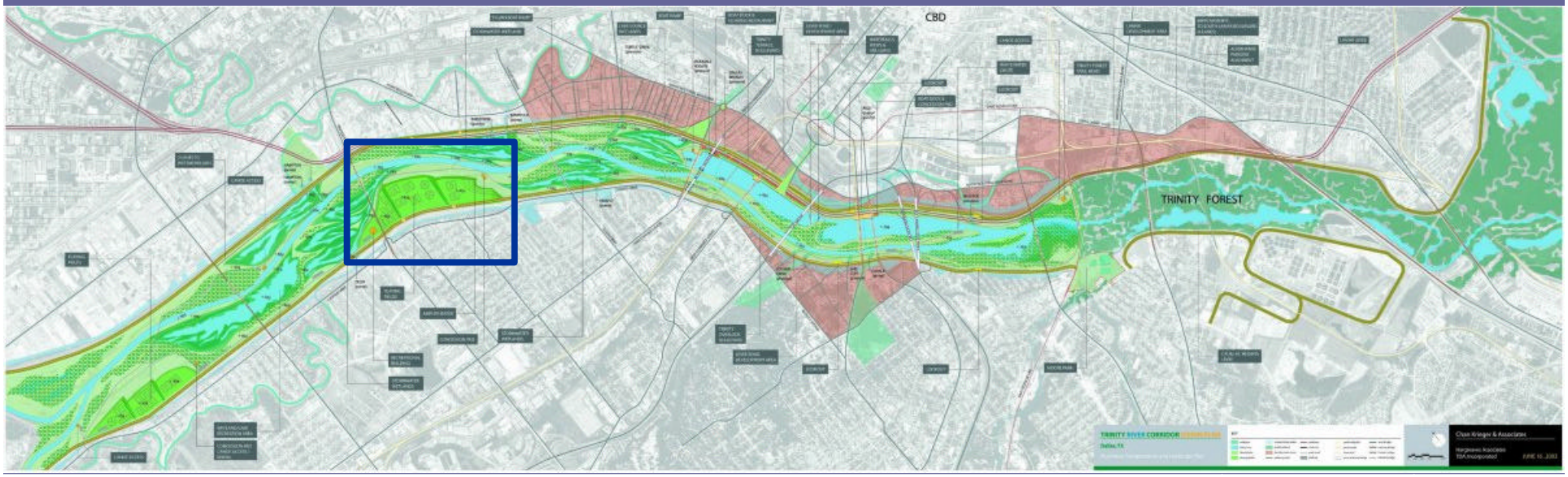
- Headwaters wetlands for continuously fed habitat
- Storm water wetlands for intermittently fed habitat
- Channel meanders to create a more natural Trinity River



Overview of Urban Design Study

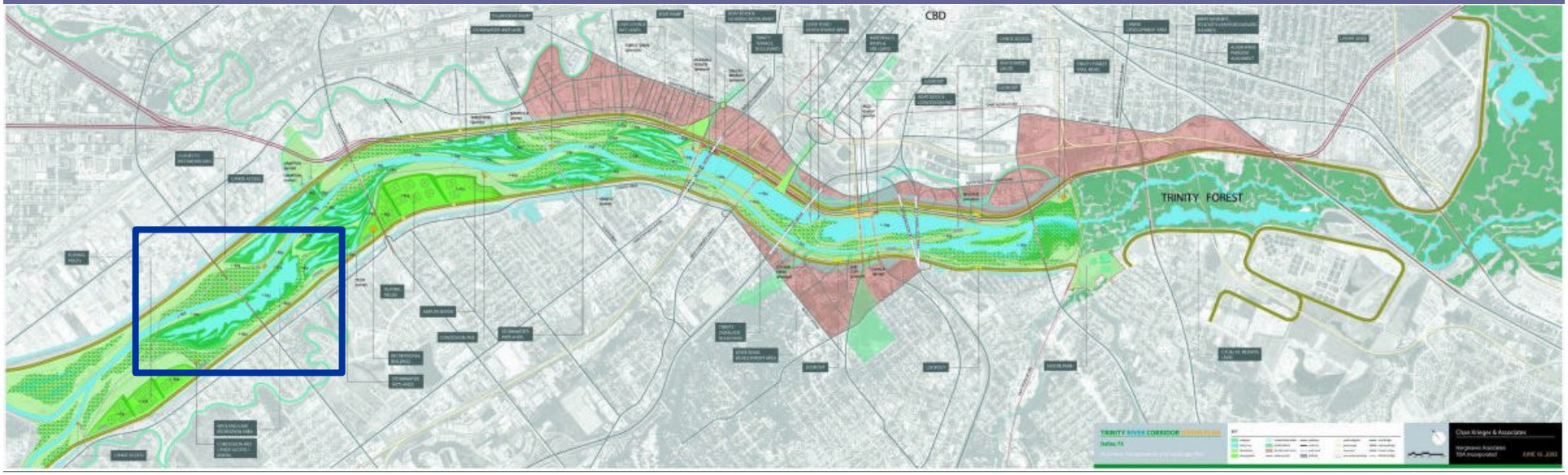
- High use park and recreation areas
- Floodway roads for vehicular access
- Pedestrian hike/bike trails and connections



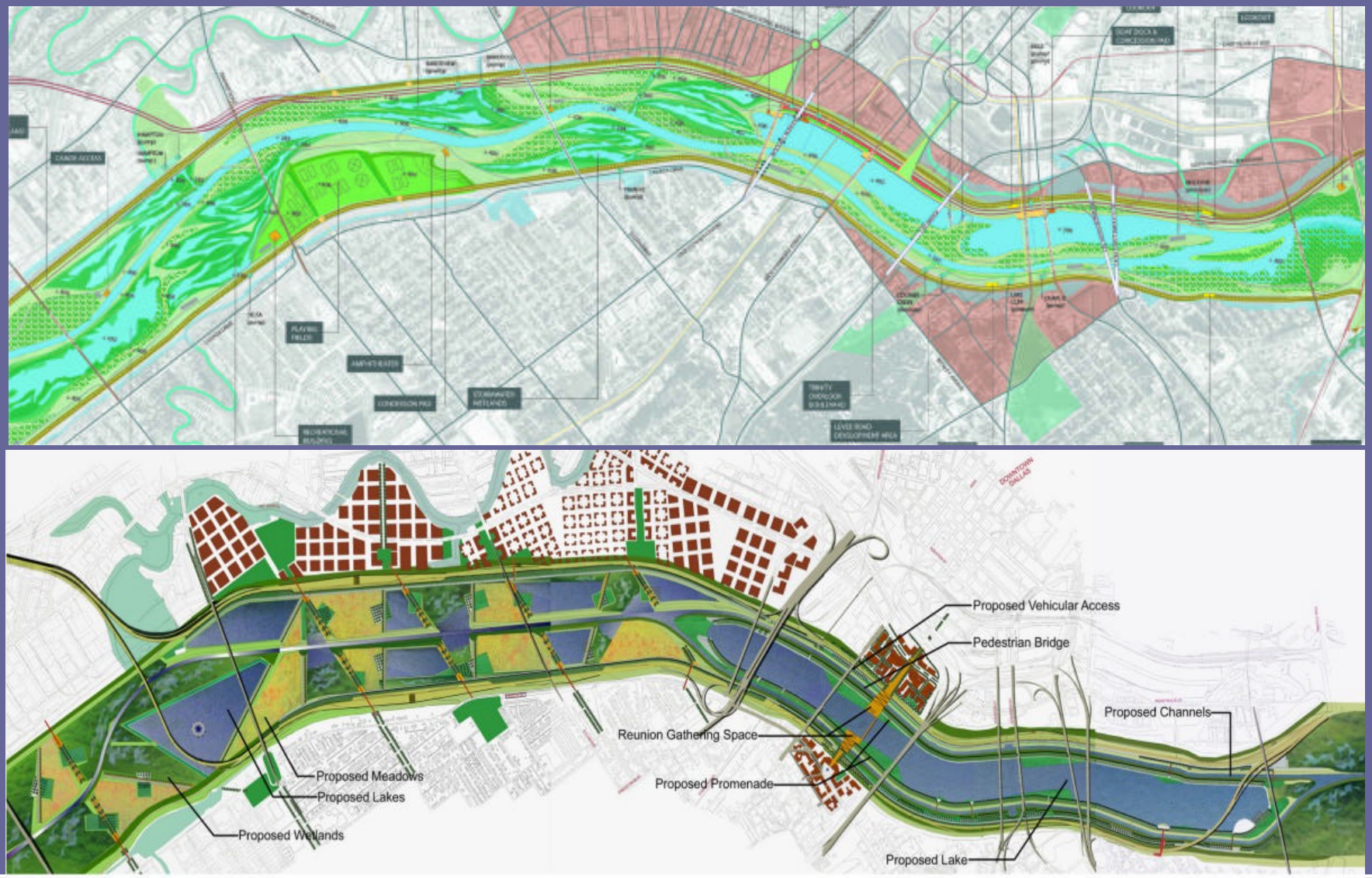


Overview of Urban Design Study

- **West Dallas Lake as natural off-channel lake**



2003 Urban Design Study and 1999 MIP

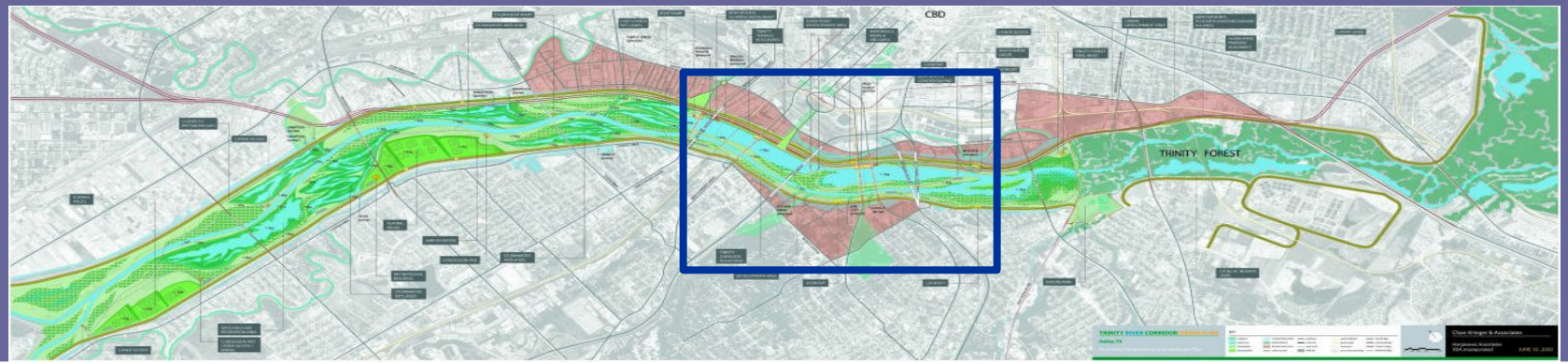


Floodway Lakes

Providing lakes to increase recreational and environmental benefits

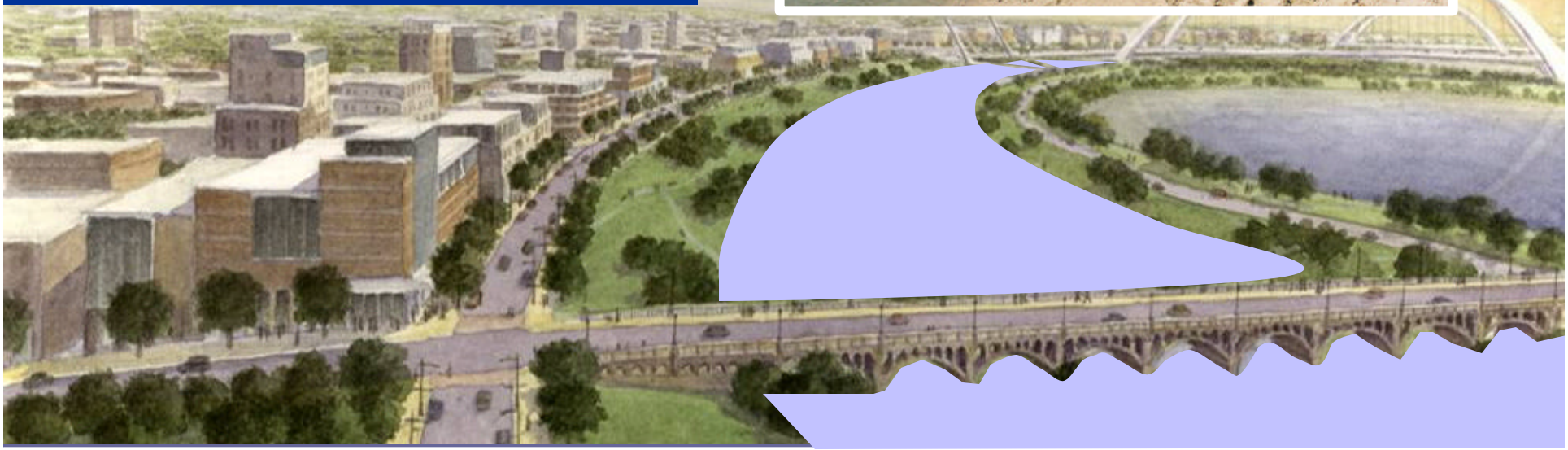
Lake Configuration Decisions

- Off-channel versus on-channel lake(s)
- Two lakes versus one lake
- Source water for lake(s)
- Lake footprint and location
- Edge treatment / look and feel
- Amenities / Functionality

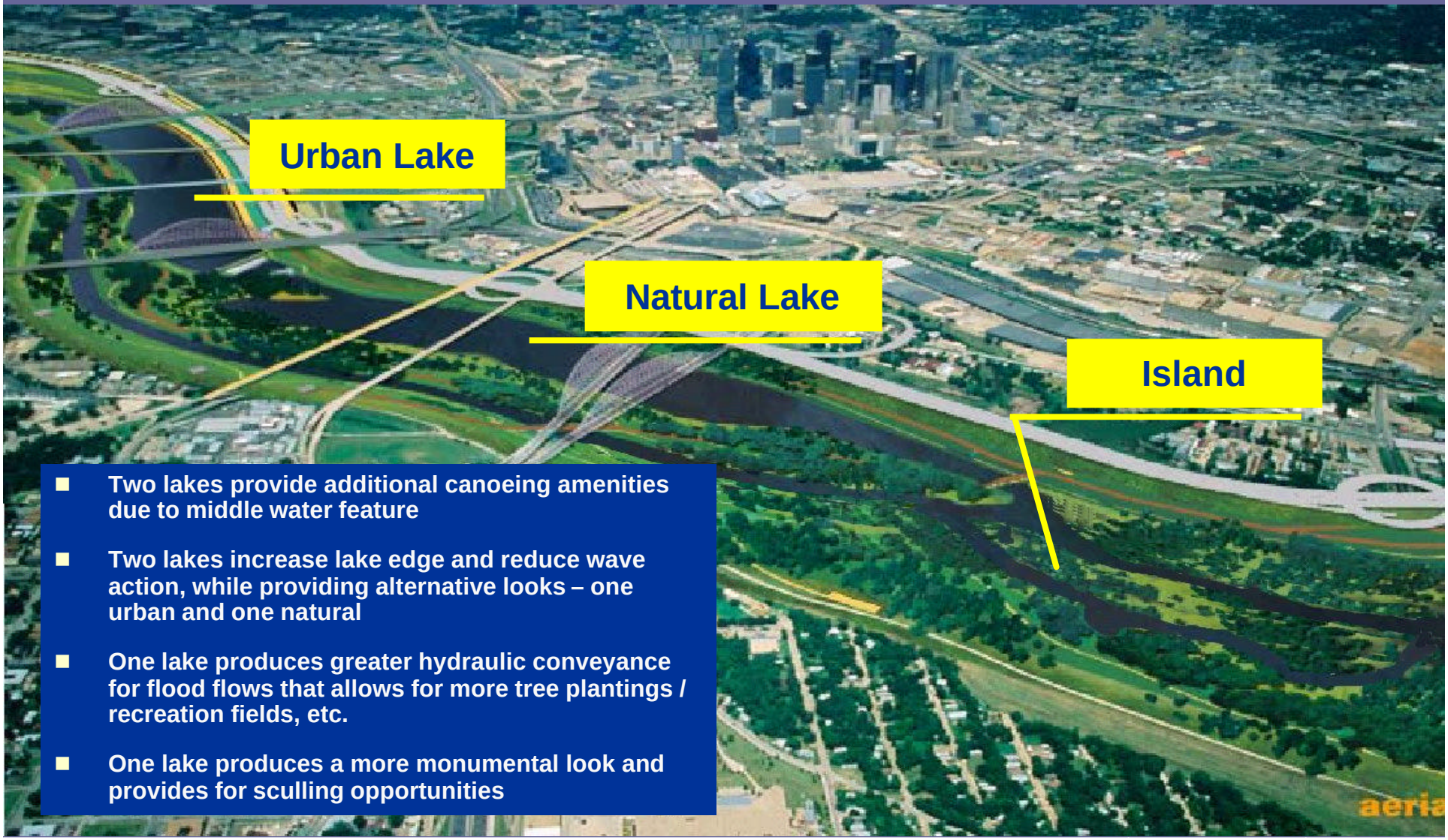


Off-Channel versus On-Channel

- Lake water quality higher if operated as off-channel lake
- Sediment and debris impacts are much lower for off-channel
- Lake water surface elevation changes problematic for on-channel lake
- Off-channel poses less risk to Federal cost-sharing of restoration activities



Two Lakes versus One Lake



- Two lakes provide additional canoeing amenities due to middle water feature
- Two lakes increase lake edge and reduce wave action, while providing alternative looks – one urban and one natural
- One lake produces greater hydraulic conveyance for flood flows that allows for more tree plantings / recreation fields, etc.
- One lake produces a more monumental look and provides for sculling opportunities

Lake Water Source Considerations

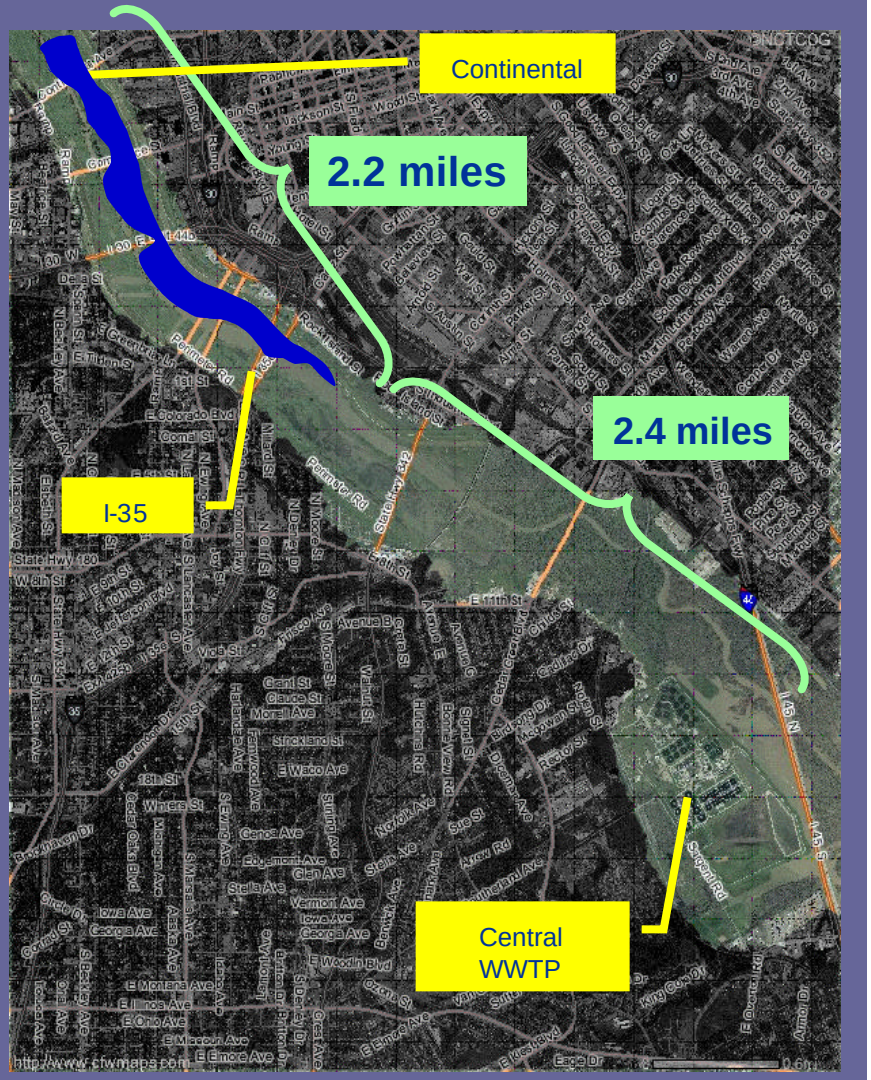
- Source options
  - Reclaimed water
  - Groundwater
  - Trinity River
  - Stormwater
- Amount of water required
- Water rights
- Water quality
- Cost

Source Water Options for a Flowing Lake System

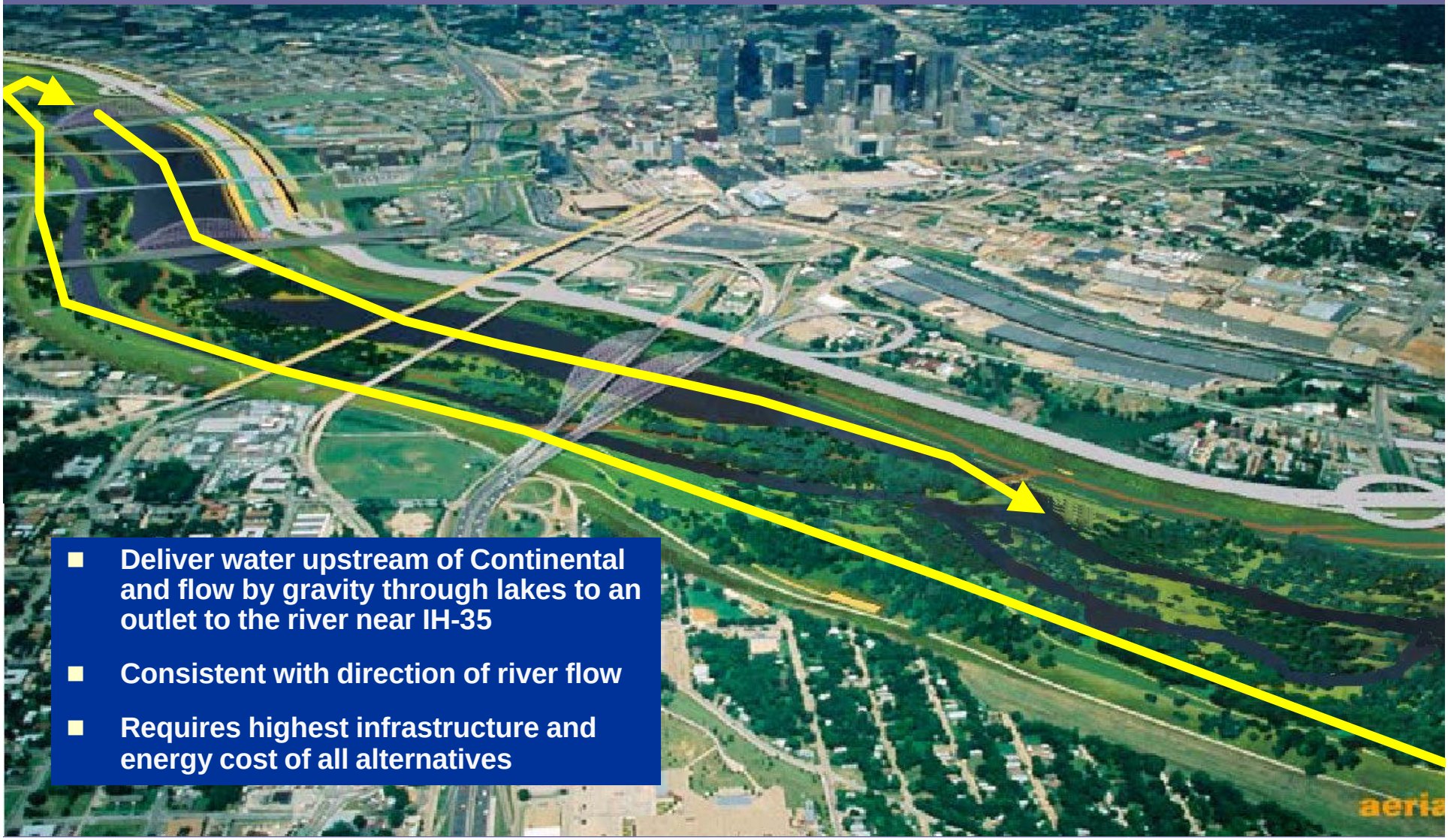
- Provide enough source water to have a lake system with water flowing through it consistently
  - Provides environmental and recreational benefits
  - Provides aesthetic benefits
- Two options available
  - Utilize reclaimed water from Central Wastewater Treatment Plant (CWWTP)
  - Utilize water from Trinity River within floodway

Utilizing Reclaimed Water as a Lake Source Water Option

- Reclaimed water from Dallas' Central Wastewater Treatment Plant could be pumped up floodway to lakes
- Relocates a portion of the flow to the lakes that is currently discharged to Trinity River at the plant
- Provides a flowing lakes system
- Reliable source of water during dry periods
- Provides a good source of irrigation water for park lands
- Provides long term potential for Dallas Water Utilities to provide an alternative water supply

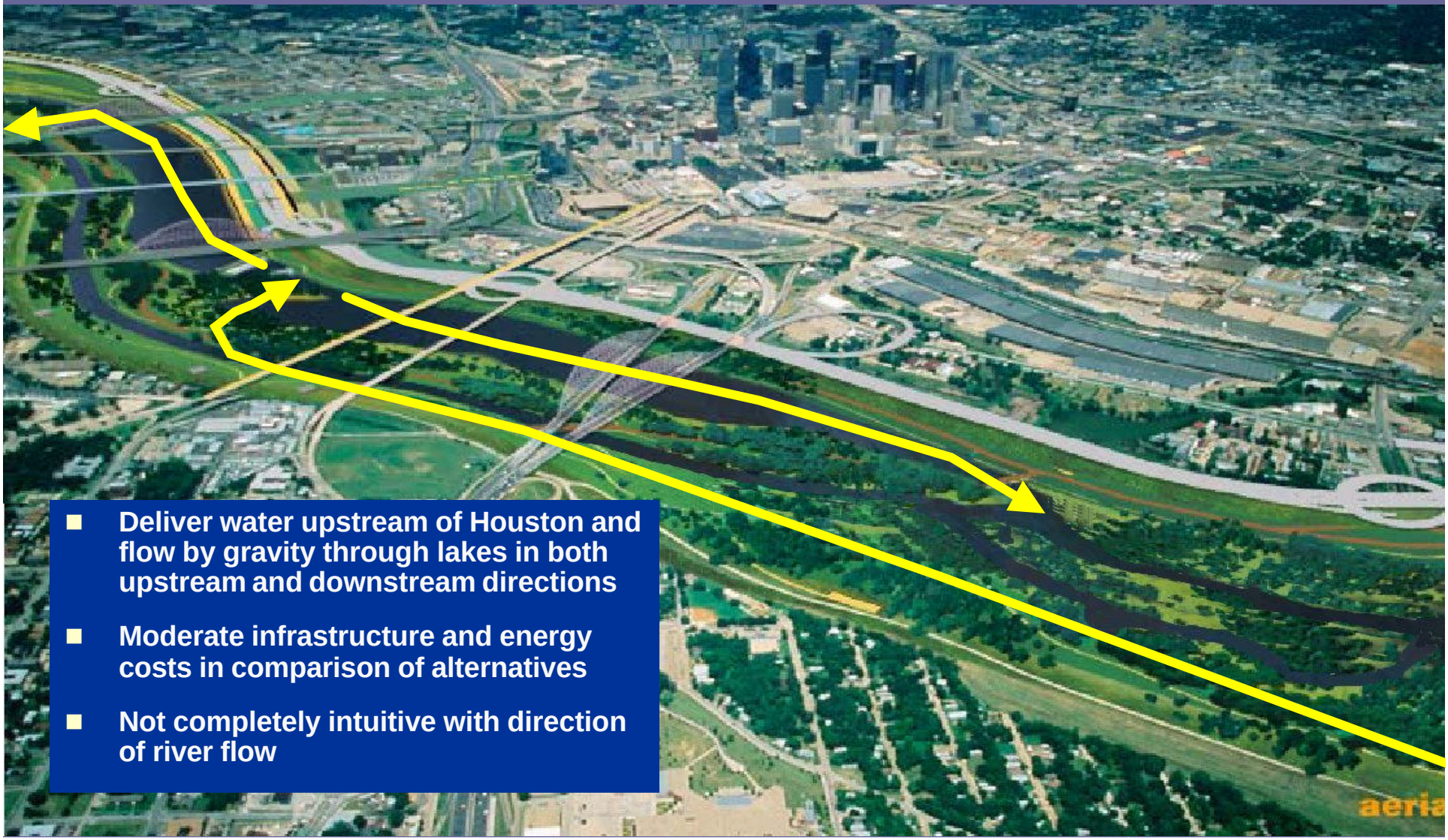


Reclaimed Water Delivery Option 1



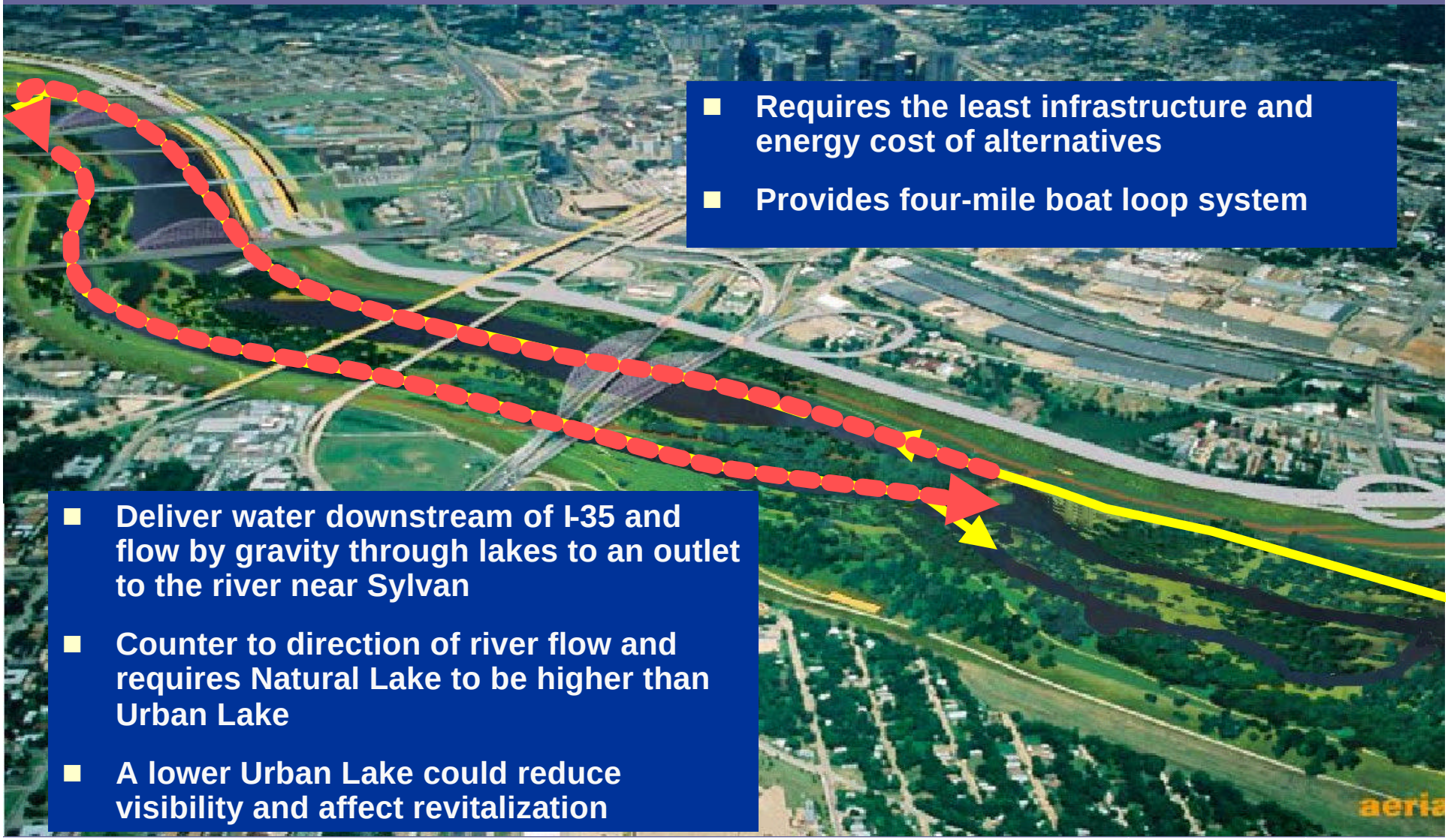
- Deliver water upstream of Continental and flow by gravity through lakes to an outlet to the river near IH-35
- Consistent with direction of river flow
- Requires highest infrastructure and energy cost of all alternatives

Reclaimed Water Delivery Option 2



- Deliver water upstream of Houston and flow by gravity through lakes in both upstream and downstream directions
- Moderate infrastructure and energy costs in comparison of alternatives
- Not completely intuitive with direction of river flow

Reclaimed Water Delivery Option 3



- Requires the least infrastructure and energy cost of alternatives
- Provides four-mile boat loop system

- Deliver water downstream of I-35 and flow by gravity through lakes to an outlet to the river near Sylvan
- Counter to direction of river flow and requires Natural Lake to be higher than Urban Lake
- A lower Urban Lake could reduce visibility and affect revitalization

Utilizing Reclaimed Water as a Lake Source Water Option

- Availability of reclaimed water for lakes is not guaranteed
- Cost-effectiveness of utilizing reclaimed water for the lakes will be determined by the City as a part of its reclaimed water implementation plan
  - Currently under development by Dallas Water Utilities
  - Trinity River Corridor Project Office is coordinating with DWU relative to the use of reclaimed water

Using the Trinity River as a Lake Source Water Option

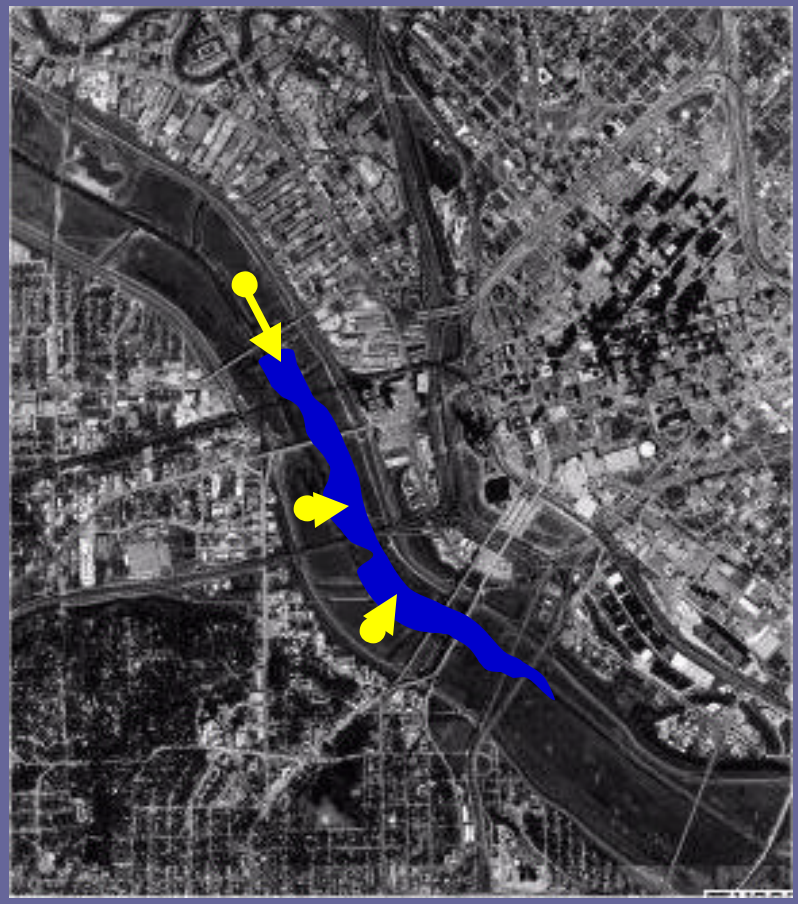
- Reliable water source for lake(s) even during dry spells
- Provides a flowing lakes system
- River water pumped into lakes system could introduce water quality issues that might reduce recreation activities
- River water pumped into lakes system would bring sediments and thereby increase operation and maintenance costs for silt removal
- Water rights would be a challenge to obtain

Source Water Options for a Non-Flowing Lake System

- Provide enough source water to ensure lakes remain full, but non-flowing
  - Significantly reduces infrastructure cost
  - Does not provide dissolved oxygen increase for the river, no waterfall features, and no boat chute opportunity would be available
- Two options available
  - Utilize groundwater
  - Utilize water from interior drainage

Utilizing Groundwater as a Lake Source Water Option

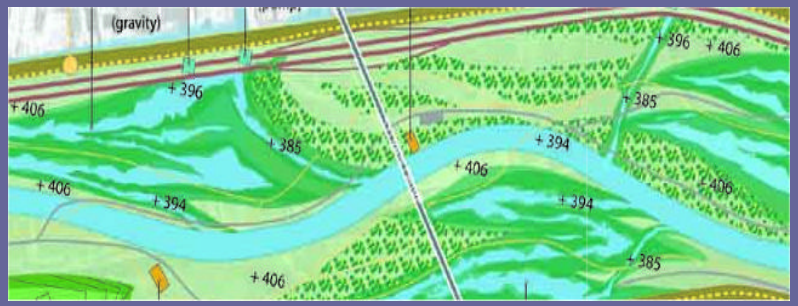
- Groundwater from the Trinity Aquifer could be used by placing one or more wells within the floodway to provide water in a non-flowing lakes system
- Trinity Aquifer water yield alone may not be sufficient to maintain lake levels during a prolonged dry periods



Utilizing Stormwater as a Lake Source Water Option

- Storm water from interior drainage and parkway runoff could be used for source water
- Major concerns are water quality and water rights
- Water yield from storm drainage alone will not be sufficient to maintain lake levels during prolonged dry periods

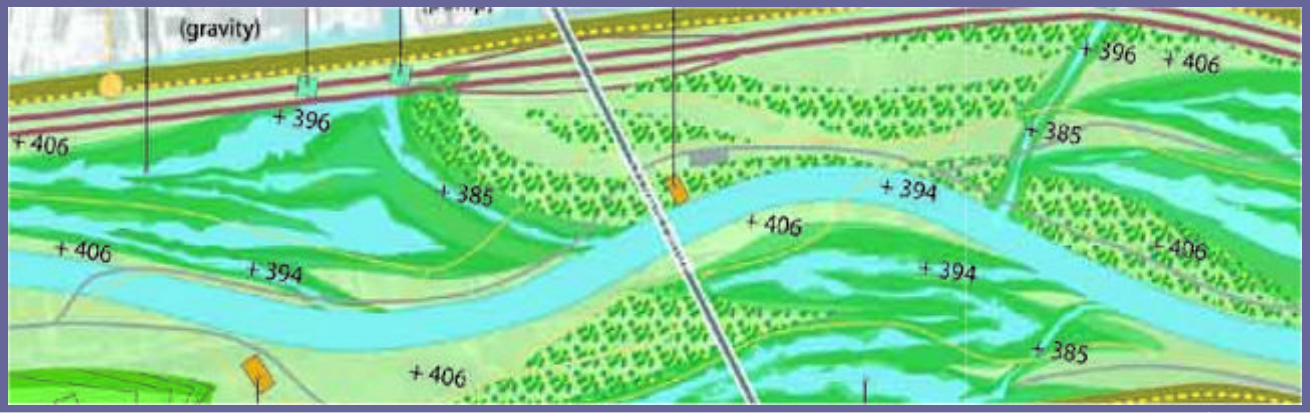
River Channel Improvements



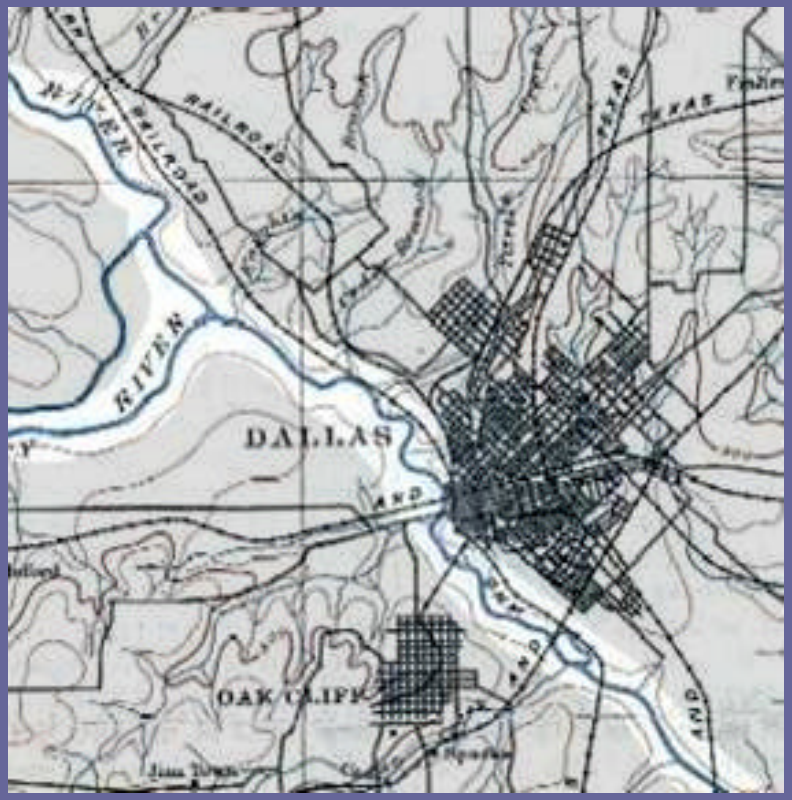
Restoring ecological, aesthetic, and recreational value

River Channel Considerations

- Relocating river through bridges
- Providing river channel meandering for recreation and ecological restoration
- Providing bi-channel configurations (islands)
- Interior drainage considerations
- Ensuring river channel will minimize debris, sediment, or scour difficulties



Historical Trinity Meandering



River Meandering Involves Several Considerations

Existing Boat Ramp and Crow Lake Park

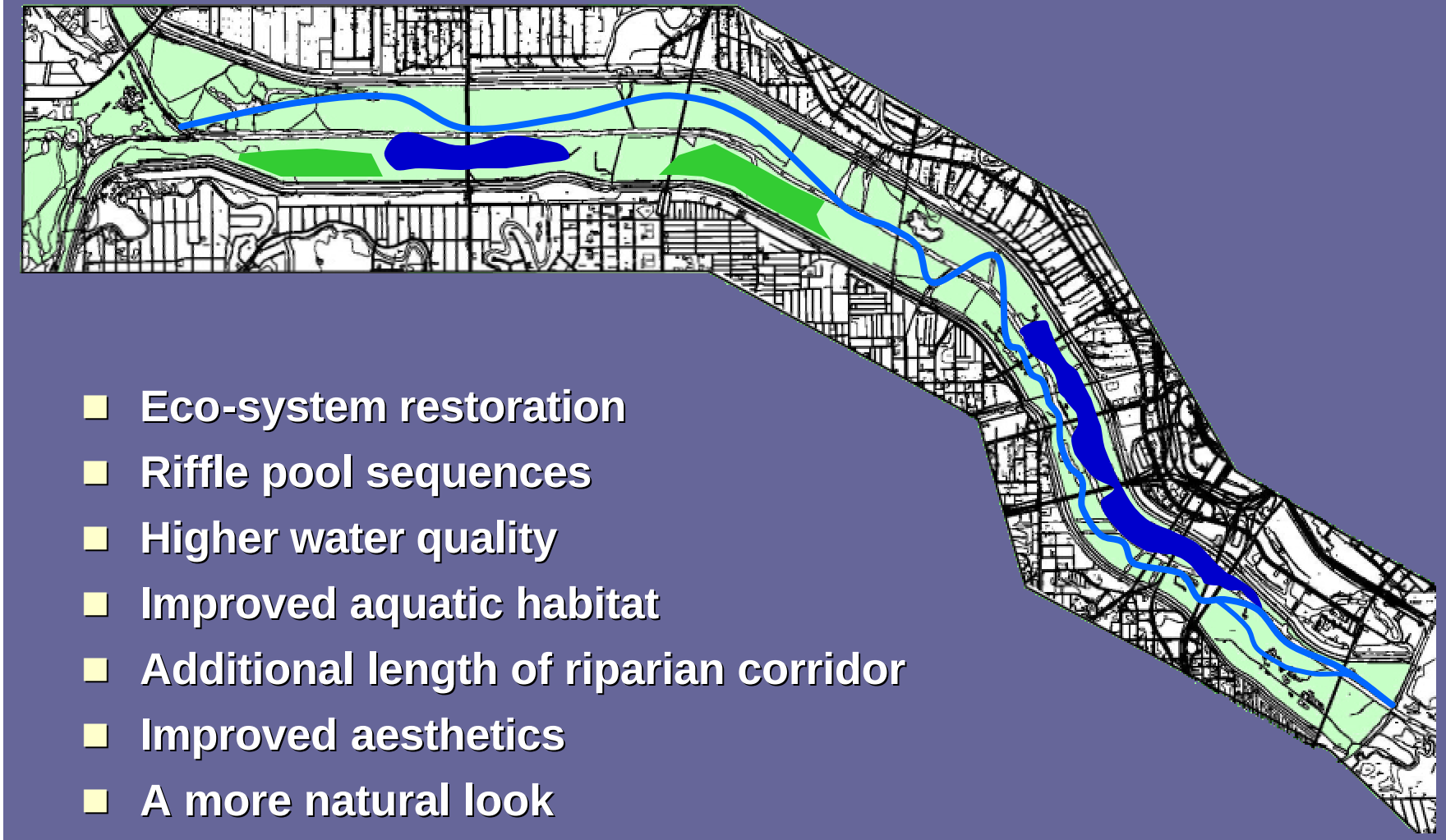
Interior Drainage from Pavaho Sump Station

(Pumped)

Interior Drainage from Turtle Creek

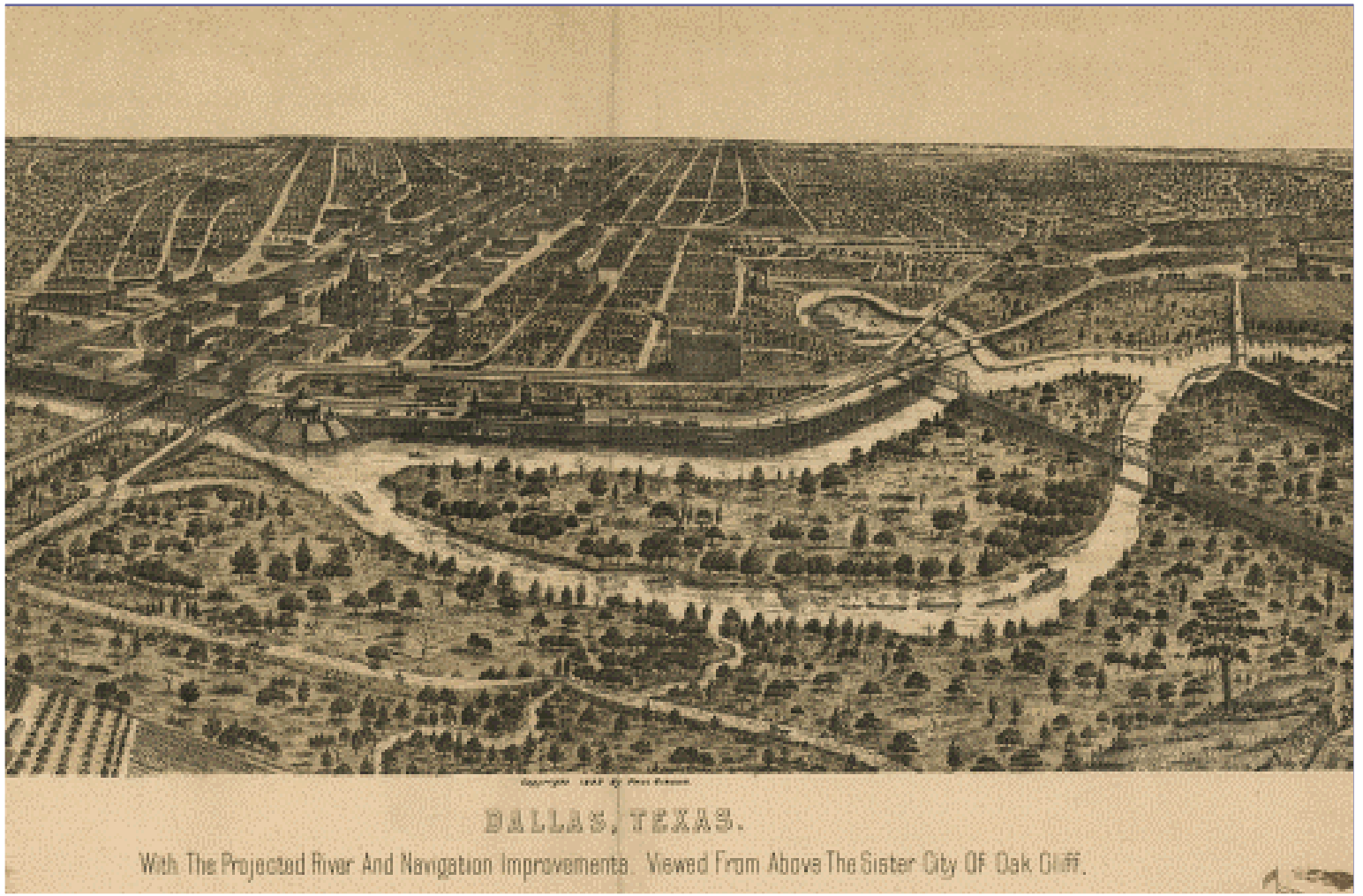
(Pressure)

Adding River Sinuosity Provides for . . .



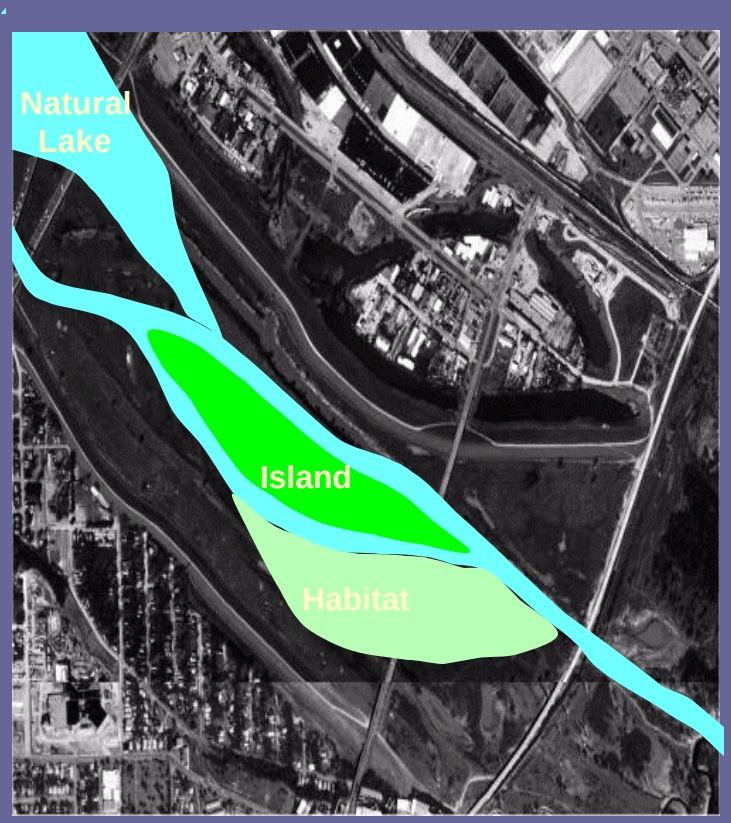
- Eco-system restoration
- Riffle pool sequences
- Higher water quality
- Improved aquatic habitat
- Additional length of riparian corridor
- Improved aesthetics
- A more natural look

River Islands



Bi-channel / Island System Downstream of Lakes

- Split channel around island for diversity of habitat and recreation
- Potential to create a terraced area downstream of island that would inundate frequently and provide wetland habitat
- Concern on usability of fill generated in this area due to shallow limestone



Improving Habitat and Recreation

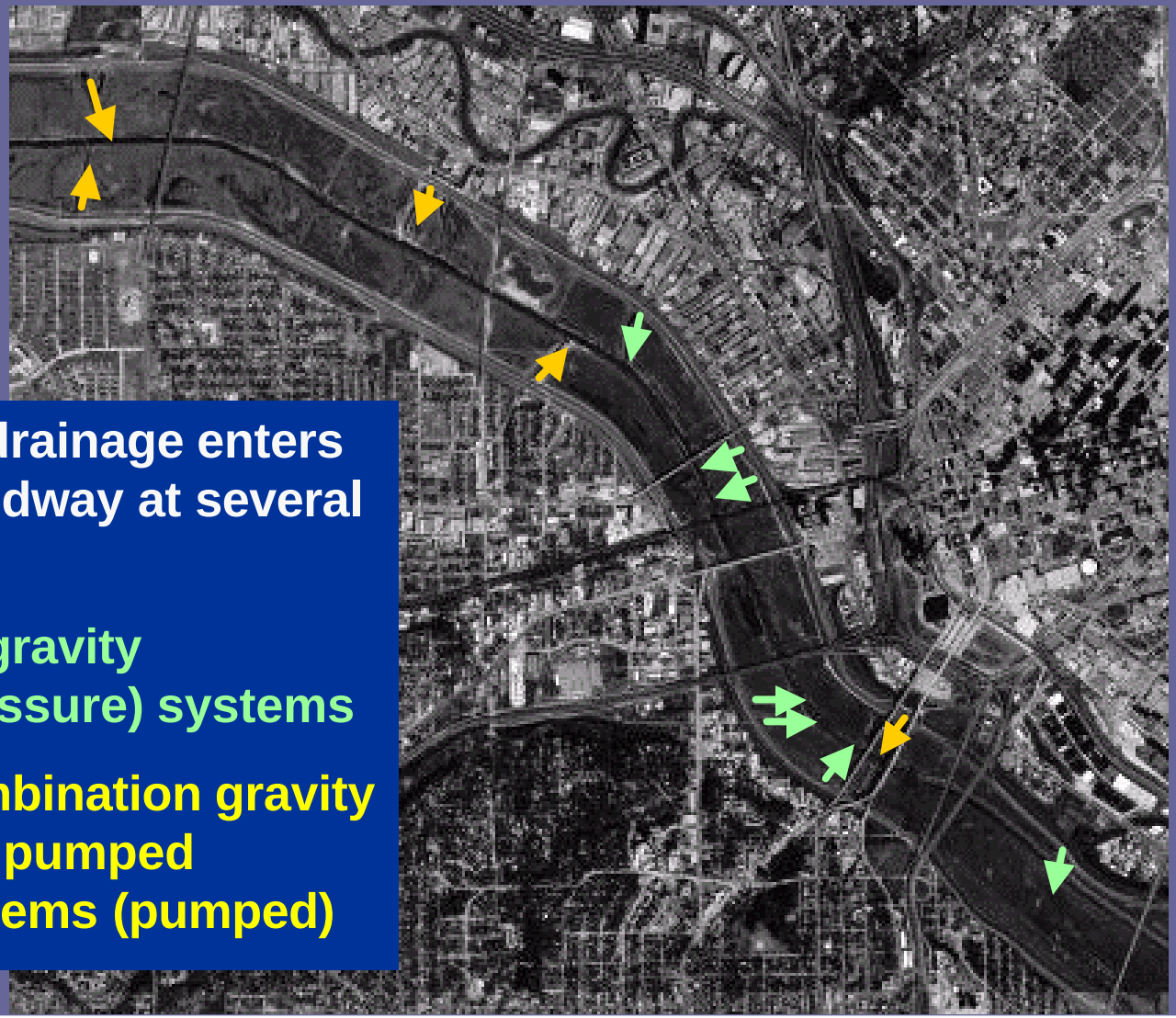
Boating

- River meandering will increase river distances and greatly improve recreational aesthetics
- River modifications as a part of channel meandering could produce whitewater-like flow regimes
- Integration of lake and river system can easily facilitate lake to river boating in a flowing lake system

Photo courtesy of BP

Photo courtesy of BP

Handling Interior Stormwater Drainage

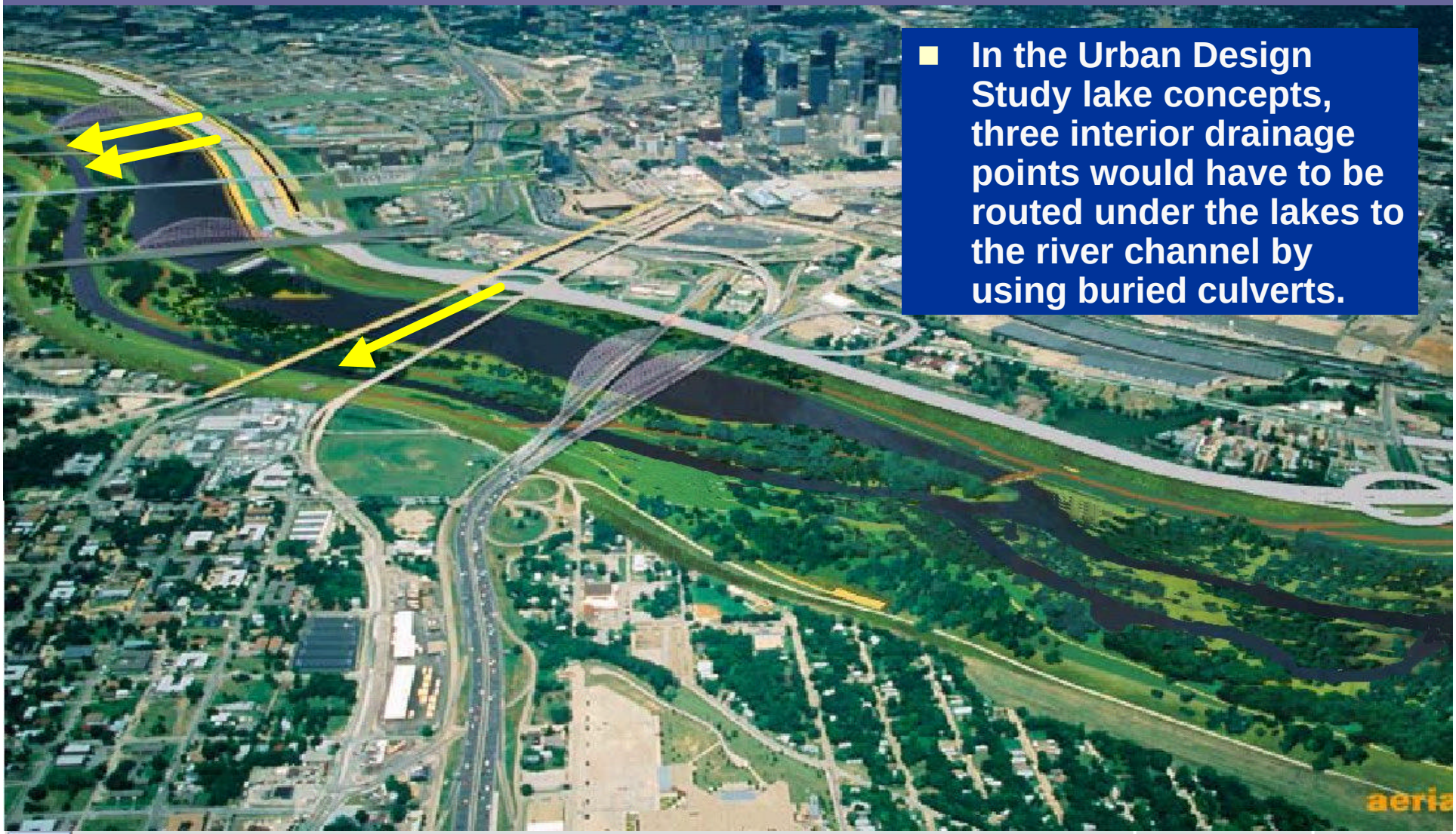


- Storm drainage enters the floodway at several points
  - All-gravity (pressure) systems
  - Combination gravity and pumped systems (pumped)

Handling Interior Stormwater Drainage

- These pump/sump facilities are critical for preventing flooding outside of levee system
- These facilities carry very large stormwater flows in large channels to the river

Handling Interior Stormwater Drainage

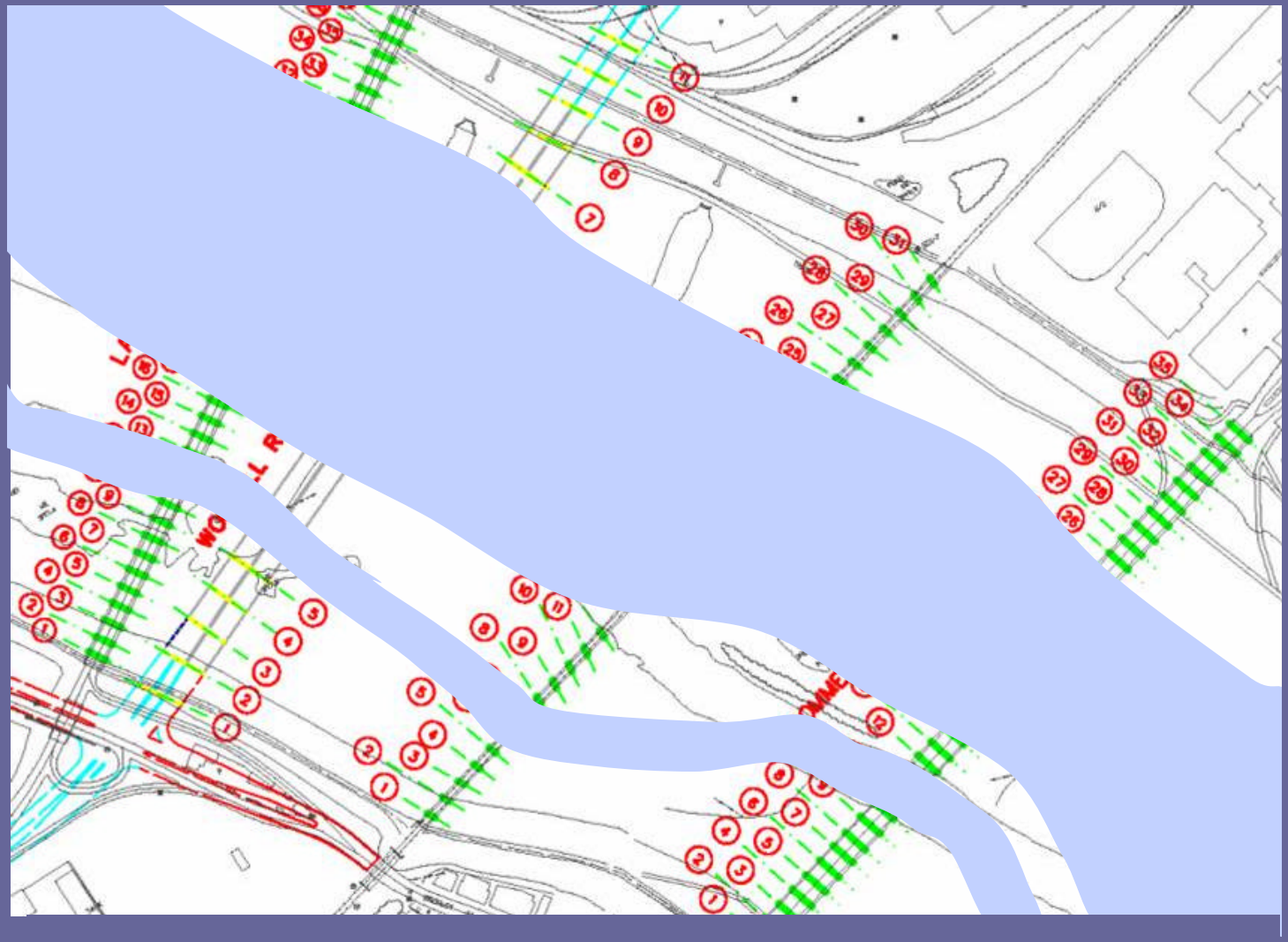


- In the Urban Design Study lake concepts, three interior drainage points would have to be routed under the lakes to the river channel by using buried culverts.

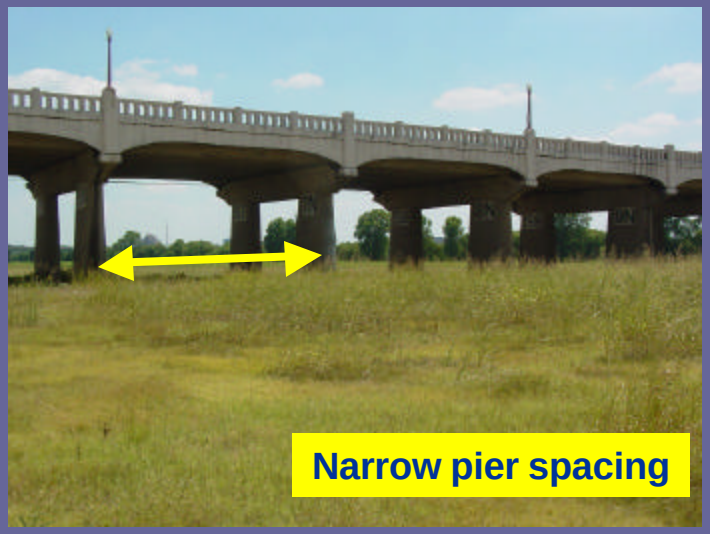
Handling Interior Stormwater Drainage

- Interior drainage points must be easy to maintain and effective at carrying flows
- Interior drainage point should be designed in a way to integrate aesthetically with the park as much as possible

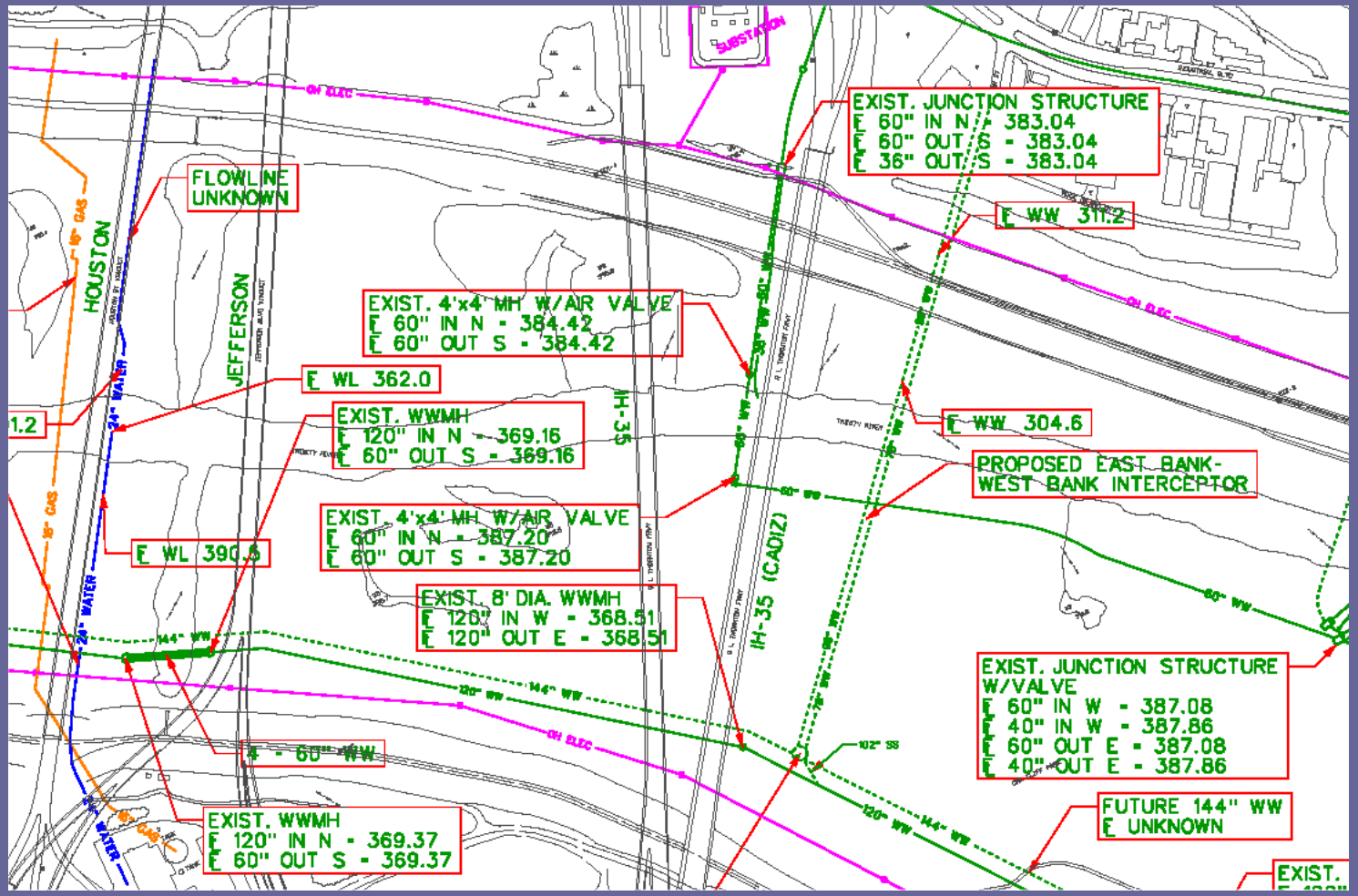
Managing Existing Infrastructure



Some Bridges Present Challenges



Utilities Within Floodway Must Be Avoided or Accommodated



Ecological Restoration

Reclaiming habitat within the floodway

Wetland Habitat

- Wetlands for lake source water
- Storm water wetlands for interior drainage points
- Channel and lake wetlands

Numerous Wetlands Already Exist Within the Dallas Floodway

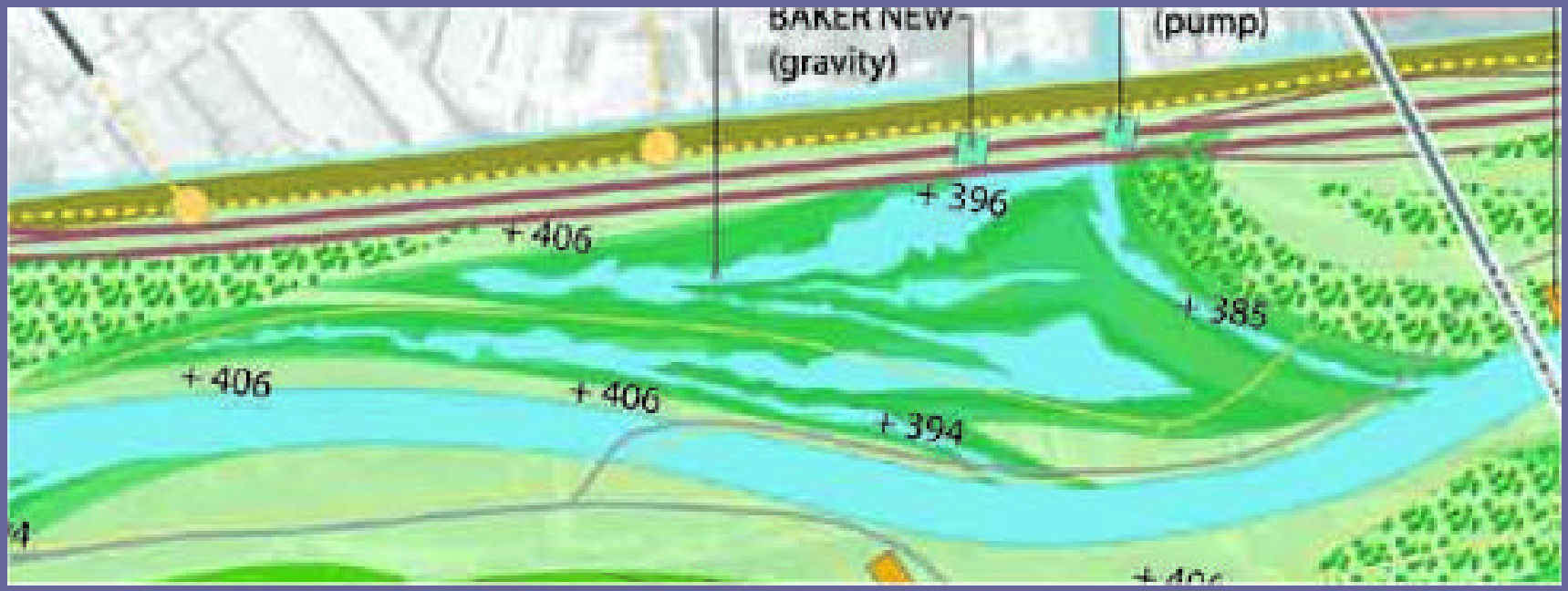
Wetland Design Will Enhance and Compliment Existing Wetlands

Headwater Wetland

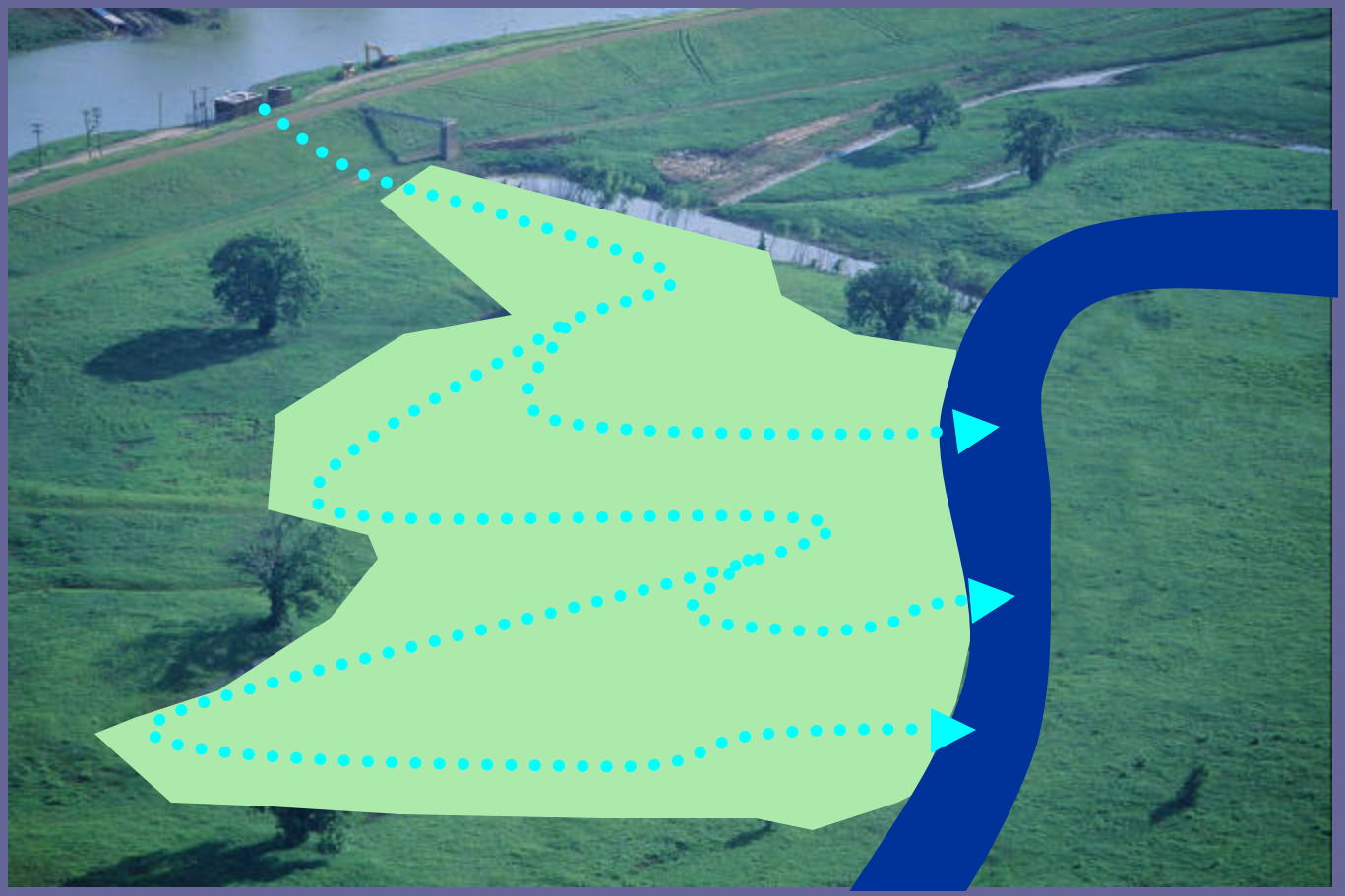
- Expected to be continuously fed by two to five million gallons per day of source water for wetlands
- Continuous flow of water will provide unique wetland habitat
- Protected by berm so that wetland will be protected from two-year frequency flood

Stormwater Wetlands

- Pipe Outfalls from pump station would redirect low flows pumped from the sump to be introduced to a wetland system
- The wetland system would experience sump water intermittently and would empty to the river



Stormwater Wetland Example



Wetlands Should Integrate With Park Elements

Trees

- Willows currently dominate riverbanks
- Mast producing trees (Oaks and Pecans, etc) needed to increase habitat value and aesthetics
- Tree growth must be managed so as not to restrict flood flows

Trees

- Significant potential for providing more tree growth within floodway
- Trees may be planted in clusters to provide pockets of forest within floodway, while allowing for acceptable flood conveyance
- Significant opportunities for grasslands and land forming

Grasslands

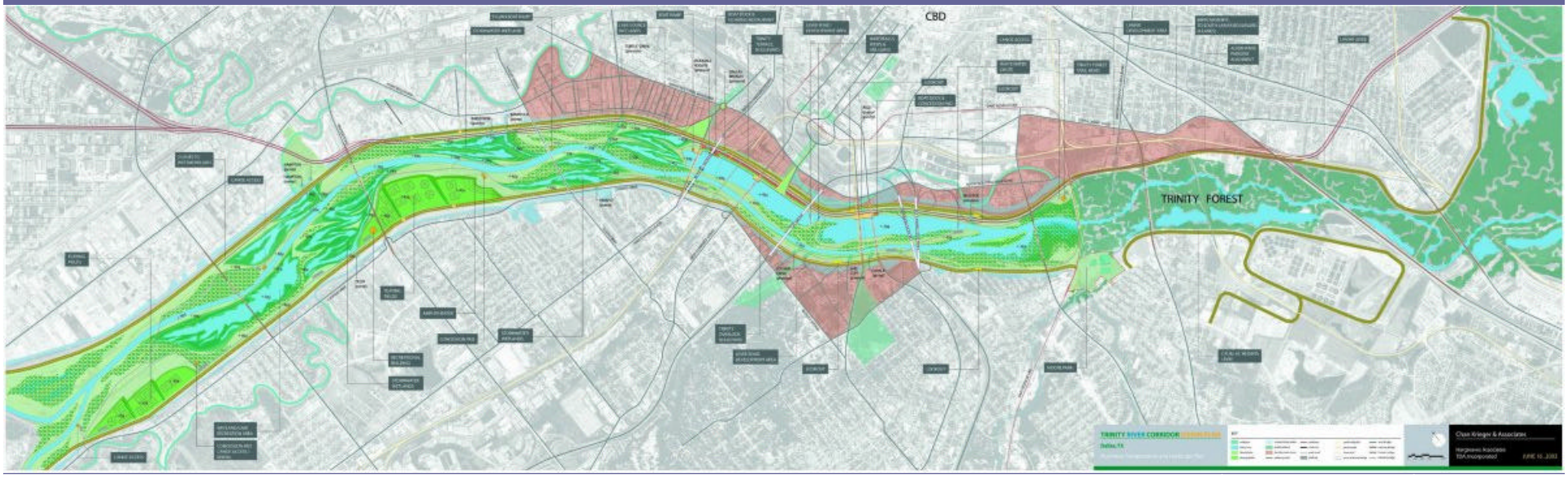
- Natural grasslands will integrate with wetland and river environments to provide important habitat
- Grasslands will predominate the floodway in order to maintain flood conveyance

Providing Recreation Improvements

Adding diverse recreational experiences in a cost-effective manner

Recreation Elements of Urban Design Study

- Promenade
- Overlooks
- Canoe Access
- Boat Docks
- Park Trails/Paths
- Park Roads
- Parking Areas

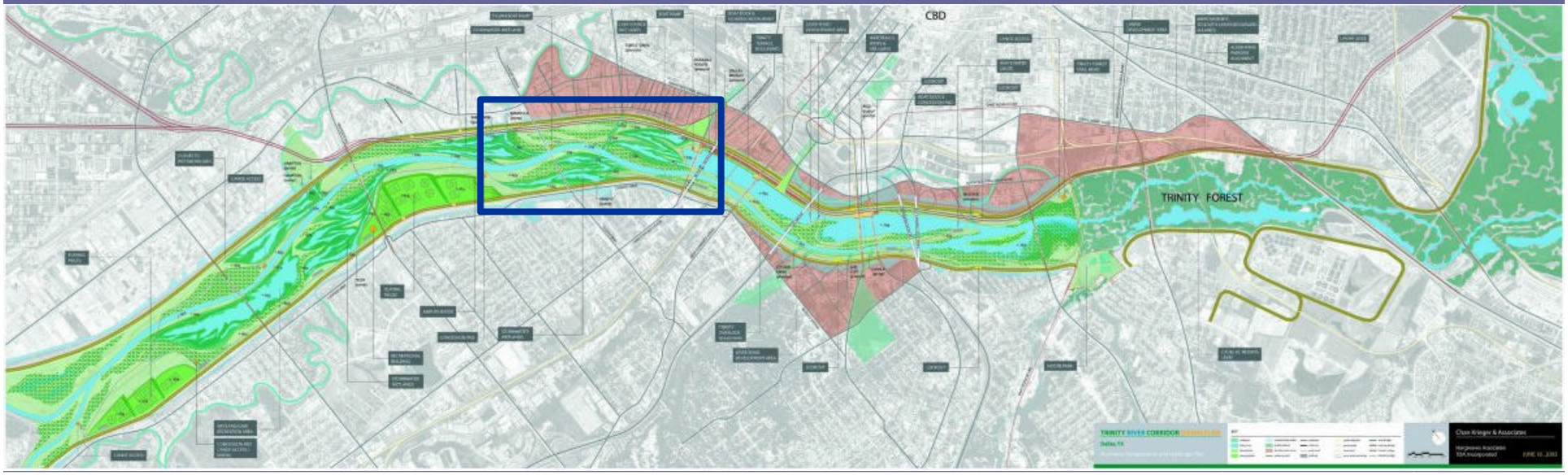


Downtown Lakes Recreation Elements

- Promenade
- Levee Trail
- Lookouts
- Boat Docks
- Park Trails/Paths
- Park Roads

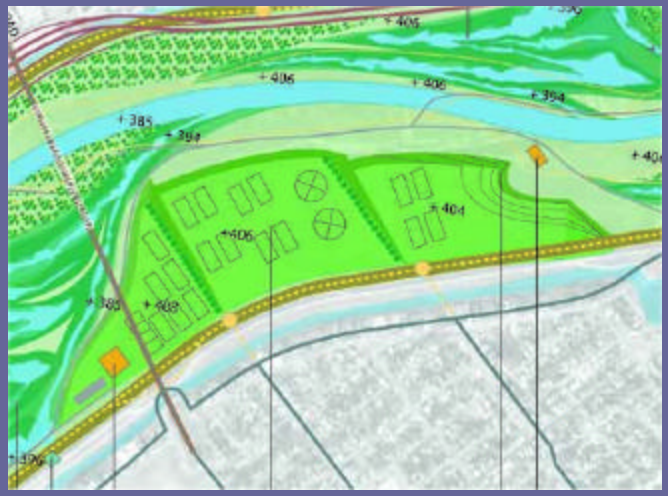
Wetland Area Recreation Elements

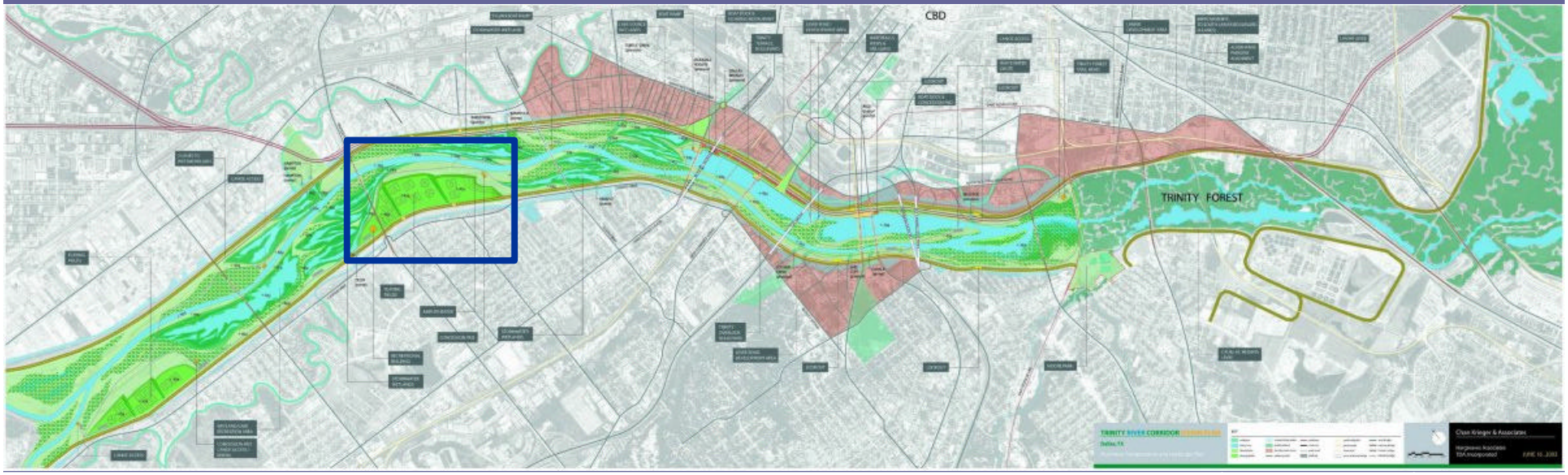
- Levee Trail
- Park Trails/Paths
- Boat Ramp (Lake)
- Park Roads



Meadows and Fields Recreation Elements

- Levee Trails
- Park Trails/Paths
- Park Roads
- Athletic Complex
- Amphitheater

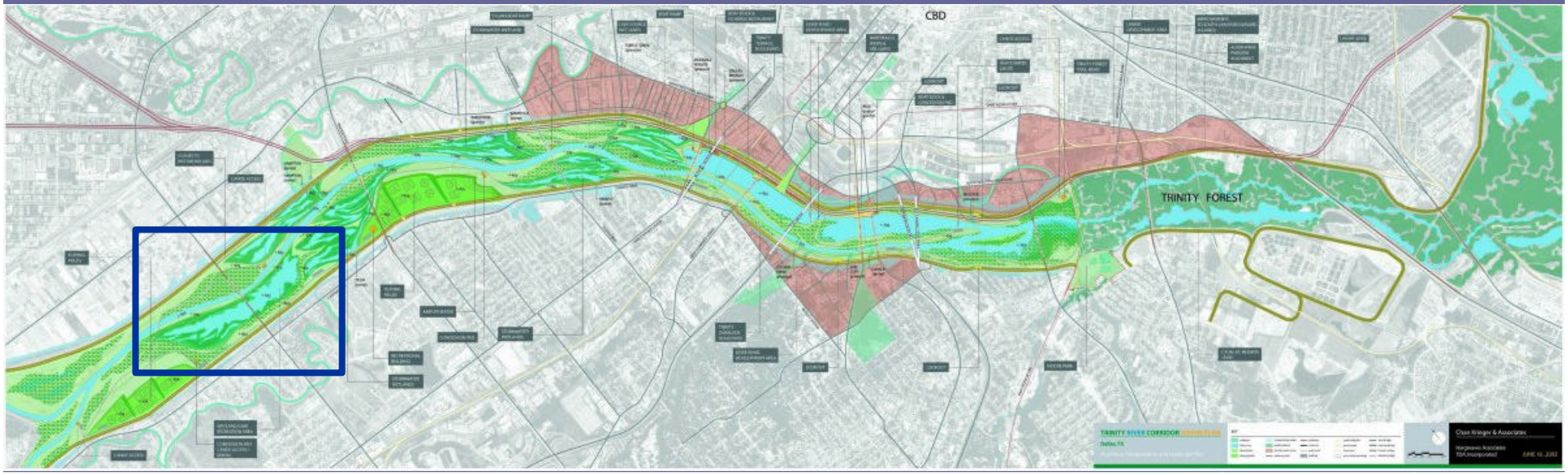




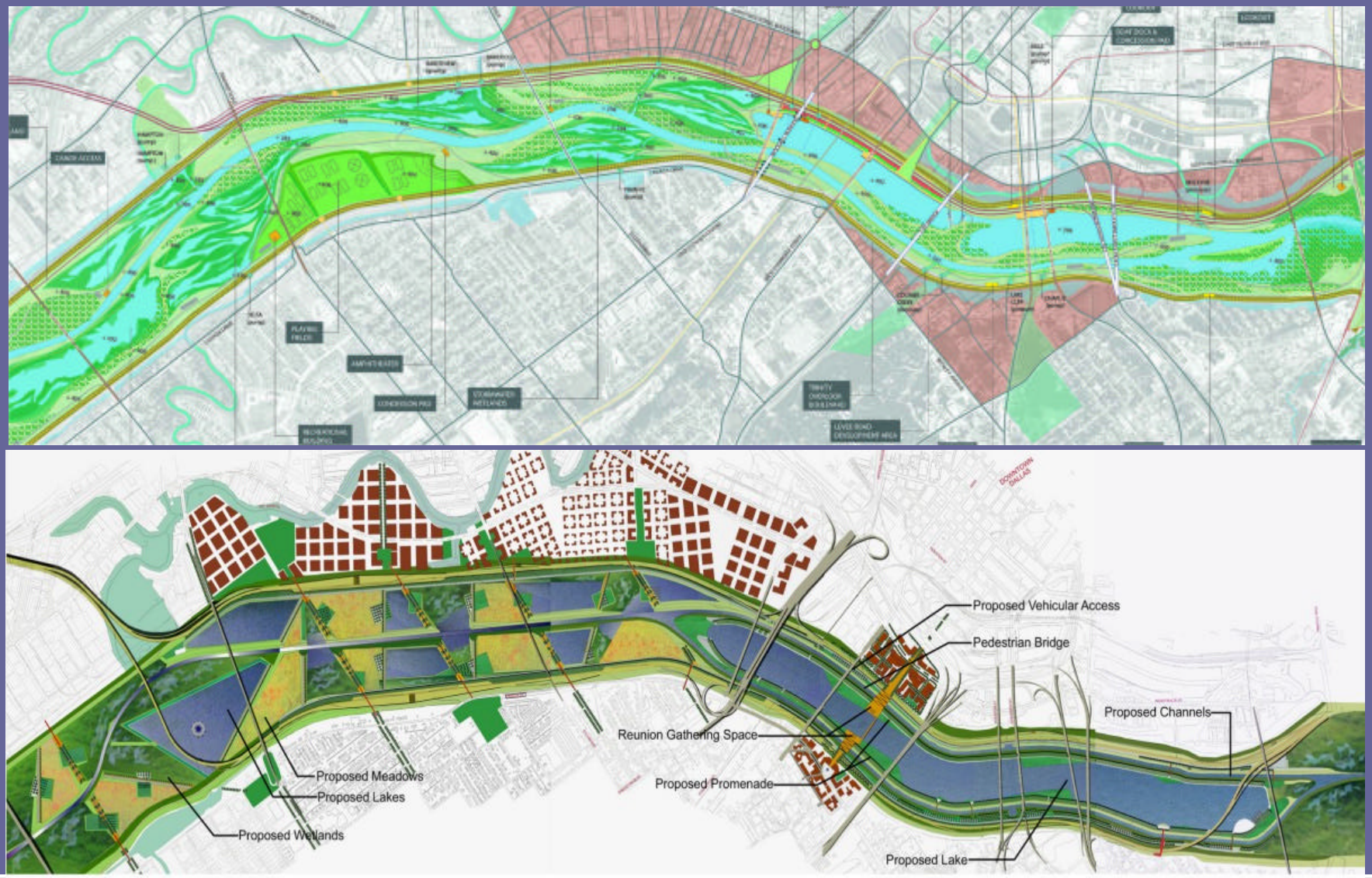
Amphitheater Example: Arkansas River, Tulsa

West Dallas Lake Recreation Elements

- Canoe Access (Lake & River)
- Levee Trails
- Park Trails/Path
- Park Roads



2003 Urban Design Study and 1999 MIP



2003 Urban Design Study and 1999 MIP

- Potential "Phase 1" projects from the 2003 Urban Design Study that were identified as candidates which may be funded, if funding is available
  - Promenade (<1mile)
  - Overlooks (2), Boardwalks in Wetlands (~1 mile)
  - Canoe Access (2), Boat Dock
  - Park Roads (~5 miles) w/Bridges (3)
  - Parking Area (~3 acres)
  - Multi-purpose Trails (~9 miles), Equestrian Trails (~3 miles)

- Phase 1" projects from the 1999 MIP (Master Implementation Plan) that were identified as funded
  - Promenade (>1mile)
  - Vehicle access (4) & Parking (240 spaces)
  - Pedestrian Bridges (4)
  - Multipurpose Trail (3.8 miles)

Flood Protection

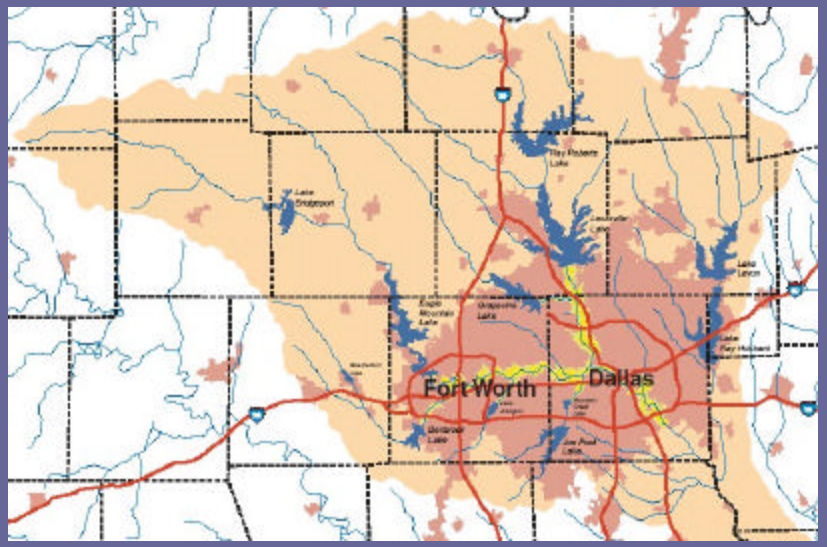
Ensuring the protection of the community from flooding

Flood Protection

- Flood protection is number one priority for floodway
- Failure of levees would produce over $8 billion in flood damages

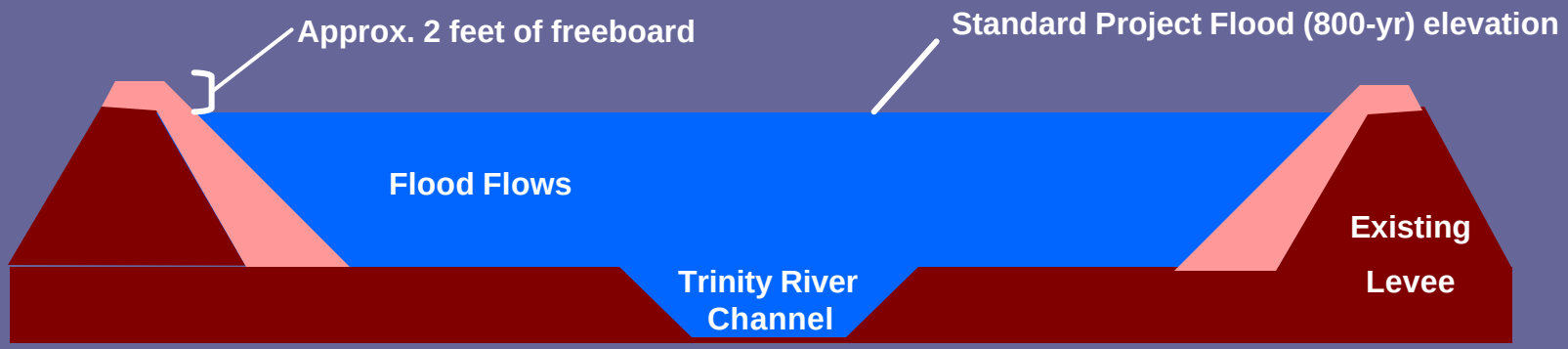
A Very Large Drainage Area

- Flows through Dallas Floodway represent drainage from over 6,100 square miles
- Area is larger than the entire state of Connecticut and larger than the states of Delaware and Rhode Island combined



Levee Improvements

- Assumes the Dallas Floodway Extension Project is in place
- Provide additional freeboard (distance between water level and top of levee)
- Stabilize slopes
- Likely to have Federal cost-sharing



ATSF Bridge Modification

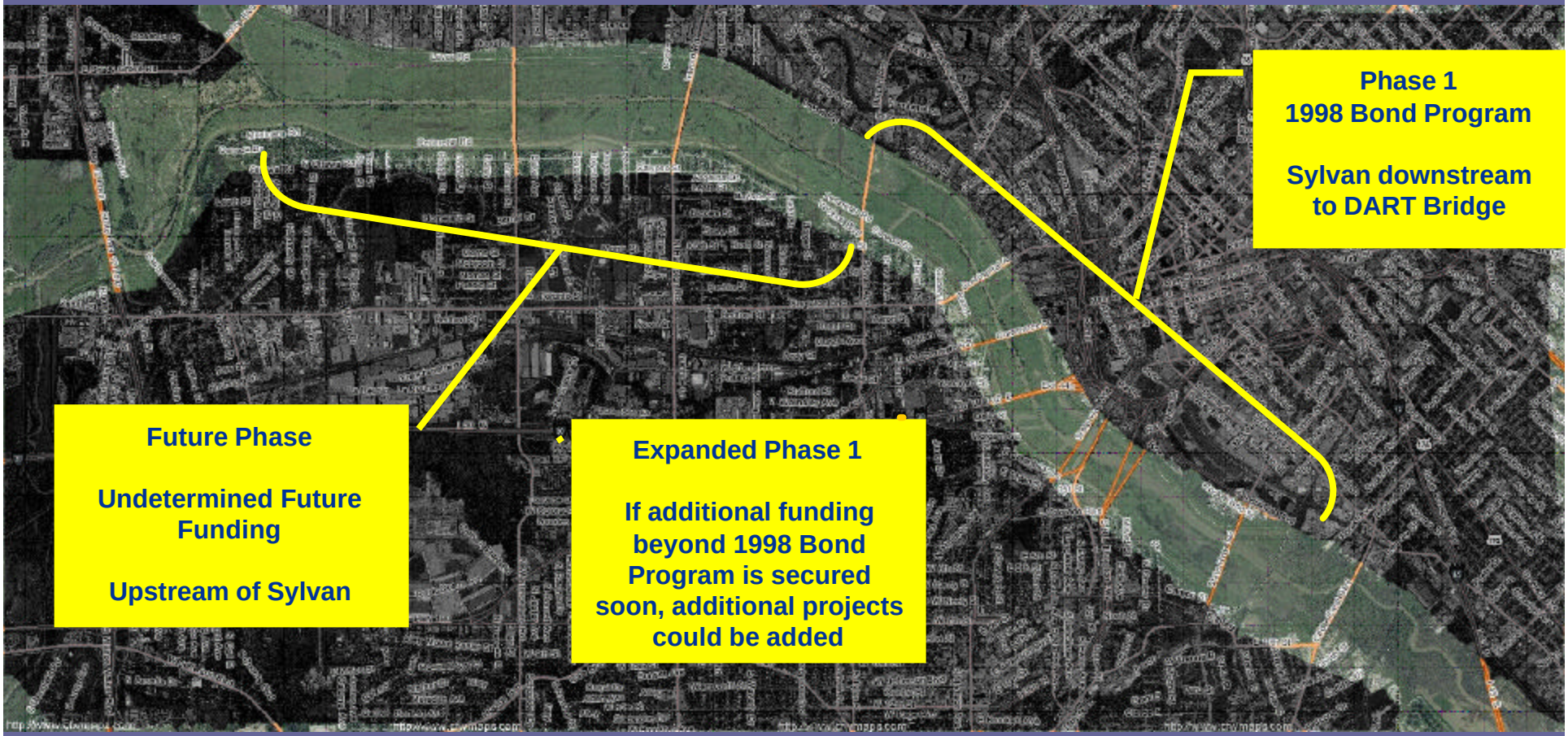
- ATSF Bridge modification will include replacement of timber piles with a wider-span new pedestrian bridge
- Earthen embankments on west overbank will be removed
- Center piece over the river channel will be preserved and included with new structure
- These modifications would produce significant flood control improvements and should have Federal cost sharing

ATSF Bridge behind DART Bridge looking south along East Levee

Flood Levels Cannot Be Changed Significantly

- Regulations provided by the USACE and the regional Corridor Development Certificate Process
- Any improvements to the floodway must have no significant change in flood levels either upstream or downstream of the project
- This is also true for any stand-alone future phase of the project

Phasing of Projects



Considerations for Phasing

- The 1998 Trinity River Corridor Bond Program has an estimated budget of about $29 million available for Phase 1 projects within the Dallas Floodway vicinity
- An expanded Phase 1 package of projects will be identified that will assume additional funding sources will be found in the very near future
- A Future Phase of projects to finish the Dallas Floodway initiatives that are now unfunded will also be identified

Basic Package for Phase 1

- The Trinity Parkway bench and the USACE levee raise projects will require about 4.6 million cubic yards of fill.
- The lakes and the river channel work downstream of Sylvan to Corinth should produce the necessary amount of excavation to satisfy the fill needs for the Trinity Parkway and levee raise.
- Thus, the two downtown lakes, channel work downstream of Sylvan, levee raise, and the Trinity Parkway project are all linked and would happen together.

Cost Sharing for the Basic Package of Phase 1

- The levee raise, some of the channel work, some of the wetland development, some of the tree plantings, and the ATSF Bridge modification would be cost shared with the Corps at 35% City cost.
- Some recreation may be cost sharable with the Corps at 50% City cost.
- The Trinity Parkway project would not put a cost burden on the City's Dallas Floodway estimated budget of $29 million.

Identify Remaining Projects that are Part of Phase 1

- Once the cost estimate for the basic package is identified, the remainder of the estimated $29 million budget would be used to fund other projects for the Dallas Floodway.
- Public input will guide decisions on which projects are included in Phase 1
- Potential projects would be lake source water, the promenade feature for the Urban Lake, trails, signage, tree plantings, park facilities, etc.

Next Steps

- If City Council approves further pursuit of the Urban Design Study approach for the Dallas Floodway, a 4 to 5-month assessment and analysis of the Urban Design Study concepts would be conducted by CDM
- By January 2004, City Council could replace the water resource components of the MIP within the Dallas Floodway with those of the Urban Design Study
- The USACE takes the Dallas Floodway work completed by CDM in early 2004 and completes the Dallas Floodway Supplemental Draft Environmental Impact Statement (EIS).
- Joint Final EIS by FHWA (Trinity Parkway) and the USACE (Dallas Floodway) would follow if a river alignment alternative is chosen for the Trinity Parkway.
- Design and construction would follow.