

To: Ms. Sara Husted

Program Specialist - National Flood Insurance Program
Texas Water Development Board
1700 N. Congress Ave, Austin TX, 78711

TWDB Contract No. 1600012049
TWDB Early Warning system Grant

Contract Issues:

Warren Escovy City of Sealy
P. o. Box 517
Sealy, Texas 77474
Email: wescovy@ci.sealy.tx.us

In November of 2016 the City of Sealy Was awarded a grant of \$14,430 for both an early warning system and for a mitigation to make a Cryan Park Pond larger. The City's match would be \$20,000 to hire a construction company to dig a pond at a 4:1 side slope with the grant reimbursing the city \$5,570. Here is the scope below:

1. \$28,860 for 4 remote sensors with software and install, weather station with install, and digging the pond side slopes to 4:1 with 10' of free board (Cryan Park Pond) and constructing a perimeter swale to capture surface runoff to direct to the pond.
3. General Fund City of Sealy contributed 50% by Planning and Community Development and the other 50% from Public Works
4. Public Works to install the Tough Sonic Remote 30 Level Sensors and the Weather Station. Digging the Cryan Park Pond side slopes to 4:1 with 10' of free board to be done by an outside contractor.
5. The software to be built by inhouse IT department.
6. The early warning system would be operated by the Planning Department's GIS system.

Here is the cost of the project by item:

- a. Four Remote 30' at \$649 plus \$1000 for installation (Public Works Department) (\$3596)
- b. Software cost to develop (\$2000)
- c. Weather station including first year of service contract (\$2760)
- d. (\$500) installation putting in some kind of protective casing
- e. Contracting out cutting the side slopes on Cryan Park Pond (\$20000)

Below is the original task budget that was approved by the TWDC.

TASK BUDGET

TASK	DESCRIPTION	TWDB AMOUNT	LOCAL AMOUNT	TOTAL AMOUNT
1	Early Warning System Procurement and Installation	\$8,860.00	\$0.00	\$8,860.00
2	Mitigation Measures on Cryan Park Pond	5,570.00	14,430.00	20,000.00
TOTAL		\$14,430.00	\$14,430.00	\$28,860.00

TASKS

EARLY WARNING SYSTEM: (WAS NOT COMPLETED)

The early warning system was going to be designed to detect water temperatures, rising and rainfall with the help of four sensors and a weather station. The issue was with getting the correct sensors to work with the city’s system which became problematic. There wasn’t going to be issues with the installation of the sensors and weather system. It was determined that only the mitigation would be able to be completed. Also, there was one public hearing conducted in regards to this project.

MITIGATION (Task 2 complete)

Pond side slopes were dug to 4:1 with 10' of free board and construct a perimeter swale to capture surface runoff to direct to the pond and should take less than 6 months. This measure should have increased detention capacity from 12.89 ac-ft of storage to 21.68 ac-ft. This mitigation measure was COMPLETED at Cryan Park Pond by Brubaker Construction Company in September of 2017. City of Sealy hired an engineer to review the drainage capacity in Cryan Park Pond and this document was provided to the City on February 4, 2019. The volume in the pond is 14.5 Acre feet.

ISSUES

In 2016 the Planning Department had requested a grant that included a mitigation portion and an Early Warning System. The mitigation was easy as it included hiring a contractor to dig out what we thought was about 9 acre feet of drainage. Our City Engineer instructed us to dig out at what was determined to be 4:1’ side slope with 10’ of free board. The issue that arose was that the original letter from our engineer David Kelly (dated Feb 11, 2011) stated that there was 12.9 acre feet of drainage and that the proposed widening of the pond

would gain an additional 8 acre feet providing an overall drainage of about 21 acre feet. It was later discovered (as determined by two different engineers) that the overall drainage is currently 14.5 acre feet even with the pond improvements completed in 2016. It is hard to determine what was the actual acre feet of drainage in 2016 and how much additional storage was created by the pond improvements. Regardless of the storage created we now know that there is 14.5 acre feet and that the widening did create additional storage.

The idea for an Early Warning system came from our GIS tech who had thought that it would be great to obtain a weather station and 4 electronic remote sensors. The sensors, called Tough Sonic remote sensors would measure the amount of rain water and the temperature which would show if the water might rise. The Weather station (which would be located at B&PW Park) would measure, wind temperature, wind speed, and transmit what the sensors picked up to our computer system.

Our system would take this information including the rising water and would translate that information to a black board system that would call residents and we would also post this information our website and facebook page. The issues that arose were that our City Engineer did not provide us with sensor data and our IT person never go a computer system software that would translate that data to our Black board and websites that could alert people.

Ultimately as the project manager I failed to get all the people to work towards making the Early Warning System a reality. What I should have done was communicated this information and my problems to my first TWDB project representative Zach Oyer. Zach was always very helpful but I never provided him with all the information nor did I make a formal request for help. Sara stepped in sometime in 2018 and I did not provide that request to her as well.

LESSONS LEARNED

We were never able to perform on getting the early warning system installed and operational. The lessons that were learned is that we should have looked at whether we could perform the work we had requested. We did not adequately put together a test run before we put it into a formal request. **As stated in the issues section the biggest problem was that I didn't ask for help from Zac, Sara, or Ivan.** The biggest lesson learned is to follow through with a plan and stick to the outline the next time.

DPK Engineering LLC
Land Development -- Site Development - Municipal

32719 Windsor Terrace
Fulshear, Texas 77441
Tel/Fax: 281-346-2616
Cell 281-300-1869

February 22, 2011

City of Sealy, Texas
415 Main Street
Sealy, Texas 77474
Tel: 979-885-3511
Fax: 979-885-3513
Email: ccoffman@ci.sealy.tx.us
Attention: Chris Coffman -- City Manager

DC
FILE *cert*

Reference: Cryan Park Detention Summary

Dear Mr. Coffman:

DPK Engineering LLC has been asked to determine the detention storage that has been constructed at the Cryan Park pond site. Based on the information that has been provided to me by Wilson Engineering and Frank Surveying the pond has a static water surface at elevation 172.2' and a 100-year water surface of 179.55'. The resulting storage based on my calculations is 561,653 cubic feet of storage (12.89 ac-ft). If you have any questions further questions please let me know.

Sincerely,



David P. Kelly II, P.E.
President
DPK Engineering LLC



Strand Associates, Inc.[®]
1906 Niebuhr Street
Brenham, Texas 77833
(P) 979-836-7037

April 17, 2019

Mr. Warren Escovy
City of Sealy
415 Main Street
Sealy, TX 77474

Re: Jacquelyn A. Cryan Memorial Park Pond Detention
City of Sealy, Texas (City)

Dear Warren,

At the request of the City, Strand Associates, Inc.[®] (Strand) has evaluated the detention capacity of the existing pond and outlet structures located in Jacquelyn A. Cryan Memorial Park with regard to future development of 13.36 acres of the Town Park Center property situated to the south and downstream of the pond and 11.29 acres located upstream of the pond. The analysis was performed based upon the pre-existing condition beginning in 2011, the year the pond was constructed. The purpose of the analysis, consisting of proposed 10.575-acre Lot 1 (90 percent being impervious) and 2.781-acre Lot 2 (1.1 acres being impervious), was to determine whether the proposed development of 13.36 acres in Town Park Center located south of the pond, the proposed 11.29-acre tract (90 percent being impervious) located to the north, and the development that has occurred in the watershed since 2011 will have a significant negative drainage impact downstream. The storage volume required for Lots 1 and 2 proposed in Town Park Center equates to 6.0 acre-feet plus another 6.0 acre-feet of capacity for the 11.29-acre tract to the north, being developed by Aldron Holdings, is confirmed to be available. It is understood that Aldron Holdings will also be providing an additional 2.0 acre-feet of detention storage upstream. Strand performed a hydraulic analysis using HydroCad Software applying SCS Type III 24-hour 100-year rain fall of 11.00 inches and determined that the use of the pond to offset the increased runoff from the proposed developments described above results in no increase in the rate of flow in Allen's Creek. As a result, there will be no significant impact down stream.

Sincerely,

STRAND ASSOCIATES, INC.[®]

Roddy J. Williams, Ph.D., P.E.
Senior Vice President

c: Lloyd Merrell, City of Sealy
File, Strand Associates, Inc.[®]

RJW.cj/S:\BREN3900-3999\3903\0551\Wn\Town Park Center Detention.docx

TBPE No. F-8405
TBPLS No. 10030000



Strand Associates, Inc.[®]
1906 Niebuhr Street
Brenham, Texas 77833
(P) 979-836-7937

April 25, 2019

Mr. Warren Escovy
City of Sealy
415 Main Street
Sealy, TX 77474

Re: Jacquelyn A. Cryan Memorial Park Pond Detention
City of Sealy, Texas (City)

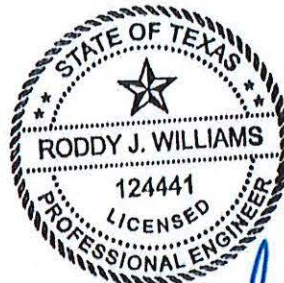
Dear Warren,

Strand Associates, Inc.[®] provided a recent analysis of the pond in our letter to you on April 17, 2019. This 100-year storm analysis, using HydroCad Software applying the SCS Type III 24-hour storm (11 inches of rainfall) routed through the pond, shows there is 14 acre-feet of storage volume capacity in the pond and it is being used.

Sincerely,

STRAND ASSOCIATES, INC.[®]

Roddy J. Williams, Ph.D., P.E.
Senior Vice President



Roddy J. Williams
4/25/19

VOLUME REPORT

Jacqueline A. Cryan Memorial Park Detention Pond

1500 Miller Road
Sealy, Texas

Prepared For:

City of Sealy



Prepared By:



P.O. Box 1029
29255 FM 1093 #7A
Fulshear, Texas 77441
(832) 252-8100

February 4, 2019

INTRODUCTION

On January 24, 2019, CivilCorp LLC was authorized by the City of Sealy to perform an aerial survey for the detention pond located at the Jacqueline A. Cryan Memorial Park off of Rexville and Miller Roads in Sealy Texas. Project coordinates: 29.766354, -96.164964.

SURVEY DESCRIPTION

The survey was conducted by CivilCorp LLC personnel on January 30, 2019. Prior to the launch and survey of the project site by the Unmanned Aerial Vehicle (UAV), ground control points were set. While ground control points are not necessary to estimate a volume, they do ensure survey deliverables are referenced to a real-world coordinate system. Ground control points constructed of white corrugated plastic were utilized for the project and tied in with survey grade GPS/GNSS instruments. 5 total ground control points were set in an evenly distributed pattern across the project site. An additional 9 spot elevation checks were taken at random places within the project area and tied in with GPS/GNSS equipment. Once ground control had been established the project site was flown by the UAV at an altitude of 150 feet AGL, resulting in a 1/2-inch ground sampling distance. Overlap parameters of the flight were set at 80% side lap and 70% front lap, resulting in a very dense collection of data. The total flight time was approximately 11 minutes. Because the detention pond contained a significant amount of water, supplemental bathymetric survey was needed. UAV survey methods cannot penetrate beneath the water surface. CivilCorp utilized a remote-controlled boat equipped with a GPS receiver and sonar sounder to determine the underwater depths of the detention pond.

SURVEY ANALYSIS

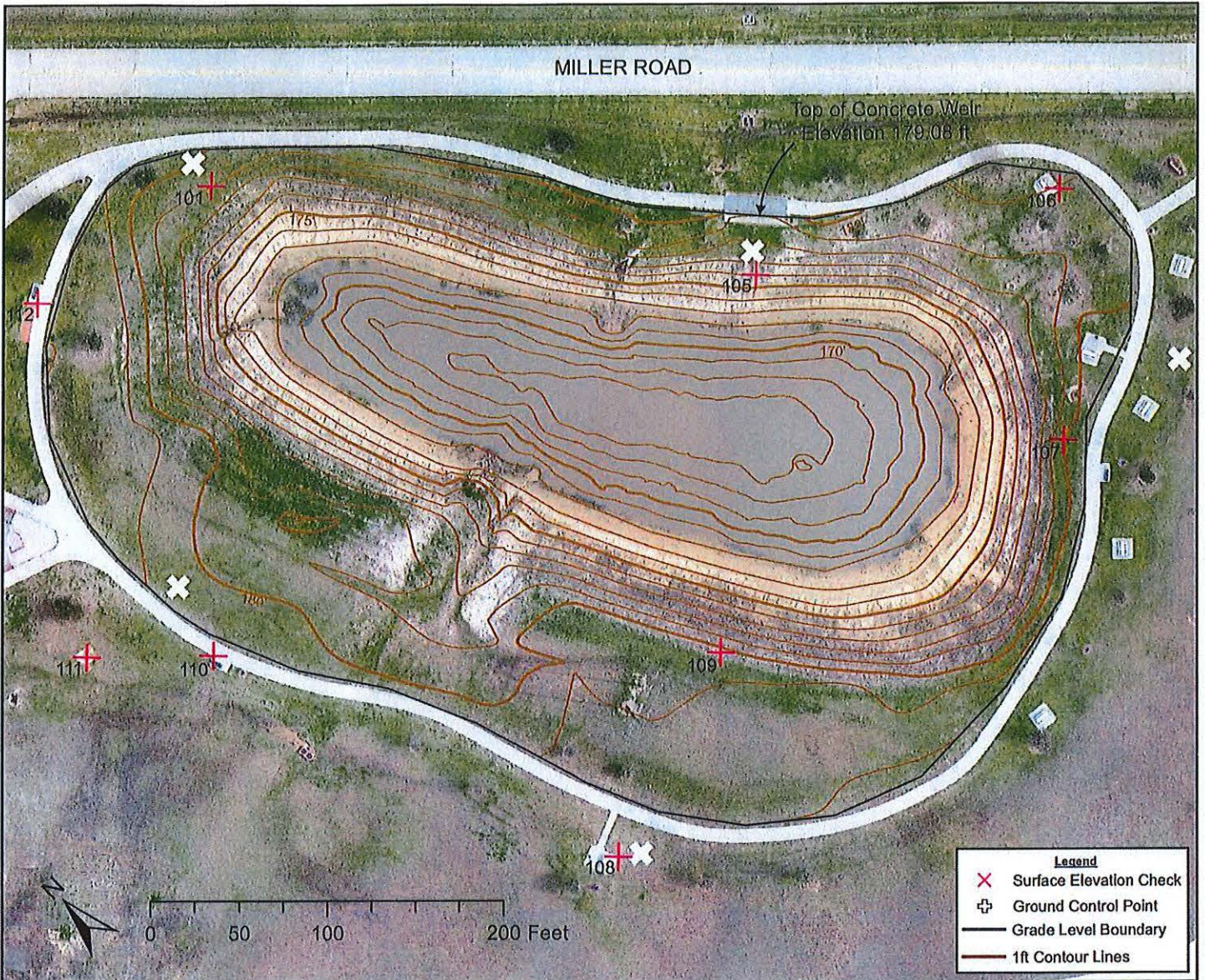
The survey data collected during the UAV survey was processed using Pix4d, an industry standard for processing UAV data. Processing outputs include a dense point cloud, digital terrain model (DTM) and overall orthoimage of the entire project site. Using the DTM, cross-sections were derived similarly to an on the ground topographic survey. This data was integrated with the bathymetric data to create a virtual surface of the detention pond using MicroStation Geopak. Once the surface had been created and reviewed for any errors, a fill volume was computed using a plane of 179.08 feet, the mean elevation of the top of the concrete weir where outfall would occur. A second volume was calculated using a plane of 177.80 feet, the mean elevation for the slope top of the detention pond embankment.

CONCLUSION

The fill volume (A) calculated from the integrated UAV and bathymetric survey of the detention pond was 22,756 cubic yards or 14.10 acre feet using the first elevation of the top of weir. The second calculated fill volume (B) using the second elevation of the top of embankment slope is 18,114 cubic yards or 11.23 acre feet. Root mean square error analysis of the ground control network yielded a result of 0.01 feet, and the spot elevation checks resulted in an average variance of 0.06 feet.

The final total estimated fill volume A has been determined to be **22,756 cubic yards or 14.10 acre feet.**
The final total estimated fill volume B has been determined to be **18,114 cubic yards or 11.23 acre feet.**

Additional information is located on the map exhibits attached to this report.



Surface Check Point Results

Check Point	GPS Surface Elevation	Computed Elevation	Differential
101	179.04	179.01	0.03
105	176.08	176.13	-0.05
106	179.05	178.91	0.14
107	180.03	180.03	0.00
108	181.97	182.01	-0.04
109	180.47	180.61	-0.14
110	180.55	180.43	0.12
111	182.08	181.85	0.23
112	182.07	181.84	0.23

Average Differential = 0.06 ft



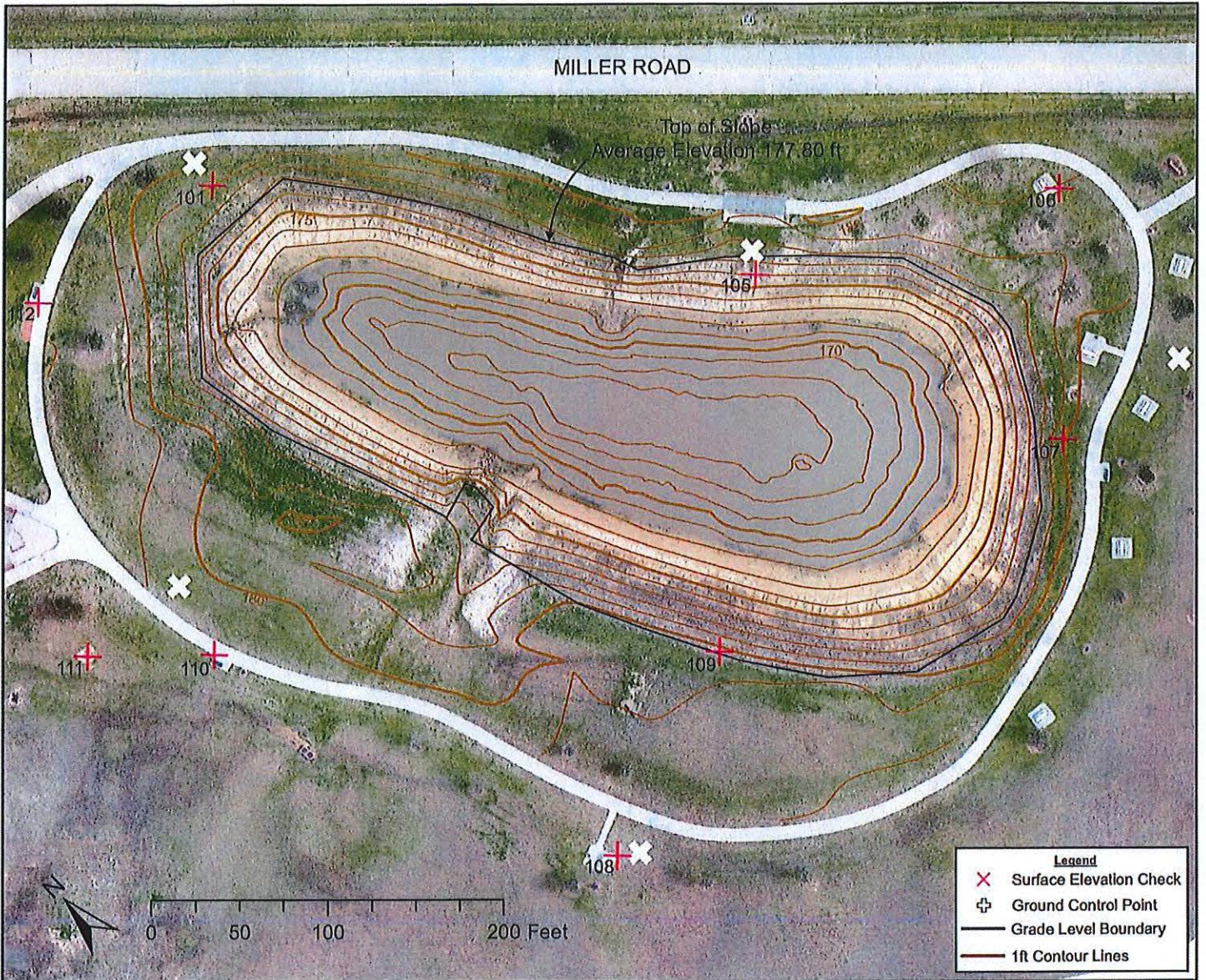
Brandon Absher

BRANDON M. ABSHER RPLS#6654
 I HEREBY CERTIFY THIS SURVEY WAS PERFORMED ON THE GROUND AND
 THIS EXHIBIT CORRECTLY REPRESENTS THE FACTS FOUND AT THE TIME OF
 THE SURVEY, JANUARY 2019.



29255 FM 1093, #7A
 Fulshear, TX 77441
 TBPLS Firm No.: 10193783
 TBPE Firm No.: 10283

Cryan Park Detention Pond
 1500 Miller Road
 Sealy, TX 77474
 (29.766354, -96.164964)
 Data Acquisition Date: 1/30/2019
 Total Calculated Volume (A):
22,756 cubic yards or 14.10 acre feet



Surface Check Point Results

Check Point	GPS Surface Elevation	Computed Elevation	Differential
101	179.04	179.01	0.03
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Cryan Park Detention Pond
 1500 Miller Road
 Sealy, TX 77474
 (29.766354, -96.164964)
 Data Acquisition Date: 1/30/2019

Total Calculated Volume (B):
18,114 cubic yards or 11.23 acre feet



Before



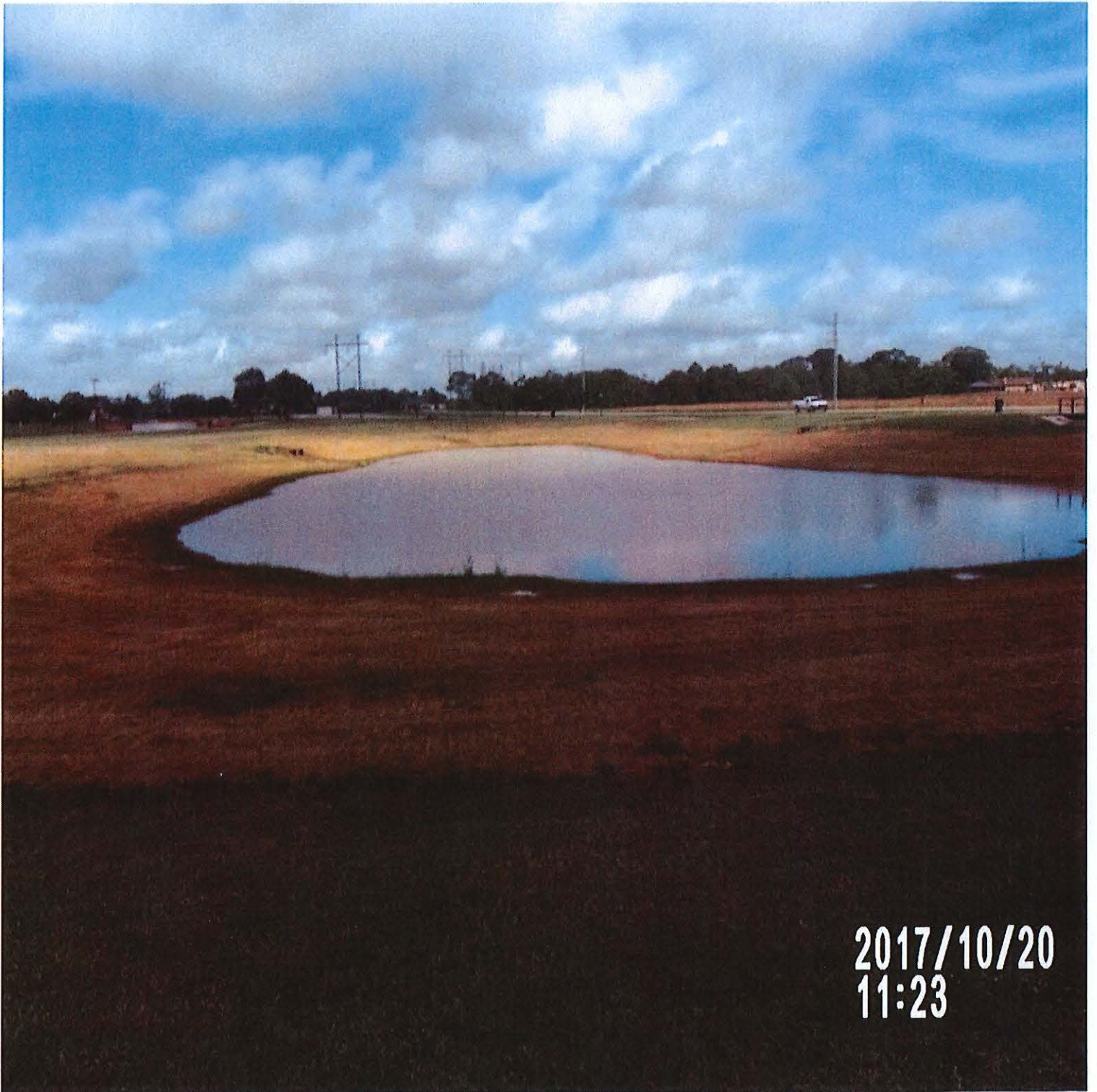
Before



Before



After



After

ATTACHMENT 1

City of Sealy Flood Early Warning System

City of Sealy

Contract #1600012049

Texas Water Development Board Comments to Draft Report

REQUIRED CHANGES

General Draft Report Comments:

In general, the study follows standard methodologies and practice. Mitigation alternatives identified may be eligible for funding under the Texas Water Development Board's financial assistance programs. Application requirements and eligibility criteria are identified by Texas Water Development Board rules specified in Section 363 of the Texas Administrative Code (TAC). The report would be appropriate for use in support of an application to the Board for financing the proposed improvements. All additional information required by Board rules, 31 TAC 363.401-404, as well as necessary information to make legal findings as required by Texas Water Code chapter 17.771-776, would be required at the time of loan application.

Please conduct a final edit of the document for grammar, spelling, typographical errors, and inconsistent usage of acronyms, and abbreviations. Please spell out all acronyms, with the acronym in parentheses, the first time they are used. Please include a list of acronyms used in the report after the Table of Contents. A version of the draft report, with the Texas Water Development Board's tracked edits, will be provided to the City's consultant for the draft report update, simultaneously, with the mailing of these comments.

Specific Draft Report Comments:

1. The draft report included photos of the pond, however, no indication of the phase of the project when they were taken in. Please label the photos as either pre, post, during excavation, or as appropriate.
2. The draft report indicates that a contracted drainage capacity report was completed which indicated a 14.5 acre foot capacity while the proposed capacity was 21.68 acre feet. Please, include a copy of the report or a brief discussion of the final capacity.
3. Please briefly discuss the "issues" that the City encountered when attempting to get the sensors to work with the City's "system".
4. The draft report consisted of a set of separate documents. Please submit the final report as one complete document.