



**Edwards Aquifer Habitat Conservation Plan  
Nonroutine Adaptive Management Proposal**

*All relevant reports, citations, and analysis can be found at [www.eahcp.org](http://www.eahcp.org).*

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**To: EAHCP Committees**  
**From: Nathan Pence, HCP Program Manager**  
**Date: March 6, 2017**  
**Re: Proposed Advantageous Substitution of Sedimentation Ponds Prescribed for  
“Minimizing Impacts of Contaminated Runoff” Recovery Measure (HCP §5.7.4)**

**PREAMBLE**

The Edwards Aquifer Habitat Conservation Plan (EAHCP) calls for the City of San Marcos to “construct two sedimentation ponds along the [San Marcos] river to help reduce the amount of contaminated materials that enters the river as a result of rain events” as a commitment under the “Minimizing Impacts of Contaminated Runoff” (HCP §5.7.4) Recovery Measure. The EAHCP prescribes two site-specific sedimentation ponds to be constructed under this measure; (1) one sedimentation pond to be located in Veramendi Park, beside Hopkins Street bridge (“Veramendi Pond”); and (2) a second sedimentation pond to be located alongside Hopkins St. to consist of widened extant drainage ditches running parallel to either side of Hopkins (“Hopkins Pond”).

This document presents a formal proposal for a Nonroutine Adaptive Management action (“Nonroutine AMP;” Funding & Management Agreement, “FMA” §7.6.2) involving the substitution of the Veramendi and Hopkins sedimentation ponds prescribed by the EAHCP for “Minimizing Impacts of Contaminated Runoff” (HCP §5.7.4). This proposal is submitted by the HCP Program Manager on behalf of the City of San Marcos (COSM); the development of this proposal was a collaborative effort by both parties. Below, a brief background is provided describing the process leading to this proposal, followed by the proposed Nonroutine AMP action, accompanied by a detailed description and justifications for the proposed Nonroutine AMP. Additional technical specifications and other supporting documentation associated with the proposal is included here as an appendix.

**BACKGROUND**

As with all Measures in the EAHCP, best available information was used to inform the selection of sedimentation ponds for construction under the EAHCP’s “Minimizing Impacts of Contaminated Runoff” (HCP §5.7.4) Recovery Measure. For this Measure, the best available contemporaneous information derived from an HCP planning process undertaken by the COSM in 2004 (COSM, 2004). Although this initiative was ultimately not implemented, the resulting draft HCP document identified both Veramendi Pond and the Hopkins Pond for water quality protection along the San Marcos River. Subsequently,



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the Edwards Aquifer Recovery Implementation Program (EARIP) referred to this same information to determine COSM's commitment under "Minimizing Impacts of Contaminated Runoff" (HCP §5.7.4), hence the current EAHCP prescription also identifying the Veramendi and Hopkins ponds for implementation.

That said, since implementation of the EAHCP began in 2013, the COSM has carried out a research and development (R&D) process related to water quality protection. This R&D process supported the production of a water quality protection planning document to be used as the basis of COSM's implementation of a separate but related Recovery Measure calling for for the establishment of a comprehensive program "to protect water quality and reduce the impacts of impervious cover."<sup>1</sup> In the culmination of this effort, the final *Water Quality Protection Plan for the City of San Marcos and Texas State University* (WQPP) was published in 2015. A revision was published in 2017, and serves as the document of record for this proposal (John Gleason LLC, 2017).

Considerable research and technical analysis concerning the Spring Lake and Upper San Marcos River watershed, and how to best protect water quality in this watershed, went into the WQPP. Through this R&D exercise, the WQPP identifies and recommends an array of structural elements, design features, and planning mechanisms to provide a comprehensive water quality protection program that will contribute to the likelihood of the survival and recovery of the Covered Species (see "Measures that Specifically Contribute to Recovery," EAHCP §5.7).

Among the various water quality protection projects contemplated in the WQPP, both the Veramendi Pond and the Hopkins Pond<sup>2</sup> were evaluated and included, along with other sedimentation ponds that would provide benefit to water quality protection in the upper San Marcos River. The information featured in the WQPP concerning the sedimentation ponds represents an advancement over the information available at the time of the writing of the HCP, and thus this information serves as the basis for this Nonroutine AMP proposal.

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<sup>1</sup> This program is carried out pursuant to COSM's commitment under the "Impervious Cover/Water Quality Protection" (HCP §5.7.6) Recovery Measure.

<sup>2</sup> Through the WQPP process it was determined that the only feasible site to construct the prescribed Hopkins Pond would be at the western side of the E. Hopkins St. bridge at river left (see Figure 1). Henceforth all metrics and discussion associated with the Hopkins Pond refer to this site.



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### PROPOSED NONROUTINE ADAPTIVE MANAGEMENT ACTION

#### Overview

In the course of reviewing the WQPP to inform the implementation of COSM/TXST's water quality protection commitments, COSM identified two potential advantageous alternatives to the Veramendi and Hopkins sedimentation ponds prescribed in the EAHCP for the "Minimizing Impacts of Contaminated Runoff" (HCP §5.7.4) Recovery Measure. These advantageous alternatives are:

- (1) A preexisting sedimentation pond ("Downtown Pond") drainage system upgrade, located on COSM property at the corner of N. C.M. Allen Parkway and E. Hutchison St. (202 N. C.M. Allen Pkwy); and
- (2) An unfinished sedimentation pond ("City Park Pond") located on COSM property in City Park, adjacent to the San Marcos Recreation Hall parking lot (also the Lions Club Tube Rental location; 170 Charles Austin Dr.).

**Figure 1**



*Figure 1* displays the approximate locations of each of the four sedimentation ponds in relation to one another in the COSM.

The COSM, in coordination with the HCP Program Manager, took into account several metrics in evaluating the Downtown and City Park sedimentation ponds as potential substitutions for the Veramendi and Hopkins sedimentation ponds, respectively. The following subsections ("Performance Comparison," "Return on Investment Comparison," and "Fiscal Impact") detail the analyses conducted in support of this proposal.



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### **Performance Comparison**

Aspects of the estimated performance of the different sedimentation ponds were compared as part of the analysis conducted in support of this proposal. Specific performance metrics calculated and evaluated included drainage area (i.e., the extent of area from which runoff drains into the pond), percent impervious cover in drainage area, and total suspended solids (TSS) removed per year. TSS is understood to be a contributing factor to water quality impairment, with deleterious effects for aquatic ecosystems. Below, *Tables 1* and *2* illustrate the results of this comparative performance analysis in terms of drainage area, percent impervious cover in drainage area, and TSS between the original ponds prescribed in the EAHCP (Veramendi and Hopkins Proxy) and the Nonroutine AMP proposed replacement ponds (Downtown and City Park), respectively.

**Table 1**

PERFORMANCE METRIC	VERAMENDI POND	DOWNTOWN POND
<i>Drainage Area</i>	15 acres	30.24 acres
<i>% Impervious Cover in Drainage Area</i>	66.0%	81.3%
<i>TSS Removed/Year</i>	5,035 lbs.	6,910 lbs.

**Table 2**

PERFORMANCE METRIC	HOPKINS POND	CITY PARK POND
<i>Drainage Area</i>	9.67 acres	20.86 acres
<i>% Impervious Cover in Drainage Area</i>	72.4%	59.4%
<i>TSS Removed/Year</i>	3,679 lbs.	8,197 lbs.

### **Return on Investment Comparison**

Relative to Veramendi and Hopkins sedimentation ponds, the Downtown and City Park sedimentation ponds presented opportunities to increase efficiency of EAHCP return on investment (ROI). Generally speaking, here, COSM defined ROI as function of EAHCP dollars spent relative water quality protection benefits obtained by the sedimentation ponds. Below, *Tables 3* and *4* illustrate the results of this comparative ROI analysis in terms of total capital cost estimate, cost per pound of TSS removed, EAHCP cost, and EAHCP cost per pound of TSS removed.



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**Table 3**

ROI METRIC	VERAMENDI POND	DOWNTOWN POND
<i>Total Capital Cost Estimate</i>	\$192,360	\$93,000
<i>Cost Per Pound of TSS Removed</i>	\$3.13	\$1.22
<i>EAHCP Cost</i>	\$192,360	\$8,000
<i>EAHCP Cost Per Pound of TSS Removed</i>	\$3.13	\$0.07

**Table 4**

ROI METRIC	HOPKINS POND	CITY PARK POND
<i>Total Capital Cost Estimate</i>	\$111,504	\$324,245
<i>Cost Per Pound of TSS Removed</i>	\$2.99	\$2.68
<i>EAHCP Cost</i>	\$111,504	\$142,000
<i>EAHCP Cost Per Pound of TSS Removed</i>	\$2.99	\$1.20

### ***Fiscal Impact***

From the beginning of this evaluation, this exercise was designed to take into account the funding limitations for EAHCP program activities established by the FMA and Table 7.1 of the EAHCP. Adoption of this proposal will not result in any deviations from the funding allowances prescribed in Table 7.1 of the EAHCP. Furthermore, as a collaborative effort between and among the EAHCP, the COSM, and TXST, the proposed Nonroutine AMP action represents considerable cost efficiencies and savings in the service of stewarding EAHCP public funding compared to what would otherwise be possible implementing ponds currently contemplated by the EAHCP. The proposed Nonroutine AMP action achieves said efficiencies and savings by:

- (1) Leveraging the existing investment made by the COSM, through the Engineering & Capital Improvements Department, in funding the original design and construction of the Downtown Pond;
- (2) Incorporating TXST's pledge, through the Meadows Center for Water and the Environment 319 grant, to fund the design and construction of a repaired drainage system for the Downtown Pond (\$85,000); and





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- (3) Incorporating the COSM's pledge, through the Engineering & Capital Improvements Department, to partially fund the construction of the City Park Pond (\$178,000).

### **NONROUTINE AMP PROPOSAL**

With the foregoing justifications stated, the HCP Program Manager, on behalf of the COSM, proposes the Downtown and City Park sedimentation ponds be substituted via the Nonroutine AMP (FMA §7.6.2) to stand in place of the Veramendi and Hopkins sedimentation ponds, respectively, in fulfillment of COSM's commitment under the "Minimizing Impacts of Contaminated Runoff" (HCP §5.7.4) Recovery Measure.

#### **REFERENCES**

*All relevant reports, citations, and analysis can be found at [www.eahcp.org](http://www.eahcp.org).*

- City of San Marcos. 2004. *Environmental Assessment/Habitat Conservation Plan for Issuance of an Endangered Species Act Section 10(a)(1)(B) Permit for the Incidental Take of the Fountain Darter (*Etheostoma fonticola*), San Marcos salamander (*Eurycea nana*), and the Comal Springs riffle beetle (*Heterelmis comalensis*) During the Implementation of Projects in the Upper San Marcos River, San Marcos, Hays County, Texas.*
- Edwards Aquifer Authority, City of New Braunfels, City of San Marcos, City of San Antonio, acting by and through its San Antonio Water System Board of Trustees, and Texas State University – San Marcos. 2012. *Funding and Management Agreement...to Fund and Manage the Habitat Conservation Plan for the Edwards Aquifer Recovery Implementation Program.* [http://www.eahcp.org/files/uploads/Funding\\_and\\_Management\\_Agreement\\_\(Appendix\\_R\).pdf](http://www.eahcp.org/files/uploads/Funding_and_Management_Agreement_(Appendix_R).pdf)



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- Edwards Aquifer Recovery Implementation Program (EARIP). 2012. *Edwards Aquifer Recovery Implementation Program Habitat Conservation Plan*. [http://www.eahcp.org/files/uploads/Final%20HCP %20November%202012.pdf](http://www.eahcp.org/files/uploads/Final%20HCP%20November%202012.pdf)
  - John Gleason LLC. 2017. *Water Quality Protection Plan for the City of San Marcos and Texas State University*. Prepared for the City of San Marcos.