

58  
**City of Las Cruces**<sup>®</sup>  
 PEOPLE HELPING PEOPLE

**Council Action and Executive Summary**

Item # 5 Ordinance/Resolution# 13-14-380

For Meeting of \_\_\_\_\_  
 (Ordinance First Reading Date)

For Meeting of February 4, 2014  
 (Adoption Date)

Please check box that applies to this item:

QUASI JUDICIAL                       LEGISLATIVE                       ADMINISTRATIVE

**TITLE:**      A RESOLUTION APPROVING A CONTRACT BETWEEN THE CITY OF LAS CRUCES (CITY) AND MOLZEN-CORBIN AND ASSOCIATES, INC., OF LAS CRUCES, NEW MEXICO TO PROVIDE GENERAL ENGINEERING SERVICES FOR THE DEVELOPMENT OF AN EMERGENCY ACTION PLAN AND AN OPERATION MAINTENANCE MANUAL FOR THE SANDHILL ARROYO DAM IN AN AMOUNT NOT TO EXCEED \$139,470.00, PLUS \$10,547.42, FOR NEW MEXICO GROSS RECEIPT TAX AND THE CITY MANAGER IS AUTHORIZED TO APPROVE CHANGE ORDERS IN AN AMOUNT NOT TO EXCEED \$6,973.50, FOR A TOTAL PROJECT AUTHORIZATION IN THE AMOUNT OF \$156,990.92.

**PURPOSE(S) OF ACTION:**

Contract award.

<b>COUNCIL DISTRICT: 5</b>		
<b><u>Drafter/Staff Contact:</u></b> Louis Grijalva, P.E.	<b><u>Department/Section:</u></b> Public Works/Project Development	<b><u>Phone:</u></b> 528-3479
<b><u>City Manager Signature:</u></b>		

**BACKGROUND / KEY ISSUES / CONTRIBUTING FACTORS:**

The State of New Mexico (State), Office of the State Engineer Dam Safety Bureau (OSE) conducted an inspection of the Sandhill Arroyo Dam facility, located near the intersection of Sonoma Ranch Boulevard and Monte Sombra Avenue, in October 2013, and produced a summary of requirements to be performed (Attachment "B"). The OSE requires that all dams upstream of populated areas develop an Emergency Action Plan and an Operation and Maintenance Manual for the facility.

In accordance with Las Cruces Municipal Code 1998, Section 24-99 (b) Authority to Award, any individual contract in excess of \$50,000.00 will be taken to City Council for approval, prior to contracting. As per Resolution 13-14-304, five firms have been pre-qualified to provide general engineering services to the City on an as-needed basis.

(Continue on additional sheets as required)

The Public Works Department/Project Development Section contacted Molzen-Corbin and Associates, Inc., and requested they provide a cost and time proposal to the City for the development of the Emergency Action Plan and Operation and Maintenance Manual for the Sandhill Arroyo Dam (Attachment "A").

On this basis, Project Development recommends Molzen-Corbin and Associates, Inc., be awarded the contract for the development of an Emergency Action Plan and an Operation Maintenance Manual for the Sandhill Arroyo Dam, in the amount of \$139,470.00, plus \$10,547.42, for New Mexico Gross Receipts Tax and a contingency of \$6,973.50, for a total amount of \$156,990.92.

**SUPPORT INFORMATION:**

1. Resolution.
2. Exhibit "A", Purchasing Manager's Request to Contract Form (PMRC).
3. Attachment "A", Molzen-Corbin and Associates Cost Proposal.
4. Attachment "B", Office of State Engineer, Dam Safety Bureau Inspection Report.

**SOURCE OF FUNDING:**

<b>Is this action already budgeted?</b>	Yes	<input checked="" type="checkbox"/>	See fund summary below
	No	<input type="checkbox"/>	If No, then check one below:
	<i>Budget Adjustment Attached</i>	<input type="checkbox"/>	Expense reallocated from: _____
		<input type="checkbox"/>	Proposed funding is from a new revenue source (i.e. grant; see details below)
		<input type="checkbox"/>	Proposed funding is from fund balance in the _____ Fund.
<b>Does this action create any revenue?</b>	Yes	<input type="checkbox"/>	Funds will be deposited into this fund: _____ in the amount of \$ _____ for FY _____.
	No	<input checked="" type="checkbox"/>	There is no new revenue generated by this action.

**BUDGET NARRATIVE**

N/A
-----

**FUND EXPENDITURE SUMMARY:**

Fund Name(s)	Account Number(s)	Expenditure Proposed	Available Budgeted Funds in Current FY	Remaining Funds	Purpose for Remaining Funds
Flood Control	44806010-854111-70433	\$156,990.92	\$300,000.00	\$143,009.08	Other flood control projects

(Continue on additional sheets as required)

**OPTIONS / ALTERNATIVES:**

1. Vote "Yes"; this will approve the contract between the City of Las Cruces and Molzen-Corbin and Associates, Inc., to provide general engineering services for the development of the Emergency Action Plan and the Operation and Maintenance Manual for the Sandhill Arroyo Dam in an amount not to exceed \$139,470.00, plus \$10,547.42, for New Mexico Gross Receipt Tax and a contingency of \$6,973.50, for a total project authorization in the amount of \$156,990.92.
2. Vote "No"; this will reject the proposed contract and a cost proposal will be requested from the other four pre-qualified firms on record to provide general engineering services to the City on an as-needed basis. This decision will delay being in compliance with the State's dam regulations.
3. Vote to "Amend"; this could reject the proposed contract and provide an opportunity to re-scope the project. This decision will delay being in compliance with the State's dam regulations.
4. Vote to "Table"; this could reject the proposed contract award and abandon the project. This decision would leave the City without an Emergency Action Plan and Operations and Maintenance Manual. This action will result in the City being non-compliant with the State's dam regulations.

**REFERENCE INFORMATION:**

The resolution(s) and/or ordinance(s) listed below are only for reference and are not included as attachments or exhibits.

1. Resolution No. 13-14-304

(Continue on additional sheets as required)

**RESOLUTION NO. 13-14-380**

**A RESOLUTION APPROVING A CONTRACT BETWEEN THE CITY OF LAS CRUCES (CITY) AND MOLZEN-CORBIN AND ASSOCIATES, INC., OF LAS CRUCES, NEW MEXICO TO PROVIDE GENERAL ENGINEERING SERVICES FOR THE DEVELOPMENT OF AN EMERGENCY ACTION PLAN AND AN OPERATION MAINTENANCE MANUAL FOR THE SANDHILL ARROYO DAM IN AN AMOUNT NOT TO EXCEED \$139,470.00, PLUS \$10,547.42, FOR NEW MEXICO GROSS RECEIPT TAX AND THE CITY MANAGER IS AUTHORIZED TO APPROVE CHANGE ORDERS IN AN AMOUNT NOT TO EXCEED \$6,973.50, FOR A TOTAL PROJECT AUTHORIZATION IN THE AMOUNT OF \$156,990.92.**

The City Council is informed that:

**WHEREAS**, the State of New Mexico (State), Office of the State Engineer Dam Safety Bureau (OSE) conducted an inspection of the Sandhill Arroyo Dam facility in October 2013, and produced a summary of requirements to be performed; and

**WHEREAS**, the OSE requires that all dams upstream of populated areas develop an Emergency Action Plan and an Operation and Maintenance Manual for the facility; and

**WHEREAS**, in accordance with Las Cruces Municipal Code 1998, Section 24-99 (b) Authority to Award, any individual contract in excess of \$50,000.00 will be taken to City Council for approval prior to contracting. As per Resolution 13-14-304, five firms have been pre-qualified to provide general engineering services to the City on an as-needed basis; and

**WHEREAS**, the Public Works Department/Project Development Section contacted Molzen-Corbin and Associates, Inc., and requested they provide a cost and time proposal to the City for the development of an Emergency Action Plan and Operation and Maintenance Manual for the Sandhill Arroyo Dam; and

**WHEREAS**, Project Development recommends Molzen-Corbin and Associates,

Inc., be awarded the contract for the development of an Emergency Action Plan and an Operation Maintenance Manual for the Sandhill Arroyo Dam, in the amount of \$139,470.00, plus \$10,547.42, for New Mexico Gross Receipts Tax and a contingency of \$6,973.50, for a total amount of \$156,990.92.

**NOW, THEREFORE,** Be it resolved by the governing body of the City of Las Cruces:

**(I)**

**THAT** the development of an Emergency Action Plan and an Operation Maintenance Manual for the Sandhill Arroyo Dam is hereby awarded to Molzen-Corbin and Associates, Inc., of Las Cruces, New Mexico, in an amount not to exceed \$139,470.00, plus \$10,547.42, for New Mexico Gross Receipts Tax and a contingency of \$6,973.50, for a total amount of \$156,990.92

**(II)**

**THAT** the Purchasing Manager is authorized to contract with Molzen-Corbin and Associates, Inc., as outlined in the signed Exhibit "A", Purchasing Manager's Request to Contract Form.

**DONE AND APPROVED** this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

APPROVED:

\_\_\_\_\_  
Mayor

ATTEST:

\_\_\_\_\_  
City Clerk

(SEAL)

VOTE:

Mayor Miyagishima:

Councillor Silva:

Councillor Smith:

Councillor Pedroza:

Councillor Small:

Councillor Sorg:

Councillor Levatino:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Moved by: \_\_\_\_\_

Seconded by: \_\_\_\_\_

APPROVED AS TO FORM:

  
\_\_\_\_\_  
City Attorney

# CITY OF LAS CRUCES

---

## PURCHASING MANAGER'S REQUEST TO CONTRACT

For Meeting of: February 4, 2014

Resolution No. 13-14-380

---

### Existing Contract Purchase For General Engineering Services

Emergency Action Plan and Operation Maintenance Manual for the Sandhill Arroyo Dam

---

The Las Cruces City Council is provided the following information concerning this request:

#### BID/RFP SOLICITATION INFORMATION:

- |  |   |
|--|---|
| 1. Original Bid/RFP & Due Date:                      | 13-14-304 / September 5, 2013               |
| 2. Description of Bid/RFP:                           | General Engineering Services                |
| 3. Number of Original Responses Accepted:            | Ten (10)                                    |
| 4. Existing Contract Expiration Date:                | October 20, 2014                            |
| 5. Last Contract Renewal by Council:                 | Resolution No. 13-14-304 / October 21, 2013 |
| 6. Using Department:                                 | Public Works                                |
| 7. Current Award Recommendation To:                  | Molzen Corbin of Las Cruces, NM             |
| 8. Total Award Amount (includes tax and contingency) | \$156,990.92                                |
| 9. Contract Duration:                                | 180 days                                    |

#### PROCUREMENT CODE COMPLIANCE:

The City of Las Cruces Procurement Code was administered in the conduct of this procurement and approval to purchase is hereby requested pursuant to **Section 24-316**.

*Karen Medina* 11/17/14  
 Purchasing Manager Date

#### CONFIRMATION OF FUND ENCUMBRANCE:

REQUISITION OR PURCHASE ORDER NUMBER:	14101983
---------------------------------------	----------

# MOLZENCORBIN

January 15, 2014

Robert E. Ebler P.E.  
 Design Engineer  
 City of Las Cruces  
 Public Works, Project Development  
 P. O. Box 20000  
 Las Cruces, NM 88004

**RE: Sand Hill Arroyo Dam, Dona Ana County,  
 Office of the State Engineer (OSE) File No. D-282  
 Proposal for O&M Manual and Emergency Action Plan**

Dear Mr. Ebler:

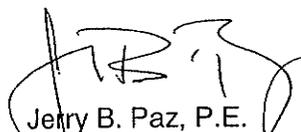
Molzen Corbin is pleased to provide your office with this proposal for Professional Engineering Services in the preparation of an Operation and Maintenance (O&M) Manual and an Emergency Action Plan (EAP) for the San Hill Arroyo Dam. This work will be done in accordance with the attached Scope of Work, which includes by reference the requirements of the OSE. Also attached is a copy of our fee breakdown for your review and approval. Molzen Corbin proposes a billing threshold and time schedule as follows:

	Description	Billing Thresholds	Contract Time
Draft	O&M Manual	\$ 40,064.00	135 days after NTP
	EAP	\$ 50,192.00	
	Expenses	\$ 21,320.00	
Final	Final O&M Manual	\$ 10,016.00	45 days after Review of Draft
	Final EAP	\$ 12,548.00	
	Expenses at Final	\$ 5,330.00	
<b>Total Fee</b>		<b>\$ 139,470.00</b>	<b>180 days</b>

We hope this proposal is agreeable to the City of Las Cruces. If you should have any questions regarding our scope, schedule, or budget, please let me know.

Sincerely,

MOLZEN CORBIN



Jerry B. Paz, P.E.  
 Vice President  
 Las Cruces Branch Manager

Sand Hill Arroyo Dam, Dona Ana County, Office of the State Engineer (OSE)  
File No. D-282

### **Scope of Work**

#### **A. Operation and Maintenance Manual**

This task is the preparation of an Operation and Maintenance Manual (O & M Manual) for the Sand Hill Arroyo Dam in accordance with 19.25.12.21.E NMAC and 19.25.12.17 NMAC of the Rules and Regulations Governing Dam Design, Construction, and Dam Safety (OSE Rules and Regulations). The O & M Manual shall include the following components:

1. General information
2. Operation instructions
3. Instrumentation
4. Security
5. Maintenance requirements
6. Inspection requirements
7. Updates and revisions
8. Appendices

*Deliverables:*

1. Three digital copies of the O & M Plan (on CD) including all appendices.
2. Ten hard copies of the O & M Plan including all appendices.

#### **B. Emergency Action Plan**

This task is the preparation of an Emergency Action Plan (EAP) for the Sand Hill Arroyo Dam, in accordance with 19.25.12.21.E NMAC and 19.25.12.17 NMAC of the Rules and Regulations Governing Dam Design, Construction, and Dam Safety (OSE Rules and Regulations). The EAP shall include the following components:

1. Notification flowchart
2. Emergency detection, evaluation and classification
3. Emergency responsibilities
4. Preparedness plan
5. Evacuation map
6. Inundation map
7. Supporting appendices

In order to prepare the flood inundation maps the following tasks will need to be also completed.

- Determine the probable maximum flood (PMF) for the dam using HMR-55A; The PMF hydrology model will be based on the hydrology model developed for the Sand Hill Arroyo Dam as PMF and Letter of Map revision 2012. The PMF analysis will include the 6-hr, 24-hr and 72-hr PMP events to select the PMF for the most critical

duration.

- Analyze the dam during the PMF event to determine the extent of the PMF flood limits based on the existing dam configuration (assuming the dam does not fail);
- Complete a dam break analysis for the dam assuming the water level in the dam is at the spillway crest;
- Complete a dam break analysis for the dam assuming the maximum water level at reservoir capacity (corresponding to the PMF event) in the dam;
- Prepare flood inundation and evacuation maps for each of the three above scenarios, Maps will be prepared in accordance with OSE GIS mapping requirements.
  - The flood inundation mapping will need to extend from the dam downstream to the Dona Ana Drain. Based on the flood inundation limits, the agencies and service providers that need to be notified will be determined and a notification flowchart will be prepared. Similarly, emergency responsibilities will be established and the preparedness plan will be developed.
  - In addition, the EAP needs to address the modification to the dam by development. Analysis of the dam will need to reflect the modifications. As-built plans for the dam will also be done.
  - Work will not begin on the EAP report until the OSE has reviewed and approved the hydrologic and dam breach analyses. A draft EAP will be prepared and submitted to the City for review. Upon City concurrence the EAP will then be submitted to the OSE for review and approval.

*Deliverables:*

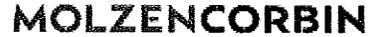
- 1 Hydrologic analysis for review and approval by the OSE
- 2 Dam breach analysis for review and approval by the OSE
- 3 Inundation and evacuation maps for review and approval by OSE
- 4 Three digital copies of the EAP report (on CD) including all appendices.
- 5 Ten hard copies of the EAP report including all appendices,

**Note: OSE project review references and checklists for both O&M and EAP are on the below site under Dam Safety links.**

[http://www.ose.state.nm.us/water\\_info\\_dam\\_safety.html](http://www.ose.state.nm.us/water_info_dam_safety.html)

**The complete O&M and EAP will be submitted at one time.**

City of Las Cruces, New Mexico  
 Sandhill Arroyo Dam, Dona Ana County, Office of the State Engineer (OSE)  
 File D-282



Proposal for Preparation of O&M Manual and Emergency Action Plan

January 15, 2014

		JP	CD	WK	JR	GDLT	LP	
		Principal Engineer	Senior Engineer	Project Manager	Engineer Intern	Eng. Technician	Administrative	
Operation & Maintenance Manual	1	General Information	2		8	24	2	
	2	Operation Instructions	2		16	24	16	2
		Reservoir Operation						
	3	Outlet Works						
		Instrumentation	2		16	24		2
		Monitoring Equipment						
	4	Roles and Responsibilities						
		Security	2		16	24		2
		Site Security					16	
	5	Vulnerability						
		Maintenance Requirements	2		16	24		2
		Physical Assets						
	6	Vegetation/Vector						
		Inspection Requirements	2		16	24		2
Updates & Revisions				2	16		2	
8	Appendices			16	40	16	8	
	Dam Data							
	Forms							
9	QA/QC	6	32	4	4			
Emergency Action Plan	1	Notification Flowchart	2		16	16	16	
	2	Emergency Detection, Eval., Class.	2		16	16	2	
	3	Emergency Responsibilities	2		16	16	2	
	4	Preparedness Plan	2		16	32	2	
	5	Evacuation Map	4		16	32	24	2
	6	Inundation Maps	8		100	70	40	
		PMF (6-hr, 24-hr, 72-hr)						
		Determine PMF Flood Limits						
		Dam Break Analysis						
	7	Inundation & Evacuation Maps						
QA/QC		6	32	4	4			
General Tasks	1	Contract Management	8		8			
	2	Coordination with Agencies	6		8	40	4	
	3	Data Gathering	2		16	32		
	4	Review Meetings (3)	6		8	18		
	5	Preparation of Deliverables			2	16	16	32
	6	Distribution of Deliverables			2			8
Total Hours		66	64	338	496	144	74	
Billing Rate		\$ 175.00	\$ 170.00	\$ 140.00	\$ 95.00	\$ 110.00	\$ 65.00	
Labor Amount		\$ 11,550.00	\$ 10,880.00	\$ 47,320.00	\$ 47,120.00	\$ 15,840.00	\$ 4,810.00	

CONTRACT AMOUNT

	Unit	Quantity	Rate	Amount
Total Labor Amount				\$ 137,520.00
Mileage	Per Mile	700	\$ 0.56	\$ 392.00
In-House Copies	Each	1,250	\$ 0.12	\$ 150.00
Commercial Copies	Each	2,500	\$ 0.10	\$ 250.00
24x36 Prints	Each	125	\$ 3.25	\$ 406.25
Workshop Host	LS			\$ 500.00
Supplies (Binders, photos...)	LS			\$ 251.75

TOTAL PROPOSED FEE (exclusive of NMGR)

\$ 139,470.00



SCOTT A. VERHINES, P.E.  
STATE ENGINEER

DAM SAFETY BUREAU  
CONCHA ORTIZ Y PINO BLDG  
P.O. BOX 25102  
SANTA FE, NEW MEXICO 87504  
(505) 827-6122  
(505) 476-0220 FAX

STATE OF NEW MEXICO  
OFFICE OF THE STATE ENGINEER  
Santa Fe

December 11, 2013

**RECEIVED**

DEC 17 2013

CITY OF LAS CRUCES  
PUBLIC WORKS DIRECTOR

Loretta Reyes, P.E., Public Works Director  
Public Works Department  
City of Las Cruces  
700 North Main Street  
Las Cruces, NM 88004

**RE: Inspection of Sand Hill Arroyo Dam, Dona Ana County, OSE File No. D-282**

Dear Ms. Reyes:

On October 28, 2013, James D. Head, P.E., of the Office of the State Engineer (OSE) staff inspected Sand Hill Arroyo Dam. A copy of Mr. Head's inspection memorandum and inspection checklist are enclosed for your information. I concur with the required actions contained in the memorandum. A copy of the OSE paper "Vegetation Management on Dams" will be sent to Mr. Peter Bennett of your staff via email for his information and use.

Sand Hill Arroyo Dam has been assessed as being in "poor" condition due to the lack of a comprehensive design report documenting critical analysis parameters; otherwise a rating of "fair" would have been appropriate due to inadequate spillway capacity. The condition rating is based on definitions developed by the Federal government as part of the National Dam Safety Program and adopted by the OSE.

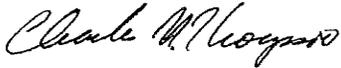
An Operation and Maintenance (O&M) Manual and Emergency Action Plan (EAP) are required for Sand Hill Arroyo Dam. Amendments to 19.25.12.17 NMAC no longer require an engineer to prepare the non-engineering elements of an O&M Manual. With regards to the EAP, the City of Las Cruces is capable of preparing the majority of the EAP document in advance of the required engineering input. The City of Las Cruces was advised of the need to prepare these documents in 2008 and 2011. Please notify this office in writing by February 28, 2014 of a proposed schedule for preparation of an EAP and O&M Manual. The DACFC should be aware of the added liability if Sand Hill Arroyo Dam fails while out of compliance with the OSE rules and regulations for dams.

If further discussion would be helpful, please contact James Head at (505) 383-4138 or me at (505) 383-4134.

~~Ms. Keretta Reyes~~  
~~Mr. Michael Johnson~~  
City of Las Cruces

December 11, 2013  
Page 2 of 2

Sincerely,



Charles N. Thompson, P.E.  
Dam Safety Bureau Chief

jdh:cnt

Enclosures

Email: Peter Bennett, Engineering Technician ([pbennett@las-cruces.org](mailto:pbennett@las-cruces.org))  
John Gwynne, P.E., DACFC ([johngw@donaanacounty.org](mailto:johngw@donaanacounty.org))

**MEMORANDUM**  
**OFFICE OF THE STATE ENGINEER**  
 Dam Safety Bureau

**DATE:** November 6, 2013

**TO:** Charles N. Thompson, P.E., Chief, Dam Safety Bureau *CNT*

**FROM:** James D. Head, P.E., Dam Safety Engineer Manager

**SUBJECT:** Inspection of Sand Hill Arroyo Dam, Doña Ana County, OSE # D-282

On October 28, 2013, I inspected Sand Hill Arroyo Dam. Observations made during the inspection are shown on the attached Inspection Checklist. Required actions for the dam owner are listed below.

**Required Actions**

1. Maintain the embankment slopes, abutments, and spillway free of woody vegetation in accordance with the OSE document "Vegetation Management on Dams".
2. Maintain the area around the outlet works intake structure free of vegetation and debris to allow the unimpeded flow of water into the outlet conduit.
3. Submit design plans for the alterations made to the outlet works intake structure.
4. Continue to implement proactive rodent abatement measures and collapse and backfill burrows with compacted soils similar in consistency to the embankment material.
5. Continue to repair erosion rills and gullies on an as needed basis on the embankment slopes and at the abutment contacts. Also remove sediment as it accumulates to restore the original reservoir contours. Sediment removal must not change the geometry of the dam or spillway or alter the dam and the associated appurtenant structures.
6. Update the OSE on the status of scheduling an interior inspection of the outlet works conduit. Dams of this size and type should have the interior of the outlet conduit inspected on a minimum ten year frequency if no problems are identified. There is no record of an inspection being performed since the original construction. The inspection must be performed by a qualified civil engineer licensed in New Mexico or a qualified contractor and a copy of the inspection report must be provided to the OSE Dam Safety Bureau. The inspection report must include video or properly formatted and captioned still frame images of the interior of the outlet conduit.
7. Survey the monuments located on the dam crest and verify that total freeboard on the reservoir has not been impacted. Total freeboard is the elevation difference between the dam crest and the open channel spillway crest. The survey data will need to be properly formatted and provided to the OSE Dam Safety Bureau.
8. Update the OSE Dam Safety Bureau on the status of preparing an Operation and Maintenance (O&M) Manual and Emergency Action Plan (EAP). The dam is classified as high hazard potential and the deadline for submitting the documents has passed. The

documents must be prepared to satisfy the requirements Subsections E and F of 19.25.12.21 NMAC.

9. An updated hydrologic and flood routing analysis is required and may be performed as part of the preparation of the forthcoming Emergency Action Plan for this dam. It is noted that the previous hydrologic analysis did not properly implement the methodology prescribed in the Hydrometeorological Report (HMR) 55A for determination of the governing Probable Maximum Precipitation event. This, in combination with additional urbanization that has occurred in the drainage basin upstream of the dam warrants an updated analysis.

#### **Compliance with Rules and Regulations**

There is currently no Operation and Maintenance (O&M) Manual or Emergency Action Plan (EAP) on file with OSE Dam Safety Bureau for this structure. Subsections E and F of 19.25.12.21 require dams classified as High Hazard Potential such as this to have an approved O&M Manual and EAP. The owner was advised of this requirement in 2008 and 2011.

#### ***Spillway Capacity***

The structure is classified as a high hazard potential structure, therefore the spillway design flood is the flood discharge corresponding to the governing (either the 6-hour Local or 72-Hour General Storm) Probable Maximum Precipitation event. From a review of the 1997 Sandhill Arroyo Dam Spillway Modification Report (specifically Pages 7 through 9) it appears that the spillway design storm (SDF) was incorrectly calculated. That is, Page 7 of the report indicates that the peak inflow from the SDF is 32,540 cfs based on a 24-hour, 10 square mile General Storm PMP event using HMR 55A. As described in Section 9 of the OSE *Hydrologic Analysis for Dams* document, HMR 55A does not include procedures or allowances for storm durations less than the complete storm, such as a 1-hour thunderstorm or a 24-hour general storm, that is, the more critical of the 6-hour Local or 72-hour General PMP events must be assigned as the SDF. The previous three OSE inspection memoranda have cited the spillway for this dam as having a capacity of 56 percent of the flood discharge corresponding to the Probable Maximum Precipitation (PMP) event. This clearly demonstrates that the spillway is undersized for the SDF for a high hazard potential dam, however, given that the aforementioned spillway design report did not properly implement the PMP derivation from HMR 55A, the actual capacity of the spillway as a percentage of the SDF has not been determined. A cursory level analysis using the USACE Envelope PMF Curve for the Albuquerque District indicates that peak discharge for a 12.8 square mile drainage basin is about 28,160 cfs. Page 8 of the aforementioned report indicates that spillway capacity at the elevation of the dam crest is 18,250 cfs, thus the inference can be made that spillway capacity is about 65 percent of the PMF as determined from the USACE Envelope Curve. Given that the previous PMP analysis does not adhere to the HMR 55A methodology or to the methodology prescribed in the OSE *Hydrologic Analysis for Dams* document and that additional development has encroached into the drainage basin for Sand Hill Arroyo Dam, an updated hydrologic and flood routing analysis for the structure is required. The updated analysis can be used to support flood inundation mapping that will need to be prepared for a forthcoming Emergency Action Plan for the dam.

***Design and Construction Documentation***

The following design and construction related documents are on file with the OSE for this dam:

- 1955 As-Let Construction Drawings
- 1979 Phase 1 Dam Safety Inspection Report
- 1997 Geotechnical Report
- 1997 Spillway Modification Report
- 1997 Modification As-Let Construction Drawings

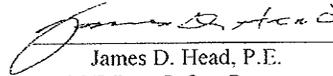
There is no comprehensive design report on file with the OSE and it is not apparent that the available documents provide detailed analysis and computations to support the overall design of the dam. Items related to the overall design include, but are not limited to, an updated hydrologic and flood routing analysis of the dam, comprehensive geotechnical computations and analysis including embankment stability and seepage, and structural aspects of the dam and appurtenant structures. The services of an engineer, licensed in New Mexico, with experience in the design of dams will need to be retained to prepare an assessment of the dam that addresses the items listed above. Because of the limited documentation, uncertainties exist as to critical analysis parameters for Sand Hill Arroyo Dam.

**Inspection Findings*****Overall Dam Condition***

Based on the cursory review of the documentation and the field inspection, Sand Hill Arroyo Dam is in "Poor" condition. According to 2008 Federal Dam Safety Condition Assessment terminology, "Poor condition is used when a dam safety deficiency is recognized for loading conditions which may realistically occur. Remedial action is necessary. A poor condition may also be used when uncertainties exist as to critical analysis parameters, which identify a potential dam safety deficiency. Further investigations and studies are necessary". The rating of "poor" is a result of the uncertainties involving the lack of a design report on file with the OSE to verify the design assumptions, otherwise a fair rating would have been appropriate due to the inadequate spillway capacity.

***Hazard Potential Classification***

The hazard potential classification for Sand Hill Arroyo Dam is high. The classification is appropriate.



James D. Head, P.E.  
OSE Dam Safety Bureau

New Mexico Office Of The State Engineer  
Dam Safety Bureau  
Inspection Checklist

County: Dona Ana	Dam Name: Sand Hill Arroyo Dam	OSE No.: D-282	Fed ID No.: NM00282
Inspection Performed By: James Head		Inspection Date: 10-28-13	Last Inspection Date: 10-29-10
Owner Name: City of Las Cruces	Owner Address: P.O. Box 20000 Las Cruces, NM 88004	Owner Contact: Mr. Michael Johnson  Contact Phone No.: 575-528-3333	
Purpose of Dam: Flood Control	Hazard Class: High	Hazard Class Appropriate: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Dam Location: W. of Sonoma Ranch Blvd., ~.5 mi. north of US 70 and ~ 2 miles east of Interstate 25.		Latitude: 32.3807°	Longitude: -106.7409°
Weather: Warm, breezy, dry		Attendees: Peter Bennett (City of LC), John Gwynne (DACFC)	

1. General Conditions	Satisfactory	Needs Attention	N/A	Remarks:
a. Access for O & M	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
b. Unauthorized access restricted	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Access unrestricted.
c. No unauthorized alterations	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	OSE records indicate the reservoir has been altered by development. No information has been provided to the OSE regarding impacts. This also seems to apply to the outlet works intake structure.

2. Upstream Slope	Satisfactory	Needs Attention	N/A	Remarks:
a. Erosion control	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Monitor and repair erosion as it occurs.
b. Woody vegetation control	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
c. Rodent control	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Maintain abatement program.
d. Distortion or cracking	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
e. Upstream wave protection	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

3. Dam Crest	Satisfactory	Needs Attention	N/A	Remarks:
a. Erosion control	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Monitor and replace any material lost to wind and water erosion.
b. Woody vegetation control	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
c. Rodent control	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
d. Distortion or cracking	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

4. Downstream Slope	Satisfactory	Needs Attention	N/A	Remarks:
a. Erosion control	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Repair erosion gullies.
b. Woody vegetation control	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Remove woody vegetation per OSE guidelines.
c. Rodent control	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Continue to implement abatement program.
d. Distortion or cracking	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
e. Seepage control	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

5. Downstream Area	Satisfactory	Needs Attention	N/A	Remarks:
a. Erosion control	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
b. Woody vegetation control	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Remove woody vegetation per OSE guidelines.
c. Rodent control	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
d. Distortion or cracking	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
e. Seepage or boils	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
f. Drains or Wells	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Est. gpm

Dam Name: Sand Hill Arroyo Dam

Inspection Date: 10-28-2013

File No. D-282

6. Abutment Contacts	Satisfactory	Needs Attention	N/A	Remarks:
a. Erosion, cracks, or slides	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Monitor and repair as needed.
b. Woody vegetation	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
c. Distortion or cracking	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
d. Seepage	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
e. Drains or Wells	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
			Est. gpm	None

7. Reservoir	Satisfactory	Needs Attention	N/A	Remarks:
a. Developed/Encroachment	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Residential development occurring around reservoir and in drainage basin. No information has been provided to OSE regarding impacts.
b. Banks and slopes stable	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Monitor and repair as erosion occurs.
c. Obstruction or debris	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
d. Sediment level				Approximately at the invert of the third row of ports from the top of the intake structure.
e. Water level				Dry.

8. Intake Structure	Type of Structure: Concrete vault with ported sides and top grate. Appears to have been modified since the 2010 dam safety inspection. More ports, possibly a newer structure.			Remarks:
	Satisfactory	Needs Attention	N/A	
a. Concrete condition	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
b. Reinforcement encasement	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
c. Coating adequacy	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
d. Leakage	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
e. Trash rack condition	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
f. Inlet unobstructed	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Clear debris intake ports.
g. Gates operative	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Ungated.
h. Woody vegetation	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Maintain area around inlet free of vegetation to prevent clogging.
Number of intake ports	27	Number of ports open	21	

9. Outlet Conduit	Type of Conduit: 24" RCP and CMP			Estimated Discharge:
	Interior inspection: Yes <input type="checkbox"/> Date			No <input checked="" type="checkbox"/>
	Satisfactory	Needs Attention	N/A	Remarks:
a. Overall Condition	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Interior inspection required.
b. Condition of surfaces	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Buried conduit, overall inspection not performed.
c. Reinforcement encasement	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Buried conduit, overall inspection not performed.
d. Clear of obstructions	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Buried conduit, overall inspection not performed.
e. Joint Condition	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Buried conduit, overall inspection not performed.
f. Leakage	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Buried conduit, overall inspection not performed.
g. Alignment	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Buried conduit, overall inspection not performed.

10. Outfall & Outlet Channel	Satisfactory	Needs Attention	N/A	Remarks:
a. Erosion	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
b. Obstructions or debris	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
c. Erosion protection	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Woody vegetation control	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Dam Name: Sand Hill Arroyo Dam

Inspection Date: 10-28-2013

File No. D-282

11. Emergency Spillway	Satisfactory	Needs Attention	N/A	Remarks:
a. Clear of obstructions	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
b. Condition of entrance	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
c. Condition of control section	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
d. Condition spillway floor	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
e. Condition of walls or slopes	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
f. Condition of joints	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
g. Energy dissipation	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
h. Condition of exit channel	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
i. Seepage control	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
j. Erosion control	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
k. Rodent control	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
l. Woody vegetation control	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
m. Capacity	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	SDF if the flood discharge corresponding to the full governing PMP event. Previous inspection reports indicate spillway is capable of passing approximately 56% of the USACE Envelope Curve PMF event.

12. Instrumentation	Satisfactory	Needs Attention	N/A	Remarks:
a. Structure instrumented	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Survey monuments on crest
b. Monitoring performed	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	No monitoring data on file
c. Piezometers	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
d. Settlement monuments	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	No monitoring data on file
e. Other	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

<b>Overall Remarks:</b>	<ol style="list-style-type: none"> <li>1) Maintain embankment slopes, the spillway approach channel, and the area immediately downstream of the dam free of woody vegetation in accordance with the OSE Vegetation Management Guidelines for Dams. It is unacceptable to use a dragline to remove woody vegetation.</li> <li>2) Maintain the outlet works free of debris and obstructions.</li> <li>3) Continue to implement a rodent abatement program.</li> <li>4) Monitor embankment erosion and repair on an as needed basis.</li> <li>5) Schedule an interior inspection of the outlet conduit by a qualified individual.</li> <li>6) Survey the monuments on the dam crest and provide the OSE Dam Safety Bureau with a copy of the readings.</li> <li>7) It is not apparent if the residential development occurring in the drainage basin was considered in the hydrologic analysis for the 1997 modification to the structure. An updated hydrologic and hydraulic analysis for the dam is required and will need to be provided to the OSE Dam Safety Bureau for review.</li> </ol>
-------------------------	---

Date: 11/6/2013  
 Signature: 