

## EXECUTIVE SUMMARY

W&M Environmental Group, Inc. (W&M) developed this Biological Evaluation (BE) to assess the potential effects of the proposed North Texas Municipal Water District (NTMWD) 42-inch sanitary sewer line installation at the Heard Natural History Museum and Wildlife Sanctuary (Heard Museum) and to identify mitigation options.

The Heard Museum is located on 289 acres north of Country Club Road (F.M. 1378), east of a railroad right-of-way, and south of Wilson Creek in McKinney, Texas. The study area (Site) consists of the proposed approximately 30-foot wide by 3,500-foot long, 2.39-acre permanent sanitary sewer easement, plus an adjacent 3.36-acre irregular-shaped temporary construction easement that occupies most of the existing prairie area for a total 5.75 acre impact. At the time this BE was prepared, no detailed plans of the utility construction were available for review by the Heard Museum or W&M.

The BE is commonly used to assess the likelihood that a proposed project may effect State and Federally-listed threatened and endangered (T&E) species and is often the predecessor of a full Environmental Assessment (EA). This BE also includes an assessment of the likely impacts to proposed (candidate) species, State-listed sensitive species (proposed, sensitive, and T&E species collectively referred to as PETS species) and natural communities likely to be affected by the proposed action (i.e., utility construction).

Due to the anticipated harm to habitat and ecosystems at the Site from the proposed utility construction and maintenance, the Heard Museum Board of Directors has passed a resolution opposing the construction of the pipeline across any portion of the Site in favor of routing the pipeline outside of the Heard Museum. However, the second objective of this BE is to identify mitigation options to address potential effects of the proposed construction of the sanitary sewer line in the event that the sewer line is installed on the Site through eminent domain. The mitigation plans are focused on preserving and restoring intact ecosystems at the Site and reducing the impact to migrant and resident wildlife at the Site. Mitigation options are presented in Section 6.0 that include arguments for not building the utility at the Site and best management practices (BMPs) that can be implemented by the NTMWD (through request) or partially implemented by the Heard Museum staff or volunteers. Other recommendations for mitigating the potential impacts of the proposed action are presented in Section 8.0.

No Federally-listed species were found likely to be effected by the proposed activity. Although the Texas horned lizard, canbrake rattlesnake, and alligator snapping turtle (State-listed threatened species) may have been residents at the Site at some point, they are not presently confirmed to be at the Site and are found not likely to be adversely effected by the proposed construction. A remnant little bluestem-Indiangrass dominated prairie (Dowell's Meadow) and a restored prairie (Ken's Prairie) are likely to be eliminated as a result of the proposed activity.

Although the proposed action may have some negative effects on the potential habitat of the western burrowing owl, a crayfish (*Procambarus steigmani*), plains spotted skunk, and five mollusks with potential to occur at the Site, these species are not protected from the impacts of the proposed utility construction by the endangered species act. However, if the project were reviewed by the Texas Parks and Wildlife Department (TPWD) as occasionally required for certain Federally-funded projects, they may propose limited protections for the crawfish given that it has been identified at the Heard Museum (apparently not in the Texas Natural Diversity Database or TXNDD).

Several bird, fish, mollusk, and amphibian species that are not State or Federally-listed may be affected by increased siltation of Mallard Marsh and associated wetlands as a result of the proposed construction. The ground disturbance of the proposed activity will reduce available foraging and some nesting locations on the Site. The human activity and noise from mechanical equipment may also reduce species stopover, foraging, and breeding in the affected prairie, adjacent forest, and at Mallard Marsh and adjacent wetlands. Those areas include an occasional rookery used by several species of egrets. These disturbances can be minimized for migratory and nesting bird species by restricting activities to times outside the critical spring migration between mid-February through May, the critical nesting period from March through August, and the fall critical migration months from September through November. Therefore, the best construction period in terms of reduced impact to most migratory and nesting birds at the Site is from December to mid-February.

This BE also includes a wetland determination to identify the approximate location of wetlands and other *waters of the U.S.* and to determine whether the wetlands are likely to be under the jurisdiction of the U.S. Army Corps of Engineers (USACE). Two ephemeral streams (Cedar Creek and a tributary), Wilson Creek, Mallard Marsh (the large constructed pond), and other smaller ponds and forested wetlands adjacent to Mallard Marsh were identified on the Site by W&M. All of the water bodies listed above were determined by W&M to be *waters of the U.S.* likely to be under the jurisdiction of the USACE. Mallard Marsh apparently is not a mitigation area for wetland impacts. Had Mallard Marsh been a mitigation area it would have been subject to USACE restrictions on mitigation areas which are typically opposed to utility easement crossings due to the risk of future disruptions from maintenance activities.

This report is formatted to first present the background information about the Site and purpose of the study. Then the Site is described based on maps, aerial photographs and other records W&M reviewed. That is followed by information about the Site from our Site reconnaissance and interviews. The proposed action is described and followed by an assessment of the likely effects of the proposed action on State and Federally-listed species. The report concludes with an assessment of the anticipated general effects of the proposed action on the various regions of the Site, including wetlands, and presents mitigation options and other recommendations to avoid and mitigate the effects of the proposed utility construction.

## 6.0 CONSTRUCTION IMPACTS AND MITIGATION MEASURES

### 6.1 General Project Impacts and Mitigation Options

The installation and maintenance of the sanitary sewer line is against the primary objectives of the Heard Museum as a conservancy and preserve for wildlife. The major concerns of the Heard Museum are that the construction and maintenance of the utilities will disrupt the resident and migratory bird species and other wildlife that use the natural resources at the Heard Museum. The construction activities are anticipated to disrupt migratory patterns, disrupt nesting habits at the Site, and eliminate species such as the small-mouth salamander from portions of the Site. Although the 222 bird species that have been observed at the Heard Museum and the 61 species that have been documented nesting at the Heard Museum do not include State and Federally-listed species that are likely to be dramatically impacted by the construction, the proposed action will have an impact on the species present. Forage and nesting areas will be at least temporarily eliminated and the water quality of the wetlands will have an additional liability of possible leaks and disruptive repairs. Additionally, a remnant prairie that apparently has survived Euro-American settlement and a restored prairie will be eliminated.

The Heard Museum staff is concerned that the installation of the sanitary sewer under wetlands will potentially drain or pollute the wetlands, sewer odors will be vented at the Site affecting the environment, and small and large leaks from the sewer line will pollute the water. Additionally, the anticipated maintenance of the line will bring future disruptions to the wildlife sanctuary. The list of concerns of the Heard Museum staff are long and valid, but details about what impacts can be expected and how they can be mitigated are obscured by the lack of construction details provided at this time. W&M has presented below a summary of the issues and potential impacts to the natural resources at the Site based on the information that has been related about the proposed action and the above assessment of the Site. Information about possible mitigation options are presented here and with additional BMPs presented within this section.

Mitigation measures are normally agreed upon between the party planning and overseeing the proposed activity and the agency reviewing a proposed project (i.e., USFWD, TPWD, USACE). Mitigation measures can either result in avoidance of impacts, reducing impacts, or restoring/replacing the resources that are impacted by the proposed action. Although the Board of Directors at the Heard Museum opposes the construction of the NTMWD sanitary sewer line across the Heard Museum property, mitigation measures for the existing plan are proposed here to consider in negotiations with the NTMWD. Additionally, the NTMWD may have already incorporated some of these mitigation measures and their proposed mitigation measures should be monitored by the Heard Museum for compliance.

The following seven points describe basic mitigation strategies related to utility projects. This list was reproduced from a TPWD publication titled Guidelines for Construction of Underground Pipelines (no date) and contains information that would likely be related during the TPWD review of the proposed activity:

1. Pipelines should follow existing rights-of-way to reduce further fragmentation of remaining wildlife habitat (Authors Note: would result in relocation of planned pipeline to a corridor such as the adjacent railroad right-of-way).
2. If new rights-of-way are required, the pipelines should be routed to avoid any wetlands, bottomland hardwoods or other forested riparian vegetation, remnant native prairie, or other high

value fish and wildlife habitat (Authors Note: utility route should avoid remnant prairies on the Site but does not).

3. A Corps of Engineers Section 404 and Section 10 permit may be required for construction and fill in water or wetland areas. Mitigation measures may be required for any proposed displacement or destruction of wetland vegetation or fish and wildlife habitat (Authors Note: NTMWD proposes to avoid permit requirements by boring under wetlands and streams).
4. Construction should be planned to minimize the amount of fish and wildlife habitat disturbed. Because forest and woody areas provide food and cover for wildlife, these cover types should be protected. Mature trees, particularly those which produce nuts or acorns, should be retained. Any trees removed should be compensated by replanting saplings as near to the original removal sites as possible. To account for natural mortality, trees should be planted at a density of 3:1 (three trees planted for each tree lost). [Authors Note: If trees are removed, consider types of trees removed and opportunities to expand remnant prairie when planning restoration.]
5. Measures should be taken to avoid soil erosion, degradation, and siltation into adjacent wetlands, waters, or drainages. Techniques should include the use of hay bales (Authors Note: hay bales should be weed-free), silt screens or similar soil erosion prevention methods (Authors Note: have had success with use of mulch berms in the area). Graded embankments should not exceed a 4:1 slope.
6. If the pipeline route crosses any riparian areas the pipe should be bored underneath the streambed whenever possible to avoid impacting riparian vegetation. If the site is not feasible for boring, the pipe or cable should be attached to existing structures such as bridges. When locating the bore or staging area it should be located in previously disturbed areas whenever possible. [Authors Note: NTMWD incorporated boring under the wetland, but also has other alternatives such as wetland avoidance and locating project in previously disturbed areas.]
7. Reclamation of construction areas should emphasize replanting with native grasses and leguminous forbs to restore all disturbed areas to a like or better condition than existed prior to the project.

## **6.2 Area-Specific Impact and Mitigation Options**

### ***Dowell's Meadow and Ken's Prairie***

The remnant prairie at Dowell's Meadow has been identified as a little bluestem-Indiangrass series. The prairie is degraded with the presence of a few weedy grasses and encroachment of woody plants; primarily roughleaf dogwood. Although Ken's prairie has been restored, there is extensive growth of king-ranch bluestem and Johnsongrass that are likely to be invigorated by the planned disturbance. Early weed control is more likely to be required at Ken's Prairie and should be anticipated at both prairies.

If the utility is constructed in its proposed location, the remnant prairies would be severely disrupted. The two major concerns during construction will be soil erosion and opportunities for invasive weeds to become established.

The excavation of a trench to lay the pipe will disrupt the native soils, which can inhibit future prairie restoration efforts. The adjacent areas will likely be compacted and rutted from the storage and operation of heavy equipment and construction materials including soil and rock stockpiles.

Care should be taken to remove and stockpile the topsoil (upper 6 to 12 inches of soil) separately from the subsoil (commonly called “double ditching”) to preserve and reuse the seedbank, prairie-adapted microorganisms, and organic matter of the prairie soil as well as matching the soil texture. However, excavating, stockpiling, and eventual grading of the soil will result in loosing soil structure, which increases the risk of soil erosion, reduces water infiltration, and retards plant growth. Cultivation of the staging areas to alleviate compaction may be required. The best technique may be to chisel plow the compacted area while incorporating weed free organic material.

Although the use of the existing soil to spread over the restoration area is estimated to contribute to the re-establishment of vegetation at the Site, the use of a seed mix is recommended and multiple applications may be required to achieve the desired density. Prairie planting methods are included in the NRCS Conservation Practice Standard for Range Planting presented in **Appendix F**. Use of green spangletop (*Leptochloa dubia*) is recommended by the NRCS as a cover crop to provide quick cover to reduce erosion and as palatable forage for wildlife. Mr. Jim Eidson of the Nature Conservancy recommends using Sudan grass or grain sorghum as a warm season cover crop that has allelopathic properties that can control weeds.

Early weed control measures may need to be implemented and are generally prescribed after the type of weed and extent has been diagnosed. Long term maintenance of the prairie will likely require either occasional controlled burns and/or mechanical brush and thatch removal. If king-ranch bluestem and Johnsongrass aggressively invade the area, multiple herbicide applications of glyphosate (roundup) may be required before prairie can be established (Johnsongrass responds positively to fire and cultivation). Establish a cover crop to minimize erosion as soon as possible after the ground is disturbed, but the best planting times range between March 15 to May 1 for optimal germination and December 1 to June 1 cover the workable planting dates for less than optimal conditions.

Mr. Eidson of the Nature Conservancy recommends approaching the disturbance as a clean seedbed planting project and his comments are integrated into the summary list of the prairie restoration prescription listed below:

1. Have contractor separate topsoil from subsoil (double ditching) as described above.
2. Apply general herbicide such as glyphosate (e.g., Roundup) to control weeds.
3. Disk and harrow excavated soils. Areas that are compacted should be chisel plowed and disked.
4. Establish a cover crop. Based on the season, a cool season rye grass or green sprangletop may be used. If applicable, a warm season Sudan grass or grain sorghum is recommended, but they should be harvested and left fallow before developing seed. The presence of Johnsongrass or king-ranch bluestem may require an additional late application of herbicide that may also kill the cover crop.
5. The native seed mix can be planted with a drill using no till techniques, which will reduce soil exposure and erosion.

Seed mixes for establishing prairie can be obtained from local vendors such as Native American Seed (<http://www.seedsource.com/>), Bamert Seed Company (<http://www.bamertseed.com/>), and Turner Seed Company (<http://www.turnerseed.com/site/Default.htm>). However, the Nature Conservancy may have preferable local seed sources available (contact Jim Eidson of the Clymer Meadow Preserve at 903-568-4139). Native plants often require stratification, which can be provided naturally by planting in late winter or early spring before the last frosts. The vendors can provide seeding rates, but Mr. Eidson recommended 30 to 40 live seeds per square foot. Fertilization of prairie soils is generally not recommended because prairie plants do well without it and fertilizer favors weeds (Packard 2005).

### *Cedar Creek*

According to Mr. Shahid, the NTMWD has stated that they are going to bore under Cedar Creek. However, at least a portion of the adjacent riparian forest, if not all wooded area within the permanent easement will likely be impacted or removed. Due to the concern about the small-mouth salamander and the risk of increased sedimentation from disturbing the Site, boring under the stream and adjacent woodland would be preferential. If the NTMWD received a permit for installing the pipeline with a trench-style excavation, slope stability and soil erosion should be addressed through aggressive techniques such as wattling (use of live bundles of branches such as willow staked in trenches across the slope) and vegetative mats.

Since pipeline routes are often kept clear of trees to prevent roots from disturbing pipes (which could cause leaks on the Site and lead to further disturbance), W&M recommends maintaining the area as either an extension of the adjacent prairie and/or open woodland using techniques similar to those described for the prairie restoration.

### *Wetlands*

The forested wetlands, Duck Pond, Mallard Marsh, and floodplain forest near Wilson Creek are proposed to have the sanitary sewer directionally drilled (bored) underground. The feasibility of directional drilling a pipe of this size is based on the soil type and other factors to be determined by the NTMWD. Common techniques for installing such a line require setting up a drilling rig and other equipment on one or both sides of the wetland and drilling a small-diameter bore from one side to the other. The pipeline has to be assembled on the ground before it can be pulled in to the borehole. Usually the pipeline is assembled on the “high” side, which appears to be the south side. That hole is used as a guide for pulling back the intact pipeline, which requires simultaneous over-drilling (back-reaming) to increase the borehole diameter. According to Mr. Jim Sparks of Mid America Underground, LLC, such drilling is generally achieved using high-pressure directional drilling whereby drilling mud containing bentonite and polymers are used as a drilling lubricant. High-pressure directional drilling is susceptible to “frac outs” whereby the separation between the pipeline and the bottom of the water body is compromised. A “frac out” may result in a release of drilling mud to the surface water and may be remedied by adding soil on top of the “frac out.” Mr. Sparks said that he and a few other utility contractors use sensors to read the pressure at the drill head in order to avoid “frac outs.”

Although no construction details about the pipeline have been provided, several sources indicated that the pipe would be at least 4 feet below and as much as 20 feet below the pond. Mr. Sparks estimated that the pipeline would likely be 8 feet to 12 feet below the pond bottom, but said that the pipeline feasibility and design would be based on the construction materials, soil types, and water table among other site-specific details.

The directional drilling operation may result in the destruction of riparian habitat that can be mitigated by double ditching and tree planting after construction is completed. Planting of large tree species should be avoided within the permanent easement to avoid root entanglement. The directional drilling activities may result in increased siltation of the surface waters that can be mitigated by following standard BMPs for controlling runoff from construction sites. The risk of a release of drilling mud (spill or frac out) to the surface waters at the Site can be mitigated by having proper geotechnical data from the Site, by using equipment to monitor the drilling pressure while drilling, and by having an emergency management plan in place for responding to spills and “frac outs.”

### **6.3 Best Management Practices**

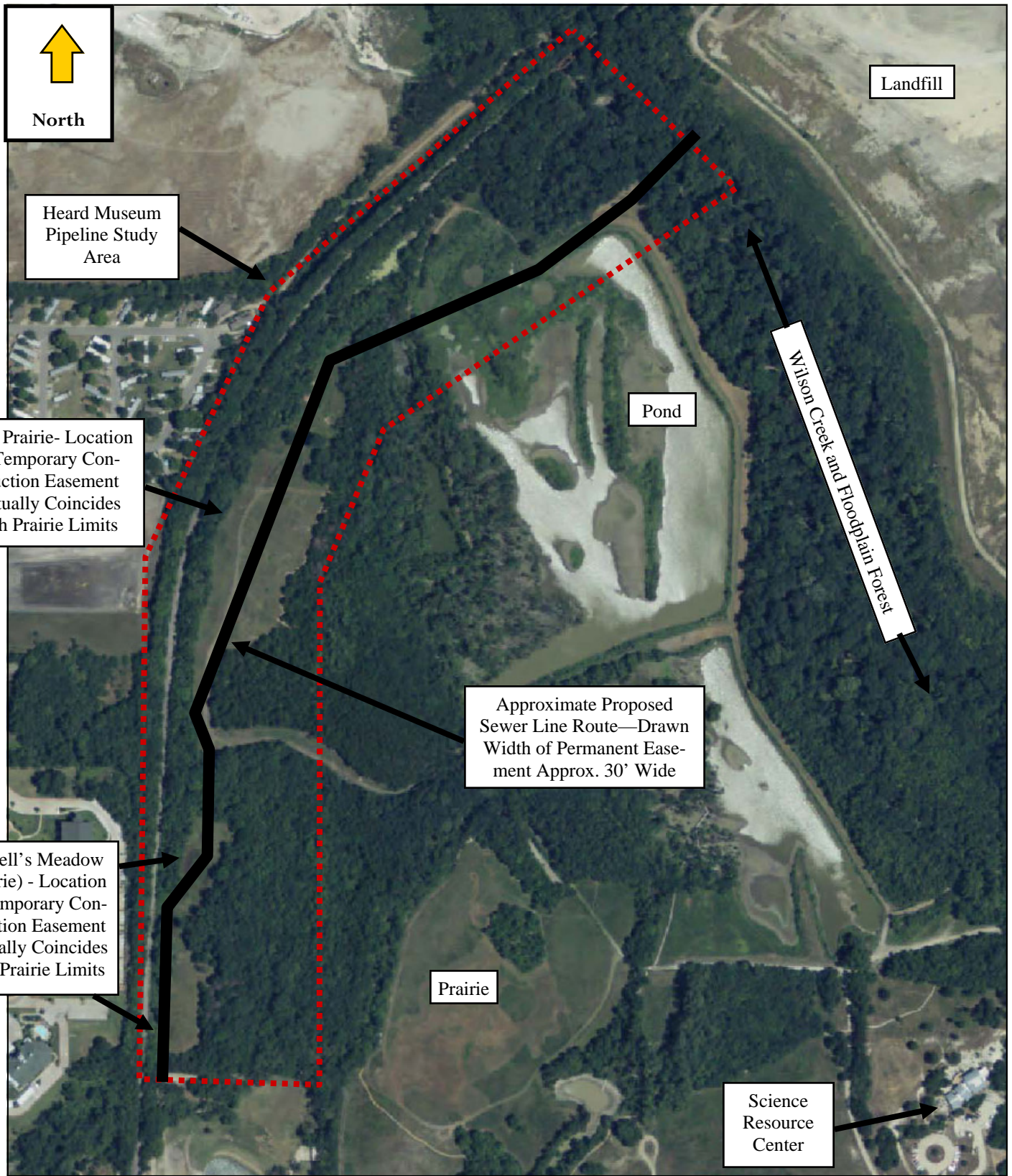
W&M has proposed the following additional BMPs to reduce the impact of the planned activity on area plants and wildlife. It is understood that the NTMWD may not agree to all of these BMPs, but W&M suggests that the Heard Museum staff or volunteers may manage some of these BMPs themselves or continue requests with the contractors to affect as many of these as possible:

1. Avoid construction activities during the critical nesting period March 1 through August 31.
2. Avoid construction activities during the critical migration period in spring from mid-February through May 31 and in fall from September 1 through November 30.
3. In order to prevent the introduction and propagation of noxious weeds, clean all equipment prior to entering construction site and inspect and clean equipment for plant material daily.
4. Use white flagging on the top of new fences to alert birds to the new obstacle.
5. Use mufflers on equipment to reduce noise.
6. Generators should have baffle boxes, mufflers, or other noise abatement capabilities.
7. Traffic will remain on established roads and avoid highly erodible soils.
8. Construction activities will stop during heavy rains.
9. All fuels, oils, and solvents will be collected and stored within secondary containment.
10. Stream crossings will not be located at bends to protect channel stability.
11. Drilling contractors should use technologies that help reduce “frac outs” when boring beneath wetlands.
12. Imported fill should be weed free.
13. To prevent wildlife entrapment, all holes and trenches will be covered or provided with wildlife escape ramps.
14. All poles or posts will be covered to prevent entrapment and discourage roosting.
15. A wildlife biologist should be on the Site to observe for presence and impact to wildlife during construction and to monitor implementation of BMPs.

## 8.0 RECOMMENDATIONS

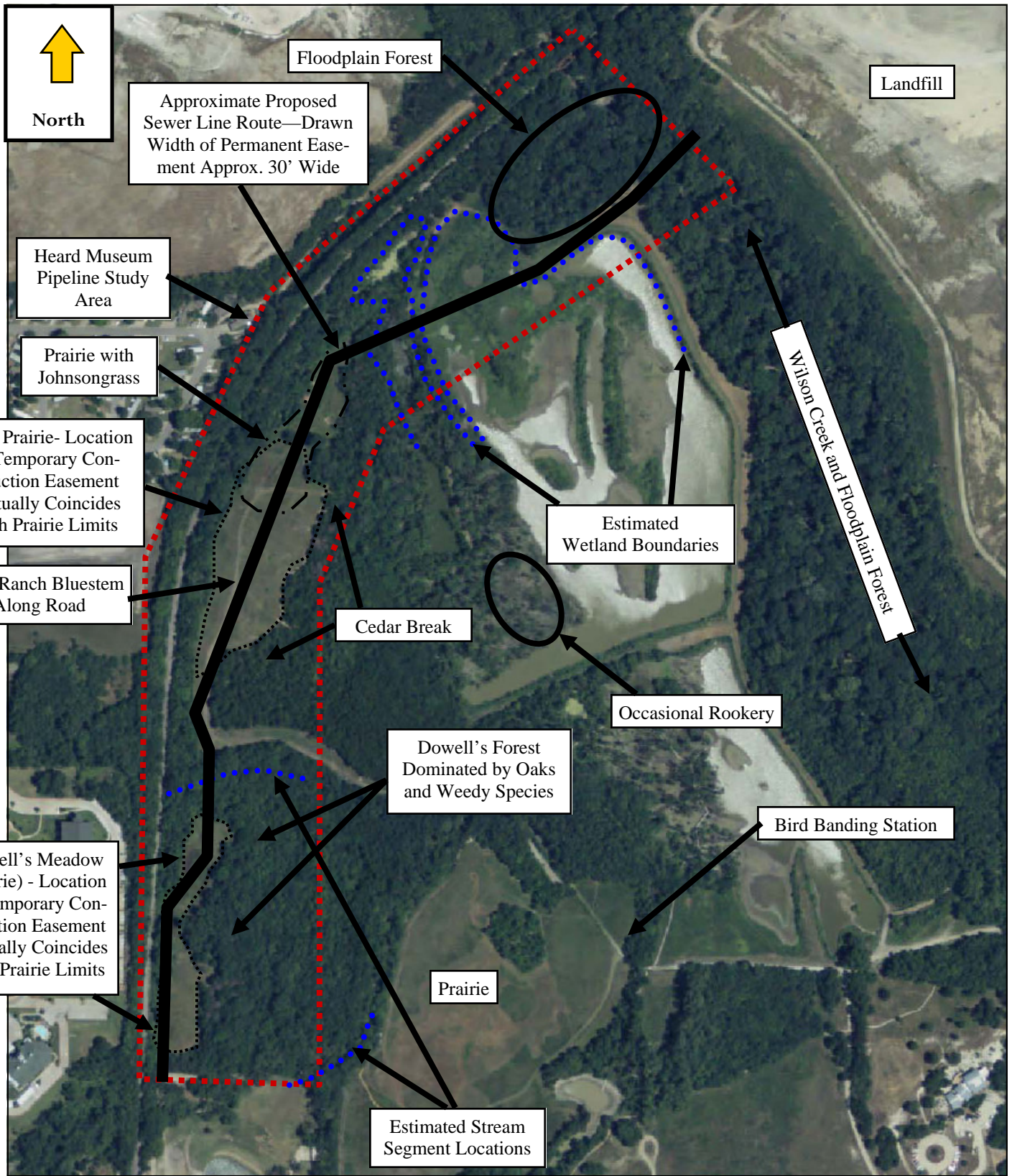
Based on the findings of this report, W&M recommends that the Board at the Heard Museum consider the following recommendations:

1. Advertise the TPWD guidelines for utility lines recommending that new projects follow existing corridors.
2. Consider requesting that the course of the pipeline within the Site be changed to preserve the rare little bluestem-Indiangrass prairie remnants. Dowell's Woods is one candidate area for relocating the utility line on the Site given its proximity to the existing planned corridor, the degraded nature of the existing resource, and opportunity to enrich the adjacent prairie during restoration activities.
3. Oppose drilling under the wetlands due to the anticipated future disturbances to water quality and habitat caused by maintaining the utility and easement.
4. Engage the NTMWD to request that BMPs identified in this report are implemented. The most critical BMPs relate to timing (best time for construction from December to mid-February), sediment control, weed control, and managing the risk of releasing drilling fluid. Heard Museum staff and volunteers may be able to assist in the implementation and monitoring of BMPs.
5. Complete TXNDD Reporting Form to report the location of rare plant and animal species and rare natural communities present at the Site to assist in future preservation of these resources for projects on or nearby the Heard Museum. The candidates for reporting include prairie remnants and possible sightings of rare reptile, crustacean, and bird species (e.g., alligator snapping turtle, canebrake rattlesnake, a crawfish [*Procambarus steigmani*], and Henslow's sparrow).



**Legend**  
 Source: 2008 Aerial Photograph from Banks Environmental Data, Inc.  
 Scale: ██████████ ~ 420'

	<b>Figure 2</b> <b>Site Layout</b> Heard Museum McKinney, Texas
	12-09-09      BE      W&M Project No.: 1017.001



**Legend**  
 Source: 2008 Aerial Photograph from  
 Banks Environmental Data, Inc.  
 Scale:  ~ 420'



**W&M**  
 ENVIRONMENTAL GROUP, INC.

**Figure 3**  
**Ecological Resource**  
**Map**  
 Heard Museum  
 McKinney, Texas

12-09-09
BE
W&M Project No.: 1017.001