

Gordon's Creek Park



Hattiesburg, Mississippi

Conceptual Development Plan

Date: July 2011



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Gordon's Creek Park

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Legend	
Zoo District Kemper Park to Hutchinson Avenue	High School District Hutchinson Avenue to Broad Street
San Antonio District Broad Street to Green Street	Cultural District Green Street to Pine Street
Downtown District Pine Street to South Main Street	Depot District South Main St. to Unetta Street
Newman-Buschman District Unetta Street to end of Buschman Street	River District End of Buschman Street to the Leaf River



Downtown District, looking northwest from the Pastry Garden on Walnut Street



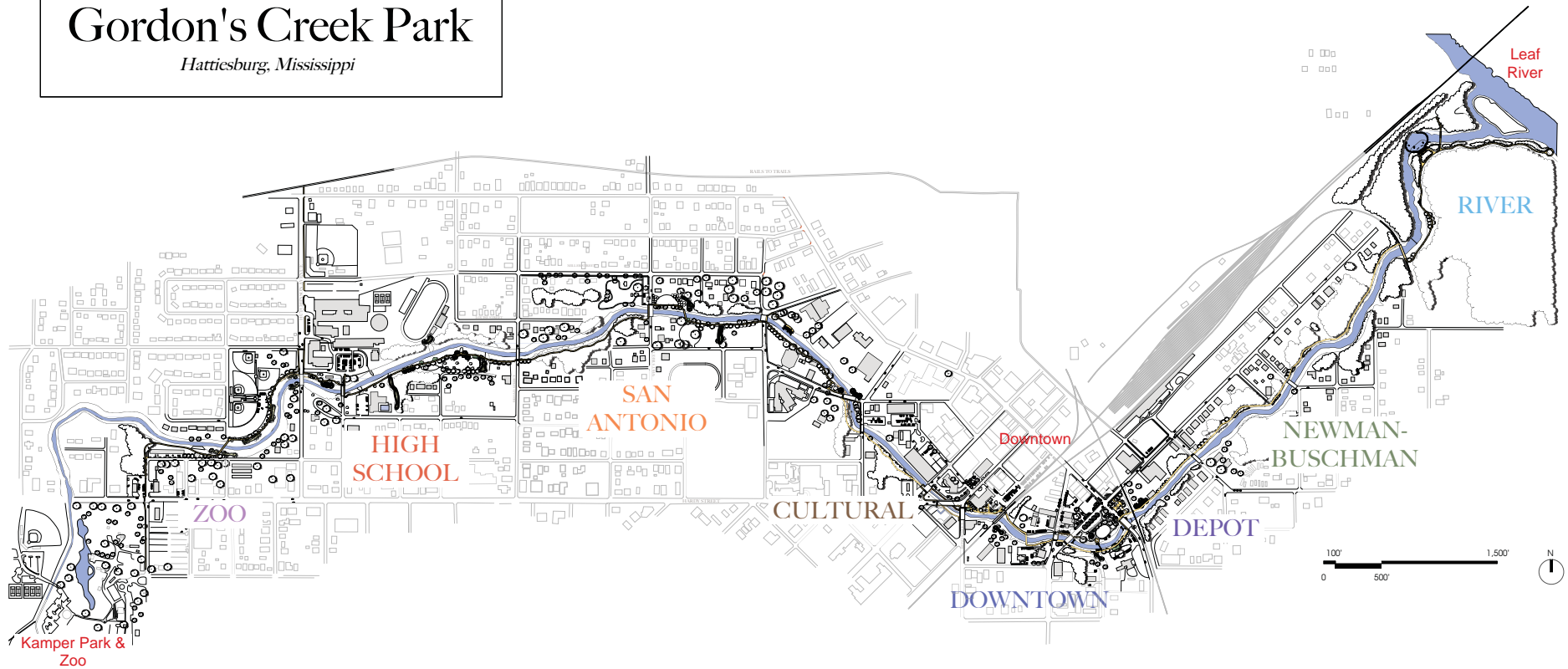
Newman-Buschman District, looking southwest from abandoned trestle



River District, mouth of Gordon's Creek, at the Leaf River

Gordon's Creek Park

Hattiesburg, Mississippi



DISTRICT THEMES

- Zoo District - Gateway
- High School District - Natural environment
- San Antonio District - Recreational
- Cultural District - Arts and culture
- Downtown District - History & Water
- Depot District - Railroad
- Newman-Buschman District - Timber Industry History
- River District - Native American History



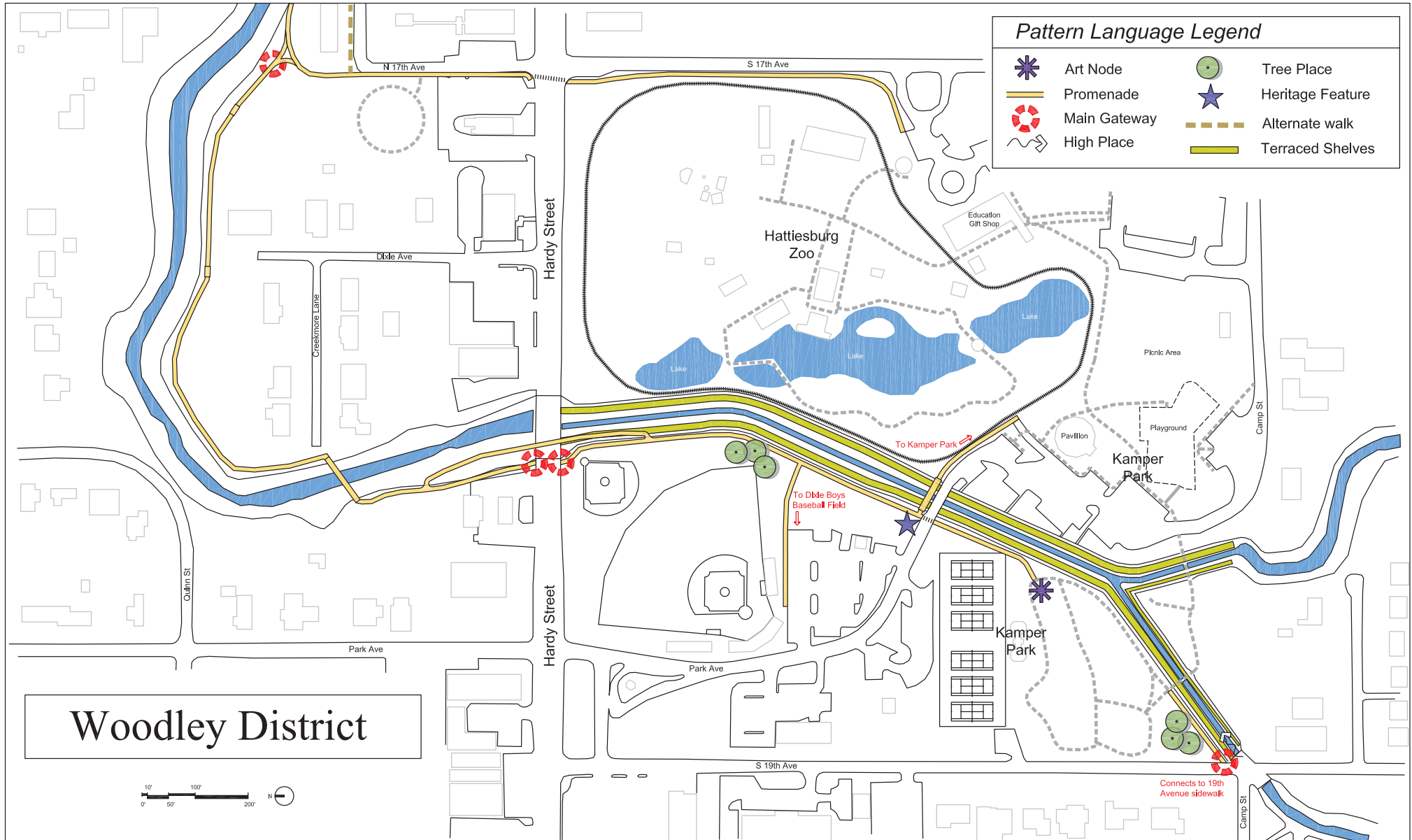
SUSTAINABILITY ELEMENTS

- *Bio-detention ponds to treat stormwater from streets
- *Selective use of woods from sustainable forests, or recycled plastic wood
- *Permeable paving systems for accent paving areas
- *Natural river banks with native plants to intercept stormwater runoff where possible



ART/INTERPRETATION ELEMENTS

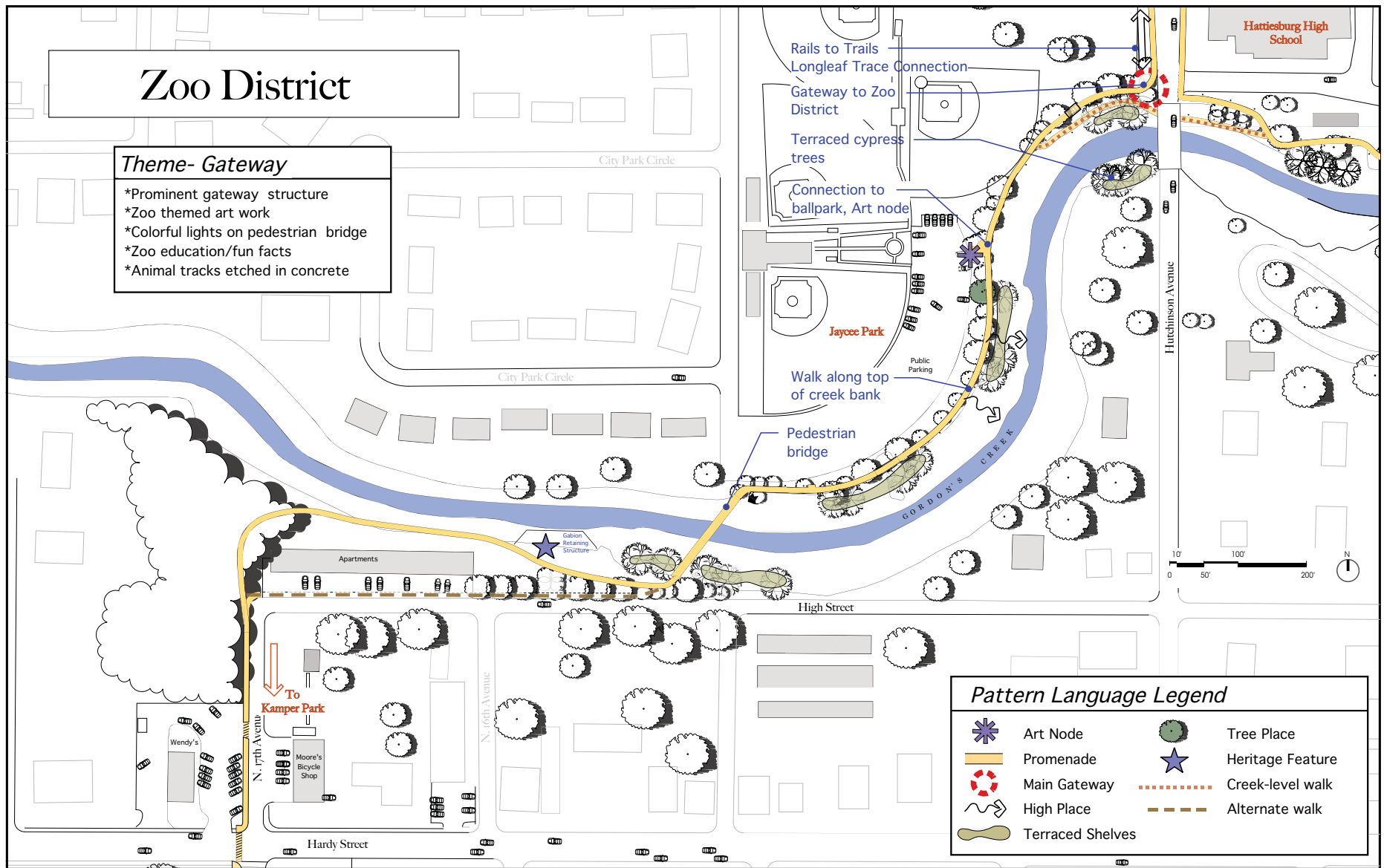
- *Art Nodes
- *Cultural Stories
- *Signage promoting awareness of history, wildlife, plant communities, watershed, and health/wellness



Zoo District

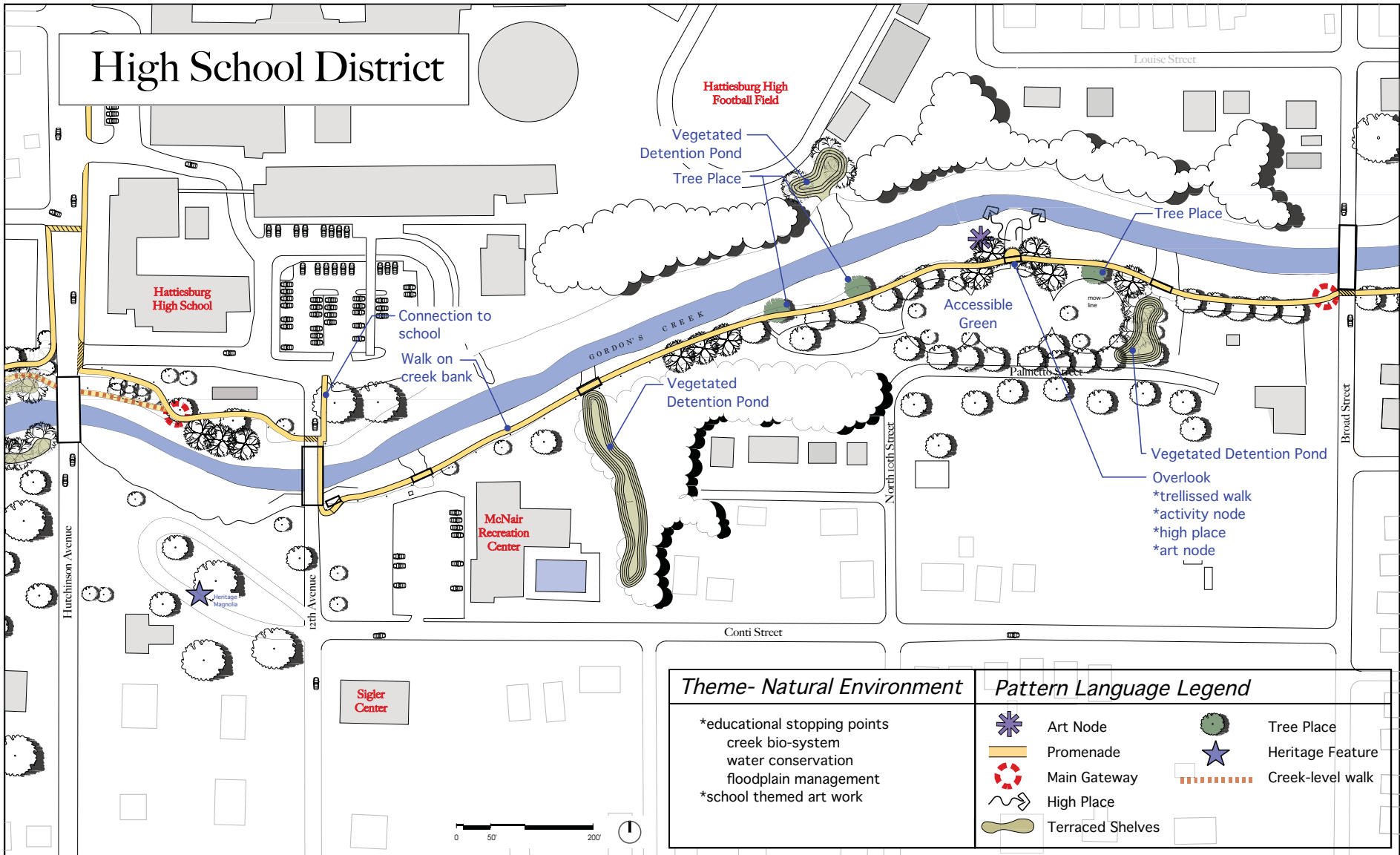
Theme- Gateway

- *Prominent gateway structure
- *Zoo themed art work
- *Colorful lights on pedestrian bridge
- *Zoo education/fun facts
- *Animal tracks etched in concrete



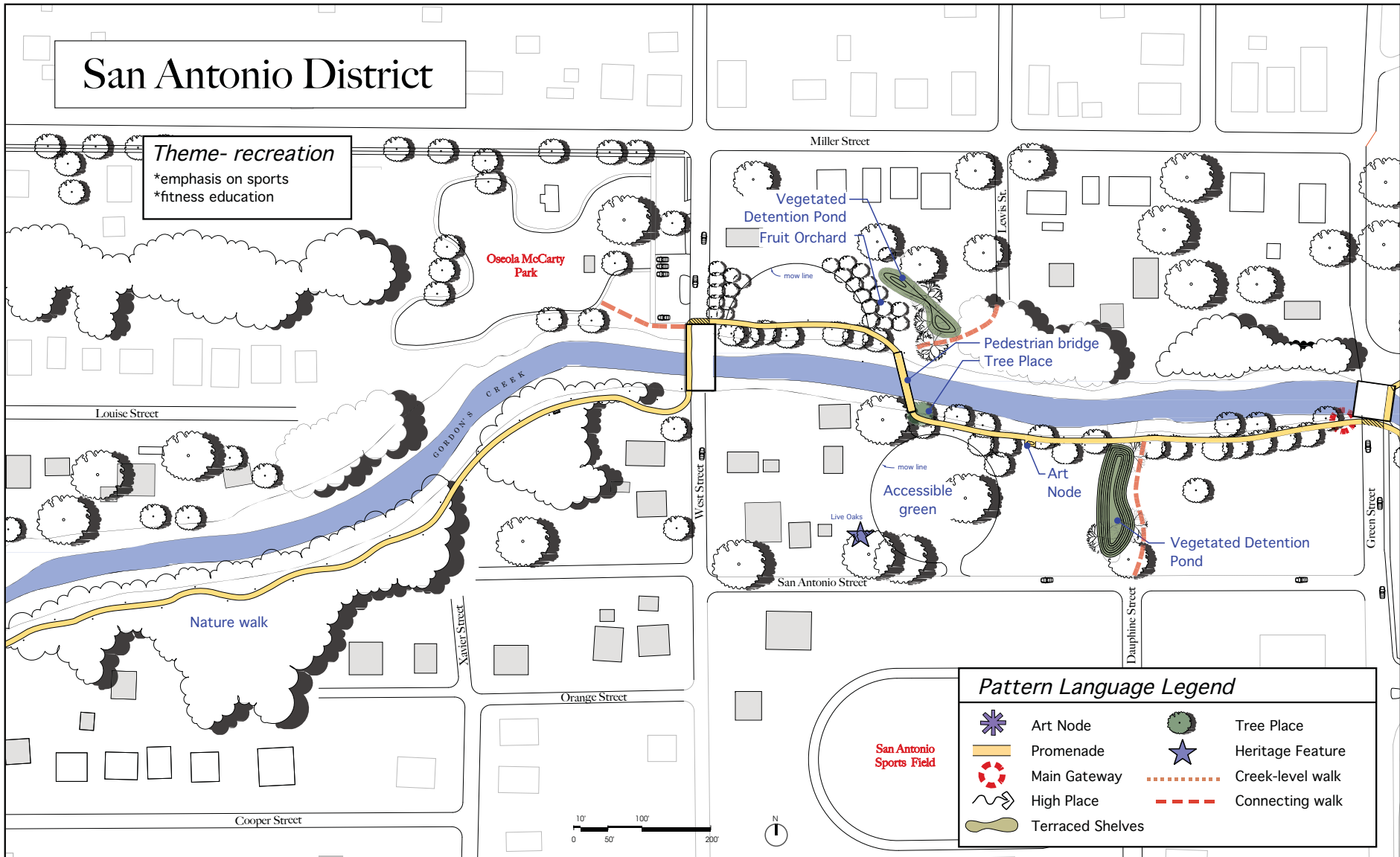
Pattern Language Legend

	Art Node		Tree Place
	Promenade		Heritage Feature
	Main Gateway		Creek-level walk
	High Place		Alternate walk
	Terraced Shelves		



San Antonio District

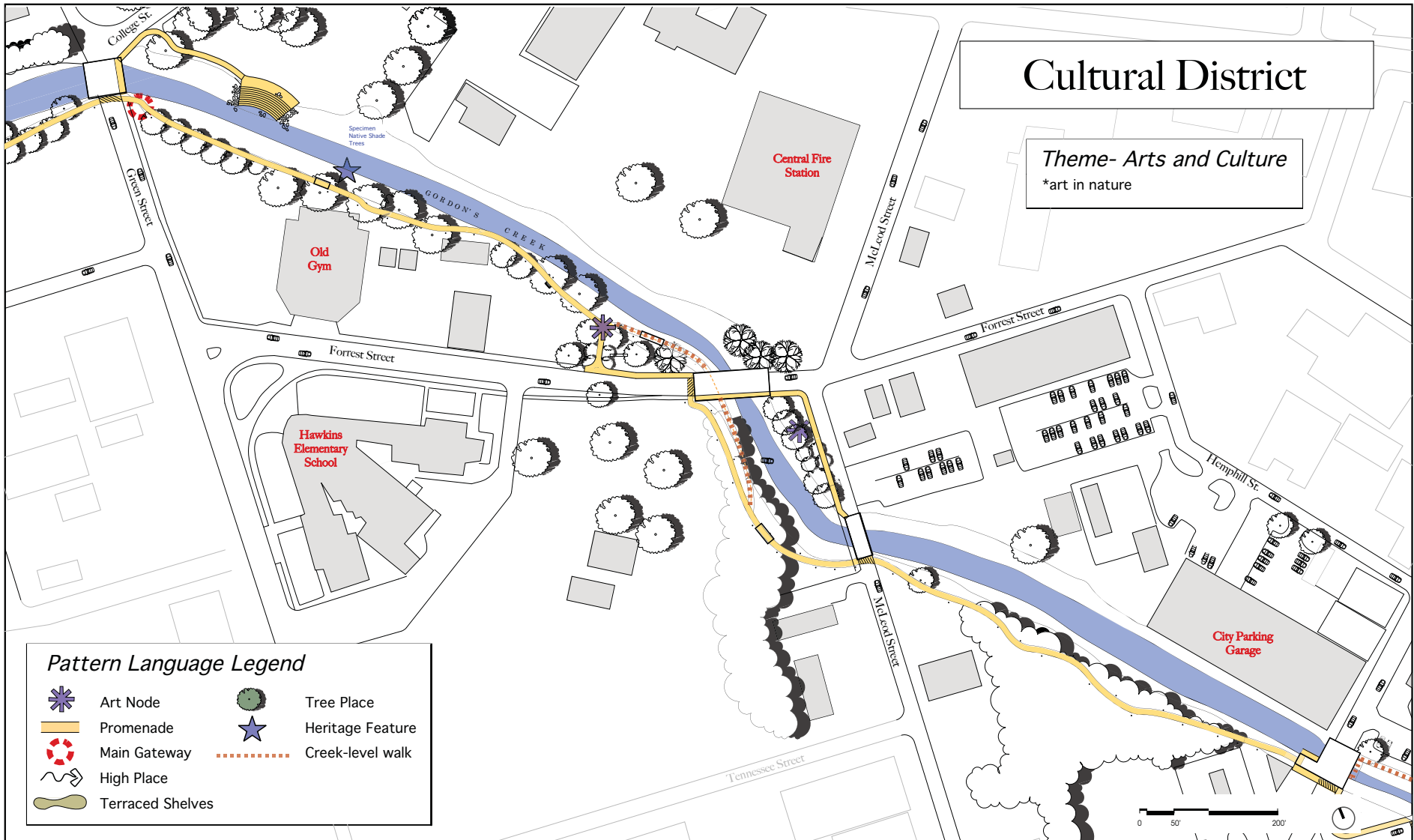
Theme- recreation
 *emphasis on sports
 *fitness education

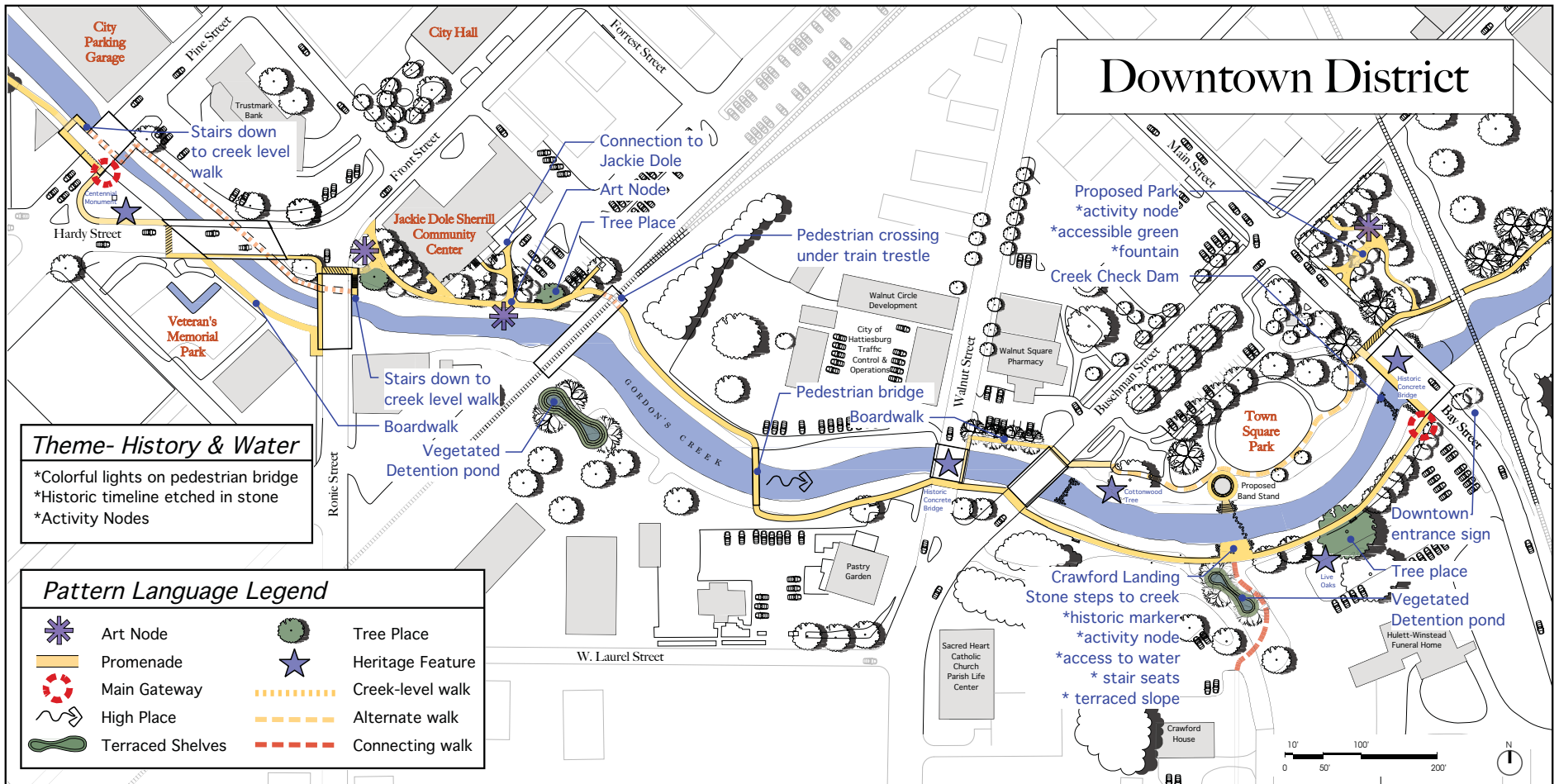


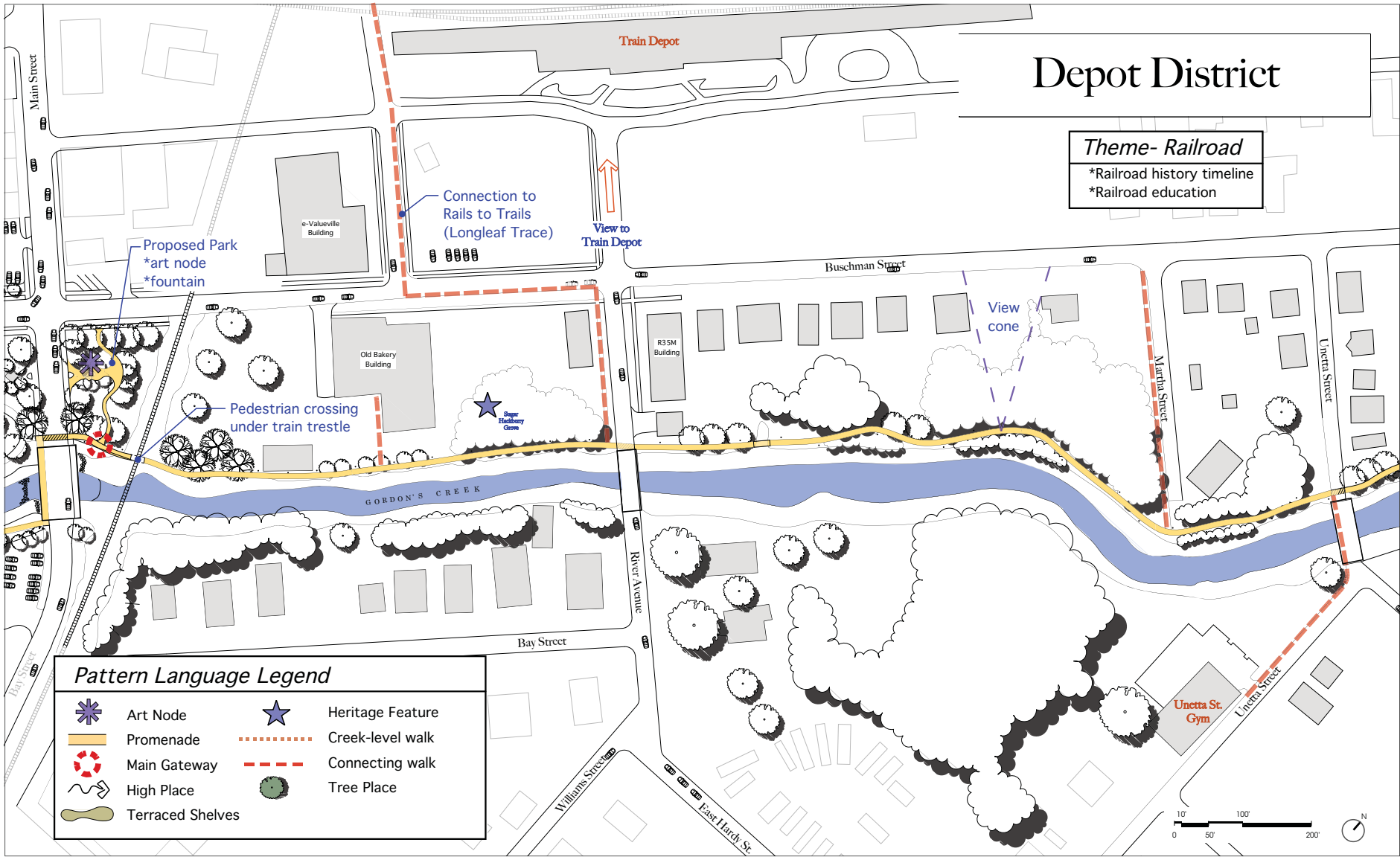
Pattern Language Legend

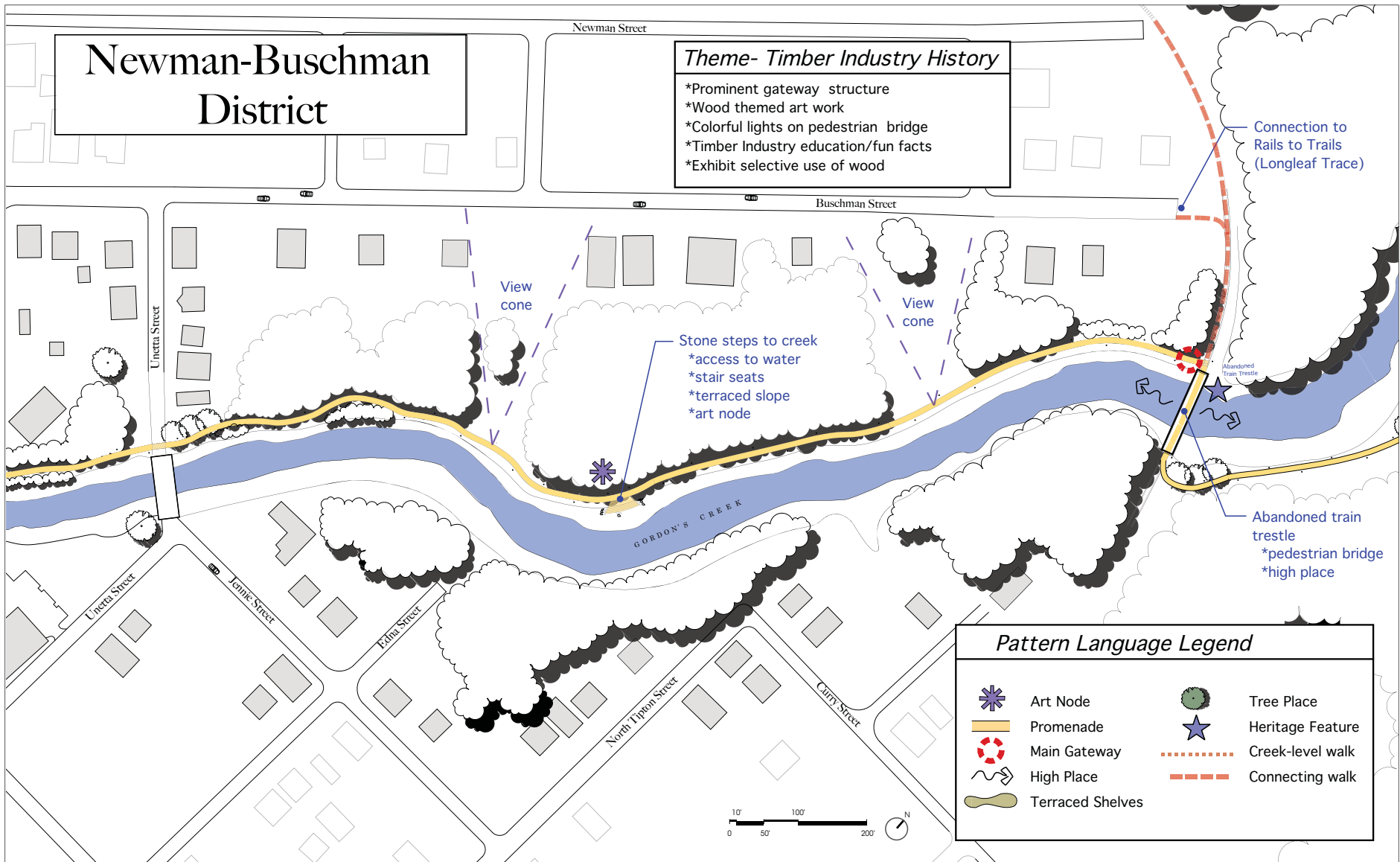
	Art Node		Tree Place
	Promenade		Heritage Feature
	Main Gateway		Creek-level walk
	High Place		Connecting walk
	Terraced Shelves		











River District

Theme- Native American History

- *Native American art work
- *Colorful lights on pedestrian bridge
- *Native American education/fun facts

To | Chain Park

Proposed Rails to Trails (Longleaf Trace)

Pedestrian bridge *connection to Long Leaf Trace and Chain Park

Enlarged creek area with stone weirs

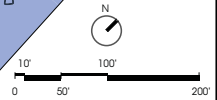
Stone steps to creek * activity node * access to water * stair seats * terraced slope

Terraced Walk * activity node * overlook * native american history/education * art node

Pattern Language Legend

	Art Node		Tree Place
	Promenade		Heritage Feature
	Main Gateway		Creek-level walk
	High Place		Proposed Rails to Trails
	Terraced Shelves		Connecting walk

River Overlook *high place *public outdoor room



Elevation along Gordon's Creek Park - River District



Gordon's Creek Park

Hattiesburg, Mississippi

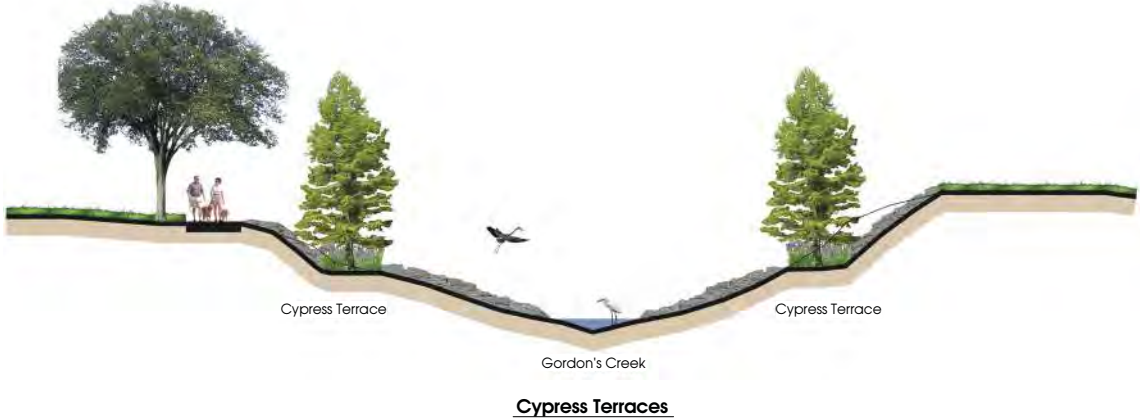
Stone steps to creek



Cypress along creek



Vegetated Detention pond





Bench

Plainwell Bench
 landscapeforms
www.landscapeforms.com



Railings

To encourage and maintain visual and physical contact with Gordon's Creek, railing shall only be used in situations when absolutely necessary. Railing is to be provided at edge of trail where there is a vertical drop of more than 30 inches. The railing allows views to the creek with minimal obstruction.
 Keuka Cable Railing System
www.keuka-studios.com



Urban Hooded Litter Receptacle with Liner

All-welded construction from flat square tube and flat bar, designed with easy access lockable door and to be anchor bolted to concrete slab. Available powdercoat finish in Cedar Green, Gloss Black, State Park Brown, Bronze or for an additional cost it can be custom painted.
 Mississippi Prison Industries Corp.
www.mpic.net



Bike Rack

MIR-062 - Bike Rack - 5' with Two Sides (Holds 9 Bikes)
 Mississippi Prison Industries Corp.
www.mpic.net



Lighting

Sternberg 1910 Acorn Light on octagonal tapered steel pole 9315 TO, same pole as in downtown Hattiesburg (at the depot)
 Sternberg Lighting
www.sternberglighting.com

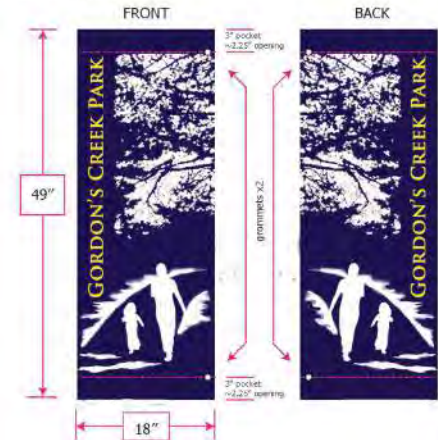


Entrance Markers



Steel Bollards with Lights

model B-3-L
 FairWeather Site Furnishings and Accessories
www.fairweathersf.com



Lightpole Banners

Single-ply Sunbrella fabric banners
 Project Graphics
www.projectgraphics.com

Gordon's Creek Park Materials Palette

Access to Water

Principle: People have a fundamental yearning for great bodies of water. But the very movement of people toward the water can also destroy the water.

Design Solution: When natural bodies of water occur near human settlements, treat them with great respect. Always preserve a belt of common land, immediately beside the water. And allow dense settlements to come right down to the water only at infrequent intervals along the water's edge.

Activity Nodes

Principle: Community facilities scattered individually through the city do nothing for the life of the city.

Design Solution: Create nodes of activity throughout the community, spread about 300 yards apart. First identify those existing spots in the community where action seems to concentrate itself. Then modify the layout of the paths in the community to bring as many of them through these spots as possible. This makes these spots function as a 'node' in the path network. Then, at the center of each node, make a small public square, and surround it with a combination of community facilities and shops which are mutually supportive.

Promenade

Principle: Every subculture needs a center for its public life: a place where you can go and see people, and to be seen.

Design Solution: Encourage the gradual formation of a promenade at the heart of each community, linking the main activity nodes, and placed centrally, so that each point in the community is within 10 minutes' walk of it. Put main points of attraction at the two ends, to keep a constant movement up and down.

Road Crossings

Principle: Where paths cross roads, the cars have power to frighten and subdue the people walking, even when the people walking have the legal right-of-way.

Design Solution: At any point where a pedestrian path crosses a road that has enough traffic to create more than a two second delay to people crossing, make a 'knuckle' at the crossing: narrow the road to the width of the through lanes only; continue the pedestrian path through the crossing about a foot above the roadway; put in islands between lanes; slope the road up toward the crossing (1 to 6 max.); mark the path with a canopy or shelter to make it visible.

Main Gateway

Principle: Any part of a town, large or small, which is to be identified by its inhabitants as a precinct of some kind, will be reinforced, helped in its distinction, marked, and made more vivid, if the paths which enter it are marked by gateways where they cross the boundary.

Design Solution: Mark every boundary in the city which has important human meaning: the boundary of a building cluster, a neighborhood, a precinct: by great gateways where the major paths cross the boundary.

Accessible Green

Principle: People need green open space to go to, when they are close they use them. But if the greens are more than three minutes away, the distance overwhelms the need.

Design Solution: Build one open green space within three minutes walk: about 750 feet of every house and workplace. This means the greens need to be uniformly scattered at 1500 feet intervals, throughout the city. Make the greens at least 150 feet across, and at least 60,000 square feet in area.

Small Public Square

Principle: A town needs public squares, they are the largest, most public rooms, that the town has. But when they are too large, they look and feel deserted.

Design Solution: Make a public square much smaller than you would at first imagine, usually no more than 45 to 60 feet across, never more than 75 feet across. This applies only to its width in the short direction. In the long direction it can certainly be longer.

High Places

Principle: The instinct to climb up to some high places, from which you can look down and survey your world, seems to be a fundamental human instinct.

Design Solution: Build occasional high places as landmarks throughout the city. They can be a natural part of the topography, or towers, or part of the roofs of the highest local building: but, in any case, they should include a physical climb.

Pools and Streams

Principle: We come from the water, our bodies are largely water, and water plays a fundamental role in our psychology. We need constant access to water, all around us, and we cannot have it without reverence for water in all its forms. But everywhere in cities water is out of reach.

Design Solution: Preserve natural ponds and streams and allow them to run through the city, make paths for people to walk along them and footbridges to cross them. Let the streams form natural barriers in the city, with traffic crossing them only infrequently on bridges. Whenever possible, collect rainwater in open gutters and allow it to flow above ground, along pedestrian paths and in front of houses. In places without natural running water, create fountains in the street.

Common Land

Principle: Without common land no social system can survive.

Design Solution: Give over 25 per cent of the land in house clusters to common land which touches, or is very near, the homes which share it. Basic, be wary of the automobile, on no account let it dominate this land.



Throughout history people have learned how to make things by observing and copying what has worked successfully in the past. A pattern language simply describes common design problems and their successful solutions.

The framework and philosophy of the "pattern language" approach was popularized in the book 'A Pattern Language' by Christopher Alexander and colleagues in the late 1970s.

The book refers to common issues or problems in the design of buildings and towns, and how they should be solved. The pattern takes a known principle and provides design solutions which have been successful around the world and over time.

The 24 patterns shown here are those taken from the book 'A Pattern Language', that directly relate to the design of a public outdoor park, such as Gordon's Creek Park.

Alexander, C. & Ishikawa, S. & Silverstein, M. (1977)
A Pattern Language: Towns, Buildings, Construction. New York, Oxford University Press

Public Outdoor Rooms

Principle: There are very few spots along the streets of modern towns and neighborhoods where people can hang out, comfortably, for hours at a time.

Design Solution: In every neighborhood and work community, make a piece of common land into an outdoor room: a partly enclosed place, with some roof, columns, without walls, perhaps with a trellis, place it beside an important path and within view of many homes and workshops.

Still Water

Principle: To be in touch with water, we must above all be able to swim, and to swim daily, the pools and ponds and holes for swimming must be so widely scattered through the city, that each person can reach one within minutes.

Design Solution: In every neighborhood, provide some still water: a pond, a pool for swimming. Keep the pool open to the public at all times, but make the entrance to the pool only from the shallow side of the pool, and make the pool deepen gradually, starting from one or two inches deep.

Activity Pockets

Principle: The life of a public square forms naturally around its edge. If the edge fails, then the space never becomes lively.

Design Solution: Surround public gatherings places with pockets of activity: small, partly enclosed areas at the edges, which jut forward into the open space between the paths, and contain activities which make it natural for people to pause and get involved.

Paths and Goals

Principle: The layout of paths will seem right and comfortable only when it is compatible with the process of walking, and the process of walking is far more subtle than one might imagine.

Design Solution: To lay out paths, first place goals at natural points of interest, then connect the goals to one another to form the paths. The paths may be straight, or gently curving between goals, their paving should swell around the goal. The goals should never be more than a few hundred feet apart.

Path Shape

Principle: Streets should be for staying in, and not just for moving through, the way they are today.

Design Solution: Make a bulge in the middle of a public path, and make the ends narrower, so that the path forms an enclosure which is a place to stay, not just a place to pass through.

Stair Seats

Principle: Whenever there is action in a place, the spots which are the most inviting, are those high enough to give people a vantage point, and low enough to put them in action.

Design Solution: In any public place where people loiter, add a few steps at the edge where stairs come down or where there is a change of level. Make these raised areas immediately accessible from below, so that people may congregate and sit to watch the goings on.

Something Roughly In the Middle

Principle: A public space without a middle is quite likely to stay empty.

Design Solution: Between the natural paths which cross a public square or courtyard or a piece of common land choose something to stand roughly in the middle: a fountain, a tree, a statue, a clock tower with seats, a windmill, a handstand. Make it something which gives a strong and steady pulse to the square, drawing people in toward the center. Leave it exactly where it falls between the paths, resist the impulse to put it exactly in the middle.

Terraced Slope

Principle: On sloping land, erosion caused by run off can kill the soil. It also creates uneven distribution of rainwater over the land, which naturally does less for plant life than it could if it were evenly distributed.

Design Solution: On all land which slopes in fields, in parks, in public gardens, even in the private gardens around a house, make a system of terraces and bunds which follow the contour lines. Make them by building low walls along the contour lines, and then backfilling them with earth to form the terraces.

There is no reason why the building itself should fit into the terraces- it can comfortably cross terrace lines.

Fruit Trees

Principle: In the climates where fruit trees grow, the orchards give the land an almost magical identity: think of the orange groves of Southern California, the cherry trees of Japan, the olive trees of Greece. But the growth of cities seems always to destroy these trees and the qualities they possess.

Design Solution: Plant small orchards of fruit trees in gardens and on common land along paths and streets, in parks, in neighborhoods: wherever there are well established groups that can themselves care for the trees and harvest the fruit.

Tree Places

Principle: When trees are planted or pruned without regard for the special places they can create, they are as good as dead for the people who need them.

Design Solution: If you are planting trees, plant them according to their nature, to form enclosures, avenues, squares, groves and single spreading trees toward the middle of open spaces. And shape the nearby buildings in response to trees, so that the trees themselves, and the trees and buildings together, form places which people can use.

Garden Growing Wildly

Principle: A garden which grows true to its own laws is not a wilderness, yet not entirely artificial either.

Design Solution: Grow grasses, mosses, bushes, flowers, and trees in a way which comes close to the way that they occur in nature: intermingled, without barriers between them, without bare earth, without formal flower beds, and with all the boundaries and edges made in rough stone and brick and wood which become a part of the natural growth.

Trellised Walk

Principle: Trellised walks have their own special beauty. They are so unique, so different from other ways of shaping a path, that they are almost archetypal.

Design Solution: When paths need special protection or where they need some intimacy, build a trellis over the path and plant it with climbing flowers. Use the trellis to help shape the outdoor spaces on either side of it.

Garden Seat

Principle: Somewhere in every garden, there must be at least one spot, a quiet garden seat, in which a person or two people can reach into themselves and be in touch with nothing else but nature.

Design Solution: Make a quiet place in the garden: a private enclosure with a comfortable seat, thick planting, sun. Pick the place or the seat carefully: pick the place that will give you the most intense kind of solitude.

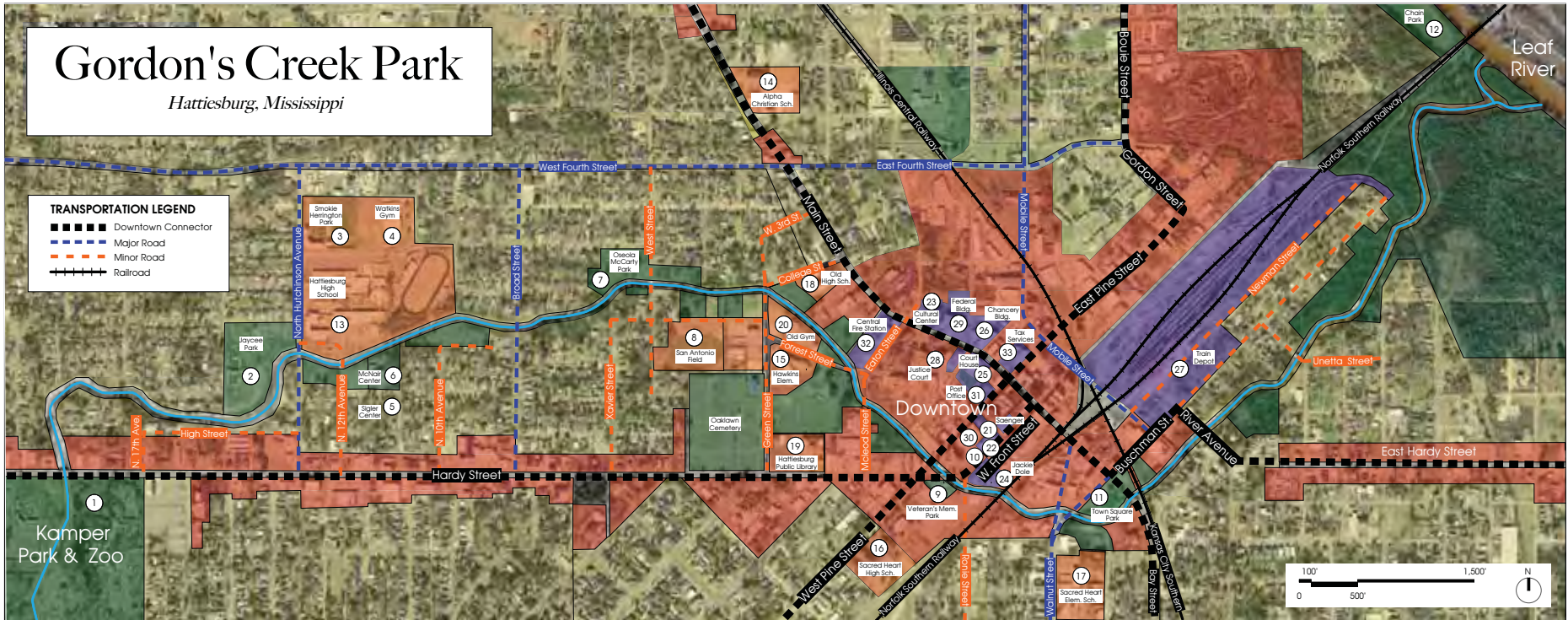
Courtyards Which Live

Principle: The Courtyards built in modern buildings are very often dead. They are intended to be private open spaces for people to use- but they end up unused, full of gravel and abstract sculptures.

Design Solution: Place every courtyard in such a way that there is a view out of it to some larger open space: place it so that at least two or three doors open from the building into it and so that natural paths which connect these doors pass across the courtyard. And, at one edge, beside a door, make a roofed veranda or a porch, which is continuous with both the inside and the courtyard.

Gordon's Creek Park

Hattiesburg, Mississippi



LAND USE LEGEND	
Recreation & Open space	Civic
1 Kamper Park & Zoo	21 The Saenger Theatre
2 Jaycee Park	22 Hattiesburg City Hall
3 Smoke Henington Park	23 Hattiesburg Cultural Center
4 Watkins Gymnasium	24 Jackie Dole Sherrill Community Center
5 Sigler Center	25 Forrest County Court House
6 McNair Recreation Center	26 Johnson Chancery Building
7 Oseola McCarty Park	27 Train Depot
8 San Antonio Field	28 Forrest County Justice Court
9 Veterans Memorial Park	29 Federal Building
10 City Hall Park	30 Old Federal Building
11 Town Square Park	31 Post Office
12 Chain Park	32 Central Fire Station
Schools & Education	33 Forrest Co. Tax Services Building
13 Hattiesburg High School	
14 Alpha Christian School	Commercial
15 Hawkins Elementary	Residential
16 Sacred Heart High School	
17 Sacred Heart Elementary	
18 Old High School	
19 Hattiesburg Public Library	
20 Old Gym	



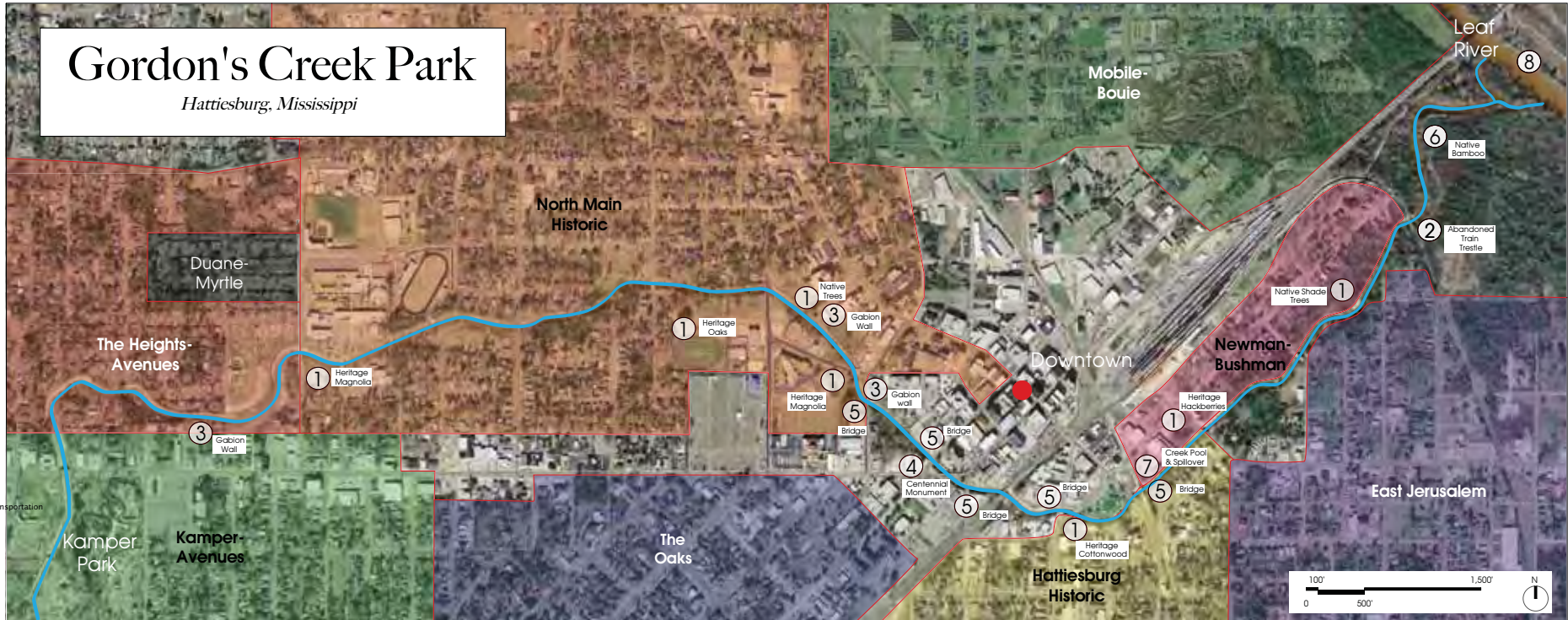
19 Award Winning Hattiesburg Public Library



27 Newly restored Hattiesburg Train Depot



10 City Hall Park and 24 Jackie Dole Sherrill Community Center



Heritage Features Legend	
① Specimen Native Shade Trees	⑦ Bay St. Bridge Pool & Spillover
② Abandoned Train Trestle	⑧ Leaf River
③ Gabion Retaining Structure	
④ Centennial Monument	
⑤ Historic Concrete Bridge	
⑥ Native Bamboo Grove	



Live Oak along Gordon's Creek at Town Square Park



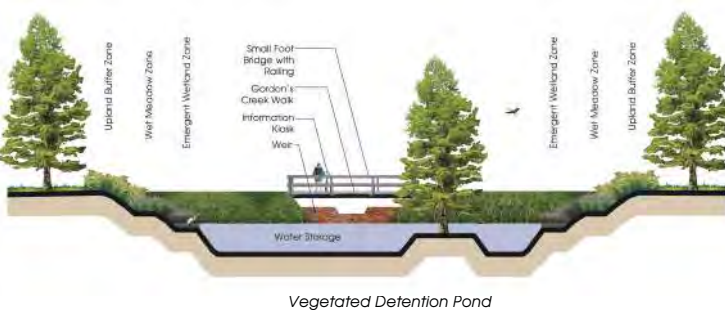
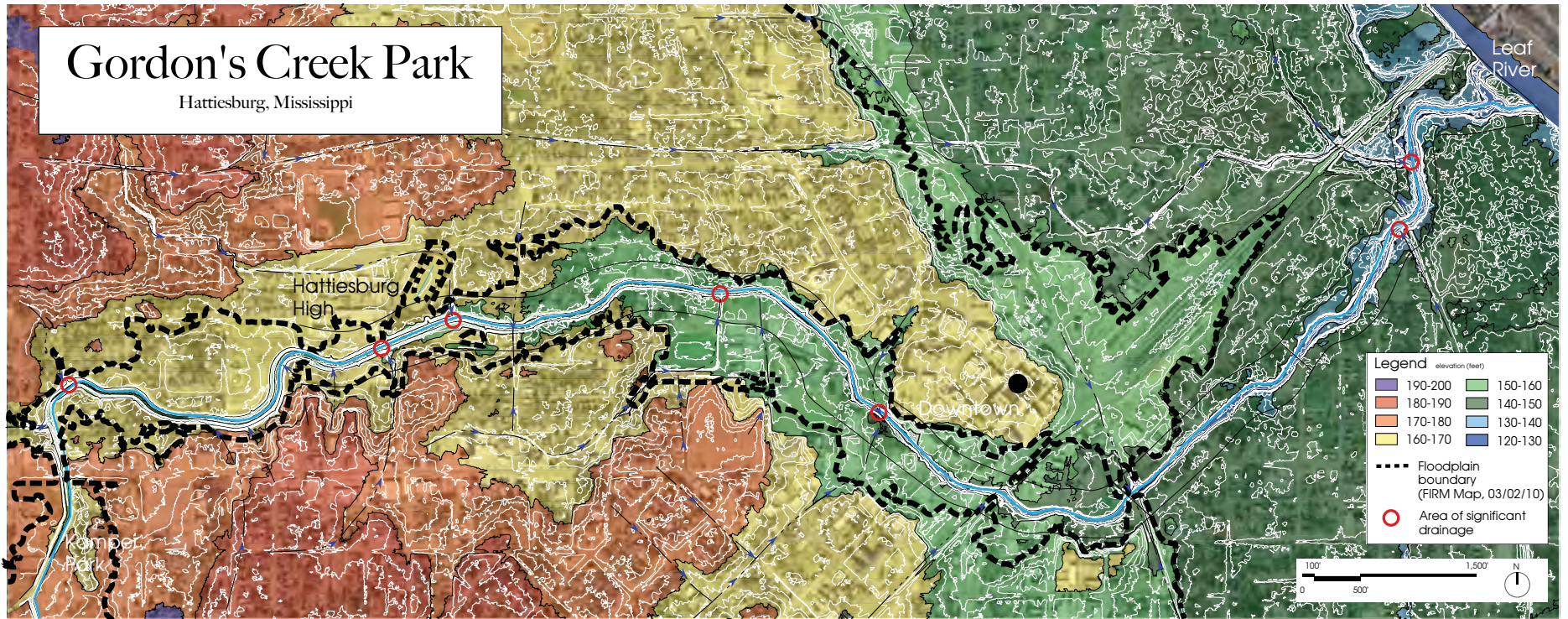
Concrete bridge over creek on Walnut Street



Abandoned train trestle in the River District

Gordon's Creek Park

Hattiesburg, Mississippi



Vegetated Detention Pond

The flood hazard in Hattiesburg comes primarily from the Leaf River and its tributary creeks including: Gordon, Mixon, Burkett and Priest which are within the Pascagoula River Basin. Floods in Hattiesburg are of relatively short duration. After an intense rainfall, floodwaters can rise at a rate of two to three feet per hour reaching maximum stage in two hours or less. April 6, 1983 was the last flood involving major river flooding with a river stage of 29.19 ft (City of Hattiesburg, Floodplain management). The drainage, landform and floodway diagram above is a graphic delineation of the special hazard areas and risk premium zones along the Gordon's Creek Park corridor. The entire area of the Gordon's Creek Park will be impacted by the flood waters of Gordon's Creek, and design solutions should reflect this. The diagram is also a valuable tool for future development locations along the creek.

The storm water drainage swales located along the creek are necessary to drain rain water as quickly as possible so flooding does not occur. However, there can be some serious negative consequences of such drainage systems. The problem is that many of the pollutants of our modern living such as oil, grease, pesticides, sediment, salt, and animal waste are washed away within the storm water and flow directly into any adjacent body of water. These secondary drainage areas open up opportunities to use storm water best management practices which are methods designed to control storm water runoff incorporating sediment control, and soil stabilization. The EPA defines storm water BMPs as a "technique, measure or structural control that is used for a given set of conditions to manage the quantity and improve the quality of storm water runoff in the most cost-effective manner."

A large amount of the Hattiesburg storm water especially in the downtown area, is conveyed by concrete swales or drainage pipes, leading excellent locations for vegetated detention ponds, which are basically bowl shaped drainage areas with native vegetation designed to fill up with runoff and then allow the storm water to pass through the pond at a slow, controlled rate through an outfall structure to the creek, (similar to the detention ponds now required with most large scale developments). The remaining pond water percolates through surrounding soils. Vegetated bioswales are effective in slowing storm water and reducing significant amounts of runoff. Removal of sediments and pollutants is high, ranging from 20 to 40 percent, but removal rates have been reported to exceed 80 percent (USEPA, 1999).

Gordon's Creek Plant Palette



Bald Cypress at Oweida McCarty Park



Cottonwood in Town Square Park



Sycamore in Newman-Buschman District



Southern Magnolia in High School District

Common	Scientific	Evergreen/Deciduous
Native Trees		
Ashes		
*Carolina Ash	Fraxinus caroliniana	Deciduous
*Green Ash	Fraxinus pennsylvanica	Deciduous
Conifers		
*Bald Cypress	Taxodium distichum	Deciduous
*Eastern Red Cedar	Juniperus virginiana	Evergreen
Loblolly Pine	Pinus taeda	Evergreen
Slash Pine	Pinus elliotti	Evergreen
Spruce Pine	Pinus glabra	Evergreen
Elms		
American Elm	Ulmus americana	Deciduous
Slippery Elm	Ulmus rubra	Deciduous
Hickories		
Pignut Hickory	Carya glabra	Deciduous
*Pecan	Carya illinoensis	Deciduous
Maples		
*Red Maple	Acer rubrum	Deciduous
Oaks		
*Laurel Oak	Quercus laurifolia	Deciduous
*Live Oak	Quercus virginiana	Evergreen
*Southern Red Oak	Quercus falcate spp.	Deciduous
**Texas Red Oak	Quercus nuttallii (texana)	Deciduous
Water Oak	Quercus nigra	Deciduous
Other Native Trees		
*Beech, American	Fagus grandifolia	Deciduous
*River Birch	Betula nigra	Deciduous
Black Cherry	Prunus serotina	Deciduous
Black Gum	Nyssa sylvatica	Deciduous
Black Willow	Salix nigra	Deciduous
Catalpa, Southern	Catalpa bignonioides	Deciduous
Cottonwood, Eastern	Populus deltoides	Deciduous
Dogwood, Flowering	Cornus florida	Deciduous
Elder, American	Sambucus canadensis	Deciduous
Hackberry	Celtis occidentalis	Deciduous
*Holly, American	Ilex opaca	Evergreen
Carolina Cherry Laurel	Prunus caroliniana	Deciduous
Black Locust	Robinia pseudo-acacia	Deciduous
*Magnolia, Southern	Magnolia grandifolia	Evergreen
*Magnolia, Sweetbay	Magnolia virginiana	Evergreen
Persimmon	Diospyros virginiana	Deciduous
Yellow Poplar	Liriodendron tulipifera	Deciduous
*Red Mulberry	Morus rubra	Deciduous
Sassafras	Sassafras albidum	Deciduous
Silver Bell	Halesia diptera	Deciduous
*Sycamore	Platanus occidentalis	Deciduous
Sweetgum	Liquidambar styraciflu	Deciduous
*Yaupon	Ilex vomitoria	Evergreen
Witchhazel	Hamamelis virginiana	Deciduous



Silverbell



Huckleberry



Switch Grass



Red Buckeye

Common	Scientific	Evergreen/Deciduous
Native Shrubs and Small Trees		
American Beautyberry	Callicarpa Americana	Deciduous
Arrowwood	Viburnum dentatum	Deciduous
Native Bamboo - River Cane	Arundinaria gigantea	Deciduous
Black Berry	Rubus argutus	Deciduous
Dew Berry	Rubus trivialis	Deciduous
Bigleaf Snowbell	Syrax grandifolius	Deciduous
Common Sweetleaf	Symplocos tinctora	Deciduous
Eastern Baccharis	Baccharis halimifolia	Deciduous
**Eastern Redbud	Cercis canadensis	Deciduous
*Elliot's Huckleberry	Vaccinium elliotii	Deciduous
*Huckleberries	Vaccinium spp.	Deciduous
*Red Bay	Persea borbonia	Deciduous
**Red Buckeye	Rosa spp.	Deciduous
**Silverbells	Halesia carolina	Deciduous
Sumac, Smooth	Rhus glabra	Deciduous
Sumac, Winged	Rhus copallinum	Deciduous
*Swamp Cyrilla, Titi	Cyrtia racemiflora	Deciduous
*Wax Myrtle	Myrica cerifera	Evergreen
Yucca	Yucca spp.	Deciduous
Annuals, Grasses & Groundcovers		
Bahia grass	Paspalum spp	Deciduous
Bermuda grass	Cynodon dactylon	Deciduous
Broom Sedge	Andropogon vagranclens	Deciduous
Plains' Coreopsis	Coreopsis tinctoria	Deciduous
Centipede Grass	Eremochloa ophiuroides	Deciduous
Wild Garlic	Allium canadense	Deciduous
Johnson Grass	Sorghum halepense	Deciduous
Nutsedge	Cyperus spp.	Deciduous
Pampas Grass	Cortaderia selloana	Deciduous
*Switch Grass	Panicum spp.	Deciduous
Torpedo Grass	Panicum repens	Evergreen
Yellow Dock	Rumex crispus	Deciduous
Vines		
Cross Vine	Bignonia capreolata	Deciduous
Carolina Jessamine	Gelsemium sempervirens	Deciduous
Muscadine Grape	Vitis rotundifolia	Deciduous
Cat Grape	Vitis palmate	Deciduous
Greenbriar	Smilax spp	Deciduous
Japanese Honeysuckle	Lonicera japonica	Deciduous
Kudzu	Pueraria lobata	Deciduous
Morning Glory	Ipomoea spp	Deciduous
Virgin's Bower	Clematis virginiana	Deciduous
Trumpet Vine	Campsis radicans	Deciduous
Virginia Creeper	Parthenocissus quinquefolia	Deciduous
Chinese Wisteria	Wisteria sinensis	Deciduous
Recommended Fruit Trees		
Fig Tree	Eicus carica	Deciduous
Oriental Persimmons	Diospyros kaki L.	Deciduous
Pear Tree	Pyrus communis	Deciduous



Non-native Mimosa in River District



Non-native Bamboo in River District

Common	Scientific	Evergreen/Deciduous
Perennials		
Wild Ageratum, Boneset	Eupatorium spp.	Deciduous
Asters	Aster spp	Deciduous
Baldwinia	Baldwinia uniflorum	Deciduous
Beggar ticks	Bidens spp	Deciduous
Dandelion	Taraxacum spp.	Deciduous
Elderberry	Sambucus Canadensis	Deciduous
Feabanes	Erigeron spp	Deciduous
Goldenrods	Solidago spp	Deciduous
Meadow Beauty	Rhexia spp	Deciduous
Bull Nettle	Solanum carolinense	Deciduous
Plantain	Plantago spp.	Deciduous
Rattlebox	Sesbania punicea	Deciduous
St. John's Wort	Hypericum spp.	Deciduous
Blue Salvia	Salvia azurea	Deciduous
Common Spiderwort	Tradescantia ohlensis	Deciduous
Sunflowers	Helianthus spp.	Deciduous
Moss Verbena	Verbena tenuisecta	Deciduous
Vervain	Verbena bonariensis	Deciduous
Non-native (red indicates highly invasive)		
<u>Non-native bamboo</u>		<u>Evergreen</u>
<u>Burford Holly</u>	<u>Milex cornuta 'Burfordii'</u>	<u>Evergreen</u>
<u>Chinaberry</u>	<u>Melia azedarach</u>	Deciduous
<u>Chinese Privet</u>	<u>Ligustrum sinense</u>	Deciduous
<u>Chinese Tallow Tree</u>	<u>Triadica sebiferum</u>	Deciduous
<u>Chinese Wisteria</u>	<u>Wisteria sinensis</u>	Deciduous
<u>Japanese Honeysuckle</u>	<u>Lonicera japonica</u>	Deciduous
<u>Japanese Privet</u>	<u>Ligustrum japonicum</u>	Evergreen
<u>Sorghum halepense</u>	<u>Sorghum halepense</u>	Deciduous
<u>Kudzu</u>	<u>Pueraria lobata</u>	Deciduous
<u>Mimosa</u>	<u>Albizia julibrissin</u>	Deciduous
<u>Nutsedge</u>	<u>Cyperus spp.</u>	Deciduous
<u>Torpedo Grass</u>	<u>Panicum repens</u>	Deciduous
<u>Tuna Oil Tree</u>	<u>Vernicia fordii</u>	Deciduous
NOTE:		
Spread of invasive non-native species displaces the more desirable native species. Control and eradication of these non-natives requires persistent and long term efforts. Most can be managed with consistent applications of approved herbicides and the City of Hattiesburg is well versed, if currently under funded, in this area of habitat management.		
Removal of non-native bamboo species is not recommended at this time, because of the difficulty involved and because of their aesthetic value, but efforts should be made to contain existing communities and prevent further spreading. This is best done by annual spring mowing of new growth shoots, and requires early scouting of the emergence of the shoots, followed by prompt mowing or herbicide application.		
The Plant Palette is a snapshot of the plant life along the Gordon's Creek Corridor which is a key element for maintaining its unique character. Listed also are native plants recommended to repeat along the creek because its features contribute to the distinguishing characteristics of the larger landscape. The Plant Palette should be used as a means of limiting choices, always a key ingredient to successful landscape design.		
An important benefit of using plants best adapted to Gordon Creek's ecology is that irrigation and maintenance are minimal. Existing wildlife habitat is strengthened by these plants that provide ample food and shelter. The intent is that Gordon's Creek Park will become a human-made place containing and expressing the essence of its nature-made genius.		

Legend:	
Non-native plants	Highly invasive
*Native species recommended for use	**Native species recommended for use but not found in creek corridor

Gordon's Creek Park

Hattiesburg, Mississippi



OPPORTUNITIES LEGEND

- * Natural Areas
- Park/Green Space
- Storm Water Detention Opportunity

Opportunities include:

- *Connectivity between neighborhoods, schools, parks and destinations
- *Educational opportunities to learn about natural systems and history of the creek and area
- *Recreational opportunities such as walking, running, biking, fishing, picnicking and observing nature
- *Environmental opportunities to reduce pollutants in the creek
- *Access to natural areas for public use and enjoyment

CONSTRAINTS LEGEND

- Low bridges
- Railroad Crossing
- Traffic Crossing (busy street)

Constraints include:

- *Creek walk connections at low bridges
- *Pedestrians navigating creek walk connections at busy streets
- *Limited physical access to creek
- *Security issues
- *Flood plain along creek



left: Loucna River,
Czech Republic
below: Vail, Colorado



Confluence Park, Denver



Helan Shrine, Kyoto

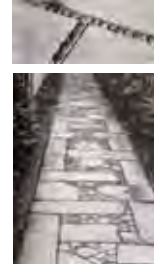


Roombeek, Holland



Town Hall on the Volme, Hagen

Creek Interventions



Varus Battle Museum and Park



Guadalupe River Park,
San Jose California



Boston, Massachusetts



Tanner Springs Park, Portland



Toppilansaari Park in Oulu, Finland



Park Andre-Citroen, Paris, France

Walks



Chaumont installation,
Touraine, France



Ken Smith Dumpster Gardens,
Ohio State University



Chaumont installation,
Touraine, France



Ken Smith schoolyard fence with
'blue sky'



Nuthe Park, Luckenwalde, Germany



Bridge, Jacksonville, Florida



Pedestrian Bridge, Memphis, Tennessee



Rothschild's installation,
New York City



Chaumont installation,
Touraine, France



Ittigen, Switzerland



Chaumont bamboo tunnel
Touraine, France



Roxy's Paine's Bluff,
Central Park, New York City

Art Nodes: Art Installations in the Public Realm



The Jumping Bridge,
Garden of Cosmic Speculation, Scotland



Pedestrian Bridges



Foot Bridge, Austin Texas

Gordon's Creek Park

Hattiesburg, Mississippi



1 View from Jaycee Park on Hutchinson Avenue looking northeast towards Hattiesburg High School



2 View from Buschman Street bridge at Town Square Park looking northeast



3 View in flood plain, looking southwest from Leaf River

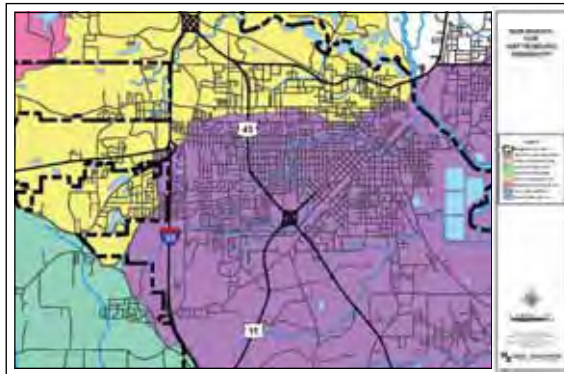
Technical Analysis

The following sections include a technical analysis of the Gordon's Creek Park Conceptual Development Plan. The analysis includes preliminary cost estimates for each district of the plan, a maintenance plan for the linear park, a list of potential funding sources, an overview of permitting requirements, typical sections for bridge crossings, and identification of detention opportunities.

Site Analysis

Gordon's Creek is a part of the Pascagoula River Basin. It is a tributary of the Leaf River and can be found in the Lott's Creek sub-basin. The creek flows from its origin east through many historic neighborhoods and Downtown Hattiesburg. Gordon's Creek discharges into the Leaf River south of the Bouie River.

Hattiesburg was founded in 1884 and grew with other settlements in the region during the timber boom. The City has continued to grow with construction of major hospitals, universities and several other commercial and industrial opportunities. The development of commercial and residential land uses on the banks of Gordon's Creek has led to erosion and initiated several restoration projects to protect the banks from additional deterioration. Bank stabilization methods vary in each section of the creek from loose riprap, concrete riprap, gabions, loose concrete and formed concrete banks. Very little of the project area has banks in a natural vegetative state. It is the goal of this project to restore some of the banks to a more natural state while still protecting the banks from further erosion.



The Gordon's Creek Park generally follows the banks of Gordon's Creek. The linear park drops into the creek bank to create several "creek-bank crossings". The crossings allow users to get a better view of the creek and add interest to the pathway. These creek-bank crossings can be found beneath two railroad trestles, five bridge crossings and along Town Square Park. The proposed design for the creek-bank crossings include pedestrian bridges and pathways terraced into the banks. Gordon's Creek Park also veers away from the creek bank to provide connectivity to nearby destinations, sidewalks and trails.



The location of the linear park is generally located in the 100-year floodplain of Gordon's Creek. Since

Gordon's Creek is listed as a flood hazard by the City of Hattiesburg's Floodplain Management Program, construction inside the floodplain should be limited to prevent damage during flood events. The park primarily consists of sidewalks, lighting, signage, and other amenities associated with a pedestrian/bicycle path. In locations where structures are proposed, consideration must be given to locating these facilities outside the 100-year floodplain.

Property Analysis

Gordon's Creek Park is located primarily on city-owned property. The park utilizes city easements along Gordon's Creek to locate the multi-use trail and amenities. Detention areas associated with the path are proposed on city-owned property and on private property. The technical assessment identified additional opportunities for detention that allowed for larger detention areas. During final design, a determination will have to be made as to the appropriate location of detention areas based on availability of land and volume of detention required. Easements will also have to be acquired to locate the path beneath the Canadian National (CN) and Norfolk Southern (NS) rail line. These easements will be further discussed under the permitting section of this technical analysis.



The detention areas identified in the conceptual plan are generally located in existing drainage ways. During the technical analysis, opportunities for detention were identified along Gordon's Creek. Opportunities were identified by ownership, availability, location and size. City-owned parcels found in low-lying areas that were primarily vacant were initially identified for detention. In addition to the physical characteristics associated with these parcels, these areas were also considered ideal for detention because no property acquisition was required. Other low-lying, vacant parcels were identified and reviewed to determine potential for detention.

Preliminary Cost Estimates

The cost analysis provided in the next section is broken down by districts and is based on the conceptual plan prepared in 2011. The conceptual cost estimate includes projected costs for site work, path construction, landscaping, irrigation, site amenities, signs, and lighting and electrical. The cost estimate also provides a general cost estimate for land acquisition, stream bank restoration and detention ponds where utilized. A more detailed cost analysis should be developed once final design is complete.

Since the Engineer has no control over the cost of labor, materials, equipment or services furnished by others, or over the Contractor's methods of determining prices, or over competitive bidding or market conditions, the Engineer's opinions of probable Construction Cost provided in this analysis are to be made on the basis of experience and qualifications and represent the Engineer's best judgment as an experienced and qualified professional, generally familiar with the construction industry; but the Engineer cannot and does not guarantee that proposals, bids or actual Construction Cost will not vary from opinions of probable cost prepared by the Engineer.

Woodley District

Pay Item Description	Estimated Quantity	Unit	Unit Price	Item Total
Land Acquisition				
Land Acquisition	2	ACRE	\$6,000.00	\$12,000.00
Site Work				
Mobilization	1	LUMP SUM	\$160,000.00	\$160,000.00
Maintenance of Traffic	1	LUMP SUM	\$20,000.00	\$20,000.00
Path				
Concrete Sidewalk, (5" Thickness)	3800	SQ. YD.	\$55.00	\$209,000.00
Handrail	300	LIN. FT.	\$75.00	\$22,500.00
Decorative Paving	1270	SQ. FT.	\$15.00	\$19,050.00
Pedestrian Bridge	170	LIN. FT.	\$1,500.00	\$255,000.00
Crosswalk Striping	150	LIN. FT.	\$25.00	\$3,750.00
Landscape				
Solid Sodding (Along Path)	5500	SQ. YD.	\$5.50	\$30,250.00
Hydroseeding (Open Space)	1	ACRE	\$3,500.00	\$3,500.00
Trees (30 Gallon)	155	EACH	\$250.00	\$38,750.00
Shrubs (3 Gallon)	950	EACH	\$30.00	\$28,500.00
Groundcover (1 Gallon)	2540	EACH	\$15.00	\$38,100.00
Bed Preparation	6350	SQ. YD.	\$1.00	\$6,350.00
Mulch (Soil Conditioner)	45	CU. YD.	\$45.00	\$2,025.00
Mulch (Surface Application)	115	CU. YD.	\$45.00	\$5,175.00
Irrigation & Water				
Hose Bib in Valve Box	9	EACH	\$75.00	\$675.00
1" Water Line	1025	LIN. FT.	\$1.40	\$1,435.00
1" Water Meter	7	EACH	\$1,500.00	\$10,500.00
Automated Drip Irrigation System	4	EACH	\$7,500.00	\$30,000.00
Site Amenities				
Bicycle Racks	9	EACH	\$350.00	\$3,150.00
Trash Receptacles	12	EACH	\$650.00	\$7,800.00
Metal Benches	6	EACH	\$750.00	\$4,500.00
Sculpture Base	1	EACH	\$1,500.00	\$1,500.00
Signs				
District Entrance Signs	2	EACH	\$1,200.00	\$2,400.00
Interpretive Signs	3	EACH	\$800.00	\$2,400.00
Mile Marker Signs	4	EACH	\$250.00	\$1,000.00
Information Kiosk	1	EACH	\$4,500.00	\$4,500.00

Pay Item Description	Estimated Quantity	Unit	Unit Price	Item Total
Lighting and Electrical				
Decorative Lighting Assembly	28	EACH	\$3,500.00	\$98,000.00
Underground Branch Circuit	3050	LIN. FT.	\$8.00	\$24,400.00
Underground Pull Box	11	EACH	\$1,400.00	\$15,400.00
Secondary Power Controller	5	EACH	\$9,500.00	\$47,500.00
Stream Bank Reconstruction				
Concrete Ditch Paving Removal	4500	SQ. YD.	\$12.00	\$54,000.00
Gabion Baskets	2240	EACH	\$350.00	\$784,000.00
Backfill Material	750	CU. YD.	\$45.00	\$33,750.00
Soil Retention Blanket	7500	SQ. YD.	\$3.25	\$24,375.00
Topsoil / Compost Mix	750	SQ. YD.	\$60.00	\$45,000.00
Loose Riprap, Size 200	400	TON	\$65.00	\$26,000.00
Native Trees (15 Gallon)	400	EACH	\$150.00	\$60,000.00
Native Grasses (Bare root)	10000	EACH	\$5.00	\$50,000.00

Subtotal Land Acquisition	\$12,000.00
Subtotal Sitework	\$180,000.00
Subtotal Path	\$509,300.00
Subtotal Landscape	\$152,650.00
Subtotal Irrigation and Water	\$42,610.00
Subtotal Site Amenities	\$16,950.00
Subtotal Signs	\$10,300.00
Subtotal Lighting and Electrical	\$185,300.00
Subtotal Streambank Reconstruction	\$1,023,125.00
Construction Sub-Total =	\$2,132,235.00
Contingency (15%) =	\$319,835.25
Construction Total =	\$2,452,070.25
Permitting (2%) =	\$49,041.41
Design (8%) =	\$196,165.62
Construction Engineering (10%) =	\$245,207.03
Total Project Cost =	\$2,942,484.30

Zoo District

Pay Item Description	Estimated Quantity	Unit	Unit Price	Item Total
Land Acquisition				
Land Acquisition	1	ACRE	\$6,000.00	\$6,000.00
Site Work				
Mobilization	1	LUMP SUM	\$50,000.00	\$50,000.00
Maintenance of Traffic	1	LUMP SUM	\$25,000.00	\$25,000.00
Path				
Concrete Sidewalk, (5" Thickness)	0	SQ. YD.	\$55.00	\$0.00
Handrail	0	LIN. FT.	\$75.00	\$0.00
Decorative Paving	0	SQ. FT.	\$15.00	\$0.00
Pedestrian Bridge	0	LIN. FT.	\$1,600.00	\$0.00
Crosswalk Striping	0	LIN. FT.	\$25.00	\$0.00
Landscape				
Solid Sodding (Along Path)	4350	SQ. YD.	\$5.50	\$23,925.00
Hydroseeding (Open Space)	1	ACRE	\$3,500.00	\$3,500.00
Trees (30 Gallon)	135	EACH	\$250.00	\$33,750.00
Shrubs (3 Gallon)	840	EACH	\$30.00	\$25,200.00
Groundcover (1 Gallon)	2240	EACH	\$15.00	\$33,600.00
Bed Preparation	5600	SQ. YD.	\$1.00	\$5,600.00
Mulch (Soil Conditioner)	40	CU. YD.	\$45.00	\$1,800.00
Mulch (Surface Application)	105	CU. YD.	\$45.00	\$4,725.00
Irrigation & Water				
Hose Bib in Valve Box	8	EACH	\$75.00	\$600.00
1" Water Line	950	LIN. FT.	\$1.40	\$1,330.00
1" Water Meter	6	EACH	\$1,500.00	\$9,000.00
Automated Drip Irrigation System	3	EACH	\$7,500.00	\$22,500.00
Site Amenities				
Bicycle Racks	9	EACH	\$350.00	\$3,150.00
Trash Receptacles	12	EACH	\$650.00	\$7,800.00
Metal Benches	6	EACH	\$750.00	\$4,500.00
Sculpture Base	1	EACH	\$1,500.00	\$1,500.00
Signs				
District Entrance Signs	2	EACH	\$1,200.00	\$2,400.00
Interpretive Signs	3	EACH	\$800.00	\$2,400.00
Mile Marker Signs	4	EACH	\$250.00	\$1,000.00
Information Kiosk	1	EACH	\$4,500.00	\$4,500.00
Lighting and Electrical				
Decorative Lighting Assembly	25	EACH	\$3,500.00	\$87,500.00
Underground Branch Circuit	2700	LIN. FT.	\$8.00	\$21,600.00
Underground Pull Box	9	EACH	\$1,400.00	\$12,600.00
Secondary Power Controller	5	EACH	\$9,500.00	\$47,500.00

Pay Item Description	Estimated Quantity	Unit	Unit Price	Item Total
Stream Bank Reconstruction				
Gabion Baskets	225	EACH	\$350.00	\$78,750.00
Backfill Material	115	CU. YD.	\$45.00	\$5,175.00
Soil Retention Blanket	3400	SQ. YD.	\$3.25	\$11,050.00
Topsoil / Compost Mix	115	SQ. YD.	\$60.00	\$6,900.00
Loose Riprap, Size 200	85	TON	\$65.00	\$5,525.00
Native Trees (15 Gallon)	115	EACH	\$150.00	\$17,250.00
Native Grasses (Bare root)	2800	EACH	\$5.00	\$14,000.00
Detention Ponds				
Excess Excavation	575	CU. YD.	\$5.25	\$3,018.75
Site Grading	5500	SQ. YD.	\$4.00	\$22,000.00
Soil Retention Blanket	5500	SQ. YD.	\$3.25	\$17,875.00
Aggregate Bed	950	CU. YD.	\$65.00	\$61,750.00
Native Trees (15 Gallon)	25	EACH	\$150.00	\$3,750.00
Native Grasses (Bare root)	1250	EACH	\$5.00	\$6,250.00

Subtotal Land Acquisition	\$6,000.00
Subtotal Sitework	\$75,000.00
Subtotal Path	\$0.00
Subtotal Landscape	\$132,100.00
Subtotal Irrigation and Water	\$33,430.00
Subtotal Site Amenities	\$16,950.00
Subtotal Signs	\$10,300.00
Subtotal Lighting and Electrical	\$169,200.00
Subtotal Streambank Reconstruction	\$138,650.00
Subtotal Detention Ponds	\$114,643.75
Construction Sub-Total =	\$696,273.75
Contingency (15%) =	\$104,441.06
Construction Total =	\$800,714.81
Permitting (2%) =	\$16,014.30
Design (8%) =	\$64,057.19
Construction Engineering (10%) =	\$80,071.48
Total Project Cost =	\$960,857.78

High School District

Pay Item Description	Estimated Quantity	Unit	Unit Price	Item Total
Land Acquisition				
Land Acquisition	3	ACRE	\$6,000.00	\$18,000.00
Site Work				
Mobilization	1	LUMP SUM	\$90,000.00	\$90,000.00
Maintenance of Traffic	1	LUMP SUM	\$15,000.00	\$15,000.00
Path				
Concrete Sidewalk, (5" Thickness)	2600	SQ. YD.	\$55.00	\$143,000.00
Handrail	600	LIN. FT.	\$75.00	\$45,000.00
Decorative Paving	1000	SQ. FT.	\$15.00	\$15,000.00
Pedestrian Bridge	165	LIN. FT.	\$1,500.00	\$247,500.00
Crosswalk Striping	240	LIN. FT.	\$25.00	\$6,000.00
Landscape				
Solid Sodding (Along Path)	3880	SQ. YD.	\$5.50	\$21,340.00
Hydroseeding (Open Space)	1	ACRE	\$3,500.00	\$3,500.00
Trees (30 Gallon)	120	EACH	\$250.00	\$30,000.00
Shrubs (3 Gallon)	750	EACH	\$30.00	\$22,500.00
Groundcover (1 Gallon)	2000	EACH	\$15.00	\$30,000.00
Bed Preparation	5000	SQ. YD.	\$1.00	\$5,000.00
Mulch (Soil Conditioner)	35	CU. YD.	\$45.00	\$1,575.00
Mulch (Surface Application)	90	CU. YD.	\$45.00	\$4,050.00
Irrigation & Water				
Hose Bib in Valve Box	7	EACH	\$75.00	\$525.00
1" Water Line	850	LIN. FT.	\$1.40	\$1,190.00
1" Water Meter	5	EACH	\$1,500.00	\$7,500.00
Automated Drip Irrigation System	3	EACH	\$7,500.00	\$22,500.00
Site Amenities				
Shaded Shelter (Small) (15' x 15')	225	SQ. FT.	\$175.00	\$39,375.00
Bicycle Racks	9	EACH	\$350.00	\$3,150.00
Trash Receptacles	12	EACH	\$650.00	\$7,800.00
Metal Benches	6	EACH	\$750.00	\$4,500.00
Sculpture Base	1	EACH	\$1,500.00	\$1,500.00
Signs				
District Entrance Signs	2	EACH	\$1,200.00	\$2,400.00
Interpretive Signs	3	EACH	\$800.00	\$2,400.00
Mile Marker Signs	4	EACH	\$250.00	\$1,000.00
Information Kiosk	1	EACH	\$4,500.00	\$4,500.00
Lighting and Electrical				
Decorative Lighting Assembly	22	EACH	\$3,500.00	\$77,000.00
Underground Branch Circuit	2400	LIN. FT.	\$8.00	\$19,200.00
Underground Pull Box	8	EACH	\$1,400.00	\$11,200.00
Secondary Power Controller	4	EACH	\$9,500.00	\$38,000.00

Pay Item Description	Estimated Quantity	Unit	Unit Price	Item Total
Stream Bank Reconstruction				
Gabion Baskets	200	EACH	\$350.00	\$70,000.00
Backfill Material	100	CU. YD.	\$45.00	\$4,500.00
Soil Retention Blanket	3000	SQ. YD.	\$3.25	\$9,750.00
Topsoil / Compost Mix	100	SQ. YD.	\$60.00	\$6,000.00
Loose Riprap, Size 200	75	TON	\$65.00	\$4,875.00
Native Trees (15 Gallon)	100	EACH	\$150.00	\$15,000.00
Native Grasses (Bare root)	2500	EACH	\$5.00	\$12,500.00
Detention Ponds				
Excess Excavation	12500	CU. YD.	\$5.25	\$65,625.00
Site Grading	10250	SQ. YD.	\$4.00	\$41,000.00
Soil Retention Blanket	10250	SQ. YD.	\$3.25	\$33,312.50
Aggregate Bed	1700	CU. YD.	\$65.00	\$110,500.00
Native Trees (15 Gallon)	50	EACH	\$150.00	\$7,500.00
Native Grasses (Bare root)	2500	EACH	\$5.00	\$12,500.00

Subtotal Land Acquisition	\$18,000.00
Subtotal Sitework	\$105,000.00
Subtotal Path	\$456,500.00
Subtotal Landscape	\$117,965.00
Subtotal Irrigation and Water	\$31,715.00
Subtotal Site Amenities	\$56,325.00
Subtotal Signs	\$10,300.00
Subtotal Lighting and Electrical	\$145,400.00
Subtotal Streambank Reconstruction	\$122,625.00
Subtotal Detention Ponds	\$270,437.50
Construction Sub-Total =	\$1,334,267.50
Contingency (15%) =	\$200,140.13
Construction Total =	\$1,534,407.63
Permitting (2%) =	\$30,688.15
Design (8%) =	\$122,752.61
Construction Engineering (10%) =	\$153,440.76
Total Project Cost =	\$1,841,289.15

San Antonio District

Pay Item Description	Estimated Quantity	Unit	Unit Price	Item Total
Land Acquisition				
Land Acquisition	3	ACRE	\$6,000.00	\$18,000.00
Site Work				
Mobilization	1	LUMP SUM	\$100,000.00	\$100,000.00
Maintenance of Traffic	1	LUMP SUM	\$15,000.00	\$15,000.00
Path				
Concrete Sidewalk, (5" Thickness)	2900	SQ. YD.	\$55.00	\$159,500.00
Handrail	100	LIN. FT.	\$75.00	\$7,500.00
Decorative Paving	1125	SQ. FT.	\$15.00	\$16,875.00
Pedestrian Bridge	100	LIN. FT.	\$15,000.00	\$150,000.00
Crosswalk Striping	120	LIN. FT.	\$25.00	\$3,000.00
Landscape				
Solid Sodding (Along Path)	4350	SQ. YD.	\$5.50	\$23,925.00
Hydroseeding (Open Space)	5	ACRE	\$3,500.00	\$17,500.00
Trees (30 Gallon)	135	EACH	\$250.00	\$33,750.00
Shrubs (3 Gallon)	840	EACH	\$30.00	\$25,200.00
Groundcover (1 Gallon)	2240	EACH	\$15.00	\$33,600.00
Bed Preparation	5600	SQ. YD.	\$1.00	\$5,600.00
Mulch (Soil Conditioner)	40	CU. YD.	\$45.00	\$1,800.00
Mulch (Surface Application)	105	CU. YD.	\$45.00	\$4,725.00
Irrigation & Water				
Hose Bib in Valve Box	8	EACH	\$75.00	\$600.00
1" Water Line	950	LIN. FT.	\$1.40	\$1,330.00
1" Water Meter	6	EACH	\$1,500.00	\$9,000.00
Automated Drip Irrigation System	3	EACH	\$7,500.00	\$22,500.00
Site Amenities				
Shaded Shelter (Small) (15' x 15')	675	SQ. FT.	\$175.00	\$118,125.00
Bicycle Racks	9	EACH	\$350.00	\$3,150.00
Trash Receptacles	12	EACH	\$650.00	\$7,800.00
Metal Benches	6	EACH	\$750.00	\$4,500.00
Sculpture Base	1	EACH	\$1,500.00	\$1,500.00
Signs				
District Entrance Signs	2	EACH	\$1,200.00	\$2,400.00
Interpretive Signs	3	EACH	\$800.00	\$2,400.00
Mile Marker Signs	4	EACH	\$250.00	\$1,000.00
Information Kiosk	1	EACH	\$4,500.00	\$4,500.00
Lighting and Electrical				
Decorative Lighting Assembly	25	EACH	\$3,500.00	\$87,500.00
Underground Branch Circuit	2700	LIN. FT.	\$8.00	\$21,600.00
Underground Pull Box	9	EACH	\$1,400.00	\$12,600.00
Secondary Power Controller	5	EACH	\$9,500.00	\$47,500.00

Pay Item Description	Estimated Quantity	Unit	Unit Price	Item Total
Stream Bank Reconstruction				
Gabion Baskets	200	EACH	\$350.00	\$70,000.00
Backfill Material	100	CU. YD.	\$45.00	\$4,500.00
Soil Retention Blanket	3000	SQ. YD.	\$3.25	\$9,750.00
Topsoil / Compost Mix	100	SQ. YD.	\$60.00	\$6,000.00
Loose Riprap, Size 200	75	TON	\$65.00	\$4,875.00
Native Trees (15 Gallon)	100	EACH	\$150.00	\$15,000.00
Native Grasses (Bare root)	2500	EACH	\$5.00	\$12,500.00
Detention Ponds				
Excess Excavation	18500	CU. YD.	\$5.25	\$97,125.00
Site Grading	14450	SQ. YD.	\$4.00	\$57,800.00
Soil Retention Blanket	14450	SQ. YD.	\$3.25	\$46,962.50
Aggregate Bed	2400	CU. YD.	\$65.00	\$156,000.00
Native Trees (15 Gallon)	75	EACH	\$150.00	\$11,250.00
Native Grasses (Bare root)	3750	EACH	\$5.00	\$18,750.00

Subtotal Land Acquisition	\$18,000.00
Subtotal Sitework	\$115,000.00
Subtotal Path	\$336,875.00
Subtotal Landscape	\$146,100.00
Subtotal Irrigation and Water	\$33,430.00
Subtotal Site Amenities	\$135,075.00
Subtotal Signs	\$10,300.00
Subtotal Lighting and Electrical	\$169,200.00
Subtotal Streambank Reconstruction	\$122,625.00
Subtotal Detention Ponds	\$387,887.50
Construction Sub-Total =	\$1,474,492.50
Contingency (15%) =	\$221,173.88
Construction Total =	\$1,695,666.38
Permitting (2%) =	\$33,913.33
Design (8%) =	\$135,653.31
Construction Engineering (10%) =	\$169,566.64
Total Project Cost =	\$2,034,799.65

Cultural District

Pay Item Description	Estimated Quantity	Unit	Unit Price	Item Total
Land Acquisition				
Land Acquisition	2	ACRE	\$6,000.00	\$12,000.00
Site Work				
Mobilization	1	LUMP SUM	\$85,000.00	\$85,000.00
Maintenance of Traffic	1	LUMP SUM	\$15,000.00	\$15,000.00
Path				
Concrete Sidewalk, (5" Thickness)	3450	SQ. YD.	\$55.00	\$189,750.00
Landing Location	4000	CU. YD.	\$100.00	\$400,000.00
Handrail	200	LIN. FT.	\$75.00	\$15,000.00
Decorative Paving	1340	SQ. FT.	\$15.00	\$20,100.00
Crosswalk Striping	240	LIN. FT.	\$25.00	\$6,000.00
Landscape				
Solid Sodding (Along Path)	5120	SQ. YD.	\$5.50	\$28,160.00
Hydroseeding (Open Space)	1	ACRE	\$3,500.00	\$3,500.00
Trees (30 Gallon)	160	EACH	\$250.00	\$40,000.00
Shrubs (3 Gallon)	1000	EACH	\$30.00	\$30,000.00
Groundcover (1 Gallon)	2670	EACH	\$15.00	\$40,050.00
Bed Preparation	6670	SQ. YD.	\$1.00	\$6,670.00
Mulch (Soil Conditioner)	50	CU. YD.	\$45.00	\$2,250.00
Mulch (Surface Application)	125	CU. YD.	\$45.00	\$5,625.00
Irrigation & Water				
Hose Bib in Valve Box	9	EACH	\$75.00	\$675.00
1" Water Line	1130	LIN. FT.	\$1.40	\$1,582.00
1" Water Meter	7	EACH	\$1,500.00	\$10,500.00
Automated Drip Irrigation System	4	EACH	\$7,500.00	\$30,000.00
Site Amenities				
Shaded Shelter (Small) (15' x 15')	450	SQ. FT.	\$175.00	\$78,750.00
Bicycle Racks	9	EACH	\$350.00	\$3,150.00
Trash Receptacles	12	EACH	\$650.00	\$7,800.00
Metal Benches	6	EACH	\$750.00	\$4,500.00
Sculpture Base	2	EACH	\$1,500.00	\$3,000.00
Signs				
District Entrance Signs	3	EACH	\$1,200.00	\$3,600.00
Interpretive Signs	3	EACH	\$800.00	\$2,400.00
Mile Marker Signs	5	EACH	\$250.00	\$1,250.00
Information Kiosk	1	EACH	\$4,500.00	\$4,500.00
Lighting and Electrical				
Decorative Lighting Assembly	30	EACH	\$3,500.00	\$105,000.00
Underground Branch Circuit	3200	LIN. FT.	\$8.00	\$25,600.00
Underground Pull Box	11	EACH	\$1,400.00	\$15,400.00
Secondary Power Controller	6	EACH	\$9,500.00	\$57,000.00

Pay Item Description	Estimated Quantity	Unit	Unit Price	Item Total
Stream Bank Reconstruction				
Gabion Baskets	240	EACH	\$350.00	\$84,000.00
Backfill Material	120	CU. YD.	\$45.00	\$5,400.00
Soil Retention Blanket	3500	SQ. YD.	\$3.25	\$11,375.00
Topsoil / Compost Mix	120	SQ. YD.	\$60.00	\$7,200.00
Loose Riprap, Size 200	90	TON	\$65.00	\$5,850.00
Native Trees (15 Gallon)	120	EACH	\$150.00	\$18,000.00
Native Grasses (Bare root)	3000	EACH	\$5.00	\$15,000.00
Detention Ponds				
Excess Excavation	13000	CU. YD.	\$5.25	\$68,250.00
Site Grading	9600	SQ. YD.	\$4.00	\$38,400.00
Soil Retention Blanket	9600	SQ. YD.	\$3.25	\$31,200.00
Aggregate Bed	1600	CU. YD.	\$65.00	\$104,000.00
Native Trees (15 Gallon)	75	EACH	\$150.00	\$11,250.00
Native Grasses (Bare root)	3750	EACH	\$5.00	\$18,750.00

Subtotal Land Acquisition	\$12,000.00
Subtotal Sitework	\$100,000.00
Subtotal Path	\$630,850.00
Subtotal Landscape	\$156,255.00
Subtotal Irrigation and Water	\$42,757.00
Subtotal Site Amenities	\$97,200.00
Subtotal Signs	\$11,750.00
Subtotal Lighting and Electrical	\$203,000.00
Subtotal Streambank Reconstruction	\$146,825.00
Subtotal Detention Ponds	\$271,850.00
Construction Sub-Total =	\$1,672,487.00
Contingency (15%) =	\$250,873.05
Construction Total =	\$1,923,360.05
Permitting (2%) =	\$38,467.20
Design (8%) =	\$153,868.80
Construction Engineering (10%) =	\$192,336.01
Total Project Cost =	\$2,308,032.06

Downtown District

Pay Item Description	Estimated Quantity	Unit	Unit Price	Item Total
Land Acquisition				
Land Acquisition	2	ACRE	\$6,000.00	\$12,000.00
Site Work				
Mobilization	1	LUMP SUM	\$112,000.00	\$112,000.00
Maintenance of Traffic	1	LUMP SUM	\$15,000.00	\$15,000.00
Path				
Concrete Sidewalk, (5" Thickness)	4400	SQ. YD.	\$55.00	\$242,000.00
Concrete Stairs	40	CU. YD.	\$100.00	\$4,000.00
Handrail	250	LIN. FT.	\$75.00	\$18,750.00
Crawford Landing	4000	CU. YD.	\$100.00	\$400,000.00
Decorative Paving	1700	SQ. FT.	\$15.00	\$25,500.00
Pedestrian Bridge	100	LIN. FT.	\$1,500.00	\$150,000.00
Crosswalk Striping	350	LIN. FT.	\$25.00	\$8,750.00
Landscape				
Solid Sodding (Along Path)	6600	SQ. YD.	\$5.50	\$36,300.00
Hydroseeding (Open Space)	1	ACRE	\$3,500.00	\$3,500.00
Trees (30 Gallon)	205	EACH	\$250.00	\$51,250.00
Shrubs (3 Gallon)	1280	EACH	\$30.00	\$38,400.00
Groundcover (1 Gallon)	3415	EACH	\$15.00	\$51,225.00
Bed Preparation	8500	SQ. YD.	\$1.00	\$8,500.00
Mulch (Soil Conditioner)	65	CU. YD.	\$45.00	\$2,925.00
Mulch (Surface Application)	160	CU. YD.	\$45.00	\$7,200.00
Irrigation & Water				
Hose Bib in Valve Box	12	EACH	\$75.00	\$900.00
1" Water Line	1450	LIN. FT.	\$1.40	\$2,030.00
1" Water Meter	9	EACH	\$1,500.00	\$13,500.00
Automated Drip Irrigation System	5	EACH	\$7,500.00	\$37,500.00
Site Amenities				
Band Stand	500	SQ. FT.	\$175.00	\$87,500.00
Bicycle Racks	12	EACH	\$350.00	\$4,200.00
Trash Receptacles	12	EACH	\$650.00	\$7,800.00
Metal Benches	12	EACH	\$750.00	\$9,000.00
Sculpture Base	3	EACH	\$1,500.00	\$4,500.00
Signs				
District Entrance Signs	7	EACH	\$1,200.00	\$8,400.00
Interpretive Signs	4	EACH	\$800.00	\$3,200.00
Mile Marker Signs	5	EACH	\$250.00	\$1,250.00
Information Kiosk	2	EACH	\$4,500.00	\$9,000.00
Lighting and Electrical				
Decorative Lighting Assembly	38	EACH	\$3,500.00	\$133,000.00
Underground Branch Circuit	4150	LIN. FT.	\$8.00	\$33,200.00

Pay Item Description	Estimated Quantity	Unit	Unit Price	Item Total
Underground Pull Box	15	EACH	\$1,400.00	\$21,000.00
Secondary Power Controller	8	EACH	\$9,500.00	\$76,000.00
Stream Bank Reconstruction				
Low Head Dam Structure	50	LIN. FT.	\$1,800.00	\$90,000.00
Gabion Baskets	315	EACH	\$350.00	\$110,250.00
Backfill Material	155	CU. YD.	\$45.00	\$6,975.00
Soil Retention Blanket	460	SQ. YD.	\$3.25	\$1,495.00
Topsoil / Compost Mix	155	SQ. YD.	\$60.00	\$9,300.00
Loose Riprap, Size 200	120	TON	\$65.00	\$7,800.00
Native Trees (15 Gallon)	160	EACH	\$150.00	\$24,000.00
Native Grasses (Bare root)	3900	EACH	\$5.00	\$19,500.00
Detention Ponds				
Excess Excavation	2000	CU. YD.	\$5.25	\$10,500.00
Site Grading	1500	SQ. YD.	\$4.00	\$6,000.00
Soil Retention Blanket	1500	SQ. YD.	\$3.25	\$4,875.00
Aggregate Bed	250	CU. YD.	\$65.00	\$16,250.00
Native Trees (15 Gallon)	15	EACH	\$150.00	\$2,250.00
Native Grasses (Bare root)	750	EACH	\$5.00	\$3,750.00

Subtotal Land Acquisition	\$12,000.00
Subtotal Sitework	\$127,000.00
Subtotal Path	\$849,000.00
Subtotal Landscape	\$199,300.00
Subtotal Irrigation and Water	\$53,930.00
Subtotal Site Amenities	\$113,000.00
Subtotal Signs	\$21,850.00
Subtotal Lighting and Electrical	\$263,200.00
Subtotal Streambank Reconstruction	\$179,320.00
Subtotal Detention Ponds	\$43,625.00
Construction Sub-Total =	\$1,735,225.00
Contingency (15%) =	\$260,283.75
Construction Total =	\$1,995,508.75
Permitting (2%) =	\$39,910.18
Design (8%) =	\$159,640.70
Construction Engineering (10%) =	\$199,550.88
Total Project Cost =	\$2,394,610.50

Depot District

Pay Item Description	Estimated Quantity	Unit	Unit Price	Item Total
Land Acquisition				
Land Acquisition	2	ACRE	\$6,000.00	\$12,000.00
Site Work				
Mobilization	1	LUMP SUM	\$82,400.00	\$82,400.00
Maintenance of Traffic	1	LUMP SUM	\$10,300.00	\$10,300.00
Path				
Concrete Sidewalk, (5" Thickness)	3850	SQ. YD.	\$50.56	\$194,668.72
Handrail	120	LIN. FT.	\$75.00	\$9,000.00
Decorative Paving	1340	SQ. FT.	\$15.00	\$20,100.00
Crosswalk Striping	240	LIN. FT.	\$25.00	\$6,000.00
Landscape				
Solid Sodding (Along Path)	5750	SQ. YD.	\$5.50	\$31,625.00
Hydroseeding (Open Space)	1	ACRE	\$3,500.00	\$3,500.00
Trees (30 Gallon)	140	EACH	\$250.00	\$35,000.00
Shrubs (3 Gallon)	880	EACH	\$30.00	\$26,400.00
Groundcover (1 Gallon)	2350	EACH	\$15.00	\$35,250.00
Bed Preparation	5900	SQ. YD.	\$1.00	\$5,900.00
Mulch (Soil Conditioner)	45	CU. YD.	\$45.00	\$2,025.00
Mulch (Surface Application)	110	CU. YD.	\$45.00	\$4,950.00
Irrigation & Water				
Hose Bib in Valve Box	8	EACH	\$75.00	\$600.00
1" Water Line	1000	LIN. FT.	\$1.40	\$1,400.00
1" Water Meter	7	EACH	\$1,500.00	\$10,500.00
Automated Drip Irrigation System	4	EACH	\$7,500.00	\$30,000.00
Site Amenities				
Cover for Railroad Crossing	600	SQ. FT.	\$100.00	\$60,000.00
Bicycle Racks	9	EACH	\$350.00	\$3,150.00
Trash Receptacles	12	EACH	\$650.00	\$7,800.00
Metal Benches	6	EACH	\$750.00	\$4,500.00
Sculpture Base	1	EACH	\$1,500.00	\$1,500.00
Signs				
District Entrance Signs	3	EACH	\$1,200.00	\$3,600.00
Interpretive Signs	3	EACH	\$800.00	\$2,400.00
Mile Marker Signs	5	EACH	\$250.00	\$1,250.00
Information Kiosk	1	EACH	\$4,500.00	\$4,500.00
Lighting and Electrical				
Decorative Lighting Assembly	27	EACH	\$3,500.00	\$94,500.00
Underground Branch Circuit	2800	LIN. FT.	\$8.00	\$22,400.00
Underground Pull Box	10	EACH	\$1,400.00	\$14,000.00
Secondary Power Controller	6	EACH	\$9,500.00	\$57,000.00

Pay Item Description	Estimated Quantity	Unit	Unit Price	Item Total
Stream Bank Reconstruction				
Gabion Baskets	215	EACH	\$0.00	\$0.00
Backfill Material	110	CU. YD.	\$45.00	\$4,950.00
Soil Retention Blanket	3100	SQ. YD.	\$3.25	\$10,075.00
Topsoil / Compost Mix	110	SQ. YD.	\$60.00	\$6,600.00
Loose Riprap, Size 200	80	TON	\$65.00	\$5,200.00
Native Trees (15 Gallon)	110	EACH	\$150.00	\$16,500.00
Native Grasses (Bare root)	2700	EACH	\$5.00	\$13,500.00
Detention Ponds				
Excess Excavation	6500	CU. YD.	\$5.25	\$34,125.00
Site Grading	4800	SQ. YD.	\$4.00	\$19,200.00
Soil Retention Blanket	4800	SQ. YD.	\$3.25	\$15,600.00
Aggregate Bed	800	CU. YD.	\$65.00	\$52,000.00
Native Trees (15 Gallon)	40	EACH	\$150.00	\$6,000.00
Native Grasses (Bare root)	1850	EACH	\$5.00	\$9,250.00

Subtotal Land Acquisition	\$12,000.00
Subtotal Sitework	\$92,700.00
Subtotal Path	\$229,768.72
Subtotal Landscape	\$144,650.00
Subtotal Irrigation and Water	\$42,500.00
Subtotal Site Amenities	\$76,950.00
Subtotal Signs	\$11,750.00
Subtotal Lighting and Electrical	\$187,900.00
Subtotal Streambank Reconstruction	\$56,825.00
Subtotal Detention Ponds	\$136,175.00
Construction Sub-Total =	\$991,218.72
Contingency (15%) =	\$148,682.81
Construction Total =	\$1,139,901.53
Permitting (2%) =	\$22,798.03
Design (8%) =	\$91,192.12
Construction Engineering (10%) =	\$113,990.15
Total Project Cost =	\$1,367,881.83

Newman-Buschman District

Pay Item Description	Estimated Quantity	Unit	Unit Price	Item Total
Land Acquisition				
Land Acquisition	2	ACRE	\$6,000.00	\$12,000.00
Site Work				
Mobilization	1	LUMP SUM	\$60,800.00	\$60,800.00
Maintenance of Traffic	1	LUMP SUM	\$8,000.00	\$8,000.00
Path				
Concrete Sidewalk, (5" Thickness)	2100	SQ. YD.	\$50.56	\$106,182.94
Decorative Paving	800	SQ. FT.	\$15.00	\$12,000.00
Pedestrian Bridge Upgrades	130	LIN. FT.	\$500.00	\$65,000.00
Crosswalk Striping	50	LIN. FT.	\$25.00	\$1,250.00
Landscape				
Solid Sodding (Along Path)	4000	SQ. YD.	\$5.50	\$22,000.00
Hydroseeding (Open Space)	1	ACRE	\$3,500.00	\$3,500.00
Trees (30 Gallon)	100	EACH	\$250.00	\$25,000.00
Shrubs (3 Gallon)	600	EACH	\$30.00	\$18,000.00
Groundcover (1 Gallon)	1600	EACH	\$15.00	\$24,000.00
Bed Preparation	4000	SQ. YD.	\$1.00	\$4,000.00
Mulch (Soil Conditioner)	30	CU. YD.	\$45.00	\$1,350.00
Mulch (Surface Application)	75	CU. YD.	\$45.00	\$3,375.00
Irrigation & Water				
Hose Bib in Valve Box	6	EACH	\$75.00	\$450.00
1" Water Line	700	LIN. FT.	\$1.40	\$980.00
1" Water Meter	4	EACH	\$1,500.00	\$6,000.00
Automated Drip Irrigation System	3	EACH	\$7,500.00	\$22,500.00
Site Amenities				
Bicycle Racks	9	EACH	\$350.00	\$3,150.00
Trash Receptacles	12	EACH	\$650.00	\$7,800.00
Metal Benches	6	EACH	\$750.00	\$4,500.00
Sculpture Base	1	EACH	\$1,500.00	\$1,500.00
Signs				
District Entrance Signs	2	EACH	\$1,200.00	\$2,400.00
Interpretive Signs	3	EACH	\$800.00	\$2,400.00
Mile Marker Signs	4	EACH	\$250.00	\$1,000.00
Information Kiosk	1	EACH	\$4,500.00	\$4,500.00
Lighting and Electrical				
Decorative Lighting Assembly	18	EACH	\$3,500.00	\$63,000.00
Underground Branch Circuit	2000	LIN. FT.	\$8.00	\$16,000.00
Underground Pull Box	7	EACH	\$1,400.00	\$9,800.00
Secondary Power Controller	4	EACH	\$9,500.00	\$38,000.00

Pay Item Description	Estimated Quantity	Unit	Unit Price	Item Total
Stream Bank Reconstruction				
Gabion Baskets	160	EACH	\$0.00	\$0.00
Backfill Material	80	CU. YD.	\$45.00	\$3,600.00
Soil Retention Blanket	2400	SQ. YD.	\$3.25	\$7,800.00
Topsoil / Compost Mix	80	SQ. YD.	\$60.00	\$4,800.00
Loose Riprap, Size 200	60	TON	\$65.00	\$3,900.00
Native Trees (15 Gallon)	80	EACH	\$150.00	\$12,000.00
Native Grasses (Bare root)	2000	EACH	\$5.00	\$10,000.00
Detention Ponds				
Excess Excavation	11000	CU. YD.	\$5.25	\$57,750.00
Site Grading	8200	SQ. YD.	\$4.00	\$32,800.00
Soil Retention Blanket	8200	SQ. YD.	\$3.25	\$26,650.00
Aggregate Bed	1400	CU. YD.	\$65.00	\$91,000.00
Native Trees (15 Gallon)	80	EACH	\$150.00	\$12,000.00
Native Grasses (Bare root)	3700	EACH	\$5.00	\$18,500.00

Subtotal Land Acquisition	\$12,000.00
Subtotal Sitework	\$68,800.00
Subtotal Path	\$184,432.94
Subtotal Landscape	\$101,225.00
Subtotal Irrigation and Water	\$29,930.00
Subtotal Site Amenities	\$16,950.00
Subtotal Signs	\$10,300.00
Subtotal Lighting and Electrical	\$126,800.00
Subtotal Streambank Reconstruction	\$42,100.00
Subtotal Detention Ponds	\$238,700.00
Construction Sub-Total =	\$831,237.94
Contingency (15%) =	\$124,685.69
Construction Total =	\$955,923.63
Permitting (2%) =	\$19,118.47
Design (8%) =	\$76,473.89
Construction Engineering (10%) =	\$95,592.36
Total Project Cost =	\$1,147,108.36

River District

Pay Item Description	Estimated Quantity	Unit	Unit Price	Item Total
Land Acquisition				
Land Acquisition	3	ACRE	\$6,000.00	\$18,000.00
Site Work				
Mobilization	1	LUMP SUM	\$130,000.00	\$130,000.00
Maintenance of Traffic	1	LUMP SUM	\$15,000.00	\$15,000.00
Path				
Concrete Sidewalk, (5" Thickness)	3400	SQ. YD.	\$50.56	\$171,915.23
Handrail	200	LIN. FT.	\$75.00	\$15,000.00
Landing Location	4000	CU. YD.	\$100.00	\$400,000.00
Decorative Paving	1300	SQ. FT.	\$15.00	\$19,500.00
Pedestrian Bridge	110	LIN. FT.	\$1,500.00	\$165,000.00
Crosswalk Striping	240	LIN. FT.	\$25.00	\$6,000.00
Landscape				
Solid Sodding (Along Path)	5050	SQ. YD.	\$5.50	\$27,775.00
Hydroseeding (Open Space)	1	ACRE	\$3,500.00	\$3,500.00
Trees (30 Gallon)	160	EACH	\$250.00	\$40,000.00
Shrubs (3 Gallon)	1000	EACH	\$30.00	\$30,000.00
Groundcover (1 Gallon)	2600	EACH	\$15.00	\$39,000.00
Bed Preparation	6500	SQ. YD.	\$1.00	\$6,500.00
Mulch (Soil Conditioner)	45	CU. YD.	\$45.00	\$2,025.00
Mulch (Surface Application)	120	CU. YD.	\$45.00	\$5,400.00
Irrigation & Water				
Hose Bib in Valve Box	10	EACH	\$75.00	\$750.00
1" Water Line	1100	LIN. FT.	\$1.40	\$1,540.00
1" Water Meter	7	EACH	\$1,500.00	\$10,500.00
Automated Drip Irrigation System	5	EACH	\$7,500.00	\$37,500.00
Site Amenities				
Shaded Shelter (Small) (15' x 15')	450	SQ. FT.	\$175.00	\$78,750.00
Bicycle Racks	9	EACH	\$350.00	\$3,150.00
Trash Receptacles	12	EACH	\$650.00	\$7,800.00
Metal Benches	6	EACH	\$750.00	\$4,500.00
Sculpture Base	1	EACH	\$1,500.00	\$1,500.00
Signs				
District Entrance Signs	2	EACH	\$1,200.00	\$2,400.00
Interpretive Signs	3	EACH	\$800.00	\$2,400.00
Mile Marker Signs	4	EACH	\$250.00	\$1,000.00
Information Kiosk	1	EACH	\$4,500.00	\$4,500.00
Lighting and Electrical				
Decorative Lighting Assembly	28	EACH	\$3,500.00	\$98,000.00
Underground Branch Circuit	3200	LIN. FT.	\$8.00	\$25,600.00
Underground Pull Box	11	EACH	\$1,400.00	\$15,400.00
Secondary Power Controller	6	EACH	\$9,500.00	\$57,000.00

Pay Item Description	Estimated Quantity	Unit	Unit Price	Item Total
Stream Bank Reconstruction				
Gabion Baskets	260	EACH	\$0.00	\$0.00
Backfill Material	130	CU. YD.	\$45.00	\$5,850.00
Soil Retention Blanket	3900	SQ. YD.	\$3.25	\$12,675.00
Topsoil / Compost Mix	130	SQ. YD.	\$60.00	\$7,800.00
Loose Riprap, Size 200	100	TON	\$65.00	\$6,500.00
Native Trees (15 Gallon)	130	EACH	\$150.00	\$19,500.00
Native Grasses (Bare root)	3250	EACH	\$5.00	\$16,250.00
Detention Ponds				
Low Head Dam Structure	400	LIN. FT.	\$1,500.00	\$600,000.00
Excess Excavation	13000	CU. YD.	\$5.25	\$68,250.00
Site Grading	8700	SQ. YD.	\$4.00	\$34,800.00
Soil Retention Blanket	8700	SQ. YD.	\$3.25	\$28,275.00
Aggregate Bed	1450	CU. YD.	\$65.00	\$94,250.00
Native Trees (15 Gallon)	100	EACH	\$150.00	\$15,000.00
Native Grasses (Bare root)	4500	EACH	\$5.00	\$22,500.00

Subtotal Land Acquisition	\$18,000.00
Subtotal Sitework	\$145,000.00
Subtotal Path	\$777,415.23
Subtotal Landscape	\$154,200.00
Subtotal Irrigation and Water	\$50,290.00
Subtotal Site Amenities	\$95,700.00
Subtotal Signs	\$10,300.00
Subtotal Lighting and Electrical	\$196,000.00
Subtotal Streambank Reconstruction	\$68,575.00
Subtotal Detention Ponds	\$263,075.00
Construction Sub-Total =	\$1,778,555.23
Contingency (15%) =	\$266,783.29
Construction Total =	\$2,045,338.52
Permitting (2%) =	\$40,906.77
Design (8%) =	\$163,627.08
Construction Engineering (10%) =	\$204,533.85
Total Project Cost =	\$2,454,406.22

Potential Funding Sources

The realization of Gordon's Creek Park depends on available funding. As the cost estimates reflect, each district has a significant cost for construction which exceeds the typical amount of funding available during a normal budget year for any municipality. Grant funding is an alternative to budgeting local dollars to fund all of construction costs. The following are potential funding sources for future construction and studies associated with the recommendations for the Gordon's Creek Park.

Funding Source	Program	Expected Range of Funding	Comments
Mississippi Department of Transportation	Transportation Enhancement Grant	\$1,000,000.00	Provides 80% funding for eligible expenses (pathways, landscape, irrigation, drainage, lighting)
Mississippi Department of Wildlife, Fisheries & Parks	Recreational Trail Program Grant	\$100,000.00	Provides 80% funding for eligible expenses (pathways, landscape, irrigation, drainage)
Blue Cross Blue Shield of Mississippi Foundation	Health & Wellness Grant	\$200,000.00	Provides 100% funding for eligible expenses (fitness related equipment)
Pat Harrison Waterway District	Works Projects & Emergency Watershed	\$25,000.00	Provides 50% funding for eligible expenses (flooding, drainage and erosion protection)
Pat Harrison Waterway District	Water Quality Grant	\$25,000.00	Provides 50% funding for eligible expenses (feasibility studies for stream water quality)
Fund For Wild Nature	Biodiversity & Wilderness Protection	\$5,000.00	Provides 100% funding for eligible expenses
National Audubon Society & Toyota Together Green Program	Solutions to Environmental Challenges	\$50,000.00	Provides 100% funding for eligible expenses (habitat, species and water quality protection)
National Fish and Wildlife Foundation	Nature of Learning	\$10,000.00	Provides 100% funding for eligible expenses (education for local conservation issues)
Scotts Miracle-Gro Company	GRO1000	\$1,500.00	Provides 100% funding for eligible expenses (community gardens and greenspaces)
Community Development Block Grant (CDBG)	Annual Infrastructure or Recreation Improvements	\$50,000.00	Provides 100% funding for infrastructure or recreation improvements in low to moderate income level areas
CDBG Funding requires placement on the City of Hattiesburg's Action Plan and Consolidated Plan (5-Year Plan). The Consolidated Plan is funded over a 5-year period and the Action Plan is funded annually.			

Landscape Management Plan

Introduction

The goal of the Gordon's Creek Landscape Management Plan is to improve the urban landscape and decrease the ecological impacts of a space developed for and used by humans through the use of layered native or other low maintenance vegetation, preservation of existing native trees and other vegetation, removal of invasive species, stormwater treatment, attractive plantings visible to the public, and the use of plants with low water requirements.

When properly applied, the Gordon's Creek Park Landscape Management Plan will ensure that this public landscape is successfully established, continues to function well over time, addresses safety issues, functions to implement the environmental goals for the Gordon's Creek watershed and is sensitive to the limited resources available for landscape management.

Landscape Management Guiding Principles

The guiding principles for the Gordon's Creek Landscape Management Plan are recreation, safety, environmental and maintenance.

1. Provide an enjoyable outdoor recreational space for all users and an aesthetic amenity for local residents.

2. Ensure public safety for all users and local residents by creating open lines of sight with the use of low (2 to 3 foot) shrubs and open, limbed-up trees.
3. Have elements such as plant selections that emphasize native plants and hardy ornamental cultivars that can prevent the effects of pests and the use of harmful chemicals, especially where they may contact people or wash into Gordon's Creek. Treat stormwater in attractive retention areas that also create new habitat and biodiversity.
4. Create a space and maintenance schedule that provides attractive recreational use areas with minimal maintenance commitment.

Recommended Plant Palette

Careful landscape planning can increase user enjoyment, solve difficult site problems, add significantly to the value and beauty of the Gordon's Creek Park, and decrease the amount of maintenance required.

Successful landscapes are created with well thought out plans and designs of outdoor spaces. By carefully considering how landscape elements are placed, you can avoid many costly mistakes that may need to be corrected.

The following list of trees, shrubs and groundcover are recommended for use due to their abilities to tolerate heat and drought, thrive without regular pruning and fertilizing, ability to protect slopes and provide attractive foliage and blooms. Each individual plant contributes to the goals of recreation, safety, environmental and maintenance.

Ornamental Groundcover (Used at focal locations and nodes of activity)		
Evergreen Giant Liriope	Liriope muscari 'Evergreen Giant'	Dense, dark green, grassy evergreen groundcover, 24" height
Louisiana Iris	Iris spp.	Variety of showy spring bloom colors, 24" height
Parsons Juniper	Juniperus davurica 'Parsonii'	Dense, spreading, yellow-green groundcover, 18" height
Ornamental Shrubs (Used at focal locations and nodes of activity)		
Loropetalum	Loropetalum chinense	Dense evergreen shrub, dark red foliage in full sun, 6' height
Indian Hawthorn	Raphiolepis indica	Dense evergreen shrub, true green foliage, white/pink spring bloom
Knockout Rose	Rosa radraz	Compact shrub rose, variety of showy bloom colors, 4' height
Carrisa Holly	Ilex cornuta 'Rotunda'	Dense evergreen shrub, small yellow/green glossy foliage, 3' height
Glossy Abelia	Abelia x grandiflora	Dense evergreen shrub, full sun, glossy foliage, bloom, 4' height
Native Shrubs (Used for pedestrian access control and bank stabilization)		
Red Buckeye	Aesculus pavia	Deciduous, shade tolerant, 10' height, showy bloom
Sweetshrub	Calycanthus foridus	Deciduous, shade tolerant, 4' height, fall color, scented foliage
Summersweet	Clethra alnifolia Linnaeus	Deciduous, shade tolerant, 4' height, fall color
Witch Alder	Fothergilla major	Deciduous, shade tolerant, 8' height, fall color
Dwarf Huckleberry	Gaylussacia dumosa	Deciduous, shade tolerant, 4' height, excellent fall color
Oakleaf Hydrangea	Hydrangea quercifolia	Deciduous, shade tolerant, 6' height, attractive bloom
Star Anise	Illicium floridanum	Evergreen, shade tolerant, 8' height, scented foliage
Virginia sweetspire	Itea virginica	Deciduous, shade tolerant, 5' height, fall color
Leucothoe	Leucothoe axillaris	Evergreen, shade tolerant, 3' height, wet soils
Lyonia	Lyonia lucida	Evergreen, shade tolerant, 3' height, white bloom
Dwarf Palmetto	Sabal minor	Large tropical leaf, shade tolerant, 5' height
Trees (Used for shade, pedestrian access control and bank stabilization)		
Southern Waxmyrtle	Myrica cerifera	Evergreen, multi trunk, scented foliage, understory, 15' height
Bald Cypress	Taxodium distichum	Deciduous, upright, fall color, attractive bark, knees
River Birch	Betula nigra	Deciduous, multi trunk, attractive bark, spreading roots
Willow Oak	Quercus phellos	Deciduous, upright, fall color, 80' height
Red Maple	Acer rubrum	Deciduous, upright, excellent fall color, 70' height
Sycamore	Platanus occidentalis	Deciduous, attractive mottled bark, large foliage, fall color, 80' height
Tulip Poplar	Liriodendron tulipifera	Deciduous, yellow bloom, fall color, 100+ height
Southern Magnolia	Magnolia grandiflora	Evergreen, branched to ground, attractive summer bloom, 90' height
Longleaf Pine	Pinus palustris	Evergreen, native pine, 100' height, heritage tree
Live Oak	Quercus virginiana	Evergreen, low branched, large canopy, 60' height
American Beech	Fagus grandifolia	Deciduous, fall color, 100' height
Titi	Cyrilla racemiflora	Deciduous, white fragrant flowers, 30' height
American Holly	Ilex opaca	Evergreen, glossy foliage, red berries, 50' height

Trees (Used for shade, pedestrian access control and bank stabilization), continued		
Swamp Chestnut Oak	Quercus michauxii	Deciduous, oval form canopy, 100' height
Yaupon Holly	Ilex vomitoria	Evergreen, attractive red berries, small glossy foliage, 30' height

Native Grasses (Pedestrian access control and bank stabilization)		
Little Bluestem	Schizachyrium scoparium	Perennial bunch grass, slender blue-green stems, 24" height
Broomsedge	Adropogon virginicus	Perennial clumping grass, reddish-brown at maturity, 24" height
Big Bluestem	Adropogon gerardii	Perennial bunch grass, slender blue-purple stems, 36-48" height
Indiangrass	Sorghastrum nutans	Perennial tussock grass, shade and fire tolerant, 24" height
Switchgrass	Panicum virgatum	Perennial grass, good for erosion control, 24" height

Retention Pond (Aquatic) Plants (Used to create attractive, aquatic habitat in retention areas)		
Arrow arum	Peltandra virginica	Large tropical leaf, shade tolerant, 3' height
Giant bulrush	Scirpus californicus	Grows to 10' tall, spreads by runners
Soft rush	Juncus effusus	Dark green reed, grows to 4' in height
Cattail	Typha latifolia	Showy flower spikes, grows to 8' tall
Butterfly ginger	Hedychium coronarium	White summer flowers, grows to 6'
Maidencane	Panicum hemitomon	Short grass that grows to 2' tall
Panic grass	Panicum virgatum	Tall grass to 6, summer seed stalks
Pickeral rush	Pontederia cordata	Blue summer flowers, grows to 4'
Common reed	Phragmites communis	Large reed that grows to 12'
Powdery thalia	Thalia dealbata	Blue/violet summer flowers, to 6'
Louisiana iris	Iris spp.	Various spring blooming species
Blue flag iris	Iris virginica	Blue spring flower, grows to 4'
Marsh mallow	Hibiscus lasiocarpus	White summer flowers, grows to 4'
Horsetail	Equisetum hyemale	Vertical reed that grows to 6'
Goldenclub	Orontium aquaticum	Yellow spring flowers, attractive leaves
Spider lily	Crinum americanum	White spring flowers, to 3'
Swamp lily	Hymenocallis occidentalis	White spring flowers, to 3'
Texas star hibiscus	Hibiscus coccineus	Red summer flowers, to 8'
Lizards tail	Saururus cernuus	White spring flowers, to 3'

Landscape Management Practices

Landscape Management begins with the practices and tactics used to provide for and support an urban landscape. The following landscape practices are recommended as a simple way to provide a safe and attractive public space. The list is long and detailed, but most of the practices can be performed by a one person crew during a weekly visit.

General Clean-up

- Remove biodegradable landscape from the pathway and ornamental planting beds. No biodegradable material should be disposed of in garbage to land fill sites.
- A monthly general clean-up program will be performed. The clean-up program shall include a policing of all maintained areas for the removal of trash (paper, cans, bottles etc.) and landscape waste such as fallen sticks and limbs.
- Debris deposited on the pathway or within ornamental planting beds by typical weather occurrences will be cleaned up.
- Clear the pathway at least weekly.

Seasonal debris removal (October through February)

- On a bi-weekly basis remove leaves from lawn areas to prevent heavy build-up and damage to turf by smothering. A single layer of leaves may be mulch-mowed into the turf. Thicker accumulations should be removed and placed in

natural landscape areas.

- Leaves may be raked or shredded by mower and blown into natural landscape beds for mulch as directed, or accumulated leaves will be raked and/or blown from lawn, plants, high maintenance bed areas and collected and removed from property and disposed of within natural landscape areas.

Pruning

- Trees shall be maintained in a healthy, vigorous growing condition, free from disease and large concentrations of pests.
- Prune trees only to remove dead, diseased, broken, dangerous, or crossing branches, and as required below.
- Prune in accordance with generally accepted standards for proper pruning. Use of a certified arborist, particularly with significant trees, is recommended.
- Discard all large tree trimmings off-site using a legal method. Small debris may be disposed of in natural landscape areas.
- Remove tree stakes from trees after two growing seasons. Check tree ties to adjust and loosen as needed after the first growing season. Remove stakes from site and dispose of by a legal method. Recycle used stakes if possible.
- All sucker growth from trunk and base of trees shall be removed monthly or as required up to twelve feet (12') from the ground to maintain a clean appearance.
- A vertical clearance of 80 inches is required above all walkways. Prune trees to remove all limbs within these areas.
- Shrubs shall be pruned only as needed to remove branches that are dead, broken, extending beyond the face of curbs or sidewalks, or are climbing building walls (not applicable to specified vines). Except as noted previously, allow the shrubs to grow in their natural form to their mature sizes. Do not shear shrubs into topiary (shapes) unless specifically instructed.
- Shrubs uniformly planted around the perimeter of tree pits shall be pruned so as to encourage a continuous planting where individual plants are not identifiable. Prune to encourage a dense, continuous planting, with natural shape and branches reaching fully to the ground.
- Allow shrubs two (2) months to rejuvenate following a hard frost prior to pruning or replacing.
- Any shrub or groundcover found to be dead or missing shall be replaced with plant material of identical species as replacement funds are available.
- Keep groundcover trimmed to edge of sidewalks, curbs, and paved areas on a monthly basis. Do not create vertical edges when pruning groundcover. Cut the edges at an angle /-\ for a more natural appearance and healthier plants. Prune so groundcover just overlaps adjoining paving; an open mulch strip here allows weeds to take hold and trash to accumulate.

Fertilizer

- Do not fertilize plantings in a swale or retention pond area.
- Fertilizers shall be either organically derived or slow-release synthetic products, to minimize water pollution and feed plants over a longer period of time.
- Granular slow release or organic fertilizer shall be 5-5-5 formulation or similar, applied per label rate for plant type. Apply fertilizer prior to an assured rain event.
- When applying granular fertilizers to drip-irrigated areas, the fertilizer must be washed in by hand or rainfall before turning on the drip system. Running the drip system immediately after application will push the fertilizer away from the emitters, resulting in a high concentration of fertilizer at the edge of the wetted zone. This highly-concentrated fertilizer can kill or damage plants. It is recommended that granular fertilizers be applied to drip-irrigated areas only in early spring, just prior to a moderate rainfall.

Mulch

- Maintaining a deep layer of bark mulch in ornamental planting beds and leaf/debris mulch in natural beds greatly reduces the labor and materials needed to control weeds, reduces water use, and helps the plants stay healthy.
- Add additional mulch regularly to maintain a layer no less than 2 inches (5 cm) deep at all times in shrub planters, tree wells, and beds where plants have not yet closed in over soil surface. Decomposition of organic mulch is considered normal wear and tear, and replacement of decomposed mulch is required seasonally. Mulch is not required in areas where plant foliage completely covers the soil surface, such that the soil is not visible through the foliage. Any mulch found outside planter areas shall be returned to the planter on a weekly basis.
- Mulch shall be uniform in color and appearance, and free of sticks or trash. Mulch may be bark, compost, shredded fall leaves (with Owner's permission), or chipped or shredded wood. When replacing existing mulch, use a mulch product that is similar in appearance to that already at the site.

Turf

- Turf areas will be kept to a minimum. Turf will provide a 3'-4' shoulder along the pathway. Large areas of turf will only be maintained at nodes of activity.
- Mowing schedule: Mow weekly during active growth periods (April-October) and at least once a month during winter or as needed. Keep mower blades sharp.
- Clippings should always be left on lawn areas ("mulch-mowing" or "grass cycling"), except if this will create a large surface buildup, for instance if saturated soft soils have prevented mowing for several weeks in spring and the grass is very tall. Grass cycling returns about 2 lb. nitrogen per 1000 sq. ft. per year, and improves resistance to drought damage and weed invasion.
- Mowing height: 2 to 2.5 inches high.
- Natural organic fertilizers or "bridge" (organic plus slow-release synthetic) fertilizers shall be used. Soluble fertilizers, though less expensive, wash off site, volatilize, require more frequent application, and are toxic to beneficial soil life, so tend to be more expensive over time.
- Mid to late fall applications are the key to building carbohydrate reserves in the grass root system over the winter. Early spring applications should be avoided because they promote rapid top growth (requiring more mowing) and can exhaust stored nutrient reserves. If spring applications are desired, they should be in late spring.
- Thatch buildup (beyond the 1/2 inch that is healthy) is usually a sign of over fertilization, over use of broadcast pesticides, over-watering, soil compaction, or other causes of diminished soil biota to break down thatch. Excess thatch prevents water penetration and promotes shallow rooting. Good maintenance practices will generally prevent thatch buildup, but where present it should be reduced by regular aeration or a vertical mowing (de-thatching), followed by adjusting cultural practices to prevent recurrence.
- Generally over seeding is practiced after aeration and before topdressing. Over seeding with perennial grass seed shall only occur in areas that lack acceptable coverage. Do not overseed with annual grass seed.
- General lawn should be top dressed with pure compost or a compost-sand mixture, 1/4 to 1/2 inch thick, to improve both drainage and soil fertility. Use a weed-free mature compost from a reputable supplier, screened to 3/8 inch minus particle size. Dragging or raking after application can help get compost down into the aeration holes and break up aeration cores and compost clumps.

Irrigation

- Fix irrigation system leaks and broken or misdirected heads as needed on every site visit.

Spring start-up

- Open the main valve(s), inspect and adjust all sprinkler heads, re-program and check battery backup in controller, and troubleshoot the entire system.

- Test sensors (rain, soil moisture, weather) and zone coverage while running.

Checks and repairs

- Once per year inspect entire irrigation system. Irrigation inspections shall include the following:
 - Activation of each zone to inspect for valve function, lateral breaks, damaged heads, coverage or anything else that would indicate any malfunction of the irrigation system.
 - Adjust irrigation heads for proper coverage.
 - Adjust automatic controller to establish frequency and length of watering periods for seasonal requirements and water restrictions.
 - Runoff of water from irrigation systems into or onto streets, sidewalks, stairs, or gutters is not permitted. Immediately shut down the irrigation system and make adjustments, repairs, or replacements as soon as possible to correct the source of the runoff.
- Do not over-water plantings. Use multiple-start times and short run times to prevent runoff. Drip systems should be left on for sufficient time to allow for saturation of the root zone. Shorter runs with drip irrigation do not provide sufficient water penetration for healthy root development. Avoid multiple-start times with drip systems if possible. Do not allow run-off from any irrigation.
- Rain sensors/weather sensor/soil moisture sensors: Install rain shut-off devices where possible. If no rain shut-off device, building manager shuts off irrigation at first sign of rain.
- Drip irrigation systems need periodic flushing to remove sediment. Systems shall be flushed at least once a year. Open ends of drip lines and run for at least 15 minutes at full flow to flush. It may be necessary to install flush outlets in order to flush the drip system.

System repair

- Regardless of the cause of damage, take immediate action to prevent further damage by shutting off the damaged part of the irrigation system and commencing with hand watering as needed. The following items are considered to be minor repairs: damaged or clogged sprinkler nozzles, adjustment of sprinkler patterns or arcs, adjustment of sprinkler position (reorient; raise, lower, or straighten sprinkler head), replacement of clogged, broken, or missing barbed style drip emitters, replacement or repositioning of drip distribution tubing smaller than 1/2 inch or 15 mm diameter. Any replacement of irrigation system components shall be made with materials of the same manufacturer and model as the original equipment.
- For safety, do not install sprinklers on risers above the ground level, even if the risers are flexible. Always use spring-operated, pop-up style, sprinkler heads. Sprinkler heads are available with pop-up heights up to 12 inches (30 cm) above ground level. If the existing sprinklers are mounted on above-ground risers, the replacements shall be pop-up type sprinklers. No exceptions.

Bioretention Areas

- Swales and rain gardens, designed to capture and hold stormwater, will not maintain optimal drainage rates if soils become compacted. Minimize foot traffic in this area, although occasional walking for maintenance is fine.
- In addition to preventing weeds, regular applications of mulch will maximize the swale's ability to capture and break down contaminants. In order to prevent runoff of excess nutrients, rain garden plantings should not be fertilized. Plant selection, a rich soil mix at time of installation, and regular mulching should provide sufficient nutrients to plantings in these areas.

Landscape Management Schedule

January

- Prune any tree branches that interfere with public safety or sight lines. Do not top or overprune trees (crape myrtles).

- Mulch mow all turf areas to mulch all organic debris such as leaves or pine straw. (Use mulching mower that chops clippings finely and blows mulch down into turf to decompose and feed soil.)

February

- Mulch mow all turf areas to mulch all organic debris such as leaves or pine straw. (Use mulching mower that chops clippings finely and blows mulch down into turf to decompose and feed soil.)
- Add new mulch to planting beds where the mulch depth has been reduced to less than 2 inches thick. Mulch not required where shrubs or groundcover completely hide the soil surface from view.

March

- Mulch mow all turf areas to mulch all organic debris such as leaves or pine straw. (Use mulching mower that chops clippings finely and blows mulch down into turf to decompose and feed soil.)
- Flush out irrigation systems as needed, run and check for proper operation of each valve zone. Test rain sensors to ensure the system is not in use during or following rain events.
- Replace irrigation controller program back-up batteries.

April

- Mulch mow all turf areas twice monthly.

May

- Mulch mow all turf areas weekly.
- Turn on irrigation system, run and visually inspect for proper zone coverage. Set seasonal programs to adjust irrigation up in July-August, and down for May-June and September-October.

June

- Mulch mow all turf areas weekly.
- Prune spring & winter-flowering shrubs as needed to maintain proper shape (not hedged or topiary).

July

- Mulch mow all turf areas weekly.

August

- Mulch mow all turf areas weekly.

September

- Mulch mow all turf areas weekly.
- Add new mulch to planters where the mulch depth has been reduced to less than 2 inches thick. Mulch not required where shrubs or groundcover completely hide the soil surface from view.

October

- Mulch mow all turf areas twice per month.
- Have backflow preventer (on irrigation water supply) tested annually by approved plumbing technician.
- Add new mulch to planters and swale where the mulch depth has been reduced to less than 2 inches (5 cm) thick. Mulch additions are not required where shrubs or groundcover completely hide the soil surface from view.

November

- Mulch mow all turf areas twice per month.
- Turn off and prepare irrigation system for winter. Make sure backflow preventer is well- insulated or drained prior to first freeze.

December

- Mulch mow all turf areas once per month.
- Prune summer and fall-blooming shrubs as needed to maintain proper shape (not hedged or topiary).

Permitting Requirements

The permitting requirements for the Gordon's Creek Park project vary from district to district. Each district would have to be evaluated during design against these permitting requirements to determine their applicability. The district evaluations included in this analysis are based on the conceptual plans.

City of Hattiesburg Floodplain Management Program

The City of Hattiesburg participates in the National Floodplain Management Program's Community Rating System. This is a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum National Flood Insurance Program (NFIP) requirements. As a result of the City's active participation in this program, flood insurance premium rates are discounted.

The City has enacted ordinances to minimize the severity of future flood damages as part of the NFIP's Community Rating System. The City's flood damage prevention ordinance prohibits construction in the floodway. Sidewalks are generally an exception to this ordinance because they do not inhibit movement of water. Structures are prohibited from being constructed in the floodway due to damage that can occur to structures during flood events.

The City of Hattiesburg Floodplain Management Coordinator should be consulted during design of every district to ensure compliance with the Flood Damage Prevention Ordinance.

Permitting Contact: Lisa Reid
Floodplain Management Coordinator
 lreid@hattiesburgms.com
 601-545-4599

Army Corp of Engineers - Mobile District

The Mobile District of the Army Corp of Engineers (ACOE) was contacted to discuss the elements of the conceptual design and how they related to permitting under the ACOE regulations. As a general rule, as long as the design remains above the ordinary high water mark, the ACOE would not have any regulatory authority over the project. Permitting is required for construction in wetlands, detention areas, outflow structures and bridges that require fill.

Wetlands

Construction of any portion of the proposed pathway within a wetland would require permitting through the ACOE. A wetland determination was not within the scope of work for this technical analysis. A wetland delineation may be required as part of specific funding regulations to rule out the possibility of construction within a wetland area. If an area of possible wetlands is encountered during design or construction of the Gordon's Creek Park, the ACOE should be contacted immediately to begin permitting.

Detention Areas

Detention areas are designed to hold water for a designated amount of time before being released. Detention methods can be used to improve water quality by allowing sediment to settle out before being released into the waterway or can aid in flood management by providing excess water a place to be stored until storm waters recede. A side effect of water detention is a change in temperature and ability to supply oxygen to aquatic plants and animals. The top layers of the detained water are exposed to more sunlight which increases the temperature of the water and lowers the oxygen level. Water at the bottom of the detained area will remain cool but has a lower dissolved oxygen (DO) level due to an increase in plant decomposition in the slower moving water. Releasing water from the top or the bottom of the detention area can create temperature and DO changes in the creek in which many of the aquatic inhabitants may not be able to adapt. Not only will these changes affect Gordon's Creek, they may indirectly affect receiving streams such as the Leaf River. As a result, any detention areas designed to feed directly into Gordon's Creek will fall under the permitting authority of the ACOE.

To permit a detention area that releases directly into Gordon's Creek, an evaluation is required to demonstrate how the proposed design will affect Gordon's Creek, the receiving stream, and the Leaf River. The ACOE will require the report to provide justification for the design and assurances that aquatic plants and animals will not be negatively affected by the design. The report will also be required to provide an evaluation on how the detention of water at each location will affect water levels upstream and downstream from the detention area.

Creek Bed Construction

Any construction below the ordinary high water mark would fall under the regulatory purview of the ACOE. This technical analysis will refer to construction below the ordinary high water mark as creek bed construction.

The construction of low head dams and ponding areas within the creek waterway would be considered creek bed construction. As with the detention areas, the ACOE is most concerned about how these areas would effect the overall temperature and dissolved oxygen levels of the creek. Gordon's Creek is currently a cold water stream because it has no impediments that prevent the water from flowing freely to the Leaf River. Low head dams would slow the movement of water through the creek and potentially detain some of it in areas for recreational purposes. This slowing of water flow would cause the temperature of the water to increase and change the chemical and physical characteristics of the stream.

Low head dams, constructed ponding areas, and stepping stones in the creek have the potential to affect future flood and dry weather events. With the construction of any impediment in the creek, the possibility of flooding increases. Some of this flooding would potentially occur in areas that have not previously experienced a flood event. The ponding areas also present potential health concerns. In the event of dry weather or drought conditions, the ACOE is concerned that some of the ponding areas, if not designed correctly, would begin to hold water. This standing water could then begin to breed mosquitos which will create other health hazards.

The final concern of the ACOE is related to the construction of stepping stones in the creek. With the sandy bottom creeks common to the Southeast, it is very difficult to place hardscapes into the creek without armoring them to prevent future erosion. It is the opinion of the ACOE that any hardscapes placed in the creek would have to be fortified to ensure they will remain after a heavy rain event. If these hardscapes are not securely in place on the stream bed, they can be moved downstream and can have unintended consequences.

Permitting creek bed construction with the ACOE is not impossible, but will require some evaluation of proposed construction plans. The ACOE will require an assessment on how the proposed construction will affect temperature, water levels, dissolved oxygen and other chemical characteristics of Gordon's Creek and the Leaf River. When referring to pooling areas or impediments placed in the creek, this assessment will also need to show the affects proposed construction plans have on upstream water levels. An assessment that shows that the proposed construction will not have a negative impact on the creek or the receiving stream will make the permitting process simpler.

Permitting with the Army Corp of Engineers is required in any district where construction will occur below the ordinary high water mark and in districts that provide detention discharging directly into Gordon's Creek. Based on these

requirements, all districts, other than the Depot District, have detention areas or construction that may fall below the ordinary high water mark. A survey of the creek will determine the location of the ordinary high water mark and the potential for permitting in the Woodley District, Cultural District, Downtown District, Newman-Buschman District and the River District.

Permitting Contact: Mike Moxey
Regulatory Division Inland Team Leader
michael.b.moxey@usace.army.mil
251-694-3771

Canadian National Railroad

Correspondence with the Canadian National Railroad (CN) included providing conceptual design drawings and discussion of project barriers. CN regulations typically have three requirements for pedestrian pathways: 1.) The pathway must be permitted. 2.) The pathway should be constructed in a way to protect users from debris that may fall from the railroad tracks. 3.) The entity requesting permitting must accept responsibility for reconstruction or relocation of the pathway if the railroad upgrades, moves or modifies the existing trestle.

Designs for the pathway must provide a 2-1/2 foot clearance from the lowest steel member in which the pathway is crossing beneath to the top of the awning or covering. The awning or covering must also extend beyond the bridge a distance that would protect the user from normal debris. This distance is typically 25 feet from the center of the trestle on either side. The durability of the canopy or awning would be left to the entity requesting the permit, but should be reasonable in preventing injuries to the user. The design should also direct users on a specific path beneath the trestle and take into consideration vibration and shaking that will occur when trains are crossing.

Canadian National Railroad permitting will be required when designing the Depot District.

Permitting Contact: John Dinning
Manager of Public Projects
john.dinning@cn.ca
601-914-2658

Norfolk Southern Railroad

Norfolk Southern Railroad (NS) was contacted to discuss details of the project and determine permitting requirements for the proposed conceptual plans. Requirements for the NS railroad are similar to those for CN railroad. The pathway design will have to include a structure to protect users from falling debris. NS requires that this structure include a roof that can withstand a 50-pound weight being dropped from the trestle. The awning or covering must extend from railroad right-of-way to right-of-way.

Designs for the pathway must provide a 3 - 4 inch clearance from the bottom of the trestle superstructure to allow for railroad trestle inspections. NS also requires that users be directed on a single path beneath the trestle by use of a fenced pathway to prevent users from wandering outside the permitted design area.

NS Railroad permitting will be required when designing the Downtown District.

Permitting Contact: David Wyatt
System Engineer Public Improvements
dave.wyatt@nscorp.com
404-529-1641

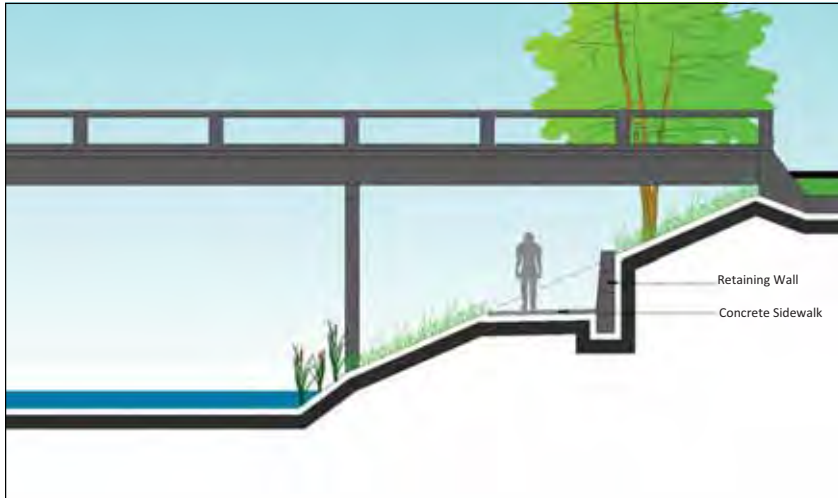
Hutchinson Avenue Creek Bank Crossing



Bird's Eye View of Crossing



Creek View of Crossing



Typical Section of Crossing

The Bird's Eye View (top left) of the Hutchinson Avenue crossing shows the bridge crossing in relation to Jaycee Park (to the left) and Hattiesburg High School (to the upper right). The Creek View (top right) of the Hutchinson Avenue crossing shows the existing conditions and clearance beneath the bridge. The typical section (bottom) shows a conceptual idea for creating a creek bank crossing beneath the Hutchinson Avenue bridge. The concept includes a cut into the existing bank to place the pathway and a retaining wall to hold back the upper part of the slope.

Forrest Street Creek Bank Crossing



Bird's Eye View of Crossing



Creek View of Crossing



Typical Section of Crossing

The Bird's Eye View (top left) of the Forrest Street crossing shows the bridge crossing in relation to Hawkins Elementary School (to the left and mostly off the picture) and the new Hattiesburg Fire Station Administrative Building (to the upper right). The Creek View (top right) of the Forrest Street crossing shows the existing conditions and clearance beneath the bridge. The typical section (bottom) shows a conceptual idea for creating a creek bank crossing beneath the Forrest Street bridge. The concept includes a cut into the existing bank to place the pathway and a retaining wall to hold back the upper part of the slope.

Pine Street, Front Street and Ronie Street Creek Bank Crossings



Bird's Eye View of Crossing

The Bird's Eye View (top left) shows the W. Pine Street, W. Front Street and Ronie Street crossings. This view shows the relationship of these crossings to Downtown Hattiesburg (right). Veteran's Park and the VFW are located between W. Front Street, Ferguson Street and Ronie Street. The Jackie Dole Sherrill Community Center is between W. Front Street and the Norfolk Southern railroad (lower left) which is utilized by the community and the city for various events and meetings. City Hall is located in the top right corner of this picture. These crossings provide the gateway into Downtown Hattiesburg.

The Creek Views (middle) of the three crossings show the existing conditions and clearances beneath the bridges. The creek bed at each crossing is relatively flat based on existing conditions. The typical sections (right) show a conceptual idea for creating a pathway beneath each bridge.



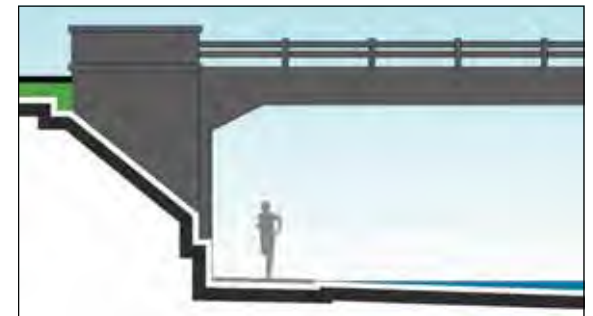
Pine Street Creek View of Crossing



Pine Street Typical Section



Front Street Creek View of Crossing



Front Street Typical Section



Ronie Street Creek View of Crossing



Ronie Street Typical Section

Norfolk Southern Railroad Creek Bank Crossing



Bird's Eye View of Crossing



Creek View of Crossing



Typical Section of Crossing

The Bird's Eye View (top left) of the Norfolk Southern (NS) crossing shows the bridge crossing in relation to Downtown Hattiesburg. The Creek View (top right) of the NS crossing shows the existing conditions and clearance beneath the trestle. The typical section (bottom) shows a conceptual idea for creating a creek bank crossing beneath the Norfolk Southern trestle. The concept includes the required 3 to 4 inch clearance from the bottom of the superstructure to the top of the awning. The awning will be extended the entire length of the NS right-of-way and provide a fence to keep pedestrians on the designated path.

Canadian National Railroad Creek Bank Crossing



Bird's Eye View of Crossing



Creek View of Crossing



Typical Section of Crossing

The Bird's Eye View (top left) of the Canadian National (CN) crossing shows the bridge crossing in relation to Town Square Park (lower left). The Creek View (top right) of the CN crossing shows the existing conditions and clearance beneath the trestle. The typical section (bottom) shows a conceptual idea for creating a creek bank crossing beneath the Canadian National trestle. The concept includes the required 2-1/2 feet clearance from the bottom of the lowest member of the trestle to the top of the awning. The awning will extend 25 feet from the center of the trestle in each direction. The pathway will be fenced to keep pedestrians on the designated path.

Through this phase of the Gordon's Creek Master Plan, research was conducted to find previous designs and studies for the Gordon's Creek area. These plans and studies were utilized during the analysis to provide map and permitting details. The plans and studies found also provide insight to how the creek has been modified to adapt to the growth occurring in the City of Hattiesburg. A brief summary of each design or study found in the research phase are provided below. The plans were not incorporated into this document in their entirety due to constraints in the file size. However, the plans will be made available for use during the design phase of the Gordon's Creek Master Plan.

U.S. Corp of Engineers 1978 Channel Improvement Project

The 1978 U.S. Corp of Engineers (ACOE) Channel Improvement Project is a set of preliminary drawings 18 pages in length. The sheets consist of channel enlargement plans from Broad Street to Main Street, clearing and snagging plans from Main Street to the Leaf River, typical sections for paving and riprap, and a landscape planting plan from Broad Street to McLeod Street.

The plans are useful in providing information on top of bank elevations, creek bottom elevations, bridge data, and utility data.

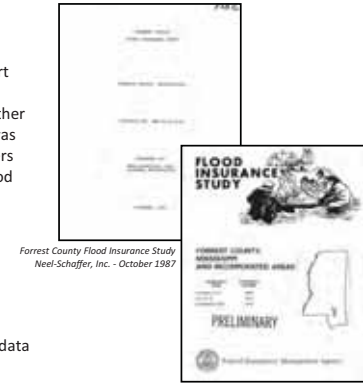


Channel Improvement Project - Preliminary Drawings
U.S. Army Corp of Engineers - July 1978

1987 Forrest County Flood Insurance Study

The 1987 Flood Insurance Study (FIS) for Forrest County is a report 24 pages in length. The report consists of an introduction, study area description, methodology, applications, and references to other studies. The Forrest County FIS prepared by Neel-Schaffer, Inc. was used in a summarized form in the 1990 U.S Army Corp of Engineers Flood Insurance Study (FIS) and was also used to develop the Flood Insurance Rate Maps (FIRMs) for the county. FIRMs provide the locations of floodways and floodplains for streams, creeks and rivers in a geographic area.

The report is useful in the Gordon's Creek Master Plan technical analysis because it provides a hydraulic and hydrologic analyses for the study area. The floodway and floodplain data was not used in this technical analysis due to the age of the data and the availability of an updated FIRM.



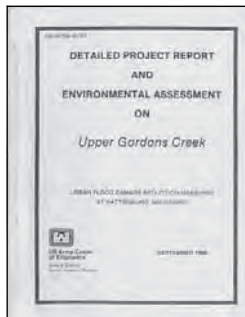
Forrest County Flood Insurance Study
Neel-Schaffer, Inc. - October 1987

Forrest County Flood Insurance Study
U.S. Army Corp of Engineers - October 1990

1986 Detailed Project Report and Environmental Assessment on Upper Gordon's Creek

The Project Report and Environmental Assessment for Upper Gordon's Creek Study is a report is approximately 200 pages in length. The report consists of an introduction, study area description, project analysis, an overview of plan options, plan implementation, recommendations and an environmental assessment. The study provides details regarding channel velocities in Gordon's Creek, flood frequency profiles, 100-year flood profiles, 500-year flood profiles, a geologic and soils investigation, and an environmental resource inventory. The Upper Gordon's Creek Study was prepared by the U.S. Army Corp of Engineers.

The report does not cover the entire study area. A copy of the Lower Gordon's Creek Detailed Project Report and Environmental Assessment was unable to be found, but the combination of these studies would provide a broad understanding of flooding within Gordon's Creek along with environmental data that would be useful in designing along the creek bank.

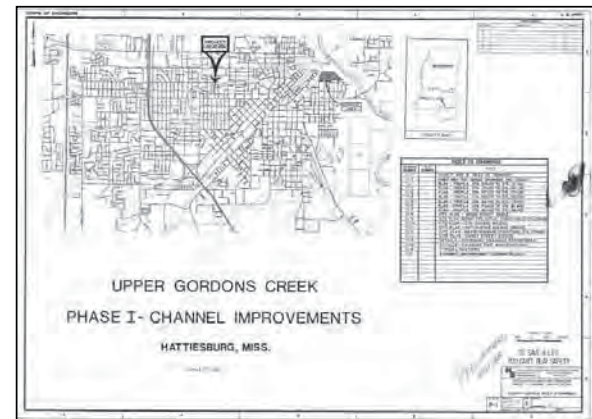


Detailed Project Report & Environmental Assessment
on Upper Gordon's Creek
U.S. Army Corp of Engineers - September 1986

1988 U.S. Corp of Engineers Phase I - Channel Improvements

The 1988 U.S. Corp of Engineers (ACOE) Phase I - Channel Improvement Project is a set of preliminary drawings 25 pages in length. The sheets consist of channel improvement plans from Hardy Street to east of Broad Street, details for bridge crossings, and details for outlet and drainage structures along the creek.

The plans are useful in providing information on top of bank elevations, creek channel cross sections, bridge data, and outlet and drainage structure data.



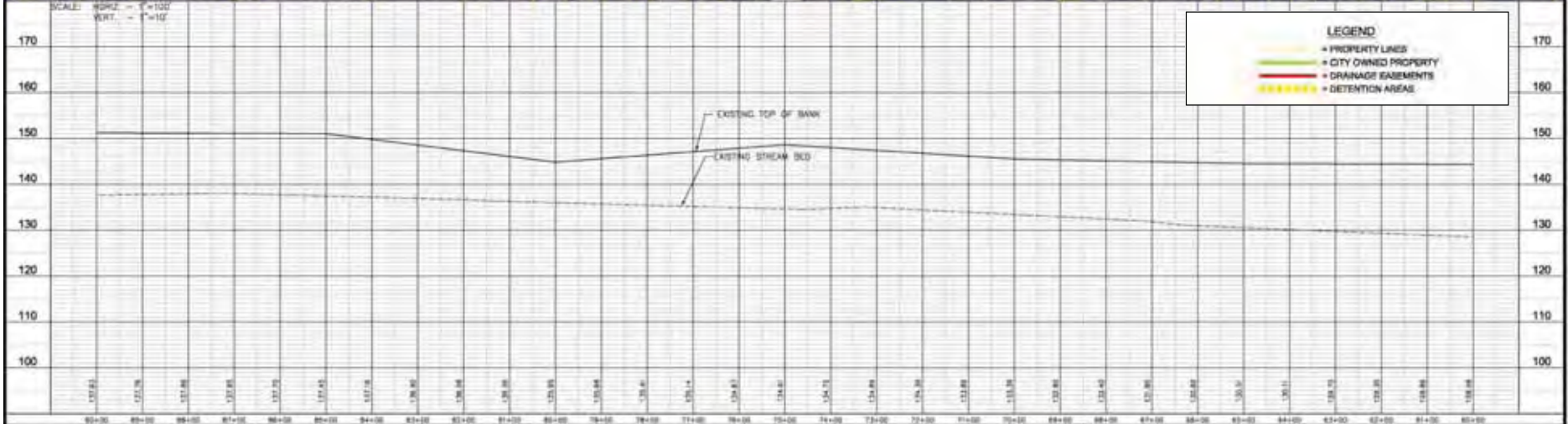
Phase I Channel Improvement Project - Preliminary Drawings
Neel-Schaffer, Inc. - October 1988













SCALE: HORZ. - 1"=100'
VERT. - 1"=10'

