

**PINTAIL LANDFILL
WALLER COUNTY, TEXAS
TCEQ PERMIT APPLICATION NO. MSW _____**

PERMIT APPLICATION

**PART II
EXISTING CONDITIONS AND
CHARACTER OF THE FACILITY AND SURROUNDING AREA**

Prepared for
PINTAIL LANDFILL, LLC

June 2016



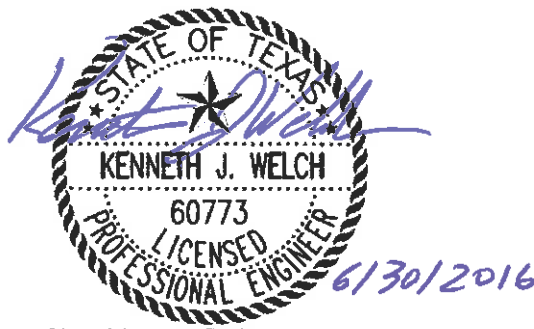
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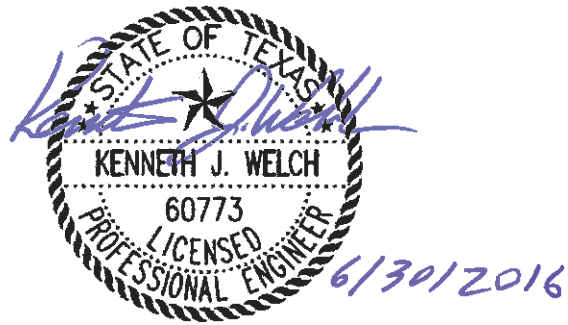
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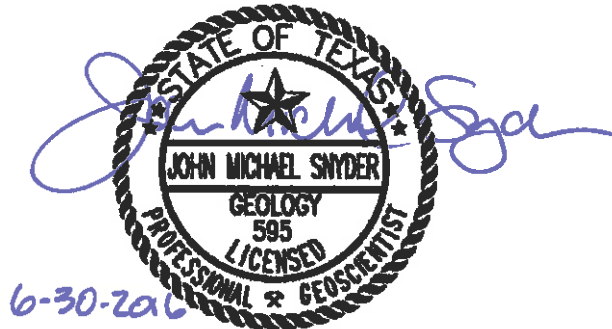
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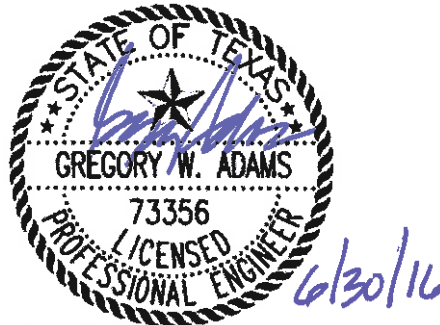
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For Section 10.5.

1 EXISTING CONDITIONS SUMMARY

30 TAC §330.61(a)

The Pintail Landfill is a proposed Type I Municipal Solid Waste Disposal Facility located in northwest Waller County, Texas. The Pintail Landfill is approximately one mile north of the intersection of State Highway 6 and US Highway 290, east of State Highway 6. The proposed facility is intended to provide waste disposal for residences and businesses within and outside Waller County. The next nearest community is the City of Hempstead, which is centered about 2 1/2 miles to the south. The proposed landfill location is outside the City of Hempstead city limits. The proposed landfill location is within the limits of the extraterritorial jurisdiction of the City of Hempstead.

Pintail Landfill, LLC purchased the tract of land consisting of 723.077 (approximately 723) acres from Marengo Family Properties, Ltd. in June 2016. The proposed Pintail Landfill permit boundary will encompass about 405 acres out of the approximately 723-acre land tract. The landfill facility will be accessed from State Highway 6 through an entrance road. A gatehouse and scales will be provided within the permit boundary. Additional facilities will include an office, maintenance area, citizen's collection station, reusable materials staging area, liquid stabilization area, and a truck wheel wash.

The overall property consists of gently undulating grasslands with limited forest cover. The property generally slopes to the south. The major topographic feature of the property is the North Branch of Clear Creek, which traverses the property in a north to south direction, entering Clear Creek approximately 1,500 feet south of the property. The permit boundary is located west of the North Branch of Clear Creek by a distance that varies from a minimum of approximately 80 feet to a maximum of approximately 650 feet. Clear Creek flows generally in a north to south direction, entering the Brazos River about 10 miles downstream from the property.

Marengo Family Properties, Ltd. owned the land since 2005 and used the property as ranchland for grazing cattle. The property has been historically used as ranchland dating back at least to the mid-1950s. No waste disposal activities have occurred on the site and no permitting or construction permit approvals have been received or applied for.

1.1 Easements and Buffer Zones

No solid waste unloading, storage, disposal, or processing operations will occur within any easement, buffer zone, or right-of-way that crosses the site. The Pintail Landfill and proposed facility is consistent with the provisions of §330.543.

No solid waste disposal shall occur within 25 feet of the center line of any utility line or pipeline easement, but no closer than the easement, unless otherwise authorized by the executive director. All pipeline and utility easements shall be clearly marked with posts that extend at least 6 feet above ground level, spaced at intervals no greater than

300 feet. There are no pipeline, utility, or other easements that will affect solid waste unloading, storage, disposal or processing operations: refer to Appendix IIA, Drawing IIA.8 - General Site Plan.

The buffer zone distances between the permit boundary and waste disposal area exceeds the minimum distance of 125 feet. Buffer zone distances vary around the permit boundary. The buffer zone distances from the permit boundary to the waste disposal area are shown on Drawing IIA.8.

The buffer zone distance for waste storage and/or processing operational activities exceeds the minimum distance of 125 feet. Buffer zone distances vary to each storage or processing facility. The buffer distances from the facility boundary to these facilities are shown on Drawing IIA.8.

Refer to Appendix IIJ – Location Restriction Certifications for location restrictions statement and certification.

1.2 Site Specific Conditions

A detailed discussion of site-specific conditions that potentially require special design considerations as set forth in §330.61(a), including impact on the surrounding area, transportation, geology, soils, groundwater, surface water, abandoned oil and water wells, floodplains, wetlands, endangered or threatened species, and Texas Historical Commission review is included in Sections 8 through 15 of this narrative. As documented, there are no existing site-specific conditions that require special design considerations or possible mitigation of conditions.

1.3 Pintail Landfill, LLC Memorandum

With respect to the siting ordinances adopted by the City of Hempstead and Waller County, Pintail Landfill, LLC is providing as an attachment to this section a memorandum. This memorandum demonstrates neither the County's nor the City's current ordinance is valid because neither ordinance specifically designates areas within their respective jurisdictions, by metes and bounds, in which waste disposal is permitted. As a result, neither ordinance can serve as a basis for any decision on the part of the Executive Director to decline to process the enclosed application. As the memorandum demonstrates, Waller County has agreed not to regulate the disposal of waste in the City's extraterritorial jurisdiction, where the entirety of the Pintail Landfill is proposed to be located. Thus, the County's ordinance is not applicable to the current application. Further, even if the City's Ordinance was valid – which it is not - if properly interpreted, it allows the siting of the Pintail Landfill at the location proposed in the application because there was a pending application that had been declared administratively complete by the TCEQ for the same area (actually a little larger) at the time of the adoption of the City's ordinance. By the express terms of the City's ordinance, the proposed site for the Pintail Landfill is a site authorized for the disposal of solid waste. Consequently, Pintail Landfill, LLC respectfully requests the Executive Director to proceed with the processing of the enclosed application. Refer to Appendix IIK – Pintail Landfill, LLC Memorandum for the Memorandum Regarding the Invalidity of the Ordinance Adopted by the City of Hempstead as it Relates to the Proposed Pintail Landfill.

2 WASTE ACCEPTANCE PLAN

30 TAC §330.61(b)

2.1 Properties and Characteristics of Waste

The major classifications of solid waste to be accepted at the Pintail Landfill include municipal solid waste, special waste in accordance with §330.171, and Class 2 and 3 industrial wastes in accordance with §330.173. Special wastes accepted at the facility include regulated asbestos-containing materials (RACM) and nonregulated asbestos-containing materials (non-RACM). In addition, other special wastes may be accepted based on a waste-specific approval as authorized by §330.171(b) and the facility.

The facility will not accept Class 1 industrial solid wastes, except for wastes that are Class 1 only because of asbestos content. The waste classifications are defined in §330.3.

Consistent with §330.15(e), the facility will not accept for disposal lead acid storage batteries; used motor vehicle oil; used oil filters; whole used or scrap tires; refrigerators, freezers, air conditioners or other items containing chlorinated fluorocarbons (CFC); bulk or noncontainerized liquid waste from nonhousehold sources; regulated hazardous waste; polychlorinated biphenyls (PCB) waste; radioactive materials as defined in Chapter 336 of this title (relating to Radioactive Substance Rules), except as authorized in Chapter 336 of this title or that are subject to an extension; or other wastes prohibited by TCEQ regulations.

The facility has not in the past accepted, and will not accept, Class 1 industrial solid waste. There are no existing or proposed Class 1 cells or disposal areas at the facility. Therefore, the facility is consistent with the provisions of §330.561; and the facility is not located within a coastal area as defined in 30 TAC §335.584(b)(3) and (4). Refer to Appendix IIJ for location restrictions statement and certification.

2.2 Volume and Rate of Disposal

The Pintail Landfill will serve individuals, businesses, and communities in Waller County and surrounding Texas counties. Pintail Landfill, LLC anticipates that in Year 1 the landfill will receive approximately 429,000 tons of incoming waste (approximately 1,500 tons per day). The waste acceptance rate will vary over the life of the facility depending on market conditions.

The estimated maximum annual waste acceptance rate for the Pintail Landfill projected for five years is as follows:

Year	Estimated Maximum Annual Waste Acceptance Rate
1	429,000 tons
2	434,363 tons
3	439,792 tons
4	445,289 tons
5	450,856 tons

As population and economic conditions and available landfill disposal capacity change within the region, the volume of incoming waste will vary. Pintail Landfill, LLC will maintain records to document the annual waste acceptance rate for the facility. If the rate exceeds the estimated rate and is not due to a temporary occurrence, Pintail Landfill, LLC will file a permit modification application consistent with §330.125(h). The modification would propose any needed changes in the site operating plan to properly manage the increased waste acceptance rate, if any. As provided by §330.125(h), the estimated waste acceptance rate is not a limiting parameter of the permit.

The TCEQ defines population equivalent as "the hypothetical population that would generate an amount of solid waste equivalent to that actually being managed based on a generation rate of five pounds per capita per day and applied to situations involving solid waste not necessarily generated by individuals." Based on this definition, the approximate current and projected population equivalents of the areas capable of being served were calculated as follows:

$$\text{Current Annual Average} = 1,500 \text{ tons/day} \times \frac{5.5 \text{ days}}{\text{week}} \times \frac{52 \text{ weeks}}{\text{year}} = 429,000 \text{ tons/year}$$

Population Equivalent:	<u>Year 1</u>	<u>Year 30</u>	<u>Year 67</u>
	= 429,000 tons/year	= 615,054 tons/year	= 973,934 tons/year
	÷ 365 days/year	÷ 365 days/year	÷ 365 days/year
	x 2,000 lb/ton	x 2,000 lb/ton	x 2,000 lb/ton
	÷ 5 lb/person/day	÷ 5 lb/person/day	÷ 5 lb/person/day
	= 470,140 persons	= 674,032 persons	= 1,067,325 persons

3 GENERAL LOCATION MAPS

30 TAC §330.61(c)

Consistent with §330.61(c), the general location maps are provided in Appendix IIA - Maps and Drawings. These general location maps are provided in addition to the maps included in Part I, Appendix IA – General Location Maps. These maps, collectively as a group, accurately show the proximity of the facility to surrounding features and specifically show the items identified in §330.61(c)(1)-(12). Refer to Appendix IIA, Drawing IIA.1 through Drawing IIA.11 for the general location maps.

4 FACILITY LAYOUT MAPS

30 TAC §330.61(d)

Consistent with §330.61(d), the facility layout maps are provided in Appendix IIA – Maps and Drawings. These facility layout maps, collectively as a group, specifically show the items identified in §330.61(d)(1)-(9). Refer to Appendix IIA, Drawing IIA.12 through Drawing IIA.15 for the facility layout maps.

5 GENERAL TOPOGRAPHIC MAP

30 TAC §330.61(e)

The United States Geological Survey (USGS) General Topographic Map is included in Appendix IIA – Maps and Drawings as Drawing IIA.2 – General Topographic Map. The topographic map consists of the 7-1/2 minute quadrangle sheets for Howth and Hempstead, Texas. Drawing IIA.2 is at a scale of 1 inch equals 2,000 feet as required by §330.61(e).

6 AERIAL PHOTOGRAPH

30 TAC §330.61(f)

Consistent with §330.61(f), the aerial photograph of the site and surrounding area is presented in Appendix IIA as Drawing IIA.7 – Aerial Photograph. The aerial photograph represents conditions as flown by Dallas Aerial Surveys in August 2011 for areas within the property boundary. The aerial photograph for areas outside the property boundary was downloaded from Google Earth on June 2, 2016 based on imagery dated November 21, 2015. The aerial photograph shows the area within at least a 1-mile radius of the permit boundary. In addition, the permit boundary and landfill footprint are shown.

7 LAND USE MAP

30 TAC §330.61(g)

Consistent with §330.61(g) a land use map is included in Appendix IIB – Land Use Analysis as Figure LU-2 - Land Use. This land use map has been prepared based on the land use analysis conducted by John Worrall Consulting. The land use features identified and depicted on this drawing, as required by §330.61(g), include the facility permit boundary, uses within the permit boundary, and existing uses such as agricultural, industrial, and residential uses within one mile of the permit boundary. Locations of residences, commercial establishments, schools, licensed day care facilities, churches, cemeteries, ponds or lakes, and recreational areas within one mile of the permit boundary are shown. In addition, a general land use map is included within the group of general location maps in Appendix IIA – Maps and Drawings to further depict the overall requirements of §305.45. Refer to the facility layout map, in Part II, Appendix IIA, Drawing IIA.8, for drainage, pipeline, and utility easements within the permit boundary.

8 IMPACT ON SURROUNDING AREA

30 TAC §330.61(h)

Consistent with §330.61(h), an evaluation of the impact on the area surrounding the facility was conducted by John Worrall Consulting. Refer to Appendix IIB – Land Use Analysis for a detailed land use analysis and discussion regarding impact on the surrounding area. The land use analysis addresses zoning within 2 miles of the facility, character of surrounding land uses within 1 mile of the facility, growth trends within 5 miles of the facility, and proximity to residences and other uses within 1 mile of the facility.

8.1 Wells Within 500 Feet

Consistent with §330.61(h)(5), a description of known wells within 500 feet of the facility has been prepared. The water well search included a search of online state records conducted in June 2016 and a windshield search for water wells. The water well search details and the state well numbering system identification number are listed in the table below. Consistent with §330.61(c)(2), the known water wells located on site and within 500 feet of the proposed permit boundary are shown on Drawing IIA.4 – Water Well Location Map.

A windshield search for water wells was conducted in July 2011. This search included driving the streets within one mile of the site and attempting to identify surface water production equipment, such as well houses, pump handles, windmills, and pressure tanks. Two probable water wells were identified north of the facility boundary along Kelley Road near the State Highway 6 intersection. Whether or not water well appurtenances are visible from the street, it is reasonable to suppose that any residence in this rural area may have a water well associated with it.

During a site investigation for water well equipment, four existing wells were identified within the property boundary. The wells identified during the site investigation have been located on the map with WW#. No records found in the water well search can be matched to WW1, WW2, and WW4. Well WW1 is currently used for non-potable water supply and was registered with the Bluebonnet Groundwater Conservation District (BWLL No. 0061) in 2011. WW2, located just outside the permit boundary near the southwest corner of the property, was determined to be plugged with concrete to the ground surface during the site investigation. WW3, identified as State Well No. 5956801, is located in the northwestern portion of the site and is unusable. WW4, located near WW1, is also unusable. WW3 and WW4 were determined to be unusable by a licensed Texas water well driller who was unable to pull the pumps. The pumps appear to have overheated and melted the PVC casing. Until the wells are plugged the exact reason for their condition cannot be determined. A possible fifth well identified by the coordinate locations from the TWDB WIID database (State Well No. 5956803) is also plotted on Drawing IIA.4 – Water Well Location Map; no evidence of this well was found during the site investigation. However, while the document was issued by the TWDB and is apparently in their water well database, a review of the document indicates that it

was drilled in 1955 to a depth of 6,000 feet, and was named Solomon David Well 1, which matches the Texas Railroad Commission records for a dry hole that is located outside the proposed waste footprint but within the permit boundary according to the surveyed location in the RRC records. Should this well be found within the waste footprint, it will be plugged in accordance with the applicable regulations, as described in Section 12.1 of this narrative.

**Pintail Landfill
Water Well Locations Identified On Site and
Within a 500-foot Radius of the Site**

Map ID	State ID	Depth(ft)	Install Date	Completion Formation*	Well Use**	Well Report Found
On-Site Wells						
WW1	--	390	Unknown	Not determined	D	N
WW2	--	Unknown	Unknown	Not determined	Plugged	N
WW3	59-56-801	Unknown	Unknown	Evangeline	U	Y
WW4	--	Unknown	Unknown	Not determined	U	N
5956803	59-56-803	6000	1955	Not determined	U	Y
Wells Within a 500-foot Radius						
121315	121315	183	Jul 2007	Not determined	I	Y
8E	59-56-8E	138	Oct 1973	Not determined	D	Y
8(LL)	59-56-8	140	May 1988	Not determined	D	Y

* Completion formation designations are from water well published information including water well driller's forms.

** Well Use Codes: P = Public, D = Domestic, I = Industrial, U = Unused, O = Other.

Sources: TCEQ Well Reports www.tceq.state.tx.us 7/2011
 TWDB www.wiwd.twdb.state.tx.us 7/2011
 Bluebonnet Groundwater Conservation District

Note: Water wells completed to depths less than 300 feet are likely completed in the Willis Sand and are in the Chicot Aquifer.

Available references were checked for locations of springs within one mile of the site and none were found.

An oil and gas well search of state records online was conducted in June 2016 to locate any oil and gas wells on the site and within one mile of the permit boundary. The search included a review of records and maps on file at the Texas Railroad Commission. One dry hole is located (by Texas RRC database coordinates) within the southern property boundary and outside the waste footprint. The dry hole was drilled in April 1955 to an original depth of 6,000 feet and according to the plugging record was filled with mud-laden fluid and cement and plugged to the surface on April 13, 1955. No surface evidence of the well has been observed.

Consistent with §330.61(h)(5) there are no known abandoned or currently producing oil or gas wells located within 500 feet of the permit boundary, as shown on Drawing IIA.5 - Locations of Oil and Gas Wells.

9 TRANSPORTATION

30 TAC §330.61(i)

Consistent with §330.61(i)(1)-(4) and the TCEQ form titled Transportation Data and Coordination Report Form for Municipal Solid Waste Type I Landfills (TCEQ-20719), transportation information is included as Appendix IIC - TXDOT Documentation. The transportation form provides information on the availability and adequacy of access roads, provides data on the existing and expected vehicular traffic on access roads within one mile of the facility during the expected site life of the facility, and projects the volume of traffic expected to be generated by the facility on the access roads within one mile of the facility. Documentation of coordination with the Texas Department of Transportation (TxDOT), is also included in Appendix IIC.

9.1 Airport Impact

Consistent with §330.61(i)(5), an evaluation of the facility impact on surrounding airports was conducted in accordance with §330.545. Refer to Appendix IIA – Maps and Drawings, Drawing IIA.6 – FAA Airport Location Map for the location of the facility in relation to area airports. The airport map uses the FAA Sectional Aeronautical Chart, Houston, 97th Edition, dated March 3, 2016 as the base drawing. The map depicts the location of the facility, a 5,000-foot radius, a 10,000-foot radius, and a six-mile radius from the facility boundary. As depicted on Drawing IIA.6, there is no public-use airport, publicly or privately owned, located within six miles of the property boundary.

Refer to Appendix IIG for documentation of coordination with the FAA regarding location of the facility in relation to airports in the designated areas as required by §330.61(i) and §330.545. Refer to Appendix IIJ for location restrictions statement and certification.

10 GENERAL GEOLOGY AND SOILS STATEMENT

30 TAC §330.61(j)

Consistent with §330.61(j)(1)-(4), a general discussion of the geology and soils of the site has been prepared.

10.1 General Geology

The Geologic Map of Texas¹ shows that the site is located on the outcrop of the Pleistocene-Pliocene-age Willis Formation. The Willis Formation is the basal formation of the Pleistocene or uppermost formation of the Pliocene in much of the Houston area of the Gulf Coast. It underlies the Lissie Formation. The Willis consists primarily of fine to coarse sand and often contains basal gravels in individual beds. Interbeds of silt and silty, sandy, and gravelly clay are common, although not often laterally continuous over broad areas.

**Pintail Landfill
Stratigraphy of Part of the Coastal Plain of Texas**

System	Series	Stratigraphic Units		Hydrogeologic Units	Approximate Thickness in Site Vicinity (ft)	Hydraulic Conductivities
Quaternary	Holocene	Alluvium		Chicot Aquifer SITE	500 to 700	645 gpd/ft ²
	Pleistocene	Beaumont Clay				
		Lissie Formation	Montgomery Formation			
			Bentley Formation			
		Willis Sand				
Late Tertiary	Pliocene	Goliad Sand		Evangeline Aquifer	1700	250 – 500 gpd/ft ²
	Upper Miocene	Fleming Formation		Burkeville Confining Unit	400±	Confining Unit
		Oakville Sandstone				

Data from the site (including area water wells) indicates that sand, silt, limited clay, and gravel is present from the surface to depths ranging from about 60 to 80 feet. Beneath the sand is a relatively thick clay that appears to range from a minimum of 20 feet to more than 40 feet thick.

The land surface slopes gently to the southeast and east from an elevation of approximately 260 feet above mean sea level (AMSL) on the northwest part of the site to

¹ Barnes, V.E., project supervisor, Hartmann, B.M. and Scranton, D.F., 1992, Geologic Map of Texas: Bureau of Economic Geology, University of Texas at Austin, cartography, scale 1:500,000.

approximately 220 feet AMSL on the southeast part of the site. A north-south trending tributary to Clear Creek is east of the proposed permit boundary.

**Pintail Landfill
Generalized Site Stratigraphy**

Geologic Unit		Lithology	Average Depth to Top of Unit (ft)	Average Thickness of Unit (ft)	Hydrogeologic Unit	
Regional	Site				Site	Regional Aquifer
Willis Formation	Stratum I	Sand, very fine to coarse with clay and gravel lenses	Surface	65 Ranges from 45 to 82 feet	Uppermost Aquifer	Chicot
	Stratum II	Clay	65	More than 40 feet	Lower Confining Unit	

Regional geologic cross sections indicate that the Willis Sand is up to 400 feet thick in Waller County. Refer to Appendix IIA, Drawing IIA.9 – Geologic Vicinity Map for a regional geologic map of the area.

10.2 General Soils

The United States Department of Agriculture, Natural Resources Conservation Service, General Soils Map of Texas indicates that the site is located on sandy and loamy soils of savannahs, specifically in the Kenney-Tabor-Chazos association that are described as *gently sloping, well drained and moderately well drained, sandy and loamy soils*. Samples from the site confirm that the surficial soils are sandy and sandy loam soils formed on sand, silt, and gravel strata.

10.3 Fault Areas

Consistent with §330.61(j)(2) and §330.555(a), a fault area evaluation was conducted as part of this application to demonstrate that the Pintail Landfill site meets the location restriction for fault areas.

The property on which the Pintail Landfill site is located was examined for the presence of faulting according to §330.555 criteria. A fault area evaluation was conducted that included reviewing aerial photographs for the site, reviewing available geologic literature and maps of the area, conducting site reconnaissance, and examining the gas and oil well structure maps.

The Geologic Map of Texas² shows no evidence of surface faulting in the area. The United States Geological Survey published a map showing young faults in the United States as a guide to possible fault activity. That map shows no faulting in the area³. In

² Ibid.

³ Howard, K.A. et al., 1978, Preliminary Map of Young Faults in the United States as a Guide to Possible Fault Activity, U.S. Geological Survey Map MF916.

addition, the Tectonic Map of Texas⁴ shows no indication of faulting at the Pintail Landfill site.

A site walkover was conducted by an experienced licensed professional geoscientist and site reconnaissance was conducted by a licensed professional engineer familiar with the faulting and solid waste disposal facilities to identify possible physical evidence caused by faulting. No unusual scarps or topographic breaks were interpreted within 200 feet of the site. No evidence of faulting was found associated with formation outcrops; no evidence of faulting was found by examination of area roadways; no structural influence of stream courses was found; and no unusual relief or topographic features (such as sag ponds or truncated alluvial spurs) were observed on the site. No evidence of structural damage to buildings on the property was identified.

In summary, no fault scarps were observed at the surface within 200 feet of the site and there was no evidence of vertical subsidence on any outcrops of geologic materials. No vertical displacement or stratigraphic offset indicative of faults was observed in outcrops. There is no known active faulting within 1/2 mile of the site in Holocene time; therefore, the site complies with §330.555. Refer to Appendix IIJ for location restrictions statement and certification.

10.4 Seismic Impact Zones

Consistent with §330.61(j)(3) and §330.557, seismic impact zones documentation was prepared as part of this application to demonstrate that the Pintail Landfill site meets the location restriction for seismic impact zones.

TCEQ regulations state that no new MSWLF units or lateral expansions shall be located in seismic impact zones unless the owner or operator demonstrates that all containment structures, including liners, leachate collection systems, and surface water control systems, are designed to resist the maximum horizontal acceleration in lithified earth material for the site.

The seismic impact zone as defined by §330.557 is an area with a 10 percent or greater probability that the maximum horizontal acceleration in lithified earthen material, expressed as a percentage of the earth's gravitational pull, will exceed 0.10g in 250 years. Based on a review of the USGS seismic maps of the area, the site is not located within a seismic impact zone. Refer to Appendix IIA, Drawing IIA.10 – Seismic Impact Zone for the site location that demonstrates the Pintail Landfill is not located in a seismic impact zone. Refer to Appendix IIJ for location restrictions statement and certification.

10.5 Unstable Areas

Consistent with §330.61(j)(4) and §330.559, unstable areas documentation was prepared as part of this application to demonstrate that the Pintail Landfill site meets the location restriction for unstable areas.

⁴ Bureau of Economic Geology, 1990, Tectonic Map of Texas, University of Texas at Austin.

An unstable area is defined by the TCEQ as a location that is susceptible to natural or human-induced events or forces capable of impairing the integrity of some or all of the landfill's structural components responsible for preventing releases from a landfill. An unstable area can exhibit poor foundation conditions, areas susceptible to mass movement, and karst terrains.

The determination of potential unstable areas at the landfill site is based on site observations and a review of existing documentation for the site by a licensed professional engineer. Based on this review, the foundation conditions and the geological formations are stable. In addition, there is no evidence to suspect mass movement of natural formations of earthen material on or in the vicinity of this site. No foundation problems exist at the site. The proposed landfill components were evaluated with respect to differential settlement, heave, and slope stability. Based on the results of these analyses, the proposed man-made features have been predicted to have adequate factors of safety with respect to stability.

Based on site observations, a review of existing geological data, and geotechnical analysis of the landfill development, the site is not located in an unstable area and the integrity of the landfill is not expected to become impaired by natural or human-induced events or forces. Refer to Appendix IIJ for location restrictions statement and certification.

11 GROUNDWATER AND SURFACE WATER

30 TAC §330.61(k)

11.1 Groundwater

Consistent with §330.61(k)(1) and §330.549, a discussion of groundwater conditions at or near the facility has been prepared. The proposed groundwater monitoring well system is shown on Drawing IIA.15 – Groundwater and Landfill Gas Monitoring Plan. The facility is not located within the recharge zone of the Edwards Aquifer, as defined in 30 TAC Chapter 213. Refer to Appendix IIJ for location restrictions statement and certification.

Groundwater conditions at the site were determined using data from a combination of piezometers and area water wells.

Groundwater occurs in the transmissive zone consisting of sand, silt, limited clay, and gravel that is found across the site at depths ranging from 60 to 80 feet deep. Wells on site indicate that a water table surface is present ranging in elevation from approximately 237 feet msl to approximately 207 feet msl. The surface appears to slope from the north and northwest part of the site towards the southeast part of the site.

The Willis Sand is the lowermost sand within the Chicot Aquifer, which is made up of the Willis and overlying Lissie and Beaumont Formations. The Chicot Aquifer is the primary shallow aquifer in the Gulf Coast region. Recharge to the Chicot Aquifer is primarily by infiltration of precipitation on the outcrop. The outcrop of the Willis Sand in Waller County is one of the recharge zones for the Chicot Aquifer. Groundwater in the outcrop area can be expected to occur as a water table within the top 50 feet of the sand.

The Willis Sand is up to 400 feet thick in the Waller County area and yields large quantities of good quality water to wells in Waller County and other down-dip counties to the east.

11.2 Surface Water

Consistent with §330.61(k)(2), a discussion of surface water at and near the site has been developed.

The Pintail Landfill is located in the Brazos River drainage basin. The North Branch of Clear Creek traverses the property in a north to south direction, and enters Clear Creek approximately 1,500 feet south of the property. The permit boundary is located west of the North Branch of Clear Creek by a distance that varies from a minimum of approximately 80 feet to a maximum of approximately 650 feet. Clear Creek flows generally in a north to south direction, and enters the Brazos River about 10 miles downstream from the property.

There are six locations where surface water enters the property and five locations where surface water exits the property. Surface water enters the property through two unnamed tributaries of Clear Creek along the west property boundary adjacent to State Highway 6. Surface water from these two points leaves the property boundary on the south side. Surface water also enters the property on the west property boundary near the northwestern corner. Surface water enters the property along the north property boundary at the location of the North Branch of Clear Creek, and at an unnamed tributary of the North Branch of Clear Creek. Surface water also enters the property on the east side near the northeastern corner that contributes to the unnamed tributary of the North Branch of Clear Creek. All locations at which surface water leaves the property are along the southern property boundary.

Surface water enters the permit boundary at two locations along the western permit boundary and one location on the southern permit boundary. Surface water leaves the permit boundary along the eastern permit boundary and enters the North Branch of Clear Creek at four locations. Surface water exits the permit boundary at one location on the western permit boundary. In addition, surface water leaves the permit boundary at two locations on the southern boundary and enters two unnamed tributaries of Clear Creek.

Refer to Drawing IIA.12 for the location where surface water enters and exits the property boundary and the permit boundary.

11.3 Stormwater Permitting

The facility will be designed to prevent the discharge of pollutants into waters of the state of Texas or waters of the United States, as defined by the Texas Water Code and the federal Clean Water Act, respectively. Pintail Landfill, LLC will submit a notice of intent (NOI) to comply with TPDES General Permit No. TXR050000 relating to stormwater discharge associated with industrial activity (Multi-Sector General Permit). Refer to Appendix III – TPDES Permit Documentation for the TPDES certification statement provided consistent with §330.61(k)(3).

12 ABANDONED OIL AND WATER WELLS

30 TAC §330.61(l)

12.1 Water Wells

The known on-site wells within the waste footprint will be plugged, capped, and closed in accordance with applicable rules and regulations of the TCEQ or other applicable state agency. As described in Section 8.1 of this narrative, there are four known abandoned water wells within the permit boundary of the Pintail Landfill.

Should any unknown abandoned water wells be discovered during facility development, Pintail Landfill will provide notification to the TCEQ executive director of their location. The well will be plugged in accordance with applicable rules and regulations of the TCEQ or other state agency and a copy of the well plugging report for any found well will be submitted to the appropriate state agency and executive director within 30 days prior to construction.

12.2 Oil and Gas Wells

There are no known existing or abandoned crude oil or natural gas wells or other wells associated with mineral recovery within the Pintail Landfill permit boundary. There is one dry hole located within the Pintail Landfill permit boundary as described in Section 8.1.

If any abandoned crude oil or natural gas wells or other wells associated with mineral recovery are located during site development, the landfill will provide the executive director of the TCEQ with written certification that all such wells have been properly capped, plugged, and closed in accordance with all applicable rules and regulations of the Railroad Commission of Texas. A copy of the well plugging report to be submitted to the appropriate state agency will also be submitted to the executive director of the TCEQ within 30 days after the well has been plugged. Any producing crude oil or natural gas well that does not affect or hamper landfill operations may be installed or remain in its current state if identified in the permit for the landfill as defined in §330.61(l)(2).

13 FLOODPLAINS AND WETLANDS

30 TAC §330.61(m)

13.1 Floodplains

Consistent with §330.61(m)(1) and §330.547, an evaluation of the 100-year floodplain has been prepared for the Pintail Landfill. The Pintail Landfill's proposed waste disposal operations will be conducted outside the 100-year floodplain.

The Federal Emergency Management Agency (FEMA) has prepared a Flood Insurance Rate Map (FIRM), Community Panel Number 48473C0050E and 48473C0150E, with an effective date of February 18, 2009. A copy of the FIRM is located in Appendix IIA, Drawing IIA.11, and depicts the Pintail Landfill in relation to the FEMA identified floodplain along the unnamed tributary of Clear Creek, which traverses the eastern portion of the facility permit boundary. Zone AE, where base flood elevations have been determined, is located within the eastern portion of the facility property boundary; however, as noted on the FIRM map, the waste disposal footprint will be outside the 100-year floodplain.

In accordance with §330.547(a), the Pintail Landfill's waste disposal operations will be designed to be outside the 100-year floodway as defined by FEMA. In accordance with §330.547(b), the Pintail Landfill's new municipal solid waste units will not be located in the 100-year floodplain. The Pintail Landfill will not restrict the flow of the 100-year flood, reduce the temporary water storage capacity of the floodplain, or result in the washout of solid waste. Further, in accordance with §330.547(c), the Pintail Landfill's processing and/or storage units are not located within the 100-year floodplain. Refer to Appendix IIJ for location restrictions statement and certification.

13.2 Wetlands

Consistent with §330.61(m)(2) and (3) and §330.553, a wetlands determination and identification has been conducted for the site. This work was conducted to identify areas subject to jurisdiction under Section 404 of the federal Clean Water Act and wetland areas as defined in 30 TAC §307.3(81). There are no applicable local laws related to wetland areas.

A wetlands and waters of the United States determination has been prepared by Half Associates, Inc. (Half) titled "Waters of the United States Delineation Report and Wetland Determination and Identification" and is included in Appendix IID – Wetlands Documentation, along with related correspondence with the U.S. Army Corps of Engineers.

As discussed in Appendix IID, the only wetland areas located within the proposed facility boundary are around the pond identified as OW-6, which is in the south central portion of the site. These wetland areas (EW-1, EW-2, SS-1, and FW-1) are all located outside the proposed landfill footprint. The municipal solid waste landfill unit at the Pintail Landfill

will not be located in wetlands. Refer to Appendix IIJ for location restrictions statement and certification.

14 ENDANGERED OR THREATENED SPECIES

30 TAC §330.61(n)

Consistent with §330.61(n) and §330.551, an evaluation of endangered or threatened species at the site has been prepared by Halff and is documented in Appendix IIE - Endangered or Threatened Species Documentation.

Based on site visits conducted by qualified biologists at Halff Associates, there are no threatened or endangered species or critical habitat found on the site.

Based on evaluation conducted by Halff, and coordination with the U.S. Fish and Wildlife Service and the Texas Parks and Wildlife Department, in accordance with §330.551(a), the facility and the operation of the facility will not result in the destruction or adverse modification of the critical habitat of endangered or threatened species, or cause or contribute to the taking of any endangered or threatened species. Refer to Appendix IIJ for location restrictions statement and certification.

Coordination with the United States Fish and Wildlife Service and the Texas Parks and Wildlife Department regarding the locations and specific data relating to endangered and threatened species in Texas is provided in Appendix IIE – Endangered or Threatened Species Documentation.

15 TEXAS HISTORICAL COMMISSION REVIEW

30 TAC §330.61(o)

Consistent with §330.61(o), a review letter was submitted to the Texas Historical Commission documenting compliance with the Natural Resources Code, Chapter 191, Texas Antiquities Code. Because the site is privately owned and does not include any site that has been designated as a state archaeological landmark and all landfill project activities on the site will be conducted by the owner, or a person who has the consent of the owner, the proposed Pintail Landfill project is not subject to any requirements under Natural Resources Code, Chapter 191, Texas Antiquities Code.

However, an archaeological survey of the property and permit boundary was conducted by AR Consultants, Inc. for the Pintail Landfill. Documentation of the coordination with the Texas Historical Commission is provided in Appendix IIF – Texas Historical Commission Documentation.

16 COUNCIL OF GOVERNMENTS AND LOCAL GOVERNMENT REVIEW REQUEST

30 TAC §330.61(p)

Consistent with §330.61(p), Parts I and II of the application were submitted for review to the Houston-Galveston Area Council to determine compliance with the regional solid waste plan. Since the Pintail Landfill is not located within the city limits of any city, there is not an appropriate local government solid waste plan and review process. Documentation of the coordination with the Houston-Galveston Area Council is provided in Appendix IIH – Houston-Galveston Area Council Documentation.