



**US Army Corps
of Engineers** ®
Galveston District

HUNTING BAYOU FLOOD RISK MANAGEMENT, HARRIS COUNTY, TEXAS

DRAFT GENERAL REEVALUATION REPORT AND INTEGRATED ENVIRONMENTAL ASSESSMENT

APPENDIX 1 ENVIRONMENTAL

June 2014

HARRIS COUNTY FLOOD CONTROL DISTRICT

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Fish and Wildlife Coordination Act Report

**Hunting Bayou Federal Flood Control Project
Fish and Wildlife Coordination Act Report
Harris County, Texas**

June 2008

U.S. Fish and Wildlife Service

Hunting Bayou Federal Flood Control Project
Fish and Wildlife Coordination Act Report
Harris County, Texas
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EXECUTIVE SUMMARY

This report was prepared by PBS&J, reviewed and submitted by the U.S. Fish and Wildlife Service (the Service) to the U.S. Army Corps of Engineers (USACE) under the authority, and in accordance with, Section 2(b) of the Fish and Wildlife Coordination Act (FWCA) (48 Stat. 401, as amended; 16 U.S.C. 661, et seq.). The primary purpose of this report is to identify and evaluate anticipated impacts of implementing the proposed project on fish and wildlife resources and alternatives within the Hunting Bayou Watershed in Harris County, Texas. This report was also prepared to recommend conservation and mitigation measures for resource protection.

Harris County Flood Control District (HCFCD) is proposing a flood damage reduction plan that includes channel improvements and construction of an off-line detention tract and an in-line detention tract that would help alleviate flooding problems along Hunting Bayou. The Hunting Bayou flood damage reduction plan includes 3.8 miles of earthen channel modifications, which would begin approximately 1,500 feet downstream of the Englewood Railroad Yard and end just downstream of United States Highway 59 (US 59) North, a 30-acre in-line detention tract and an approximately 75-acre off-line detention tract. Due to the deepening and widening of the existing channel, all existing bridge and pipeline/utility line crossings along the project reach would be replaced or modified. This consists of 13 roadway bridges, 5 railroad bridges, 4 pedestrian bridges, and approximately 63 pipeline/utility line crossings. Four proposed soil placement sites located in the vicinity of the proposed project area would be utilized for disposal of excavated materials. Location maps are included in Appendix A.

The existing Hunting Bayou channel and proposed in-line detention tract consists of pine-hardwood forest, scrub-shrub, mowed/disturbed vegetation, and forested and emergent wetlands. Channel improvements would consist of channel modifications of an earthen bottom with the exception of an existing 0.2 mile reach of concrete lining through the Englewood railroad yard, which is necessary to prevent slope erosion and assist with slope stability. The proposed channel improvements and in-line detention tract consist of approximately 15.18 acres of pine-hardwood forest, approximately 4.12 acres of scrub-shrub vegetation, approximately 101.67 acres of mowed/disturbed vegetation, 1.07 acres of forested wetlands, 1.73 acres of emergent wetland, 0.09 acre of scrub-shrub wetland, and an estimated 1.18 acres of fringe wetlands, totaling 125.04. This vegetation would be removed during excavation activities to modify the channel and create the in-line detention basin.

The proposed off-line detention tract includes approximately 37.43 acres of pine-hardwood forest, approximately 26.32 acres of scrub-shrub, approximately 7.67 acres of mowed/disturbed vegetation, approximately 3.2 acres of disturbed coastal prairie, 0.32 acre of scrub-shrub wetland, and approximately 1.15 acres of forested wetlands. Although approximately 3.2 acres

of coastal prairie currently exists within the proposed off-line detention tract, the entire 76.1 acres is classified as disturbed coastal prairie for the purpose of this report since the majority of the proposed 76.1-acre off-line detention tract consisted of coastal prairie as recently as 1956, according to a review of historic aerial photographs. Coastal prairie is becoming increasingly scarce throughout the region, making remaining tracts of coastal prairie extremely valuable. The Service recommends a 2:1 mitigation ratio for prairie impacts due to the time lag involved in creating or bringing to similar value another, possibly more degraded site, plus the uncertainties involved in recreating a coastal prairie ecotype (U.S. Fish and Wildlife Service [USFWS] 2007). The Service recommends compensation in the form of purchase, creation, and management of a coastal prairie tract of at least 150 acres if the site cannot be preserved and managed intact.

Four proposed soil placement sites (4, 5, 6, and UP) are located in various locations within the vicinity of the proposed project area. Proposed soil placement site 4 contains approximately 32.8 acres of mowed/disturbed vegetation and approximately 0.7 acres of emergent wetlands. Proposed soil placement site 5 consists of approximately 93.7 acres of mowed/disturbed vegetation and approximately 1.7 acres of emergent wetlands. Proposed soil placement site 6 consists of approximately 29.9 acres of pine-hardwood forest, approximately 9.59 acres of scrub-shrub, approximately 1.38 acres of forested wetlands, and 0.23 acre of emergent wetland. Proposed soil placement site UP consists of approximately 78.6 acres of pine-hardwood forest and approximately 2.9 acres of mowed/disturbed vegetation.

It should be noted that if requests for fill dirt are received from within the community, such as from local housing developments, road projects, etc., one or more of the proposed soil placement sites may not be utilized. Project properties potentially receiving excavated materials would be analyzed with a Record of Environmental Consideration to ensure that the disposal of excavated materials will not result in any significant impacts.

Approximately twenty five vacant residential parcels totaling approximately 3.3 acres along the Hunting Bayou channel will be acquired. These parcels contain mowed/disturbed areas of grass, shrubs and saplings typical of a residential setting. Sparse mature tree species were observed within these parcels. In addition to the vacant residential parcels, approximately 40-50 parcels with structures (mostly residential) will need to be acquired to implement the proposed channel modifications.

Due to a lack of suitable habitat and the urbanized character of the project area, it is unlikely that any federally listed threatened or endangered species would utilize any of the proposed project area. Consequently, no adverse effects to federally listed species are expected to occur by implementation of the proposed project.

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INTRODUCTION

Flooding continues to be a significant problem along Hunting Bayou. In recent years, flooding was documented in 1979, 1980, 1983, 1989, 1993, 1994, 1997, 1998, and 2001 (Tropical Storm Allison). Over 8,000 structures were damaged within the watershed as a result of the flooding caused by Tropical Storm Allison. The most significant flooding occurs in the upper reaches of the bayou in the Kashmere Gardens and Liberty Gardens neighborhoods. The second site of significant flood damage is in the reach of the bayou near Interstate Highway 10 (IH 10) East. Without the addition of flood control improvements, flood damages are anticipated to average approximately \$24.2 million annually.

The Hunting Bayou project is included as part of the Buffalo Bayou and Tributaries Project for flood control authorized by the Water Resources Development Act of 1996. This report is provided under the authority of Section 2(b) of the FWCA. The Hunting Bayou Flood Damage Reduction Plan, authorized for construction by Public Law 101-640, consists of a channel enlargement project from the mouth of Hunting Bayou upstream for a distance of 14.3 miles to the vicinity of US 59 North. Under future urban conditions, this plan would provide protection from a 4 percent annual exceedance probability flood event (25-year). With present local drainage conditions in the watershed, the plan would provide protection from a flood greater than a 40-year flood or a flood with a 2.5 percent annual exceedance probability.

The local sponsor and non-federal interest party, HCFCD, no longer supports the plan recommended for Hunting Bayou in the Corps Feasibility Report that was authorized by the Water Resources Development Act (WRDA) of 1990. HCFCD would like to consider a project alternative that is less disruptive to the existing community and environment adjacent to the channel, particularly through Herman Brown Park and downstream. The proposed project includes channel improvements, construction of an off-line detention tract, and an in-line detention tract that would help alleviate flooding problems along Hunting Bayou.

This report was prepared by PBS&J, reviewed and submitted by the Service to the Corps under the authority, and in accordance with, Section 2(b) of the FWCA (48 Stat. 401, as amended; 16 U.S.C. 661, et seq.). The primary purpose of this report is to identify and evaluate anticipated impacts of implementing the proposed project on fish and wildlife resources and alternatives within the Hunting Bayou Watershed in Harris County, Texas. This report was also prepared to recommend conservation and mitigation measures for resource protection.

DESCRIPTION OF THE PROJECT AREA

The Hunting Bayou watershed is comprised of approximately 30 square miles and is highly developed with a mix of residential, commercial, and industrial land uses. The watershed resides in three municipal jurisdictions. The upstream two-thirds of the watershed are within the corporate limits of the city of Houston. Much of the downstream portions of the watershed near IH 10 East are located within the cities of Galena Park and Jacinto City.

The Hunting Bayou watershed is located within the Gulf Coast Prairies and Marshes Region of Texas (TPWD, 2004). The Gulf Coast Prairie is a nearly-level plain less than 150 feet mean sea level (msl) in elevation and is dissected by numerous streams flowing into the Gulf of Mexico. Typical vegetation before development of the region occurred was coastal prairie or post oak savannah. Dominant grasses included big bluestem (*Andropogon gerardii*), little bluestem (*Schizachyrium scoparium*), Indian grass (*Sorghastrum nutans*), eastern gamagrass (*Tripsacum*

dactyloides), and switchgrass (*Panicum virgatum*). Riparian hardwood forests dominated by sugarberry (*Celtis laevigata*), pecan (*Carya illinoensis*), elm (*Ulmus spp.*), and oak (*Quercus spp.*) were found along stream corridors of the region. Presently, the Hunting Bayou watershed is highly developed and little of the natural plant communities remain. The urban nature of the remaining watershed supports ornamental plants and assemblages of native and exotic species indicative of frequent and heavy disturbance that has occurred in the watershed over several decades.

The Hunting Bayou watershed is located within the Austroriparian Biotic Province (Blair, 1950). At least 47 species of mammals, 29 species of snakes, 10 lizards, 2 land turtles, 17 species of frogs and toads, and 18 species of salamanders are known to occur in this province (Blair, 1950). Not all species were found throughout the entire province and many species are locally scarce or non-existent because of habitat loss. While the province supports a large number of species, few of these species are found within the Hunting Bayou watershed. The heavily urbanized condition of the watershed does not provide sufficient habitat for large mammals and provides generally low-quality habitat for other terrestrial and aquatic organisms with a few exceptions where there is medium quality. Small mammals, reptiles, amphibians, and birds found within the watershed are those able to use urbanized site or are commensal with humans.

FISH AND WILDLIFE CONCERNS AND PLANNING OBJECTIVES

Concerns regarding the development of the proposed off-line detention tract were summarized in the 2007 Fish and Wildlife Planning Aid Letter (PAL). A copy of the PAL is provided in Appendix B.

The off-line detention tract consists of pine-hardwood forest with open sites of coastal prairie and forested wetlands. Aerial photographs show that the majority of this tract consisted of coastal prairie as recently as 1956. Dominant grasses and forbs observed in the remnant coastal prairie include vegetation that is typical of an original coastal prairie community. The remnant coastal prairie portion is somewhat overgrown by woody species, mostly native but with an interspersed of invasive exotics. These woody species could be controlled by mowing and fire management if the tract were to be preserved as a remnant prairie. Given the fragmented, small and isolated nature of the proposed off-line detention tract, its native wildlife value is somewhat diminished. However, this tract retains the basic soils, topography, undisturbed nature, and seed bank necessary to rejuvenate high-quality native prairie. Additionally, the remaining coastal prairie sites serve important aesthetic, flood control, and air pollution buffering functions within an urban environment.

The Service is concerned with the loss of coastal prairie and recommends mitigation for coastal prairie impacts located within the project area.

EVALUATION METHODOLOGY

To gain further knowledge of the ecological value of undeveloped sites in the Hunting Bayou watershed, HCFCD conducted vegetation surveys to assess the vegetation quality of sites to be impacted. Vegetation surveys were conducted between February 2002 and February 2007. Vegetation communities were identified as forest, prairie, mowed/disturbed vegetation, and wetland. The purpose of the vegetation surveys was to characterize the existing vegetation within the proposed project area. Prior to the field assessment, potential vegetation communities

occurring within the project area were mapped by photo-interpretation on color infrared photograph aerial base maps.

In summarizing the data collected, the quality of each vegetation type was assessed based on frequency of native versus non-native/noxious/exotic species, beneficial use for wildlife, habitat rarity, and whether each species is typical of the vegetation community it was found in. For the purpose of this report, each vegetation community was classified as high, medium, or low quality. A high-quality classification would be given to vegetation communities that have a majority of native species indigenous to its vegetation type, little to no exotic species, high wildlife use, and habitat importance/rarity. Also given consideration was whether each tract of land is contiguous with other large tracts of beneficial habitat that have natural qualities, such as periodic applications of fire and vegetation maturity. A medium rating would be given to lands that contain a mix of native and non-native species, some beneficial wildlife use, and proximity to other natural habitats. A low rating would be given to lands that are isolated that contain few indigenous species, elevated populations of non-native and exotic species, and low potential for wildlife use.

DESCRIPTION OF FISH AND WILDLIFE RESOURCES

The proposed project includes channel improvements, construction of an off-line detention tract and an in-line detention tract that would help alleviate flooding problems along Hunting Bayou. In addition, the proposed project includes four soil placement sites. Table 1 summarizes the cumulative totals for each of the proposed sites. The existing fish and wildlife resources within each of these components are described below. Refer to Appendix A for the locations of the proposed project components and Appendix C for representative site photographs.

Table 1
Cumulative Total for Each Proposed Site

Proposed Site	Total Size (Acres)
Off-Line Detention Tract	76.1
In-Line Detention Tract/Hunting Bayou Channel	125
Soil Placement Site 4	33.5
Soil Placement Site 5	93.7
Soil Placement Site 6	41.1
Soil Placement UP	81.5

Off-Line Detention Tract

The proposed off-line detention tract is located north of the Union Pacific Railroad tracks that extend parallel to IH 10 East and totals 76.1 acres. Based on a review of historical aerial photography, vegetation found within this tract historically consisted of coastal prairie. The site currently consists of approximately 3.2 acres of coastal prairie, 37.43 acres of pine-hardwood forest, 26.32 acres of scrub-shrub vegetation, 7.67 acres of mowed/disturbed vegetation, 1.15 acres of forested wetlands, and 0.32 acre of scrub-shrub wetland. Each of these communities is described in detail below. A location map depicting these habitats is provided in Appendix A.

The location and ease of access to the off-line detention tract has resulted in many portions of the site being used as illegal dumping sites. Debris found within the off-line detention tract consists of household waste, tires, steel, and other large objects.

Pine-Hardwood Forest/Scrub-Shrub

Forest overstory vegetation consists of sugarberry up to 12 inches in diameter at breast height (dbh), American elm (*Ulmus americana*) up to 18 inches dbh, cedar elm (*Ulmus crassifolia*), sweetgum (*Liquidambar styraciflua*), green ash (*Fraxinus pennsylvanica*), deciduous holly (*Ilex decidua*), common persimmon (*Diospyros virginiana*), and Chinese tallow (*Sapium sebiferum*). Dominant midstory in the forested and scrub-shrub sites consists of dense stands of yaupon (*Ilex vomitoria*), Chinese privet (*Ligustrum sinense*), eastern baccharis (*Baccharis halimifolia*), wax myrtle (*Myrica cerifera*), dwarf palmetto (*Sabal minor*), and saplings of green ash and boxelder (*Acer negundo*). Dominant herbaceous species found in this site consist of Alabama supplejack (*Berchemia scandens*), Japanese honeysuckle (*Lonicera japonica*), southern dewberry (*Rubus trivialis*), goldenrod (*Solidago* spp.), and butterfly milkweed (*Asclepias tuberosa*). The proposed off-line detention tract overstory is typical of pine-hardwood forests that are located within an urban setting in that it supports exotic species such as Chinese tallow tree while containing a lack of native species naturally occurring in hardwood forests such as oak, hickory (*Carya* spp.), beech (*Fagus* spp.), and magnolia (*Magnolia* spp.). Although the fragmented nature and urban location of the proposed off-line detention tract generally provides low-quality habitat for large mammals and other native animal species, it does provide beneficial use for some small wildlife and avian species.

Largely due to the fragmented and urban nature of the pine-hardwood forest and the presence of exotic species, the proposed off-line detention tract has been deemed as bearing a rating of no greater than medium. Due to the non-contiguous nature of the off-line detention tract, its benefit to terrestrial wildlife is limited to its inhabitants. There are no corridors to link this tract of land to additional natural resources. The vegetative analysis of the proposed off-line detention tract demonstrates this site to be lacking in many native species that have been historically associated with pine-hardwood forests. Additionally, the suppression of fire contributes to the invasion of aggressive intrusive species, such as Chinese tallow, Chinese privet, and Japanese honeysuckle. While some non-native vegetation may be utilized by wildlife, the presence of non-native/exotic species is an indicator of the decline of the overall health of the system. The potential for the rebound of indigenous species is possible; however, the proposed off-line detention tract's size and isolation relegate this system to an overall rating of medium. The midstory vegetation provides some beneficial uses for wildlife; however, the elevations of exotic and noxious species such as Chinese privet and Japanese honeysuckle suggest that this site is typical of urban forested sites in that they support exotic species and lack many species typically found in forested communities. The herbaceous vegetation found within the proposed off-line detention tract is typical of urban forested sites in that while containing species that can be classified as beneficial for some wildlife, fire suppression, lack of many indigenous plant species, and the presence of exotic species suggest that the proposed off-line detention tract cannot be considered optimum for the purpose of this report and is therefore given a medium rating.

Mowed/Disturbed Vegetation

Mowed/disturbed vegetation within the proposed off-line detention tract includes grasses and other herbaceous plants. Species include Johnson grass, *Paspalum* spp., *Chloris* spp., *Panicum*

spp., Bermuda grass (*Cynodon dactylon*), seacoast bluestem, Brazilian vervain (*Verbena brasiliensis*), common ragweed (*Ambrosia psilostachya*), dayflower (*Commelina erecta*), and white clover (*Trifolium repens*). The mowed/disturbed vegetation is classified as low quality for the purpose of this report.

Coastal Prairie

Based on a review of historical aerial photography, the majority of the 76.1-acre off-line detention tract consisted of coastal prairie as recently as 1956. At present, approximately 3.2 acres of coastal prairie remains mainly in the southeastern portion of the proposed off-line detention tract. The coastal prairie vegetation is dominated by grasses and other herbaceous plants. Grasses and sedges commonly found in these sites consist of muhly grass (*Muhlenbergia* spp.), brownseed paspalum (*Paspalum plicatulum*), bushy bluestem, falling beakrush (*Rhynchospora caduca*), littlehead nut-rush (*Scleria oligantha*), vasey grass (*Paspalum urvillei*), woolly croton (*Croton capitatus*), silver bluestem (*Bothriochloa saccharoides*), little bluestem (*Schizachyrium scoparium*), Cherokee sedge (*Carex cherokeensis*), thin paspalum (*Paspalum setaceum*), and eastern gamagrass. Other plant species found within this site include Maximilian sunflower (*Helianthus maximiliani*), scented gaura (*Gaura drummondii*), southern dewberry, Alabama supplejack, justiceweed (*Eupatorium leucolepis*), common persimmon, compass flower (*Silphium laciniatum*), wax myrtle, meadow pink (*Sabatia campestris*), and common frogfruit (*Phyla nodiflora*).

Vegetation existing within the coastal prairie is typical of native coastal prairie found prior to development of the area. Isolation and fragmentation of the prairie habitat and presence of woody vines, such as southern dewberry and Alabama supplejack, suggest that these surviving small patches of coastal prairie are slowly being consumed by forest vegetation. Few tracts of coastal prairie remain in southeast Texas, making remaining tracts of coastal prairie increasingly valuable. Due to its increasingly rare nature, the coastal prairie found within the proposed off-line detention tract is classified as high quality.

Wetlands

Wetland field investigations previously conducted were reconfirmed by observational surveys conducted in June 2006. One scrub-shrub wetland and two forested wetlands totaling approximately 1.47 acres are located within the proposed off-line detention tract. Vegetation contained in and around these wetland sites consist of sugarberry, Chinese tallow tree, green ash, hop hornbeam (*Ostrya virginiana*), dwarf palmetto, and annual marsh elder (*Iva annua*). These forested wetlands are typical of wetlands located within fragmented urban forests, which contain beneficial native species that are being encroached upon by invasive species such as the Chinese tallow tree. These wetlands contain beneficial use for wildlife and ecosystem health but lack many species found in non-developed sites. For the purpose of this report, these wetlands are classified as medium quality.

In-Line Detention Tract/Hunting Bayou Channel

The section of proposed improvements along the existing Hunting Bayou Channel and the proposed in-line detention tract, totaling 125 acres, consist of maintained grassland sites with emergent and forested wetlands located south of the proposed off-line detention tract. Channel improvements would consist of channel modifications of an earthen bottom with the exception of maintaining an existing 0.2 mile reach of concrete lining, which extends the through Englewood

railroad yard, to prevent slope erosion and assist with slope stability. Specifically, the proposed channel section and in-line detention tract consist of approximately 15.18 acres of pine-hardwood forest, approximately 4.12 acres of scrub-shrub vegetation, approximately 101.67 acres of mowed/disturbed vegetation, 1.07 acres of forested wetlands, 1.73 acres of emergent wetlands, 0.09 acre of scrub-shrub wetland, and an estimated 1.18 acres of fringe wetlands. A location map that depicts these habitats, with the exception of the fringe wetlands, is provided in Appendix A. Fringe wetlands were evaluated through field surveys of four 1,000-foot representative reaches within the channel and the acreage is a calculated average extrapolated from the results of these surveys. Therefore, fringe wetlands are not shown on the exhibits.

Pine-Hardwood Forest/Scrub-Shrub

Forest and scrub-shrub vegetation located within the Hunting Bayou channel and proposed in-line detention tract consists of sugarberry, white mulberry (*Morus alba*), Jerusalem thorn (*Parkinsonia aculeata*), eastern cottonwood (*Populus deltoides*), glossy privet (*Ligustrum lucidum*), Chinese tallow tree, American elm, green ash, red bay, red maple (*Acer rubrum*), black willow, laurel oak (*Quercus laurifolia*), cedar elm, sweetgum, yaupon, and American beauty berry (*Callicarpa americana*), greenbriar (*Smilax* spp.), muscadine grape (*Vitis rotundifolia*), peppervine, Alabama supplejack, and poison ivy (*Toxicodendron radicans*). The proposed in-line detention tract overstory is typical of frequently disturbed pine-hardwood forests in that it contains elevated populations of exotic species, such as Chinese tallow tree, while containing a lack of a variety of native species naturally occurring in pine-hardwood forests such as oak, hickory, and magnolia. The in-line detention tract vegetation contains beneficial native species; however, its highly fragmented nature, urban location, presence of exotic species, and lack of native species diversity does not provide sufficient habitat for most wildlife and avian species. For the purpose of this report, the proposed in-line detention tract is classified as low.

Mowed/Disturbed Vegetation

Mowed/disturbed vegetation within the off-line detention tract includes grasses and other herbaceous plants that exist the within existing transmission line and drainage ditch right-of-way. Species include Johnson grass, *Paspalum* spp., *Chloris* spp., *Panicum* spp., Bermuda grass, seacoast bluestem, Brazilian vervain (*Verbena brasiliensis*), common ragweed (*Ambrosia psilostachya*), dayflower (*Commelina erecta*), and white clover (*Trifolium repens*). The quality of the mowed/disturbed vegetation is considered to be low for the purpose of this report.

Wetlands

Wetland field investigations were previously conducted in 2002 and were reconfirmed by observational surveys conducted during 2006. A total of 1.07 acres of forested wetlands, 1.73 acres of emergent wetlands, 0.09 acre of scrub-shrub wetland, and an estimated 1.18 acres of fringe wetlands are located within the proposed in-line detention tract and Hunting Bayou channel, totaling 4.07 acres. Wetland plants exist within the channel where the rate of flow is low and in wetlands adjacent to the bayou. Dominant plant species within the channel include alligator weed (*Alternanthera philoxeroides*), which is an invasive species. Dominant forested wetland species include black willow, smartweeds (*Polygonum* spp.), seedboxes (*Ludwigia* spp.), and softrush (*Juncus effusus*). Dominant emergent wetland species include smartweeds, seedboxes, softrush, spikerush (*Eleocharis microcarpa*), pennywort (*Hydrocotyl* spp.), curly

dock (*Rumex crispus*), and marsh flatsedge (*Cyperus pseudovegetus*). These wetlands are typical of wetlands located within fragmented urban forests and maintained sites that contain beneficial native species that are being encroached upon by invasive species such as the Chinese tallow tree. These wetlands contain beneficial use for wildlife and ecosystem health but lack many species found in non-developed sites. For the purpose of this report, these wetlands are classified as medium quality.

Soil Placement Sites

Four soil placement sites (4, 5, 6, and UP) have been identified for the disposal of the material excavated during construction of the proposed detention tracts and channel modifications. It should be noted that if requests for fill dirt are received from within the community, such as from local housing developments, road projects, etc., one or more of the proposed soil placement sites may not be utilized. Project properties potentially receiving excavated materials would be analyzed with a Record of Environmental Consideration to ensure that the disposal of excavated materials will not result in any significant impacts. Location maps depicting the existing habitats at each proposed soil placement site are provided in Appendix A.

Proposed soil placement site 4 contains approximately 32.8 acres of disturbed vegetation and two emergent wetlands totaling approximately 0.7 acre. Disturbed vegetation within this soil placement site includes goose grass, brownseed paspalum, little bluestem, Johnson grass, lemon beebalm, bitter sneezeweed (*Helenium amarum*), and scented gaura. Wetland species include black willow saplings, cottonwood saplings, cedar (*Juniperus* spp.) saplings, narrowleaf cattail (*Typha angustifolia*), seaside goldenrod, sensitive briar (*Mimosa microphylla*), knotroot bristlegrass (*Setaria parviflora*), variable panicgrass (*Dichanthelium commutatum*), King Ranch bluestem (*Bothriochloa ischaemum*), climbing hempvine (*Mikania scandens*), marsh elder (*Iva frutescens*), and bag-pod (*Sesbania vesicaria*). These wetland sites contain beneficial use for wildlife and ecosystem health but lack many species found in non-developed sites. For the purpose of this report, the mowed/disturbed vegetation is classified as low quality and the wetlands are classified as medium quality.

Proposed soil placement site 5 is divided by a 4-foot barbed wire cattle fence that extends east to west. The portion of the site located north of the fence is referred to as site 5A and the portion south of the fence is referred to as site 5B. Both sites predominantly consist of disturbed vegetation, totaling 93.7 acres combined, which for the purpose of this report is classified as low quality. Disturbed vegetation within site 5A, which is currently grazed by cattle, includes carpet grass, Bahia grass, bag-pod, and Macartney rose (*Rosa bracteata*). Disturbed vegetation on site 5B includes carpet grass, Bahia grass, bag-pod, Macartney rose and Chinese tallow tree. There is one 1.7-acre emergent wetland, previously identified in 2006, located within proposed soil placement site 5B. This wetland site contains beneficial use for wildlife and ecosystem health but lacks many species found in non-developed sites. For the purpose of this report, this wetland is classified as medium quality.

Proposed soil placement site 6 consists of approximately 29.9 acres of pine-hardwood forest, approximately 9.59 acres of scrub-shrub vegetation, approximately 1.38 acres of forested wetlands and approximately 0.23 acre of emergent wetlands, and is a highly-disturbed site with moderate natural vegetation. Vegetation is dominated by goose grass, Bahia grass, beebalm (*Monarda didyma*), King Ranch bluestem, Johnson grass, silver bluestem, vasey grass, coneflower (*Echinacea purpurea*), scented gaura, Brazilian vervain, slender vervain (*Verbena*

halei), and golden tickseed (*Coreopsis tinctoria*). The wetland sites contain beneficial use for wildlife and ecosystem health but lack many species found in non-developed sites. For the purpose of this report, these wetlands are classified as medium quality.

Proposed soil placement site UP is located adjacent to the east of the proposed off-line detention tract. Union Pacific Railroad is planning to expand their rail yard onto this tract of land. As part of HCFCD's agreement to purchase the adjacent approximately 75 acre site for the off-line basin, HCFCD has agreed to provide Union Pacific Railroad with approximately 201,828 cubic yards of fill material from the excavation for their site development. Although uncertain at this time, it is probable that the excavated material will be grade for expansion of their rail yard. Vegetation consists of approximately 78.6 acres of pine-hardwood forest and approximately 2.9 acres of mowed/disturbed vegetation. Dominant vegetation consists of sugarberry, American elm, cedar elm, sweetgum, green ash, deciduous holly, common persimmon, Chinese tallow, yaupon, and Chinese privet. Dominant herbaceous species found on this site consist of Alabama supplejack, Japanese honeysuckle, southern dewberry, goldenrod, and butterfly milkweed. Proposed soil placement site UP contains beneficial native species; however, its highly fragmented nature, urban location, presence of exotic species, and lack of native species diversity does not provide sufficient habitat for most wildlife and avian species. For the purpose of this report, the forest and mowed/disturbed vegetation on this site is classified as low.

Bridge Replacements and Modifications

The vegetation around the bridges is typical maintained right-of-way consisting of mowed Bermuda grass.

Wildlife

An environmental baseline report of the Hunting Bayou watershed (HCFCD, 1990) documented a limited number of vertebrate species. Two species of crustaceans, six species of fish, one species of amphibian, three species of reptiles, 29 species of birds, and two species of mammals have been observed within the watershed. Several species of worms and chironomids were observed in the bayou and its tributaries. Additional field studies conducted in 1998, 2000, and 2001 for the flood damage reduction plan support the conclusion of the baseline report regarding low species diversity. During these field studies, the only reptiles observed in the channel right-of-way were spiny soft-shell turtles (*Trionyx spijferous pallidus*) and red-eared sliders (*Trachemes scripta elegans*). Spotted gar (*Lepiososteus oculatus*), grass carp (*Ctenopharyngodon idella*), tilapia (*Tilapia mossambica*), and numerous small fish of indeterminate species were observed in the channel throughout the project area. Birds observed within the project area include green herons (*Butoroides virescens*), great blue herons (*Ardea herodias*), great egrets (*Casmerodius albus*), hooded mergansers (*Mergus culcullatus*), other unidentified species of ducks, belted kingfisher (*Ceryle alcyon*), and at least one species of raptor.

During vegetation surveys in June 2006, the wildlife species identified within the off-line detention tract include mockingbird (*Mimus polyglottas*), eastern cottontail (*Sylvilagus floridanus*), and red shouldered hawk (*Bueto lineatus*). Within the in-line detention tract and along the Hunting Bayou channel, wildlife species observed include spotted gar, tilapia, red-eared slider, yellow crowned night heron (*Nyctanassa violacea*), great egret (*Ardea alba*), and double crested cormorant (*Phalacrocorax auritus*). Wildlife observed within the soil placement

sites included red-eared slider, great egret, and cattle egrets (*Bubulcus ibis*). The pine-hardwood forests and wetlands within the project area may also serve as stop over points for migratory birds.

Threatened and Endangered Species

According to the Service's *Listed/Candidate Species and Species of Concern within Clear Lake Ecological Services Office Area of Responsibility*, one endangered flowering plant species (Texas prairie dawn-flower, *Hymenoxys texana*) and one delisted bird species (bald eagle, *Haliaeetus leucocephalus*) are known to occur within Harris County (USFWS 2008). The Service has indicated, however, that no threatened or endangered species are likely to occur within the study area (Turner Collie & Braden Inc. [TC&B] 1998). Based on a review of Texas Parks and Wildlife's (TPWD) *Annotated County Lists of Rare Species* for Harris County, there are no listed state species of concern located within the study area (TPWD 2008). Furthermore, TWPD conducted a Wildlife Diversity Program review of the proposed project and indicated that no anticipated negative impact to rare species or natural communities is expected to occur (TWPD 1999). National Marine Fisheries Service (NMFS) provided a list of threatened and endangered species under its jurisdiction (NMFS 1998). This list included marine mammals (whales) and turtles. A list of endangered and threatened species under NMFS' jurisdiction, which includes mammals, turtles, fish, invertebrates, plant and candidate, proposed, and delisted species, was also reviewed (NMFS 2008). The proposed flood control measures are not expected to impact any of the species under NMFS' jurisdiction since no marine or anadromous (e.g., salmon) species are known to occur within Hunting Bayou. Copies of agency coordination letters are provided in Appendix B.

FISH AND WILDLIFE RESOURCES WITHOUT PROJECT

Off-line Detention Tract

Pine-hardwood forest acreage would increase over time as scrub-shrub communities within the off-line detention tract matured. Trees would mature, creating additional cavities for wildlife use; however, overall habitat values would decrease as a result of encroachment of non-native vegetation. Mowed/disturbed vegetation sites within the proposed off-line detention tract are anticipated to remain the same. Coastal prairie acreage within the proposed off-line detention tract would likely decrease due to the encroachment of native and non-native woody species. Forested wetlands acreage is not expected to change substantially since drainage patterns would not be altered without the proposed project. This assumption is also based on the fact that the surrounding area has been mostly developed since at least 1984 and there has been no substantial change in the size the forested wetland in the 24 years. Management and land use would remain the same as the off-line detention tract is currently not conducive to public use and its fragmented and urban nature generally provides modest habitat for most terrestrial wildlife species.

In-line Detention Tract/Hunting Bayou Channel

Pine-hardwood and wetland habitat currently existing within the channel and proposed in-line detention tract is not anticipated to change. With the exception of the 25 vacant residential parcels being acquired by HCFCD, the majority of the mowed/disturbed vegetation within this site is currently maintained by HCFCD.

Soil Placement Sites

Although vegetation within soil placement site 4 is not expected to change substantially, it is anticipated that non-native species such as the Chinese tallow-tree would begin to encroach on this highly disturbed tract. The two emergent wetlands, which currently contain black willow, cottonwood and cedar saplings, would mature into scrub-shrub wetlands. Based on development trends in the vicinity of this site, it is expected that this site would be converted to commercial or industrial property in the future.

Soil placement sites 5A and 5B are currently utilized for grazing. Although the intentions of the private landowner are unknown, it is probable that these sites will eventually be developed at some point in the future given that they are situated in a relatively urbanized area with close proximity to other developed properties.

Soil placement site UP contains a mixture of pine-hardwood forest and mowed/disturbed vegetation. The tract is owned by the Union Pacific Railroad and it is possible that the site could be developed or used in the future. This tract generally provides modest habitat for most terrestrial wildlife species given its fragmented and urban nature. If the site remains undeveloped, trees would mature, creating additional cavities for wildlife use; however, overall habitat values would decrease as a result of encroachment of non-native vegetation. Mowed/disturbed vegetation areas would generally remain the same.

Bridge Replacements and Modifications

The mowed/disturbed vegetation around the bridges is not anticipated to change in the future without the project. HCFCD will continue to maintain the right-of-way for flood control purposes.

Wildlife

Terrestrial wildlife within the proposed project area is not anticipated to change in the future without the project. Migratory birds would continue to use the pine-hardwood forest and wetlands in the project area as stop over points for rest and forage opportunities.

DESCRIPTION OF SELECTED PLAN AND OTHER ALTERNATIVES

The Hunting Bayou Federal Flood Control Project is being undertaken by the local sponsor, HCFCD, in accordance with Section 211(f) of WRDA, 1996. The Corps Galveston District is the lead federal agency. The proposed project involves the reformulation of the originally authorized flood damage reduction plan for the Hunting Bayou watershed and implementation of the reformulated plan. The original plan was recommended in the May 1988 Feasibility Report for Buffalo Bayou and Tributaries, Texas, and authorized by WRDA, 1990. The purpose of the proposed action is to develop a flood damage reduction plan that considers any new information since the completion of the feasibility study (USACE 1988) and to address concerns expressed by the public, including the affected communities and the environmental resource agencies.

Seven action alternatives and one no-action alternative were evaluated for the proposed project. Each of these is discussed below.

Alternative 1

Alternative 1 is similar to the National Economic Development (NED) Plan presented in the 1988 USACE feasibility study. It consists of grass-lined channel modifications from US 59 North to the mouth of Hunting Bayou, a distance of approximately 13.8 miles.

Alternative 2

Alternative 2 is similar to the plan recommended in the General Reevaluation Study (GRR). The flood damage reduction features for Alternative 2 include:

- 3.8 miles of channel modifications from US 59 North to Wayside Drive
- Modification or replacement of 22 bridges
- 150 acres of off-line detention east of Homestead Road
- 30 acres of in-line detention east of Homestead Road
- Buyout of 54 structures in the residual floodplain

Alternative 3

Alternative 3 is essentially the same as Alternative 2 except that the proposed channel improvements have a concrete-lined section with a 50-foot bottom width and a buyout is not included. This alternative was proposed in an effort to minimize the amount of right-of-way that would be required to construct the project.

Alternative 4

Alternative 4 is essentially the same as Alternative 2 except that the proposed channel improvements have a grass-lined section that includes terraces to provide opportunities for aesthetic open space or recreational activities.

Alternative 5

Alternative 5 is an entirely non-structural alternative that consists of purchasing and demolishing all of the structures in the watershed that were shown to be cost-effective for buy-out. A total of 974 residential structures met the cost-effectiveness criteria for buy-out. Non-structural alternatives are usually proposed for federal flood-damage reduction projects as a method to reduce flood damages in a way that is less intrusive on the physical and biological environment, even though they may be disruptive on the human environment.

Alternative 6

Alternative 6 is an entirely non-structural alternative that consists of elevating all of the structures in the watershed that were shown to be cost-effective for flood proofing. A total of 1,039 structures met the cost-effectiveness criteria for floodproofing. This alternative was proposed for the same reasons as Alternative 5.

Alternative 7 - No Action Alternative

The No Action Alternative assumes that no flood damage reduction project be implemented. Without the addition of flood control improvements, annual flood damages are estimated to be \$38.5 million.

Recommended Alternative

The Recommended Alternative consists of the following:

- 3.8 miles of earthen channel modifications to Hunting Bayou to widen the channel to varying widths to increase flow capacity, with a maximum 60-foot bottom width trapezoidal cross section and a 0.05% slope
- Creation of an off-line stormwater detention basin on a 75-acre site
- Creation of an in-line stormwater detention basin on a 30-acre site
- Bridge modifications
- Soil placement sites for the disposal of excavated material
- Acquisition of approximately 25 vacant parcels (totaling approximately 3.3 acres) and an estimated 40-50 parcels with structures for channel improvements

Channel modifications to Hunting Bayou begin just east of US 59 North to just downstream of Wayside Street. The proposed off-line stormwater detention tract is located north of Hunting Bayou, north of the railroad tracks, east of Homestead Road, and to the west of Settegast Railroad Yard. The in-line stormwater detention basin is proposed just south of the off-line stormwater detention basin and railroad tracks to the north and south of Hunting Bayou. Location maps are included in Appendix A.

All bridges along the proposed alignment, totaling 22 bridges, will be replaced or modified as a result of the proposed project. Table 2 identifies each of the bridges that would need to be replaced or modified if the recommended plan were constructed.

Table 2
Proposed Bridge Replacements and Modifications

Name	Bridge Station	Owner
HB&T RR Crossing	562+00	Railroad
Wayside Drive	564+09	COH
SP Englewood Yard Bridge	566+44	Railroad
SP Englewood Yard Bridge	566+69	Railroad
SP Englewood Yard Bridge	568+49	Railroad
Private SP RR Access Road	571+61	Railroad
Liberty Road	572+25	TxDOT
Loop 610 Second Crossing	599+52	TxDOT
Homestead Road	635+97	COH
Kelley Road West	648+92	COH
Kelley Road East	653+75	COH
Loop 610 Third Crossing	658+96	TxDOT
Walkway @ Hutcheson Park	661+53	COH
Walkway @ Hutcheson Park	672+94	COH

Name	Bridge Station	Owner
Lockwood Street	686+66	COH
Walkway @ Pickfair	692+95	COH
Wipprecht Street	704+55	COH
Wayne Street	716+69	COH
Hirsch Street	724+66	COH
Leffingwell Street	729+22	COH
Falls Street	732+67	COH
Walkway @ Russell	739+35	COH

PROJECT IMPACTS

Implementation of the proposed project would require the removal of existing vegetation during excavation of the channel improvements, in-line detention basin, and off-line detention basin. The following sections discuss the anticipated impacts of the proposed project to the existing vegetation. Table 3 summarizes the size and quality of each habitat type by location and summarizes mitigation recommendations for unavoidable impacts resulting from the proposed project.

Off-line Detention Tract

Vegetation within the off-line detention tract, which would be removed during excavation, is a mixture of second-growth forest and scrub-shrub, coastal prairie, and forested wetlands. The removal of coastal prairie would result in the loss of a valuable resource that has become increasingly scarce across southeast Texas. If the existing coastal prairie cannot be preserved and managed intact, the Service recommends compensation in the form of purchase, creation, and/or management of a coastal prairie tract of at least 150 acres. A 2:1 mitigation ratio is recommended for the coastal prairie impacts. There are two reasons for using a 2:1 ratio: 1) the time lag involved in creating or bringing to similar value another site that may be more degraded; and 2) the uncertainties involved in recreating a coastal prairie ecotype.

In-line Detention Tract/Hunting Bayou Channel

Vegetation within the in-line detention tract and channel consists of pine-hardwood forests, scrub shrub, mowed/disturbed vegetation, forested, scrub-shrub, and emergent wetlands. Forested and scrub-shrub sites contain diminished native species diversity while containing increased levels of exotic plant species such as Chinese tallow tree. Construction of the grass-lined channel would result in the removal of the existing vegetation located within the proposed channel right-of-way. Predominant vegetation includes grass and other herbaceous plants growing on the tops and banks of the earthen channel. The proposed project would remove potential wildlife habitat; however, the majority of the habitat within the project area is of medium to low wildlife habitat quality. Wetlands located within this site contain beneficial native species; however, their highly fragmented nature, urban location, presence of exotic species, and lack of native species diversity does not provide sufficient habitat for most wildlife and avian species. Woody vegetation within the channel right-of-way consists of small fragments of woodlots or narrow bands of trees and

shrubs growing along the edges of the right-of-way. Relatively few large mature trees would be affected by the project. The large mature trees (dbh ranging from 12 to 24 inches) that would be removed are situated in a thin band along the top of banks mainly west of Hutcheson Park and include eastern cottonwood and sugarberry.

Typical short-term construction impacts on water quality include increased turbidity and siltation. High turbidity is either tolerated by many species or temporarily displaces the fish until acceptable levels of turbidity are restored. However, high levels of turbidity can create situations that clog the gills of fish and reduce their ability to extract oxygen from the water. Turbidity and sedimentation may also affect food supplies and the ability of a fish to locate prey. While fish normally recover quickly from stress, such circumstances during spawning seasons may reduce reproductive success. Emergent wetland plants that currently grow within the pilot channel bottom and predominantly along the edges of the channel would be expected to return to the channel and channel edges after the project is completed.

Table 3
Vegetation Quality and Mitigation Measures

Habitat	Location	Acres	Vegetation Quality	Mitigation Recommendations
Forest/Scrub-Shrub	Off-line basin	63.75	Medium	Mitigation of forest/scrub shrub habitat in in-line basin, channel, and soil placement sites to be determined through coordination with environmental resource agencies and addressed in mitigation plan
	In-line basin and channel	19.30	Low	
	Soil placement sites	118.09	Low	
	Total	63.75	Medium	
Mowed/ Disturbed Vegetation	Off-line basin	7.67	Low	N/A
	In-line basin and channel	101.67	Low	
	Soil placement sites	129.40	Low	
	Total	238.74	Low	
Coastal Prairie	Off-line basin	3.20	High	Purchase, creation and management of at least 150 acres of coastal prairie ecotype ¹
	In-line basin and channel	0.00	N/A	
	Soil placement sites	0.00	N/A	
	Total	3.20	High	
Wetland	Off-line basin	1.47	Medium	Mitigation for wetland impacts to be determined through environmental modeling in coordination with the USACE and environmental resource agencies
	In-line basin and channel	4.07	Medium	
	Soil placement sites	4.01	Medium	
	Total	9.55	Medium	

¹. Based on the recommended 2:1 mitigation ratio.

Soil Placement Sites

The proposed soil placement sites contain a mixture of pine-hardwood forest, scrub-shrub, mowed/disturbed vegetation, and forested and emergent wetlands. At this time, HCFCD is not planning to use the proposed soil placement sites, but rather is planning to relocate the soil to sites within the community for use in currently underway projects, such as roadway improvements and building pads. Sites where potential soil placement is considered will be

reviewed by HCFCF with a Record of Environmental Consideration to ensure significant resources are not impacted. Any site with potential impacts will be rejected for soil placement.

Bridge Replacements and Modifications

The impacts of the proposed bridge replacements and modifications are similar to those of the proposed channel improvements. Potential impacts to water quality, wildlife, and aquatic habitat are anticipated to be minor and temporary and may include increase in turbidity and siltation, removal of emergent wetland plants, and displacement of fish and other aquatic wildlife. The channel is expected to return to its current condition following completion of the construction activities.

FISH AND WILDLIFE CONSERVATION MEASURES

The coastal prairie ecotype has become increasingly rare in the region; loss of any remaining coastal prairie tracts represents the loss of a valuable resource. Research on similar prairie and bottomland hardwood fragments has shown that native breeding bird, mammal, and herpetofaunal diversity is diminished when sites become fragmented below even a thousand acres in size, and particularly so when they are less than 100 acres (USFWS 2007). However, even small sites can serve as important natural preserves in the midst of ever-expanding urban environments and should be considered for preservation nonetheless. The Service recommends that communities of declining, high quality ecotypes (such as coastal prairie, bottomland hardwood forest, cypress-tupelo swamps, etc.) be preserved intact whenever possible and feasible.

RECOMMENDATIONS

Following consideration of the anticipated impacts resulting from implementation of the proposed Hunting Bayou flood damage reduction plan, the Service makes the following recommendations:

- A 2:1 mitigation ratio is recommended for the coastal prairie impacts due to the time lag involved in creating or bringing to similar value another, possibly more degraded, site, plus the uncertainties involved in recreating a coastal prairie ecotype.
- If the existing coastal prairie cannot be preserved and managed intact, the Service recommends compensation in the form of purchase, creation, and management of a coastal prairie tract of at least 150 acres.
- If possible, the Service prefers to preserve tracts containing remnant plant communities of declining, high-quality ecotypes (such as coastal prairie, bottomland hardwood forest, cypress-tupelo swamps, etc.) intact. In the event that removal is unavoidable, adequate mitigation will be sought.
- The Service requests that HCFCF consult with federal and state agencies for the development of a mitigation plan.
- An invasive species plan will be developed for each of the mitigation sites to address locally invasive plant and animal species.
- Wetland, forest, and scrub/shrub habitats will be mitigated for.
- Eliminate the use of concrete lined portions of the channel where possible.

- Provide slope stability to avoid soil erosion by planting native grasses.
- Use drift fences along portions of the channel where possible to prevent unnecessary accumulation of soil or plant material from entering the channel.
- Plant in-line and off-line basins with a suite of native grass and sapling species. Monitor these areas for a minimum of 5 years.
- If possible, leave dead snag trees as they provide habitat for wildlife.

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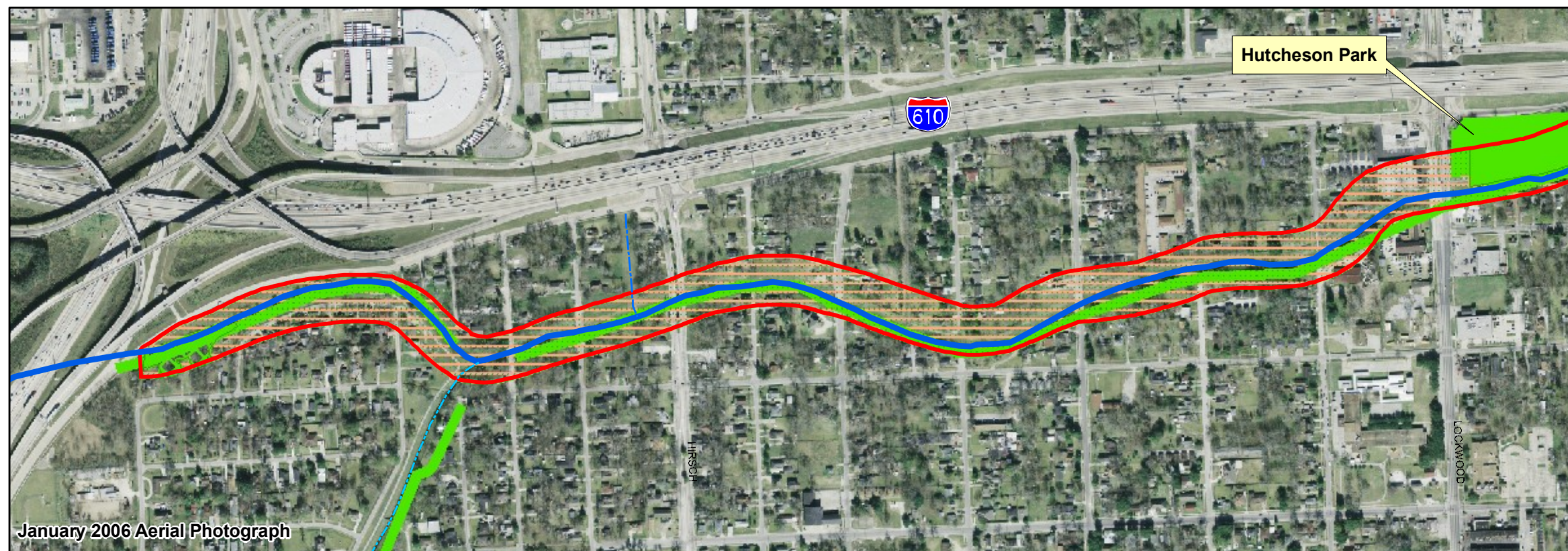
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Appendix A

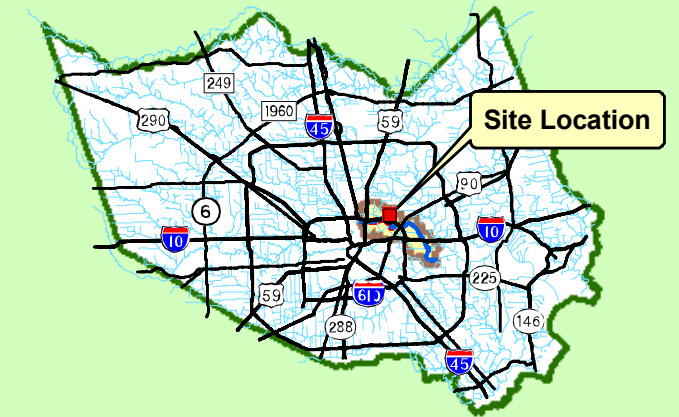
Figures

Channel Map - Panel 1

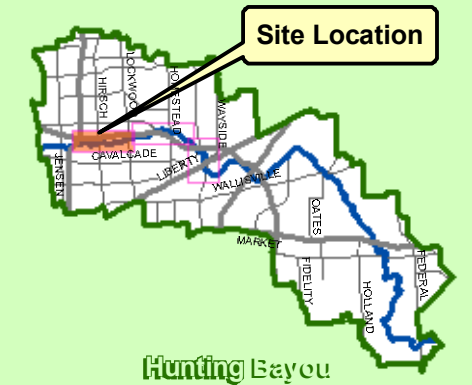
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Harris County Vicinity Map



Watershed Vicinity Map

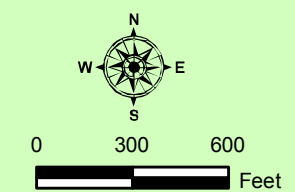


Legend

	Proposed Project R.O.W.		Major Channels
	Upland Mixed Hardwood		Minor Channel
	Mowed, Disturbed Vegetation		Historical
	Parks		Storm Sewer

Mission Statement

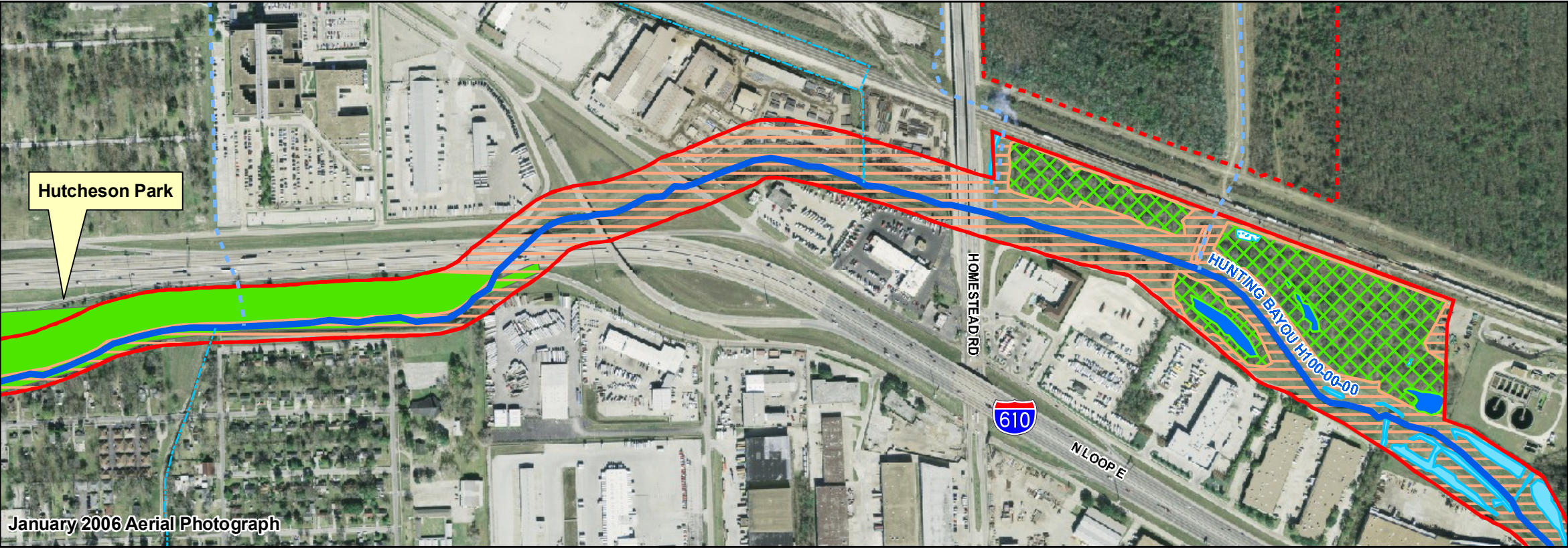
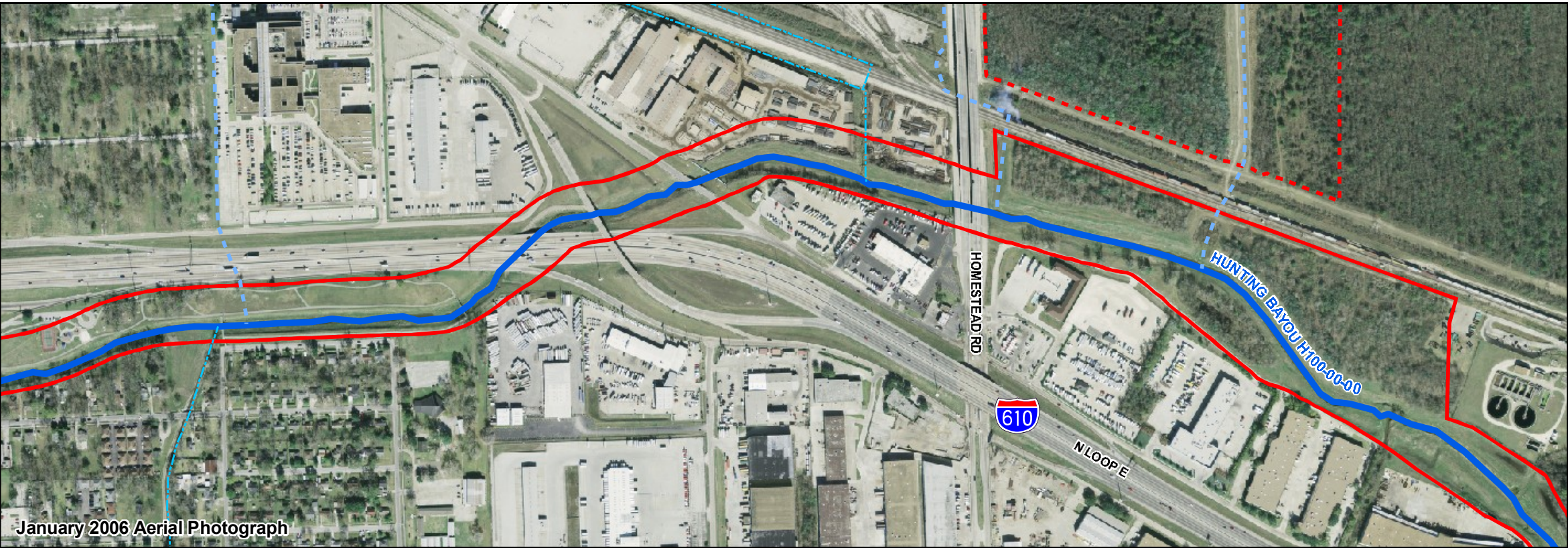
To provide flood damage reduction projects that work, with appropriate regard for community and natural values



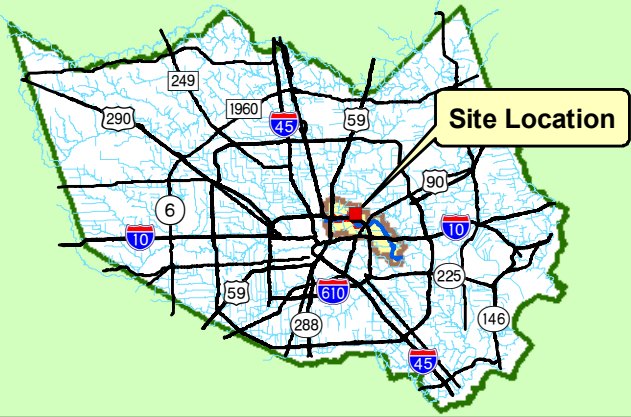
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Channel Map - Panel 2

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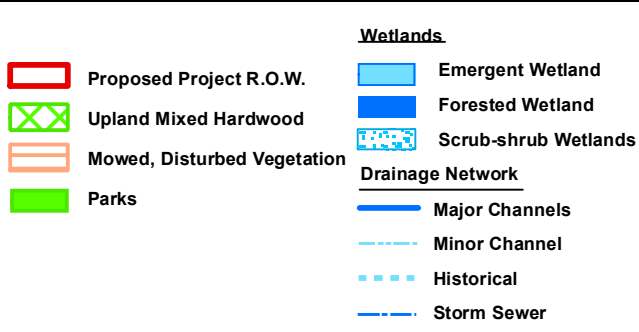
Harris County Vicinity Map



Watershed Vicinity Map

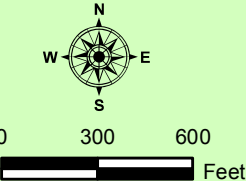


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Mission Statement

To provide flood damage reduction projects that work, with appropriate regard for community and natural values



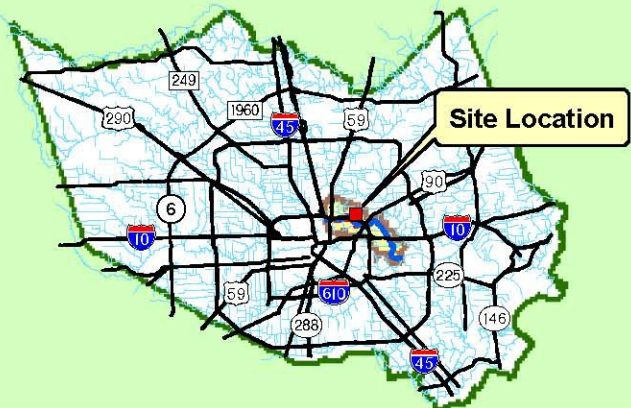
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Channel Map - Panel 3

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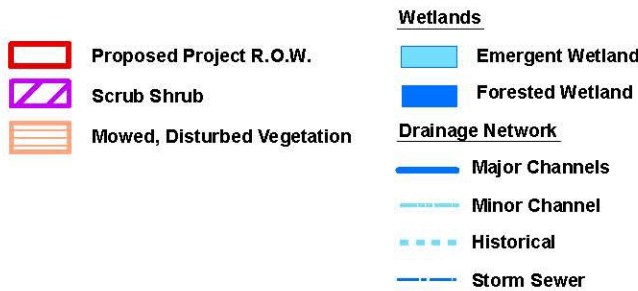
Harris County Vicinity Map



Watershed Vicinity Map

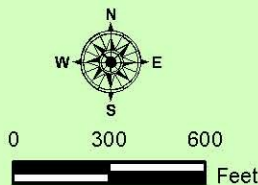


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Mission Statement

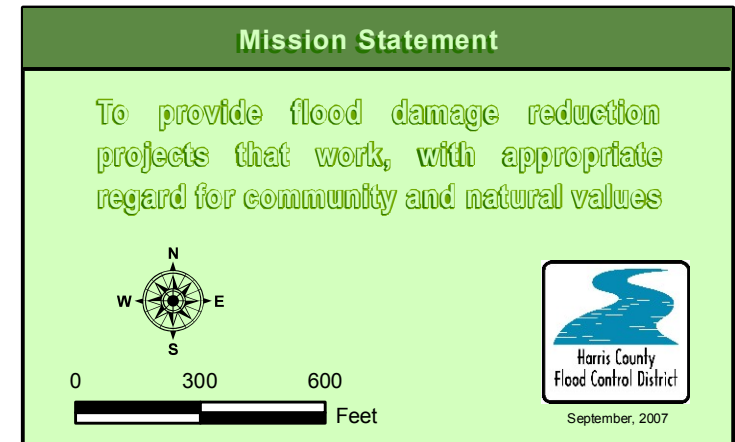
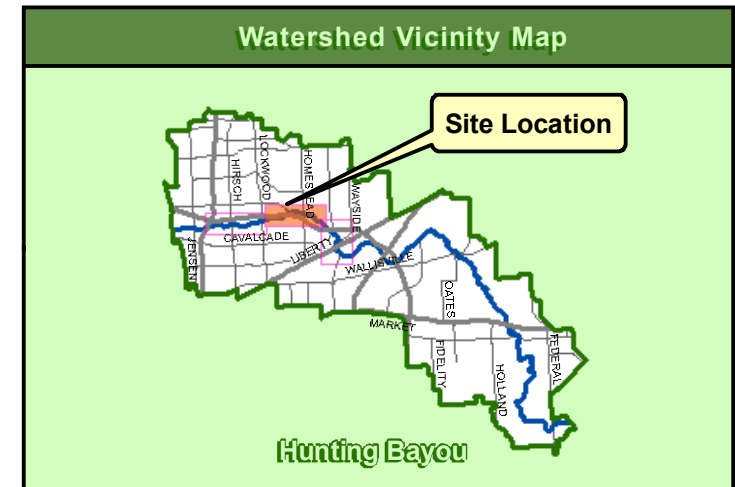
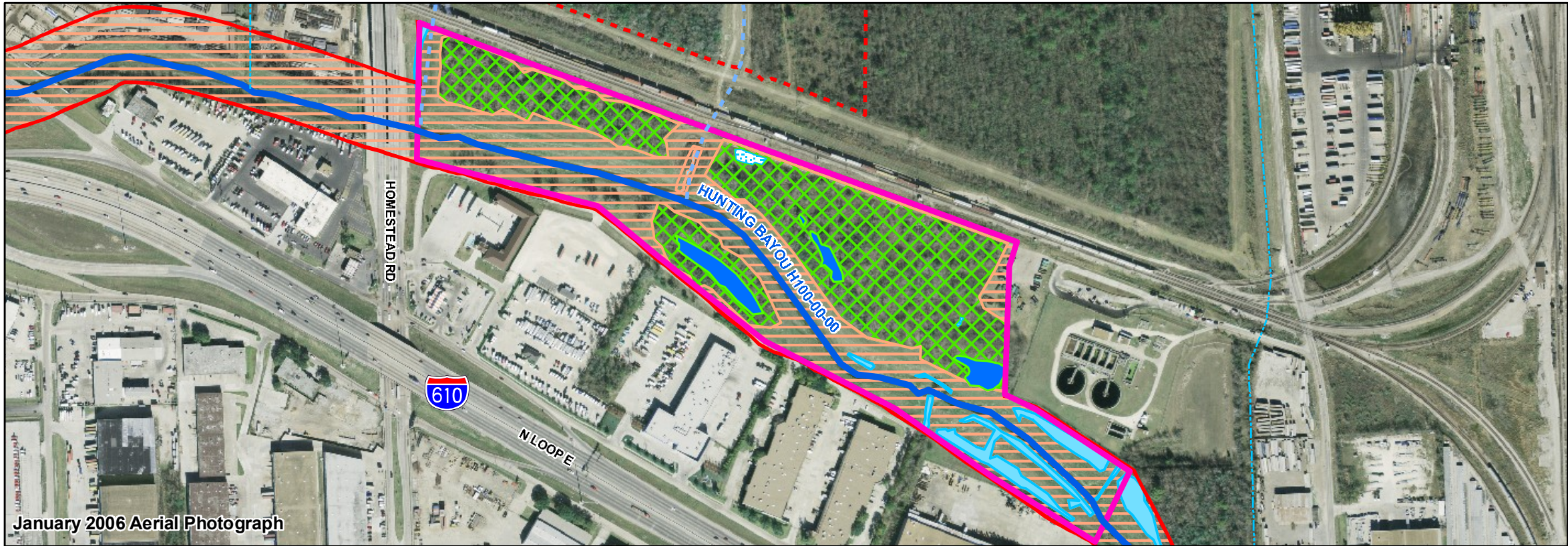
To provide flood damage reduction projects that work, with appropriate regard for community and natural values



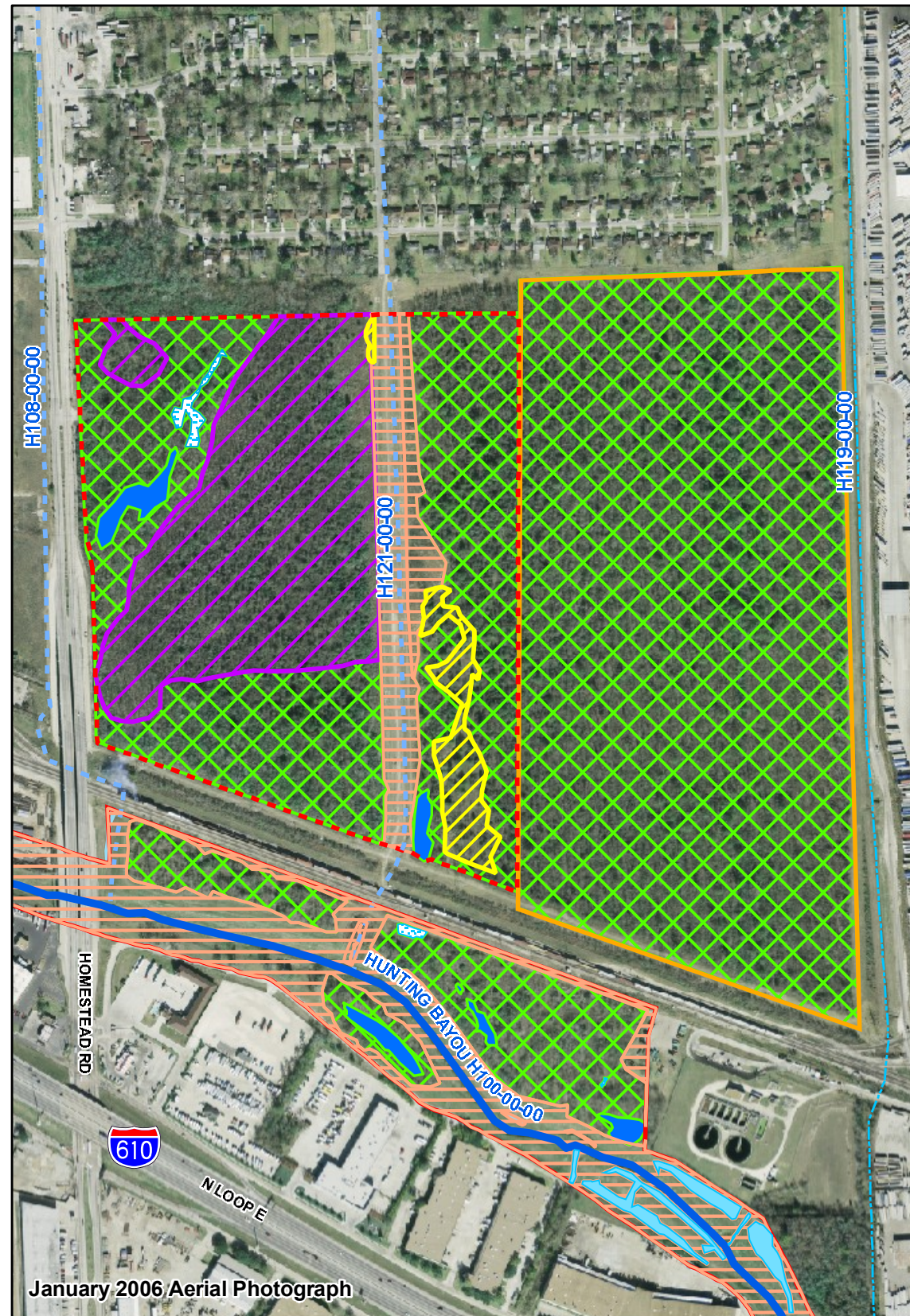
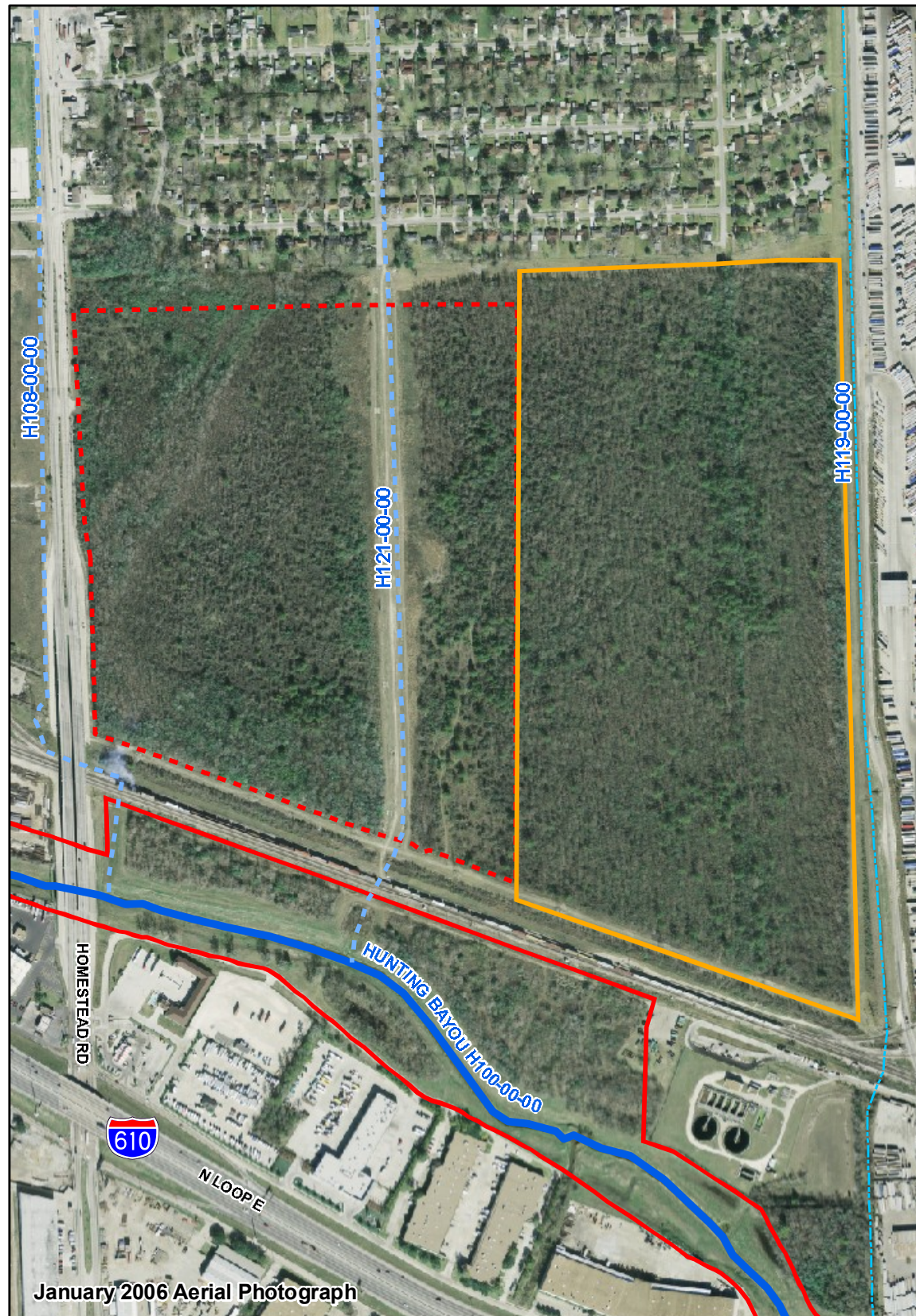
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Inline Detention Site

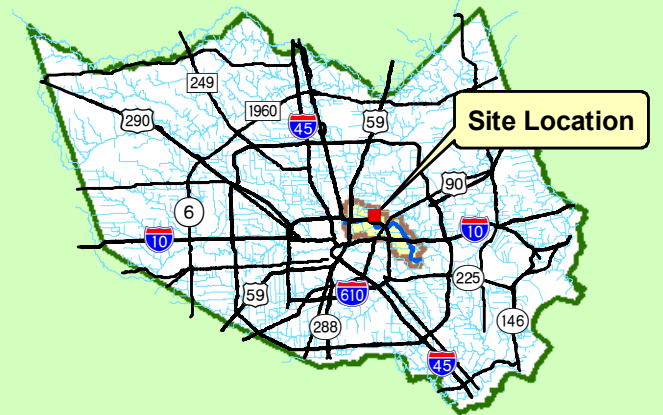
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Off-line Detention Basin & Proposed Soil Placement Site UP



Harris County Vicinity Map



Watershed Vicinity Map

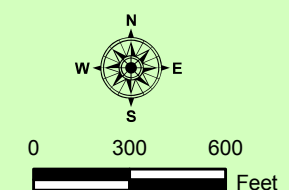


Legend

	Proposed Project R.O.W.		Emergent Wetland
	Proposed SWDB Basin		Forested Wetland
	Proposed Soil Placement Site		Scrub-shrub Wetlands
Detention Site		Drainage Network	
	Upland Prairie Grasses		Major Channels
	Mowed, Disturbed Vegetation		Minor Channel
	Scrub Shrub		Historical
	Upland Mixed Hardwood		Storm Sewer

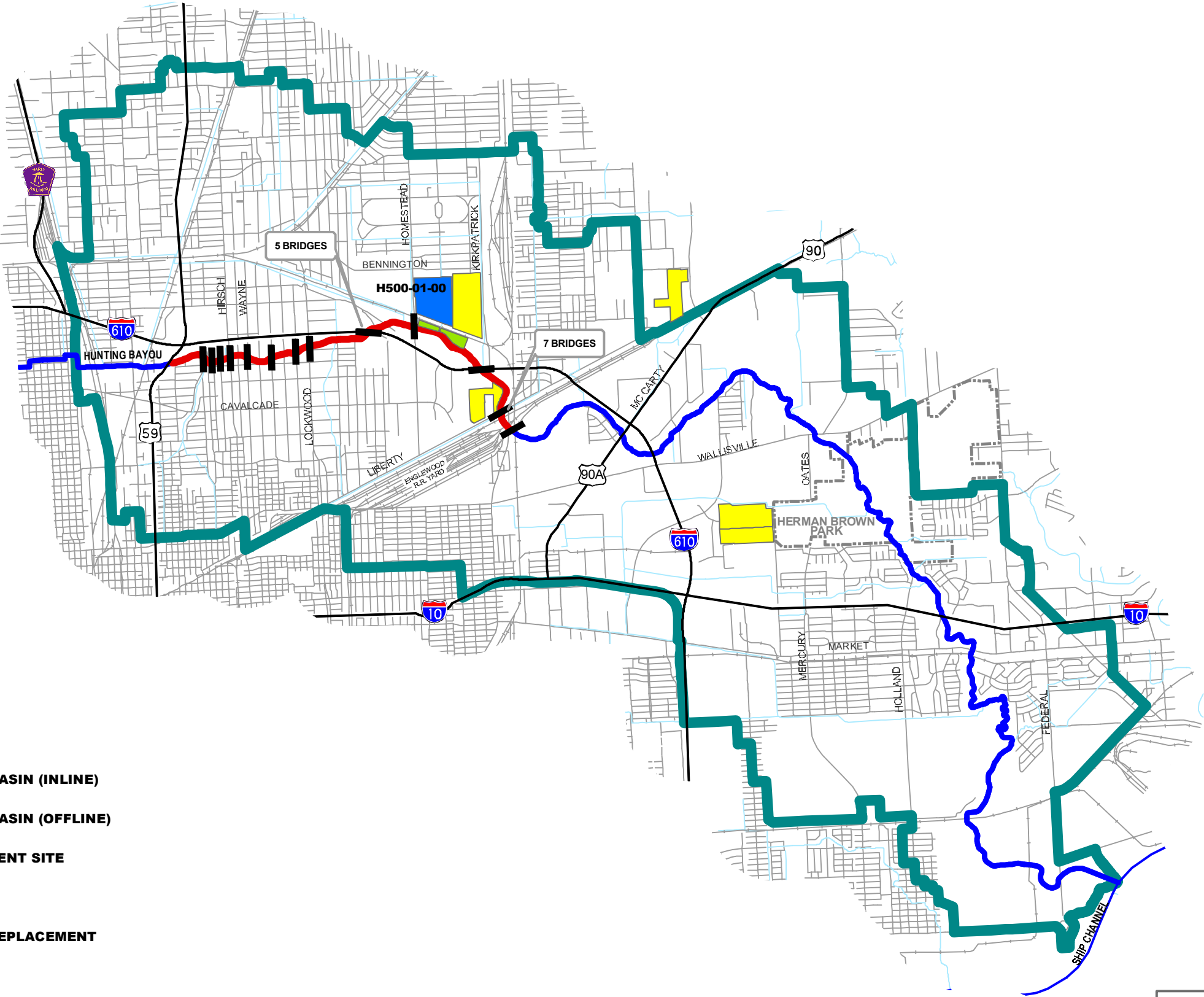
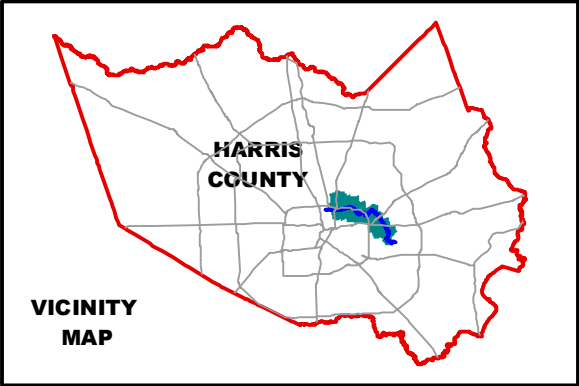
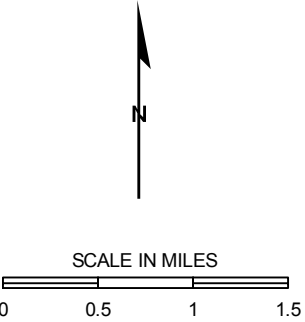
Mission Statement

To provide flood damage reduction projects that work, with appropriate regard for community and natural values



September, 2007

Hunting Bayou Watershed



LEGEND

- PROPOSED DETENTION BASIN (INLINE)
- PROPOSED DETENTION BASIN (OFFLINE)
- PROPOSED SOIL PLACEMENT SITE
- CHANNEL MODIFICATION
- BRIDGE MODIFICATION/REPLACEMENT

DRAINAGE NETWORK

- MAJOR CHANNEL
- MINOR CHANNEL

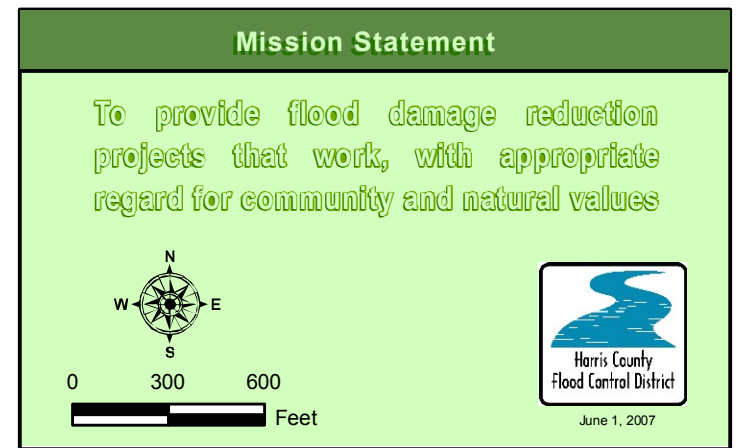
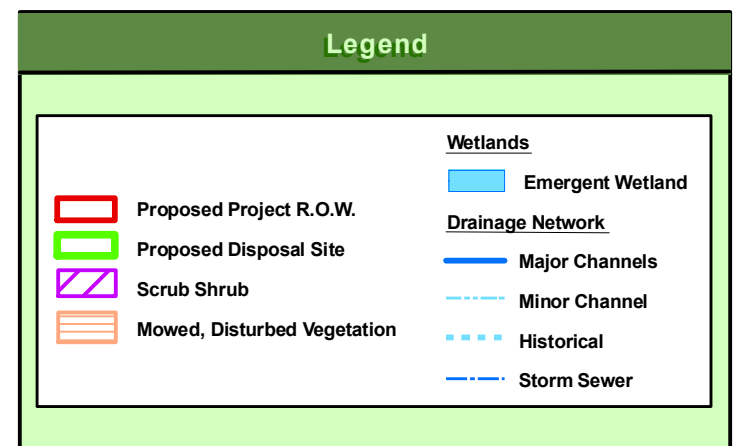
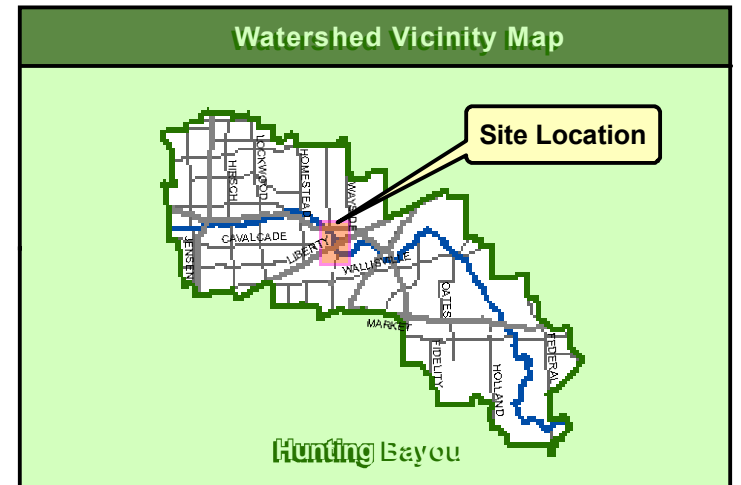
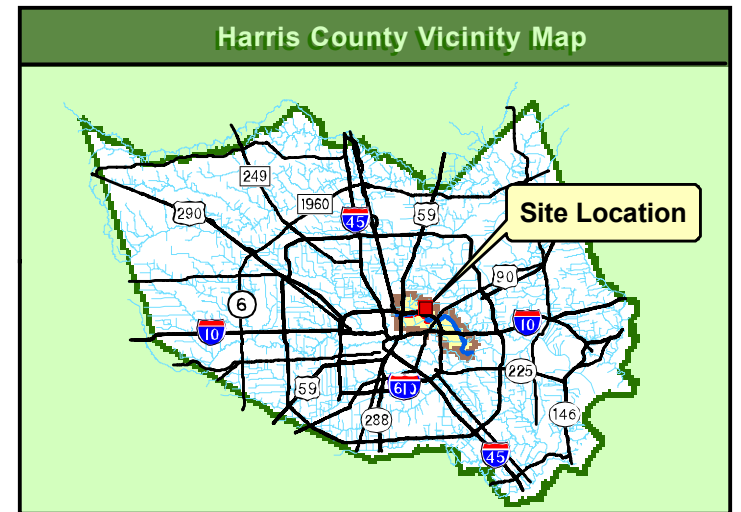
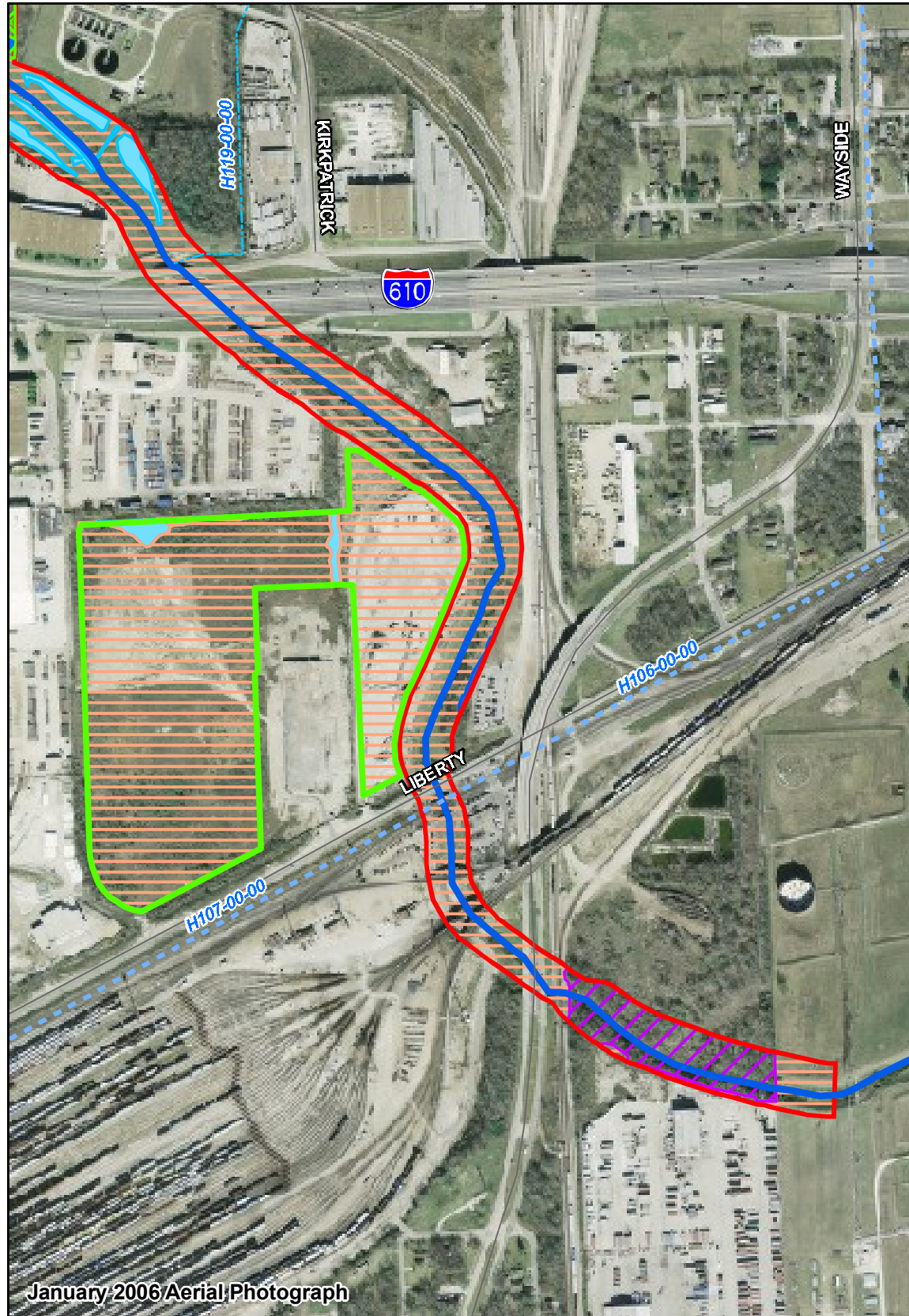
**Upper Hunting Bayou
Flood Damage Reduction Plan**

RECOMMENDED PLAN

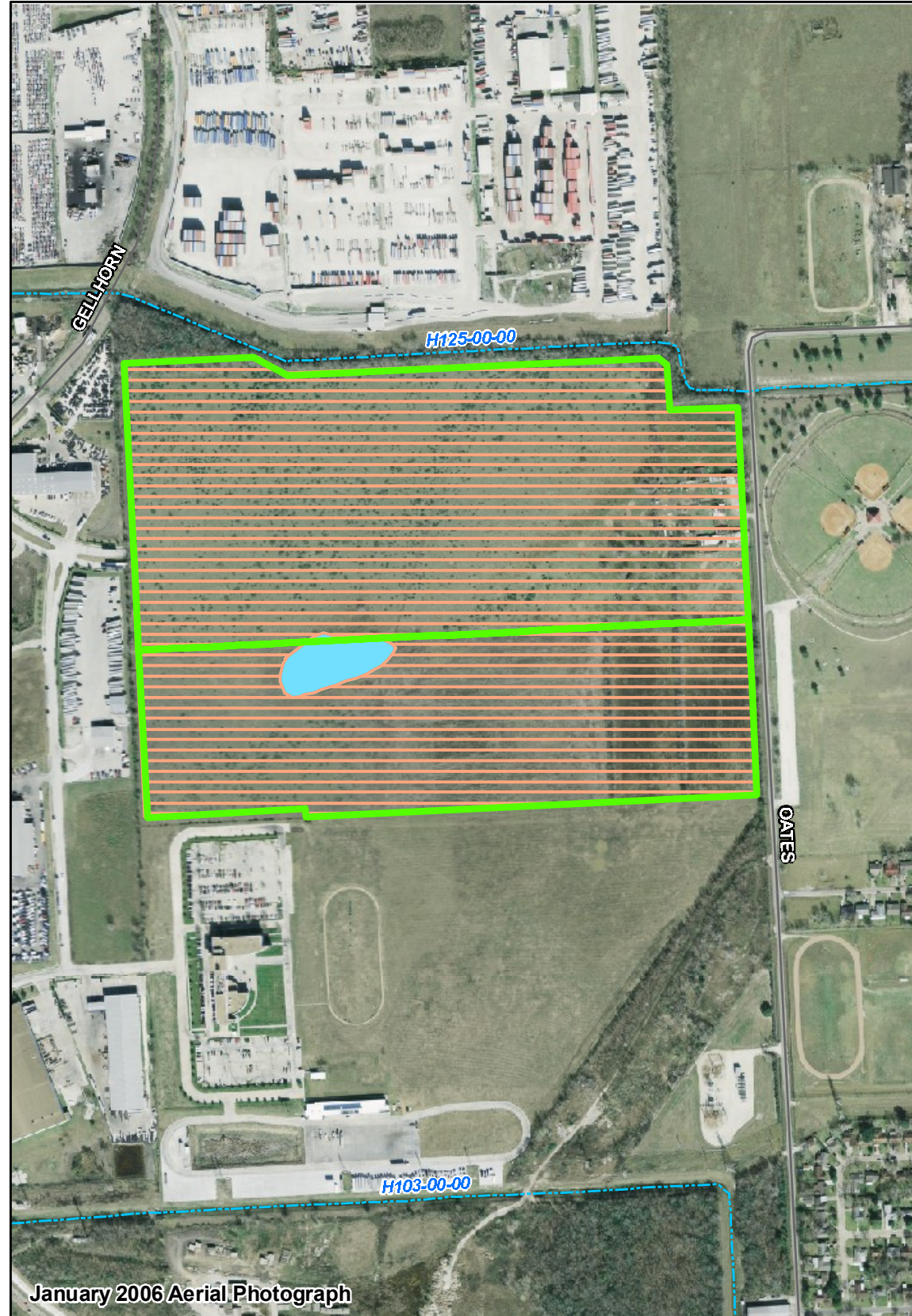
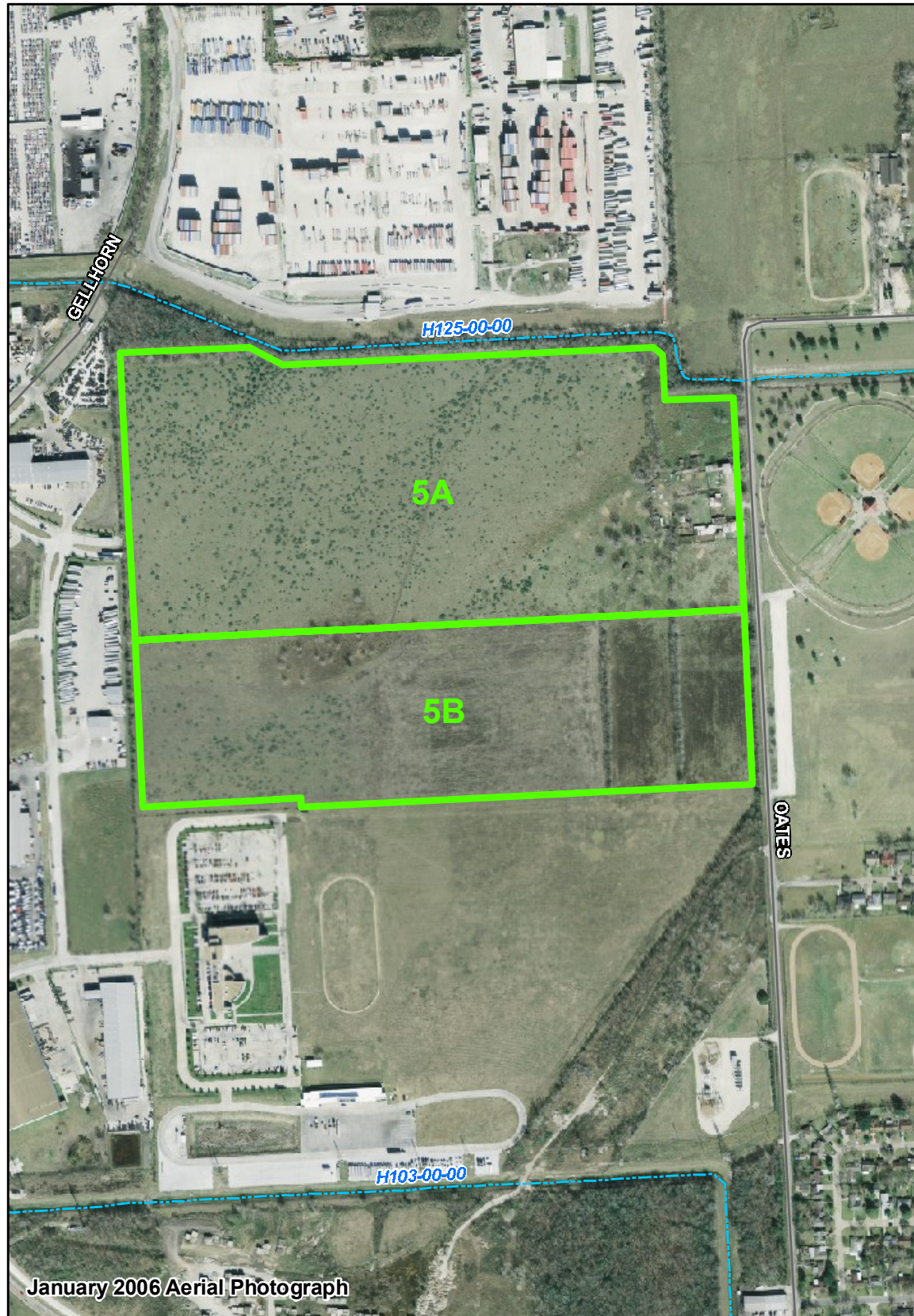


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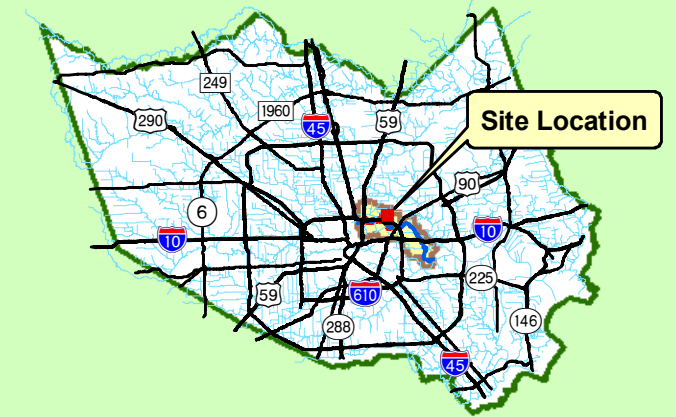
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H100-00-00-Y001



Proposed Soil Placement Site 5A & 5B



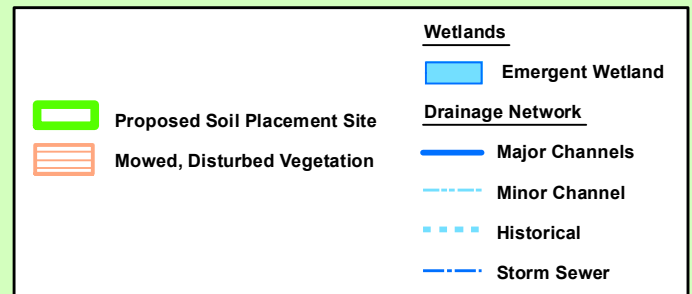
Harris County Vicinity Map



Watershed Vicinity Map

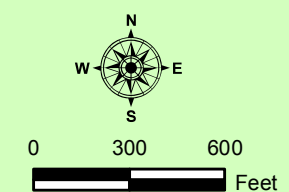


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Mission Statement

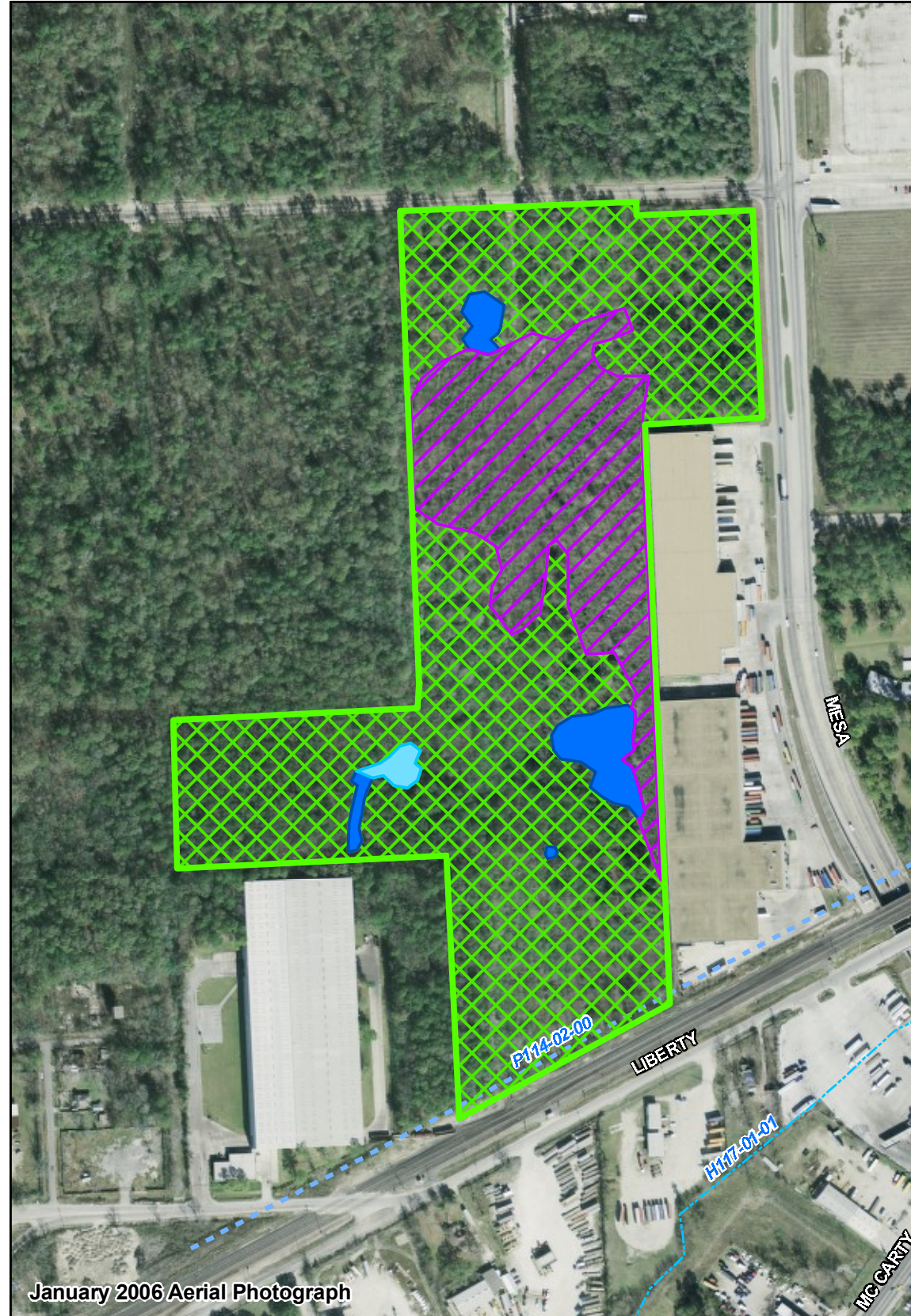
To provide flood damage reduction projects that work, with appropriate regard for community and natural values



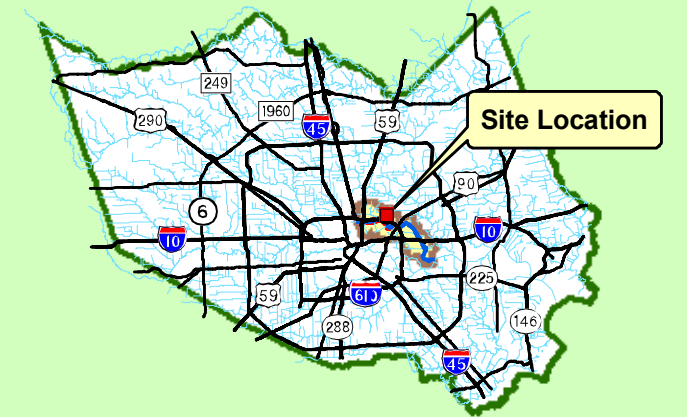
June 1, 2007

Proposed Disposal Site No. 6

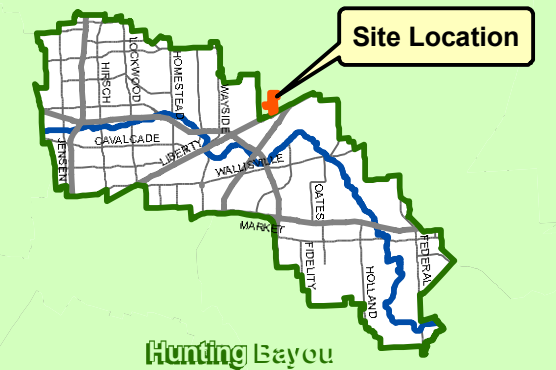
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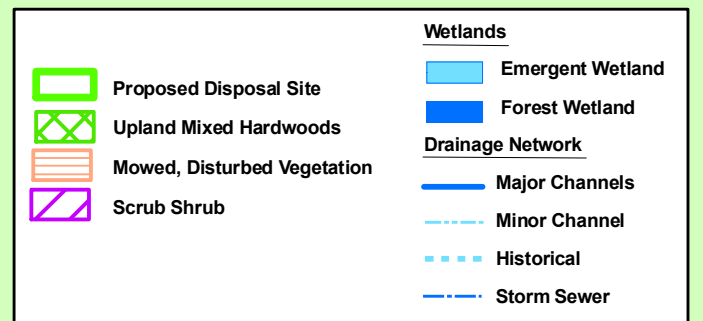
Harris County Vicinity Map



Watershed Vicinity Map

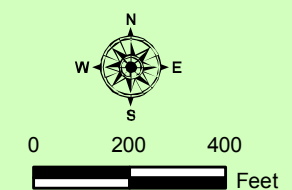


Legend



Mission Statement

To provide flood damage reduction projects that work, with appropriate regard for community and natural values



June 1, 2007

Appendix B

Coordination Letters



**United States Department of the Interior
FISH AND WILDLIFE SERVICE**

Division of Ecological Services
17629 El Camino Real #211
Houston, Texas 77058-3051
281-286-8282 FAX: 281-488-5882



August 22, 2008

Mr. Glen Laird, AICP
Environmental Service Department Manager
Harris County Flood Control District
9900 Northwest Freeway
Houston, TX 77092

Dear Mr. Laird:

This letter is in response to a request for comment on the final draft of the Hunting Bayou Federal Flood Control Project Fish and Wildlife Coordination Act Report (CAR), dated June 2008, written and submitted by PBS&J. The U.S. Fish and Wildlife Service (Service) has reviewed the CAR and is satisfied with the current revision as it has addressed all previously submitted comments.

The revised Department of the Interior Manual Instructions (503 DM 1), dated August 3, 1973, assign responsibility for Department of the Interior coordination and review of Department of the Army permit applications to the U.S. Fish and Wildlife Service (Service). Our comments are provided in accordance with these instructions and with the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661, et seq.), with the provisions of the Endangered Species Act of 1973 (87 Stat. 884, as amended; 16 U.S.C. 703 et seq.) and the Migratory Bird Treaty Act (40 Stat. 755, as amended; 16 U.S.C. 703 et seq.).

Thank you for the opportunity to review and comment on the CAR. Early coordination on future flood control projects between the Service and Harris County Flood Control District (HCFCD) will allow Service staff to develop and submit a CAR on those projects that require one. The rate of urban development in the Houston Metropolitan area has covered many thousands of acres of native prairie, wetlands, and bottomland forest, all productive and declining native wildlife habitat types, within the past 20 years. It is important that flood reduction projects such as the Hunting Bayou Federal Flood Control Project maximize opportunities to reverse this trend whenever possible. The Service recognizes and appreciates the efforts of HCFCD to minimize the impacts at Hunting Bayou and looks forward to coordination on this and other flood control projects in the future.

Please contact Donna Anderson at 281/286-8282 if you have any questions.

Sincerely,

for

Stephen D. Parris
Field Supervisor, Clear Lake ES Field Office

**TAKE PRIDE[®]
IN AMERICA**



United States Department of the Interior

FISH AND WILDLIFE SERVICE

Division of Ecological Services

17629 El Camino Real #211

Houston, Texas 77058-3051

281/286-8282 / (FAX) 281/488-5882



January 11, 2007

Colonel David C. Weston, Commander
Attn: Chief, Environmental Branch
US Army Corps of Engineers
PO Box 1229
Galveston, TX 77553

Dear Colonel Weston:

This Fish and Wildlife Planning Aid Letter (PAL) provides U.S. Fish and Wildlife Service (Service) input regarding wildlife resource impacts from the Hunting Bayou Flood Control Project. The proposed H500-01-00 detention basin site has been planned as an excavated detention basin for the upcoming Hunting Bayou Flood Control Project and was the site of recent (December, 2006) and past (April, 2002) interagency field trips. Because the proposed project is being undertaken by the Harris County Flood Control District (HCFD) as the project lead, we are also furnishing a copy of this PAL to HCFD to assist in their project design efforts.

The 135-acre proposed H500-01-00 detention basin site is an isolated site within the City of Houston. It lies north of IH Loop 610, east of Homestead Road, and west of Kirkpatrick Road. It is also bounded by a lateral drainage ditch feeding into Hunting Bayou, a railroad siding, and commercial development. Approximately 75 acre within the site is owned by HCFD and is proposed as the detention basin itself.

This site includes both remnant coastal prairie and forested wetlands. The tract appears to not have been previously ditched, drained, leveled, or plowed. Natural landscape features such as swales, flats, ridges, and pimple mounds are in evidence as is the near-absence of common invasive exotic plant species and the imported red fire ant. Dominant grasses and forbs observed in the prairie included *Muhlenbergia capillaris* (Gulf muhly), *Paspalum plicatulum* (brownseed paspalum), *Andropogon glomeratus* (bushy bluestem), *Andropogon gerardii* (big blue-stem), *Spartina spartinae* (Gulf cord-grass), *Carex microdonta* (little-toothed caric-sedge), *C. meadii* (Mead's caric-sedge), *Juncus acuminatus* (taper-tip rush), and *Arnoglossum plantagineum* (prairie Indian plantain). This vegetation association is typical of a type of original coastal prairie community (Rosen, unpublished data).

The prairie portion of the site is somewhat overgrown by woody species, mostly native but with an interspersed of invasive exotics such as *Triadica sebifera* (Chinese tallow-tree) and *Ligustrum sinense* (Japanese privet). These woody species could be easily controlled by mowing and fire management, were it decided to preserve the tract as a remnant native prairie. Common native shrub and tree species in the forested portion of the site include *Ilex vomitoria* (yaupon), *Ilex opaca* (American holly), *Ulmus crassifolia* (cedar elm), *Quercus virginiana* (live oak), *Carya illinoensis* (pecan), *Ilex decidua* (possumhaw), *Crataegus* spp. (hawthorn), *Morella cerifera* (southern wax-myrtle), *Ulmus americana*

TAKE PRIDE
IN AMERICA

Colonel David C. Weston
Attn: Chief, Environmental Branch
January 5, 2007
Page 2

(American elm), *Viburnum dentatum* (arrow-wood), and *Sabal minor* (dwarf palmeto). At least two shallow swales contained *Fraxinus pennsylvanica* (green ash), *Quercus phellos* (willow oak), dwarf palmetto, and *Taxodium distichum* (baldcypress).

The tract is relatively small, isolated, and fragmented, therefore its native wildlife value is somewhat diminished. Research on similar prairie and bottomland hardwood fragments has shown that native breeding bird, mammal, and herpetofaunal diversity is diminished when sites become fragmented below even a thousand acres in size, and particularly so when they are less than 100 acres. However, this tract retains the basic soils, topography, undisturbed nature, and seed bank necessary to rejuvenate good-quality native prairie. Plant diversity is not so directly related to tract size, and the recent development of most of the remaining large tracts of coastal prairie has made it advisable to identify and preserve the few remaining tracts as educational and conservation resources. Additionally, they serve important aesthetic, flood control, and air pollution buffering functions within an urban environment.

The Service usually recommends that tracts containing remnant plant communities of declining, high-quality ecotypes (such as coastal prairie, bottomland hardwood forest, cypress-tupelo swamps, etc.) be preserved intact. Even small sites can serve as important natural preserves in the midst of ever-expanding urban environments. However, due to the small, isolated nature of this tract and the difficulties in finding a suitable land steward, HCFD may not find this feasible. If this site cannot be preserved and managed intact, we recommend compensation in the form of purchase, creation, and management of a coastal prairie tract of at least 150 acres. A 2:1 mitigation ratio is recommended due to the time lag involved in creating or bringing to similar value another, possibly more degraded, site, plus the uncertainties involved in re-creating a coastal prairie ecotype. We can assist in site selection and in developing the restoration/management plan.

Thank you for the opportunity to assist in planning for this urban flood control project. The rate of development in the Houston Metropolitan Area has destroyed many thousands of acres of native prairie, wetlands, and bottomland forest, all productive and declining native habitats, within the past 20 years. It is important that flood control projects such as the Hunting Bayou Flood Control Project seek to reverse this trend whenever possible.

Please contact me or Phil Glass at 281/286-8282 for further clarification of our recommendations or for assistance in developing the mitigation plan.

Sincerely,



Stephen D. Parris
Field Supervisor, Clear Lake ES Field Office

cc:

Jennifer Dyke, Harris County Flood District, Houston, TX
Woody Woodrow, Texas Parks and Wildlife Department, Dickinson, Texas

RECEIVED

OCT 14 1998

Turner Collie & Braden Inc.

Engineers • Planners • Project Managers

USEWS ClearLake ES

P.O. Box 130089
Houston, Texas 77219-0089
5757 Woodway 77057-1599
713 780-4100
Fax 713 780-0838

October 9, 1998

Ms. Edith Erfling
U.S. Fish and Wildlife Service
17629 El Camino Real, Suite 211
Houston, TX 77058

A review of U.S. Fish and Wildlife Service files and your project information indicate that no federally listed or proposed threatened or endangered species are likely to occur at the project site.

Approved

Date

Edith Erfling
for Carlos H. Mendoza
Project Leader, Clear Lake ES Field Office
U.S. Fish and Wildlife Service
17629 El Camino Real, Suite 211
Houston, Texas 77058

Re: **Hunting Bayou Federal Flood Control Project**
TC&B Job No. 30-01390-001

Dear Ms. Erfling:

The purpose of this letter is to advise you that the Harris County Flood Control District (HCFCD) and the U.S. Army Corps of Engineers (USACE) have entered into a partnership to develop flood control concepts for the Hunting Bayou watershed. Our firm, Turner Collie & Braden Inc. (TC&B), has been contracted to perform engineering services for the project and to prepare an Environmental Impact Statement (EIS) to address the potential impacts of implementation of the proposed improvements. We are requesting documented consultation in regard to compliance with the Endangered Species Act of 1973.

Hunting Bayou is a major tributary of Buffalo Bayou generally located in the northeastern quadrant of the City of Houston about four to five miles from the central business district. The watershed drains about 18,600 acres, or 29 square miles. Communities and areas in the watershed include Galena Park, Jacinto City, and a part of northeast Houston in the vicinity of Loop 610. Hunting Bayou is about 16 miles in length and outfalls to Buffalo Bayou and the Houston Ship Channel about 8 miles upstream from the San Jacinto River.

Destructive flood events are a regular occurrence in the Houston metropolitan area. These events have affected the neighborhoods and businesses in the Hunting Bayou watershed. More than 200 residences in the Hunting Bayou watershed are identified as having repetitive flooding damages by the Federal Emergency Management Agency. Major flooding in Hunting Bayou has occurred in June 1976, April 1979, and during 1989. The causes of flooding are a combination of naturally intense rainfalls, highly impervious soils that restrict water absorption, the proximity to Galveston Bay, and land-surface subsidence in the area. Flooding affects property values, increases claims on insurance, causes disruption to the lives of its victims, and places demands on flood assistance agencies and emergency services. As many as 10,000 residences may be affected by a major flood in the Hunting Bayou watershed.

In 1988, the USACE published a Feasibility Report which identified a federal flood control project for Hunting Bayou. This project involved the recommended channelization of Hunting Bayou from its mouth upstream 14.3 miles, almost the entire length of the channel. Although the project was authorized by Congress in 1990, it has not been constructed. Only limited channel improvements have been made since 1990 by the HCFCD.



Turner Collie & Braden Inc.

Page 2

The proposed study is a result of implementation of the Water Resources Development Act of 1996. Section 211(f) authorized non-federal interests to undertake studies or design of flood control improvements to demonstrate the potential advantages and effectiveness of local implementation of federal flood control projects for three designated projects. Hunting Bayou was one of the projects selected for study. This legislation allows HCFCD to identify and recommend for implementation flood control projects that are effective, affordable, environmentally sound, and acceptable to the community. The basic objective of the study along the main stem of Hunting Bayou is to reduce flood risk to residential, commercial, and industrial areas. The attached newsletter provides an overview and background on the project, the project planning process to be followed, information on the Citizen Advisory Committee, and the project schedule. The attached exhibit depicts the Hunting Bayou watershed and vicinity.

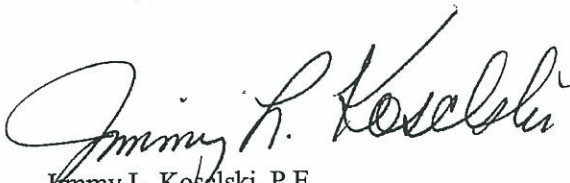
The EIS will address and evaluate alternative methods of providing flood control along Hunting Bayou. The conceptual alternatives currently being considered include: flood proofing, buyouts, channelization, detention, diversion, and levee construction. To aid us in our studies, we request that your agency identify any specific information, issues, or concerns that should be included in the EIS so we can accommodate or resolve those issues in the EIS. Also, we are requesting your assistance in obtaining specific information on the existing conditions for certain biological resources in the project area. Information we are interested in obtaining includes:

- A list of federal endangered and threatened species and species of special concern that do or could occur in the area under review.
- A list of common plant communities that exist in the area.

We will also be conducting several agency coordination meetings to keep you informed of our progress during the study. You will be notified of these meetings separately.

Should you be contacted by HCFCD/USACE personnel or representatives of our staff in connection with the preparation of the EIS, your assistance and cooperation would be greatly appreciated. If you have any questions, please feel free to contact me at (713) 267-2789.

Sincerely,



Jimmy L. Koselski, P.E.
Project Manager
Environmental Planning



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE

Southeast Regional Office
9721 Executive Center Drive North
St. Petersburg, FL 33702
(727) 570-5312, FAX 570-5517

NOV 17 1998

F/SER3:JBM

Jimmy L. Kosclski, P.E.
Project Manager, Environmental Planning
Turner Collie & Braden Inc.
P.O. Box 130089
Houston, Texas 77219-0089

Dear Mr. Kosclski:

This responds to your October 9, 1998 letter requesting a list of Federally-designated endangered and threatened species which may occur in Hunting Bayou, Houston, Texas. The enclosed list provides the threatened and endangered species under the jurisdiction of the National Marine Fisheries Service for the Texas marine environment. Although candidate species are not protected under the Endangered Species Act, concerns about their status indicate that they may warrant listing in the future. The fishes in this category are dusky, sand and night sharks; saltmarsh topminnow; and speckled hind, jewfish, Warsaw and Nassau groupers. Please consider these species during project planning, so that future listings may be avoided.

If you have any questions or if further assistance is needed to develop the Environmental Impact Statement for Hunting Bayou's watershed flood control project, please contact David Bernhart at 727-570-5312.

Sincerely,

Charles A. Oravetz
Chief, Protected Resources Division

Enclosure



Revised 1/12/98

**Endangered and Threatened Species and Critical Habitats
Under the Jurisdiction of the National Marine Fisheries Service**

Texas

Listed Species	Scientific Name	Status	Date Listed
Marine Mammals			
blue whale	<i>Balaenoptera musculus</i>	Endangered	12/02/70
finback whale	<i>Balaenoptera physalus</i>	Endangered	12/02/70
humpback whale	<i>Megaptera novaeangliae</i>	Endangered	12/02/70
right whale	<i>Eubalaena glacialis</i>	Endangered	12/02/70
sei whale	<i>Balaenoptera borealis</i>	Endangered	12/02/70
sperm whale	<i>Physeter macrocephalus</i>	Endangered	12/02/70
Turtles			
green sea turtle	<i>Chelonia mydas</i>	Threatened ¹	07/28/78
hawksbill sea turtle	<i>Eretmochelys imbricata</i>	Endangered	06/02/70
Kemp's ridley sea turtle (Atlantic)	<i>Lepidochelys kempii</i>	Endangered	12/02/70
leatherback sea turtle	<i>Dermochelys coriacea</i>	Endangered	06/02/70
loggerhead sea turtle	<i>Caretta caretta</i>	Threatened	07/28/78

Species Proposed for Listing

None

Proposed Critical Habitat

None

Designated Critical Habitat

None

¹ Green turtles are listed as threatened, except for breeding populations of green turtles in Florida and on the Pacific Coast of Mexico, which are listed as endangered.

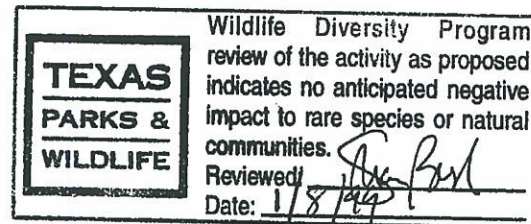
Turner Collie & Braden Inc.

Engineers • Planners • Project Managers

P.O. Box 130089
Houston, Texas 77219-0089
5757 Woodway 77057-1599
713 780-4100
Fax 713 780-0838

October 9, 1998

Ms. Shannon Breslin
Texas Parks and Wildlife Department
Biological and Conservation Data System
3000 South IH-35, Suite 100
Austin, TX 78704



Re: Hunting Bayou Federal Flood Control Project
TC&B Job No. 30-01390-001

Dear Ms. Breslin:

The purpose of this letter is to advise you that the Harris County Flood Control District (HCFCD) and the U.S. Army Corps of Engineers (USACE) have entered into a partnership to develop flood control concepts for the Hunting Bayou watershed. Our firm, Turner Collie & Braden Inc. (TC&B), has been contracted to perform engineering services for the project and to prepare an Environmental Impact Statement (EIS) to address the potential impacts of implementation of the proposed improvements. We are requesting documented consultation in regard to compliance with the Endangered Species Act of 1973.

Hunting Bayou is a major tributary of Buffalo Bayou generally located in the northeastern quadrant of the City of Houston about four to five miles from the central business district. The watershed drains about 18,600 acres, or 29 square miles. Communities and areas in the watershed include Galena Park, Jacinto City, and a part of northeast Houston in the vicinity of Loop 610. Hunting Bayou is about 16 miles in length and outfalls to Buffalo Bayou and the Houston Ship Channel about 8 miles upstream from the San Jacinto River.

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Turner Collie & Braden Inc.

Page 2

Congress in 1990, it has not been constructed. Only limited channel improvements have been made since 1990 by the HCFCD.

The proposed study is a result of implementation of the Water Resources Development Act of 1996. Section 211(f) authorized non-federal interests to undertake studies or design of flood control improvements to demonstrate the potential advantages and effectiveness of local implementation of federal flood control projects for three designated projects. Hunting Bayou was one of the projects selected for study. This legislation allows HCFCD to identify and recommend for implementation flood control projects that are effective, affordable, environmentally sound, and acceptable to the community. The basic objective of the study along the main stem of Hunting Bayou is to reduce flood risk to residential, commercial, and industrial areas. The attached newsletter provides an overview and background on the project, the project planning process to be followed, information on the Citizen Advisory Committee, and the project schedule. The attached exhibit depicts the Hunting Bayou watershed and vicinity.

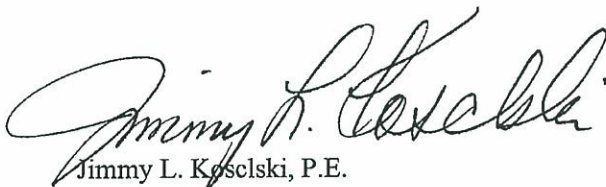
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- A list of common plant communities that exist in the area.

We will also be conducting several agency coordination meetings to keep you informed of our progress during the study. You will be notified of these meetings separately.

Should you be contacted by HCFCD/USACE personnel or representatives of our staff in connection with the preparation of the EIS, your assistance and cooperation would be greatly appreciated. If you have any questions, please feel free to contact me at (713) 267-2789.

Sincerely,



Jimmy L. Koselski, P.E.
Project Manager
Environmental Planning

Appendix C

Site Photographs

Appendix C – Site Photographs
Hunting Bayou Federal Flood Control Project
Fish and Wildlife Coordination Act Report



Photograph 1: Typical view of Hunting Bayou.



Photograph 2: Remnant prairie located within proposed off-line detention basin.

Appendix C – Site Photographs
Hunting Bayou Federal Flood Control Project
Fish and Wildlife Coordination Act Report



Photograph 3: Remnant prairie located within the proposed off-line detention basin.



Photograph 4: Remnant prairie located within the proposed off-line detention basin.

Appendix C – Site Photographs
Hunting Bayou Federal Flood Control Project
Fish and Wildlife Coordination Act Report



Photograph 5: Pine-hardwood forest located within the proposed off-line detention basin.



Photograph 6: Forested wetland located within the proposed in-line detention basin.

Appendix C – Site Photographs
Hunting Bayou Federal Flood Control Project
Fish and Wildlife Coordination Act Report



Photograph 7: Emergent wetland within the proposed in-line detention basin.



Photograph 8: Maintained right-of-way within the proposed off-line detention basin.

Appendix C – Site Photographs
Hunting Bayou Federal Flood Control Project
Fish and Wildlife Coordination Act Report



Photograph 9: Typical vegetation located within soil placement site 4.



Photograph 10: Typical vegetation located within soil placement sites 5A and 5B.

Appendix C – Site Photographs
Hunting Bayou Federal Flood Control Project
Fish and Wildlife Coordination Act Report



Photograph 11: Typical vegetation located within soil placement site 6.



Photograph 12: Typical vegetation located within soil placement site UP.

Attachment B

Biological Assessment



Hunting Bayou Federal Flood Control Project Biological Assessment

Prepared for

Harris County Flood Control District

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Section 1 – Background

The Hunting Bayou Federal Flood Control Project is a general re-evaluation of the Hunting Bayou element of the U.S. Army Corps of Engineers (USACE) Buffalo Bayou and Tributaries, Texas Flood Risk Reduction Project. The general re-evaluation was initiated by Harris County Flood Control District (HCFCD), acting as the Local Sponsor, in partnership with the USACE pursuant to Section 211(f) of the Water Resources Development Act of 1996. The re-evaluation study has resulted in the current recommended project consisting of 3.8 miles of channel widening and deepening to provide a trapezoidal, grass-lined channel. The channel project extent is between U.S. Highway 59 (US 59) and Wayside Drive, including a 75-acre Offline Detention Area north of the main channel between Homestead Road and Interstate Highway 610 (IH 610). An additional detention basins are under review: an 11-acre detention basin north of Liberty Road. The project also requires three disposal tracts to accommodate excavated soil placement – Disposal Areas 3, 4, and 5, including a 78-acre tract adjacent to the proposed Offline Detention Area. The natural environment within the recommended project area generally consists of fragmented, undeveloped land surrounded by urban residential and industrial development.

This biological assessment discusses two federally listed species on the threatened and endangered list. Texas prairie dawn (*Hymenoxys texana*), is known to occur within Harris County, Texas, and was listed as endangered on March 6, 1985 (*Federal Register*, Vol. 51, No. 49, March 13, 1986, pp. 8681 - 8683). The other federally listed species is the Bald Eagle (*Haliaeetus leucocephalus*). The Bald Eagle is known to occur in Harris County, Texas; however, it has been delisted and is being monitored for five years for all of the lower 48 states (*Federal Register*, Vol. 72, No. 130, July 9, 2007, pp. 37346 – 37372), except for the Sonoran Desert area within Arizona where it is listed as threatened, according to the U.S. Fish and Wildlife Service (USFWS).

This biological assessment discusses the likelihood that these two species would occur or have historically occurred within the areas of the Hunting Bayou Federal Flood Control Project. A discussion of the general habitat needs for each species is presented, followed by the likelihood of occurrence of each species within the project area. For this assessment, the project area has been divided into six locations:

1. Main Channel
2. Offline Detention and the and the Union Pacific Rail Road (UPRR) Disposal Area
3. Disposal Area 4 and the Proposed Detention Area
4. Disposal Area 5

Each of the six locations is discussed separately relative to the habitat potential for both the Bald Eagle and Texas prairie dawn.

Section 2 – Bald Eagle

General Habitat

Bald Eagles (*Haliaeetus leucocephalus*) are a North American species that historically occurred throughout the contiguous United States and Alaska. Males generally measure 3 feet from head to tail, weigh 7 to 10 pounds, and have a wingspan of 6 to 7 feet. Females are larger, some reaching 14 pounds, with a wingspan of up to 8 feet. Adults have a white head, neck, and tail and a large yellow bill. Immature Bald Eagles require 4 to 5 years to reach full adult plumage, with the distinctive head and tail feathers. During this time, immature Bald Eagles may be confused with immature Golden Eagles (*Aquila chrysaetos*) (Texas Parks and Wildlife Department [TPWD], 2010, *Habitat Management Guidelines for Bald Eagles in Texas* downloaded from <http://www.tpwd.state.tx.us/huntwild/wild/species/endang/animals/birds/index.phtml> on 1/27/10).

Between the 1870s and 1970s, the Bald Eagle population severely declined in the lower 48 states. However, the Bald Eagle population has rebounded and breeding territories have been re-established in each of the lower 48 states (USFWS, 2007, National Bald Eagle Management Guidelines downloaded from <http://www.fws.gov/pacific/eagle/NationalBaldEagleManagementGuidelines.pdf> on 1/27/10). In 2007, the USFWS removed the Bald Eagle from the list of threatened and endangered species under the Federal Endangered Species Act in all geographic areas except the Sonoran Desert Bald Eagle range, where it remains protected as a threatened species (72 *Federal Register* p. 37345, July 9, 2007). In Texas, the Bald and Golden Eagle Protection Act (Eagle Act) is the primary law protecting Bald Eagles.

Breeding Bald Eagles occupy “territories,” areas they will typically defend against intrusion by other eagles. In addition to the active nest, a territory may include one or more alternative nests (nests built or maintained by the eagles but not used for nesting). Bald eagles exhibit high nest site fidelity, and nesting territories are often used in consecutive years.

Nesting sites are generally near coastlines, rivers, large lakes, or streams that support an adequate food supply. Bald Eagles often nest in mature or old-growth trees, snags (dead trees), cliffs, rock promontories, rarely on the ground, and with increasing frequency on human-made structures such as power poles and communication towers. In forested areas, Bald Eagles often select the tallest trees with limbs strong enough to support a nest that can weigh more than 1,000 pounds. Nest sites typically include at least one perch with a clear view of the water where the eagles usually forage. Shoreline trees or snags located in reservoirs provide the visibility and accessibility needed to locate aquatic prey. Eagle nests are constructed with large sticks, and may be lined with moss, grass, plant stalks, lichens, seaweed, or sod. Nests are usually about 4 to 6 feet in diameter and 3 feet deep, although larger nests exist.

Nesting activity begins several months before egg-laying, which starts in the eastern half of Texas as early as the first part of October and can last until July with the fledging of the young (TPWD 2010). Young birds usually remain in the vicinity of the nest for several weeks after fledging, because they are almost completely dependent on their parents for food until they disperse from the nesting territory approximately 6 weeks later.

Bald Eagles are opportunistic feeders. Fish compose much of their diet, but they also eat waterfowl, shorebirds/colonial waterbirds, small mammals, turtles, and carrion. Because they are visual hunters, eagles typically locate their prey from a conspicuous perch, or soaring flight, then swoop down and strike.

During the breeding season, Bald Eagles are sensitive to a variety of human activities. However, not all Bald Eagle pairs react to human activities in the same way. Some pairs nest successfully just dozens of yards from human activity, while others abandon nest sites in response to activities much farther away. This variability may be related to a number of factors, including visibility, duration, noise levels, extent of the area affected by the activity, prior experiences with humans, and tolerance of the individual nesting pair. Bald eagles are most sensitive during courtship and the nest-building phase, and are moderately sensitive during the nesting period of their breeding season.

The TPWD has provided habitat management guidelines for Bald Eagles on their website <http://www.tpwd.state.tx.us/huntwild/wild/species/endang/animals/birds/index.phtml>. The guidelines reference two zones relative to a nest site. The primary zone is an area extending 750 to 1,500 feet from a nest site where specific activities should not occur, such as habitat alteration or change of land use, use of chemicals labeled as toxic to fish and wildlife, etc. A secondary management zone of an additional 750 feet to 1 mile is also established to protect the integrity of the primary zone and to protect important feeding areas.

Onsite Inspection and Historical Review

During the site visits for wetland delineation and habitat analysis, at each of the six locations no Bald Eagles were observed. No large mature or old growth trees that are large enough to support eagle nests were observed. No nearby water bodies large enough to support the aquatic prey that Bald Eagles require were observed. The closest large waterbody that clearly supports adequate aquatic prey is Lake Houston, which is located more than 10 miles to the northeast of the project area. Hunting Bayou in the project area is not large enough or deep enough to support the medium to large fish and other aquatic prey Bald Eagles require.

Main Channel

The main channel of Hunting Bayou is located within a densely urbanized section of Houston. Review of historical aerial photographs show that Hunting Bayou was channelized before 1930, and subdivisions on both sides of the upper portion of the main channel were constructed during the 1940s. Today, the average width and depth of the main channel area ranges from less than 10 feet wide and less than 1 foot deep in the upper section of the project area, to less than 30 feet wide and an average of approximately 2 feet deep just downstream of Wayside Drive. There are a few pools over 4 feet deep scattered below IH 610, but are not large or numerous enough to support medium to large fish and other aquatic prey that Bald Eagles require. The majority of the Hunting Bayou stream banks, with the exception of a few sections within the downstream segment of the project area, are maintained by mowing. The few sections that are not mowed have few trees occurring near the water's edge. The trees include mulberry (*Morus rubra*), hackberry (*Celtis laevigata*), box elder (*Acer negundo*), and black willow (*Salix nigra*).

The southern bank of the main channel area east of Homestead Road and between the southern top of bank of Hunting Bayou to the adjacent development, has mixed hardwood forest and open areas that are routinely mowed. None of this forested section has mature old growth trees. The north bank drainage along the eastern boundary of the existing Homestead Road was a natural channel in 1930 and was likely channelized in association with construction of the Homestead Road bridge, which occurred between 1930 and 1944. This drainage was moved to its present location (farther west) before 1976 and was probably associated with the landfill that was between the north bank of Hunting Bayou and the railroad tracks east of Homestead Road. The landfill was abandoned before 1978.

The southern bank area east of Homestead Road was mostly forested until sometime between 1944 and 1950, when the majority of the trees were removed. A drainage ditch was added that crossed

the eastern half of this area and appears to be associated with the construction of IH 610, the North Loop. A large pond created between 1979 and 1984 is probably associated with construction of the warehouses along the southern boundary of the southern bank area. This left a small group of trees along the southwestern boundary of the southern bank area, which was removed when a road was constructed that connected the warehouse area to Homestead Road before 1995. As previously stated, the section of Hunting Bayou that is east of Homestead Road is not large enough to support an adequate aquatic prey population that Bald Eagles require. No Bald Eagles were observed during site visits for wetland delineation or habitat analysis. Site visits to the main channel occurred June 4, 5, 9, and 10, 2008 for Stream Physical Habitat Assessment. The site visits for Fringe Wetland Survey occurred May 15 through May 17, 2007 and for Habitat Assessment occurred July 1 through July 15, 2008.

Offline Detention and the UPRR Disposal Area

The Offline Detention and UPRR Disposal Area is a mixture of mixed hardwoods and loblolly pine, scrub-shrub, overgrown prairie, and new detention area and disposal area that was constructed in 2009 and therefore is not shown in. A few mature oak trees were observed along the western section of the Offline Detention Area along a remnant swale. No Bald Eagles were observed within the Offline Detention or the UPRR Disposal Area during site visits for wetland delineation and habitat analysis. The 1930 aerial photograph shows both areas as open fields. The 1944 aerial photograph shows a few trees located along the remnant swale and the remainder of the area is open fields. The 1950, 1984, 1995, 2004, 2006, and 2008 aerial photographs show a progression over time from open fields to mixed forest, scrub-shrub, and overgrown prairie. Historically, this is not quality habitat for Bald Eagles. Site visits to the Offline Detention Area and the UPRR Disposal Area occurred between April 2 and April 21, 2008 for habitat review, and on November 13, 2006 by Dr. Larry Brown for Texas prairie dawn review.

Disposal Area 4 and the Proposed Detention Area

Disposal Area 4 is currently an open field that historically has been used as a soil disposal site. There are no mature trees within the disposal site. The proposed detention area is currently used by a concrete plant. Both areas have been used as disposal sites or as a concrete facility since 1995. Open fields that do not have nearby tall trees or open water that is large enough to support an adequate aquatic prey population are not quality Bald Eagle habitat. No Bald Eagles were observed within either area during site visits for wetland delineation and habitat analysis. Site visits to Disposal Area 4 and the Proposed Detention Area occurred during July 2008 for wetland review and habitat assessment, and on May 12, 2010 by Dr. Larry Brown for Texas prairie dawn.

Disposal Area 5

Disposal Area 5 is an open pasture. A few trees are located just west of the corrals and other farm buildings located long the area's eastern boundary. The 1930, 1944, 1950, and 1984 aerial photographs show the area as open fields. The 1995, 2004, 2006, and 2008 aerial photographs show a slow progression over time from open fields to fields with scrub-shrub. No Bald Eagles were observed within the area during site visits for wetland delineation and habitat analysis. Site visits to Disposal Area 5 occurred on June 14, 2006 for wetland review, and on May 12, 2010 by Dr. Larry Brown for Texas prairie dawn review.

Bald Eagle Summary

The onsite review and historical review indicate that there is no Bald Eagle habitat available within the Hunting Bayou Federal Flood Control Project area. The main channel of Hunting Bayou, the Offline Detention Area, and UPRR Disposal Area are located within a densely urbanized section of Houston. Disposal Area 4 has no mature old growth trees and the proposed detention area is currently used by a concrete plant. Disposal Area 5 is an open pasture. Without the presence of Bald Eagles the proposed Hunting Bayou Federal Flood Control Project would not affect this species.

Section 3 – Texas Prairie Dawn

General Habitat

Texas prairie dawn (*Hymenoxys texana*) is a small taprooted annual plant that is only 2 to 8 inches tall. Its basal leaves are spoon-shaped and may have toothed margins. The smaller alternate leaves on the branching stem are narrow and untoothed. On March 6, 1985 (*Federal Register*, 1985, Vol. 50, No. 44, March 6, 1985, pp. 9095 – 9097), Texas prairie dawn was proposed for listing as an endangered species. The proposed rule stated that the main threat to prairie dawn is habitat destruction, and that it is especially vulnerable to accidental disturbance. Therefore, without proper protection planning, this species is subject to possible elimination. Commercial trade of Texas prairie dawn is not known to exist; however, the potential exists for uncontrolled collecting and vandalism. The proposed rule stated that the preferred action is to list Texas prairie dawn as endangered without critical habitat. At the time of the proposed rule, Texas prairie dawn was not known to exist on federal lands. The final rule was published in the *Federal Register* on March 13, 1986 (*Federal Register*, 1986, Vol. 51, No. 49, March 13, 1986, pp. 8681 – 8683).

The USFWS published the recovery plan for Texas prairie dawn in 1989 (*USFWS*, 1989, *Hymenoxys texana* Recovery Plan, pp 53.) and approved the plan on April 13, 1990. The recovery criteria for Texas prairie dawn are the following:

“*Hymenoxys texana* can be downlisted to threatened when at least 50 separate populations, each occupying at least 1 hectare (2.47 acres) of suitable habitat are discovered or established, and when these 50 populations are protected from land use practices or land use changes that could destroy the populations. *Hymenoxys texana* can be delisted when management practices are established that ensure the numbers of plants at protected populations will remain stable. Since many questions about the biology and habitat requirements of *Hymenoxys texana* remain unanswered, it may be necessary to modify the downlisting and delisting criteria as additional information is obtained.”

The recovery plan states the following major steps are needed for Texas prairie dawn to recover:

- Maintaining present populations on public lands through effective agency planning and habitat management
- Maintaining present populations on private land through landowner cooperation and habitat management
- Studying propagation and establishing a botanical garden population
- Searching for additional populations in natural habitat, if needed
- Obtaining biological information needed for effective management
- Developing public support of preservation of Texas prairie dawn

The recovery plan states that the Texas prairie dawn has been found on Houston Community College property on a site that was used as a football field, and this site is maintained by mowing. The recovery plan states that the USACE has found 11 sites in two federally-owned reservoirs—Addicks and Barker Reservoirs—located in western Harris County, Texas. The recovery plan states that Harris County's Mercer Arboretum and Botanic Gardens has successfully propagated Texas prairie dawn from seed. Anita Tiller, botanist with Mercer Arboretum and Botanic Gardens, stated that they have routinely grown prairie dawn in their greenhouses to maintain the seed viability and for public education (Anita Tiller, telephone interview, January 28, 2004).

Texas prairie dawn has been associated with a specific type of saline, sandy mound. These mounds have been called by various names, including "mima mounds" or "pimple mounds." The mounds are typically barren areas that are sparsely vegetated. The soil chemistry, morphology, and taxonomy of these mounds have not been well determined. Discussions with local soil specialists (Glen Chervenka, telephone interview January 28, 2004; Gerald W. Crenwelge, telephone interview February 24, 2004) indicated the best information on these types of mounds is a master's thesis by S. M. Starowitz (Starowitz, S.M. 1994. *A Study of Aquic Conditions in a Microtoposequence of Seasonally Wet Soils on the Texas Coast Prairie*, M.S. Thesis, Texas A&M.). Starowitz reviewed the soils and hydrology of small mounds that appear to be similar to the mounds that are associated with Texas prairie dawn. The mounds studied are located on uncultivated pasture in western Harris County, Texas, and represent an area that has not been previously drained or cultivated. This site is 8 to 15 miles north of existing populations of Texas prairie dawn in Addicks and Barker Reservoirs. The area of study was chosen for the following reasons:

1. Minimum disturbance
2. Presence of microtopographic landforms
3. Existence of soil bodies that are extensive on the Texas Coast Prairie

Starowitz's conclusions indicate that the differences in the soil profile and chemistry among the mounds, intermounds, and depressions have caused differences in rates of water flow through and between these areas of different soils. The flow rates also reverse during the year as the ratio between precipitation and evapotranspiration changes. When precipitation exceeds evapotranspiration, the water flow is away from the mounds to the underlying water table, which is connected to the perched water table of the intermound and depression areas. When evapotranspiration is higher than precipitation, the water flow is away from the depression area down to the perched water table, across the intermound area to the mound area and lower water table. This hydrological system causes the intermound zone to have elevated levels of sodium and soluble salts since the evapotranspiration within the intermound concentrates them. Starowitz's work used a series of open pipes to monitor water levels (piezometers); tensiometers that measure water saturation within the soil column; and platinum electrodes to measure redox potential, or the amount of reduction/lack of oxygen in the soil column. Starowitz summarizes:

...the mound is the driving force for hydric changes of the microtoposequence, since it has a continuous water table (endosaturation) to about 4.5 m. Both the intermound and depression have perched water tables (episaturation). Water flows from areas of upper elevation to lower areas via surface flow and groundwater flow in the direction of the depression during the portions of the year when precipitation exceeds evapotranspiration. Discharge is therefore depression focused. When evapotranspiration exceeds precipitation the movement of water is focused in the opposite direction, where recharge moves in the direction of the mound (from highest to lowest soil water potential). The latter explains the elevated sodium levels and soluble salts found in intermound subsoils (Thesis, pp 96 and 100).

Both the intermound and depression sites have low permeability in the subsoil due to moderately fine textures. The intermound and depression sites also have low permeability, due to the high exchangeable sodium levels (sodium absorption ratios and exchangeable sodium percentages above 13 and 15 percent, respectively) that caused dispersed clays to clog pores and limit throughflow. All soils had coarser textures in the lower portions of the horizons (below 350 cm), which caused an occluded aquifer in the intermound and depression areas where the water flow was confined by a slowly permeable aquitard at the upper contact and below by stratified coarse, fine sequence of parent materials.

Gerald W. Crenwelge, retired soil scientist with the Natural Resources Conservation Service (NRCS), (telephone interview, February 24, 2004), stated this is a reasonable explanation of how saline intermounds occur, and is probably how the mima or pimple mounds that are associated with Texas prairie dawn hydrologically function; however, specific research on mounds associated with Texas prairie dawn has not been conducted.

Elevated sodium and soluble salts appear to be an important criterion for the long-term survival of Texas prairie dawn, because this endangered plant is typically found growing either on top or along the base of these saline dense sandy mounds. Discussions with Dr. Larry Brown, a local plant taxonomist, indicate that in areas that are not barren, Texas prairie dawn has a difficult time competing with other vegetation (Personal interview, January 27, 2004). Dr. Brown, Jackie M. Poole (1988 Texas Natural Heritage Program review letter to USFWS [USFWS 1989]), and Charles Travis (1988 TPWD review letter to USFWS [USFWS 1989]) state that Texas prairie dawn appears to tolerate the elevated sodium and soluble salts that are associated with these mounds. Therefore, if the elevated sodium and soluble salts are important, then the surface and subsurface hydrology is also an important factor that needs to be preserved for the long-term survival of Texas prairie dawn. Disturbance of the surface and subsurface hydrology of the mima mound areas would probably remove the elevated sodium and soluble salts and therefore remove the available Texas prairie dawn habitat.

Onsite Inspection and Historical Review

During the site visits to each of the six locations for wetland delineation and habitat analysis, no Texas prairie dawn, associated species such as *Sporobolus pyramidatus*, *Willkommia texana* var. *texana*, *Chloris texensis*, *Rayjacksonia aurea*, and *Thurovia triflora*, or Texas prairie dawn's typical habitat, mima mounds, were observed. Dr. Larry Brown, a local plant taxonomist and co-author of the Texas prairie dawn recovery plan, also conducted site visits on November 11 and 12, 2006 to the Offline Detention and UPRR Disposal Area, and on May 9 and 12, 2010 to Disposal Areas 3, 4 and Proposed Detention, Area 5.

Historically, only two areas, Disposal Area 4, and the Offline Detention and UPRR Disposal Area had small white photographic signatures that may indicate that mima mounds may have been present. However, both of these sites have been altered to such an extent that there is no indication, i.e., no white photographic signatures, and no field expression of mima mounds or typical Texas prairie dawn habitat. Field visits revealed that these sites do not exhibit typical Texas prairie dawn habitat. Disposal Area 4 has been used as a fill area and industrial site, leaving no original natural areas. The Offline Detention and UPRR Disposal Area has become overgrown with mixed forest, scrub-shrub, and overgrown prairie.

Main Channel

The main channel appears to have been channelized before 1930. Review of the 1930, 1944, 1950, 1984, 1995, 2004, 2006, and 2008 aerial photographs does not indicate any mima mounds within the

main channel area. No Texas prairie dawn or its typical habitat was observed within the area during site visits for wetland delineation and habitat analysis. Site visits to the main channel occurred June 4, 5, 9, and 10, 2008 for Stream Physical Habitat Assessment and May 15 through May 17, 2007 for Fringe Wetland Survey. Site visits to the channel east of Homestead Road occurred July 1 through July 15, 2008 for Habitat Assessment.

Offline Detention and the UPRR Disposal Area

The 1930 and 1944 aerial photographs show a large number of white circular to semi-circular areas, which may have indicated mima mounds. These white areas are faded in the 1950 aerial photograph and have disappeared in the 1984 aerial photograph. The area was altered by construction of a wastewater treatment facility that has since been removed, an unimproved road with drainage ditches near the center of the area, and an abandoned unimproved road and its drainage ditches approximately 400 feet from the eastern property boundary. The 1950, 1984, 1995, 2004, 2006, and 2008 aerial photographs show a progression over time from open fields to mixed forest, scrub-shrub, and overgrown prairie. None of these are typical habitat for Texas prairie dawn. No Texas prairie dawn or its typical habitat was observed within the areas during site visits for wetland delineation and habitat analysis. Site visits to the Offline Detention Area and the UPRR Disposal Area occurred between April 2 and April 21, 2008 for wetland and habitat review, and on November 13, 2006 by Dr. Larry Brown for Texas prairie dawn review. Dr. Brown confirmed that Texas prairie dawn was not present.

Disposal Area 4 and the Proposed Detention Area

Disposal Area 4 is currently an open field that historically has been used as a soil disposal site; the proposed detention area is currently a concrete plant. The 1930 and 1944 aerial photographs show photographic signatures (white spots) that may have been mima mounds within the southwestern one-third of the area. Since before 1950, this area has been used as an earthen fill site that included the entire area, as shown in the 1995 photograph. Disturbance or burial of the original soil profiles typically destroys the habitat of Texas prairie dawn. No Texas prairie dawn or its typical habitat was observed within the area during site visits for wetland delineation and habitat analysis. Site visits to Disposal Area 4 and the Proposed Detention Area occurred during July 2008 for wetland review and habitat assessment and on May 12, 2010 by Dr. Larry Brown for Texas prairie dawn review. Dr. Brown confirmed that Texas prairie dawn was not present.

Disposal Area 5

Disposal Area 5 is an open pasture with corrals and other farm buildings located on the eastern end of the area. The 1930, 1944, and 1950 aerial photographs do not indicate any photographic signatures (white spots) that are typical for mima mounds. The 1995, 2004, 2006, and 2008 aerial photographs show a slow progression over time from open fields to fields with scrub-shrub. No Texas prairie dawn or its typical habitat was observed within the area during site visits for wetland delineation and habitat analysis. Site visits to Disposal Area 5 occurred on June 14, 2006 for wetland review, and on May 12, 2010 by Dr. Larry Brown for Texas prairie dawn review. Dr. Brown confirmed that Texas prairie dawn was not present.

Texas Prairie Dawn Summary

Review of historical aerial photographs indicated only two areas had small white photographic signatures that may indicate that mima mounds may have been present. However, both Disposal Area 4 and the Offline Detention Area and the UPRR Disposal Area have been altered to such an extent that no white photographic signatures are present in the recent aerial photographs. No Texas prairie dawn or its typical habitat was observed during site visits for wetland review and habitat assessment within the proposed Hunting Bayou Federal Control Project. Dr. Brown confirmed that Texas prairie dawn is not present within these areas. Since Texas prairie dawn is not present, the proposed Hunting Bayou Federal Flood Control Project would not affect the continued existence of this species.

Section 4 – Determination of Effects

During the site visits and historical review of the Hunting Bayou Federal Flood Control Project, no appropriate habitat was observed for the Bald Eagle or for Texas prairie dawn. No Bald Eagle nests or Bald Eagles were observed. Dr. Brown did not observe Texas prairie dawn (or its typical habitat) and concluded that Texas prairie dawn is not present within the sites reviewed. Without appropriate habitat for the Bald Eagle or for Texas prairie dawn, there is no effect of the Hunting Bayou Federal Flood Control Project on these two federally listed species.

Attachment C

Environmental Justice Analysis

ATTACHMENT 5
Environmental Justice Analysis
Percent Minority and Low-Income Population in Areas of ROW Acquisition

Census 2010 Geographic Areas	Population	Ethnicity/Race Percentages				Hispanic/ Latino (of any race)	Percent Minority	Percent Below Poverty
		White	Black/ African American	Asian	Other			
City of Houston	2,099,451	25.6	23.1	5.9	1.5	43.9	74.4	21.5
Harris County	4,092,459	33.0	18.4	6.0	1.7	27.7	67.0	17.3
<i>Census Tracts and Blocks within TSP Project Area</i>								
Census Tract 2109	1,620	2.2	73.8	1.2	0.5	22.3	97.8	44.7
Block 1000	0	0	0	0	0	0	0	--
Block 1003	15	20.0	60.0	0	0	0	80.0	--
Block 1004	21	0	52.4	0	47.6	0.0	100.0	--
Block 1005	5	0	0	0	0	100.0	100.0	--
Block 1006	84	0	82.3	0	1.2	16.7	100.0	--
Block 1007	32	0	81.3	0	0	18.7	100.0	--
Block 1014	51	2.0	86.3	0	0	11.7	98.0	--
Block 1015	0	0	0	0	0	0	0	--
Block 2002	12	0	100.0	0	0	0	0	--
Block 2003	20	0	20.0	0	0	80.0	100.0	--
Block 2004	31	0	83.9	0	0	16.1	100.0	--
Block 2005	31	0	87.1	0	0	12.9	100.0	--
Block 2006	31	0	64.5	0	0	35.5	100.0	--
Block 2007	4	0	100.0	0	0	0	100.0	--
Block 2008	14	0	100.0	0	0	0	100.0	--
Block 2009	17	5.9	70.6	0	0	23.5	94.1	--
Block 2011	58	1.7	86.2	0	0	12.1	98.3	--
Census Tract 2112	2,831	1.0	64.3	0.3	0.7	33.6	98.9	49.6
Block 1001	6	0	100.0	0	0	0	100.0	--
Block 1003	103	0	92.2	0	1.0	6.8	100.0	--
Block 1004	32	0	87.5	0	0	12.5	100.0	--
Block 1005	13	0	61.5	0	0	38.5	100.0	--
Block 1006	8	0	100.0	0	0	0	100.0	--
Block 1007	36	5.6	86.1	0	0	8.3	94.4	--
Block 1008	20	30.0	35.0	0	0	35.0	70.0	--

Census 2010 Geographic Areas	Population	Ethnicity/Race Percentages				Hispanic/ Latino (of any race)	Percent Minority	Percent Below Poverty
		White	Black/ African American	Asian	Other			
Block 1011	0	0	0	0	0	0	0	--
Block 1015	80	2.5	92.5	0	2.5	2.5	97.5	--
Census Tract 2117	3,886	1.1	66.6	0.1	1.2	31.0	98.9	34.9
Block 1000	0	0	0	0	0	0	0	--
Block 1001	0	0	0	0	0	0	0	--
Block 1002	0	0	0	0	0	0	0	--
Block 1004	0	0	0	0	0	0	0	--
Block 1012	104	0	73.1	0	0	26.9	100.0	--
Block 1014	153	0	88.2	0	0.7	11.1	100.0	--
Block 1018	56	0	64.3	0	0	35.7	100.0	--
Block 2005	0	0	0	0	0	0	0	--
Block 2006	0	0	0	0	0	0	0	--
Block 2007	0	0	0	0	0	0	0	--
Block 2015	0	0	0	0	0	0	0	--
Block 2030	0	0	0	0	0	0	0	--
Block 2031	0	0	0	0	0	0	0	--
Block 2032	0	0	0	0	0	0	0	--
Block 2033	0	0	0	0	0	0	0	--
Block 2034	0	0	0	0	0	0	0	--
Block 2048	0	0	0	0	0	0	0	--
Tract 2124	3,216	2.5	5.8	0.2	0.7	90.8	97.5	28.4
Block 2001	0	0	0	0	0	0	0	--
Block 2005	4	0	0	0	0	100.0	100.0	--
Block 2008	0	0	0	0	0	0	0	--
Block 2009	0	0	0	0	0	0	0	--
Block 2010	0	0	0	0	0	0	0	--
Block 2051	10	0	50.0	0	0	50.0	100.0	--
Block 2055	0	0	0	0	0	0	0	--
Tract 2302	5,054	2.2	83.8	0.2	1.2	12.6	97.8	23.7
Block 1000	4	50.0	50.0	0	0	0	50.0	--
Block 1001	0	0	0	0	0	0	0	--
Block 1009	0	0	0	0	0	0	0	--
Block 1010	0	0	0	0	0	0	0	--

Census 2010 Geographic Areas	Population	Ethnicity/Race Percentages				Hispanic/ Latino (of any race)	Percent Minority	Percent Below Poverty
		White	Black/ African American	Asian	Other			
Block 1011	0	0	0	0	0	0	0	--
Block 1013	0	0	0	0	0	0	0	--
Block 1039	0	0	0	0	0	0	0	--
Block 1040	0	0	0	0	0	0	0	--
Block 1041	0	0	0	0	0	0	0	--
Block 3017	0	0	0	0	0	0	0	--
Block 5015	0	0	0	0	0	0	0	--
Block 5016	34	0	76.5	0	14.7	0	8.8	--
Block 5017	57	0	100.0	0	0	0	100.0	--
Block 5018	0	0	0	0	0	0	0	--
Block 5019	0	0	0	0	0	0	0	--
Block 5020	0	0	0	0	0	0	0	--
Block 5021	0	0	0	0	0	0	0	--
Block 5022	0	0	0	0	0	0	0	--
Block 5023	0	0	0	0	0	0	0	--
Block 5024	0	0	0	0	0	0	0	--
Block 5025	0	0	0	0	0	0	0	--
Block 5026	0	0	0	0	0	0	0	--
Block 5027	0	0	0	0	0	0	0	--
Block 5028	0	0	0	0	0	0	0	--
Block 5029	0	0	0	0	0	0	0	--
Block 5030	0	0	0	0	0	0	0	--
Block 5031	0	0	0	0	0	0	0	--
Block 5033	0	0	0	0	0	0	0	--
Block 5034	0	0	0	0	0	0	0	--
Block 5035	0	0	0	0	0	0	0	--
Block 5036	0	0	0	0	0	0	0	--
Block 5037	0	0	0	0	0	0	0	--
Block 5038	0	0	0	0	0	0	0	--
Block 5035	0	0	0	0	0	0	0	--
Block 5039	0	0	0	0	0	0	0	--
Block 5041	0	0	0	0	0	0	0	--
Block 5043	0	0	0	0	0	0	0	--

Census 2010 Geographic Areas	Population	Ethnicity/Race Percentages				Hispanic/ Latino (of any race)	Percent Minority	Percent Below Poverty
		White	Black/ African American	Asian	Other			
Block 5044	0	0	0	0	0	0	0	--
Block 5045	0	0	0	0	0	0	0	--
Block 5046	0	0	0	0	0	0	0	--
Block 5047	0	0	0	0	0	0	0	--
Block 5051	0	0	0	0	0	0	0	--
Block 5052	0	0	0	0	0	0	0	--
Tract 2326	3,000	14.4	7.5	0.1	1.1	76.9	85.6	4.8
Block 1000	36	11.1	16.7	0	0	72.2	88.9	--
Block 2000	539	12.2	15.2	0	1.5	71.1	87.8	--
TSP (96 Block Total)	1,721	5.1	58.7	0	0.9	35.3	94.9	--
TSP (7 Tract Total)	24,336	4.2	48.8	0.2	0.9	45.7	95.8	28.7

Source: U.S. Census Bureau 2010, and American Community Survey.