Draft Environmental Assessment

City of Houston Parks Hazardous Fuels Reduction HMGP-DR-1999-0034

Harris and Fort Bend Counties, Texas

November 2013

Federal Emergency Management Agency
Department of Homeland Security
500 C Street, SW
Washington, DC 20472

FEMA

This document was prepared by

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Contract No.: HSFEHQ-09-D-1128

Task Order: HSFE60-13-J-0003

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Acronyms and Abbreviations

ACHP	Advisory Council on Historic Preservation
APE	area of potential effect
AQCR	air quality control regions
Atlas	Texas Archeological Sites Atlas
BGEPA	Bald and Golden Eagle Protection Act
BMPs	best management practices
CAA	Clean Air Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CMZ	Coastal Management Zone
CWA	Clean Water Act
EA	environmental assessment
EIS	environmental impact statement
EO	Executive Order
EPA	United States Environmental Protection Agency
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FIRM	flood insurance rate map
FONSI	finding of no significant impact
GLO	Texas General Land Office
HMGP	Hazard Mitigation Grant Program
in/hr	inch(es) per hour
MBTA	Migratory Bird Treaty Act
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act

NHPA	National Historic Preservation Act
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NWI	National Wetlands Inventory
OSHA	Occupational Safety and Health Administration
PARD	Parks and Recreation Department
RCRA	Resource Conservation and Recovery Act
SARA	Superfund Amendments and Reauthorization Act
SHPO	state historic preservation officer
TCEQ	Texas Commission on Environmental Quality
THC	Texas Historical Commission
TMDL	total maximum daily load
TPWD	Texas Parks and Wildlife Department
TSCA	Toxic Substances Control Act
TWDB	Texas Water Development Board
USACE	United States Army Corps of Engineers
U.S.C.	United States Code
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
WIID	Water Information Integration and Dissemination System

SECTION 1 Introduction

The City of Houston proposes to perform hazardous fuels reduction in seven city parks to reduce wildfire hazard in residential areas near wooded areas in the parks. The seven targeted neighborhood parks represent a potential direct wildfire threat to nearby residences and businesses (**Figure 1.1**). The City of Houston submitted an application to the Federal Emergency Management Agency (FEMA) through the Texas Division of Emergency Management (TDEM) for a grant under FEMA's Hazard Mitigation Grant Program (HMGP). The TDEM is the direct applicant for the grant, and the City of Houston is the subapplicant.

The HMGP is authorized under Section 404 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act. Under the HMGP, federal funds pay 75 percent of the project cost, and the remaining 25 percent comes from nonfederal funding sources.

The City of Houston Parks and Recreation Department (PARD) would plan, execute, and monitor all activities required to create reduced-fuel buffer zones around residential and non-residential structures through removal or reduction of flammable vegetation in the parks, including removal of trees, tree branches and understory vegetation to increase vertical clearance. The proposed fuels reduction also involves minimizing the volume of surface fuel, such as dry leaves, pine needles, dead and dying foliage, and fallen trees. The city anticipates that the proposed fuels reduction buffer zones would generally be approximately 100 feet wide, but the required radius of fuel reduction around homes and businesses would be established by the Houston Fire Department and would be directly related to the degree of fire hazard.

The project would be performed on the ground surface of each park. Tracked cutting equipment would be used for clearing of understory areas. Tree stumps would be ground to level the stump with the surrounding ground. Debris produced by the proposed activities and some preexisting debris that would be present would be recycled into mulch and distributed throughout the park. For large tree and limb cutting, heavy equipment would be used to transfer heavy debris to the "Living Tree Center," a city recycling facility. Additional details on the existing vegetation at the seven park sites and on the equipment to be used for vegetation removal and management of debris are provided in Section 3.

Six of the seven targeted parks are in Harris County, and one is in Fort Bend County, as shown in **Figure 1.1**. Coolgreen Corridor, Cullinan JS & LH, Herman Brown, Hogg Bird Sanctuary, Keith-Wiess, and Woodland parks are in Harris County while Cullinan Park at Oyster Creek is in Fort Bend County. The proposed project areas total 71 acres (see **Appendix A** for maps of each park), with Herman Brown Park having the largest project area (26 acres) and Woodland Park and Hogg Sanctuary Park having the smallest area (less than 3 acres).

Figure 1.1. Proposed Project Locations and Surrounding Area

This environmental assessment (EA) has been prepared in accordance with the National Environmental Policy Act (NEPA) of 1969, the President's Council on Environmental Quality regulations to implement NEPA (40 Code of Federal Regulations [CFR] Parts 1500-1508), and the Federal Emergency Management Agency's (FEMA's) regulations implementing NEPA (44 CFR Part 10). FEMA is required to consider and evaluate potential environmental impacts before funding or approving actions and projects. The purpose of this EA is to analyze the potential environmental impacts of the proposed City of Houston Parks and Recreation Department (PARD) hazardous fuels reduction project. FEMA will use the findings in this EA to determine whether to prepare an environmental impact statement (EIS) or a finding of no significant impact (FONSI).

SECTION 2 Purpose and Need

FEMA's HMGP provides funds to state and local governments to implement long-term hazard mitigation measures after a major disaster declaration. The purpose of the HMGP is to reduce the loss of life and property due to natural disasters and to enable risk mitigation measures to be implemented during the immediate recovery from a declared disaster.

The purpose of the proposed project is to reduce wildfire hazard in and near seven City of Houston parks. The project is needed because a long-term drought (extending from 2008 to 2013) has increased the potential wildfire hazard by killing many trees and providing a large amount of dry fuel for a potential wildfire in densely wooded areas at these parks. Wooded areas of thick vegetation and dead vegetative understory material along the park boundaries are close to homes and some commercial-industrial areas that back up to these seven city parks. The high density of the vegetation is a wildfire hazard even where the vegetation is healthy. The Houston parks are all subject to high winds that could carry a wildfire from the wooded park vegetation into residential properties.

SECTION 3 Alternatives

This section describes the alternatives considered, including the proposed action.

3.1 No Action Alternative

The no action alternative is included to describe potential conditions if no action is taken to reduce wildfire hazards. Under the no action alternative, the City of Houston would not implement hazardous fuels reduction in and around the seven parks. Under the no action alternative, existing conditions would continue, and the seven parks would not be treated for hazardous fuel reduction. Residences and commercial-industrial buildings near the parks would remain at an elevated risk for the spread of a catastrophic wildfire.

Because the current risk of wildfire in the seven parks would not be reduced under the no action alternative, the probability of loss of human life and property in a wildfire would continue to be unacceptably high. A major wildfire could also have severe temporary impacts on environmental resources (i.e., air quality, water quality, and emergency services). Fighting a major wildfire would also require large quantities of water at a time when water resources in Texas are already strained by drought.

Under the no action alternative, minor-short term impacts that may occur under the proposed action would be avoided because there would be no work conducted to remove trees or fuels. The impacts avoided could include temporary increases in noise, truck traffic, and minor short-term impacts to air quality.

3.2 Proposed Action

The Houston Parks and Recreation Department would plan, execute, and monitor all activities required to create reduced-fuel buffer zones around residential and non-residential structures through removal or reduction of flammable vegetation in the parks, including removal of trees, tree branches, and understory vegetation to increase vertical clearance. The proposed fuels reduction also involves minimizing the volume of surface fuel, such as dry leaves, pine needles, dead and dying foliage, and fallen trees. Living trees would only be removed if they are an invasive species or if necessary due to their location. Stumps would be ground to within 3 inches or less of the adjacent grade. The city anticipates that the proposed fuels reduction buffer zones would generally be approximately 100 feet wide, but the required radius of fuel reduction around homes and businesses would be established by the Houston Fire Department and would be directly related to the degree of fire hazard. During project implementation, the equipment used would likely include a skid-steer loader with grapple, a tracked backhoe with a “mechanical thumb” to allow gripping of tree trunks, timber axes, one or more large wood chippers, one or more trailer trucks, several smaller trucks, a lift to raise workers into trees, and various hand-held equipment. Debris produced by the proposed activities and some preexisting debris that would be present would be recycled into mulch and distributed throughout the park. For large tree and limb cutting, heavy equipment would be used to transfer heavy debris to the “Living Tree Center,” a city recycling facility.

Coolgreen Corridor Park is on the northeast side of Houston in Harris Council District I. Coolgreen is 26.59 acres in area, with a proposed project area of approximately 7 acres. The proposed fuel reduction buffer zone extends from the west side of the park close to Pecan Grove Street and follows along the south boundary of the park, ending at Greens Bayou. The proposed buffer zone is densely wooded.

Cullinan JS & LH Park is in the southeast part of Houston in Council District I. Cullinan's total area is approximately 44 acres, with a project area of approximately 4 acres. Zone 1 is approximately 2.1 acres and is bounded by warehouses and other commercial buildings on the western side. Zone 2 is 0.88 acres at the eastern end of the park between one of the park ponds and a residential area. Zone 3 is in the northeastern corner of the park and is 0.93 acres.

Cullinan Park at Oyster Creek is on the southwest side of Houston in Fort Bend County. The park is 754.83 acres, with a proposed project area of approximately 11 acres. Zone 1 is in the north of the park, which has very dense trees lines. Zone 2 is in the southwestern corner of the park adjacent to a gated community.

Herman Brown Park is in Council District I in the northeast part of Houston. The park is 717.35 acres, and U.S. Highway 90 (US90) divides the park. All of the seven proposed project zones are on the south side of US90. Zones 1 and 2 are at the northern park property. Zones 1 and 2 are adjacent to commercial areas. Both zones 1 and 2 are densely forested. Zone 3 is 2.94 acres located north of Nola Court. Zone 3 is not dense with trees but is dense with bushes. Zone 4 is 2.91 acres on the south boundary of an apartment complex within the same neighborhood as Zone 3 and is very densely wooded. Zone 5 is west of Maxey Road, north of Woodforest Drive and east of the railroad track, and is 5.66 acres. Access in Zone 5 is limited because most of the side streets from Woodforest Blvd are blocked by fences. This makes it difficult to categorize the buffer area. Zone 6 is 1.94 acres and bounds a trailer park to the east. Zone 6 can be accessed from Royal Drive, which ends at the park boundary. Zone 6 is very densely wooded. Zone 7 runs along the south boundary of the park and extends from US90 to Hunting Bayou, with an area of approximately 11 acres. The eastern half of zone 7 is densely wooded.

Hogg Bird Sanctuary Park is in the Houston Heights area in Council District C. The park is adjacent to Bayou Bend Park and is part of Memorial Park although separated from the main part of Memorial Park by a residential neighborhood and a golf course. The park area is 16.47 acres. The proposed project area is approximately 3.0 acres. The proposed buffer zone is on the north and west boundaries of the park. The buffer zone is very dense with trees and bushes.

Keith-Wiess Park is north of Houston in Council District B between Hardy Toll Road and Highway 59. The park is 499.46 acres, and the project area is approximately 17 acres. Zone 1 is approximately 9 acres in the northeastern section of the park. A ditch runs along the south perimeter of the zone. Zone 1 is adjacent to a subdivision. Houses located along Fall Meadow Lane and Orange Grove Drive line the perimeter of Zone 1. Zone 2 is approximately 7 acres in the southwest corner of the park. Zone 2 extends from Aldine Westfield Road north of Mierianne Street to Halls Bayou.

Woodland Park is in the Houston Heights area, bounded by Interstate 45 North (I-45N), Houston Avenue, and White Oak Drive on the north part of Houston in Council District H. The park has an area of 19.67 acres, and the project area is approximately 3 acres.

3.3 Additional Action Alternatives Considered and Dismissed

City of Houston considered the alternative of removing vegetation from private property around homes and businesses to create defensible space, rather than reducing vegetative fuel in the parks. This alternative was rejected for three reasons:

- It would cost much more than the proposed action on a citywide scale.
- It would be difficult to get enough property owners to participate to make this approach effective for entire neighborhoods.
- Homes with defensible space would still be vulnerable to firebrands thrown off from a crown fire in trees in the parks.

The alternative of focusing fuel reduction on the tree canopies and not removing understory fuels was also considered. From the standpoint of effectiveness, this alternative would fall between the proposed action and the no action alternative. This action alternative would not reduce the amount of "ladder fuel" present that could carry a ground fire up into the trees; understory branches less than 15 feet from the ground surface would not be removed. This alternative would leave significant understory fuel that would provide a significant fuel source and would reduce the overall effectiveness of the wildfire mitigation project. This alternative was rejected.

The alternative of focusing fuel reduction on the removal of understory fuels without thinning the canopy was also considered. From the standpoint of effectiveness, this alternative would fall between the proposed action and the no action alternative. This action alternative would not reduce the amount of "ladder fuel" present that could carry a ground fire up into the tree canopies. This alternative would leave significant ladder fuel that would provide a fuel source and would reduce the overall effectiveness of the wildfire mitigation project. This alternative was therefore rejected.

The alternative to use prescribed burn activities in the seven city parks was further considered. However, City ordinance precluded this alternative, as prescribed burns are disallowed in urban parks because of the high risk it presents to locations that are directly adjacent to residential and commercial property. This alternative was rejected.

SECTION 4 Affected Environment, Potential Impacts, and Mitigation

This section describes the environment potentially affected by the no action and proposed action alternatives, evaluates potential environmental impacts, and recommends measures to avoid or reduce them.

4.1 Resources Not Affected and Not Considered Further

This section provides an overview of the environmental resources that would not be affected by the no action or proposed action alternatives and that have been removed from further consideration in this EA.

4.1.1 Geology and Seismicity

Based on its nature and location, the proposed action could have no effect on geology or seismicity and is very unlikely to be affected by them. Vegetative fuel reduction is a surface activity that does not affect geology and is not affected by geology. Therefore, geology and seismicity are not considered further in this analysis.

4.1.2 Wild and Scenic Rivers

The National Wild and Scenic Rivers System (Public Law 90-542; 16 United States Code [U.S.C.] 1271 et seq.) was created in 1968 to preserve rivers with outstanding natural, cultural, and recreational value in a free-flowing condition. The project area is not near any river segment designated as "wild and scenic." The Rio Grande, located along the Texas border, is the only wild and scenic river in Texas. The proposed project would not cause any impacts to wild and scenic rivers because the project site is not within the Rio Grande watershed (see **Appendix B**) (Interagency Wild and Scenic Rivers Council 2013). Wild and scenic rivers are not considered further in this analysis.

4.2 Physical Resources

This section provides an overview of the affected area and potential environmental effects from the no action and proposed action alternatives on physical resources, including soils, air quality, climate, and visual resources.

4.2.1 Soils

The project area is in the Gulf Coast Prairie region, which is characterized by well-developed clayey soils with high shrink-swell properties. Many soil types are present within the areas of concern (see **Appendix C** for maps of each park). Six of the seven parks have hydric soils as a primary soil type. Hydric soils are associated with wetlands. The properties of soil types at the seven City of Houston parks are summarized in **Table 4.1**, **Table 4.2**,**Table 4.3**, **Table 4.4**, and **Table 4.5** below.

Table 4.1. Coolgreen Corridor Park and Cullinan JS & LH Park

Parameters	Beaumont-Urban Clay (Bc)[1]	Vamont-Urban Clay (Vn)	Ozan-Urban Loam (On)
Depth	More than 80 inches	More than 80 inches	More than 80 inches
Drainage	Poorly drained	Somewhat poorly drained	Poorly drained
Permeability	Very low to moderately low (0.00 to 0.06 inches per hour [in/hr])	Very low to moderately low (0.00 to 0.06 in/hr)	Moderately low to moderately high (0.06 to 0.20 in/hr)
Parent Material	Formed in marine environment, gypsum, and calcium carbonate	Mix of river alluvium and marine sediment	River alluvium
Slope	0 to 1%	0 to 5%	0 to 1%
Depth to Water	0 to 12 inches	18 to 36 inches	6 to 18 inches
Hydric	Yes	No	Yes

[1] Present in Cullinan JS & LH Park and Coolgreen Corridor Park, other soils only present in Coolgreen Corridor Park

Table 4.2. Cullinan Park at Oyster Creek

Parameters	Brazoria Clay (Ma)	Norwood Silt Loam (Nc)	Asa Fine Sandy Loam (Aa)
Depth	More than 80 inches	More than 80 inches	More than 80 inches
Drainage	Moderately well drained	Well drained	Well drained
Permeability	Very low to moderately low (0.00 to 0.06 in/hr)	Moderately high to high (0.57 to 1.98 in/hr)	Moderately high to high (0.57 to 1.98 in/hr)
Parent Material	Formed in mix of marine sediment and alluvium	Mix of river alluvium and marine sediment	Mix of river alluvium and marine sediment
Slope	0 to 1%	0 to 1%	0 to 1%
Depth to Water Table	More than 80 inches	More than 80 inches	More than 80 inches
Hydric	Yes	No	No

Table 4.3. Herman Brown Park

Parameters	Lake Charles Clay (LcA)	Bernard Clay Loam (Bd)	Vamont Clay (VaA)	Beaumont Clay (Ba)	Aldine Very Fine Sandy Loam (Am)
Depth	More than 80 inches	More than 80 inches	More than 80 inches	More than 80 inches	More than 80 inches
Drainage	Moderately well drained	Somewhat Poorly drained	Somewhat Poorly drained	Poorly drained	Well drained
Permeability	Very low to moderately low (0.00 to 0.06 in/hr)	Very low to moderately low (0.00 to 0.06 in/hr)	Very low to moderately low (0.00 to 0.06 in/hr)	Very low to moderately low (0.00 to 0.06 in/hr)	Moderately high to high (0.57 to 1.98 in/hr)
Parent Material	Formed in mix of marine sediment and alluvium	Formed in mix of marine sediment and alluvium	Formed in mix of marine sediment and alluvium	Mix of river alluvium and marine sediment	Mix of river alluvium and marine sediment
Slope	0 to 1%	0 to 1%	0 to 1%	0 to 1%	0to 1%
Depth to Water Table	More than 80 inches	18 to 30 inches	18 to 36 inches	0 to 12 inches	More than 80 inches
Hydric	No	Yes	No	Yes	No

Table 4.4. Keith-Wiess Park

Parameters	Clodine Loam (Cd)	Clodine-Urban Land Complex (Ce)	Gessner Loam (Ge)
Depth	More than 80 inches	More than 80 inches	More than 80 inches
Drainage	Poorly drained	Poorly drained	Poorly drained
Permeability	Moderately high to high (0.57 to 1.98 in/hr)	Moderately high to high (0.57 to 1.98 in/hr)	Moderately high to high (0.57 to 1.98 in/hr)
Parent Material	Formed from alluvial deposits	Formed from alluvial deposits	Formed from alluvial deposits
Slope	0 to 1%	0 to 1%	0 to 1%
Depth to Water Table	0 to 30 inches	0 to 30 inches	About 0 inches
Hydric	Yes	Yes	Yes

Table 4.5. Woodland Park and Hogg Bird Sanctuary

Parameters	Aldine-Urban Land Complex (An)	Vamont-Urban Land Complex (Vn)[1]	Atasco Fine Sandy Loam (AtB)[2]
Depth	More than 80 inches	More than 80 inches	More than 80 inches
Drainage	Somewhat poorly drained	Somewhat poorly drained	Moderately Well Drained
Permeability	Very low to moderately low (0.00 to 0.06 in/hr)	Very low to moderately low (0.00 to 0.06 in/hr)	Very low to moderately low (0.00 to 0.06 in/hr)
Parent Material	Formed from alluvial deposits	Mix of marine sediments and alluvial deposits	Formed from alluvial deposits
Slope	0 to 2%	0 to 5%	1 to 4%
Depth to Water Table	18 to 21 inches	18 to 36 inches	18 to 21 inches
Hydric	No	No	No

[1] Present in both Hogg Bird Sanctuary and Woodland Park
[2] Present in Hogg Bird Sanctuary only

The Farmland Protection Policy Act (FPPA; 7 USC 4201, et seq.) and its regulations (7 CFR Part 658) establish criteria for identifying and considering the effects of federal programs on the conversion of farmland to non-agricultural uses. The FPPA does not apply to lands already in urban development, which includes lands in "urbanized areas" as identified on the Census Bureau map or a USGS topographic map.

No Action Alternative

In the absence of a major wildfire in the proposed project area, the no action alternative would have no effect on soils. However, a major wildfire would be more likely under the no action alternative and could alter the cycling of nutrients; the physical and chemical properties; and the temperature, moisture, and biotic characteristics of the soil. These primary impacts from a wildfire can also result in indirect impacts, including increased hydrophobicity, which could cause decreased infiltration and increased runoff that often causes increased erosion.

Proposed Action

The proposed action would have minimal impact on soils in the project area. The proposed fuel reduction actives include grinding of stumps to within 3 inches or less to grade with soil and therefore would not cause soil disturbance and would not cause any significant soil and sediment removal and transport. Short term soil disturbance may occur from the use of mechanical equipment; however, best management practices (BMPs) would be implemented to reduce soil disturbance in the project area during vegetation removal. No adverse impact to soils is anticipated.

The proposed action is taking place in an urbanized area within lands that are not classified as farmland; therefore, the FPPA does not apply and there will be no adverse impact to prime or unique farmland.

4.2.2 Air Quality

The Clean Air Act (CAA; 42 USC 7401 et seq.) provides the basis for regulating air emissions. Air quality control regions (AQCRs) have been created under the CAA. The U.S. Environmental Protection Agency (EPA) classifies air quality within each AQCR according to whether the concentrations of certain pollutants called criteria air pollutants exceed National Ambient Air Quality Standards (NAAQS).

The proposed project area is in central Harris County and northeast Fort Bend County. This region is designated in attainment status for five of the six criteria pollutants set by EPA. The EPA air quality monitoring stations in the region have detected levels of ground level ozone (O3) that exceed the NAAQS, and Harris County is designated as nonattainment status for O3.

No Action Alternative

In the absence of a major wildfire in the seven parks, no impacts would occur under the no action alternative because current air quality would not change. No changes would occur that would affect air emissions. However, a major wildfire would be more likely under the no action alternative, and a major wildfire would cause substantial pollutant emissions.

Proposed Action

Air quality impacts associated with the proposed action would be localized and temporary, occurring over a period of 6 to 8 weeks during implementation of the fuel reduction measures at the seven Houston parks. Negligible impacts would be expected, as described below.

During project implementation, the equipment used would likely include a skid-steer loader with grapple, a tracked backhoe with a “mechanical thumb” to allow gripping of tree trunks, timber axes, one or more large wood chippers, one or more trailer trucks, several smaller trucks, a lift to raise workers into trees, and various hand-held equipment. The equipment would emit hydrocarbons and cause a temporary negative impact on local air quality. To minimize emissions, fuel-burning equipment running times will be kept to a minimum and engines will be properly maintained.

Post-project routine maintenance of the fuel reduction areas would be conducted by removing regrowth of underbrush, removing understory tree branches, and removing dead and distressed trees to maintain a viable fire break. Hydrocarbon emissions associated with these activities may cause temporary minor negative impacts on local air quality.

4.2.3 Climate Change

“Climate change” refers to changes in Earth’s climate caused by a general warming of the atmosphere. Its primary cause is emissions of carbon dioxide and methane. The impact climate change may have on the proposed project area is uncertain and difficult to anticipate. Climate change is capable of affecting species distribution, temperature fluctuations, sea level dynamics, and weather patterns.

No Action Alternative

In the absence of a major wildfire, no impact on climate change is anticipated under the no action alternative, as current conditions would not change. A major wildfire would be more likely under the no action alternative and could contribute to climate change, but the contribution of the project areas within the seven parks would not be significant.

Climate change may result in more extended drought periods in the project area and increase the risk of wildfire. The no action alternative would not provide any wildfire risk reduction, and a major wildfire would be more likely within the project area.

Proposed Action

Because of the small scale and short duration of the proposed action, the contribution of greenhouse gas emissions from the operation of the proposed equipment to climate change would be minor.

The proposed action would reduce the risk of a major wildfire in the project area, thereby reducing the risk of wildfires that might potentially contribute to climate change.

4.2.4 Visual Quality and Aesthetics

The project area is densely vegetated with trees and understory brush in some areas, while other areas are less densely vegetated. **Figure 4.1** shows a representative view of existing visual conditions within the project area.

No Action Alternative

In the absence of a major wildfire, there would be no impact on visual quality and aesthetics under the no action alternative, as current conditions would not change. A major wildfire would be more likely under the no action alternative and would have substantial negative impacts on visual quality immediately after the fire for adjacent landowners that have visual access to the seven parks.

Proposed Action

This project would remove some trees and understory and would change views both from adjacent residential areas into the parks and from the parks of the surrounding residential areas. **Figure 4.2** and **Figure 4.3** show post thinning conditions and views. The thinning would generally improve the aesthetics and views overall by opening up views from adjacent properties onto the parks.

Figure 4.1. Cullinan Park at Oyster Creek – Existing Conditions Vegetation

Figure 4.2. Cullinan Park at Oyster Creek – Post Thinning Conditions

Figure 4.3. Cullinan JS & LH Park – Interface of Pre-Thinning and Post-Thinning

4.3 Water Resources

This section provides an overview of the affected area and potential environmental effects of the no action and proposed action alternatives on water resources, including water quality, streams, wetlands, and floodplains.

4.3.1 Water Quality

4.3.1.1 Surface Water

Sections 303(d) and 305(b) of the Clean Water Act (CWA) require all states to identify and characterize waters that do not meet, or are not expected to meet, water quality standards. The Texas Commission on Environmental Quality (TCEQ) is the regulatory agency responsible for compliance with water quality standards in Texas. The TCEQ's 2012 Integrated Report for CWA Sections 303(d) and 305(b) characterizes the quality of Texas surface waters and identifies those waters that do not meet water quality standards on the 303(d) list, an inventory of impaired waters (TCEQ 2013). Streams are classified by segment within their respective basins.

Three of the seven parks in the proposed project (Coolgreen Corridor, Cullinan at Oyster Creek, and Herman Brown) discharge stormwater into TCEQ classified stream segments near the proposed project areas. Each of these stream segments have consistently failed to meet water quality standards. **Table 4.6** and **Table 4.7** list the parks where fuel reduction work is planned and lists the year the water body was first listed on the 303(d) list.

Table 4.6. Impaired Segments: Coolgreen Corridor, Cullinan at Oyster Creek, and Herman Brown Parks

Parks	Water Body	Zone No.	Distance from Project Area (mi)	Segment ID	First Year on the 303(d) List
Coolgreen Corridor	Greens Bayou	1	0.15	1006	2006
Cullinan at Oyster Creek	Upper Oyster Creek	1	0.30	1245	1996
	Upper Oyster Creek	2	0.10	1245	1996
Herman Brown	Greens Bayou	1	0.62	1006	2006
	Greens Bayou	2	0.69	1006	2006
	Greens Bayou	3	0.76	1006	2006
	Greens Bayou	4	0.81	1006	2006
	Hunting Bayou	5	0.38	1007	1996
	Hunting Bayou	6	0.44	1007	1996
	Hunting Bayou	7	0.10	1007	1996

An unclassified water body is a water body for which the use has not been identified. Keith-Wiess Park and Herman Brown Park contain unclassified water bodies on the 303(d) list that are close to or within the proposed project areas (see **Table 4.7** below).

Table 4.7. Impaired Segments: Keith-Wiess and Woodland Parks

Parks	Water Body	Zone No.	Distance from Project Area (mi)	Segment ID	First Year on the 303(d) List
Keith-Wiess	Halls Bayou	1	0.36	1006D	2002
	Halls Bayou	2	0.02	1006D	2002
Woodland	Little White Oak Bayou	1	0.01	1013A	2002
	Little White Oak Bayou	2	0.01	1013A	2002
	Little White Oak Bayou	3	0.04	1013A	2002
	Little White Oak Bayou	4	0.01	1013A	2002
	Little White Oak Bayou	5	In project area	1013A	2002

No Action Alternative

In the absence of a major wildfire in the proposed work areas, the no action alternative would have no effect on surface water quality because inputs to receiving waters would not change. However, a major wildfire would be more likely under the no action alternative and could have substantial impacts on surface water quality. Reduced vegetation cover could lead to flooding, soil erosion

and sedimentation, pollution from substances that are no longer filtered by riparian vegetation, and changes in water temperature. A major wildfire may cause changes to the soil as discussed in Section 4.2.1, which could impact surface water. Infiltration properties of soils may be altered when fire destroys vegetation cover within a watershed. These changes in vegetation and subsequent changes in soil often result in decreased infiltration, increased overland flow, and ultimately increased stream flow (USDA Forest Service 2005).

Proposed Action

The proposed action would not contribute fecal bacteria, other organics, or legacy pollutants to the receiving waters of Buffalo Bayou, Little White Oak Bayou, Halls Bayou, Greens Bayou, and Upper Oyster Creek; therefore, the proposed action would not affect any total maximum daily loads (TMDLs) for these creeks. The proposed action could cause temporary adverse impacts to the surface water of these creeks or bayous over a period of about 2 months from erosion and sedimentation. Operation of heavy equipment during the proposed action would disturb soil, which would increase erosion potential during heavy rains. The applicant must ensure that BMPs are implemented to minimize transport of sediment to Buffalo Bayou, Little White Oak Bayou, Halls Bayou, Greens Bayou, and Upper Oyster Creek. Mulch created from cut vegetation would be used for temporary erosion control to prevent soil or sediment from reaching the waterways. Appropriate barriers (e.g. silt fencing) would be used to prevent mulch from being washed into the creeks. Water quality impacts from the proposed action would be localized and temporary, occurring over a period of a couple of months at each park. With the implementation of these BMPs, the effect on water quality would not be significant.

4.3.1.2 Groundwater

The major aquifer underlying the proposed project area is the Gulf Coast aquifer. The aquifer consists of discontinuous beds of clay, silt, sand, and gravel that are hydrologically connected to form a large, leaky artesian system. The Gulf Coast aquifer spans 54 Texas counties along the coastline belt from Louisiana to Mexico. Water quality issues associated with the Gulf Coast aquifer include land-surface subsidence, increased chloride content in the groundwater in the southwestern portion of the aquifer, and saltwater intrusion along the coast (Texas Water Development Board [TWDB] 2006). Water quality in the aquifer is typically good to the north of the San Antonio River Basin while to the south towards Mexico high salinity and alkalinity are common, making much of the water unsuitable for irrigation (Ashworth and Hopkins 1995).

A data search on the TWDB Water Information Integration and Dissemination (WIID) System was conducted on June 17, 2013. The WIID System provides groundwater data and submitted water well driller reports. A search of water wells within a 1-mile radius of each project area was conducted; a few water wells were identified but no groundwater quality data are available (**Appendix D-2**). Properly cased and sealed wells should minimize any impact on groundwater from runoff in the project area.

No Action Alternative

In the absence of a major wildfire in the seven parks, the no action alternative would have no effect on groundwater quality because current conditions would remain the same. However, a major wildfire would be more likely under the no action alternative and would cause changes to the soil

as discussed in Section 4.2.1.1, which could impact groundwater. Infiltration properties of soils are often altered when fire destroys vegetation and litter cover within a watershed. These changes in the soil often result in decreased infiltration, increased overland flow, and ultimately increased streamflow discharges (United States Department of Agriculture [USDA] 2005).

Proposed Action

The proposed action would reduce the risk of catastrophic wildfires and thus would reduce the potential impact to groundwater recharge from a wildfire. The proposed vegetation thinning would not cause any impacts on the Gulf Coast aquifer. Impacts to infiltration rates and runoff in the project area are not anticipated from the proposed action; therefore, no impacts to the Gulf Coast aquifer are anticipated.

4.3.2 Wetlands

Executive Order 11990, Protection of Wetlands, requires that federal agencies avoid to the extent possible, the long and short term adverse impacts associated with destruction or modification of wetlands. Agencies that provide funding for improvements or for activities affecting land use should "consider factors relevant to a proposal's effect on the survival and quality of the wetlands." Among these factors are:

(a) public health, safety, and welfare, including water supply, quality, recharge and discharge; pollution; flood and storm hazards; and sediment and erosion;

(b) maintenance of natural systems, including conservation and long-term productivity of existing flora and fauna, species and habitat diversity and stability, hydrologic utility, fish, wildlife, timber, and food and fiber resources; and

(c) other uses of wetlands in the public interest, including recreational, scientific, and cultural uses."

The U.S. Fish and Wildlife Service (USFWS) (2012) National Wetlands Inventory (NWI) map for the project area, in **Appendix D-1**, shows wetlands on land directly affected by the proposed action. The NWI shows wetlands near the proposed work zones at the following parks: Cullinan JS & LH, Cullinan at Oyster Creek, Herman Brown, and Keith-Wiess.

FEMA regulation 44 CFR Part 9, Floodplain Management and Protection of Wetlands, sets forth the policy, procedures, and responsibilities to implement and enforce EO 11990 and prohibits FEMA from funding construction in a wetland unless no practicable alternatives are available. To comply with EO 11990, FEMA uses the eight-step decision-making process in 44 CFR 9.6 to evaluate proposed actions that have potential to affect a wetland.

The NWI maps show wetlands in and near the proposed project area (see **Appendix D-1** for wetland maps). Parks included in the proposed action that have wetlands mapped close to the proposed fuel reduction buffer zones are as follows: Cullinan at Oyster Creek has five wetlands nearby, Keith-Wiess has two, and Herman Brown and Cullinan JS & LH have one each. All of these wetlands are either freshwater emergent or freshwater forested/shrub wetlands.

No Action Alternative

In the absence of a major wildfire in the seven parks, the no action alternative would have no effect on wetlands because existing conditions would continue unchanged. However, a major wildfire would be more likely under the no action alternative and could result in adverse impacts to vegetation in wetlands. Destruction of vegetation in wetlands would destroy habitat for wildlife and lessen the effectiveness of wetlands to filter pollutants and maintain water quality.

Proposed Action

The proposed project would be conducted in compliance with Executive Order 11990. While wetlands may be adjacent to the proposed work, the proposed action would not occur in wetland areas. Under the proposed action, BMPs would be implemented to prevent impacts on nearby wetlands. In addition, long-term project maintenance would have no impact on wetlands.

4.3.3 Floodplains

Executive Order 11988, Floodplain Management, requires federal agencies to take actions to minimize occupancy of and modifications to floodplains. FEMA regulations in 44 CFR Part 9, Floodplain Management and Protection of Wetlands, set forth the policy, procedures, and responsibilities to implement and enforce Executitve Order 11988 and prohibit FEMA from funding improvements in the 100-year floodplain unless no practicable alternative is available.

FEMA regulations at 44 CFR 9.6 contain an 8-step decision-making process for proposed projects that have potential impacts to or within the 100-year floodplain. The eight steps reflect the decision-making process required in Section 2(a) of the executive order. The first step is to determine if the proposed action is in the 100-year floodplain.

Per 44 CFR Part 9.11, there shall be no new construction or substantial improvement in a floodway except for a functionally dependent use or a structure or facility which facilitates an open space use. Hazardous fuels reduction does not qualify as new construction or substantial improvement, and furthermore, the action would be considered one that facilitiates open space use. In addition, 44 CFR Part 9.11 states that there shall be no encroachments, including fill, new construction, substantial improvements of structures or facilities, or other development within a designated regulatory floodway that would result in any increase in flood levels within the community during the occurrence of the base flood discharge. This requirement is commonly refered to as the “no rise” requirement and compliance with it is further outlined in 44 CFR Part 60.3.

FEMA flood insurance rate maps (FIRMs) show floodplain areas and the extent of the 100-year floodplain with respect to the park fuel reduction project areas. Pertinent portions of the FEMA FIRMs for the park project areas are presented with the related FIRM panel numbers in **Table 4.8** are also included in **Appendix D-3** and **Appendix D-4**.

Table 4.8 shows each park with the appropriate FIRM panel numbers and effective dates for the maps.

Table 4.8. Houston Parks and FEMA FIRMs

Parks	FIRM Panel No.	Flood Zones for Proposed Project
Cullinan JS & LH	48201C0885M (03/29/2013)	Zone X
Cullinan at Oyster Creek	48157C0145L and 48157C0260L (10/30/09)	AE Floodway; Zone AE; .2% annual chance flood hazard
Coolgreen Corridor	48201C0715M (03/29/2013)	Zone X
Herman Brown	48201C0695M and 48201C0715M (03/29/2013)	Zone X; Zone AE; .2% annual chance flood hazard
Hogg Bird Sanctuary	48201C0670M (10/16/2013)	AE Floodway; Zone AE; .2% annual chance flood hazard
Keith-Wiess	48201C0490L (06/18/2007)	Zone X; Shaded Zone X; Zone AE
Woodland	48201C0690M (10/16/2013)	AE Floodway; Zone AE; .2% annual chance flood hazard

No Action Alternative

In the absence of a major wildfire in the parkland areas, the no action alternative would have no effect on floodplains because the current conditions would continue unchanged. However, a major wildfire would be more likely under the no action alternative and would have impacts on the floodplain. If a wildfire were to occur, vegetation and ground cover would be significantly reduced, which could lead to increased erosion rates and increased stormwater runoff following a rain event. The no action alternative has the potential to increase localized sedimentation and flooding.

Proposed Action

In compliance with FEMA regulations implementing Executive Order 11988, Floodplain Management, FEMA is required to carry out the 8-step decision-making process for actions that are proposed in the floodplain per 44 CFR §9.6.

Step 1 is to determine whether the project is located in the 100-year floodplain. FEMA has determined that portions of the proposed action alternative are located in the 100-year floodplain in Zones AE and AE Floodway, as depicted on the FIRMs summarized in **Table 4.8**. Zone AE indicates an area with with a 1 percent annual chance of flooding where base flood elevations have been determined. The regulatory floodway is the channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than a designated height.

Step 2 is to notify and involve the public in the decision-making process, which will be incorporated into the notice of availability for this EA.

Step 3 is to identify and evaluate practicable alternatives to locating the proposed project in the floodplain, including alterative sites and actions outside of the floodplain. The purpose of the project is to reduce wildfire risk where developed areas interface with areas that are subject to wildland fire due to the accumulation of vegetative fuel loads. The City of Houston considered

several alternative actions. The alternative of conducting defensible space around homes and businesses on private property was dismissed because it was costly, it might be ineffective if not enough property owners voluntarily participated, homes with defensible space would still be vulnerable to firebrands thrown off from a crown fire in trees in the parks. The city also looked at modified versions of the proposed action where the action areas would stay the same, but the focus of the vegetation management from the ground to the crown would vary. These actions would still be in the floodplain as is the proposed action. These alternatives were dismissed because they would leave significant fuel loads that would reduce the overall effectiveness of the wildfire mitigation project. Finally prescribed burns were considered as an alternative. Portions of this alternative would still be in the floodplain. City ordinance precluded this alternative, as prescribed burns are disallowed in urban parks because of the high risk it presents to locations that are directly adjacent to residential and commercial property. Large portions of the proposed action are in Zone X or in the 500-year floodplain, but there is no practicable alternative for the portions with in the floodplain because it is in these areas where developed areas come into contact with heavy vegetative fuel loads, and this wildfire risk needs to be mitigated. No alternatives outside of the floodplain exist that would reach the purpose and need for the project.

Step 4 is to identify impacts associated with occupancy and modification of the floodplain and support of floodplain development that could result from pursuing the proposed ction alternative. Per 44 CFR 9.10 “Identify impacts of proposed actions,” FEMA should consider whether the proposed action will result in an increase in the useful life of any structure or facility in question, maintain the investment at risk and exposure of lives to the flood hazard, or forego an opportunity to restore the natural and beneficial values served by floodplains or wetlands. FEMA should specifically consider and evaluate impacts associated with modification of floodplains; additional impacts which may occur when certain types of actions may support subsequent action which have additional impacts of their own; adverse impacts of the proposed actions on lives and property and on natural and beneficial floodplain values; and these three categories of factors: flood hazard-related factors, natural values-related factors, and factors relevant to a proposed action’s effects on the survival and quality of wetlands. Per 44 CFR, natural values-related factors include, water resource values (natural moderation of floods, water quality maintenance, and ground water recharge); living resource values (fish and wildlife and biological productivity); cultural resource values (archeological and historic sites, and open space recreation and green belts); and agricultural, aquacultural and forestry resource values. Factors relevant to a proposed action’s effects on the survival and quality of wetlands include public health, safety, and welfare, including water supply, quality, recharge and discharge; pollution; flood and storm hazards; and sediment and erosion; maintenance of natural systems, including conservation and long term productivity of existing flora and fauna, species and habitat diversity and stability, hydrologic utility, fish, wildlife, timber, and food and fiber resources; and other uses of wetlands in the public interest, including recreational, scientific, and cultural uses.

The proposed action alternative is not expected to result in an increased base discharge nor should it increase the flood hazard potential to surrounding structures. The proposed hazardous fuels reduction is not anticipated to encourage development or increase occupancy in the floodplain. Hazardous fuels reduction activities at the seven Houston parks will not significantly adversely affect water resources. The functions of the floodplain to provide flood storage and conveyance, filter nutrients and impurities from runoff, reduce flood velocities, reduce flood peaks, moderate

temperature of water, reduce sedimentation, promote infiltration and aquifer recharge, and reduce frequency and duration of low surface flows will remain in tact after the implementation of the project. As discussed in Section 4.3.1 of this EA, there will be minor short-term impacts to water quality during the implementation phase of the project. Floodplains also provide services in the form of providing fish and wildlife habitat, breeding, and feeding grounds. These floodplain vaules will not be significantly adversely impacted and the overall integrity of the ecosystem will not be impacted. FEMA has determined the project will have no effect on threatened and endangered species and will not adversely modify or otherwise affect critical habitat. The proposed action would have negligible impacts to native species and their habitats and population levels of native species would not be affected. Sufficient habitat would remain functional to maintain viability of all species. There is the potential for adverse impacts to migratory bird species that may be present at the time of vegetation removal activities. The proposed action will not adversely affect the societal and recreational benefits provided by the floodplain in these parks. Open space and recreational uses in the parks will not be affected by the proposed action. As discussed in Section 4.6, there is the potential for archeological resources to be present at Cullinan Park at Oyster Creek and at Keith-Wiess Park. Archeological resources are considered a societal resource and a value and benefit of floodplain areas. The proposed action could impact archeological resources due to ground disturbance associated with heavy equipment use.

Step 5 is to minimize the potential adverse impacts and support to or within floodplains identified under Step 4 and restore and preserve the natural and beneficial values served by floodplains. Many of the impacts discussed above are considered insignificant or beneficial to the floodplain. The proposed action to reduce fuel loads contributes to the conservation of the floodplain and its natural and beneficial values. Short-term water quality impacts will be mitigated by the implementation of BMPs (see Section 4.3.1). Impacts to migtatory bird species will be minimized by seasonal restrictions such that work is conducted outside of nesting season or by the deployment of a biological monitor if work must take place during nesting season (see Section 4.5.3). The City of Houston is required to deploy a Secretary of the Interior (SOI)-qualified archeological monitor for all proposed fuels reduction activities in Cullinan Park at Oyster Creek and for fuels reduction activities within the southwest corner of Keith-Wiess Park in order to mitigate adverse impacts to archeological resources (see Section 4.6). For any work in the floodplain, the City of Houston will be required to coordinate with the local floodplain administrator and obtain any required permits prior to initiating work. All coordination pertaining to these activities and applicant compliance with any conditions should be documented and copies forwarded to the state and FEMA for inclusion in the permanent project files. Coordination with the floodplain administrator will ensure that the “no rise”requirement is met per 44 CFR Part 9.11 and 44 CFR Part 60.3.

Step 6 is to determine whether the proposed action is practicable and to reevaluate alternatives. Per the discussion above, the proposed action alternative is the only practicable alternative.

Step 7 requires that the public be provided with an explanation of any final decision that the floodplain is the only practicable alternative. In accordance with 44 CFR §9.12, the City of Houston must prepare and provide a final public notice 15 days prior to the start of any hazardous fuels reduction activities in the floodplain. Documentation of the final public notice is to be forwarded to FEMA for inclusion in the permanent project files.

Step 8 is the review of the implementation and post-implementation phases of the proposed action to ensure that the requirements stated in 44 CFR Part 9.11 are fully implemented. The proposed hazardous fuels reduction project will be conducted in accordance with applicable floodplain development requirements.

4.4 Coastal Resources

The Coastal Zone Management Act (CZMA) enables coastal states to designate state coastal zone boundaries and develop coastal management programs to improve protection of sensitive shoreline resources and guide sustainable use of coastal areas. The Texas coastal management program is administered by Texas General Land Office (GLO). The proposed project would occur at seven City of Houston parks located inland of Galveston Bay and the Texas Gulf Coast. None of the parks lie within the Texas Coastal Management Zone (CMZ) boundary as designated by GLO and shown on **Figure 4.4**. In November 2013, FEMA confirmed with GLO that none of the seven parks are located within the Texas CMZ.

No Action Alternative

In the absence of a major wildfire in the parkland areas, the no action alternative would not result in any impacts to coastal resources and coastal management planning would proceed. However, a major wildfire would be more likely under the no action alternative.

Proposed Action

The proposed action would not affect coastal resources as none are located within the Texas CMZ.

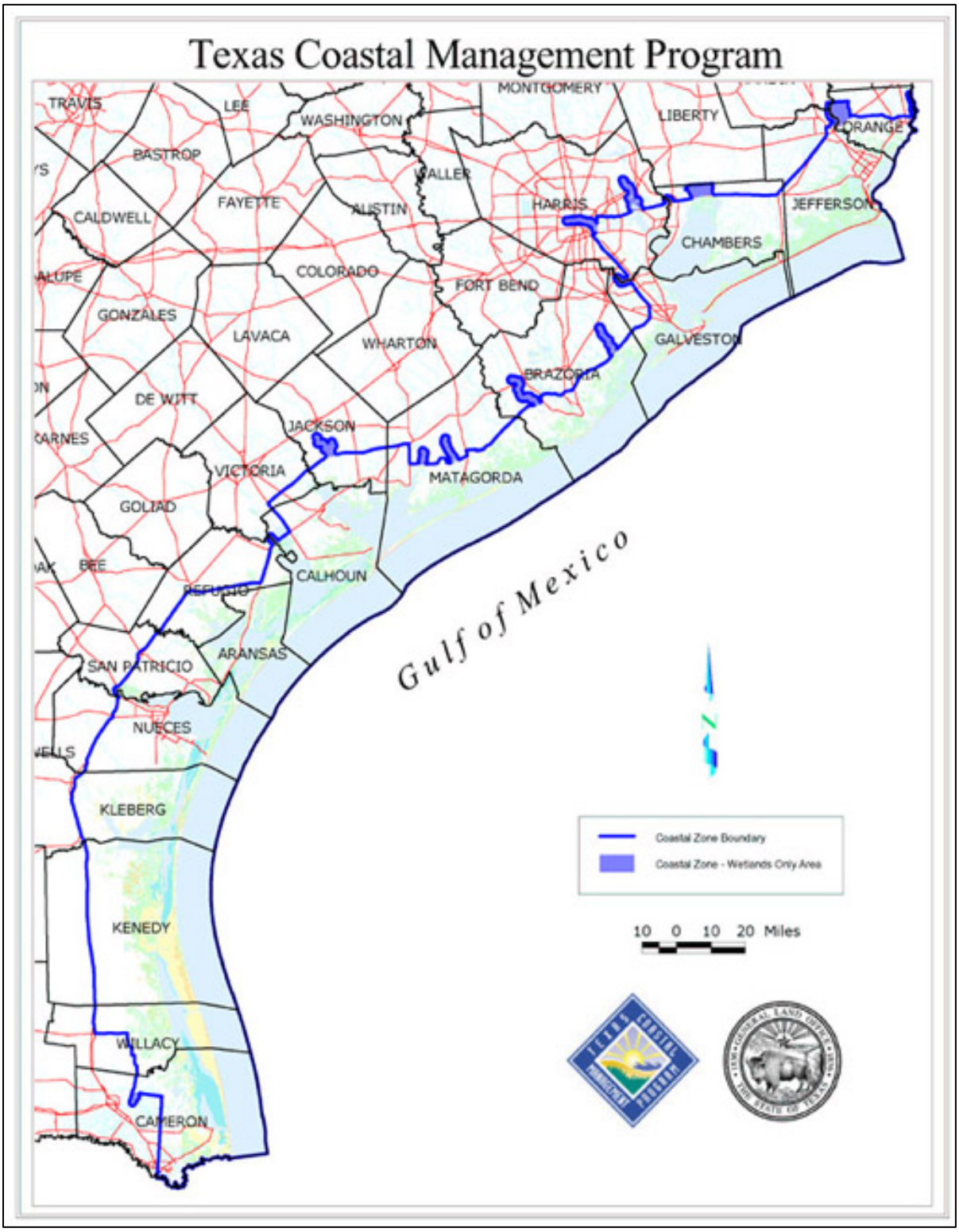


Figure 4.4. Texas Coastal Management Zone

4.5 Biological Resources

Vegetation and wildlife communities and state and federally listed threatened and endangered species potentially present within the project areas are discussed in this section.

4.5.1 Vegetation

According to the Gould Ecoregions of Texas, Harris and Fort Bend counties are located within the Gulf Coast Prairies and Marshes, Piney Woods, and Post Oak Savannah ecoregions. However, all of the seven Houston Park project areas are located only in the Gulf Coast Prairies and Marshes ecoregion, with Keith-Wiess Park exhibiting characteristics of both the Gulf Coast Prairies and Piney Woods ecoregions.

The Gulf Coast Prairies and Marshes ecoregion is a nearly level, slowly drained plain less than 150 feet in elevation, dissected by streams and rivers flowing into the Gulf of Mexico. The region includes barrier islands along the coast, salt grass marshes surrounding bays and estuaries, remnant tallgrass prairies, oak parklands and oak mottes scattered along the coast, and tall woodlands in the river bottomlands. Native vegetation consists of tallgrass prairies and live oak woodlands. Brush species, such as mesquite and acacias, are more common now than in the past. Although much of the native habitat has been lost to agriculture and urbanization, the region still provides important habitat for migratory birds and spawning areas for fish and shrimp.

The Piney Woods forests stretch across eastern Texas, northwestern Louisiana, and southwestern Arkansas. Sandhill pine forests are characteristic of the Piney Woods. Longleaf pine (*Pinus palustris*) shares dominance with shortleaf pine (*Pinus echinata*) and loblolly pine (*Pinus taeda*). In this flatwood forest habitat, pines dominate the overstory with a well-developed woody understory. Pine density is low, the herb layer is sparse, and exposed sandy tracts are common. Common associated trees are bluejack oak (*Quercus incana*) and post oak (*Q. stellata*), with a characteristic understory of yaupon (*Ilex vomitoria*) and flowering dogwood (*Cornus florida*). Savanna-like areas occur on poorly drained soils and contain scattered individuals of longleaf and loblolly pine along with tupelo (*Nyssa sylvatica*), sweetgum (*Liquidambar styraciflua*), and magnolia (*Magnolia virginiana*). The interaction of moisture and fire frequency determines vegetation structure and composition. In other sections, oaks and hickories are mixed in with pines.

About 3 percent of the remaining habitat in the Piney Woods is considered intact. Bottomland forests around major river drainages have been completely converted. Longleaf pine areas have been converted to loblolly or slash pine plantations or are severely fire suppressed. Urban development was a major cause of habitat loss in the early part of this century as was logging. Today, fire suppression is a major factor of habitat loss for fire-dependent species as is conversion to pine plantation.

The project areas have been greatly influenced by past and present human activities and largely differ from the historical natural ecoregion conditions described above. Therefore, habitat surveys were conducted in June 2013 to document dominant plant species and habitat types. The surveys determined that the project areas are characterized by disturbed mixed forests, hardwood flats, wetlands, and maintained parklands.

Table 4.9 presents the dominant habitat type listed for each of the seven City of Houston parks and the fuels reduction areas located therein. A detailed list of dominant plant species for each habitat type is provided in the Habitat Type Summary Table in **Appendix E**.

Table 4.9. Dominant Habitat Types – City of Houston Parks Project Areas

Park	Zone	Area	Dominant Habitat Type
Keith-Wiess	1		Hardwood Flats, <10% Pine
Keith-Wiess	2	1, 2	Hardwood Flats, <1% Pine
Keith-Wiess	2	3	Open Grasses, Frequently Mowed
Coolgreen Corridor	1	1	Mixed Hardwood, <1% Pine
Coolgreen Corridor	1	2, 4	Hardwood Flats, Dead Pine
Coolgreen Corridor	1	3	Hardwood Flats, <1% Pine
Herman Brown	1		Hardwood Flats, No Pine
Herman Brown	2		Hardwood Flats, No Pine
Herman Brown	3		Recently Cleared
Herman Brown	4		Recently Cleared
Herman Brown	5		Mostly Cleared; Herbaceous-Shrub Wetlands
Herman Brown	6		Mixed Hardwoods, Dead Pine
Herman Brown	7		Hardwood Flats, No Pine; Some Open Grasses
Cullinan JS & LH	1		Hardwood Flats, <1% Pine
Cullinan JS & LH	2		Managed Grasses w/ Scattered Hardwoods; Pond
Cullinan JS & LH	3		Managed Grasses; Hardwood Flats, No Pine
Hogg Bird Sanctuary	1		Riparian Mixed Hardwoods, <10% Pine; Stream
Woodland Park	1		Mixed Hardwoods, <10% Pine
Woodland Park	2		Riparian Mixed Hardwoods, <1% Pine
Woodland Park	3		Mixed Hardwoods, Dead Pine
Woodland Park	4		Riparian Mixed Hardwoods, No Pine
Woodland Park	5		Riparian Mixed Hardwoods, No Pine
Cullinan at Oyster Creek	1	1	Hardwood Flats; Stream
Cullinan at Oyster Creek	1	2	Open Grasses
Cullinan at Oyster Creek	1	3-6	Hardwood Flats, No Pine
Cullinan at Oyster Creek	2		Riparian Mixed Hardwoods, Emergent Wetlands

Invasive Species

Executive Order 13112 requires federal agencies to prevent the introduction of invasive species and provide for their control to minimize the economic, ecological, and human health impacts that invasive species cause. While EO 13112 applies to animal and plant invasive species, the proposed fuels reduction activities will likely reduce the amount of suitable habitat available for animal invasives. However, fuels reduction activities could provide avenues for the establishment of invasive plant species through accidental introduction and the removal of native vegetation.

Texas state agencies have identified 12 invasive plant species as particularly worrisome in the Gulf Coast Prairies and Marshes ecoregion shown in **Table 4.10**:

Table 4.10. Invasive Plant Species in the Gulf Coast Prairies and Marshes

Common Name	Scientific Name
Giant Salvinia	*Salvinia molesta*
Chinese Tallow Tree	*Triadica sebifera*
Salt Cedar	*Tamarix ramosissima*
Deep-rooted Sedge	*Cyperus entrerianus*
Brazilian Peppertree	*Schinus terebinthifolius*
Chinaberry Tree	*Melia azedarach*
Japanese Honeysuckle	*Lonicera japonica*
Chinese Privet	*Ligustrum sinense*
Common Water Hyacinth	*Eichhornia crassipes*
Alligatorweed	*Alternanthera philoxeroides*
Trifoliate Orange	*Poncirus trifoliate*
Guineagrass	*Urochloa maxima*

Source: Texas Invasive Plant & Plant Council

During June 2013 habitat surveys, no animal and six invasive plant species were recorded within project areas, including four species of state concern listed in the table above. The six observed invasive species include Chinese tallow tree, Japanese honeysuckle, Japanese privet (*Ligustrum japonicum*), Bermuda grass (*Cynodon* spp.), alligatorweed, and common water hyacinth. Woodland Park was the only park where invasive species were not documented. **Table 4.11** provides a list of project areas where invasive species are present.

Table 4.11. Invasive Plant Species – City of Houston Parks Project Areas

Park	Zone	Area	Invasive Species
Keith-Wiess	1	2, 3	Chinese tallow tree; Japanese honeysuckle
Coolgreen Corridor	1	1	Chinese tallow tree; Japanese honeysuckle; Japanese privet
Coolgreen Corridor	1	2, 4	Chinese tallow tree
Coolgreen Corridor	1	3	Chinese tallow tree; Japanese privet
Herman Brown	1		Chinese tallow tree; Japanese privet
Herman Brown	2		Chinese tallow tree; Japanese privet
Herman Brown	5		Chinese tallow tree
Herman Brown	6		Japanese honeysuckle
Herman Brown	7		Chinese tallow tree; Japanese privet; Bermuda grass
Cullinan JS & LH	1		Chinese tallow tree
Cullinan JS & LH	2		Chinese tallow tree
Hogg Bird Sanctuary	1		Chinese tallow tree; Japanese privet
Cullinan at Oyster Creek	1	1, 6	Japanese honeysuckle
Cullinan at Oyster Creek	1	3	Chinese tallow tree; Japanese honeysuckle

Park	Zone	Area	Invasive Species
Cullinan at Oyster Creek	1	5	Japanese privet
Cullinan at Oyster Creek	2		Chinese tallow tree; Japanese privet; alligatorweed; common water hyacinth

No Action Alternative

In the absence of a major wildfire in the seven parks, the no action alternative would have no effect on vegetation because the vegetation that is currently present would persist. While fire is a natural component to these ecosystems, years of fire suppression have increased fuel density and would likely increase the extent and intensity of future wildfires in the area. A major wildfire would be more likely under the no action alternative and would result in partial or complete loss of vegetation in the affected area.

Proposed Action

In general, the project areas consist of metro parks characterized by high levels of human disturbance and a preponderance of edge habitats. Proposed fuels reduction activities will remove significant amounts of vegetation; however, the majority of this vegetation is edge habitat located at the wildland-urban interface. Edge habitats generally contain weedy, adaptable plant species that easily recover from large disturbance events. Additionally, reduction areas will target dead or dying trees and understory woody and herbaceous plants. Removal of dead and dying trees could prevent the spread of disease to healthy trees and would improve the safety of those who use and live adjacent to park areas. Understory species are often quick to recover, and revegetation through natural succession occurs quickly. Therefore, while initial reduction activities will have a significant short-term impact on vegetation within the reduction zones, the proposed action will likely have little impact on the long-term health of existing vegetative communities.

Six invasive plant species were observed during June 2013 biological field surveys, including four species identified as a state concern. While fuels reduction activities could increase the likelihood of introduction and establishment of invasive species, EO 13112 requires FEMA to utilize best management practices to prevent the introduction and spread of invasive species and to detect and respond rapidly to control any such species. Vegetation reduction zones should be re-seeded or re-planted with native vegetation immediately after fuels reduction activities have ended to lessen the likelihood of the establishment of invasive plant species. Any invasive species encountered during fuels reduction activities or re-seeding should be removed.

4.5.2 Threatened and Endangered Species and Critical Habitat

The Endangered Species Act (ESA) of 1973 gives USFWS federal regulatory authority for the protection of threatened and endangered species. This protection includes a prohibition of direct take (e.g., killing, harassing) and indirect take (e.g., destruction of critical habitat). The proposed project sites are located in Harris County and the eastern part of Fort Bend County, Texas. Two species are listed as federally endangered for Harris and Fort Bend Counties and are shown in **Table 4.12** (USFWS 2013a and 2013b). The project area does not contain designated critical habitat for any federally listed species.

Table 4.12. Harris and Fort Bend Counties, Texas Federally Listed Species

Common Name	Scientific Name	Federal Status
Plants		
Texas prairie dawn-flower	*Hymenoxys texana*	Endangered
Mammals		
West Indian Manatee	*Trichechus manatus*	Endangered

Source: USFWS 2013a and 2013b

The Texas Parks and Wildlife Code prohibits the take of state-listed threatened and endangered species. In addition to the two federally listed species listed in **Table 4.12**, TPWD lists 28 species known to potentially occur in Harris and Fort Bend counties as state threatened or state endangered. The state listed species are shown in **Table 4.13**.

Table 4.13. Harris and Fort Bend Counties, State-Listed Species

Common Name	Scientific Name	State Status
Birds		
American Peregrine Falcon	*Falco peregrinus anatum*	Threatened
Attwater's Greater Prairie Chicken	*Tympanuchus cupido attwateri*	Endangered
Bald Eagle	*Haliaeetus leucocephalus*	Threatened
Interior Least Tern	*Sterna antillarum athalassos*	Endangered
Peregrine Falcon	*Falco peregrinus*	Threatened
Red-cockaded Woodpecker	*Picoides borealis*	Endangered
White-faced Ibis	*Plegadis chihi*	Threatened
White-tailed Hawk	*Buteo albicaudatus*	Threatened
Whooping Crane	*Grus americana*	Endangered
Wood Stork	*Mycteria americana*	Threatened
Plants		
Texas prairie dawn-flower	*Hymenoxys texana*	Endangered
Mammals		
Louisiana Black Bear	*Ursus americanus luteolus*	Threatened
Rafinesque's Big-eared Bat	*Corynorhinus rafinesquii*	Threatened
Reptiles		
Alligator Snapping Turtle	*Macrochelys temminckii*	Threatened
Green Sea Turtle	*Chelonian mydas*	Threatened
Kemp's Ridley Sea Turtle	*Lepidochelys kempii*	Endangered
Leatherback Sea Turtle	*Dermochelys coriacea*	Endangered
Loggerhead Sea Turtle	*Caretta caretta*	Threatened
Smooth Green Snake	*Liochlorophis vernalis*	Threatened
Texas Horned Lizard	*Phrynosoma cornatum*	Threatened
Timber/Canebrake Rattlesnake	*Crotalus horridus*	Threatened
Amphibians		
Houston Toad	*Anaxyrus houstonensis*	Endangered
Fish		

Common Name	Scientific Name	State Status
Creek Chubsucker	*Erimyzon oblongus*	Threatened
Smalltooth Sawfish	*Pristis pectinata*	Endangered
Mollusks		
False Spike Mussel	*Quadrula mitchelli*	Threatened
Louisiana Pigtoe	*Pleurobema riddellii*	Threatened
Sandbank Pocketbook	*Lampsilis satura*	Threatened
Smooth Pimpleback	*Quadrula houstonensis*	Threatened
Texas Fawnsfoot	*Truncilla macrodon*	Threatened
Texas Pigtoe	*Fusconaia askewi*	Threatened

Source: Texas Parks and Wildlife Department 2013

Additional federal regulations protect migratory birds and bald and golden eagles. Although the Migratory Bird Treaty Act (MBTA) applies to federal and state listed bird species, such as the Whooping crane and Peregrine falcon, it also applies to nearly all native North American bird species and is discussed in Section 4.5.3 Common Wildlife Species.

The Bald and Golden Eagle Protection Act (BGEPA) requires measures to prevent the harassment and take of Bald eagles resulting from human activities. The BGEPA provides for the protection of the Bald eagle and the Golden eagle by prohibiting the take, possession, sale, purchase, barter, transport, export, or import of any Bald or Golden eagle, alive or dead, including any part, nest, or egg, unless allowed by permit (16 U.S.C. 668(a); 50 CFR 22). Take means to pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, destroy, molest, or disturb. This includes inactive nests as well as active eagle nests.

The Golden eagle has not been documented in the project areas and is not listed as being present within Harris or Fort Bend counties. However, the Bald eagle is a known inhabitant of both counties and could potentially be found within the project areas.

A field survey was conducted on June 5, 2013 and June 6, 2013 to characterize the wildlife communities and habitat types within the project areas (**Appendix E**). In addition to documenting general wildlife observations and the dominant vegetation types present, the survey focused on determining the presence or absence of listed species and their habitats. The field survey was supplemented by a desktop analysis and literature review to determine the likelihood that listed species are present within the project areas.

The field surveys, desktop analysis, and literature review concluded that the wetlands and waterways and the maintained park and fragmented forest habitat located within the project areas in Harris and Fort Bend counties do not contain suitable habitat for the federally listed Texas prairie dawn and the West Indian manatee. Likewise, the project areas do not contain suitable habitat for the state-listed Attwater's greater prairie chicken, Interior least tern, smalltooth sawfish, Louisiana black bear, red wolf, green sea turtle, Kemp's Ridley sea turtle, leatherback sea turtle, loggerhead sea turtle, Texas horned lizard, creek chubsucker, smalltooth sawfish, false spike mussel, Louisiana pigtoe, sandbank pocketbook, smooth pimpleback, Texas fawnsfoot, and Texas pigtoe. Therefore, no impacts from the proposed action on these federally and state listed species are expected.

Field surveys did document potential habitat within project areas for 13 state listed species within Harris or Fort Bend counties. These species and a description of potential habitat located within project areas are provided in **Table 4.14**. Additional details may be found in the Listed Species Summary Table in **Appendix E**.

Table 4.14. State-Listed Species for Harris and Fort Bend Counties With Potential Habitat Present by Park

Species	Park	Potential Habitat
Alligator Snapping Turtle	Cullinan Park at Oyster Creek	Pumpkin Lakes and Oyster Creek
	Hogg Bird Sanctuary	Buffalo Bayou
American Peregrine Falcon	Cullinan Park at Oyster Creek	Stopover habitat adjacent to Zone 2 at Pumpkin Lakes
Bald Eagle	Hogg Bird Sanctuary	Low-quality nesting habitat – Buffalo Bayou
Houston Toad	Cullinan Park at Oyster Creek	Pumpkin Lakes
	Cullinan JS & LH	Zone 2 Pond
	Hogg Bird Sanctuary	Ephemeral Pools
Peregrine Falcon	Cullinan Park at Oyster Creek	Stopover habitat adjacent to Zone 2 at Pumpkin Lakes
Rafinesque's Big-eared Bat	Cullinan Park at Oyster Creek	Roosting habitat
	Cullinan JS & LH	Roosting habitat
	Hogg Bird Sanctuary	Roosting habitat
Red-cockaded Woodpecker	Keith-Wiess	Low-quality foraging; no cavities/nesting
	Hogg Bird Sanctuary	Low-quality foraging; no cavities/nesting
	Herman Brown	Low-quality foraging; no cavities/nesting
Smooth Green Snake	Cullinan Park at Oyster Creek	Wetland areas
Timber/Canebrake Rattlesnake	Cullinan Park at Oyster Creek	Pumpkin Lakes and Oyster Creek
	Cullinan JS & LH	Zone 2 Pond
	Hogg Bird Sanctuary	Buffalo Bayou; Ephemeral Drainage
	Keith-Wiess	Halls Bayou
White-faced Ibis	Cullinan Park at Oyster Creek	Stopover at Pumpkin Lakes and Oyster Creek
	Cullinan JS & LH	Stopover at Zone 2 Pond
	Hogg Bird Sanctuary	Stopover at Ephemeral Pools and Buffalo Bayou
White-tailed Hawk	Woodland Park	Live Oak Savanna
Whooping Crane	Cullinan Park at Oyster Creek	Stopover at Pumpkin Lakes and Oyster Creek
	Cullinan JS & LH	Stopover at Zone 2 Pond
	Hogg Bird Sanctuary	Stopover at Ephemeral Pools and Buffalo Bayou
Wood Stork	Cullinan Park at Oyster Creek	Stopover at Pumpkin Lakes and Oyster Creek
	Cullinan JS & LH	Stopover at Zone 2 Pond
	Hogg Bird Sanctuary	Stopover at Ephemeral Pools and Buffalo Bayou

No Action Alternative

In the absence of a major wildfire in the seven parks, the no action alternative would have no effect on protected species because existing conditions would continue unchanged. However, a major wildfire would be more likely under the no action alternative and would damage potential habitat of the state listed and federally protected Bald eagle. A major wildfire would also result in direct take of the less mobile listed species (e.g., Houston Toad). Additionally, ash deposition resulting from wildfires would degrade water quality and significantly impact state-listed aquatic species.

Proposed Action

Despite the potential habitat present, none of the 13 state-listed species were observed during June 2013 surveys and no evidence of presence (e.g. nests, tracks, droppings) was recorded. In addition, desktop analysis and literature reviews determined that the Rafinesque's big-eared bat, timber/canebrake rattlesnake, and White-tailed hawk are unlikely to be found within the fragmented forested and maintained parkland habitats within the project areas. While the wetlands and waterways could provide stopover habitat for listed waterbirds, such as the White-faced ibis, Whooping crane, and Wood stork, and resident habitat for aquatic and semi-aquatic reptiles and amphibians, including the alligator snapping turtle, Houston toad, and smooth green snake, proposed fuels reduction activities will not occur within wetlands or waterways. BMPs will be implemented for any activities conducted on lands adjacent to wetlands and waterways to protect riparian habitats and water quality. Therefore, based on field habitat evaluations, review of available data on species occurrences and habitat requirements, and review of species information from TPWD, the proposed fuels reduction activities are not expected to have an adverse effect on state-listed species.

In addition, habitat is not present for the federally listed Texas prairie dawn-flower or the West Indian Manatee within any of the seven parks. FEMA has determined that the project will have no effect to these federally endangered species. In addition, FEMA has determined there will be no adverse modification to critical habitat as none has been designated in the project area.

Both the Bald eagle and Peregrine falcon have recently been delisted by the USFWS; however, both species remain protected by additional regulations at the federal and state level. The state-listed threatened Peregrine falcon, including both the American and arctic subspecies, are not likely to nest within the project areas because their preferred nesting habitat – tall cliffs – is not present. However, biologists conducting site surveys in June 2013 noted that falcons may use the area as temporary stopover habitat during migration. Given the level of human disturbance, the species' ability to find alternative suitable habitat, and the lack of recorded sightings in the area, it is unlikely that the proposed action will impact Peregrine falcons.

The June 2013 wildlife and habitat surveys also documented that potential Bald eagle (state threatened) nesting habitat, consisting of large pines, is present within the project area, particularly surrounding Buffalo Bayou in Hogg Bird Sanctuary. However, no active or abandoned nests or evidence of eagle activity was documented in the area. Therefore, the proposed action is unlikely to adversely impact Bald eagles. If the project activities occur adjacent to any occupied or unoccupied Bald or Golden eagle nest, the applicant must contact FEMA and consult with USFWS before work begins.

4.5.3 Common Wildlife Species

In addition to the listed species discussed in the previous section, the proposed action has the potential to impact common wildlife species and their habitats. **Table 4.15** provides a list of species that were recorded during site surveys conducted in June 2013.

Table 4.15. Common Wildlife Species Observed Within Project Areas

Common Name	Scientific Name
Birds	
American Robin	*Turdus migratorius*
American Crow	*Corvus brachyrhynchos*
Blue Jay	*Cyanocitta cristata*
Carolina Chickadee	*Poecile carolinensis*
Great Egret	*Ardea alba*
Mourning Dove	*Zenaida macroura*
Mallard	*Anas platyrhynchos*
Northern Cardinal	*Cardinalis cardinalis*
Northern Mockingbird	*Mimus polyglottos*
Mammals	
American Red Squirrel	*Tamiasciurus hudsonicus*
Eastern Gray Squirrel	*Sciurus carolinensis*
Eastern Fox Squirrel	*Sciurus niger*

Common species observed during field surveys are typical of residential communities located at the rural-urban fringe. The park woodland habitats likely support additional species adapted to modified habitats in residential areas, such as frogs, snakes, common songbirds, vultures, hawks, opossum, raccoon, and white-tailed deer.

While not afforded the same protections as federal- and state-listed species, common wildlife species are protected under several federal regulations. The MBTA, which implements various treaties and conventions between the United States, Canada, Japan, Mexico, and the former Soviet Union, decrees that all migratory birds and their parts (including eggs, nests, and feathers) are fully protected. Nearly all native North American bird species are protected by the act. Under the act, taking, killing, or possessing migratory birds is unlawful. According to TPWD, over 600 species of birds have been observed in the state of Texas, more than any other state in the United States. Over 75 species are unique to the upper Texas coast, which includes Harris and Fort Bend counties. Due to its location on the Central Flyway, the majority of species likely to be found within the Houston Parks study areas are seasonal residents or migrants. While only present for part of the year, any changes in environmental conditions in the study areas could have a potential impact on these species.

The Magnuson-Stevens Fishery Conservation and Management Act applies to saltwater fish, including anadromous fish, which swim up rivers from coastal areas to spawn in fresh water. The Texas striped bass is an example of an anadromous species found in the coastal regions of southeastern Texas. However, the streams in the seven parks (Buffalo Bayou, Little White Oak Bayou, Greens Bayou, Halls Bayou, and Upper Oyster Creek) have no record of anadromous fish

and do not provide a suitable, unobstructed conveyance or habitat to accommodate anadromous fish.

No Action Alternative

In the absence of a major wildfire in the parkland areas, the no action alternative would have no effect on common wildlife species in the project area. However, a major wildfire would be more likely under the no action alternative and could result in the direct mortality of wildlife and the modification or destruction of wildlife habitat.

Proposed Action

The birds and mammals observed and expected in the project area are common urban species that are well adapted to habitats that are heavily influenced by human activity. While several of these species use canopy trees and understory shrubs for foraging, nesting, and other life functions, they are highly mobile species that are likely to move to adjacent suitable habitat during tree removal activities. Therefore, the majority of potential impacts would likely be temporary in nature and have little effect on local populations. As a result, significant adverse impacts from the proposed action to the various bird and mammal species documented within the project area are not expected.

All of the bird species listed in **Table 4.12**, **Table 4.13**, **Table 4.14**, and **Table 4.15** are afforded protection under the MBTA. To comply with the Migratory Bird Treaty Act, the City of Houston will limit vegetation management work during the peak migratory bird nesting period of March through August as much as possible to avoid destruction of individuals, nests, or eggs. If vegetation reduction activities must occur during the nesting season, the City of Houston will deploy a qualified biological monitor with experience conducting breeding bird surveys to survey the vegetation management area for nests prior to conducting work. The biologist will determine the appropriate timing of surveys in advance of work activities. If an occupied migratory bird nest is found, work within a buffer zone around the nest will be postponed until the nest is vacated and juveniles have fledged. The biological monitor will determine an appropriate buffering radius based on species present, real-time site conditions, and proposed vegetation management methodology and equipment. For work near an occupied nest, the biological monitor would prepare a report documenting the migratory species present and the rationale for the buffer radius determination, and submit that report to FEMA for inclusion in project files. The City of Houston will retain larger diameter (6 inches or greater in diameter) dead trees as snags whenever practical, at an average rate of 1 to 3 per acre while still achieving fuels reduction.

Anadromous fish are not present within the project area, and the proposed action will not impact streams; therefore, the proposed action would have no effect on fish protected by the Magnuson-Stevens Act.

4.6 Cultural Resources

The National Historic Preservation Act (NHPA) of 1966 (16 U.S.C 470 et seq.) establishes the federal policy to protect historic properties and promote historic preservation in cooperation with states, tribal governments, local governments, and other consulting parties. The NHPA created the National Register of Historic Places (NRHP) and designated the state historic preservation officer

(SHPO) as the entity responsible for administering state-level programs. The NHPA also created the Advisory Council on Historic Preservation (ACHP), the federal agency responsible for overseeing the Section 106 process and providing commentary on federal activities, programs, and policies that affect historic properties.

Section 106 of the NHPA and its implementing regulations (36 CFR Part 800) establish the procedures for federal agencies to follow in taking into account the effects of their actions on historic properties. The Section 106 process applies to any federal undertaking that has the potential to affect historic properties, defined in the NHPA as those properties (archaeological sites, standing structures, or other historic resources) that are listed in or eligible for listing in the NRHP. Although buildings and archaeological sites are most readily recognizable as historic properties, a diverse range of resources are listed in the NRHP, including roads, landscapes, and vehicles.

Under Section 106, federal agencies are responsible for identifying historic properties within the area of potential effects (APE) for an undertaking, assessing the effects of the undertaking on those historic properties, if present, and considering ways to avoid, minimize, and mitigate any adverse effects of its undertaking on historic properties. It is the primary regulatory framework that is used in the NEPA process to determine impacts on cultural resources.

Cultural resources consist of locations of human activity, occupation, or use identified through field inventory, historic documentation, or oral evidence. The term includes archaeological, historic, and architectural properties and sites or places of traditional cultural or religious importance to Native American tribes or other social or cultural groups (**Appendix F**).

4.6.1 Historic Properties

Archival research conducted via the Texas Historical Commission's (THC) Texas Historic Sites Atlas web site indicated that no previously recorded historic architectural properties or NRHP properties or districts have been identified within or in the immediate vicinity of all of the seven parks. The closest NRHP property or district is approximately 4 miles northwest of Cullinan JS & LH Park; 6 miles southwest of Cullinan Park at Oyster Creek; 5 miles southwest of Keith-Wiess Park; 5 miles south of Herman Brown Park; 5 miles south of Coolgreen Corridor; and ¾ mile southeast of Woodland Park. The Bayou Bend National Register District is within approximately 900 feet of the Hogg Bird Sanctuary though the proposed action would be conducted completely outside of this district.

4.6.2 Archaeological Sites

Based on a review of the THC Atlas and sites that are registered with the Texas Archeological Research Laboratory (TARL), FEMA determined that Cullinan JS & LH Park, Coolgreen Corridor Park, and Woodland Park do not have any previously recorded archeological sites. Herman Brown Park, and Hogg Bird Sanctuary each have several recorded archeological sites within the park, but the sites are not within or immediately adjacent to the APE for the proposed work in these parks. Cullinan Park at Oyster Creek contains multiple recorded archeological sites and several are in close proximity to the APE for the proposed work in this park. Keith-Wiess Park contains a few previously recorded archeological sites, one of which is within the APE at the southwest corner of

the park. The applicant must deploy a Secretary of the Interior (SOI)-qualified archeological monitor for all proposed fuels reduction activities in Cullinan Park at Oyster Creek and for fuels reduction activities within the southwest corner of Keith-Wiess Park.

4.6.3 Native American Cultural/Religious Sites

No registered American Indian traditional cultural properties are located on or near the proposed project sites.

No Action Alternative

Under the no action alternative, the proposed project would have no impact on cultural resources, and FEMA has determined that no historic architectural properties would be affected by the no action alternative.

Proposed Action

On April 2, 2013, FEMA provided documentation via email of consultation with Region VI's tribal consultation specialist. Based on that consultation, there is no need for Section 106 tribal consultation for this project as it is not located in areas where there is tribal interest.

The proposed action was coordinated with the SHPO, and correspondence is included in **Appendix G**. In a letter dated July 26, 2012, SHPO made a determination of "no historic properties affected; project may proceed" for Woodland Park and Hogg Bird Sanctuary in response to an inquiry that was sent by the City of Houston.

On May 9, 2013, FEMA initiated Section 106 consultation with the SHPO. Based on the archival research and previous coordination with the SHPO regarding this project, FEMA made a determination of No Historic Properties Affected for the undertaking at Cullinan JS & LH Park, Brown (Herman) Park, Coolgreen Corridor, Hogg Bird Sanctuary, and Woodland Park. Due to the potential presence of archeological resources at Cullinan Park at Oyster Creek and Keith-Wiess Park and based on the archeological monitoring requirement, FEMA made a determination of No Adverse Effect to Historic Properties for work at these two parks. SHPO concurred with FEMA's determination on June 7, 2013. To mitigate any potential impact to archeological rsources, the applicant must deploy a Secretary of the Interior (SOI)-qualified archeological monitor for all proposed fuels reduction activities in Cullinan Park at Oyster Creek and for fuels reduction activities within the southwest corner of Keith-Wiess Park.

FEMA has determined that the proposed action would have no adverse impact on cultural resources.

In the event that archeological deposits, including any Native American pottery, stone tools, bones, or human remains are uncovered, the project must be halted immediately in the vicinity of the discovery, and all reasonable measures must be taken to avoid or minimize harm to the finds. The subapplicant must secure all archeological findings and restrict access to the sensitive area. The subapplicant must inform FEMA immediately, and FEMA will consult with the SHPO. Work in sensitive areas must not resume until consultation is completed and until FEMA determines that

appropriate measures have been taken to ensure compliance with the NHPA and its implementing regulations.

4.7 Socioeconomics

This section provides an overview of the affected area and potential environmental effects of the no action and proposed action alternatives on socioeconomic resources, including environmental justice, hazardous materials, noise, traffic, public services and utilities, and human health and safety.

4.7.1 Environmental Justice

Environmental justice is defined by EO 12898 (59 *Federal Register* 7629) and CEQ Guidance (1997). Under EO 12898, demographic information is used to determine whether minority populations or low-income populations are present in the areas potentially affected by the range of project alternatives. If so, a determination must be made whether implementation of the program alternatives may cause disproportionately high and adverse human health or environmental impacts on those populations.

This environmental justice analysis is focused at the local (census tract) level. The local area included in this analysis is where project-related activities would occur, or project-related traffic would increase, potentially causing an adverse and disproportionately high effect on neighboring minority and low-income populations. For this project, the analysis includes the Census Tracts listed in **Table 4.16** (U.S. Census Bureau 2010b). **Table 4.16** and **Table 4.17** provide economic and demographic characteristics in the project area. Information for Harris and Fort Bend counties as a whole are presented for comparison.

Low Income Populations

Residents of areas with a high percentage of people living below the poverty level may be considered low-income populations. The U.S. Census Bureau poverty threshold for a family of four (two adults and two children) in 2012 was $23,681 and $11,945 for an individual (U.S. Census Bureau 2013a). Low-income populations are also considered to include residents of areas where the median family income is less than 60 percent of the median income of the surrounding area.

Poverty rates for the census tracts as well as Fort Bend and Harris counties are provided in **Table 4.16**. Fort Bend and Harris counties have a poverty rate of 8.3 percent and 17.3 percent, respectively; therefore, a local population with a total of 16.6 percent (Fort Bend County) and 34.6 percent (Harris County) of their population living in poverty is considered to be meaningfully greater for this analysis. A portion of Keith-Wiess Park is located in census tract 2219, which has a poverty rate of 38.7 percent and indicates this is a low income population.

The median family and household incomes are lower than the County incomes in some census tracts and higher than the County average in other census tracts (**Table 4.16**). The following parks are located in census tracts that have median family and household incomes lower than the County in which they are located: Keith-Wiess (census tracts 2223 and 2219), Coolgreen Corridor (census

tract 2327.02), Cullinan JS & LH Park (census tract 3328), and portions of the area around Herman Brown (census tract 2327.01).

Minority Populations

CEQ (1997) defines the term "minority" as persons from any of the following groups: Black, Asian or Pacific Islander, American Indian or Alaskan Native, and Hispanic. The U.S. Census Bureau does not treat “Hispanic or Latino” as a racial category, so people identifying themselves as Hispanic or Latino make a separate selection of a racial category. This analysis is based on U.S. Census Bureau data from the American Community Survey. For the purposes of this analysis, "minority" includes all people who do not identify themselves as “white alone” plus Hispanics and Latinos who identify themselves as “white alone."

As shown in **Table 4.17**, the project areas have a moderate to high percentage of minority residents compared to the County within which each park resides (see **Table 4.16)**. In Harris County 47.9 percent of the population is minority while in Fort Bend County 52.1 percent of the population is a minority. The following parks are located in census tracts that have a higher percentage of minority residents compared to the County they are in: Cullinan Park at Oyster Creek (census tract 6728), Keith-Wiess Park (census tracts 2219 and 2223), Coolgreen Corridor Park (census tract 2327.02), Cullinan JS & LH Park, a portion of Herman Brown Park (census tract 2327.01).

No Action Alternative

Under the no action alternative, all populations within the project area would continue to be at risk of a catastrophic wildfire. The no action alternative would not have a disproportionately high and adverse human health or environmental effect on low-income or minority populations and meets the requirements of EO 12898.

Proposed Action

The proposed action could have temporary air quality and traffic related effects on minority populations in close proximity to the project area. See Section 4.2.2 Air Quality and Section 4.7.4 Traffic for additional information.

The proposed action would also have a beneficial effect on all people living and working in the vicinity of the project area, including any low-income or minority persons, as it would reduce the risk of harm to personal property and persons from wildfire. No disproportionately high and adverse impacts to low-income or minority populations would result from the proposed action. Therefore, the proposed action would comply with EO 12898.

Table 4.16. Income

Parameter	Harris County census tract 2219	Harris County census tract 2223	Harris County census tract 2326	Harris County census tract 2327.01	Harris County census tract 2327.02	Harris County census tract 3328	Harris County census tract 5103	Harris County census tract 5108	Harris County	Fort Bend County census tract 6728	Fort Bend County
Percentage of population below poverty level	38.7%	22.8%	4.8%	31.4%	26.9%	31.0%	5.9%	5.0%	17.3%	13.6%	8.3%
Median family income	$36,474	$43,972	$72,864	$35,290	$31,535	$31,711	$124,395	$176,417	$60,260	$102,500	$90,760
Median household income	$35,701	$45,218	$73,750	$33,297	$31,809	$30,772	$74,900	$112,992	$52,675	$94,142	$82,571

Table 4.17. Minority Populations

Ethnic Composition	Harris County census tract 2219	Harris County census tract 2223	Harris County census tract 2326	Harris County census tract 2327.01	Harris County census tract 2327.02	Harris County census tract 3328	Harris County census tract 5103	Harris County census tract 5108	Harris County	Fort Bend County census tract 6728	Fort Bend County
White alone	2,912	2,463	2,169	3,870	2,801	3083	5104	5090	2,464,110	2,214	307,725
	67.8%	65.3	66.5	50.0	48.5	62.6	94.3	85.4%	62.2%	29.1%	55.6%
Black or African American alone	61	155	66	2,004	1,169	508	19	160	759,849	1,409	121,971
	1.4%	4.1%	2.0%	25.9%	20.2%	10.3%	0.4%	2.7%	19.2%	18.5%	22.0%
Asian alone	63	46	0	55	0	40	57	425	249,348	3,841	95,134
	1.5%	1.2%	0.0%	0.7%	0.0%	0.8%	1.1%	7.%	6.3%	50.5%	17.2%
American Indian alone	0	0	127	0	0	0	0	0	16,650	0	1,620
	0.0%	0.0%	3.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.4%	0.0%	0.3%
Native Hawaiian alone	0	0	0	0	0	0	0	0	2,447	0	31
	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%
Some other race or multi-racial	1,255	1,106	899	1,810	1,809	1,297	230	287	463,883	145	26,998
	29.2%	29.3%	27.6%	23.4%	31.3%	26.3%	4.3%	4.8%	11.7%	1.9%	4.9%
Total Population	**8,285**	**7,061**	**5,900**	**13,053**	**10,007**	**9,024**	**7,115**	**6,715**	**5,577,352**	**8,588**	**687,548**
Hispanic or Latino[1]	3,994	3,291	2,639	5,314	4,228	4,096	1,705	753	1,621,065	979	134,069
	3.1%	87.3%	80.9%	68.7%	73.2%	83.1%	31.%	12.6%	50.0%	12.9%	24.2%
Total Minority Population[2,3]	**4,118**	**3,546**	**2,776**	**7,390**	**5,333**	**4,627**	**1,977**	**1,545**	**2,671,541**	**6,287**	**358,067**
	49.7%	50.2%	47.1%	56.6%	53.3%	51.3%	27.8%	23.0%	47.9%	73.2%	52.1%

Notes:

[1] The term "Hispanic or Latino" is an ethnic category and can apply to members of any race, including respondents who self-identified as "White." The total numbers of Hispanic residents for each geographic region are tabulated separately from the racial distribution by the U.S. Census Bureau.

[2] A minority is defined in CEQ's environmental justice guidance as a member of the following population groups: American Indian/Alaskan Native, Asian or Pacific Islander, Black (non-Hispanic), or Hispanic (CEQ 1997).

[3] "Total Minority" includes all people who are not "White alone" plus Hispanics and Latinos who are white alone.

4.7.2 Hazardous Materials

Hazardous materials are those substances defined by the Comprehensive Environmental Response, Compensation, and Liability Act, as amended by the Superfund Amendments and Reauthorization Act, and the Toxic Substances Control Act. The Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act, which was further amended by the Hazardous and Solid Waste Amendments, defines hazardous wastes. In general, both hazardous materials and hazardous waste include substances that, because of their quantity, concentration, physical, chemical, or infectious characteristics, may present substantial danger to public health or the environment when released or otherwise improperly managed.

To determine whether any hazardous waste facilities exist within the vicinity or upgradient of the project areas, or whether there is a documented environmental issue or concern that could affect the proposed project areas, a search for Superfund sites, toxic release inventory sites, industrial water dischargers, hazardous facilities or sites, and multi-activity sites was conducted using EPA's Envirofacts database.

According to EPA's EnviroMapper for Envirofacts, more than 400 RCRA facilities and industrial wastewater facilities are within one mile, a buffer suggested by the fire department and accepted by the City of Houston PARD, of the seven parks. Maps generated using Envirofacts EnviroMapper for the air, water, waste, land, and toxics media for each of the seven parks are shown in **Figure 4.5** through **Figure 4.10**.

No Action Alternative

Under the no action alternative, conditions in the project area would remain the same, and wildfire hazard at the seven parks would remain at its current elevated level. There would be no effects related to hazardous materials under the no action alternative. In the event of a major wildfire, chemical fire retardants could be applied, but the impacts would not be significant.

Proposed Action

Under the proposed action, no impacts from hazardous materials are anticipated because no active Superfund sites, toxic release inventory sites, industrial water dischargers, hazardous waste facilities or sites, or multi-activity sites are within the proposed project area (EPA 2013). The proposed action would not affect the facilities near the area.

Implementation of the proposed action would involve the use of heavy equipment with some associated minor risk of spills of fuels, oils, or cleaning fluids. The application of BMPs for equipment use would avoid these effects and there would be no significant impacts related to hazardous materials under the proposed action. Excavated soil and waste materials would be managed and disposed of in accordance with applicable local, state, and federal regulations. If contaminated materials are discovered during the project activities, work would cease until the appropriate procedures and permits can be implemented. Any hazardous materials discovered, generated, or used during construction would be handled and disposed of in accordance with applicable local, state, and federal regulations.

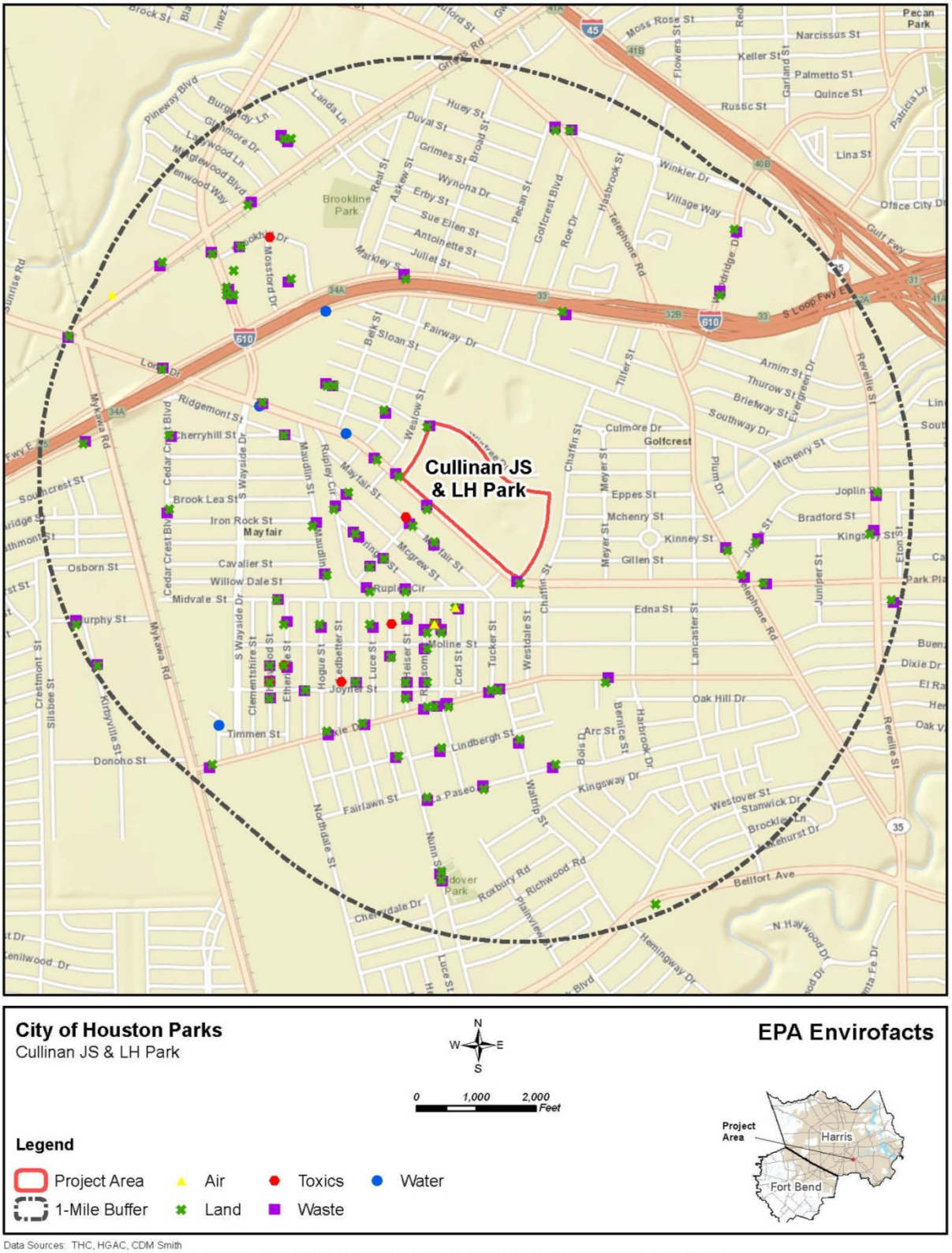


Figure 4.5. Cullinan JS & LH Park

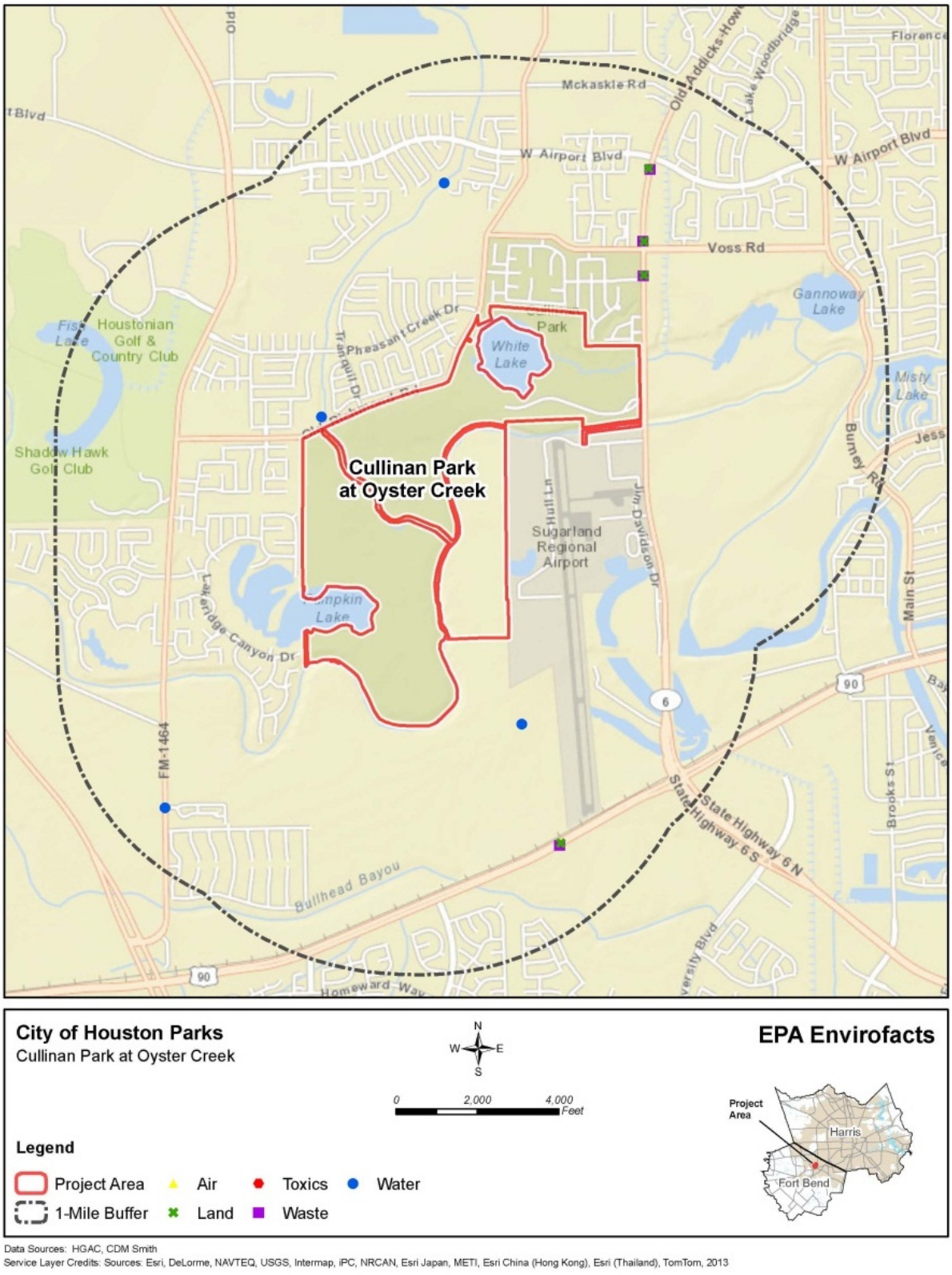


Figure 4.6. Cullinan Park at Oyster Creek

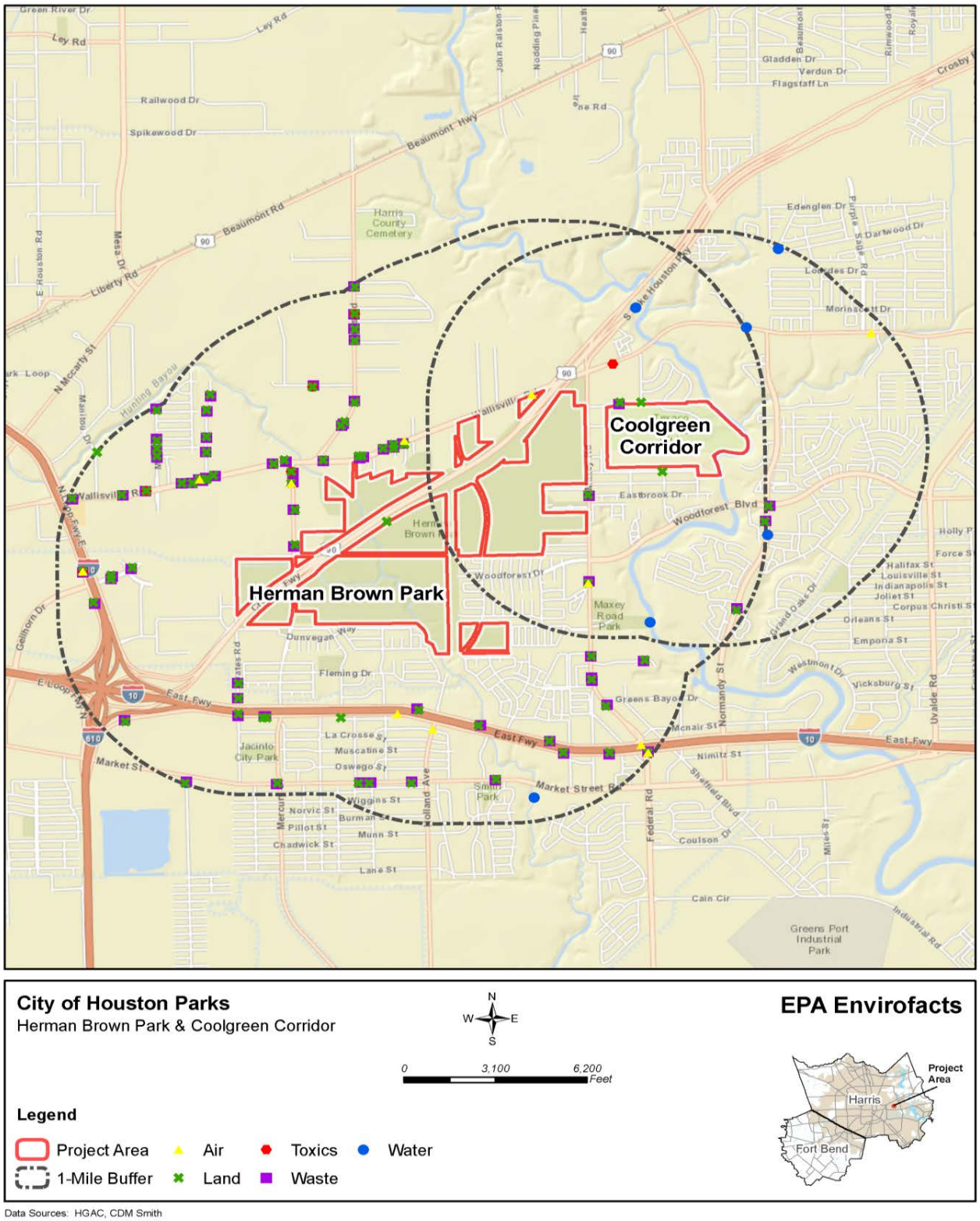


Figure 4.7. Herman Brown Park and Coolgreen Corridor

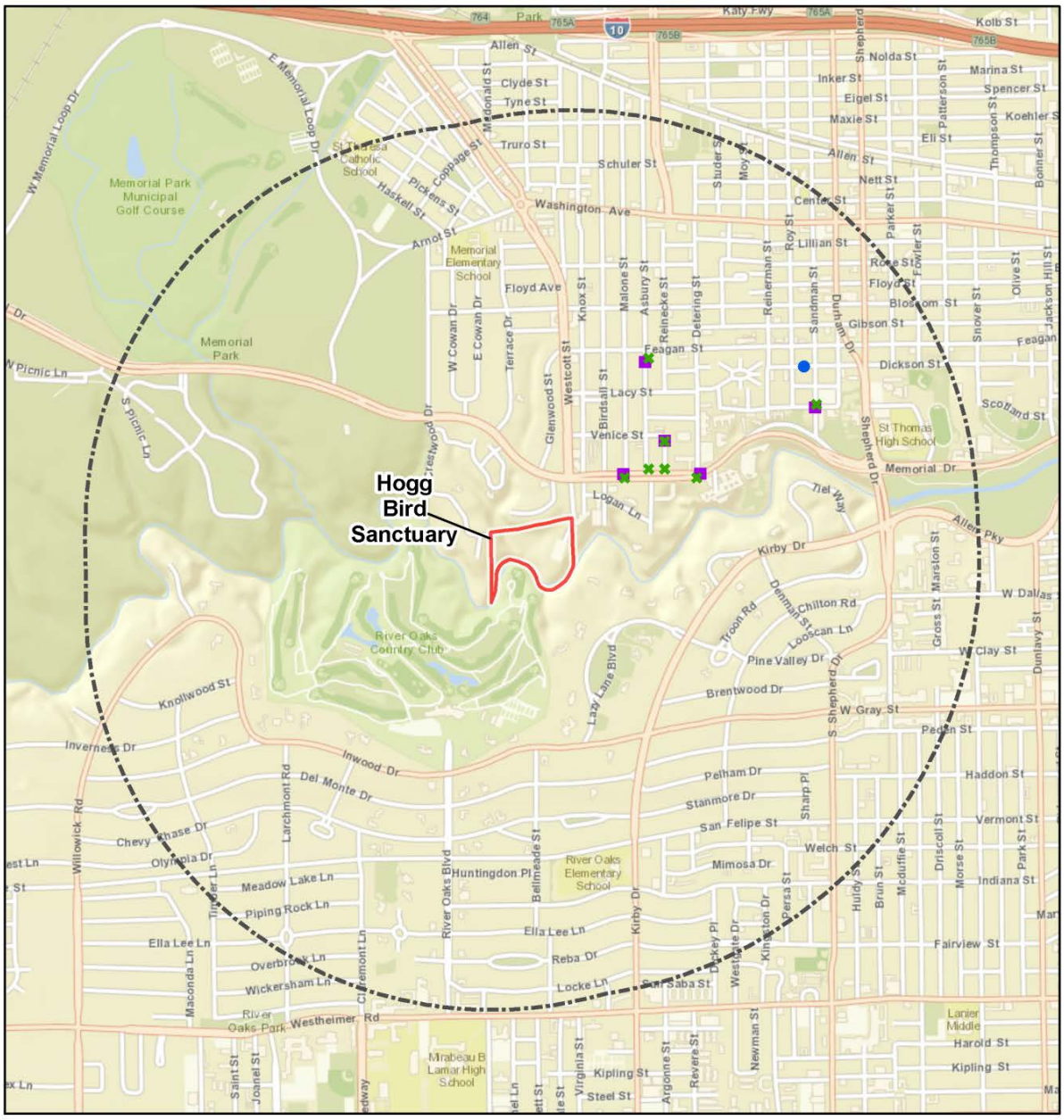


Figure 4.8. Hogg Bird Sanctuary

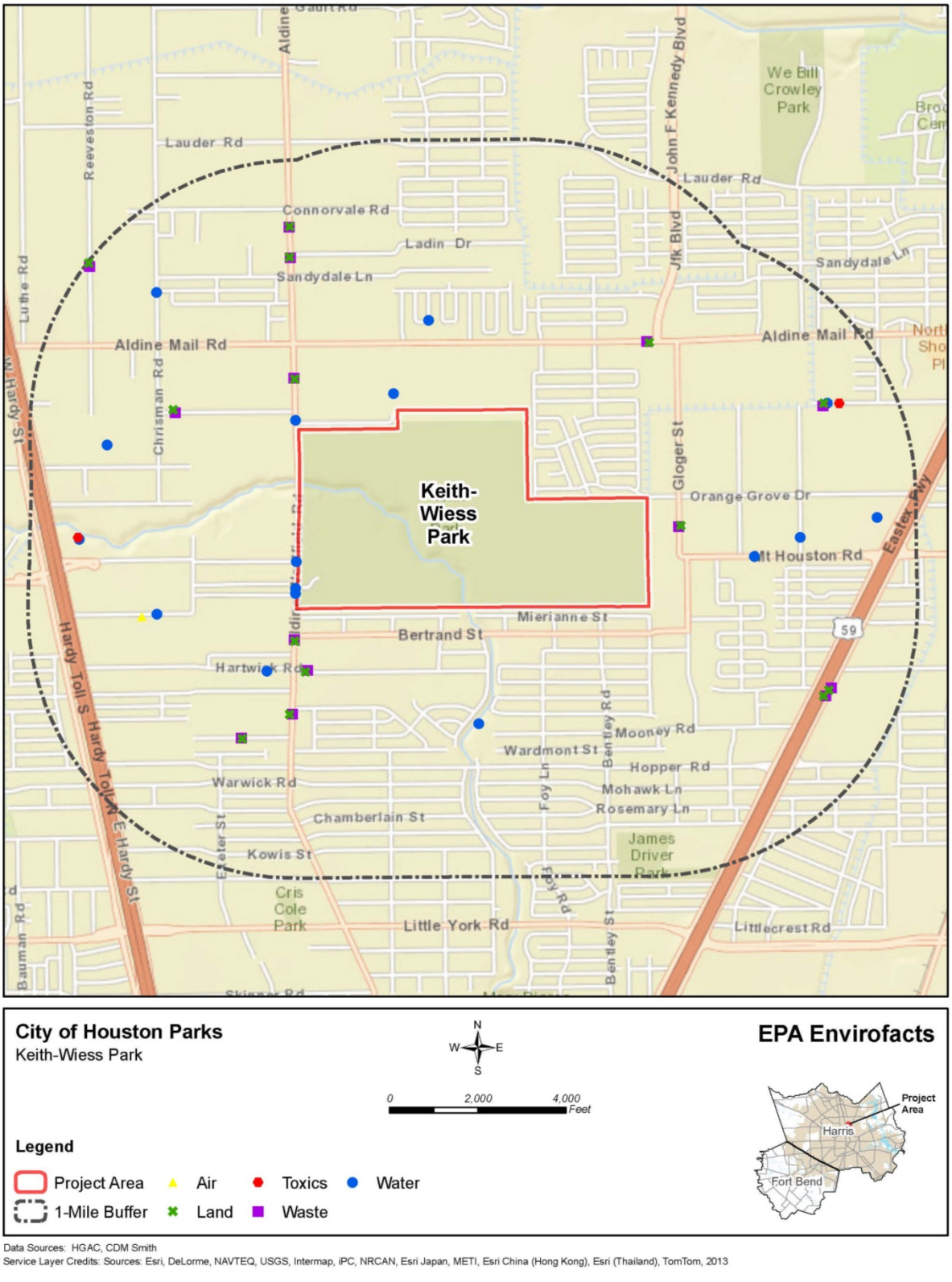


Figure 4.9. Keith-Wiess Park

Figure 4.10. Woodland Park

4.7.3 Noise

Sounds that disrupt normal activities or otherwise diminish the quality of the environment are designated as noise. Noise events that occur during the night (10 p.m. to 7 a.m.) are more disturbing than those that occur during normal waking hours (7 a.m. to 10 p.m.). Noise is typically associated with climatic conditions (wind, thunder), transportation (traffic on roads, airplanes), and other "life sounds" (people talking, children playing). The potential effects of noise are related to distance from the source, background levels, and the randomness of a noise.

Assessment of noise impacts includes the project's proximity to sensitive receptors. A sensitive receptor is defined as an area of frequent human use that would benefit from a lowered noise level. Typical sensitive receptors include residences, schools, churches, hospitals, and libraries. The project areas are located along the edges of wooded parkland areas that are adjacent to single-family homes, multi-family housing, and some commercial-light industrial areas in a medium-density residential setting. The project area is adjacent to homes and any noise generating activities within these areas would have the potential to affect these sensitive receptors.

No Action Alternative

Under the no action alternative, no fire hazard mitigation measures would occur; thus, there would be no change in existing noise levels that could affect sensitive receptors in the project area.

Proposed Action

Under the proposed action, noise would be generated by operation of equipment involved in cutting of vegetation and debris removal. Limiting noise to daytime hours would reduce effects to the homes adjacent to the proposed project areas. Fuels reduction activities must take place during normal business hours. Equipment and machinery used at the proposed project site must meet local, state, and federal noise control-regulations. All internal combustion engines would be equipped with properly operating mufflers and air inlet silencers, where appropriate, that meet or exceed original factory specifications. The increased noise levels from the proposed action are not expected to cause significant adverse impacts on the surrounding environment.

4.7.4 Traffic

The proposed project areas are served by a system of primarily residential streets that access most of the proposed work zones from the private side.

No Action Alternative

Existing conditions would remain the same under the no action alternative and there would be no impact on traffic or the transportation system. In the event of a major wildfire, which would be more likely under the no action alternative, the local road system could be disrupted by residents attempting to escape the fire.

Proposed Action

The proposed action would have a low impact on the traffic around the project area. Trucks and equipment would likely be driven to the site from nearby areas using local highways and streets. In

most cases, trucks and equipment would work from within the parkland properties while leaving local streets unobstructed during the fuels reduction work. Therefore, there would not be a significant impact on local traffic patterns under the proposed action.

4.7.5 Public Services and Utilities

City of Houston Public Utilities provides water and wastewater service to developed areas adjacent to the proposed project areas. Electrical power is supplied by Center Point Energy, Reliant Energy and potentially six other potential electric companies by a combination of overhead and underground lines. Natural gas is supplied by other providers.

No Action Alternative

Existing conditions would remain the same under the no action alternative and there would be no effect on public services or utilities except in the event of a major wildfire, which would be more likely under the no action alternative. A wildfire would involve local firefighters and law enforcement who may not be able to respond to other emergencies during that time. A major wildfire could also affect overhead power lines.

Proposed Action

The proposed action would not directly affect utilities or require additional utilities in the project area. The proposed action would reduce the risk of a major wildfire in the project area and contribute to the containment of wildfires, which would prevent or reduce damage to utilities.

4.7.6 Public Health and Safety

The risk of a catastrophic fire in the project area is high because of heavy fuel loading (closely spaced trees and shrubs and dead material on the forest floor) that has accumulated over time. Heavy rain following wildfires can contribute to sediment and debris in nearby waterways, which can affect downstream water quality and damage structures, roads, and utilities critical to the safety and well-being of citizens downstream from the project area.

No Action Alternative

A major wildfire in the project area would be more likely under the no action alternative. If a wildfire occurred, people in and near the burned area would be at risk. Wildfires can generate substantial amounts of particulate matter, which can affect the health of people breathing the smoke-ladden air. Therefore, the health of people downwind of a wildfire, especially young children, the elderly, and people with lung disease or asthma, could be adversely affected. Major wildfires are also a major threat to the health and safety of frontline firefighters.

Proposed Action

Under the proposed action, the project would have a positive impact on public health and safety by mitigating the potential wildfire hazard in the proposed project areas. The proposed action would reduce the intensity and size of wildfires and reduce the potential for a catastrophic fire. Fires that spread at a lower rate and intensity are easier to control, which greatly reduces the hazard to people and homes.

4.8 Summary of Effects and Mitigation

Table 4.18. Summary of Impacts and Mitigation

Affected Environmental Resource Area	Impacts	Agency Coordination/ Permits	Mitigation/BMPs
Soils	Short-term soil disturbance from mechanical equipment. No impact to prime and unique farmland.	NRCS	The applicant must ensure that BMPs would are be implemented to minimize transport of sediment. Mulch created from cut vegetation would be used for temporary erosion control to prevent soil or sediment from reaching the waterways. Appropriate barriers would be used to prevent mulch from being washed into the creeks.
Air Quality	Short-term and localized minor impacts from vegetation removal equipment emissions.	EPA/TCEQ	Fuel-burning equipment running times will be kept to a minimum and engines must be properly maintained.
Climate Change	No impact	EPA	N/A
Visual Quality and Aesthetics	Improved aesthetics and views.	N/A	N/A
Water Quality	Minor short-term adverse impacts on surface water quality from erosion and sedimentation caused by temporary soil disturbance.	TCEQ	The applicant must ensure that BMPs would are be implemented to minimize transport of sediment. Mulch created from cut vegetation would be used for temporary erosion control to prevent soil or sediment from reaching the waterways. Appropriate barriers would be used to prevent mulch from being washed into the creeks
Wetlands	No impact	USACE/NWI	N/A
Floodplains	Some work located within floodplain but no adverse impact to floodplain.	FEMA	For any work in the floodplain, the City of Houston will be required to coordinate with the local floodplain administrator and obtain any required permits prior to initiating work. All coordination pertaining to these activities and applicant compliance with any conditions should be documented and copies forwarded to the state and FEMA for inclusion in the permanent project files.
Coastal Resources	No impact	TXGLO	N/A

Affected Environmental Resource Area	Impacts	Agency Coordination/ Permits	Mitigation/BMPs
Biological Resources	Short-term minor impact to vegetation and common wildlife species. No effect to federally listed species.	USFWS/TPWD	Seasonal restrictions or biological monitoring to minimize impacts to migratory birds. Work near eagle's nest cannot proceed until coordination complete with FEMA and USFWS.
Cultural Resources	No adverse effect to historic properties.	SHPO/THC	The applicant must deploy a Secretary of the Interior (SOI)-qualified archeological monitor for all proposed fuels reduction activities in Cullinan Park at Oyster Creek and for fuels reduction activities within the southwest corner of Keith-Wiess Park. In the event that archeological deposits are uncovered, the project must stop and applicant must contact FEMA. FEMA will consult with the SHPO.
Environmental Justice	No impact	EPA	N/A
Hazardous Materials	No impact	EPA/TCEQ	BMPs for equipment would be implemented to reduce spills and leaks. Excavated soil and waste materials would be managed and disposed of in accordance with applicable local, state, and federal regulations. If contaminated materials are discovered during the project activities, work would cease until the appropriate procedures and permits can be implemented. Any hazardous materials discovered, generated, or used during construction would be handled and disposed of in accordance with applicable local, state, and federal regulations.
Noise	Short-term, minor impact during construction	OSHA*	Fuels reduction activities must take place during normal business hours. Equipment and machinery used at the proposed project site must meet local, state, and federal noise control-regulations.
Traffic	Short-term, minor impact during construction	City of Houston Parks and Recreation	Construction will be during day time only
Public Service and Utilities	No impact.	City of Houston Parks and Recreation	N/A
Public Safety and Health	Positive impact.	City of Houston Parks and Recreation	N/A

*OSHA – Occupational Safety and Health Administration

SECTION 5 Cumulative Impacts

Cumulative impacts are the combined impacts of the proposed action and other past, present, and reasonably foreseeable future actions, regardless of who undertakes the actions (40 CFR 1508.7). Cumulative impacts can result from individually minor but collectively significant actions.

No significant cumulative impacts are foreseen from implementation of the proposed action and other past, present, and future actions. Because the proposed action would have no impact or essentially no impact on water resources, wetlands, floodplains, wildlife or vegetation, cultural resources, environmental justice, public services and utilities, or public health and safety, the proposed action would not contribute to significant cumulative impacts on these resources. Similarly, the proposed action is not expected to have an impact related to hazardous materials and would therefore not contribute to a cumulative impact.

City of Houston PARD has already completed some fuels reduction work in the same general areas where the proposed action would occur through their Disaster Relief Council work related to Hurricane Ike. The city has cleared some brush and removed vegetative debris and some dead trees. The majority of their fuels reduction and defensible space efforts are still waiting on FEMA grant approval. Operation of heavy equipment during fuels reduction disturbs soil, and the past and proposed work could have a cumulative effect. However, with the implementation of BMPs to protect soils, a significant adverse cumulative impact on soils would not be expected.

City of Houston PARD has previously conducted fuels reduction work similar to the proposed action on some of the 100-foot wide fuel reduction zones at the parkland sites through the Disaster Recovery Council's program. The 71 acres within the 100-foot wide work zones within the proposed action areas would occur on city-owned parkland along the fringes of the wooded parkland areas that are adjacent to residences. No significant differences in soils or topography would result in a different vegetation type or condition from the proposed action. These parklands represent remnants of larger vegetation communities that have been previously fragmented by residential and commercial developments that are adjacent to these parklands. The 71 acres of thinning and limbing work to the previously affected parkland areas would not result in a significant cumulative impact on vegetation or wildlife.

Temporary noise, traffic, and air quality impacts of the proposed action could combine with similar impacts of other residential or transportation projects occurring at the same time. It is unlikely that the cumulative impact of these projects and the proposed action would be significant.

Climate change is by its nature a cumulative impact. Carbon dioxide emissions from the proposed action would make a very small contribution to climate change.

SECTION 6 Agency Coordination, Public Involvement, and Permits

6.1 Agency Coordination

Consultation letters and responses from resource agencies such as the SHPO and TPWD are provided in **Appendix G**.

6.2 Public Participation

The public information process for the proposed City of Houston PARD fuel reduction project will include a public notice in the *Houston Chronicle*, the regional general circulation newspaper that covers Harris and Fort Bend counties. The public notice will state that information about the proposed action, including this environmental assessment, is available at the City of Houston Parks and Recreation Department headquarters at 2999 Wayside Drive. The notice will invite the public to submit their comments, for or against, in writing within 30 days so that they may be considered and evaluated. FEMA will consider and respond to all public comments in the final EA. If no substantive comments are received, the draft EA will become final, and a FONSI will be issued for the project. At this time, a public meeting is not planned because the proposed action is not considered controversial.

6.3 Permits

No local, state, or federal permits appear to be necessary to implement the proposed fuel reduction project. The proposed action does not require coverage under Texas Pollutant Discharge Elimination System (TPDES) construction stormwater general permit TXR150000 because it is not a construction project and would not generate stormwater associated with industrial activity as defined in 40 CFR 122.26(a)(14).

SECTION 7 References

Ashworth, John, B. and Hopkins, Janie. 1995. Aquifers of Texas: Texas Water Development Board Report 345, 69 p.

Bureau of Economic Geology, The University of Texas at Austin. 1976. Geologic Atlas of Texas, Beaumont Sheet.

Cowardin, L. M., Carter, V., Golet, F. C., and LaRoe, E. T. 1979. Classification of Wetlands and Deepwater Habitats of the United States, FWS/OBS-79/31, U.S. Fish and Wildlife Service, Office of Biological Services, Washington, DC.

Federal Emergency Management Agency. 2013. Flood Insurance Rate Maps. Obtained from FEMA Map Service Center. Accessed on: July 21, 2013. Available at: https://msc.fema.gov/webapp/wcs/stores/servlet/FemaWelcomeView?storeId=10001&catalogId=10001&langId=-1.

Texas Archeological Research Laboratory (TARL). 2013. TARL Listing of Archeological Sites in Texas, Internet site: http://www.utexas.edu/research/tarl/ , accessed June 5, 2013.

Texas Archaeological Sites Atlas. 2013. Restricted Information Access. Electronic document, http://nueces.thc.state.tx.us/ , accessed April 8, 2013.

Texas Commission on Environmental Quality (TCEQ). 2012. 2010 Texas Integrated Report for Clean Water Act Sections 305(b) and 303(d), Internet site: http://www.tceq.texas.gov/waterquality/assessment/10twqi/10twqi, accessed June 4, 2013.

Texas Historical Commission (THC). 2013. Section 106, Internet site: http://www.thc.state.tx.us/tribal/section.shtml, accessed June 14, 2013.

Texas Historic Sites Atlas. 2013. Electronic document, http://atlas.thc.state.tx.us/. Accessed June 14, 2013.

Texas Invasive Plant and Pest Council. 2011. Gulf coast prairies and marshes dirty dozen. Internet site: http://www.texasinvasives.org/i101/ecoalert_detail.php?ecoregion_id=2, accessed July 8, 2013.

Texas Parks and Wildlife Department (TPWD). 1997. Learn about Texas birds. Texas Parks and Wildlife, Austin, TX. 56 pp.

TPWD. 2013. List of Rare, Threatened, and Endangered Species of Texas by County. Accessed May 16, 2013 for Harris and Fort Bend Counties at: http://www.tpwd.state.tx.us/landwater/land/maps/gis/ris/endangered_species/

Texas Water Development Board (TWDB). 2006. Minor Aquifers of Texas, Internet site: http://www.twdb.state.tx.us/mapping/doc/maps/aqu_min_8x11.pdf, accessed June 4, 2013.

TWDB. 2013. WIID System: Water Information Integration & Dissemination, Internet site: http://wiid.twdb.texas.gov/, accessed June 6, 2013.

U.S. Army Corps of Engineers (USACE). 2008. Draft Master Plan Revision Addicks and Barker Reservoirs Buffalo Bayou and Tributaries. Prepared for USACE – Galveston District by The Louis Berger Group, Inc. June 2008. 169 pp. USACE. 2012. Draft Environmental Assessment Addicks and Barker Dam Safety Modification. USACE – Galveston District. October 2012. 212 pp.

U.S. Census Bureau. 2010a. 2010 Census Interactive Population Search, Internet site: http://2010.census.gov/2010census/popmap/ipmtext.php?fl=48, accessed May 23, 2013.

U.S. Census Bureau. 2010b. American FactFinder, Internet site: http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml, accessed May 23, 2013.

U.S. Census Bureau. 2010c. Harris and Fort Bend Counties, Texas QuickLinks, Internet site: http://quickfacts.census.gov/qfd/states/48/48061lk.html, accessed May 23, 2013.

U.S. Census Bureau. 2010d. Interactive Population Map, Internet site: http://2010.census.gov/2010census/popmap/, accessed May 23, 2013.

U.S. Census Bureau. 2013. Poverty Threshold, 201. Accessed on September 17, 2013. Available at: http://www.census.gov/hhes/www/poverty/data/threshld/index.html.

U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS). 2010. "Field Indicators of Hydric Soils in the United States, Version 7.0. L.M. Vasilas, G.W. Hurt, and C.V. Noble (eds). USDA, NRCS, in cooperation with the National Technical Committee for Hydric Soils.

U.S. Department of Agriculture, NRCS. 2013. Web Soil Survey (WSS), Internet site: http://websoilsurvey.nrcs.usda.gov, accessed June 10, 2013.

U.S. Department of Agriculture, Forest Service. 2005. Wildland Fire in Ecosystems: Effects of Fire on Soil and Water. General Technical Report RMRS-GTR-42-volume4.

U.S. Environmental Protection Agency (EPA). 2012a. Currently Designated Nonattainment Areas for All Criteria Pollutants, Internet site: http://www.epa.gov/air/oaqps/greenbk/ancl.html#TEXAS, accessed May 21, 2013.

U.S. Environmental Protection Agency. 2012b. AirData: Air Quality Index Report, Internet site: http://www.epa.gov/airdata/ad_rep_aqi.html, accessed May 21, 2013. U.S. Environmental Protection Agency, 2011, Plan EJ 2014, Internet Site:

http://www.epa.gov/compliance/environmentaljustice/resources/policy/plan-ej-2014/plan-ej-2011-09.pdf, accessed June 12, 2013

U.S. Fish & Wildlife Service (USFWS). 2012. National Wetlands Inventory, Internet site: http://www.fws.gov/wetlands/Data/Mapper.html, accessed June 17, 2013.

USFWS. 2013a. Species by County Report: Fort Bend County, TX. Internet site: http://ecos.fws.gov/tess_public/countySearch!speciesByCountyReport.action?fips=48157 ,accessed September 30, 2013.

USFWS. 2013b. Species by County Report: Harris County, TX. Internet site: http://ecos.fws.gov/tess_public/countySearch!speciesByCountyReport.action?fips=48201 ,September 30, 2013.

USFWS. 2013c. Guidelines for Surveys to Assess Potential Project Impacts to Red-cocked Woodpecker. Survey Protocol. (http://www.fws.gov/rcwrecovery/files/RecoveryPlan/survey_protocol.pdf)

World Wildlife Fund (WWF). 2013. Temperate coniferous forest – Piney Woods forests. Internet site: http://worldwildlife.org/ecoregions/na0523, accessed July 9, 2013.

SECTION 8 List of Preparers

The following is a list of preparers who contributed to the development of the City of Houston Parks and Recreation Department EA for FEMA.

The individuals listed below had principal roles in the preparation and content of this document. Many others had significant roles and contributions as well, and their efforts were no less important to the development of this EA. These others include senior managers, administrative support personnel, legal staff, and technical staff.

CDM Smith

Preparers	Experience and Expertise	Role in Preparation
Beverly, Howard	Senior Cultural Resource Specialist	Cultural Resources
Boucher, Hank	Environmental Engineer and Planner	Technical review
Bradstreet, Nicole	GIS Specialist	Data collection, Data management, GIS Analysis, Map Preparation
Da Costa, Larissa	Water Resources Engineer	Site visit and field work; Water Resources; Introduction; Purpose and Need; Socioeconomics
Kase, Sydney	GIS Specialist	Data collection, Data management, General GIS Support
McAuley, Erin	Environmental Planner	Resource Impacts for No Action Alternative, Technical editing and Production
Petty, Matthew	Biologist and Environmental Scientist	Wetlands; Floodplains; Biological Resources
Poyant, Andrew	Environmental Scientist	Biological Resources
Rugg, Mack	Senior Environmental Scientist	Cumulative Impacts, technical review and editing
Schenk, Roger	Senior Environmental Scientist	Site visit and field work; Soils; Air Quality; Climate Change; Alternatives; Cumulative Impacts; Agency Coordination
Stenberg, Kate	Senior Biologist, Senior Planner	Impact Analysis; Vegetation
Wade, Murray	Senior Environmental Scientist	Biological Resources

CH2M Hill

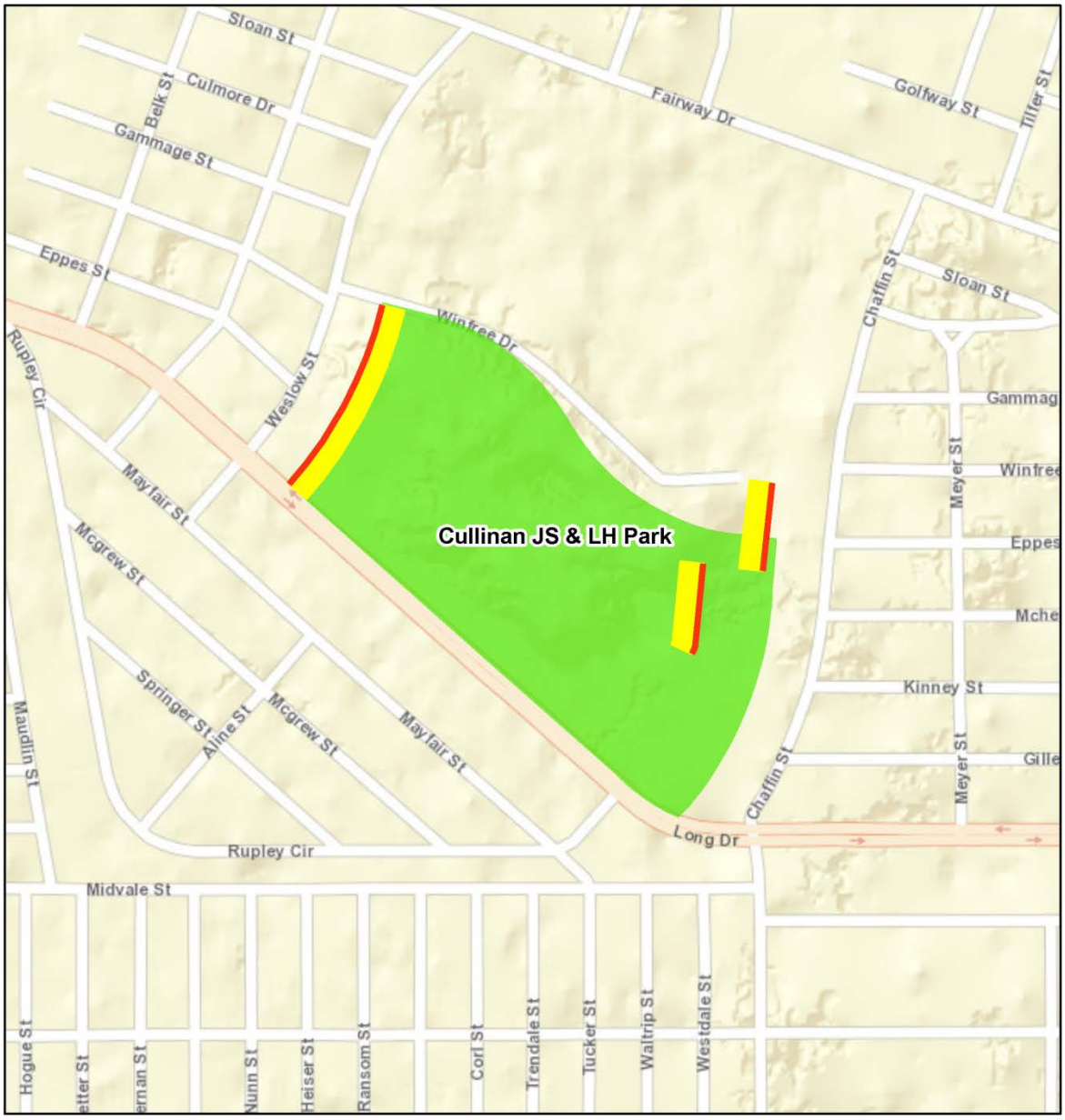
Preparer	Experience and Expertise	Role in Preparation
Garcia, Linda	Biologist	Biology site visit
Olney, Troy	Biologist	Biology site visit and field notes
Speights, Jason	Biologist	Biology site visit and field notes

Federal Emergency Management Agency

Reviewers	Role in Preparation
Jaynes, Kevin, Regional Environmental Officer	Technical Review and Approval
Weir, Dorothy, Environmental Specialist	Technical Review and Approval

Appendices

Appendix A
Project Area Locations



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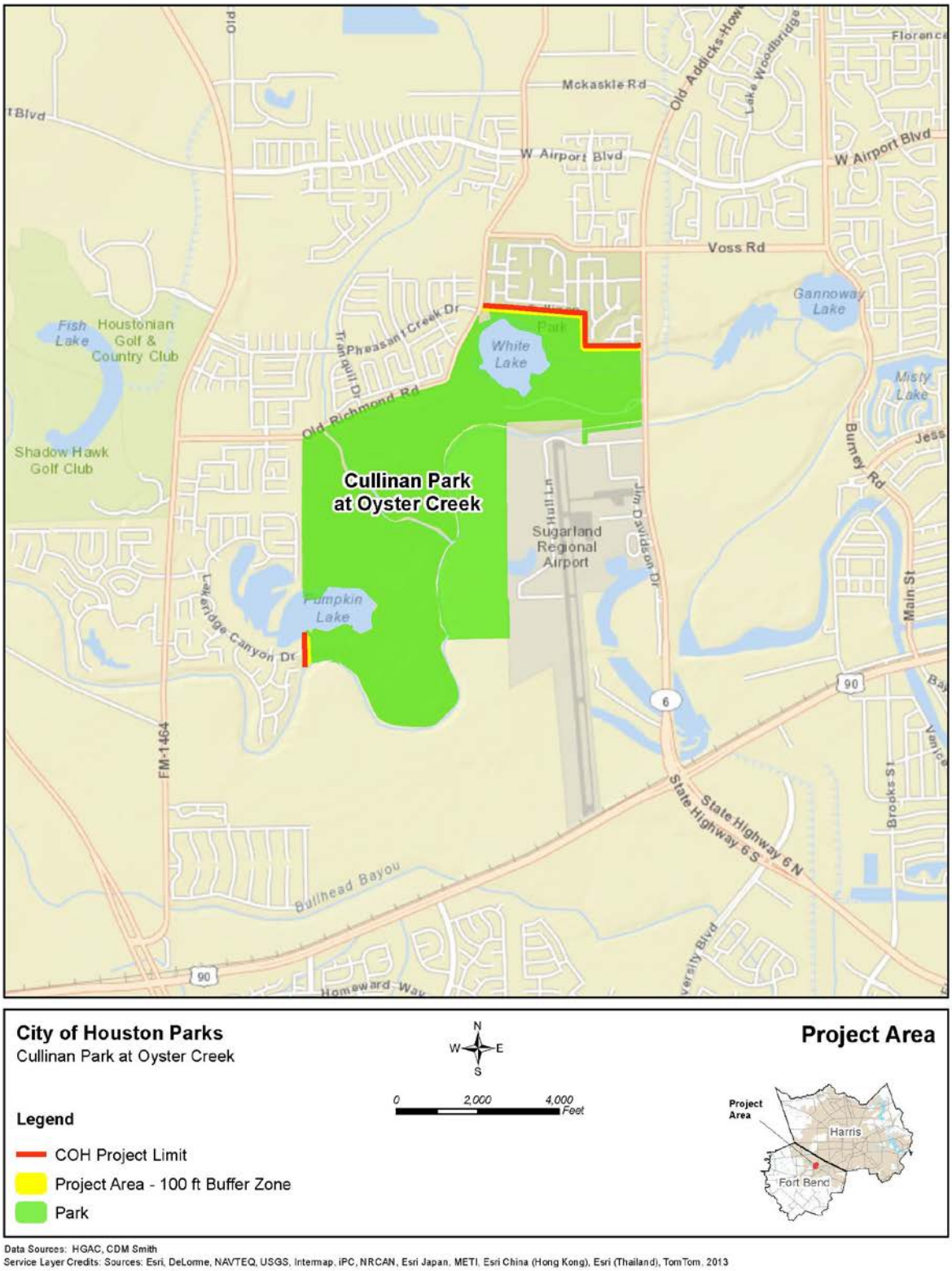
Cullinan Park at Oyster Creek
Mckaskle Rd
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Voss Rd
Old Addicks-Howell
Lake Woodbridge
Florence
Gannoway Lake
Misty Lake
Burney Rd
Main St
Brooks St
Houstonian Golf & Country Club
Fish Lake
Shadow Hawk Golf Club
Pheasant Creek Dr
Tranquil Dr
Old Richmond Rd
White Lake
Park
Sugarland Regional Airport
Hull Ln
Jim Dobson Dr
Pumpkin Lake
Lakeridge Canyon Dr
FM-1464
State Highway 6 S
State Highway 6 N
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City of Houston Parks
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Harris
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Data Sources: HGAC, CDM Smith
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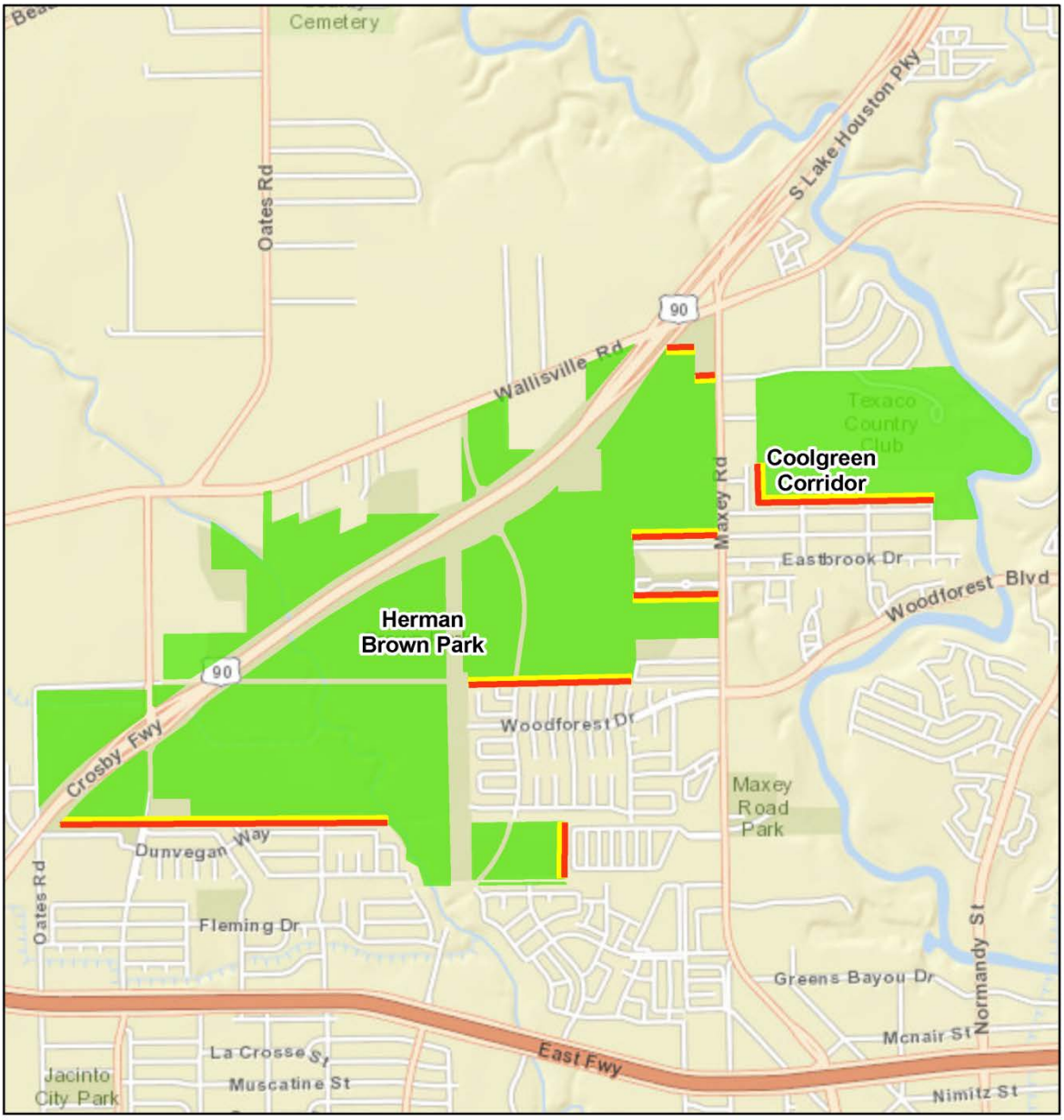

City of Houston Parks
Herman Brown Park & Coolgreen Corridor

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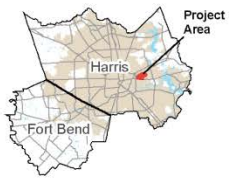
Legend

- COH Project Limit
- Project Area - 100 ft Buffer Zone
- Park

Project Area



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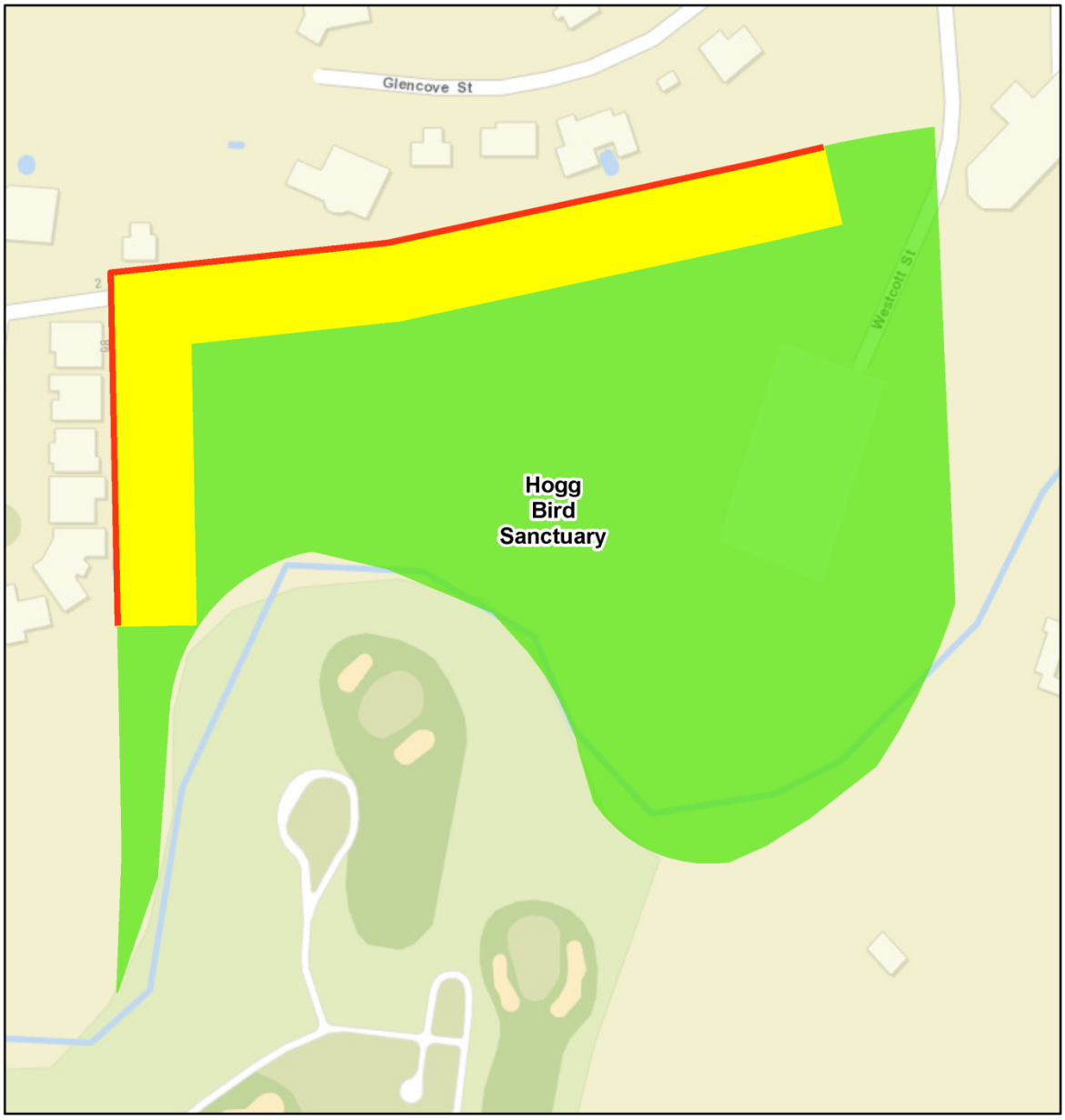

City of Houston Parks
Hogg Bird Sanctuary

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Project Area

Legend

- COH Project Limit
- Project Area - 100 ft Buffer Zone
- Park

Data Sources: HGAC, CDM Smith
Service Layer Credits: Sources: Esri, DeLorme, NAVTEQ, USGS, Intermap, iPC, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, 2013

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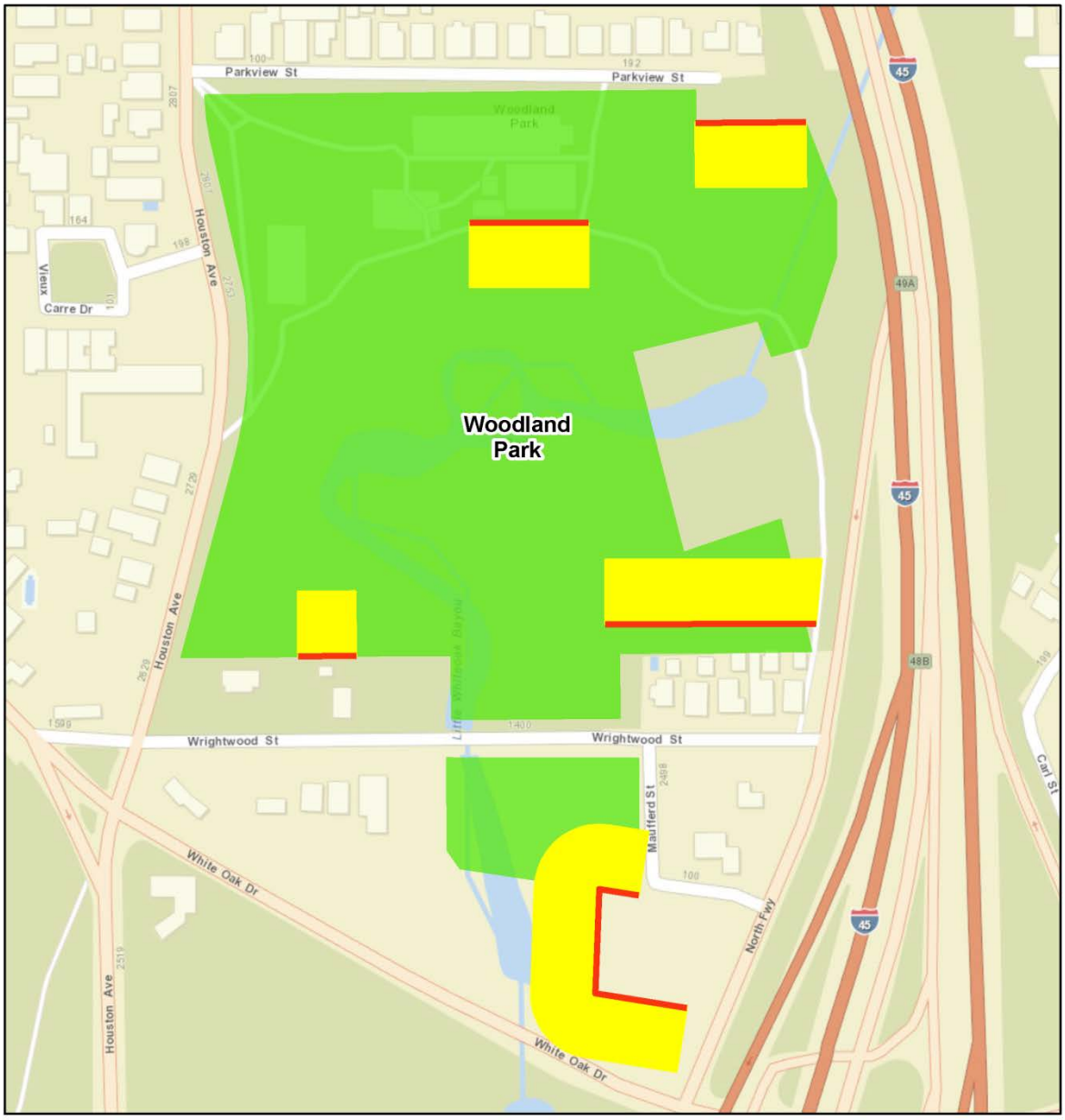

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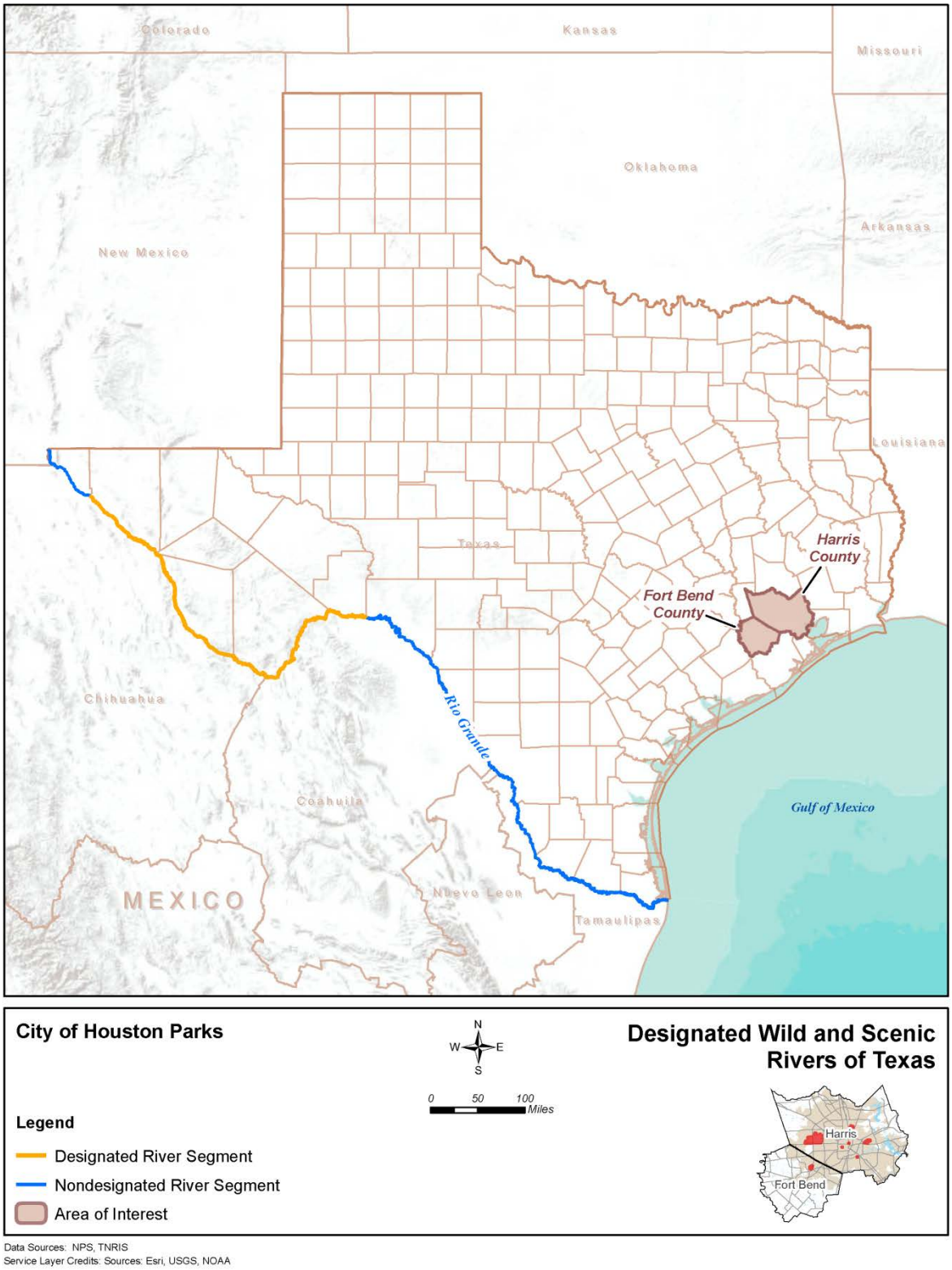
Appendix B
Wild and Scenic Rivers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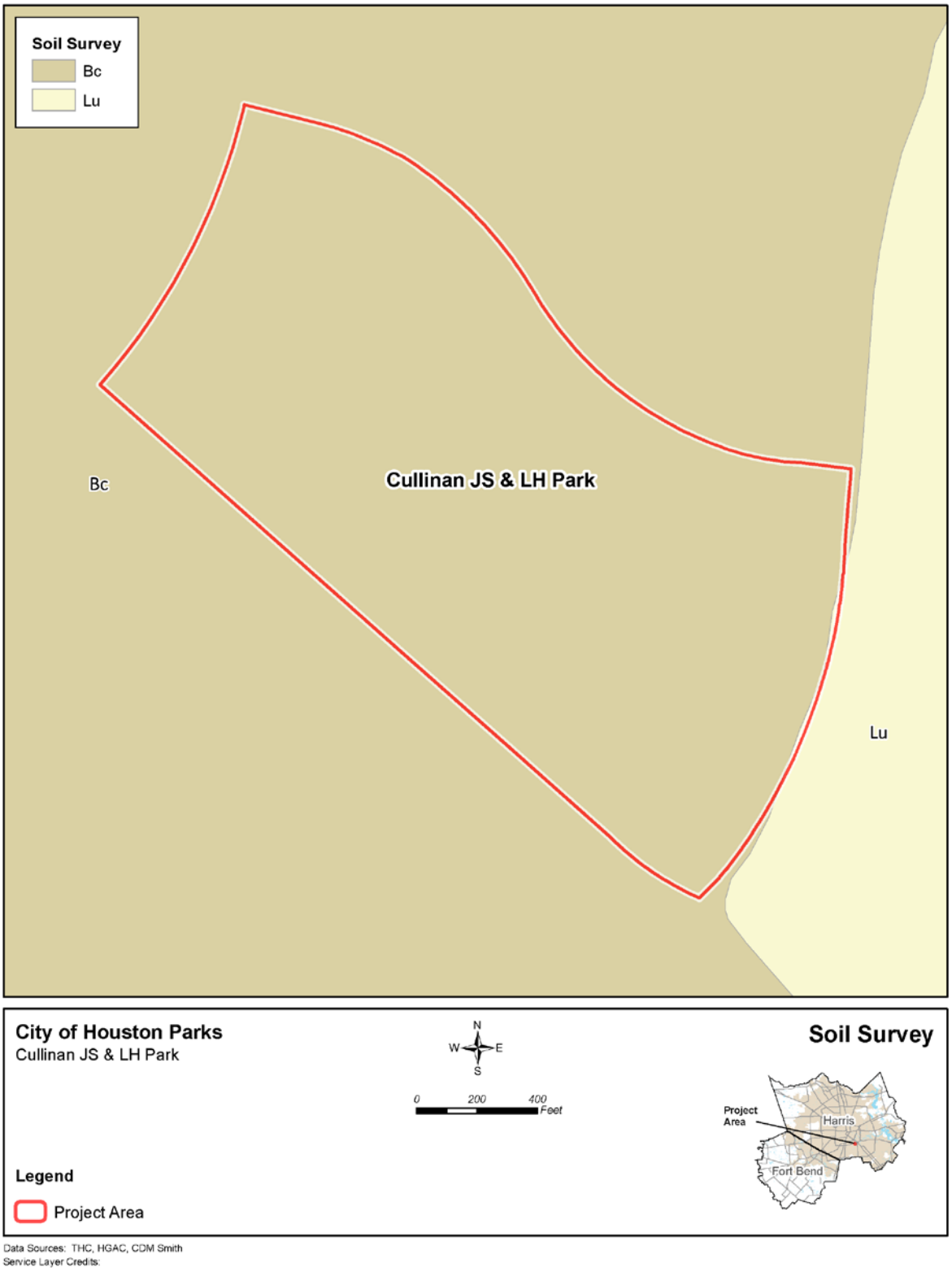
Area of Interest
Data Sources: NPS, TNRIS
Service Layer Credits: Sources: Esri, USGS, NOAA

Appendix C
Soils Maps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Project Area
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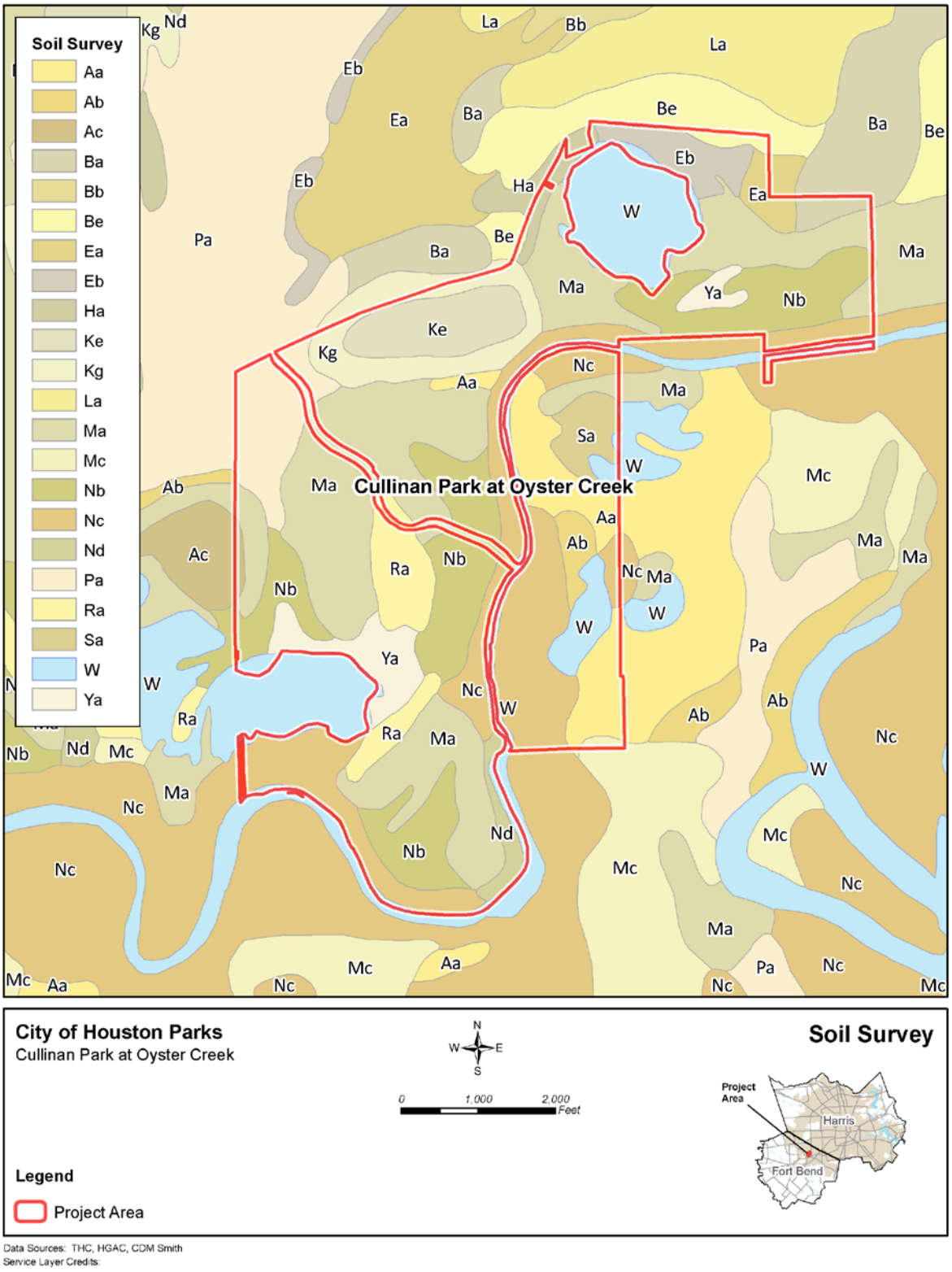
Service Layer Credits: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Cullinan Park at Oyster Creek
City of Houston Parks
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Data Sources: THC, HGAC, CDM Smith
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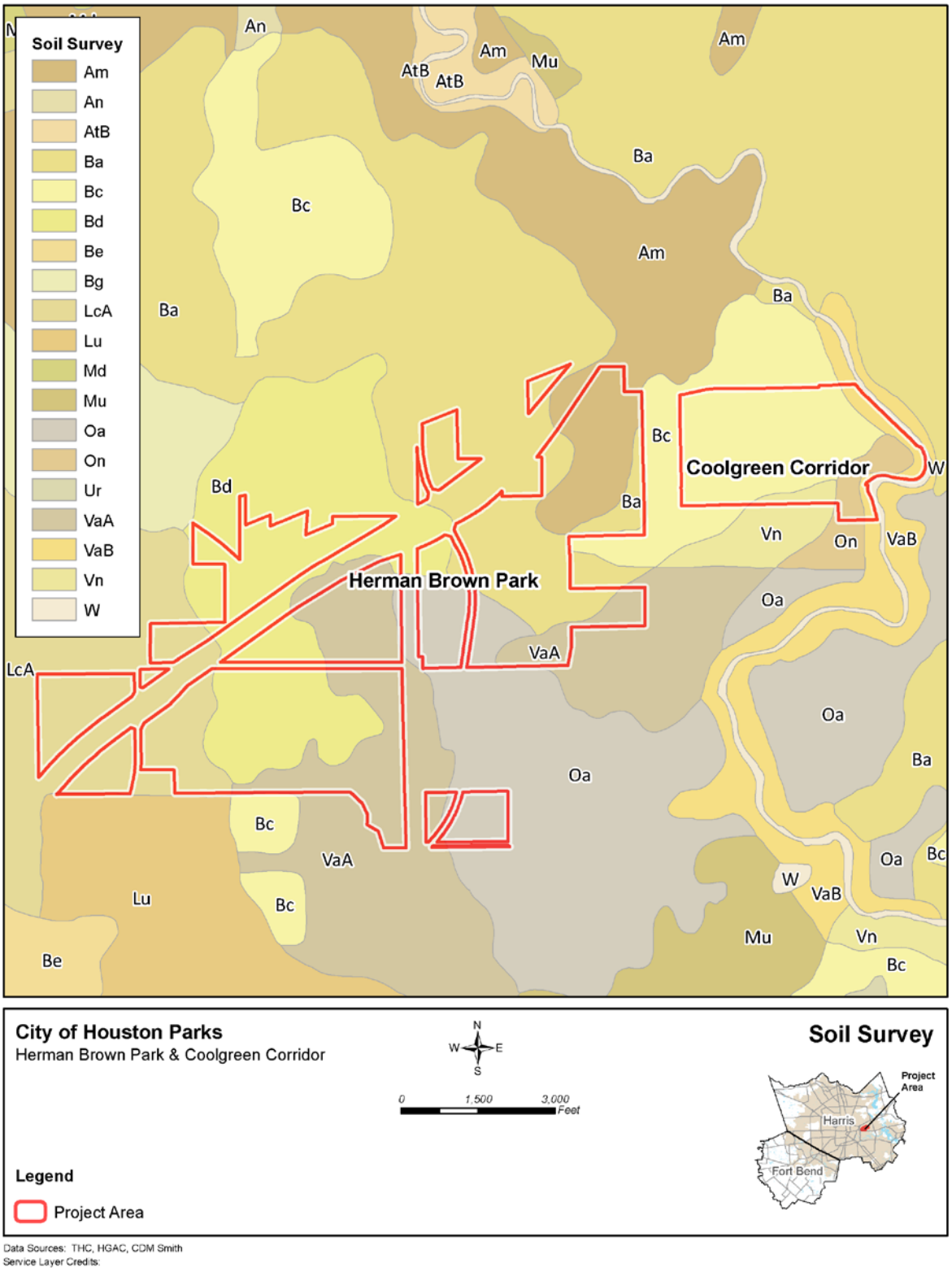
Soil Survey
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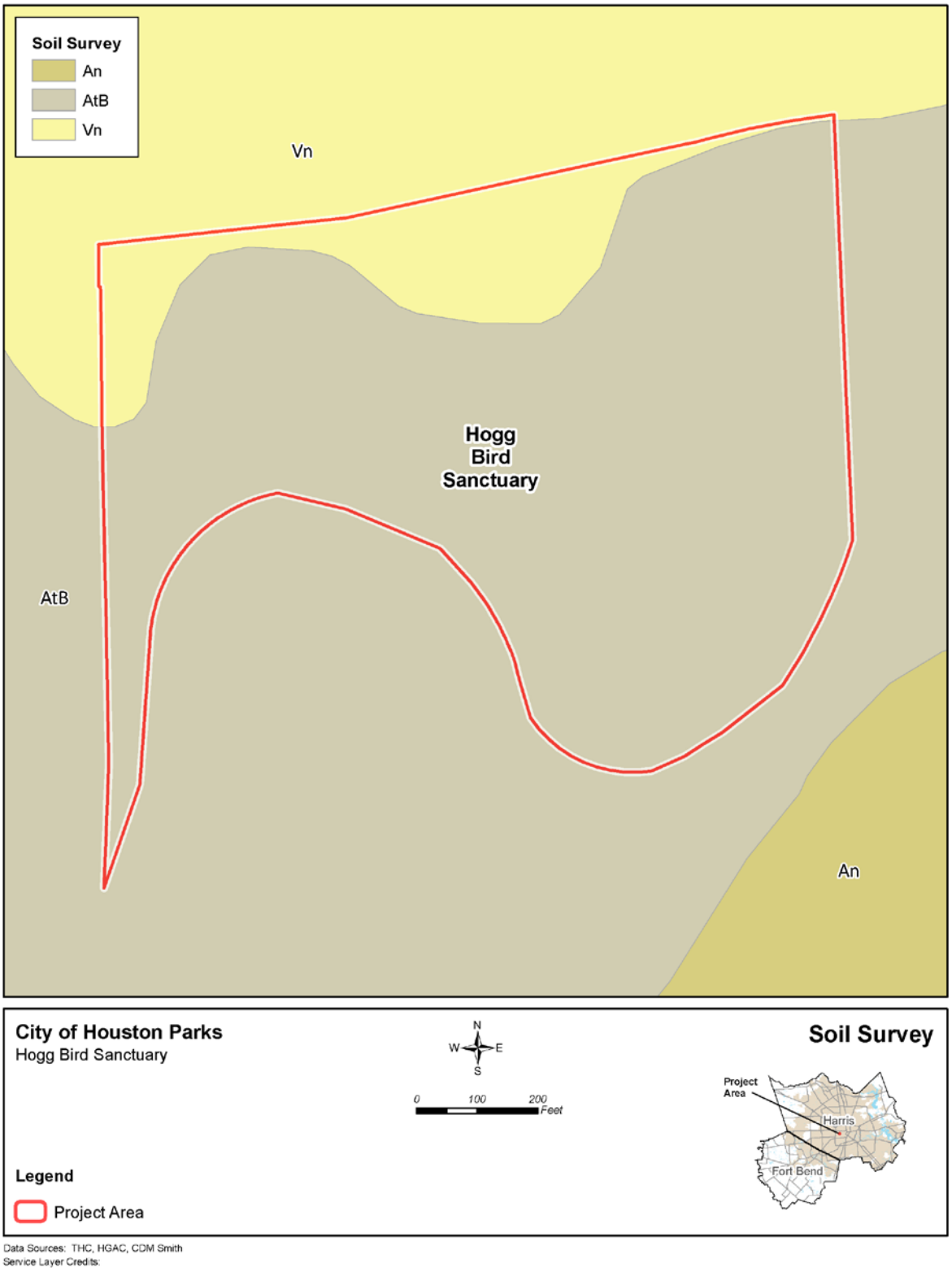
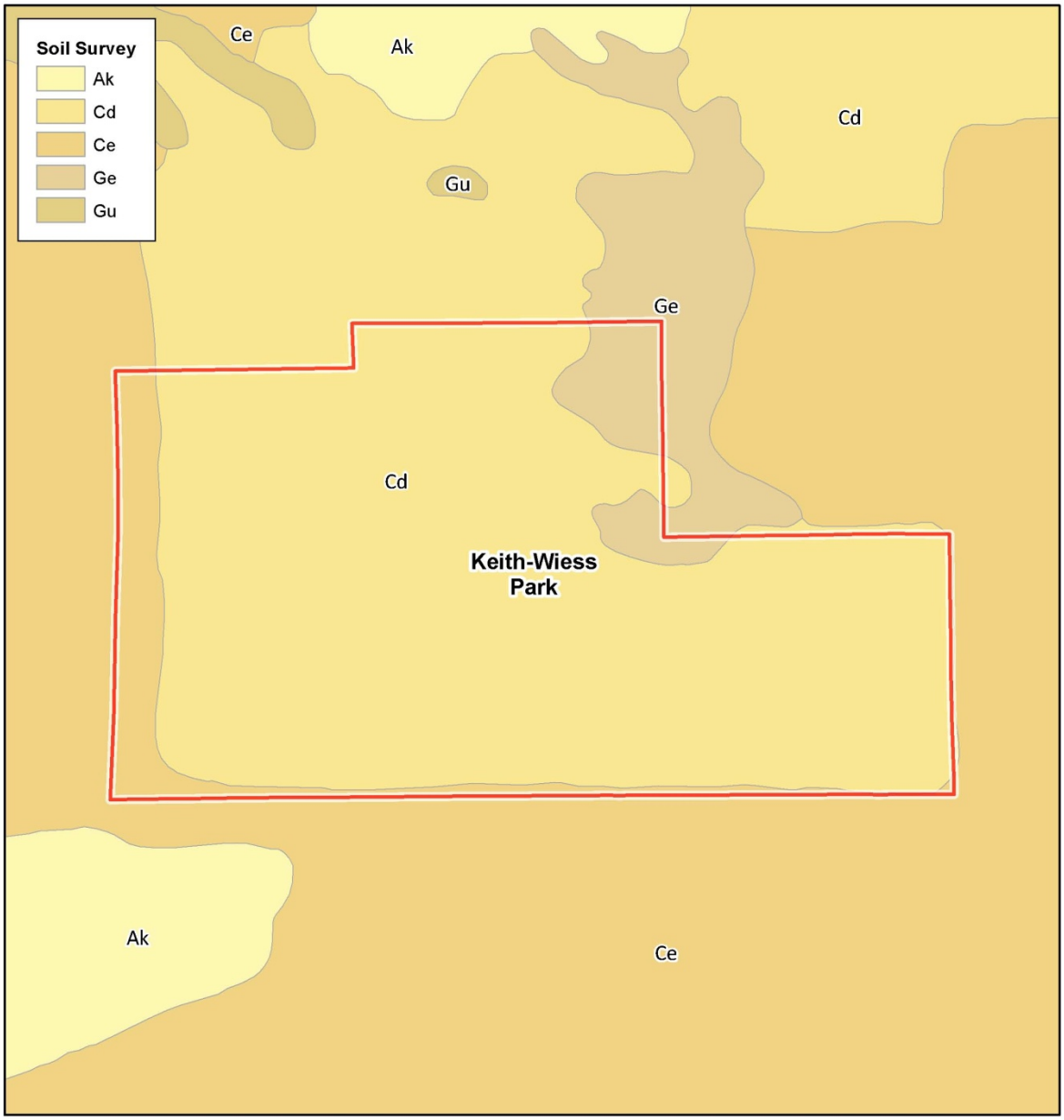
LcA
Lu
Md
Mu
Oa
On
Ur
VaA
VaB
Vn
W
Herman Brown Park
Coolgreen Corridor
City of Houston Parks
Herman Brown Park & Coolgreen Corridor
N
W
E
S
0
1,500
3,000
Feet
Soil Survey
Project Area
Harris
Fort Bend
Legend
Project Area
Data Sources: THC, HGAC, CDM Smith
Service Layer Credits:


Soil Survey
An
AtB
Vn
Vn
Hogg
Bird
Sanctuary
AtB
An
City of Houston Parks
Hogg Bird Sanctuary
N
W
E
S
0
100
200
Feet
Soil Survey
Project
Area
Harris
Fort Bend
Legend
Project Area
Data Sources: THC, HGAC, CDM Smith
Service Layer Credits:

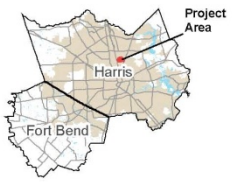


City of Houston Parks
Keith-Wiess Park

N
W E
S

0 500 1,000 Feet

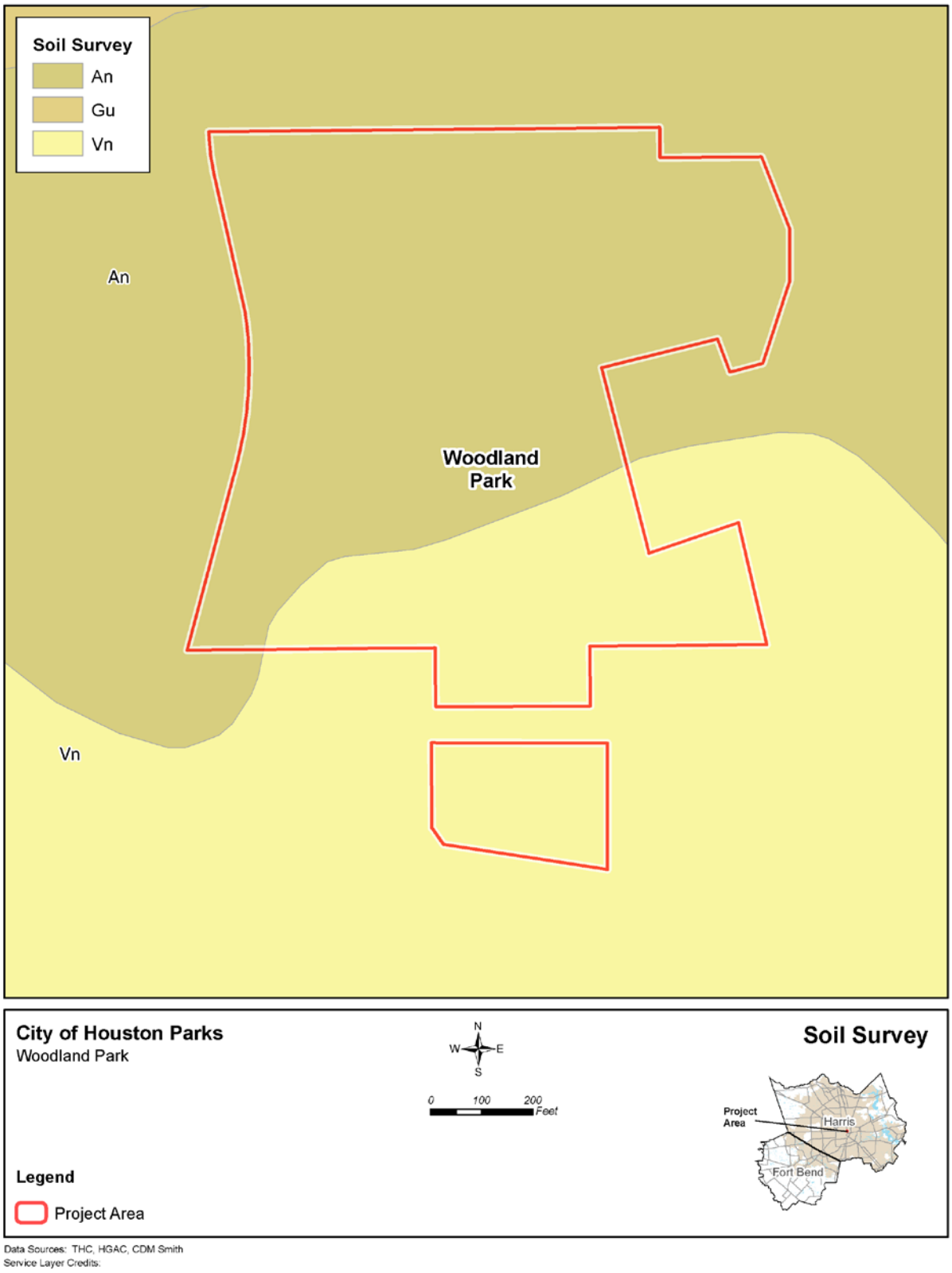
Soil Survey



Legend

Project Area

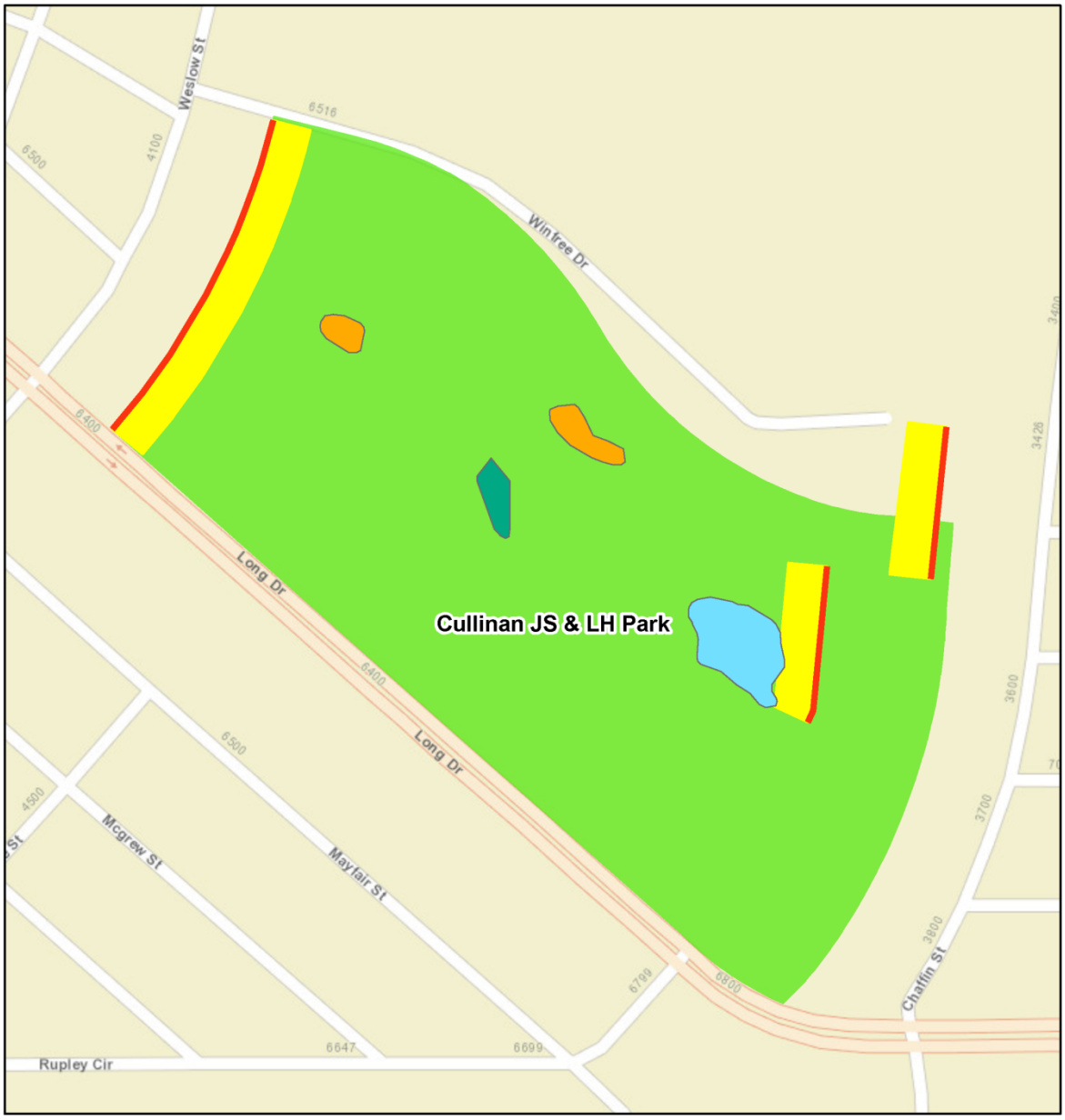
Data Sources: THC, HGAC, CDM Smith
Service Layer Credits:


Soil Survey
An
Gu
Vn
An
Woodland Park
Vn
City of Houston Parks
Woodland Park
N
W
E
S
0
100
200
Feet
Soil Survey
Project Area
Harris
Fort Bend
Legend
Project Area
Data Sources: THC, HGAC, CDM Smith
Service Layer Credits:

Appendix D
Water Resources Information

1. Wetlands Maps
2. Groundwater Well Maps
3. Floodplain Maps
4. FEMA Flood Insurance Rate Maps

Appendix D-1
Wetland Maps



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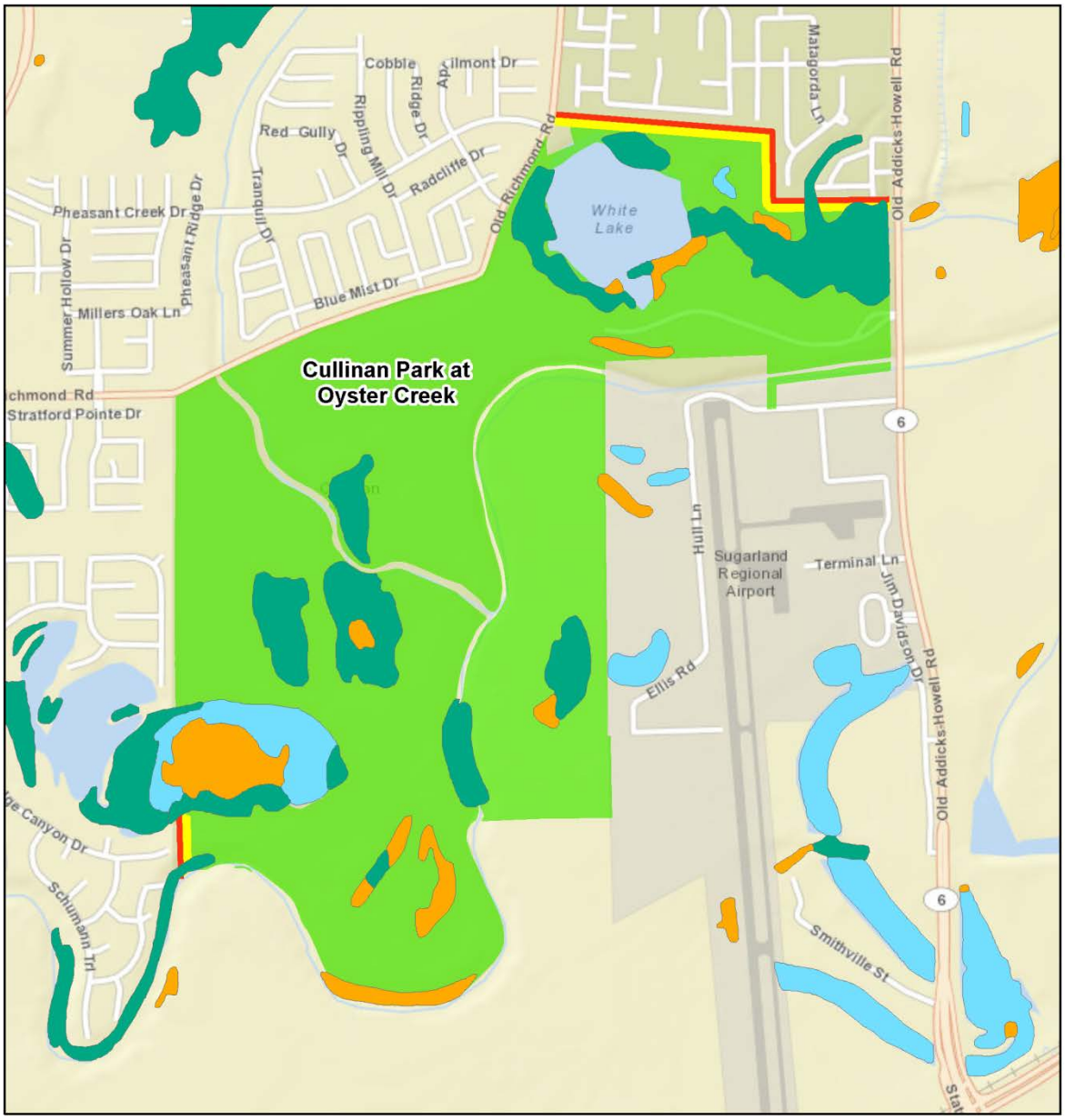


City of Houston Parks
Cullinan Park at Oyster Creek

N
W E
S

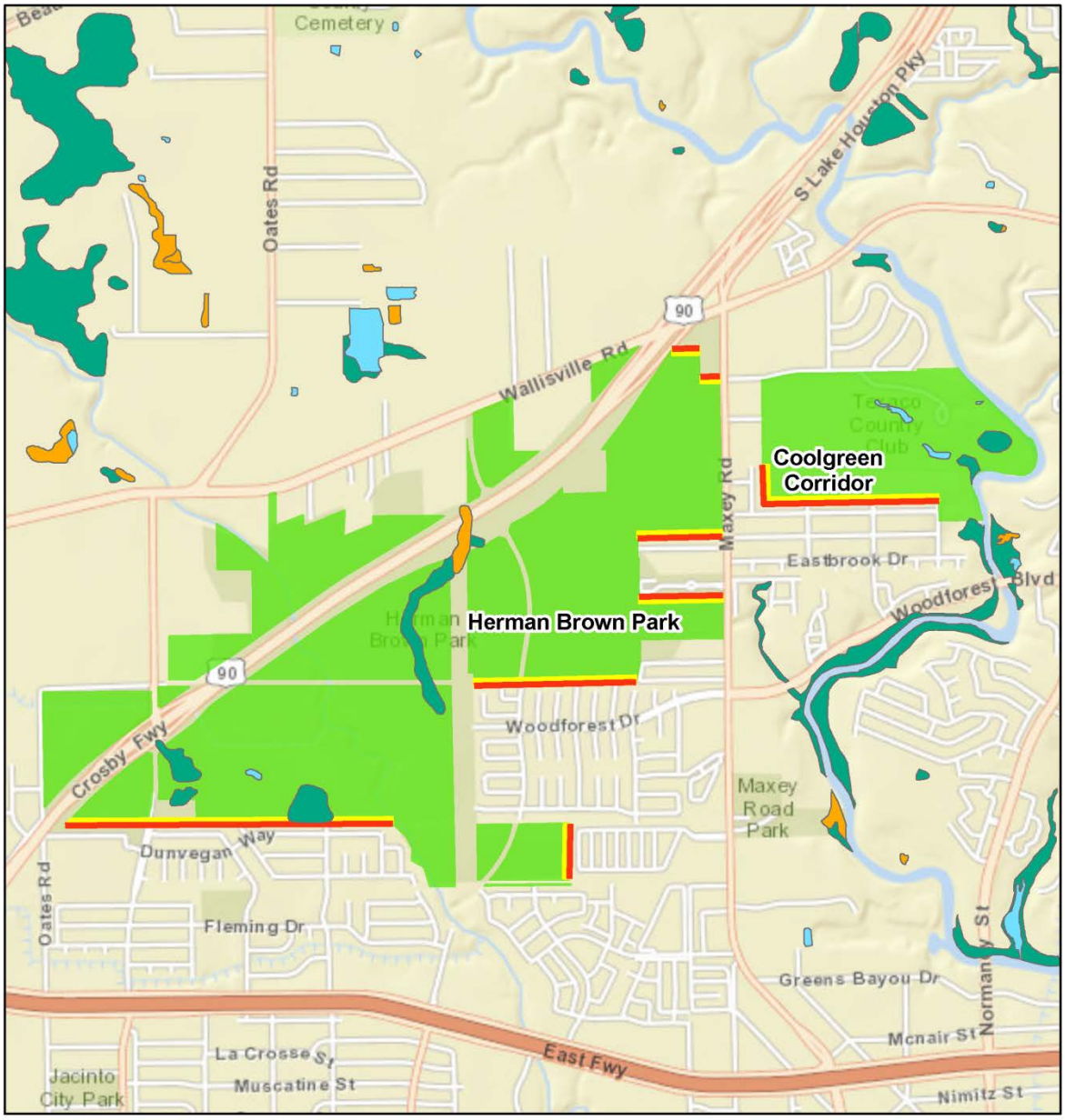
0 500 1,000 Feet

Wetlands

Legend

- COH Project Limit
- Project Area - 100 ft Buffer Zone
- Park
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond

Data Sources: THC, HGAC, CDM Smith
Service Layer Credits: Sources: Esri, DeLorme, NAVTEQ, USGS, Intermap, iPC, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, 2013



City of Houston Parks
Herman Brown Park & Coolgreen Corridor

N
W E
S

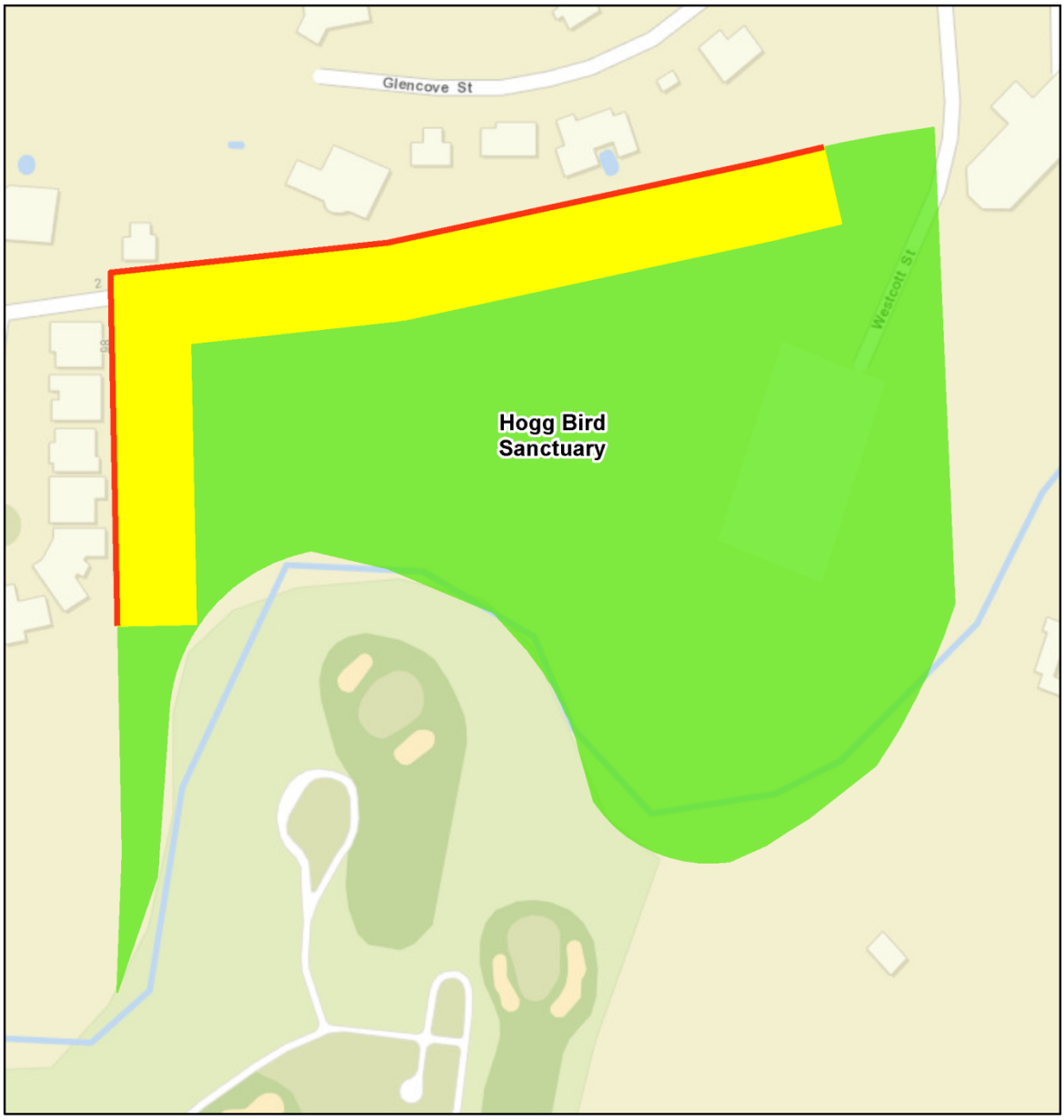
0 1,500 3,000 Feet

Legend

- COH Project Limit
- Project Area - 100 ft Buffer Zone
- Park
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond

Wetlands

Data Sources: THC, HGAC, CDM Smith
Service Layer Credits: Sources: Esri, DeLorme, NAVTEQ, USGS, Intermap, iPC, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, 2013



City of Houston Parks
Hogg Bird Sanctuary

N
W E
S

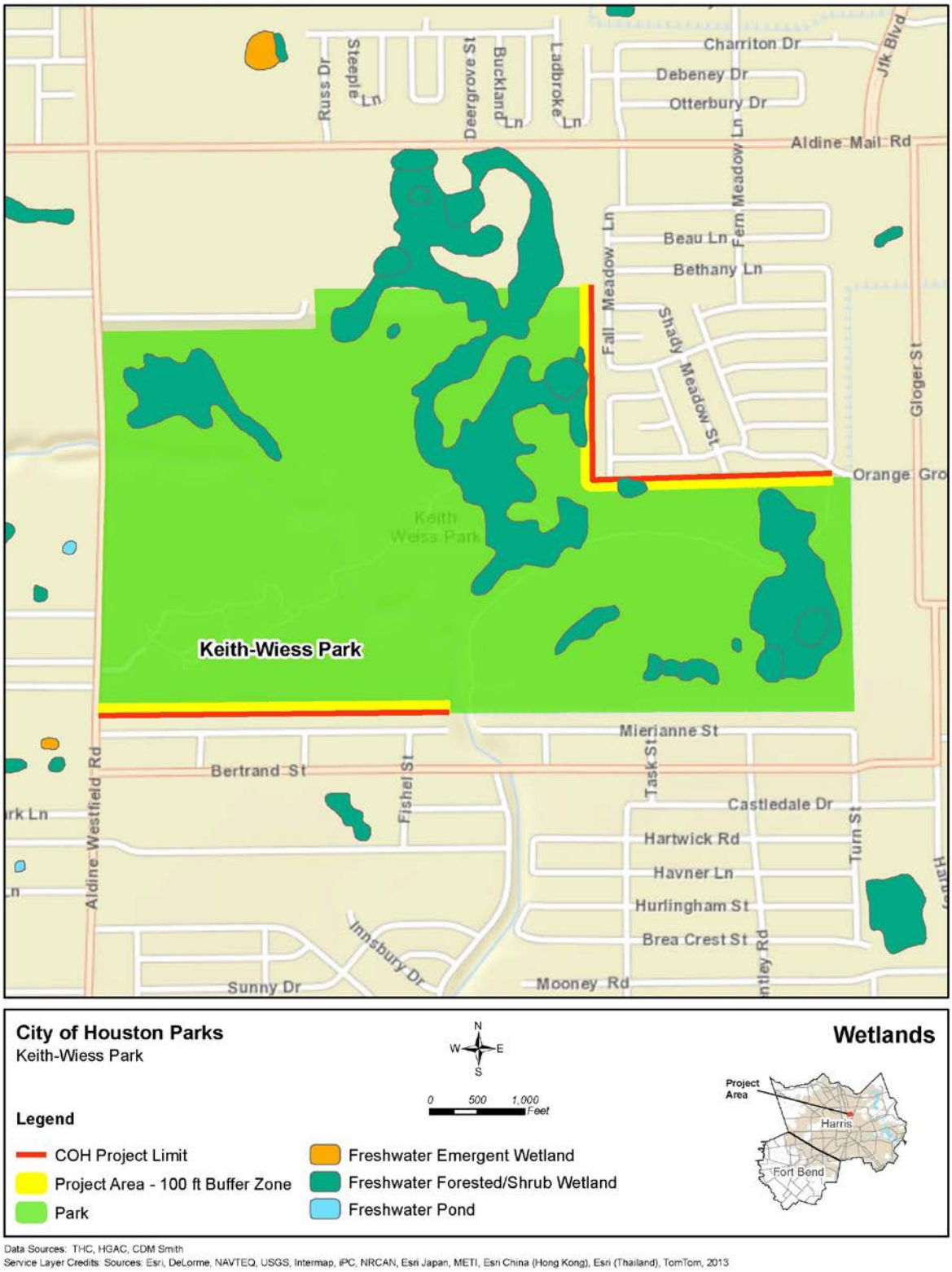
0 100 200 Feet

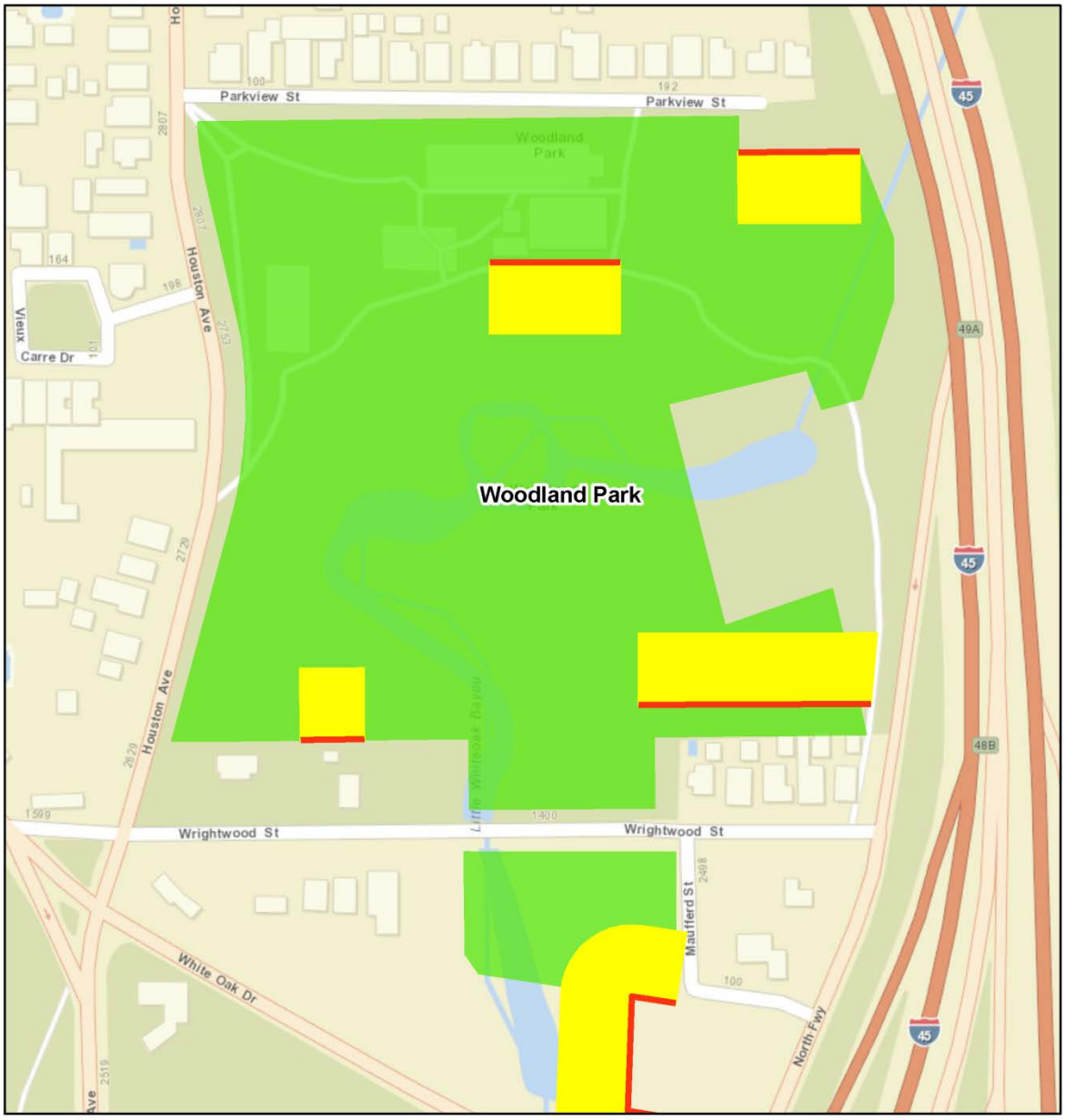
Wetlands

Legend

- COH Project Limit
- Project Area - 100 ft Buffer Zone
- Park
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond

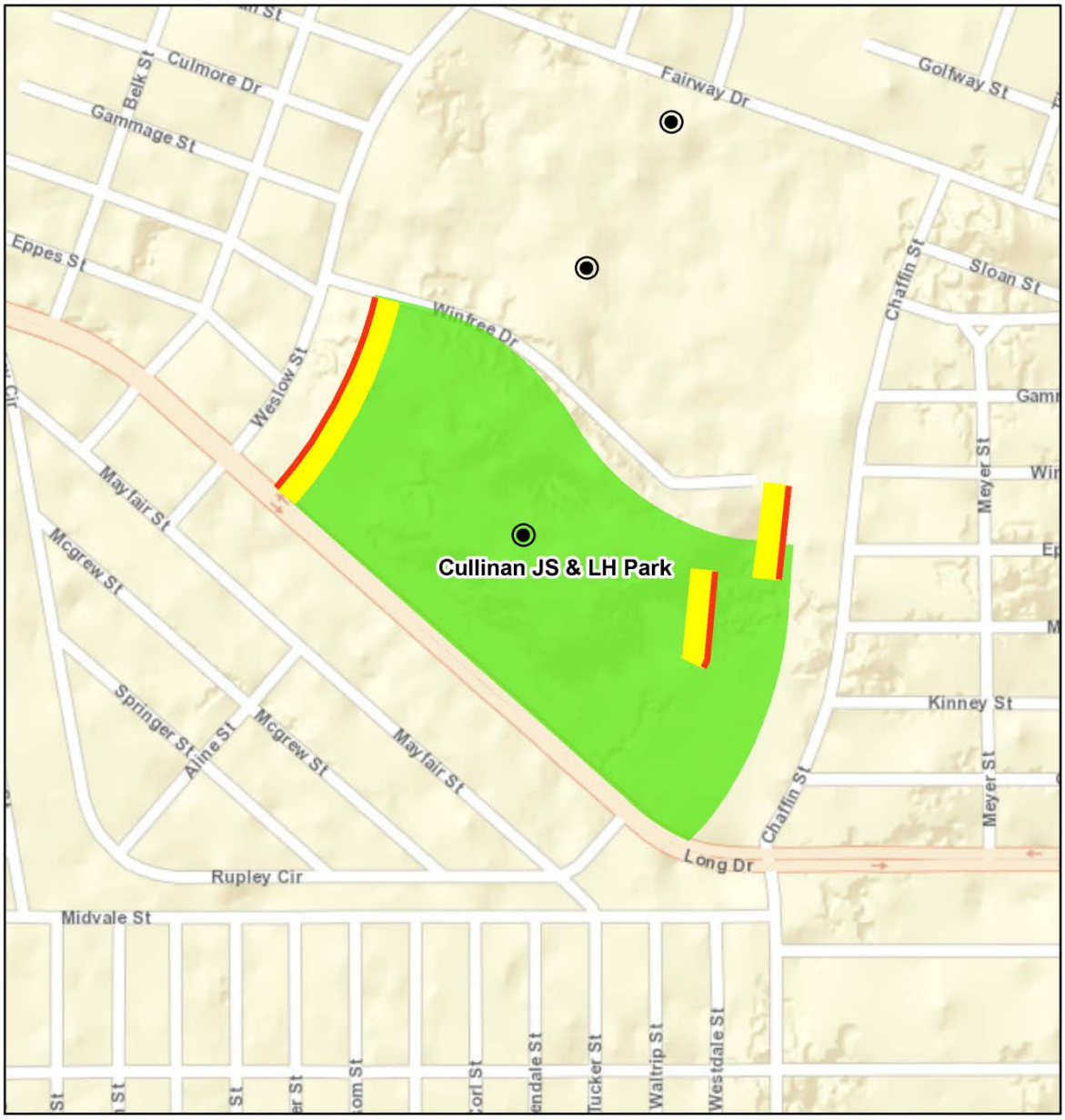
Data Sources: THC, HGAC, CDM Smith
Service Layer Credits: Sources: Esri, DeLorme, NAVTEQ, USGS, Intermap, iPC, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, 2013


Charriton Dr
Debeney Dr
Otterbury Dr
Aldine Mail Rd
Beau Ln
Bethany Ln
Fall Meadow Ln
Fern Meadow Ln
Shady Meadow St
Gloger St
Orange Gro
Keith Weiss Park
Keith-Wiess Park
Mierianne St
Bertrand St
Fishel St
Task St
Castledale Dr
Hartwick Rd
Havner Ln
Hurlingham St
Brea Crest St
Turn St
Aldine Westfield Rd
Innsbury Dr
Sunny Dr
Mooney Rd
Russ Dr
Steeple Ln
Deergrove St
Buckland Ln
Ladbroke Ln
Jfk Blvd
City of Houston Parks
Keith-Wiess Park
Legend
COH Project Limit
Project Area - 100 ft Buffer Zone
Park
Freshwater Emergent Wetland
Freshwater Forested/Shrub Wetland
Freshwater Pond
N
W
E
S
0 500 1,000 Feet
Wetlands
Project Area
Harris
Fort Bend
Data Sources: THC, HGAC, CDM Smith
Service Layer Credits: Sources: Esri, DeLorme, NAVTEQ, USGS, Intermap, iPC, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, 2013



Data Sources: THC, HGAC, CDM Smith
Service Layer Credits: Sources: Esri, DeLorme, NAVTEQ, USGS, Intermap, iPC, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, 2013

Appendix D-2
Groundwater Well Maps



City of Houston Parks
Cullinan JS & LH Park

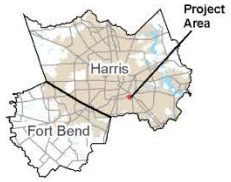
Legend

- Groundwater Well
- COH Project Limit
- Project Area - 100 ft Buffer Zone
- Park

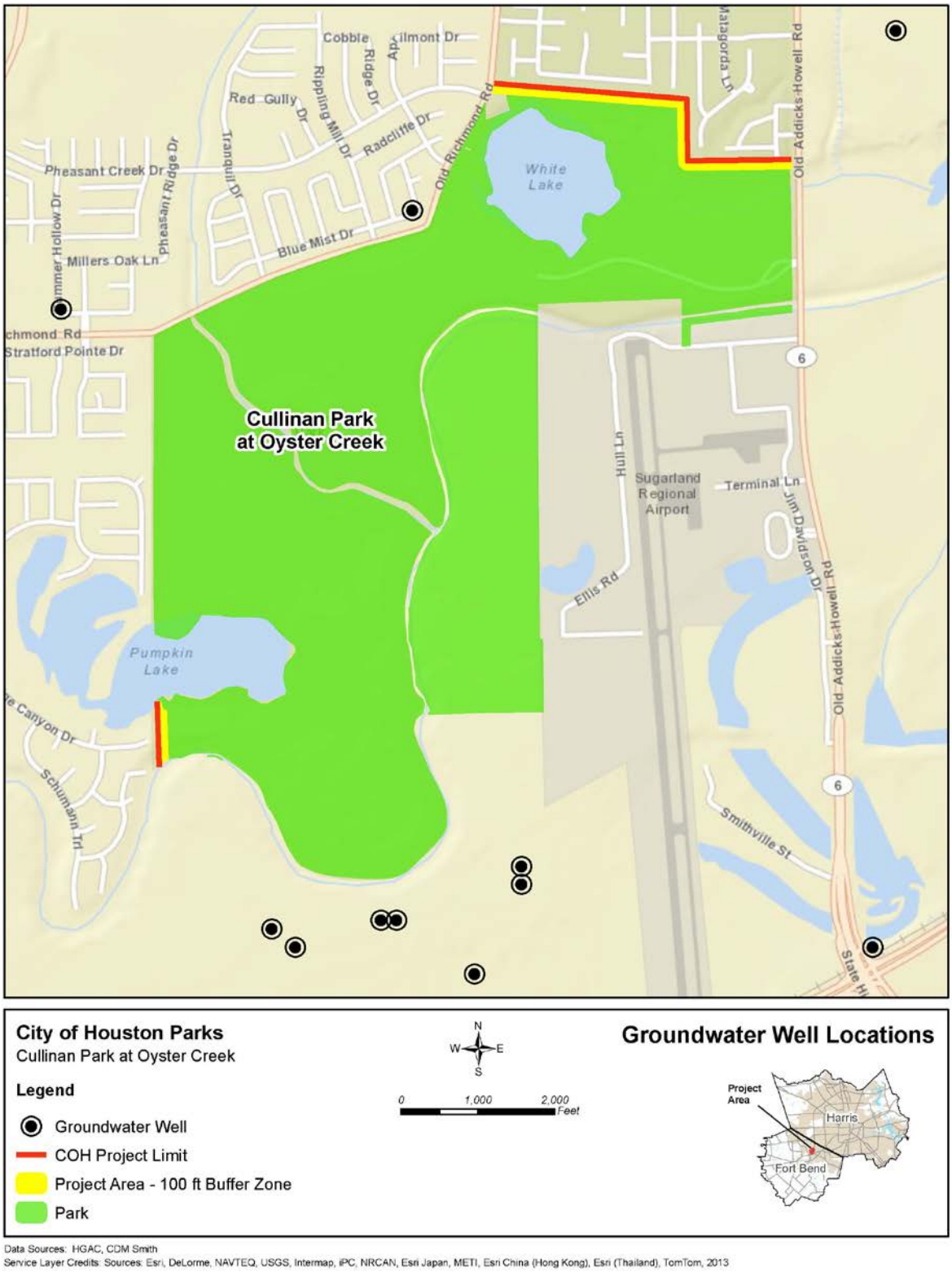
N
W E
S

0 400 800 Feet

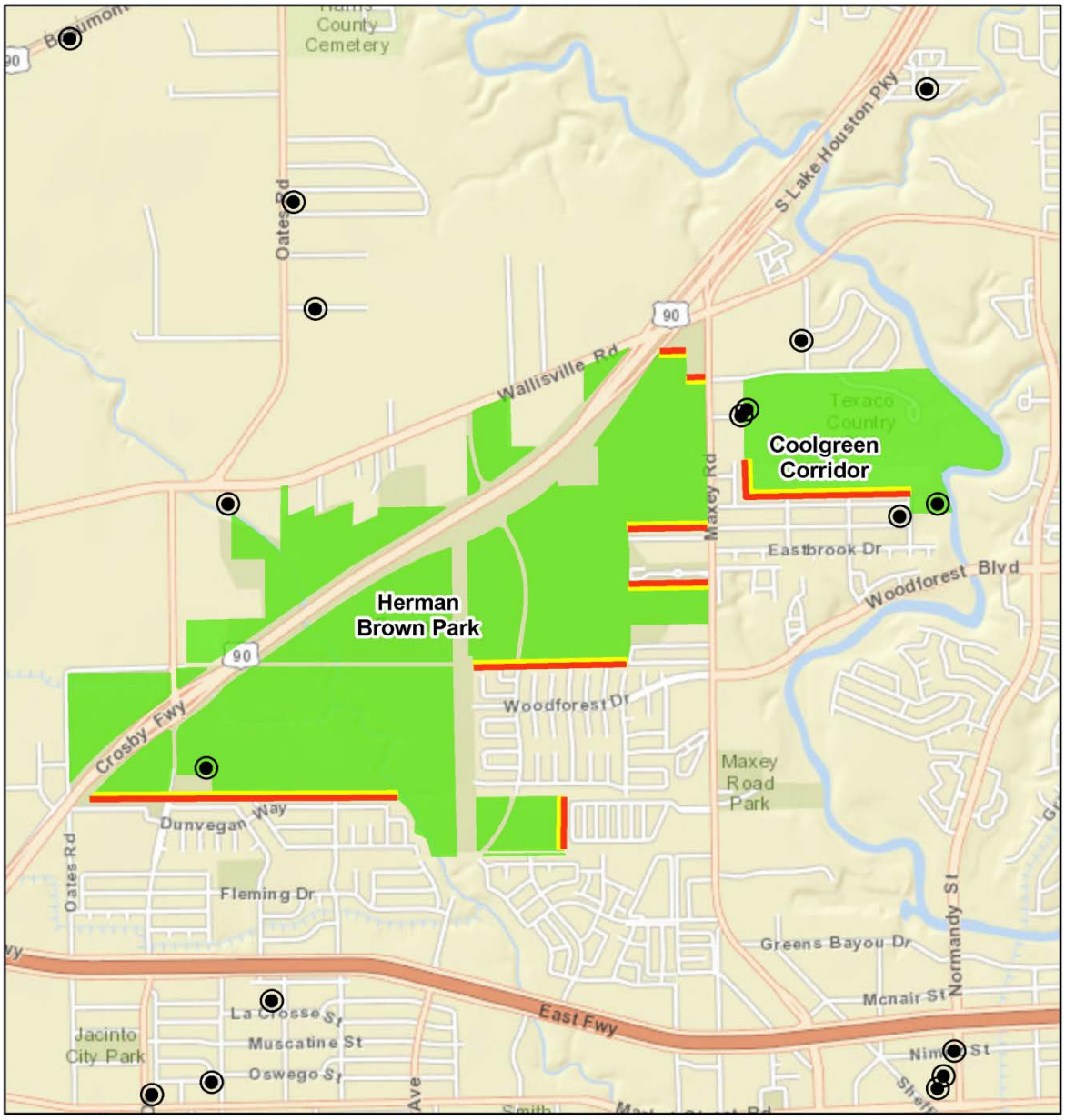
Groundwater Well Locations



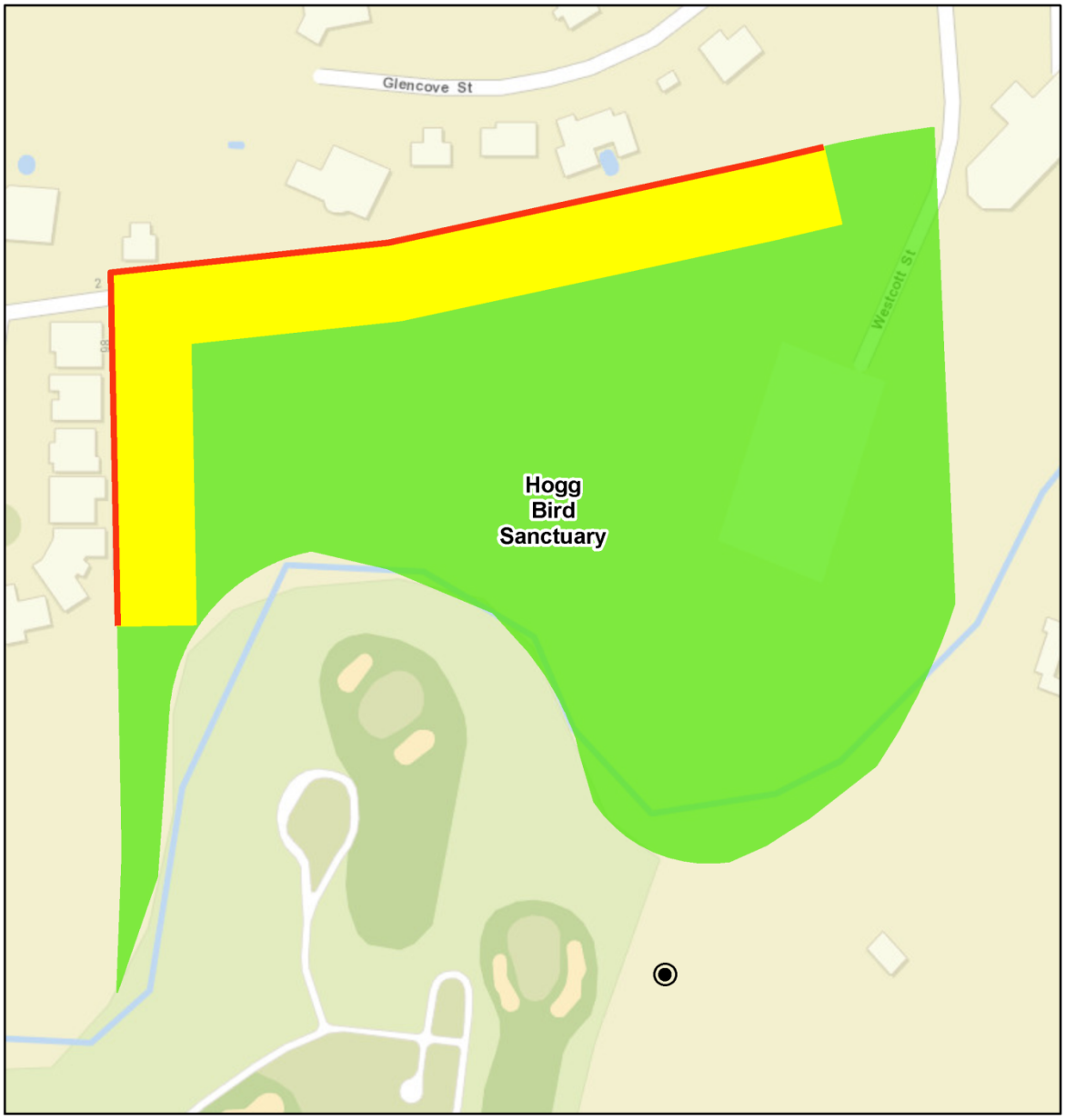
Data Sources: HGAC, CDM Smith
Service Layer Credits: Sources: Esri, DeLorme, NAVTEQ, USGS, Intermap, iPC, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, 2013



Data Sources: HGAC, CDM Smith
Service Layer Credits: Sources: Esri, DeLorme, NAVTEQ, USGS, Intermap, iPC, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, 2013



Data Sources: HGAC, CDM Smith
Service Layer Credits: Sources: Esri, DeLorme, NAVTEQ, USGS, Intermap, iPC, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, 2013



City of Houston Parks
Hogg Bird Sanctuary

Legend

- Groundwater Well
- COH Project Limit
- Project Area - 100 ft Buffer Zone
- Park

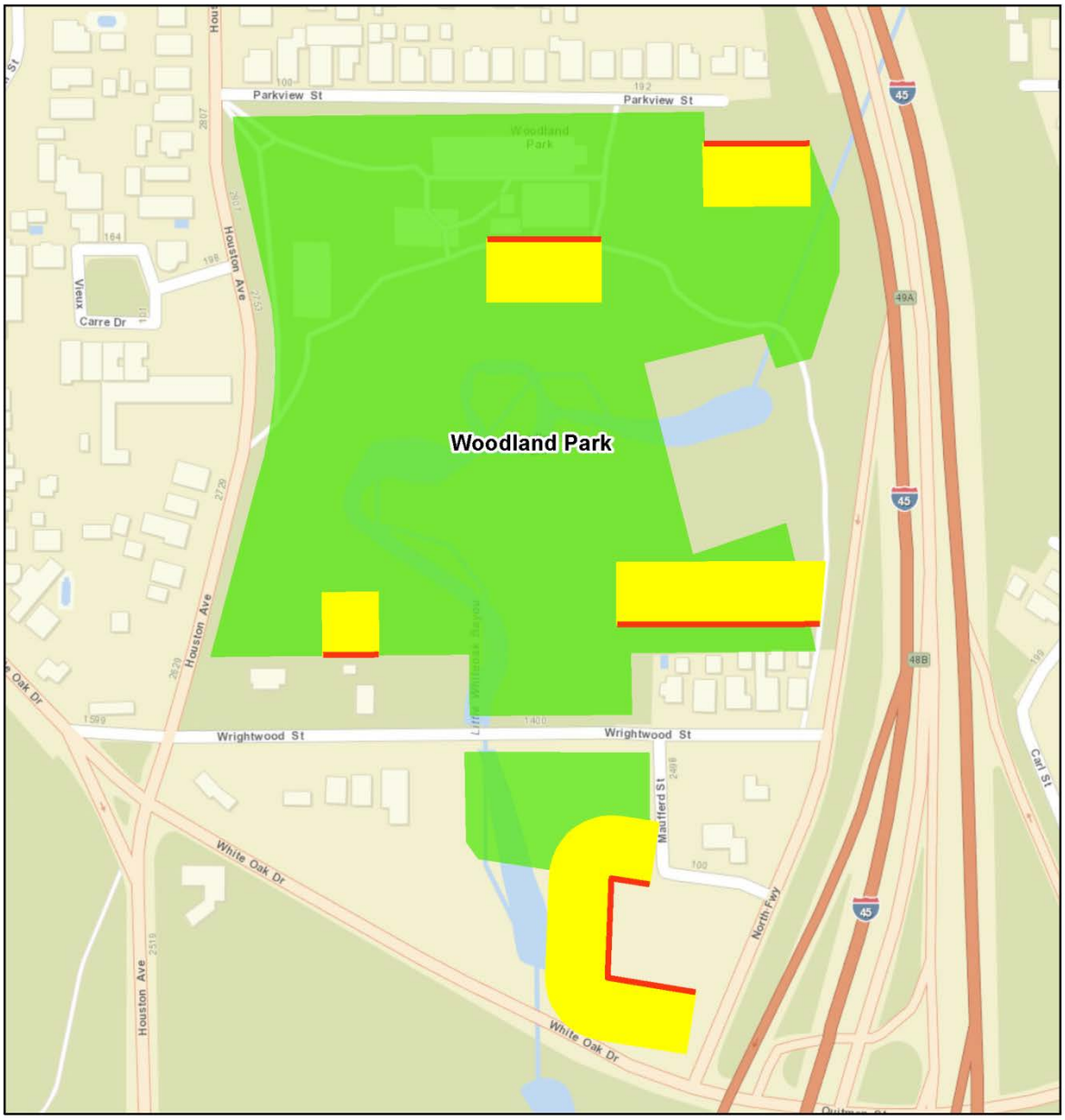
N
W E
S

0 100 200 Feet

Groundwater Well Locations

Data Sources: HGAC, CDM Smith
Service Layer Credits: Sources: Esri, DeLorme, NAVTEQ, USGS, Intermap, iPC, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, 2013

Data Sources: HGAC, CDM Smith
Service Layer Credits: Sources: Esri, DeLorme, NAVTEQ, USGS, Intermap, iPC, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, 2013



City of Houston Parks
Woodland Park

Legend

- Groundwater Well
- COH Project Limit
- Project Area - 100 ft Buffer Zone
- Park

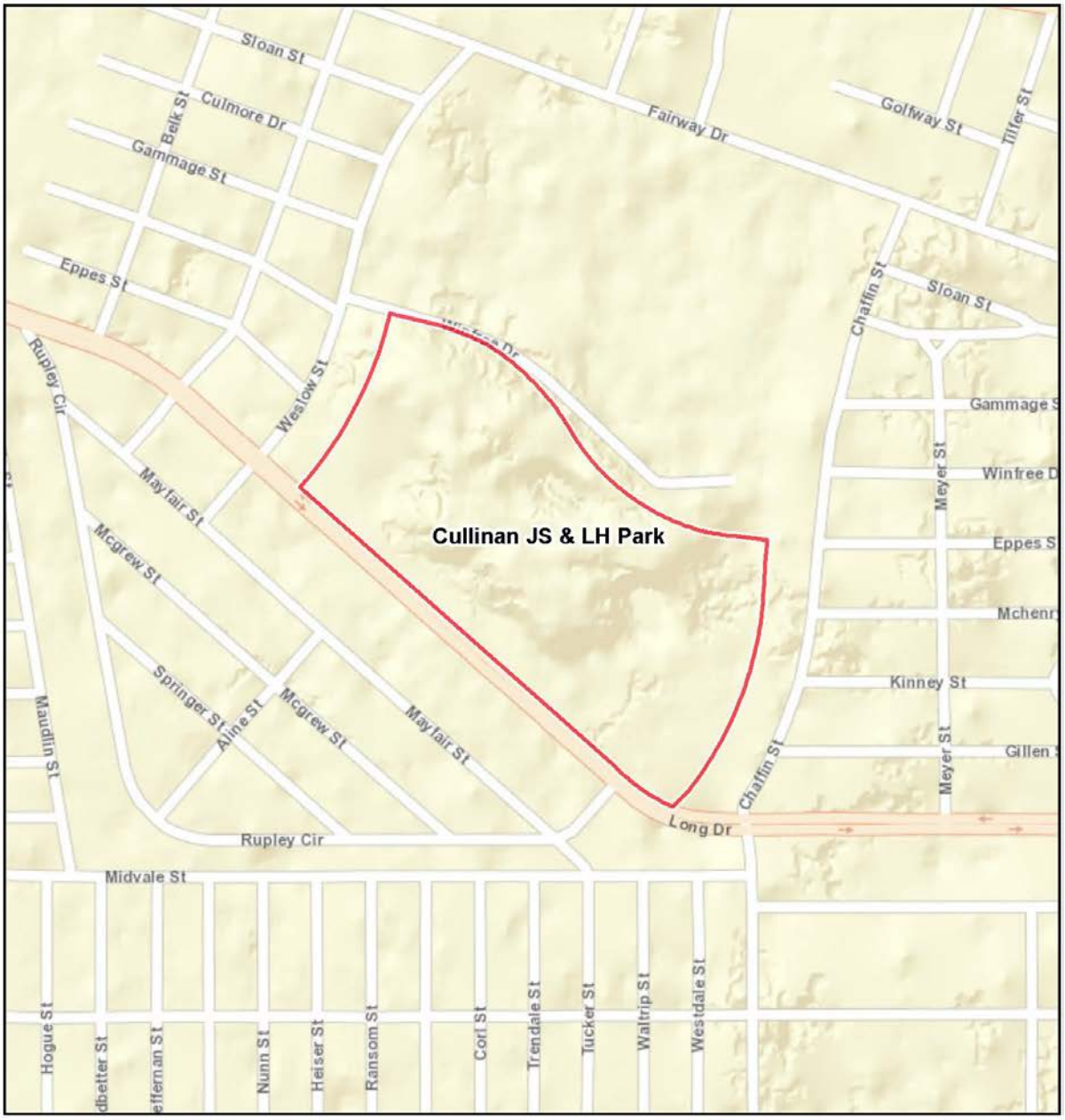
N
W E
S

0 150 300 Feet

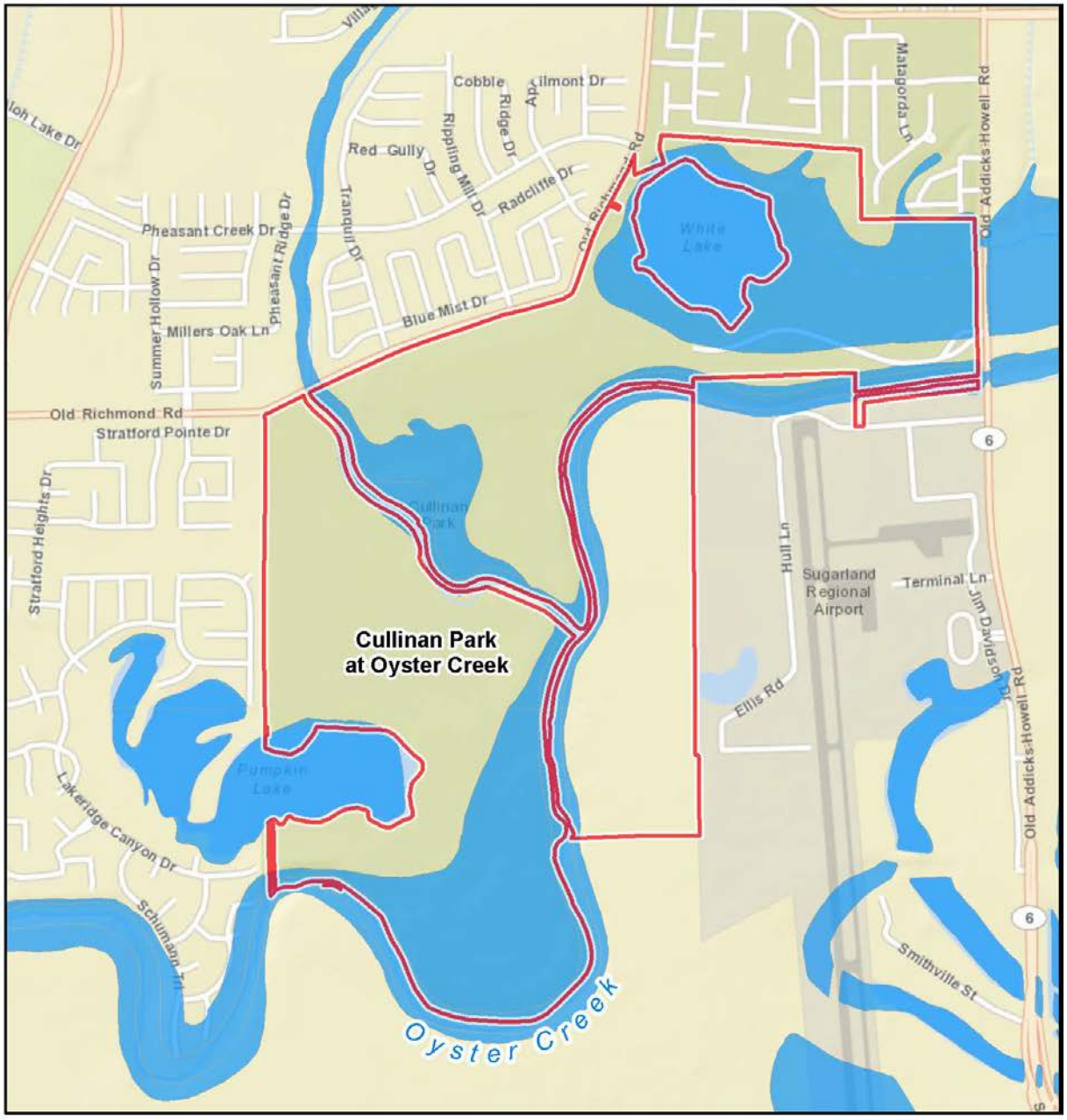
Groundwater Well Locations

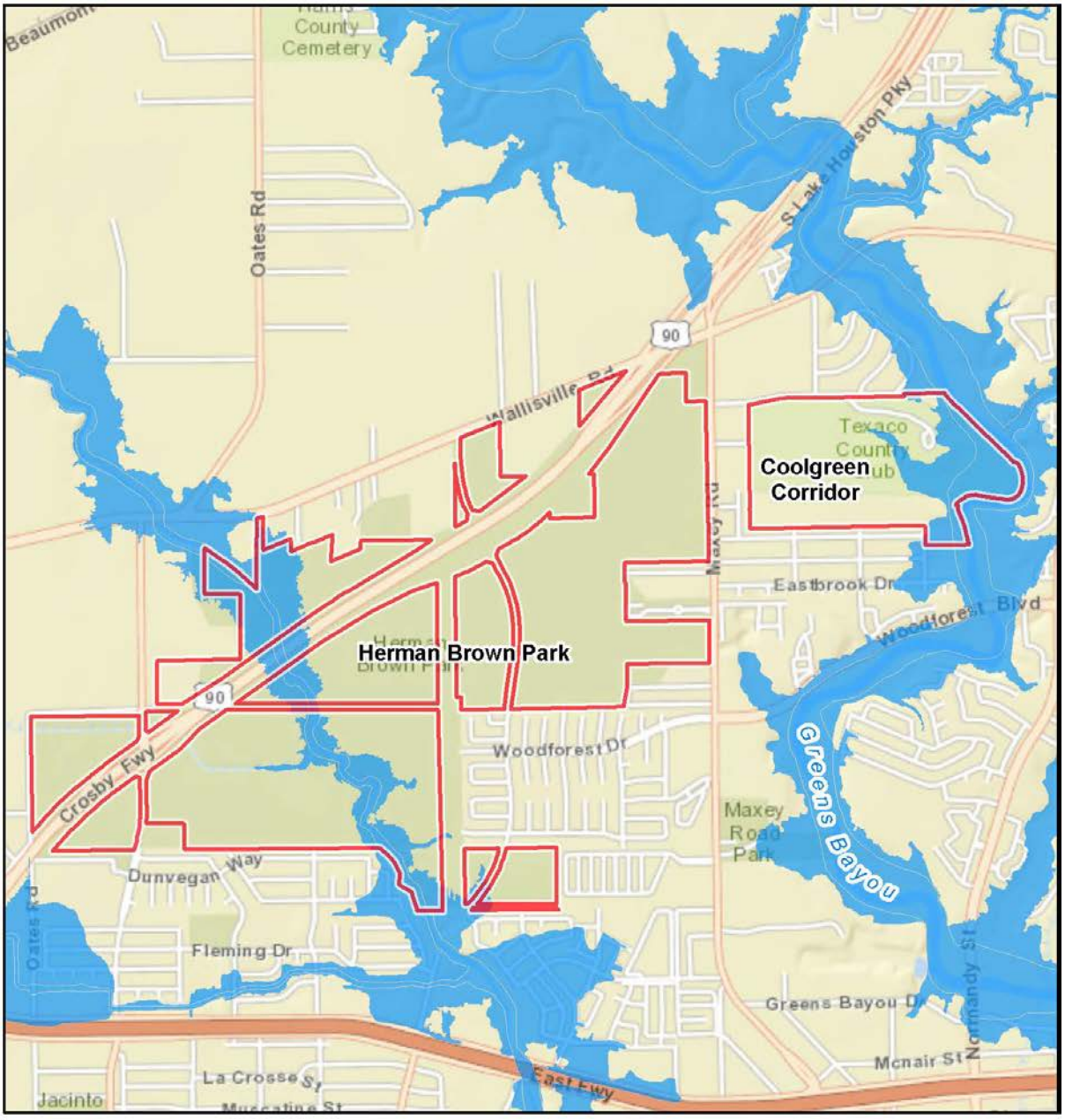
Data Sources: HGAC, CDM Smith
Service Layer Credits: Sources: Esri, DeLorme, NAVTEQ, USGS, Intermap, iPC, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, 2013

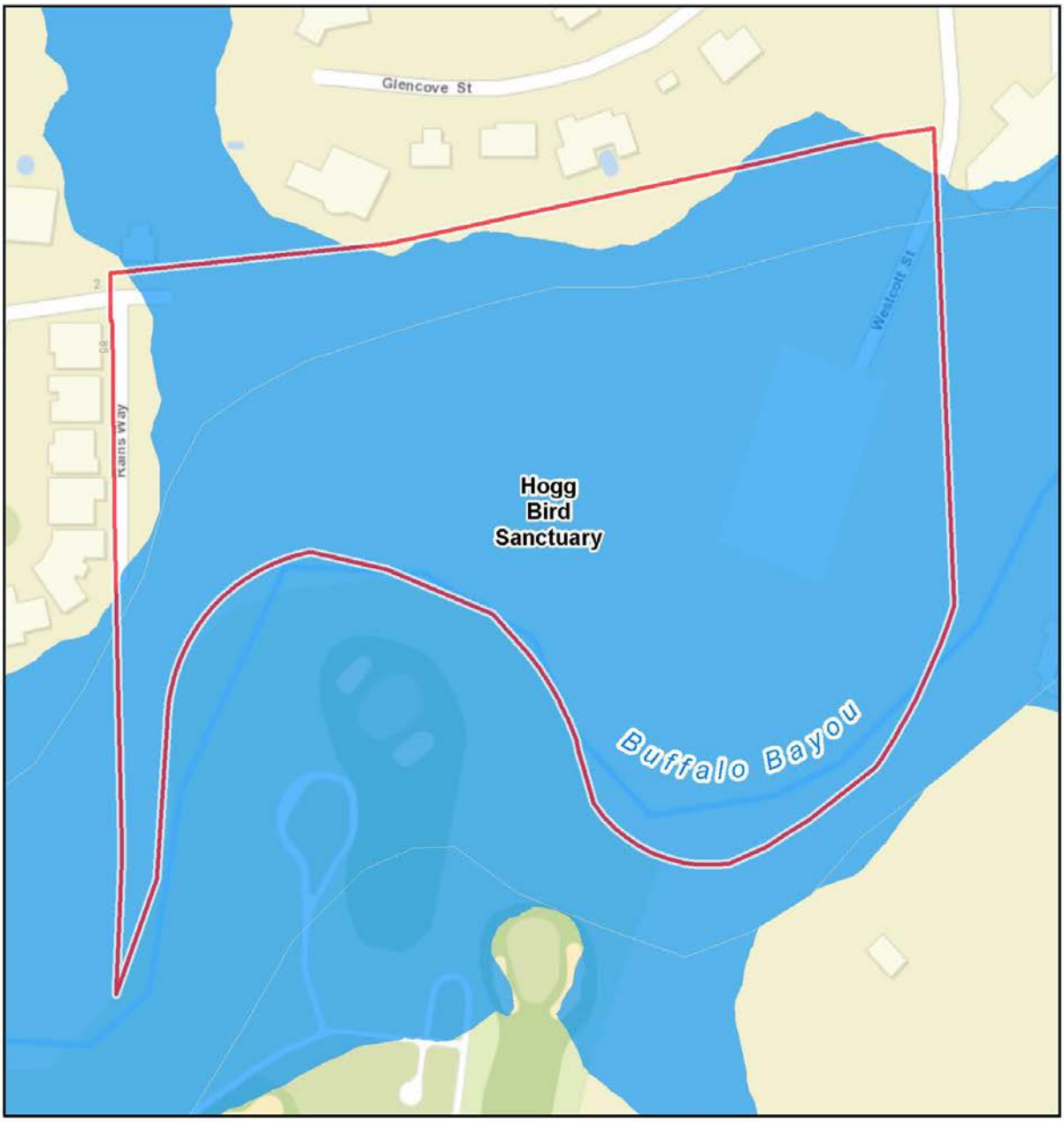
Appendix D-3
Floodplains



Data Sources: FEMA, HGAC, CDM Smith
Service Layer Credits: Sources: Esri, DeLorme, NAVTEQ, USGS, Intermap, iPC, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, 2013


Cullinan Park at Oyster Creek
Oyster Creek
White Lake
Pumpkin Lake
Cullinan Park
Sugarland Regional Airport
Cobble Ridge Dr
Red Gully Dr
Rippling Mill Dr
Radcliffe Dr
Tranquil Dr
Pheasant Ridge Dr
Pheasant Creek Dr
Summer Hollow Dr
Millers Oak Ln
Blue Mist Dr
Old Richmond Rd
Stratford Pointe Dr
Stratford Heights Dr
Lakeridge Canyon Dr
Schumann Trl
Hull Ln
Terminal Ln
Ellis Rd
Jim Davis Rd
Old Addicks-Howell Rd
Smithville St
6
City of Houston Parks
Cullinan Park at Oyster Creek
N
W
E
S
0
1,000
2,000
Feet
Floodplains
Project Area
Harris
Fort Bend
Legend
Project Area
100-Year Floodplain
Data Sources: FEMA, HGAC, CDM Smith
Service Layer Credits: Sources: Esri, DeLorme, NAVTEQ, USGS, Intermap, iPC, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, 2013


Beaumont
County Cemetery
Oates Rd
S Lake Houston Pky
90
Wallisville Rd
Texaco Country Club
Coolgreen Corridor
Maxey Rd
Eastbrook Dr
Woodforest Blvd
Herman Brown Park
90
Crosby Fwy
Woodforest Dr
Greens Bayou
Maxey Road Park
Dunvegan Way
Fleming Dr
Oates Rd
Greens Bayou Dr
Normandy St
Mcnair St
La Crosse St
East Fwy
Jacinto
Muscatine St
City of Houston Parks
Herman Brown Park & Coolgreen Corridor
N
W
E
S
0 1,000 2,000 Feet
Floodplains
Project Area
Harris
Fort Bend
Legend
Project Area
100-Year Floodplain
Data Sources: FEMA, HGAC, CDM Smith
Service Layer Credits: Sources: Esri, DeLorme, NAVTEQ, USGS, Intermap, iPC, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, 2013



Data Sources: FEMA, HGAC, CDM Smith
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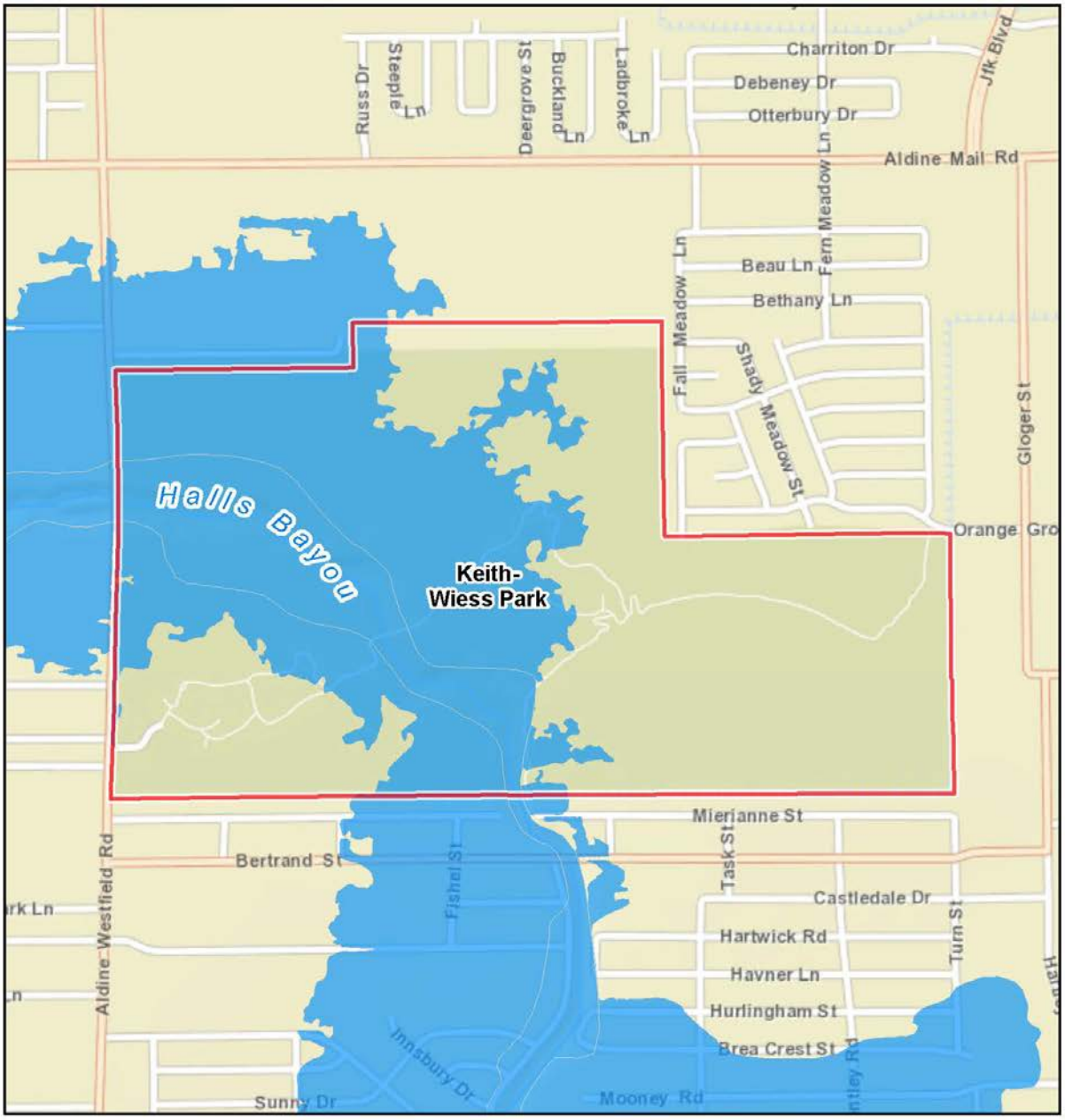
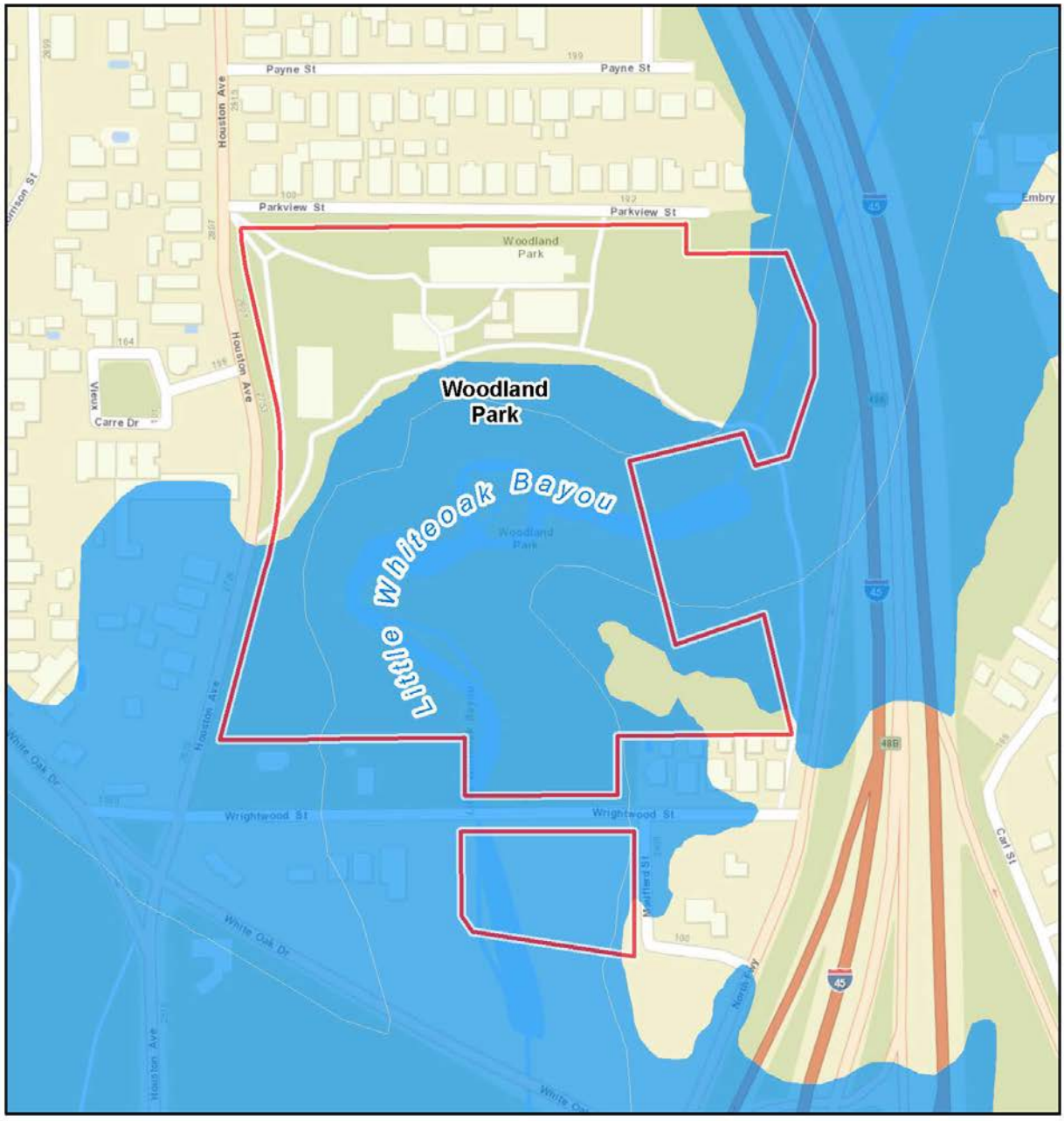
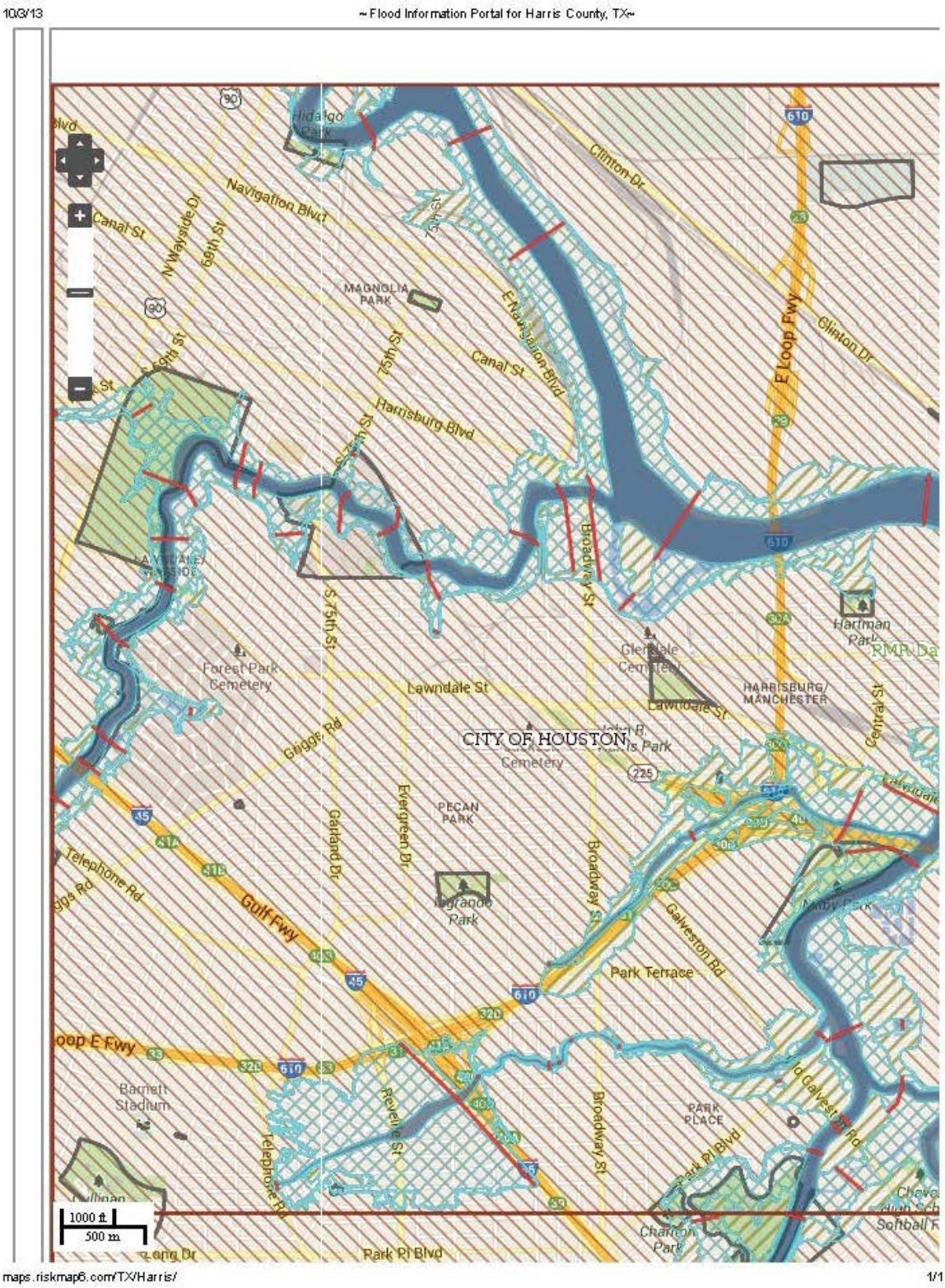


Data Sources: FEMA, HGAC, CDM Smith
Service Layer Credits: Sources: Esri, DeLorme, NAVTEQ, USGS, Intermap, iPC, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, 2013

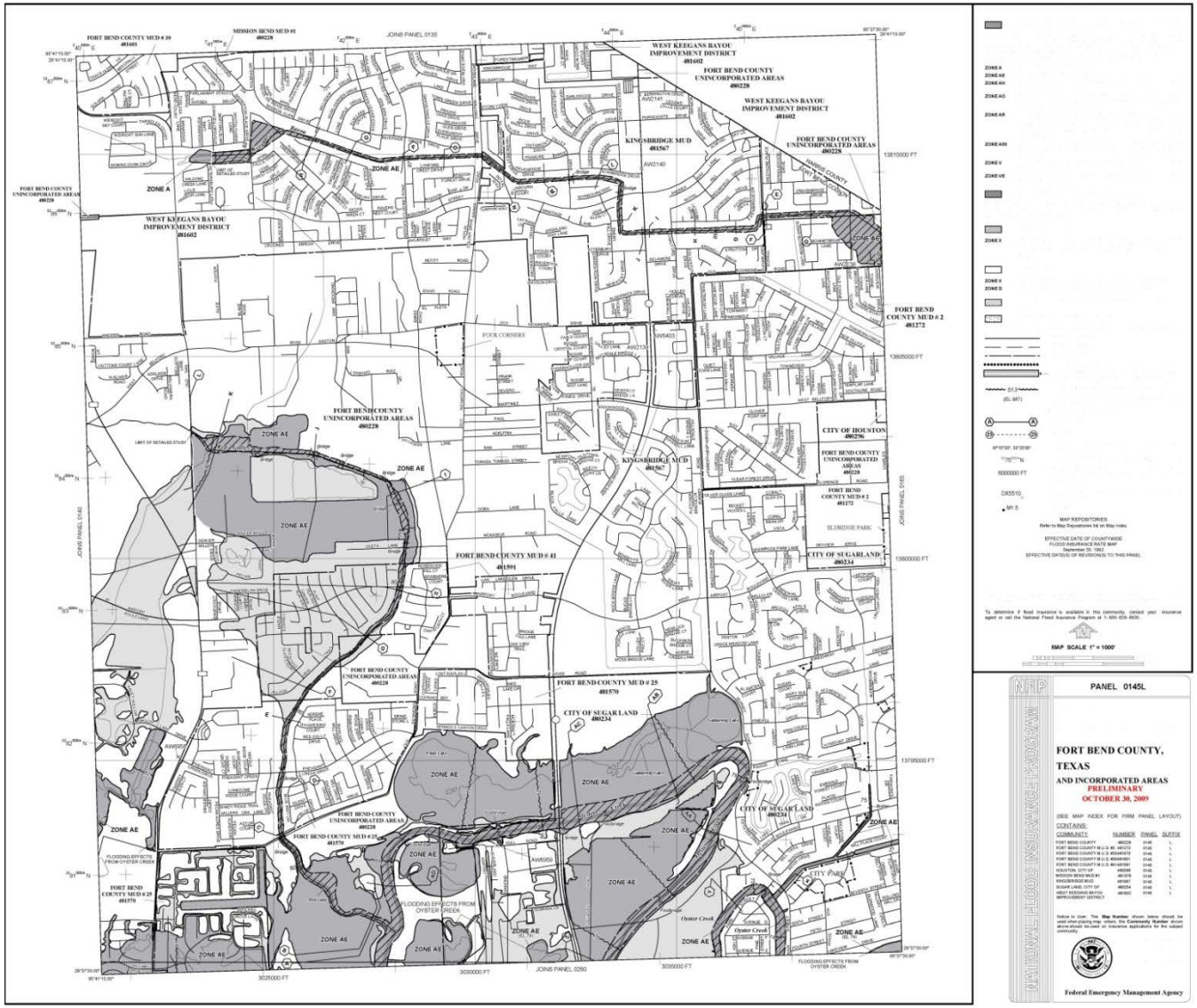


Data Sources: FEMA, HGAC, CDM Smith
Service Layer Credits: Sources: Esri, DeLorme, NAVTEQ, USGS, Intermap, iPC, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, 2013

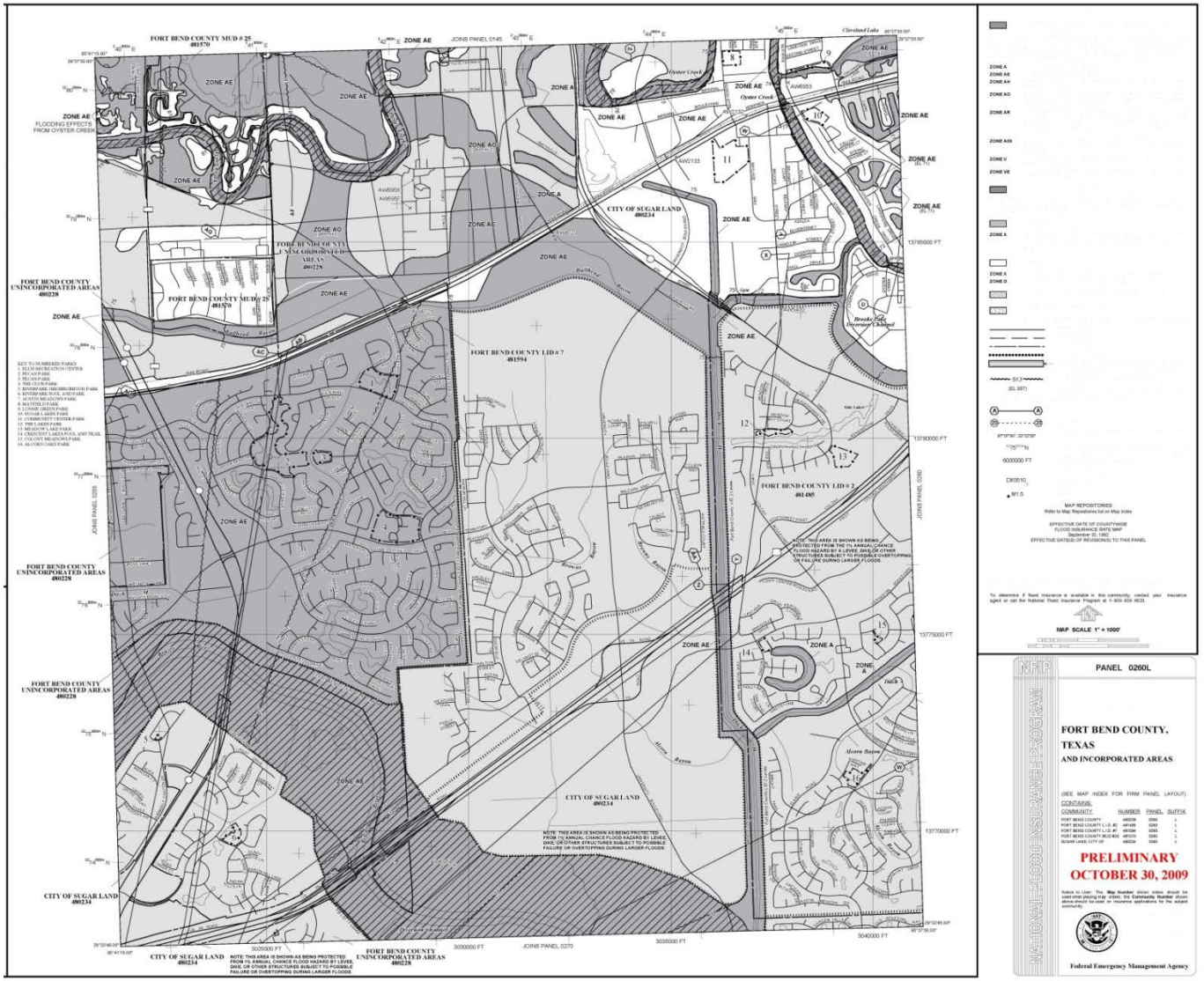
Appendix D-4
Flood Insurance Rate Maps



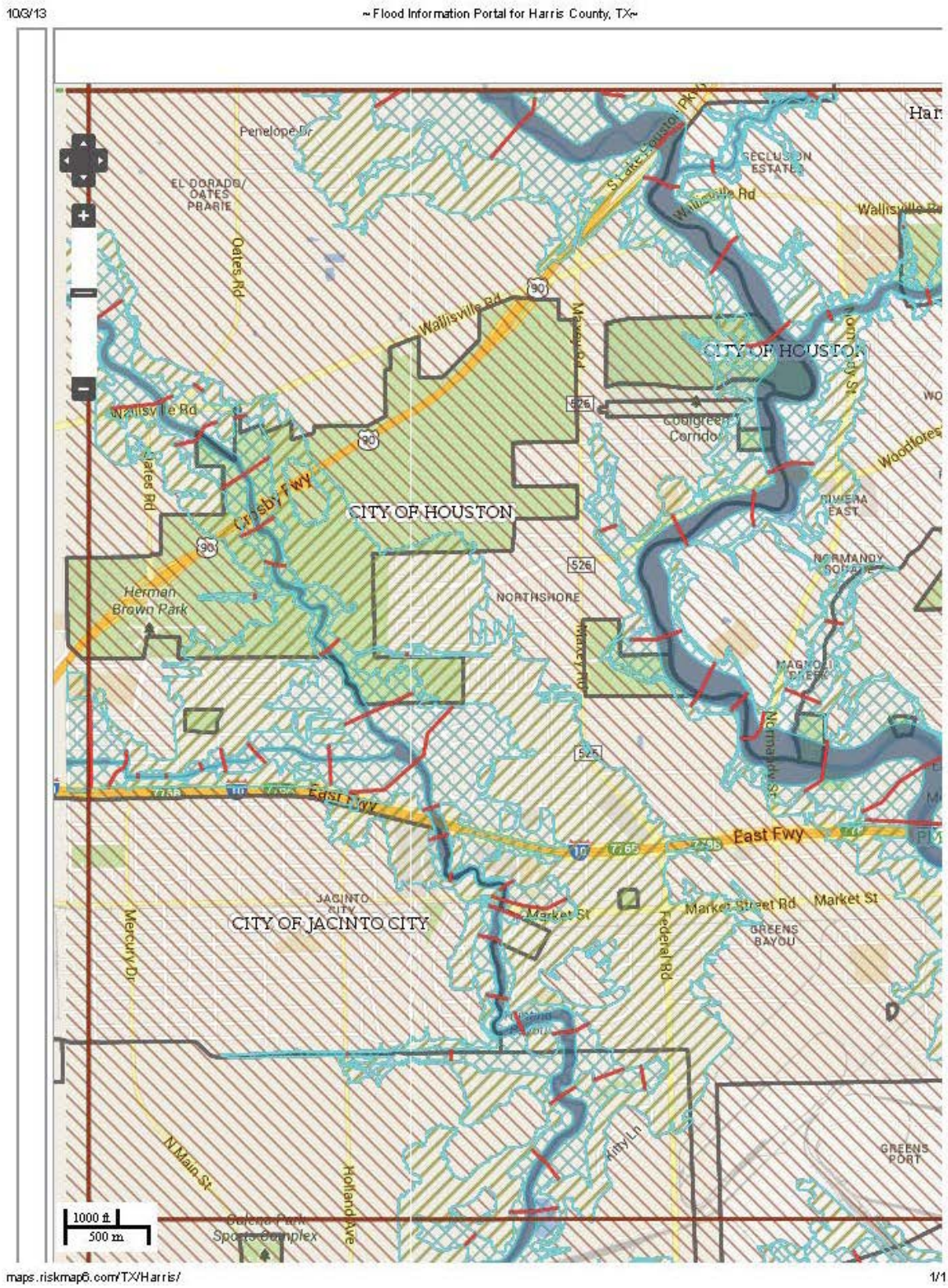
Preliminary FIRM #48201C0885M



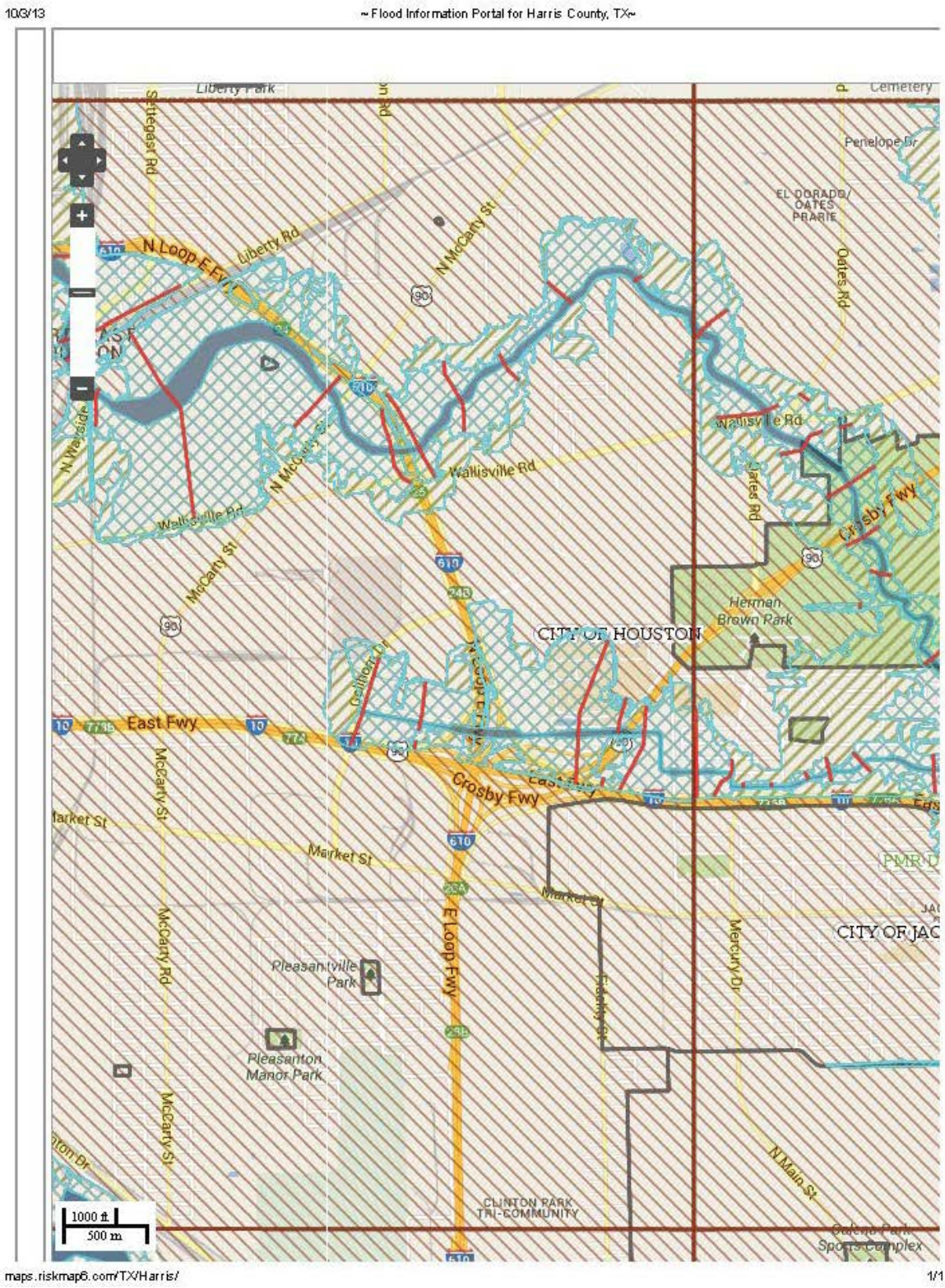
Preliminary FIRM #48157C0145L



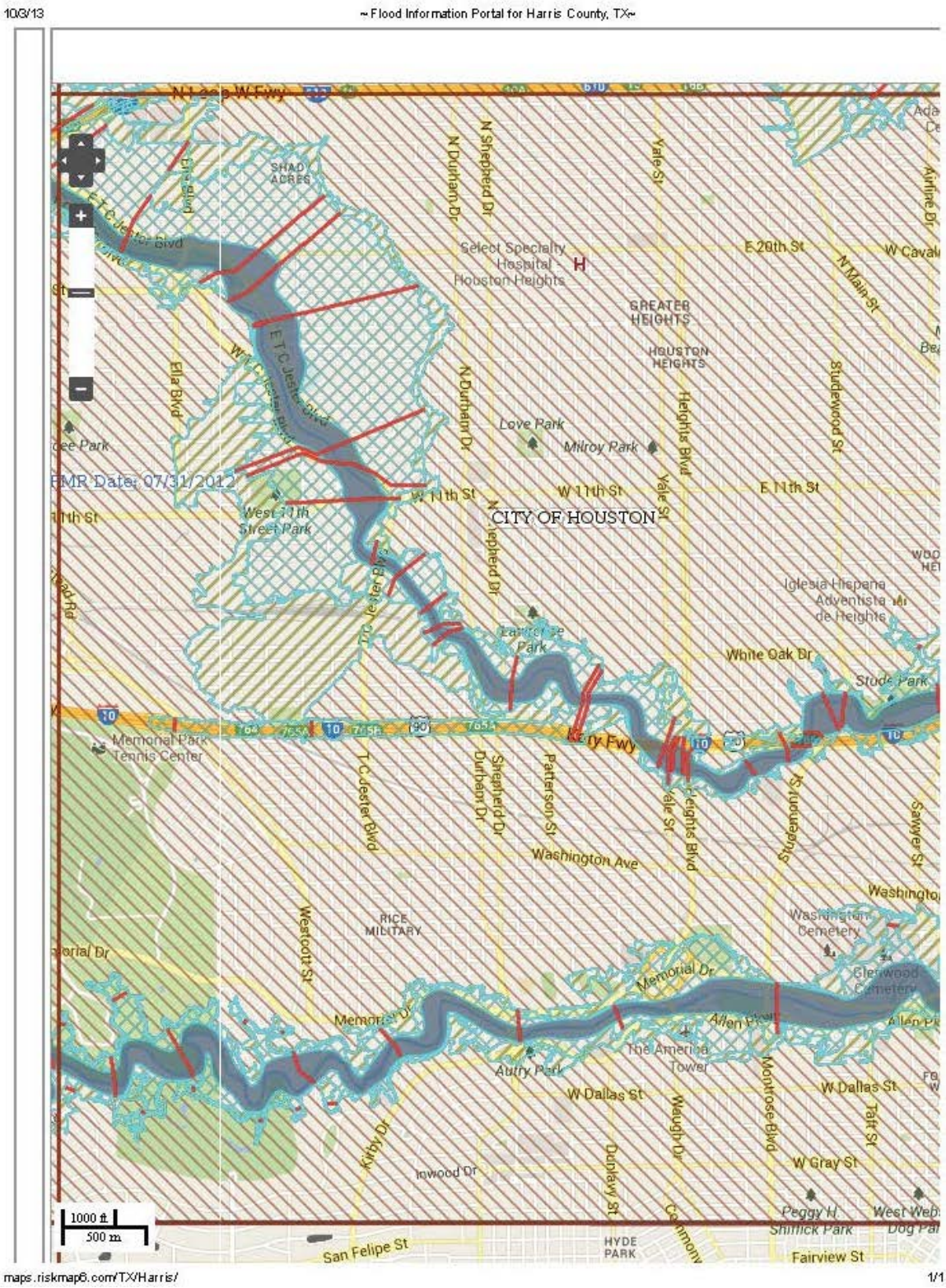
Preliminary FIRM #48157C0260L



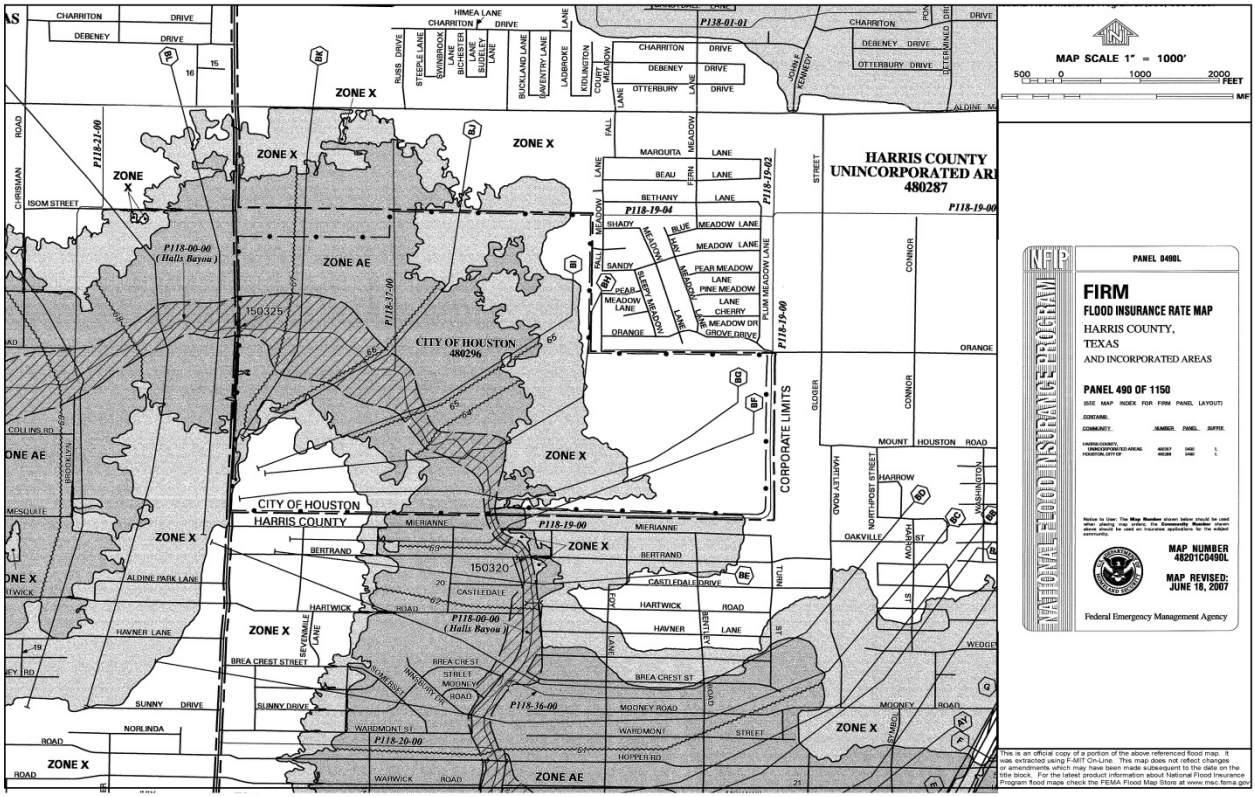
Preliminary FIRM #48201C0715M



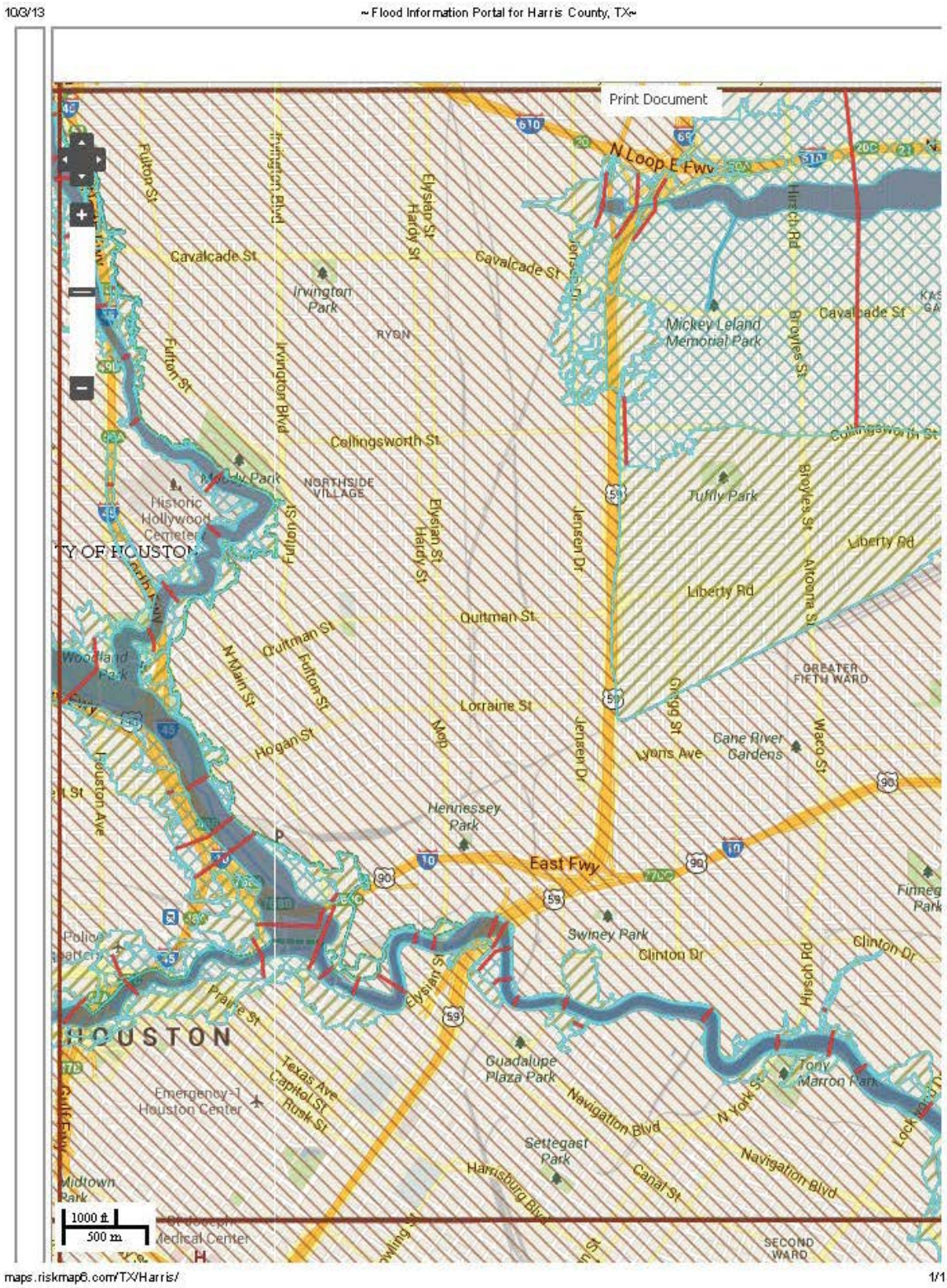
Preliminary FIRM #48201C0695M



Preliminary FIRM #48201C0670M



FIRMette from Panel 48201C0490L



Preliminary FIRM #48201C0690M

Appendix E
Habitat Information

Appendix E. Table 1. Listed Species Summary, Fort Bend County, TX

Species (Common) [1]	Species	Federal Status	State Status	Habitat Description	Habitat Present in Survey Areas
Amphibians					
Houston toad	Anaxyrus houstonensis	LE	E	Endemic; sandy substrate, water in pools, ephemeral pools, stock tanks; breeds in spring especially after rains; burrows in soil of adjacent uplands when inactive; breeds February-June; associated with soils of the Sparta, Carrizo, Goliad, Queen City, Recklaw, Weches, and Willis geologic formations.	Potential habitat present in Zones 1 and 2 at Cullinan Park at Oyster Creek
Birds					
American Peregrine Falcon	Falco peregrinus anatum	DL	T	Year-round resident and local breeder in west Texas, nests in tall cliff eyries; also, migrant across state from more northern breeding areas in U.S. and Canada, winters along coast and farther south; occupies wide range of habitats during migration, including urban, concentrations along coast and barrier islands; low-altitude migrant, stopovers at leading landscape edges, such as lake shores, coastlines, and barrier islands.	Potential stopover habitat present adjacent to Zone 2 at Pumpkin Lakes. No nests or individuals observed.
Arctic Peregrine Falcon	Falco peregrinus tundrius	DL	--	Migrant throughout state from subspecies' far northern breeding range, winters along coast and farther south; occupies wide range of habitats during migration, including urban, concentrations along coast and barrier islands; low-altitude migrant, stopovers at leading landscape edges, such as lake shores, coastlines, and barrier islands.	Potential stopover habitat present adjacent to Zone 2 at Pumpkin Lakes. No nests or individuals observed.
Attwater's Greater Prairie-Chicken	Tympanuchus cupido attwateri	LE	E	This county within historic range; endemic; open prairies of mostly thick grass 1- to 3-feet tall; from near sea level to 200 feet along coastal plain on upper two-thirds of Texas coast; males form communal display flocks during late winter-early spring; booming grounds important; breeding	No tallgrass prairie habitat present in Survey Areas.

Species (Common) [1]	Species	Federal Status	State Status	Habitat Description	Habitat Present in Survey Areas
				February-July.	
Bald Eagle	Haliaeetus leucocephalus	DL	T	Found primarily near rivers and large lakes; nests in tall trees or on cliffs near water; communally roosts, especially in winter; hunts live prey, scavenges, and pirates food from other birds.	Potential low-quality nesting habitat present (Buffalo Bayou). No nests or individuals observed.
Henslow's Sparrow	Ammodramus henslowii			Wintering individuals (not flocks) found in weedy fields or cut-over areas where lots of bunch grasses occur along with vines and brambles; a key component is bare ground for running/walking.	Unlikely to occur in the Survey Areas due to lack of preferred bunch grass and bare ground habitat. No nests or individuals observed.
Interior Least Tern	Sterna antillarum athalassos	LE	E	Subspecies is listed only when inland (more than 50 miles from a coastline); nests along sand and gravel bars within braided streams, rivers; also know to nest on manmade structures (inland beaches, wastewater treatment plants, gravel mines, etc.); eats small fish and crustaceans; when breeding forages within a few hundred feet of colony.	No sand and gravel bars, or similar manmade habitat present in Survey Areas.
Peregrine Falcon	Falco peregrinus	DL	T	Both subspecies migrate across the state from more northern breeding areas in U.S. and Canada to winter along coast and farther south; subspecies (F. p. anatum) is also a resident breeder in west Texas; the two subspecies' listing statuses differ, F.p. tundrius is no longer listed in Texas but because the subspecies are not easily distinguishable at a distance, reference is generally made only to the species level; see subspecies for habitat.	Potential stopover habitat present adjacent to Zone 2 at Pumpkin Lakes. No nests or individuals observed.
Sprague's Pipit	Anthus spragueii	C		Only in Texas during migration and winter, mid-September to early April; short to medium distance, diurnal migrant; strongly tied to native upland prairie, can be locally common in coastal grasslands, uncommon to rare further west; sensitive to patch size and avoids edges.	Unlikely to occur due to lack of native upland prairie preferred habitat in Survey Areas. No individuals observed.

Species (Common) [1]	Species	Federal Status	State Status	Habitat Description	Habitat Present in Survey Areas
Western Burrowing Owl	Athene cunicularia hypugaea			Open grasslands, especially prairie, plains, and savanna, sometimes in open areas, such as vacant lots near human habitation or airports; nests and roosts in abandoned burrows.	Potential low-quality open grassland habitat present. No individuals or burrows observed.
White-faced Ibis	Plegadis chihi		T	Potential migrant via plains throughout most of state to coast; winters in coastal marshes of Aransas, Calhoun, and Refugio counties.	Potential stopover habitat at Cullinan Park at Oyster Creek (Pumpkin Lakes and Oyster Creek), Cullinan JS & LH (Zone 2 pond), and Hogg Bird Sanctuary (ephemeral pools and Buffalo Bayou). No individuals observed.
White-tailed Hawk	Buteo albicaudatus		T	Near coast on prairies, cordgrass flats, and scrub-live oak; further inland on prairies, mesquite and oak savannas, and mixed savanna-chaparral; breeding March-May.	Potential live oak habitat present at Woodland Park. No individuals observed.
Whooping Crane	Grus americana	LE	E	Potential migrant via plains throughout most of state to coast; winters in coastal marshes of Aransas, Calhoun, and Refugio counties.	Potential stopover habitat at Cullinan Park at Oyster Creek (Pumpkin Lakes and Oyster Creek), Cullinan JS & LH (Zone 2 pond), and Hogg Bird Sanctuary (ephemeral pools and Buffalo Bayou). No individuals observed.
Wood Stork	Mycteria americana		T	Forages in prairie ponds, flooded pastures or fields, ditches, and other shallow standing water, including salt-water; usually roosts communally in tall snags, sometimes in association with other wading birds (i.e. active heronries); breeds in Mexico and birds move into Gulf States in search of mud flats and other wetlands, even those associated with forested areas; formerly nested in Texas, but no breeding records since 1960.	Potential stopover habitat at Cullinan Park at Oyster Creek (Pumpkin Lakes and Oyster Creek), Cullinan JS & LH (Zone 2 pond), and Hogg Bird Sanctuary (ephemeral pools and Buffalo Bayou). No individuals observed.

Species (Common) [1]	Species	Federal Status	State Status	Habitat Description	Habitat Present in Survey Areas
Fishes					
American Eel	Anguilla rostrata			Coastal waterways below reservoirs to gulf; spawns January to February in ocean, larva move to coastal waters, metamorphose, then females move into freshwater; most aquatic habitats with access to ocean, muddy bottoms, still waters, large streams, lakes; can travel overland in wet areas; males in brackish estuaries; diet varies widely, geographically, and seasonally.	No coastal waterways with preferred habitat present in Survey Areas.
Sharpnose Shiner	Notropis oxyrhynchus	C		Endemic to Brazos River drainage; also, apparently introduced into adjacent Colorado River drainage; large turbid river, with bottom a combination of sand, gravel, and clay-mud.	No large river habitat present in Survey Areas.
Mammals					
Louisiana Black Bear	Ursus americanus luteolus	LT	T	Possible as transient; bottomland hardwoods and large tracts of inaccessible forested areas.	No large, inaccessible forested tracts of bottomland hardwoods found in Survey Areas.
Plains Spotted Skunk	Spilogale putorius interrupta			Catholic; open fields, prairies, croplands, fence rows, farmyards, forest edges, and woodlands; prefers wooded, brushy areas and tallgrass prairie.	Potential to occur along forest edges throughout the Survey Areas. No individuals observed.
Red Wolf	Canis rufus	LE	E	Extirpated; formerly known throughout eastern half of Texas in brushy and forested areas, as well as coastal prairies.	Potential habitat does exist, but unlikely to occur due to extirpation.
Mollusks					
False Spike Mussel	Quadrula mitchelli		T	Possibly extirpated in Texas; probably medium to large rivers; substrates varying from mud through mixtures of sand, gravel and cobble; one study indicated water lilies were present at the site; Rio Grande, Brazos, Colorado, and Guadalupe (historic) river basins.	No large stream or river substrate habitat present in Survey Areas.

Species (Common) [1]	Species	Federal Status	State Status	Habitat Description	Habitat Present in Survey Areas
Smooth Pimpleback	Quadrula houstonensis	C	T	Small to moderate streams and rivers as well as moderate size reservoirs; mixed mud, sand, and fine gravel, tolerates very slow to moderate flow rates, appears not to tolerate dramatic water level fluctuations, scoured bedrock substrates, or shifting sand bottoms, lower Trinity (questionable), Brazos, and Colorado River basins.	No large stream or river substrate habitat present in Survey Areas.
Texas Fawnsfoot	Truncilla macrodon	C	T	Little known; possibly rivers and larger streams, and intolerant of impoundment; flowing rice irrigation canals, possibly sand, gravel, and perhaps sandy-mud bottoms in moderate flows; Brazos and Colorado River basins.	No large stream or river substrate habitat present in Survey Areas.
Reptiles					
Alligator Snapping Turtle	Macrochelys temminckii		T	Perennial water bodies; deep water of rivers, canals, lakes, and oxbows; also swamps, bayous, and ponds near deep running water; sometimes enters brackish coastal waters; usually in water with mud bottom and abundant aquatic vegetation; may migrate several miles along rivers; active March-October; breeds April-October.	Potential habitat present just outside the Survey Areas at Hogg Bird Sanctuary (Buffalo Bayou) and Cullinan Park at Oyster Creek (Pumpkin Lakes and Oyster Creek).
Texas horned lizard	Phrynosoma cornutum		T	Open, arid, and semi-arid regions with sparse vegetation, including grass, cactus, scattered brush, or scrubby trees; soil may vary in texture from sandy to rocky; burrows into soil, enters rodent burrows, or hides under rock when inactive; breeds March-September.	No arid, sparsely vegetated habitat present in Survey Areas.

Species (Common) [1]	Species	Federal Status	State Status	Habitat Description	Habitat Present in Survey Areas
Timber/Canebrake rattlesnake	Crotalus horridus		T	Swamps, floodplains, upland pine and deciduous woodlands, riparian zones, abandoned farmland; limestone bluffs, sandy soil or black clay; prefers dense ground cover, i.e. grapevines or palmetto.	Potential habitat present at Cullinan Park at Oyster Creek (Pumpkin Lakes and Oyster Creek), Cullinan JS & LH (Zone 2 pond), Keith-Wiess Park (Halls Bayou), and Hogg Bird Sanctuary (ephemeral drainage and Buffalo Bayou fringe). No individuals observed.
Plants					
Threeflower Broomweed	Thurovia triflora			Texas endemic; near coast in sparse, low vegetation on a veneer of light colored silt or fine sand over saline clay along drier upper margins of ecotone between salty prairies and tidal flats; further inland associated with vegetated slick spots on prairie mima mounds; flowering September-November.	Not likely to occur due to the absence of slick spots and pimple mounds in the Survey Areas. No individuals observed.

1 -Based on information provided at http://www.tpwd.state.tx.us/gis/ris/es/ES_Reports.aspx?county=Fort Bend.

Appendix E. Table 2. Listed Species Summary, Harris County, TX

Species (Common) [1]	Species	Federal Status	State Status	Habitat Description	Habitat Present in Survey Areas
Amphibians					
Houston toad	Anaxyrus houstonensis	LE	E	Endemic; sandy substrate, water in pools, ephemeral pools, stock tanks; breeds in spring especially after rains; burrows in soil of adjacent uplands when inactive; breeds February-June; associated with soils of the Sparta, Carrizo, Goliad, Queen City, Recklaw, Weches, and Willis geologic formations.	Potential to occur due to presence of suitable habitat at Cullinan Park at Oyster Creek (Pumpkin Lakes), , Cullinan JS & LH (Zone 2 pond), and Hogg Bird Sanctuary (ephemeral pools).
Birds					
American Peregrine Falcon	Falco peregrinus anatum	DL	T	Year-round resident and local breeder in west Texas, nests in tall cliff eyries; also, migrant across state from more northern breeding areas in U.S. and Canada, winters along coast and farther south; occupies wide range of habitats during migration, including urban, concentrations along coast and barrier islands; low-altitude migrant, stopovers at leading landscape edges, such as lake shores, coastlines, and barrier islands.	Potential stopover habitat present adjacent to Zone 2 at Cullinan Park at Oyster Creek (Pumpkin Lakes). No nests or individuals observed.
Arctic Peregrine Falcon	Falco peregrinus tundrius	DL	--	Migrant throughout state from subspecies' far northern breeding range, winters along coast and farther south; occupies wide range of habitats during migration, including urban, concentrations along coast and barrier islands; low-altitude migrant, stopovers at leading landscape edges, such as lake shores, coastlines, and barrier islands.	Potential stopover habitat present adjacent to Zone 2 at Cullinan Park at Oyster Creek (Pumpkin Lakes). No nests or individuals observed.
Bald Eagle	Haliaeetus leucocephalus	DL	T	Found primarily near rivers and large lakes; nests in tall trees or on cliffs near water; communally roosts, especially in winter; hunts live prey, scavenges, and pirates food from other birds.	Potential low-quality nesting habitat present at Hogg Bird Sanctuary (Buffalo Bayou). No nests or individuals observed.

Species (Common) [1]	Species	Federal Status	State Status	Habitat Description	Habitat Present in Survey Areas
Black Rail	Laterallus jamaicensis			Salt, brackish, and freshwater marshes, pond borders, wet meadows, and grassy swamps; nests in or along edge of marsh, sometimes on damp ground but usually on mat of previous year's dead grasses; nest usually hidden in marsh grass or at base of Salicornia.	Potential low-quality nesting habitat present at Cullinan Park at Oyster Creek (Pumpkin Lakes and Oyster Creek), Cullinan JS & LH (Zone 2 pond), and Hogg Bird Sanctuary (ephemeral pools and Buffalo Bayou fringe). No nests or individuals observed.
Brown Pelican	Pelecanus occidentalis	DL		Largely coastal and near shore areas where it roosts and nests on islands and spoil banks.	No coastline or barrier habitat present in Survey Areas.
Henslow's Sparrow	Ammodramus henslowii			Wintering individuals (not flocks) found in weedy fields or cut-over areas where lots of bunch grasses occur along with vines and brambles; a key component is bare ground for running/walking.	Unlikely to occur in the Survey Areas due to lack of preferred bunch grass and bare ground habitat. No nests or individuals observed.
Mountain Plover	Charadrius montanus			Breeding: nests on high plains or shortgrass prairie, on ground in shallow depression; non-breeding: shortgrass plains and bare, dirt (plowed) fields; primarily insectivorous.	Unlikely to occur in the Survey Areas due to lack of preferred habitat. No nests or individuals observed.
Peregrine Falcon	Falco peregrinus	DL	T	Both subspecies migrate across the state from more northern breeding areas in U.S. and Canada to winter along coast and farther south; subspecies (F. p. anatum) is also a resident breeder in west Texas; the two subspecies' listing statuses differ, F.p. tundrius is no longer listed in Texas; but because the subspecies are not easily distinguishable at a distance, reference is generally made only to the species level; see subspecies for habitat.	Potential stopover habitat present adjacent to Zone 2 at Cullinan Park at Oyster Creek (Pumpkin Lakes). No nests or individuals observed.

Species (Common) [1]	Species	Federal Status	State Status	Habitat Description	Habitat Present in Survey Areas
Red-cockaded Woodpecker	Picoides borealis	LE	E	Cavity nests in older pine (60+ years); forages in younger pine (30+ years); prefers longleaf, shortleaf, and loblolly.	Low-quality foraging habitat present at Keith-Wiess Park (Zone 1), Hogg Bird Sanctuary, and Herman Brown Park (Zone 4). No RCW cavities observed at any locations.
Snowy Plover	Charadrius alexandrinus			Formerly an uncommon breeder in the Panhandle; potential migrant; winter along coast.	No coastal sand beaches or barren river bank habitat present in Survey Areas.
Southeastern Snowy Plover	Charadrius alexandrines tenuirostris			Wintering migrant along the Texas Gulf Coast beaches and bayside mud or salt flats.	No coastal sand beaches or barren river bank habitat present in Survey Areas.
Sprague's Pipit	Anthus spragueii	C		Only in Texas during migration and winter, mid-September to early April; short to medium distance, diurnal migrant; strongly tied to native upland prairie, can be locally common in coastal grasslands, uncommon to rare further west; sensitive to patch size and avoids edges.	Unlikely to occur due to lack of native upland prairie preferred habitat in Survey Areas. No individuals observed.
White-faced Ibis	Plegadis chihi		T	Potential migrant via plains throughout most of state to coast; winters in coastal marshes of Aransas, Calhoun, and Refugio counties.	Potential stopover habitat at Cullinan Park at Oyster Creek (Pumpkin Lakes and Oyster Creek), Cullinan JS & LH (Zone 2 pond), and Hogg Bird Sanctuary (ephemeral pools and Buffalo Bayou). No individuals observed.
White-tailed Hawk	Buteo albicaudatus		T	Near coast on prairies, cordgrass flats, and scrub-live oak; further inland on prairies, mesquite and oak savannas, and mixed savanna-chaparral; breeding March-May.	Potential live oak habitat present at Woodland Park. No individuals observed.

Species (Common) [1]	Species	Federal Status	State Status	Habitat Description	Habitat Present in Survey Areas
Whooping Crane	Grus americana	LE	E	Potential migrant via plains throughout most of state to coast; winters in coastal marshes of Aransas, Calhoun, and Refugio counties.	Potential stopover habitat at Cullinan Park at Oyster Creek (Pumpkin Lakes and Oyster Creek), Cullinan JS & LH (Zone 2 pond), and Hogg Bird Sanctuary (ephemeral pools and Buffalo Bayou). No individuals observed.
Wood Stork	Mycteria americana		T	Forages in prairie ponds, flooded pastures or fields, ditches, and other shallow standing water, including salt-water; usually roosts communally in tall snags, sometimes in association with other wading birds (i.e. active heronries); breeds in Mexico and birds move into Gulf states in search of mud flats and other wetlands, even those associated with forested areas; formerly nested in Texas, but no breeding records since 1960.	Potential stopover habitat at Cullinan Park at Oyster Creek (Pumpkin Lakes and Oyster Creek), Cullinan JS & LH (Zone 2 pond), and Hogg Bird Sanctuary (ephemeral pools and Buffalo Bayou). No individuals observed.
Fishes					
American Eel	Anguilla rostrata			Coastal waterways below reservoirs to gulf; spawns January to February in ocean, larva move to coastal waters, metamorphose, then females move into freshwater; most aquatic habitats with access to ocean, muddy bottoms, still waters, large streams, lakes; can travel overland in wet areas; males in brackish estuaries; diet varies widely, geographically, and seasonally.	No coastal waterways with preferred habitat present in Survey Areas.
Creek Chubsucker	Erimyzon oblongus		T	Tributaries of the Red, Sabine, Neches, Trinity, and San Jacinto rivers; small rivers and creeks of various types; seldom in impoundments; prefers headwaters, but seldom occurs in springs; young typically in headwater rivulets or marshes; spawns in river mouths or pools, riffles, lake outlets, upstream creeks.	No tributary habitat or coastal rivers present in Survey Areas.

Species (Common) [1]	Species	Federal Status	State Status	Habitat Description	Habitat Present in Survey Areas
Smalltooth Sawfish	Pristis pectinata	LE	E	Different life history stages have different patterns of habitat use; young found very close to shore in muddy and sandy bottoms, seldom descending to depths greater than 32 ft (10 m); in sheltered bays, on shallow banks, and in estuaries or river mouths; adult sawfish are encountered in various habitat types (mangrove, reef, seagrass, and coral), in varying salinity regimes and temperatures, and at various water depths, feed on a variety of fish species and crustaceans.	No coastal shore or barrier habitat present in Survey Areas.
Mammals					
Louisiana Black Bear	Ursus americanus luteolus	LT	T	Possible as transient; bottomland hardwoods and large tracts of inaccessible forested areas.	No large, inaccessible forested tracts of bottomland hardwoods found in Survey Areas.
Plains Spotted Skunk	Spilogale putorius interrupta			Catholic; open fields, prairies, croplands, fence rows, farmyards, forest edges, and woodlands; prefers wooded, brushy areas and tallgrass prairie.	Potential to occur along forest edges throughout the Survey Areas. No individuals observed.
Rafinesque's Big-eared Bat	Corynorhinus rafinesquii		T	Roosts in cavity trees of bottomland hardwoods, concrete culverts, and abandoned manmade structures.	Potential roosting habitat present at Cullinan Park at Oyster Creek, Cullinan JS & LH (Zone 2 pond), and Hogg Bird Sanctuary (ephemeral pools and Buffalo Bayou fringe). No individuals observed.
Red Wolf	Canis rufus	LE	E	Extirpated; formerly known throughout eastern half of Texas in brushy and forested areas, as well as coastal prairies.	Potential habitat does exist but unlikely to occur due to extirpation.

Species (Common) [1]	Species	Federal Status	State Status	Habitat Description	Habitat Present in Survey Areas
Southeastern Myotis Bat	Myotis austroriparius			Roosts in cavity trees of bottomland hardwoods, concrete culverts, and abandoned manmade structures.	Potential roosting habitat present at Cullinan Park at Oyster Creek, Cullinan JS & LH (Zone 2 pond), and Hogg Bird Sanctuary (ephemeral pools and Buffalo Bayou fringe). No individuals observed.
Mollusks					
Little Spectaclecase	Villosa lienosa			Creeks, rivers, and reservoirs, sandy substrates in slight to moderate current, usually along the banks in slower currents; east Texas, Cypress through San Jacinto River basins.	No coastal waterways with preferred habitat present in Survey Areas.
Louisiana Pigtoe	Pleurobema riddellii		T	Streams and moderate-size rivers, usually flowing water on substrates of mud, sand, and gravel; not generally known from impoundments; Sabine, Neches, and Trinity (historic) River basins.	No large stream or river substrate habitat present in Survey Areas.
Sandbank Pocketbook	Lampsilis satura		T	Small to large rivers with moderate flows and swift current on gravel, gravel-sand, and sand bottoms; east Texas, Sulfur south through San Jacinto River basins; Neches River.	No large stream or river substrate habitat present in Survey Areas.
Texas Pigtoe	Fusconaia askewi		T	Rivers with mixed mud, sand, and fine gravel in protected areas associated with fallen trees or other structures; east Texas River basins, Sabine through Trinity rivers as well as San Jacinto River.	No large stream or river substrate habitat present in Survey Areas.
Wabash Pigtoe	Fusconaia flava			Creeks to large rivers on mud, sand, and gravel from all habitats except deep shifting sands; found in moderate to swift current velocities; east Texas River basins, Red through San Jacinto River basins; elsewhere occurs in reservoirs and lakes with no flow.	No large stream or river substrate habitat present in Survey Areas.

Species (Common) [1]	Species	Federal Status	State Status	Habitat Description	Habitat Present in Survey Areas
Reptiles					
Alligator Snapping Turtle	Macrochelys temminckii		T	Perennial water bodies; deep water of rivers, canals, lakes, and oxbows; also swamps, bayous, and ponds near deep running water; sometimes enters brackish coastal waters; usually in water with mud bottom and abundant aquatic vegetation; may migrate several miles along rivers; active March-October; breeds April-October.	Potential habitat present just outside the Survey Areas at Hogg Bird Sanctuary (Buffalo Bayou) and Cullinan Park at Oyster Creek (Pumpkin Lakes and Oyster Creek).
Green Sea Turtle	Chelonia mydas	LT	T	Gulf and bay system; shallow water seagrass beds, open water between feeding and nesting areas, barrier island beaches; adults are herbivorous, feeding on sea grass and seaweed; juveniles are omnivorous feeding initially on marine invertebrates, then increasingly on sea grasses and seaweeds; nesting behavior extends from March to October, with peak activity in May and June.	No coastal gulf and barrier habitat present in Survey Areas.
Gulf Saltmarsh Snake	Nerodia clarkia			Saline flats, coastal bays, and brackish river mouths.	No coastal saline flats or brackish river habitat present in Survey Areas.
Kemp's Ridley Sea Turtle	Lepidochelys kempii	LE	E	Gulf and bay system, adults stay within the shallow waters of the Gulf of Mexico; feed primarily on crabs but also snails, clams, other crustaceans and plants, juveniles feed on sargassum and its associated fauna; nests April through August.	No coastal gulf and barrier habitat present in Survey Areas.
Leatherback Sea Turtle	Dermochelys coriacea	LE	E	Gulf and bay systems, and widest ranging open water reptile; omnivorous, shows a preference for jellyfish; in the U.S. portion of their western Atlantic nesting territories, nesting season ranges from March to August.	No coastal gulf and barrier habitat present in Survey Areas.
Loggerhead Sea Turtle	Caretta caretta	LT	T	Gulf and bay system primarily for juveniles, adults are most pelagic of the sea turtles; omnivorous, shows a preference for mollusks, crustaceans, and coral; nests from April through November.	No coastal gulf and barrier habitat present in Survey Areas.

Species (Common) [1]	Species	Federal Status	State Status	Habitat Description	Habitat Present in Survey Areas
Smooth Green Snake	Liochlorophis vernalis		T	Gulf Coastal Plain; mesic coastal shortgrass prairie vegetation; prefers dense vegetation.	Potential habitat present in low-lying wetland areas at Cullinan Park at Oyster Creek. No individuals observed.
Texas horned lizard	Phrynosoma cornutum		T	Open, arid and semi-arid regions with sparse vegetation, including grass, cactus, scattered brush or scrubby trees; soil may vary in texture from sandy to rocky; burrows into soil, enters rodent burrows, or hides under rock when inactive; breeds March-September.	No arid, sparsely vegetated habitat present in Survey Areas.
Timber/Canebrake rattlesnake	Crotalus horridus		T	Swamps, floodplains, upland pine and deciduous woodlands, riparian zones, abandoned farmland; limestone bluffs, sandy soil or black clay; prefers dense ground cover, i.e. grapevines or palmetto.	Potential habitat present at Cullinan Park at Oyster Creek (Pumpkin Lakes and Oyster Creek), Cullinan JS & LH (Zone 2 pond), Keith-Wiess Park (Halls Bayou), and Hogg Bird Sanctuary (ephemeral drainage and Buffalo Bayou fringe). No individuals observed.
Plants					
Coastal Gay-feather	Liatris bracteata			Texas endemic; coastal prairie grasslands of various types, from salty prairie on low-lying somewhat saline clay loams to upland prairie on non-saline clayey to sandy loams; flowering in fall.	Unlikely to occur due to lack of open, upland prairie habitat. No individuals observed.

Species (Common) [1]	Species	Federal Status	State Status	Habitat Description	Habitat Present in Survey Areas
Florida Ladies-tresses	Spiranthes brevilabris var. floridana			Moist to wet, relatively open sites of pine-dominated landscapes, mesic pine uplands, open scrub pinelands with saw palmetto, Catahoula sandstone barrens, meadows, open grassy lawns, pitcher plant and seepage bogs, wet prairies, wet savannahs, and flatwoods. Delicate, nearly ephemeral, orchid with winter rosette. Flowers April-May.	Potential to occur throughout Survey Area, particularly around wetland areas at Cullinan Park at Oyster Creek (Pumpkin Lakes and Oyster Creek), Herman Brown Park (Zone 5), and Cullinan JS & LH (Zone 2 pond). No individuals observed.
Giant Sharpstem Umbrella-sedge	Cyperus cephalanthus			In Texas on saturated, fine sandy loam soils, along nearly level fringes of deep prairie depressions; also in depressional area within coastal prairie remnant on heavy black clay; in Louisiana, most sites are coastal prairie on poorly drained sites, some on slightly elevated areas surrounded by standing shallow water, and on moderately drained sites; soils include very strongly acid to moderately alkaline silt loams and silty clay loams; flowering/fruiting May-June, August-September, and possibly other times in response to rainfall.	Not likely to occur due to the absence of preferred saturated deep depressions and coastal prairie remnants. No individuals observed.
Houston Daisy	Rayjacksonia aurea			Texas endemic; on and around naturally barren or sparsely vegetated saline slick spots or pimple mounds on coastal prairies, usually on sandy to sandy loam soils, occasionally in pastures and on roadsides in similar soil types where mowing may mimic natural prairie disturbance regimes; flowering late September-November (-December).	Not likely to occur due to the absence of saline slick spots and pimple mounds. No individuals observed.
Neglected Coneflower	Echinacea paradoxa var. neglecta			Rocky prairies, glades, and cross timber open woodlands and savannas. Full sun.	Not likely to occur due to the absence of rocky prairie and open savanna habitat. No individuals observed.

Species (Common) [1]	Species	Federal Status	State Status	Habitat Description	Habitat Present in Survey Areas
Panicled Indigobush	Amorpha paniculata			A stout shrub, 3 m (9 ft) tall that grows in acid seep forests, peat bogs, wet floodplain forests, and seasonal wetlands on the edge of Saline Prairies in East Texas. It is distinguished from other Amorpha species by its fuzzy leaflets with prominent raised veins underneath, and the flower panicles, which are 8 to 16 inches long and slender, held above the foliage.	Potential to occur throughout Survey Area, particularly around wetland areas at Cullinan Park at Oyster Creek (Pumpkin Lakes and Oyster Creek), Herman Brown Park (Zone 5), and Cullinan JS & LH (Zone 2 pond). No individuals observed.
Texas Ladies-tresses	Spiranthes brevilabris var.			Sandy soils in moist prairies, including Blackland/Fleming prairies, calcareous prairie pockets surrounded by pines, pine-hardwood forest, open pinelands, wetland pine savannahs/flatwoods, and dry to moist fields, meadows, and roadsides. Delicate, nearly ephemeral orchid, producing winter rosettes, flowers February-April. Historically endemic to SE coastal plain.	Potential to occur throughout Survey Area, particularly around wetland areas at Cullinan Park at Oyster Creek (Pumpkin Lakes and Oyster Creek), Herman Brown Park (Zone 5), and Cullinan JS & LH (Zone 2 pond). No individuals observed.
Texas Meadow-rue	Thalictrum texanum			Texas endemic; mostly found in woodlands and woodland margins on soils with a surface layer of sandy loam, but it also occurs on prairie pimple mounds; both on uplands and creek terraces but perhaps most common on claypan savannas; soils are very moist during its active growing season; flowering/fruiting (January-) February-May, withering by midsummer, foliage reappears in late fall (November) and may persist through the winter.	Potential to occur throughout the Survey Areas, particularly in lower-lying, moist woodlands at Herman Brown Park (Zone 5), Keith-Wiess Park (Zone 1), and Coolgreen Corridor.
Texas Windmill-grass	Chloris texensis			Texas endemic; sandy to sandy loam soils in relatively bare areas in coastal prairie grassland remnants, often on roadsides where regular mowing may mimic natural prairie fire regimes; flowering in fall.	Not likely to occur due to the absence of bare prairie remnants. No individuals observed.

Species (Common) [1]	Species	Federal Status	State Status	Habitat Description	Habitat Present in Survey Areas
Threeflower Broomweed	Thurovia triflora			Texas endemic; near coast in sparse, low vegetation on a veneer of light colored silt or fine sand over saline clay along drier upper margins of ecotone between salty prairies and tidal flats; further inland associated with vegetated slick spots on prairie mima mounds; flowering September-November.	Not likely to occur due to the absence of slick spots and pimple mounds in the Survey Areas. No individuals observed.

1 -Based on information provided at http://www.tpwd.state.tx.us/gis/ris/es/ES_Reports.aspx?county=Harris.

Appendix E. Table 3. Red-cockaded Woodpecker Habitat Assessment

Park	Zone	Foraging Habitat Present?	Cavity Trees Present?	Cavity Tree Flagged for Removal?	GPS Point Collected?
Keith-Wiess	1	Yes	No	N/A	N/A
Keith-Wiess	2	No	No	N/A	N/A
Hogg Bird Sanctuary	1	Yes	No	N/A	N/A
Woodland	1	No	No	N/A	N/A
Woodland	2	No	No	N/A	N/A
Woodland	3	No	No	N/A	N/A
Woodland	4	No	No	N/A	N/A
Woodland	5	No	No	N/A	N/A
Herman Brown	1	No	No	N/A	N/A
Herman Brown	2	No	No	N/A	N/A
Herman Brown	3	No	No	N/A	N/A
Herman Brown	4	Yes	No	N/A	N/A
Herman Brown	5	No	No	N/A	N/A
Herman Brown	6	No	No	N/A	N/A
Herman Brown	7	No	No	N/A	N/A
Coolgreen	1	No	No	N/A	N/A
Cullinan at Oyster Creek	1	No	No	N/A	N/A
Cullinan at Oyster Creek	2	No	No	N/A	N/A
Cullinan JS & LH	1	No	No	N/A	N/A
Cullinan JS & LH	2	No	No	N/A	N/A

Appendix E. Table 4. Survey Area Habitat Type and Animal Species Observations

Park Name	Zone	Area (Acres)	Habitat Type	Animal Species Observed	Photo ID
Keith-Wiess	1	9.32	Hardwood Flats, <10% pine	Northern mockingbird, Carolina chickadee, mourning dove, northern cardinal	KW01_01; KW01_02; KW01_03; KW01_04
	2	7.26	Hardwood Flats, <10% pine	Northern mockingbird, Carolina chickadee, northern cardinal	KW02_01; KW02_02; KW02_03
Hogg Bird Sanctuary	1	2.96	Mixed Hardwood, <50% pine; wetland fringe along Buffalo Bayou	Great egret, Carolina chickadee, northern cardinal, Eastern grey squirrel	Hogg01_01; Hogg01_02; Hogg01_03; Hogg01_04; Hogg 01_05
Woodland Park	1	0.39	Mixed hardwood, <10% pine; open managed grasses; a few very large live oaks	Eastern grey squirrel, northern mockingbird, mourning dove	Wood01_01
	2	0.42	Mixed hardwood, <1% pine; riparian banks	Eastern grey squirrel, northern cardinal	Wood02_01
	3	0.76	Mixed hardwood, <1% pine	Mourning dove	Wood03_01
	4	0.21	Mixed hardwood, <1% pine; riparian banks of ephemeral channel	Eastern grey squirrel, northern mockingbird	Wood04_01
	5	1.20	Mixed hardwood, no pine; riparian banks of Little Whiteoak Bayou	Northern mockingbird, Carolina chickadee, northern cardinal	Wood05_01
Herman Brown	1	0.94	Hardwood flats	No wildlife observed	HB01_01
	2	0.68	Hardwood flats	Northern mockingbird, Carolina chickadee	HB02_01
	3	2.94	Recently cleared; previously hardwood flats	No wildlife observed	HB03_01
	4	2.91	Recently cleared; previously hardwood flats	No wildlife observed	HB04_01
	5	5.66	Small emergent wetland area; currently being cleared; adjacent hardwood flats	Northern mockingbird, Carolina chickadee, blue jay, northern cardinal	HB05_01
	6	1.94	Mixed hardwoods; dead pines	Northern mockingbird, Carolina chickadee,	HB06_01; HB06_02
	7	11.29	Hardwood flats with interspersed	Eastern grey squirrel, northern mockingbird,	HB07_01; HB07_02;

Park Name	Zone	Area (Acres)	Habitat Type	Animal Species Observed	Photo ID
			open grasses near the west end of the zone (soccer field and park trails)	mourning dove; fox squirrel, American robin	HB07_03
Coolgreen Corridor	1	7.12	Hardwood flats, pines are dead; herbaceous wetland vegetation in some areas	Eastern grey squirrel, northern mockingbird, mourning dove, northern cardinal	Cool01_01; Cool01_02; Cool01_03; Cool01_04
Cullinan Park at Oyster Creek	1	9.30	Hardwood flats; Intermittent stream; patches of open grasses and shrubs	American crow, northern mockingbird, Carolina chickadee, northern cardinal, mourning dove	OC01_01; OC01_01b; OC01_02; OC01_03; OC01_04; OC01_05
	2	1.40	Hardwood flats; emergent wetland fringe along Pumpkin Lakes and Oyster Creek	northern mockingbird, Carolina chickadee, northern cardinal, mourning dove	OC02_01
Cullinan JS & LH	1	2.10	Mixed hardwoods; small open managed area	northern mockingbird, Carolina chickadee	JSLH01_01; JSLH01_02
	2	0.88	Emergent wetland fringe along pond with a few large pine; open managed grasses along trail	Mourning dove, Eastern grey squirrel, mallards in pond	JSLH02_01
	3	0.93	Mixed hardwoods; open managed grasses along trail	Mourning dove, Eastern grey squirrel, blue jay, northern cardinal	JSLH03_01; JSLH03_02

Appendix F
Cultural Resources

City of Houston Parks
Cullinan JS & LH Park

Legend

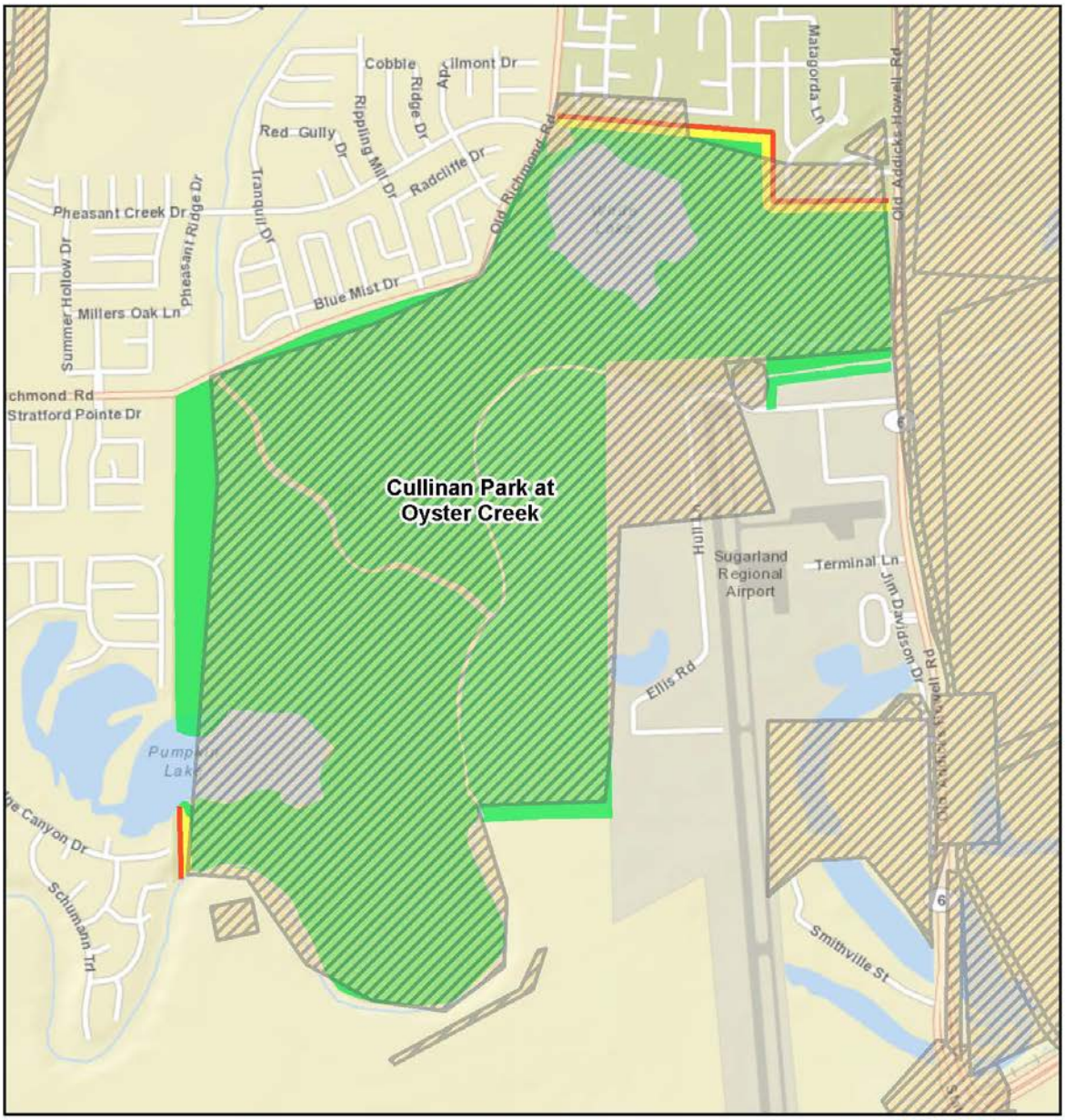
- Area Surveyed for Cultural Resources
- COH Project Limit
- Project Area - 100 ft Buffer Zone
- Park

N
W E
S

0 200 400 Feet

Cultural Resources

Data Sources: THC, HGAC, CDM Smith
Service Layer Credits: Sources: Esri, DeLorme, NAVTEQ, USGS, Intermap, iPC, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, 2013



City of Houston Parks
Cullinan Park at Oyster Creek

Legend

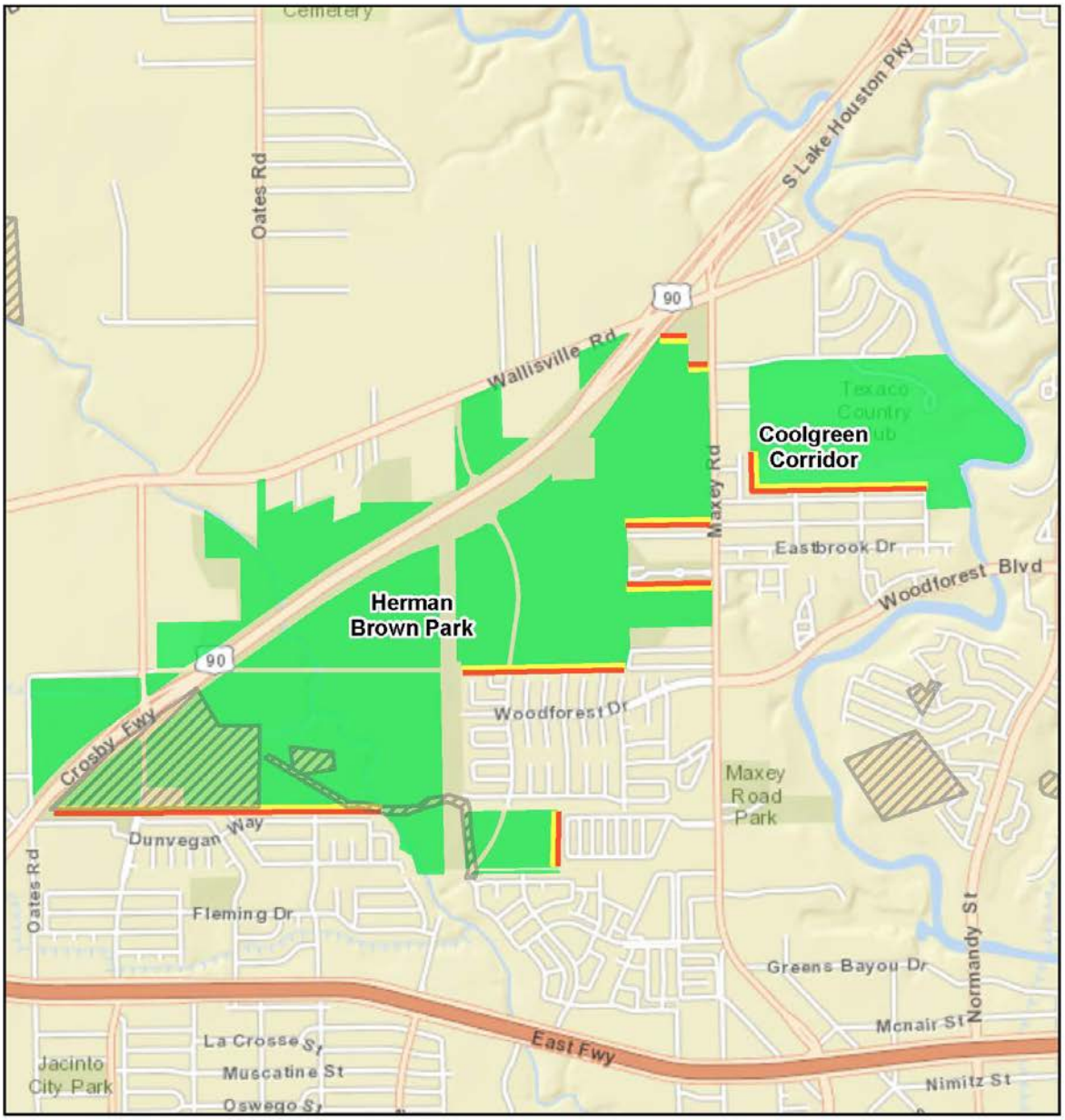
- Area Surveyed for Cultural Resources
- COH Project Limit
- Project Area - 100 ft Buffer Zone
- Park

N
W E
S

0 500 1,000 Feet

Cultural Resources

Data Sources: THC, HGAC, CDM Smith
Service Layer Credits: Sources: Esri, DeLorme, NAVTEQ, USGS, Intermap, iPC, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, 2013



City of Houston Parks
Herman Brown Park & Coolgreen Corridor

Legend

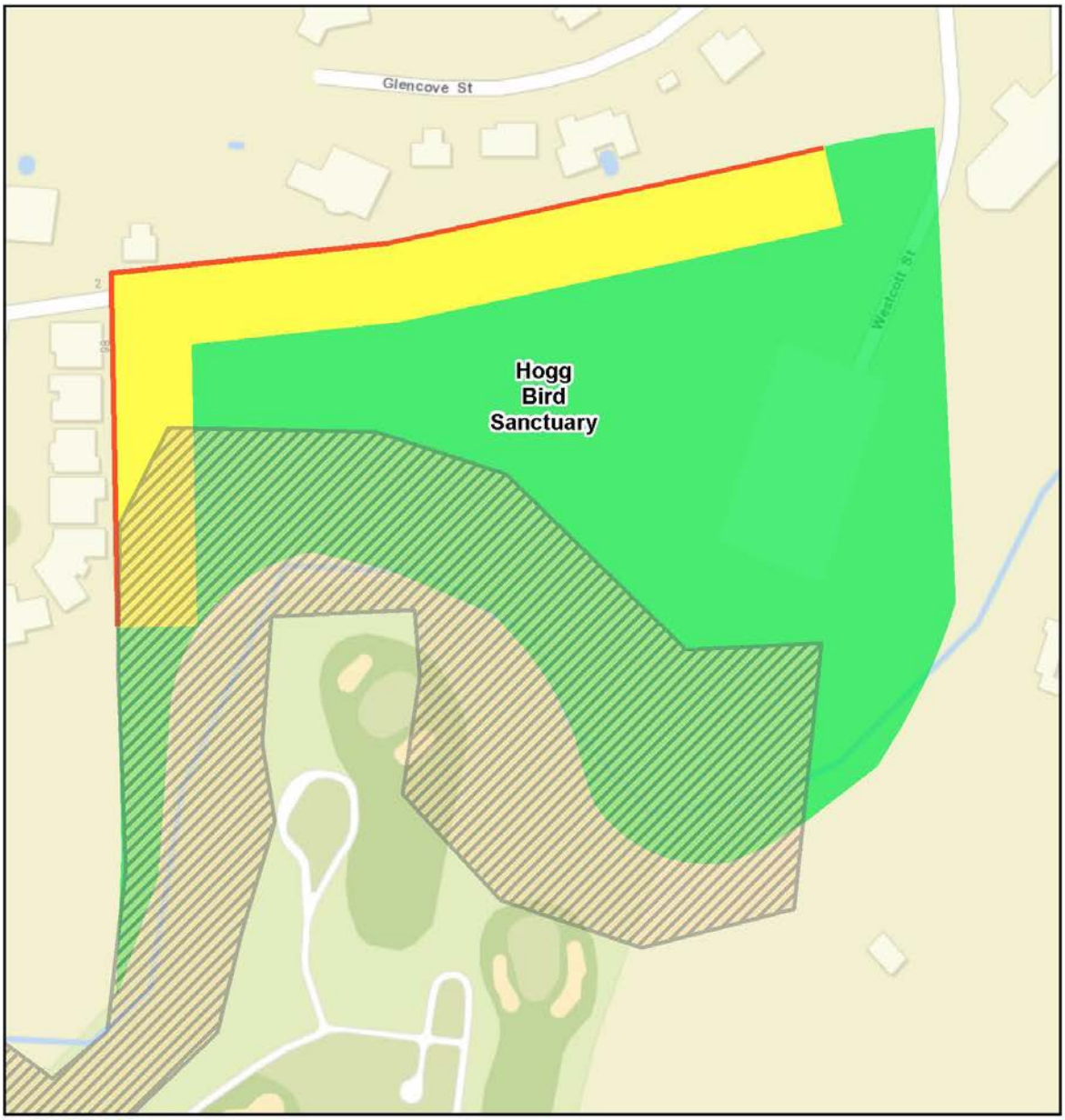
- Area Surveyed for Cultural Resources
- COH Project Limit
- Project Area - 100 ft Buffer Zone
- Park

N
W E
S

0 1,500 3,000 Feet

Cultural Resources

Data Sources: THC, HGAC, CDM Smith
Service Layer Credits: Sources: Esri, DeLorme, NAVTEQ, USGS, Intermap, iPC, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, 2013


Glencove St
Wescott St
Hogg
Bird
Sanctuary
City of Houston Parks
Hogg Bird Sanctuary
Legend
Area Surveyed for Cultural Resources
COH Project Limit
Project Area - 100 ft Buffer Zone
Park
N
W
E
S
0
100
200
Feet
Cultural Resources
Project Area
Harris
Fort Bend
Data Sources: THC, HGAC, CDM Smith
Service Layer Credits: Sources: Esri, DeLorme, NAVTEQ, USGS, Intermap, iPC, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, 2013

City of Houston Parks
Keith-Wiess Park

Legend

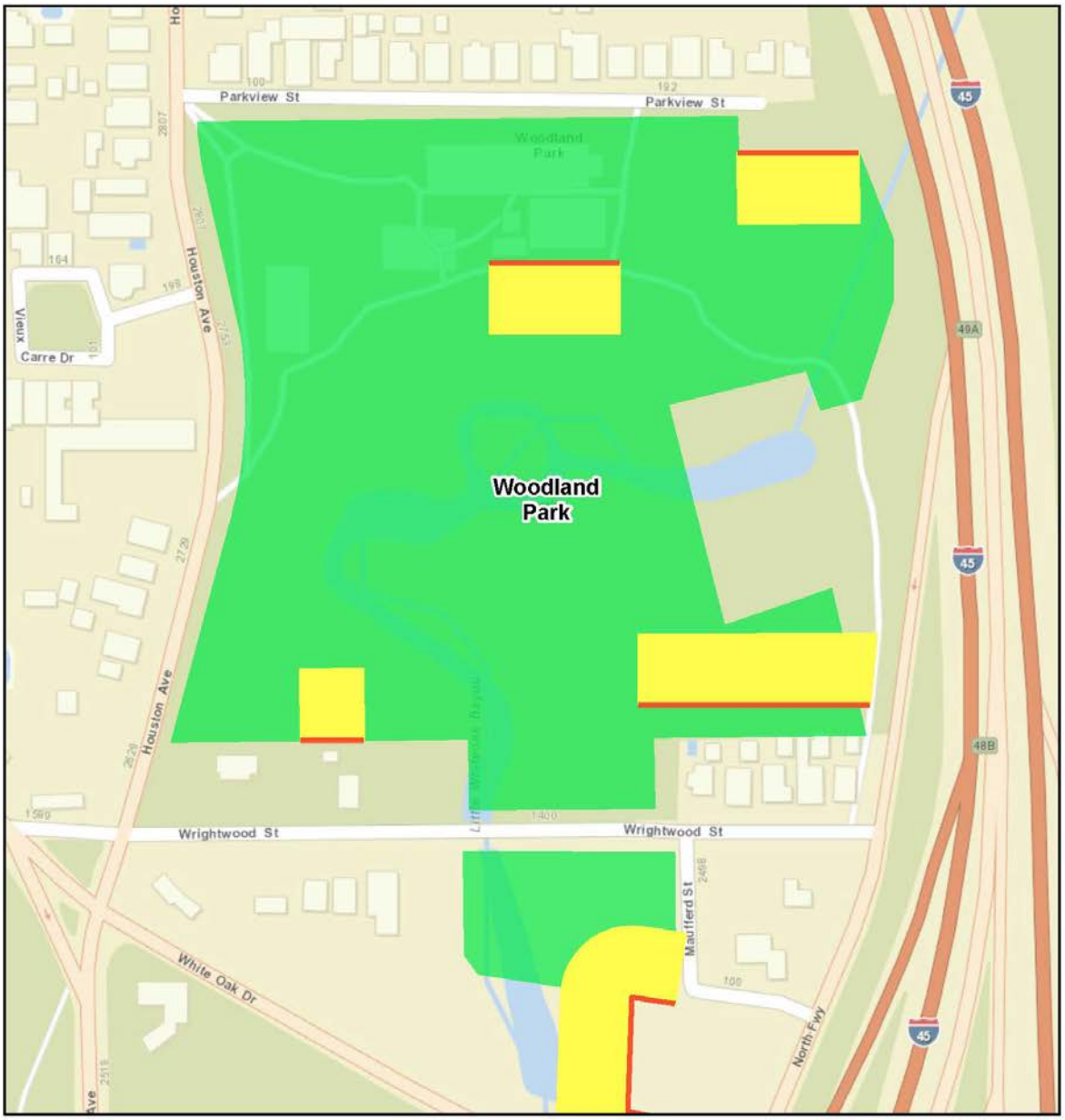
- Area Surveyed for Cultural Resources
- COH Project Limit
- Project Area - 100 ft Buffer Zone
- Park

N
W E
S

0 500 1,000 Feet

Cultural Resources

Data Sources: THC, HGAC, CDM Smith
Service Layer Credits: Sources: Esri, DeLorme, NAVTEQ, USGS, Intermap, iPC, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, 2013



City of Houston Parks
Woodland Park

Legend

- Area Surveyed for Cultural Resources
- COH Project Limit
- Project Area - 100 ft Buffer Zone
- Park

N
W E
S

0 100 200 Feet

Cultural Resources

Data Sources: THC, HGAC, CDM Smith
Service Layer Credits: Sources: Esri, DeLorme, NAVTEQ, USGS, Intermap, iPC, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, 2013

Appendix G
Agency Coordination Letters

U.S. Department of Homeland Security
Federal Emergency Management Agency
800 N Loop 288
Denton, Texas, 76209

FEMA

May 9, 2013

Mr. Mark Wolfe
State Historic Preservation Officer
Texas Historical Commission
P.O. Box 12276
Austin, TX 78711

RE: Section 106 Review, Wildfire Mitigation in Eight City Parks, City of Houston, Harris County, Texas

Dear Mr. Wolfe,

The Hazard Mitigation Grant Program (HMGP) of the Federal Emergency Management Agency (FEMA) is considering providing grant funding to the City of Houston, Texas, for hazardous fuels reduction activities along residential corridors at eight city parks located throughout the City of Houston. FEMA has determined that this project constitutes an undertaking and is initiating consultation under Section 106 of the National Historic Preservation Act.

The City proposes to create a defensible space buffer (approximately 100 feet wide) along residential corridors near eight area parks.

1. Cullinan, JS & LH Park; 44 acres: 6700 Long, Houston, TX 77087 (Latitude: 29.68933; Longitude: -95.30898);
2. Cullinan/Oyster Creek Park; 754 acres: State Highway 6 S, Houston, TX 77478 (Latitude: 29.62861; Longitude: -95.66800);
3. Keith-Wiess Park; 499 acres: 12300 Aldine Westfield Road, Houston, TX 77039 (Latitude: 29.89360; Longitude: -95.34442);
4. Brown (Herman) Park; 717 acres: 400 Mercury, Houston, TX 77013 (Latitude: 29.78719; Longitude: -95.23166);
5. Cullen Park; 9,269 acres: 19008 Saums, Houston, TX 77084 (Latitude: 29.84749; Longitude: -95.62792);
6. Coolgreen Corridor; 26 acres: 12800 Coolgreen, Houston, TX 77015 (Latitude t: 29.79468; Longitude: -95.21273);
7. Hogg Bird Sanctuary; 16 acres: 100 Westcott, Houston, TX 77007 (Latitude: 29.75906; Longitude: -95.42343);
8. Woodland Park; 19 acres: 212 Parkview, Houston, TX 77019 (Latitude: 29.78218; Longitude: -95.37039).

The proposed undertaking at each park involves minimizing combustible materials such as dry leaves, pine needles, dead and dying foliage, and dead or dying trees and their branches to create safety perimeters around residences and City facilities where they abut the park perimeters. The City will not remove healthy, living trees unless they are an invasive species. Root balls and stumps will not be pulled or otherwise mechanically removed, but instead will be ground down in place to the surface level. Equipment will include loppers, pole saws, chainsaws, timber-axes, and stump grinders. The City will dispose of larger trees and limbs using heavy equipment to transport debris to designated recycling center. Smaller debris materials will be chipped on site and used as mulch for landscaping within the parks.

The Area of Potential Effect (APE) for the undertaking includes the 100-foot defensible space buffer zones within the eight parks as depicted in red on the enclosed park aerial maps.

FEMA reviewed the Texas Historical Commission (THC) Texas Historic Sites Atlas and determined that there are no National Register of Historic Places (NRHP) properties or districts within the immediate vicinity of seven of the eight parks. The closest NRHP property or district is approximately 4 miles to the northwest of Cullinan JS & LH Park; 6 miles to the southwest of Cullinan/Oyster Creek Park; 5 miles to the southwest of Keith-Wiess Park; 5 miles to the south of Brown (Herman) Park; 8 miles to the southeast of Cullen Park; 5 miles to the south of Coolgreen Corridor; and ¾ of a mile to the southeast of Woodland Park. The Bayou Bend National Register District is in close proximity (approximately 900 feet) to the Hogg Bird Sanctuary, though the undertaking will be conducted completely outside of this district.

Based on a review of the THC Atlas and sites that are registered with the Texas Archeological Research Laboratory (TARL), FEMA determined that Cullinan JS & LH Park, Coolgreen Corridor Park, and Woodland Park do not have any previously recorded archeological sites. Brown (Herman) Park, Cullen Park, and Hogg Bird Sanctuary each have several recorded archeological sites within the park, but the sites are not within or immediately adjacent to the APE for these parks. Cullinan/Oyster Creek Park contains multiple recorded archeological sites and several are in close proximity to the APE for this park. Keith-Wiess Park contains a few previously recorded archeological sites, one of which is within the APE at the southwest corner of the park. FEMA will require a Secretary of the Interior (SOI)-qualified archeological monitor to be present for all proposed fuels reduction activities in Cullinan/Oyster Creek Park and for fuels reduction activities within the southwest corner of Keith-Wiess Park.

The City has previously coordinated with your office on the proposed undertaking at two of the above eight parks: Woodland Park (Track #201211211) and Hogg Bird Sanctuary (Track #201211221). Your office responded on July 26, 2012, with a "No historic properties affected; project may proceed" determination for the undertaking at both of these parks.

Based on the archival research and previous coordination with the THC regarding this project, FEMA makes a determination of **No Historic Properties Affected** for the undertaking at Cullinan JS & LH Park, Brown (Herman) Park, Cullen Park, Coolgreen Corridor, Hogg Bird Sanctuary, and Woodland Park. Based on the required monitoring at two parks, FEMA makes a determination of **No Adverse Effect to Historic Properties** for the portion of the undertaking at

Cullinan/Oyster Creek Park and Keith-Wiess Park. We request concurrence with this determination. Photographs and aerial maps are provided for the eight parks. In addition, the past coordination letters for Woodland Park and Hogg Bird Sanctuary are enclosed. Your prompt review of this project is greatly appreciated. Should you need additional information please contact Leah Anderson, Deputy Regional Environmental Officer at (940) 383-7288.

Sincerely,

for Kevin Jaynes
Regional Environmental Officer
FEMA Region 6

Enclosures:

Photographs and Maps for Eight Parks
SHPO Letters

CONCUR
by
for Mark Wolfe
State Historic Preservation Officer
Date 6/7/13
Track#

Attachments:

-----Original Message-----
From: Weir, Dorothy [mailto:Dorothy.Weir@fema.dhs.gov]
Sent: Friday, November 15, 2013 1:13 PM
To: Stenberg, Kate
Subject: FW: FEMA CZMA Consistency Determination: Hazardous Fuels Reduction at City of Houston Parks

FYI

Dorothy Weir
Environmental Specialist
FEMA Region 6
909 N. Loop 288
Denton, TX 76209
Phone: 940-383-7250
BB#: 940-435-9275
Fax: 940-383-7299
Dorothy.Weir@fema.dhs.gov

-----Original Message-----
From: Federal Consistency Federal Consistency [mailto:Federal.Consistency@GLO.TEXAS.GOV]
Sent: Thursday, November 07, 2013 1:04 PM
To: Weir, Dorothy
Cc: Sheri Land
Subject: RE: FEMA CZMA Consistency Determination: Hazardous Fuels Reduction at City of Houston Parks

Dorothy,

It appears that all three parks are outside of the Coastal Zone Boundary (Cullinan Park 1.2 miles, Coolgreen 1.64 mi., and Herman Brown Park 0.5 mi.) and are not subject to CZMA consistency review. Attached is a Google Earth .kmz file of the Coastal Zone Boundary. Please let me know if my analysis of the park locations with respect to the boundary is incorrect.

Regards, rn

Ray Newby, P.G.
Coastal Geologist
Coastal Resources
Texas General Land Office
1700 N. Congress
Austin, Texas 78701
phone (512) 475-3624
fax (512) 475-0680

>>> "Weir, Dorothy" <Dorothy.Weir@fema.dhs.gov> 10/29/2013 2:28 PM >>>
Hi Ray,

I didn't know if this one was also going out in the Texas Register? Or if you needed more information for a consistency determination?

Thanks,
Dorothy

Dorothy Weir
Environmental Specialist
FEMA Region 6
909 N. Loop 288
Denton, TX 76209
Phone: 940-383-7250
BB#: 940-435-9275
Fax: 940-383-7299
Dorothy.Weir@fema.dhs.gov

From: Weir, Dorothy
Sent: Monday, September 30, 2013 4:25 PM
To: Federal.Consistency@GLO.TEXAS.GOV
Subject: FEMA CZMA Consistency Determination: Hazardous Fuels Reduction at City of Houston Parks

Hi,

FEMA is proposing to fund hazardous fuels reduction activities at three City of Houston parks that lie within the coastal management zone. The three parks within the Texas coastal zone are Cullinan JS & LH Park in southeast Houston (about 20 miles from Galveston Bay), and Coolgreen Corridor Park and Herman Brown Park in northeast Houston, both of which are within 15 miles of the Texas Gulf Coast at Baytown. The scope of work is below and maps are attached.

FEMA is preparing an Environmental Assessment for this wildfire mitigation project, and we are seeking a consistency determination under the Coastal Zone Management Act. We do not think that the General Concurrence #5 between FEMA and the former Coastal Coordination Council applies, so we are contacting you directly for a project specific review.

Please let us know whether the project is consistent with the CZMA and Texas' coastal management plan. The intent of the project is to reduce wildfire risk to residential and commercial structures that interface with densely vegetated portions of these city parks.

We would like to obtain concurrence from your office prior to sending the Environmental Assessment to public comment.

Thanks for your help,
Dorothy

Proposed Scope of Work:

The Houston Parks and Recreation Department would plan, execute, and monitor all activities required to create reduced-fuel buffer zones around residential and non-residential structures through removal or reduction of flammable vegetation in the parks, including removal of trees, tree branches, and understory vegetation to increase vertical clearance. The proposed fuels reduction also involves minimizing the volume of surface fuel, such as dry leaves, pine needles, dead and dying foliage, and fallen trees. The city anticipates that the proposed fuels reduction buffer zones would generally be approximately 100 feet wide, but the required radius of fuel reduction around homes and businesses would be established by the Houston Fire Department and would be directly related to the degree of fire hazard. Tracked cutting equipment would be used for clearing of understory areas. Tree stumps would be ground to level the stump with the surrounding ground. Debris produced by the proposed activities and some preexisting debris that would be present would be recycled into mulch and distributed throughout the park. For large tree and limb cutting, heavy equipment would be used to transfer heavy debris to the "Living Tree Center," a city recycling facility.

Cullinan JS & LH Park is in the southeast part of Houston in Council District I. Cullinan's total area is approximately 44 acres, with a project area of approximately 4 acres. Zone 1 is approximately 2.1 acres and is bounded by warehouses and other commercial buildings on the western side. Zone 2 is 0.88 acres at the eastern end of the park between one of the park ponds and a residential area. Zone 3 is in the northeastern corner of the park and is 0.93 acres.

Coolgreen Corridor Park is on the northeast side of Houston in Harris Council District I. Coolgreen is 26.59 acres in area, with a proposed project area of approximately 7 acres. The proposed fuel reduction buffer zone extends from the west side of the park close to Pecan Grove Street and follows along the south boundary of the park, ending at Greens Bayou. The proposed buffer zone is densely wooded.

Herman Brown Park is in Council District I in the northeast part of Houston. The park is 717.35 acres, and U.S. Highway 90 (US90) divides the park. All of the seven proposed project zones are on the south side of US90. Zones 1 and 2 are at the northern park property. Zones 1 and 2 are adjacent to commercial areas. Both zones 1 and 2 are densely forested. Zone 3 is 2.94 acres located north of Nola Court. Zone 3 is not dense with trees but is dense with bushes. Zone 4 is 2.91 acres on the south boundary of an apartment complex within the same neighborhood as Zone 3 and is very densely wooded. Zone 5 is west of Maxey Road, north of Woodforest Drive and east of the railroad track, and is 5.66 acres. Access in Zone 5 is limited because most of the side streets from Woodforest Blvd are blocked by fences. This makes it difficult to categorize the buffer area. Zone 6 is 1.94 acres and bounds a trailer park to the east. Zone 6 can be accessed from Royal Drive, which ends at the park boundary. Zone 6 is very densely wooded. Zone 7 runs along the south boundary of the park and extends from US90 to Hunting Bayou, with an area of approximately 11 acres. The eastern half of zone 7 is densely wooded.

Dorothy Weir
Environmental Specialist
FEMA Region 6
909 N. Loop 288
Denton, TX 76209
Phone: 940-383-7250
BB#: 940-435-9275
Fax: 940-383-7299
Dorothy.Weir@fema.dhs.gov<mailto:Dorothy.Weir@fema.dhs.gov>

CC: Rose
Luci

TEXAS PARKS & WILDLIFE

Life's better outside.®

September 24, 2012

Joe Turner
City of Houston
Parks and Recreation Department
2999 S. Wayside
Houston, Texas 77023

RE: Hazardous Fuel Reduction Project
The City of Houston, Harris County

Dear Mr. Turner:

The Texas Parks and Wildlife Department (TPWD) has received your request for information regarding potential impacts to threatened and endangered species and for information on other issues of concern relating to the project referenced above. Under Section 12.0011 of the Texas Parks and Wildlife Code, TPWD is charged with "providing recommendations that will protect fish and wildlife resources to local, state, and federal agencies that approve, permit, license, or construct developmental projects" and "providing information on fish and wildlife resources to any local, state, and federal agencies or private organizations that make decisions affecting those resources."

Please be aware that a written response to a TPWD recommendation or informational comment received by a state governmental agency may be required by state law. For further guidance, see the Texas Parks and Wildlife Code, Section 12.0011, which can be found online at http://www.statutes.legis.state.tx.us/Docs/PW/htm/PW.12.htm#12.0011. For tracking purposes, please refer to TPWD project numbers ERCS-2546 in any return correspondence regarding this project.

The City of Houston proposes to conduct hazardous fuel reduction under the Hazard Mitigation Grant Program. Work is proposed at eight park locations within Harris County.

Federal Regulations

Endangered Species Act (ESA)

Federally-listed animal species and their habitat are protected from "take" on any property by the ESA. Take of a federally-listed species can be allowed if it is "incidental" to an otherwise lawful activity and must be permitted in accordance with Section 7 or 10 of the ESA. Federally-listed plants are not protected from take except on lands under federal/state jurisdiction or for which a federal/state nexus (i.e., permits or funding) exists. Any take of a federally-listed species or its habitat without the required allowance from U.S. Fish and Wildlife Service (USFWS) is a violation of the ESA.

4200 SMITH SCHOOL ROAD
AUSTIN, TEXAS 78744-3291
512.389.4800
www.tpwd.state.tx.us

The Texas Natural Diversity Database (TXNDD) is intended to assist users in avoiding harm to rare species or significant ecological features. Given the small proportion of public versus private land in Texas, the TXNDD does not include a representative inventory of rare resources in the state. Absence of information in the database does not imply that a species is absent from that area. Although it is based on the best data available to TPWD regarding rare species, the data from the TXNDD do not provide a definitive statement as to the presence, absence or condition of special species, natural communities, or other significant features within your project area. These data are not inclusive and **cannot be used as presence/absence data**. This information cannot be substituted for on-the-ground surveys. The TXNDD is updated continuously based on new, updated and undigitized records; for questions regarding a record, please contact txndd@tpwd.state.tx.us.

Due to the large scope of the project, TPWD recommends that the applicant contact the TXNDD through the email above and request the TXNDD data to adequately evaluate the proposed project's impacts upon rare resources.

Migratory Bird Treaty Act (MBTA)

MBTA implicitly prohibits intentional and unintentional take of migratory birds, including their nests and eggs, except where permitted. Measures should be taken to ensure that migratory bird species within and near the project area are not adversely impacted by clearing and construction activities.

> **Recommendation:** TPWD recommends that vegetation removal be avoided during the primary migratory bird nesting season, March through August, to avoid adverse impacts to this group. If clearing vegetation during the nesting season is unavoidable, TPWD recommends the construction area be surveyed to ensure that no nests with eggs or young will be disturbed by construction. Any vegetation (trees, shrubs, and grasses) where occupied nests are located should not be disturbed until the eggs have hatched and the young have fledged. For additional information regarding potential impacts of the project on migratory birds, contact the USFWS - Migratory Bird Office at (505) 248-7882.

Clean Water Act (CWA)

The U.S. Army Corps of Engineers (USACE) as authorized by Section 404 of the CWA of 1972 issues permits for unavoidable discharge of dredged or fill material into Waters of the U.S., including wetlands. Any unavoidable impacts to jurisdictional streams and wetlands would be subject to review and approval of the USACE. If potential impacts to jurisdictional wetlands are anticipated, the appropriate USACE district office should be consulted pursuant to CWA.

Wetlands, riparian areas, and bottomland forests generally provide valuable habitat for wildlife and protect waterways from sediment loads in runoff water. Such habitats are priority habitat types targeted for conservation by TPWD across the state.

Recommendation: The City of Houston should minimize disturbance to inert microhabitats, i.e., snags, brush piles, fallen logs, creek banks, and pools as these provide habitat for a variety of wildlife species and their food sources.

Recommendation: In wetland areas, only vegetation impeding construction should be removed, equipment should not be driven over vegetation when it is extremely wet, and heavy machinery should not be stored on vegetative cover for long periods of time. Protective mats should be placed within streambeds during construction to reduce the amount of soil and root disturbance and aid in the recovery of plants.

Recommendation: Vehicles not needed specifically at creek crossings should utilize nearby roadways and bridges when crossing wetlands and streams to avoid soil disturbances.

State Regulations

Section 68.015, Parks and Wildlife Code – State-listed Species

Section 68.015 of the Parks and Wildlife Code regulates state-listed species. Please note that there is no provision for take (incidental or otherwise) of state-listed species. State-listed species may only be handled by persons with a scientific collection permit obtained through TPWD. For more information on this permit, please contact the Wildlife Permits Office at (512) 389-4647.

The TPWD county lists for rare species may be obtained from the following link: http://www.tpwd.state.tx.us/landwater/land/maps/gis/ris/endangered_species/. These lists provide information regarding rare species that have potential to occur within each county. Rare species could potentially be impacted if suitable habitat is present at or near the project site.

Recommendation: TPWD recommends that the City of Houston consult the above-reference TPWD county lists to determine if habitat for state-threatened species occurs within the project area. An on-the-ground survey by a qualified biologist should be performed in areas of suitable habitat to determine if species are present. If present, the City of Houston should incorporate actions into the project to avoid impacts to these species.

Potential adverse impacts should be identified and conservation measures to offset harm should be incorporated into the project mitigation plan. If rare, threatened, and endangered species are to be adversely affected, TPWD should be contacted for further coordination.

Revegetation

Recommendation: TPWD recommends that the City of Houston reseed disturbed soils with a mixture of grasses and forbs native to Harris County. To enhance native grasses available to wildlife in the project area, TPWD recommends that Bermuda grass be avoided to the extent possible in reseeding efforts, though TPWD understands that slopes may require certain grasses to control erosion. As an introduced species that can be extremely invasive, its use in federally funded projects may be inconsistent with Executive Order 13112 on Invasive Species.

For assistance in determining the best native seed mix for the project area, please contact our staff. Runoff control measures should be maintained until native plants have been reestablished on disturbed areas.

TPWD advises review and implementation of these recommendations. If you have any questions, please contact me at (361) 576-0022.

Sincerely,

Amy Turner

Amy Turner, Ph.D.
Wildlife Habitat Assessment Program
Wildlife Division

/ajt:ERCS- 2546