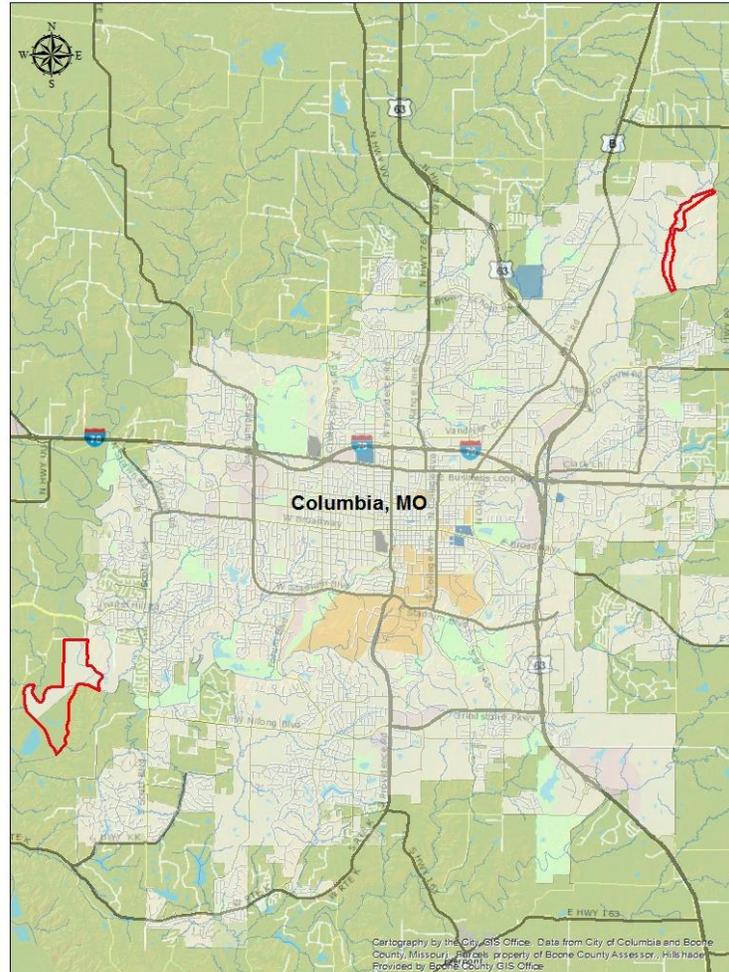


Hinkson/Perche Creek Proposed Wetland & Stream Mitigation Bank (Bank Prospectus)



**City of Columbia
Columbia, Missouri**

Boone County, Missouri

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City of Columbia
Hinkson/Perche Creek
Proposed Wetland & Stream Mitigation Bank

I. INTRODUCTION AND OBJECTIVES OF PROPOSED MITIGATION BANK

The City of Columbia (Sponsor) is proposing the construction (restoration) or enhancement of approximately **100-120 acres of wetland** and the establishment and/or enhancement of approximately **17,000 feet of stream buffer on Perche Creek and approximately 22,000 feet of stream buffer along Hinkson Creek** for a mitigation bank that will provide compensatory mitigation for City of Columbia infrastructure construction projects with unavoidable wetland and/or stream impacts. The proposed Wetland and Stream Mitigation Bank (Bank) will be established and constructed at two locations either within City limits or adjacent to and bordered by Hinkson and Perche Creeks in Boone County, Missouri (Figure 1).

Figure 1: Project Coordinates

Site	Latitude	Longitude	Sec/Twn/Range
Landfill	39° 00' 30.89"	92° 15' 28.02"	Sec. 15,22 & 27, T49N, R12W
Perche	38° 54' 46.75'	92° 25' 31.93"	Sec. 29, 30 & 31, T48N, R13W

II. ESTABLISHMENT AND OPERATION OF THE BANK

The U.S. Army Corps of Engineers (USACE) approval of this Instrument constitutes the regulatory approval required for the [Hinkson/Perche Creek Wetland and Stream Mitigation Bank] to be used to provide compensatory mitigation for Department of the Army permits pursuant to 33 C.F.R. 332.8(a)(1). This Instrument is not a contract between the Sponsor or the Property Owner and the USACE or any other agency of the federal government. Any dispute arising under the Instrument will not give rise to any claim by the Sponsor or the Property Owner for monetary damages. This provision is controlling notwithstanding any other provision or statement in the Instrument to the contrary.

The Sponsor proposes to create/restore/enhance/preserve a total of approximately 480 acres of wetland/stream and wetland/stream buffer at the Bank in two sites:

- **Landfill** – This site is located on the City landfill property. Approximately 10,000 feet of stream buffer along Hinkson Creek will be affected. The Landfill Site will be developed primarily for stream credits through riparian corridor improvements (i.e., tree plantings and preservation of existing riparian areas that are held by the Sponsor). Depending on site design, a small wetland could be developed in the southeast corner within the existing agricultural field.
- **Perche** – This site is a large area owned by the City at the confluence of Hinkson and Perche Creeks. This site will be developed for wetland and stream credits. The Perche Site is an area of approximately 420 acres at the confluence of Hinkson and Perche Creeks. This acreage is currently a mix of row crop and hay agricultural fields and existing floodplain riparian and scour/oxbow features. The Sponsor proposes to restore/enhance approximately 90 acres of wetland and restore/enhance approximately 21,700 feet with 200-300 foot stream buffers at the Perche site.

Both sites are bordered or bisected by Hinkson and/or Perche Creek. The Bank is located entirely within the Hinkson Creek watershed and at the confluence with Perche Creek, which is in the Lower Missouri-Moreau (HUC 10300102) and within the city limits of Columbia, Missouri. Hinkson Creek is classified as intermittent (Class C) above Route 163 in Columbia and perennial (Class P) below Route 163 within Missouri's Water Quality Standards (10 CSR 20-7.031), with the designated beneficial uses of irrigation, livestock and wildlife watering, protection of warm water aquatic life and human health (fish consumption), whole body contact recreation (Category B) and secondary contact recreation. The dominant soil types at the Bank are 1) Moniteau, a poorly-drained silt loam, 2) Haymond, a well-drained silt-loam, 3) Wilbur, a moderately well-drained silt loam, 4) Perche, a moderately well-drained silt loam, and 5) Carlow, a poorly-drained silty clay. The existing riparian corridors average 50 feet in width at both sites and are primarily made up of silver maple and sycamore with some cottonwood and miscellaneous hard mast species.

III. BANK OWNERSHIP AND LONG-TERM MANAGEMENT

The Sponsor purchased the properties through fee-simple title acquisition in the mid-1980s and 1990s. Upon assurance of Bank acceptance, the Sponsor will place a deed restriction on the parcels, assuring it is maintained as a wetland and stream habitat in perpetuity. The Sponsor will own the Bank until all the credits are used, at which time the Sponsor will retain the Bank as natural resource type public land. The Sponsor will be the Owner/Operator and will be responsible for the implementation of any agreed upon adaptive management plan for the life of the Bank.

IV. RESPONSIBILITY STATEMENT

Wetland and stream credits have not yet been determined. Credits generated by the construction of this Bank are intended to be used as compensation for City of Columbia construction projects with unavoidable wetland and/or stream impacts. Likely third party use will be limited to other regional government entities (MoDOT, Boone County, Municipalities). However, mitigation credits may be sold on the open market with the approval of the sponsor and the Corps of Engineers. In the event that the Sponsor should sell credits to a third party, the Sponsor would assume all legal responsibility for providing compensatory mitigation at the time the third party secures credits.

V. SERVICE AREA FOR THE MITIGATION BANK

According to 33 CFR Part 332.8(d)(6)(ii)(A) and the Mitigation Banking Instrument Outline For Proposed Mitigation Banks Within the State of Missouri, the service area for a bank "should be appropriately sized to ensure that the aquatic resources provided will effectively compensate for adverse environmental impacts across the entire service area." Furthermore, the USACE Districts and the Interagency Review Team (IRT) have agreed that the Ecological Drainage Unit (EDU), defined by the Missouri Resource Assessment Partnership (MoRAP), is the largest service area unit that will be considered for mitigation banks. City of Columbia (Sponsor) linear transportation and infrastructure projects typically involve numerous small impacts within several watersheds; therefore, the EDU will be the basis for Bank service areas.

An EDU is based on combining watersheds containing aquatic assemblages that are relatively similar and are distinct within the context of the surrounding watersheds. There are 19 EDUs within Missouri, and the boundaries of these will serve as the primary service area boundaries for the City Bank. The Plains/Des Moines EDU in the northeast corner of the state and the Plains/Kansas EDU, which comprises only a small area around the Kansas River in Missouri, are combined with the Plains/ Mississippi Tributaries between the Des Moines and Missouri Rivers and the Plains/Missouri River tributaries between the Blue and Lamine Drainages, respectively. Thus, there are 17 functional service areas as listed in **Figure 2** and illustrated in **Figure 3** at the end of this section.

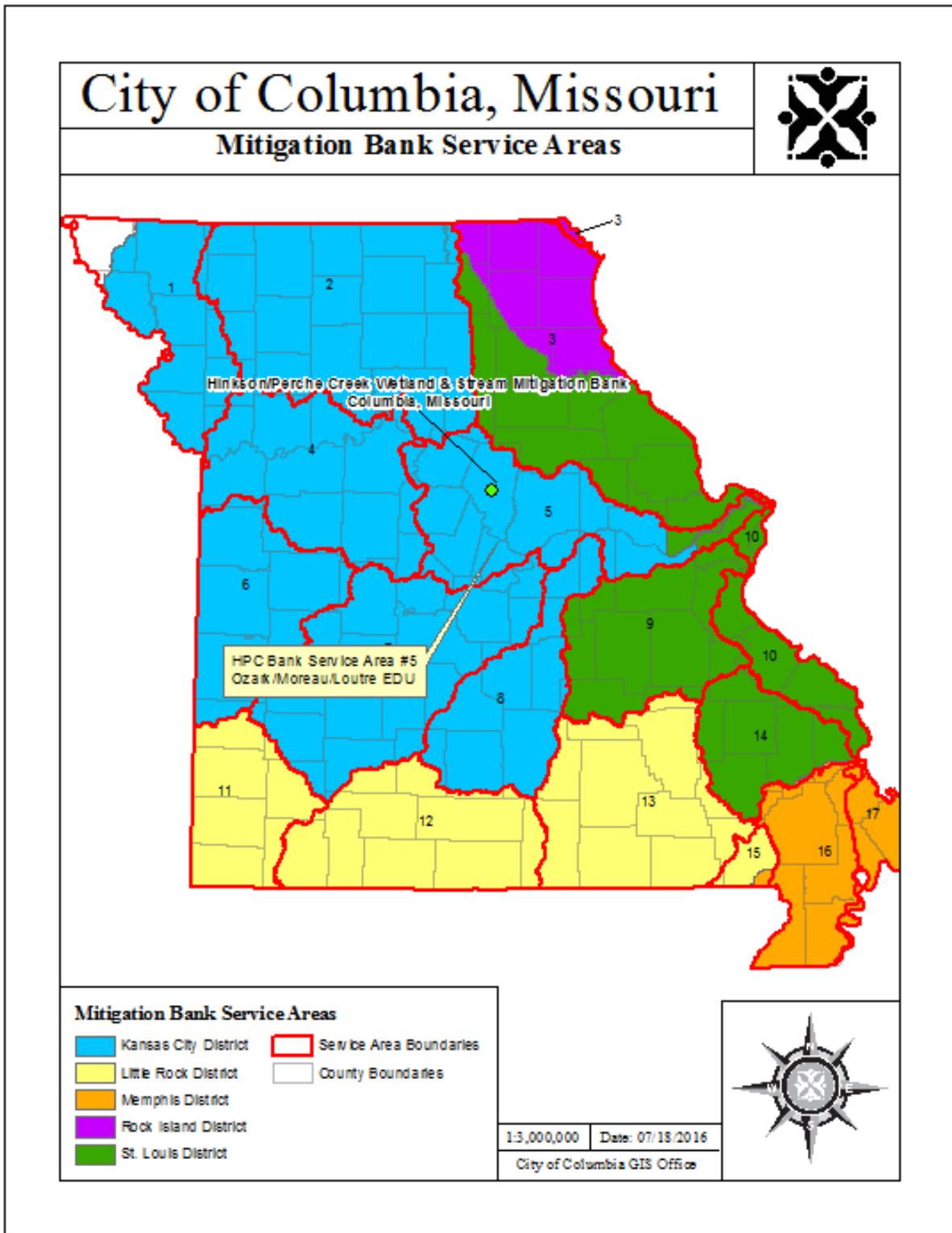
The primary goal of this Bank consists of providing compensatory mitigation for unavoidable impacts to wetlands and streams (resulting from City of Columbia transportation and infrastructure projects) within its primary Service Area--EDU #5. EDU #5 lies within the Ozark Highland Border (Moreau/Loutre) Aquatic Subregion. The Moreau/Loutre EDU lies in east-central Missouri and includes all of the smaller direct tributaries to the Missouri River downstream of the outlet of the Little Chariton River to the confluence of the Missouri and Mississippi Rivers; however, for the purposes of this Compensation Planning Framework, this EDU does not include the Missouri River proper. The EDU is primarily within the Ozark Highlands; however, the northern and western boundaries also extend into the Central Dissected Till Plains. This EDU is contained within Howard, Boone, Cooper, Morgan, Miller, Moniteau, Cole, Osage, Callaway, Gasconade, Montgomery, Warren, Franklin, St. Charles, and St. Louis counties. Overall, there are 8,109 miles of primary stream channel within this EDU, of which 2,338 miles are classified as perennial. Major streams include Bonne Femme Creek, Petite Saline Creek, Moniteau Creek, **Perche Creek**, **Hinkson Creek**, Cedar Creek, Moreau Creek, Middle River, Auxvasse Creek, Loutre River, Boeuff Creek, Charette Creek, St. Johns Creek, Bonhomme Creek, and Coldwater Creek. Because this EDU straddles two major ecoregions, it is very physiographically, hydrologically, and biologically diverse. The EDU is mainly within the Inner and Outer Ozark Border ecological subsections, but it also includes portions of the Prairie Ozark Border and the Claypan Till Plains subsections.

Bank credits will generally be authorized for use within EDU #5, but may be authorized, by the Corps of Engineers, in consultation with the IRT, outside the primary service area on a case-by-case basis. Mitigation ratios may increase when impacts located in another EDU are mitigated at the Bank. The USACE District, with jurisdiction over the area of impact, will be responsible for authorizing the use of credits from the Bank and determining the appropriate mitigation ratio in accordance with applicable requirements. The establishment of the primary service area for the Bank does not preclude any subsequent public interest review processes of Section 10/404 permit applications for specific infrastructure projects.

Figure 2: The Geographic Extent of Bank Service Areas within Missouri

Service Area	USACE District	EDU Service Area Location Description
1	Kansas City	Plains/Missouri Tributaries between Nishnbotna and Platte Drainages
2	Kansas City	Plains/Grand/Chariton
3	St. Louis	Plains/ Mississippi Tributaries between the Des Moines and Missouri Rivers
	Rock Island	Plains/Des Moines
4	Kansas City	Plains/Missouri Tributaries between Blue and Lamine Drainages
		Plains/Kansas
5	Kansas City	Ozark/Moreau/Loutre
	St. Louis	
6	Kansas City	Plains/Osage
7	Kansas City	Ozark/Osage
8	Kansas City	Ozark/Gasconade
9	St. Louis	Ozark/Meramec
10	St. Louis	Ozark/Mississippi Tributaries between Missouri and Ohio Rivers
11	Little Rock	Ozark/Elk/Spring
12	Little Rock	Ozark/White
13	Little Rock	Ozark/Current/Black
14	St. Louis	Ozark/Upper St. Francis/Castor
15	Little Rock	Mississippi Alluvial Plain/White/Black
16	Memphis	Mississippi Alluvial Plain/St. Francis
17	Memphis	Mississippi Alluvial Lower Mississippi/St. John's Bayou

Figure 3: City of Columbia Mitigation Bank Primary Service Area



VI. NEED AND TECHNICAL FEASIBILITY

The Sponsor is responsible for an ever expanding urban area. As the City of Columbia expands there is an increasing need for new or upgrades to existing infrastructure. This includes, but is not limited to, roads, sewers, power lines and sub-stations, stormwater facilities, municipal buildings, and recreational improvements. It is not unusual for infrastructure projects to involve impacts to wetlands and/or Waters of the U.S. When impacts occur it is often necessary to provide compensatory mitigation. The Sponsor views the Bank as an opportunity to develop existing City property into natural resource assets while providing for future Clean Water Act impacts.

The two sites chosen are well situated along Hinkson and Perche Creeks for bank development activities. The Sponsor is actively seeking stream buffer improvements through its Collaborative Adaptive Management (CAM) process. This project will benefit CAM goals by restoring stream buffer to large areas along Hinkson Creek. The most critical, technical aspect of wetland and stream restoration is the hydrology. Stream buffer restoration is not highly dependent on hydrology other than the potential for loss due to overbank flooding. Wetland restoration/enhancement is highly dependent on hydrology for success. The Sponsor believes that there is adequate hydrologic potential to meet wetland restoration goals at the Perche Site.

VII. QUALIFICATIONS OF THE SPONSOR

The Sponsor has a dedicated group of scientists and engineers responsible for regulatory matters. The Sponsor has applied for and been granted many Section 404 permits requiring a mitigation plan and subsequent implementation and/or construction. The Sponsor has a permanent staff of civil engineers with years of experience designing infrastructure projects, including engineering plans and cost estimates. The lead scientist for the Sponsor has assisted with the development of five mitigation banks including preparation of the prospectus for the MoDOT Blue Springs Wetland Mitigation Bank in Jackson County, Missouri, and the development, from prospectus to final banking instrument, of the MoDOT North Fork Spring River Wetland Mitigation Bank in Barton County, Missouri. The Sponsor has the expertise to carry out preparation of the banking instrument as well as the required construction plans, planting plans, and cost estimates for the Bank.

VIII. MITIGATION PLAN REQUIREMENTS FOR BANK SITE

A. Ecological Context

Columbia, and by default the Hinkson and Perche Creek Wetland and Stream Mitigation Bank is within the Ozark Highlands Section, Outer Ozark Border Subsection and more specifically the Rock Bridge Oak Woodland/Forest Low Karst Hills Land Type Association (LTA). “This LTA occupies hills with karst features associated with Hinkson Creek. Broad, gently rolling uplands and deep, abruptly dissected valleys associated with Hinkson, lower Perche, and other creeks in Boone County and Columbia. It is separated from all surrounding LTAs on the basis of well-developed karst.”

“The LTA consists of loess-covered upland divides dissected by deeply entrenched streams cutting through Mississippian limestones. Till is almost completely absent. The landscape is replete with sinkholes, losing streams, and numerous caves. Local relief averages 200 feet but is

noticeably lower in the Perche valley. The LTA includes the Manitou Bluffs between Rocheport and McBaine. Historically, the LTA was oak savanna and woodland on the upland surface, while oak and mixed-hardwood forests covered the valley slopes and bottoms. Some poorly-drained, ephemeral wetlands and some prairies may have occupied the flatter uplands. Today, the landscape is dominated by Columbia and its rapidly expanding urban influence. However, many of the valleys are still timbered and relatively wild. Many of the caves and their rare species are protected in parks and conservation areas.” (Atlas of Missouri Ecoregions, Nigh & Schroeder, 2002)

B. Objectives

The desired outcome of the Hinkson/Perche Creek Wetland & Stream Mitigation Bank is diversity of function and habitat. Following the watershed approach, the two Sites, (Landfill and Perche), all along Hinkson Creek, will serve crucial functions of storm and floodwater retention, sediment/nutrient filtration, while also providing a broad range of fish and wildlife habitat. The Sponsor proposes to create several constructed wetland pools within the floodplain portion of the Perche Site, which is currently a combination of fallow fields and cultivated agricultural ground. The Perche Site has two relatively large existing wetlands. The largest is an oxbow that is historically called Brushwood Lake. The second wetland is an associated scour that exits Brushwood Lake to the south. Additionally, the Sponsor proposes to construct at least two perched pools at the Perche Site. These pools should remain fishless, and therefore offer prime breeding habitat for local amphibians. All of the enhanced and constructed pools will provide vital breeding and feeding habitat for a variety of mammals, insects, and birds, including shorebirds, waterfowl, wading birds and raptors. The perched pools will also provide critical breeding habitat for indigenous amphibians and reptiles, which could potentially include the Northern crawfish frog (*Rana areolata circumlosa*), a species of conservation concern in Missouri. Also, the preservation/enhancement of the remnant forested oxbow slough (Brushwood Lake) will provide those same benefits outlined above, while also offering established protective cover for the aforementioned species.

The Landfill Site will be developed primarily for stream credits consisting of riparian restoration/enhancement and preservation.

In addition to the wetland areas, the Sponsor will control either one side for relatively long sections and/or both sides of Hinkson and Perche Creeks along the two sites. The Sponsor will preserve and enhance/restore the existing corridors, as well as the mature lowland and upland forests. The Sponsor also proposes to plant native grasses and native trees as buffer in the areas not being developed as wetlands or riparian corridors.

The Sponsor is anticipating the restoration/enhancement of all types of wetland habitat, forested, scrub/shrub and emergent marsh.

C. Site Selection and Baseline Information

1. Area Land Use

Historic use of the Bank site has been a mix of agriculture and urban buffer. The Landfill and Perche Sites still have active row crop agriculture. In studying aerial photography, it appears that Hinkson Creek has not had any substantial stream channelization. The floodplain is mostly intact and has not been heavily developed. Long, meandering loops and frequent over-bank flooding through a heavily forested valley probably dissipated the energy of the stream

historically. With increasing urbanization and subsequent greater areas of impervious surface flood intensity has increased. The valley likely had a high water table and therefore a potential mixture of both surface and groundwater driven wetlands.

The City has owned both properties (fee simple) since the early to middle 1980s. There are no real estate encumbrances on any of the proposed properties. Currently, portions of the Perche and Landfill Sites are planted annually to row crops (soybeans/corn), with the exception of the oxbow slough and its associated riparian and upland forest habitat. Due to its proximity to Perche Creek, and resultant annual flooding, crop yields from the Perche Site are typically marginal to poor.

- The Landfill Site is bordered on the south by Hinkson Creek Road and on the north and east by Rogers Road.
- The Perche Creek Site is an extensive area owned by the City that is near the Columbia Regional Wastewater Treatment Plant and bisected by the MKT Recreation Trail. It is somewhat isolated from roadways. Much of this site was purchased in the 1980s in anticipation of future needs. Most of the immediate surrounding area to the south and west is prone to annual flooding.

2. Hydrology

Hydrology at both sites is primarily the result of surface water collection resulting from direct precipitation and over-bank flooding of Hinkson and Perche Creeks. The Perche Site has contributing hydrology from 2-3 upland drainages. Grading, ditching, and terracing have been constructed in an attempt to remove surface water from the current and historical agricultural portions of the sites. The remnant oxbow channel (Brushwood Lake) on the Perche Site holds water nearly year-round and tends to only draw down completely during very dry periods in the summer months. The groundwater table at the Perche Site has likely lowered due to channel incision of both Hinkson and Perche Creeks. The Sponsor has not studied the seasonal groundwater fluctuations on the sites, and does not deem it necessary, as the designed wetlands will perch surface water for periods of time sufficient to meet wetland criteria.

In developing the Bank Site, the City proposes to create shallow depressions and detention pools at the Perche Site in order to detain storm and flood water for longer periods of time. A review of the Hinkson Creek hydrograph for the past six years indicates overbank flood events in 4 of the 6 years or 66% frequency. The increased pool volume at the Perche Site should promote some gradual recharge and filtration of these waters before entering back into Hinkson and Perche Creeks, while at the same time providing valuable habitat for wetland-dependent plant and animal species. There may be wetland development at the Landfill Site. However, at this time the primary focus for this site will be stream riparian corridor restoration, enhancement, and preservation. In addition to this, the Sponsor plans to construct ditch plugs in order to restore hydrology to former forested wetland areas that have been drained through a network of ditches.

3. Soils

The dominant soil types at the Bank are 1) Moniteau, a hydric, poorly drained silt loam, 2) Haymond, a well-drained silt loam, 3) Wilbur, a moderately well-drained silt loam, 4) Perche, a moderately well-drained silt loam, and 5) Carlow, a poorly-drained silty clay. The poorly-drained hydric soils will be very good areas for pool construction as will the moderately well-drained soils. The Sponsor believes that with good design and adequate hydrologic inputs that many areas at the Perche Site can be developed into a broad diversity of wetland habitats. There

are many areas within the Perche Site that can be developed into forested floodplain buffer and riparian habitat. Existing wetlands at the Perche Site have soils with well-developed redoximorphic features.

4. Vegetation

The Perche Site is an area of approximately 420 acres, of which 250 acres are annually planted to row crops and approximately 150 acres are in hay production. For the most part, the agricultural fields are graded to drain surface water to the ditches along the field edges that convey water off the site. Some edge areas, as well as some shallow depression areas within the agricultural fields, pond water for short durations, sufficient for hydrophytic vegetation growth during wet years. These areas comprise approximately 14 acres of the site and are highly disturbed from plowing, disking, and chemical applications associated with agriculture. These areas are dominated by smartweed, amaranth, fall panic grass, and barnyard grass. These areas should be greatly enhanced by the Bank development, resulting in a proliferation of emergent species that should benefit from more favorable growing conditions, stable hydrologic influences, and the cessation of chemical applications.

Forested areas at the Perche Site are limited to the riparian corridor along Hinkson and Perche Creeks, the MKT Trail corridor and the oxbow (Brushwood Lake). These lowland areas are dominated by silver maple, sycamore, and black willow, with secondary species consisting of bur oak, swamp white oak, hackberry, pin oak, cottonwood, river birch, hickory, ash, walnut, and American elm. Dominant undergrowth in these lowland woods consists of grapevine, poison ivy, coral berry, Virginia wild rye, nettle, wood reed, and river oats. For the most part, the forested areas appear to be fairly well-drained, with a few sparsely vegetated, wetter depression areas interspersed throughout. Width of the existing riparian corridor is 50-100 feet with an average of 50 feet. The reintroduction of hydrology across the site should greatly enhance the habitat viability of the lower elevation forests.

The riparian areas adjacent to Hinkson Creek at the Landfill Site are similar to the Perche site with a stronger hard mast component. Corridor width along the site is variable and generally wider with the exception of the reach adjacent to the crop field north of Hinkson Creek Rd.

A non-comprehensive list of existing plants observed across both sites has been generated. Approximately 75% of the observed species are OBL, FACW or FAC. Most of the species observed are very typical species encountered in similar habitats across central Missouri; however, a few, such as arrowhead, buttonbush, soft rush, and monkey flower are more conservative. They are a good indication that these areas can be restored to a functional, wetland habitat. The existing seed bank at the site should provide ample diversity once agriculture is ceased and wetland hydrology is restored to the site.

APPENDIX

Aerial Overview Maps

USGS Topographic Maps

