

**EMERGENCY ACTION PLAN FOR
LINED ASH IMPOUNDMENT AND
LINED DECANT WATER POND
NMOSE FILE NOS. D-634 AND D-635
FOUR CORNERS POWER PLANT
SAN JUAN COUNTY, NEW MEXICO**

**Prepared for
ARIZONA PUBLIC SERVICE
COMPANY**

**Prepared by
AECOM
Revision 2: February 2017
Revision 3: January 2020**

**EMERGENCY ACTION PLAN
FOR
LINED ASH IMPOUNDMENT (LAI) AND
LINED DECANT WATER POND (LDWP)**

Dam Location:
San Juan County, New Mexico

Township, Range and Section:
T29N, R16W, Section 34

Latitude and Longitude:
Latitude 36° 41' 24" and Longitude -108° 30' 36"

Dam Owner and Operator:
Arizona Public Service Company
Four Corners Power Plant
Telephone: (505) 598-8405
Fax: (505) 598-8339

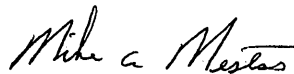
AECOM
Phoenix, Arizona

February 2017



William Clifton
Engineering Manager, Four Corners Power
Plant,
Arizona Public Service

4-3-2017
Date



Mike Mestas
San Juan County
Office of Emergency Management

3-9-17
Date

EMERGENCY ACTION PLAN
LINED ASH IMPOUNDMENT AND LINED DECANT WATER POND
FOUR CORNERS POWER PLANT
NMOSE File Nos. D-634 and D-635
SAN JUAN COUNTY, NEW MEXICO

DAM OWNER'S CERTIFICATION

I, David A. Hansen, being first duly sworn, upon my oath, state that I am the Vice-President (officer) of Fossil Generation of Arizona Public Service Company, a corporation duly organized under the laws of the state of Arizona, that the accompanying Emergency Action Plan for the Lined Ash Impoundment and Lined Decant Water Pond at the Four Corners Power Plant near Farmington, New Mexico, was made under authority of the board of directors of said corporation and that, in their behalf, I have read and examined the statements and representations and all that is shown herein is done with their free consent and in accordance with their wishes and state that the same are true and correct to the best of my knowledge and belief.

David A. Hansen

David A. Hansen, Vice-President

3/20/2017

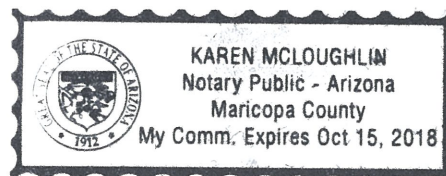
Date

Subscribed and sworn to before me this 20th day of March, 2017

Karen McLaughlin

Notary Public

My commission expires (seal)



EMERGENCY ACTION PLAN
LINED ASH IMPOUNDMENT AND LINED DECANT WATER POND
FOUR CORNERS POWER PLANT
NMOSE File No. D-634 and D-635
SAN JUAN COUNTY, NEW MEXICO

ENGINEER'S CERTIFICATE

I, Alexander W. Gourlay, hereby certify that I am a professional engineer licensed in the state of New Mexico, qualified in civil engineering; that the accompanying Emergency Action Plan for the Lined Ash Impoundment and the Lined Decant Water Pond was prepared by me or under my supervision; that the accompanying Emergency Action Plan is in compliance with the Dam Design, Construction and Dam Safety Regulations (19.25.12 NMAC) and that the same are true and correct to the best of my knowledge and belief.

Alexander W. Gourlay, License Number NM 19846, (seal)

Alexander W. Gourlay, PE

Date: 2-22-17



OFFICE OF EMERGENCY MANAGEMENT'S CERTIFICATION

I hereby certify that the accompanying Emergency Action Plan for the Lined Ash Impoundment and the Lined Decant Water Pond has been duly examined by me and accepted for filing on the _____ day of _____, 20__.

Susan Walker

The New Mexico Department of Homeland Security
and Emergency Management

STATE ENGINEER'S CERTIFICATE

I hereby certify that the accompanying Emergency Action Plan for the Lined Ash Impoundment and Lined Decant Water Pond and appurtenant structures has been duly examined by me and accepted for filing on the 19TH day of FEBRUARY, 2020.

Charles Thompson

Fe State Engineer

Certification Statement 40 CFR § 257.73 (a)(3) – Structural integrity criteria for existing CCR surface impoundments. – Emergency Action Plan (EAP)

CCR Units: Arizona Public Service, Four Corners Power Plant; Lined Ash Impoundment and Lined Decant Water Pond

I, Alexander W. Gourlay, being a Registered Professional Engineer in good standing in the State of New Mexico, do hereby certify, to the best of my knowledge, information, and belief, that the information contained in this certification has been prepared in accordance with the accepted practice of engineering. I certify, for the above-referenced CCR Units, that the Emergency Action Plan meets the requirements of 40 CFR § 257.73(a)(3).

ALEXANDER W. GOURLAY

Printed Name

February 22, 2017

Date

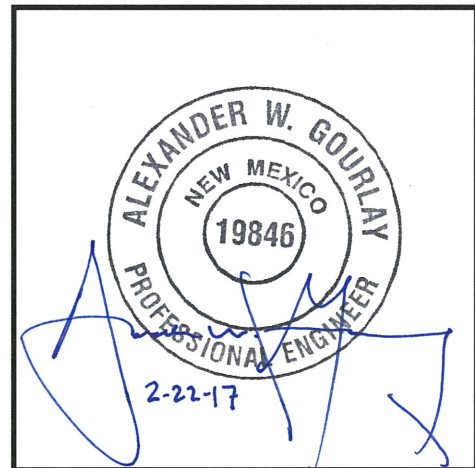


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D	Media Announcement
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RECORD OF REVISIONS AND UPDATES

Revision Number	Date	Revisions Made	By Whom
1	June 2011	1) Modified format to address regulatory comments 2) Added a statement addressing how to handle the environmental aspects of a release 3) Added NMOSE file numbers for the dams and signatures for responsible persons from APS and San Juan County 4) Revised certification language 5) Added Section 1 – Basic EAP Data 6) Revised the Emergency Detection, Evaluation, and Classification guidance section 7) Revised alert notification language and added the Green Alert notification, moved notifications and communications from Section 3 to Section 4 8) Revised the termination responsibilities 9) Elevation-capacity curves from the 2009 Revised Breach Analysis added to Appendix E	URS
2	February 2017	1) Major revision to comply with EPA CCR regulations (40 CFR § 257.73(a)(3)) 2) Updated Elevation-Capacity curves for the 5280 Lift of the LAI	AECOM
3	January 2020	1) Moved all Drawing Exhibits into Appendix E 2) Added Record of Revisions and Updates 3) Added Record of EAP Exercises 4) Added footer to Section 1 5) Revised contacts and telephone numbers 6) Added requirement in Section 3.7 to verify and update contact names and numbers annually 7) Added the NWS Albuquerque and CBRFC SLC offices to the EAP Distribution List (Table 6-1) 8) Minor text changes for consistency with the above changes	AECOM

RECORD OF EAP EXCERCISES

Exercise Type	Date	Comments	By Whom
Tabletop	12/21/2017	Annual face-to-face meeting between APS and local emergency response agencies.	APS and local emergency response agencies
Tabletop	12/05/2018	Held at the San Juan County Fire Operations Center	APS and local emergency response agencies
Tabletop	12/04/2019	Annual face-to-face meeting between APS and local emergency response agencies.	APS and local emergency response agencies

1.0 BASIC EAP DATA

1.1 STATEMENT OF PURPOSE

The following document presents the Emergency Action Plan (EAP) for the two Coal Combustion Residual (CCR) Impoundments: the Lined Ash Impoundment (LAI) and the Lined Decant Water Pond (LDWP) at the Four Corners Power Plant (FCPP). This EAP prepared for the LAI and LDWP is a formal document that identifies potential emergency conditions that could develop at the LAI and LDWP, provides a plan for communication of the conditions, and specifies preplanned actions to be followed to minimize property damage and loss of life. This EAP also provides procedures and information to assist the owner in issuing early warning information of the emergency situation to responsible emergency management authorities. The **notification flow charts** and **evacuation maps** follow this section (see tabs). The notification flow charts provide the notification sequence to follow for the three emergency response levels. The evacuation maps provide the emergency managers with an identification of the critical areas located within the area of inundation from the LAI and LDWP release. Overall, the purpose of the EAP is threefold:

- Safeguard the lives and to reduce property damage of the citizens living within the LAI and LDWP potential flood or inundation area.
- To provide effective plans for surveillance of the LAI and LDWP, prompt notification to local emergency management agencies, and citizen warning and evacuation response when required.
- To assign emergency actions to be taken by the dam operator/owner, public officials, emergency personnel, and to outline responsibilities of each party involved in the emergency management process in the event of a potential or imminent failure of the LAI and LDWP.

1.2 POTENTIAL IMPACTED AREA

The impacted area is located along the banks of the Chaco River, directly adjacent to and north of the FCPP to its confluence with the San Juan River.

- The N36 Bridge may be impacted by the inundation and should be closed to traffic in the event of a Red Alert Emergency Condition at the LAI and/or LDWP.

- Three residential structures along the Chaco River are not in the area of inundation, but are in proximity and therefore should be evacuated as a precaution in the event of a Red Alert Emergency Condition at the LAI and/or LDWP.

Please refer to the **Evacuation Maps (Figures 1-3 and 1-4)** for more detail of the expected impacted area to be evacuated and known structures within this area.

1.3 SITE DESCRIPTION

The LAI and LDWP are located in Northwestern New Mexico, in San Juan County, on the Navajo Indian Reservation (Section 34, Township 29 North, and Range 16 West). The LAI and LDWP are within the Four Corners Power Plant (FCPP), which is located approximately 6 miles southwest of Fruitland, New Mexico. The LAI and LDWP are accessible from U.S. Highway 64 via County Road 6675 near Fruitland, New Mexico. The project vicinity is shown in Figure 1-1. The following subsections provide general information about the LAI and LDWP.

Arizona Public Service Company (APS) constructed the LAI from 2003 to 2014 and the LDWP in 2003. APS and URS Corporation (URS) developed the design of the LAI and LDWP. There have been no major modifications or repairs to the LAI or LDWP since the end of construction for each respective dam. There have been no significant events such as flooding or earthquakes at the LAI or the LDWP.

1.4 DESCRIPTION OF LINED ASH IMPOUNDMENT AND LINED DECANT WATER POND

The LAI perimeter embankment is an earthen, zoned embankment dam consisting of compacted bottom ash and fly ash with a 15-foot wide compacted clayey soil blanket on the upstream slope. A single layer of high-density polyethylene (HDPE) geomembrane is on the base and upstream slopes of the LAI. The HDPE geomembrane overlies the compacted clayey soil on the upstream slope of the LAI embankments. The water within the LAI drains west, through two outlets, into the LDWP. The plan and profiles of the 5280 Lift of the LAI are shown on the Drawing Exhibits in Appendix E (Figures E-2A to E-2E). The description of the LAI is provided in Table 1-1. The storage area and capacity of the LAI are provided in Table 1-2.

Table 1-1 Description of the Lined Ash Impoundment (5280-Lift)

Purpose:	CCR Disposal
Type:	Earthen Embankment
Built:	2003-2014

Hazard Classification:	Significant (New Mexico Administrative Code)
State Identification:	D-634
Legal Description:	Lined Ash Impoundment
Owner:	Arizona Public Service
Location Coordinates:	Latitude: 36° 41' 06"; Longitude: -108° 30' 11"
Height:	107 feet
Crest Elevation:	5,280 feet above mean seal level (nominal elevation of West Embankment)
Crest Length:	6,400 feet
Crest Width:	30 feet (West Embankment), 20 feet (South Embankment)
Upstream Slope:	3 Horizontal : 1 Vertical (West Embankment), 2 Horizontal : 1 Vertical (South Embankment)
Downstream Slope:	3 Horizontal : 1 Vertical (West Embankment), 2 Horizontal : 1 Vertical (South Embankment)
Normal Operational Storage Capacity:	5,364 acre-feet
Maximum Storage Capacity:	5,986 acre-feet
Maximum Operating Level:	5275.2 feet above mean sea level
Gage Type:	Fly ash levels are surveyed with GPS equipment in two (2) locations (north end and south end) on a monthly basis
Outlets:	Two outlets along West Embankment: Drop Inlet Structure (gravity outlet) and Toe Drain (pumped outlet)

Table 1-2 Lined Ash Impoundment Storage Area and Capacity

Elevation (ft)	Area (acres)	Capacity (acre-ft)
5208	2	2
5228	71	969
5248	82	2530
5258	86	3456
5268	109	4546
5270	124.38	4718.29
5280	129.16	5986.02

The LDWP perimeter embankment is an earthen, zoned embankment dam. Along the northern and eastern sections, the embankment consists of compacted bottom ash with a 15-foot wide layer of compacted clayey soil on the upstream slope. Along the southern and western sections, the embankment consists entirely of compacted clay. The LDWP includes a double lined system

installed along the inside area of the pond. The double liner with integral leakage collection system consists of two layers of 60-mil HDPE liner with a 200-mil HDPE Geonet drainage material between the 60-mil HDPE sheets. The Geonet drainage material conveys any leaks in the primary liner to the leak collection sump located adjacent to the southwest corner of the LDWP. The description of the LDWP is provided in Table 1-3. The storage area and capacity of the LDWP is shown below in Table 1-4.

Table 1-3 Description of the Lined Decant Water Pond

Purpose:	Detention of water from Lined Ash Impoundment for reuse at the power plant
Type:	Bottom Ash Embankment
Built:	2003
Hazard Classification:	Significant (New Mexico Administrative Code)
State Identification:	D-635
Owner:	Arizona Public Service
Location Coordinates:	Latitude: 36° 41' 00"; Longitude: -108° 30' 37"
Height:	16 feet
Crest Elevation:	5,216 feet
Crest Length:	5,488 feet
Crest Width:	20 feet
Upstream Slope:	2 Horizontal : 1 Vertical
Downstream Slope:	1.5 Horizontal : 1 Vertical
Drainage Area:	45 acres (direct precipitation only)
Normal Operational Storage Capacity:	435 acre-feet
Maximum Storage Capacity:	517 acre-feet
Inlet of pipe from Lined Ash Impoundment:	One 8-inch diameter HDPE pipe and one 16-inch diameter HDPE pipe from the LAI Drop Inlet Structure, and one 8-inch diameter HDPE DR 11 pipe from the LAI Toe Drain.
Outlets:	One 6-inch diameter HDPE pipe to a return water pump (pumped outlet).
Invert of inlet for return water pumps:	5,206 feet
Maximum Operating Level:	Elevation 5,213.2 feet

Dead Storage Capacity:	517 acre-feet
Reservoir Gage:	Located 35 feet from toe of east embankment
Sediment in Storage:	none (not measurable; windblown sediment)
Sediment Storage Rate:	no sediment (only negligible amount that is windblown)
Date of most recent elevation-area-capacity survey:	2003 at the end of construction. The water level in the LDWP is recorded daily in plant logs.

Table 1-4 Lined Decant Water Pond Storage Area and Capacity

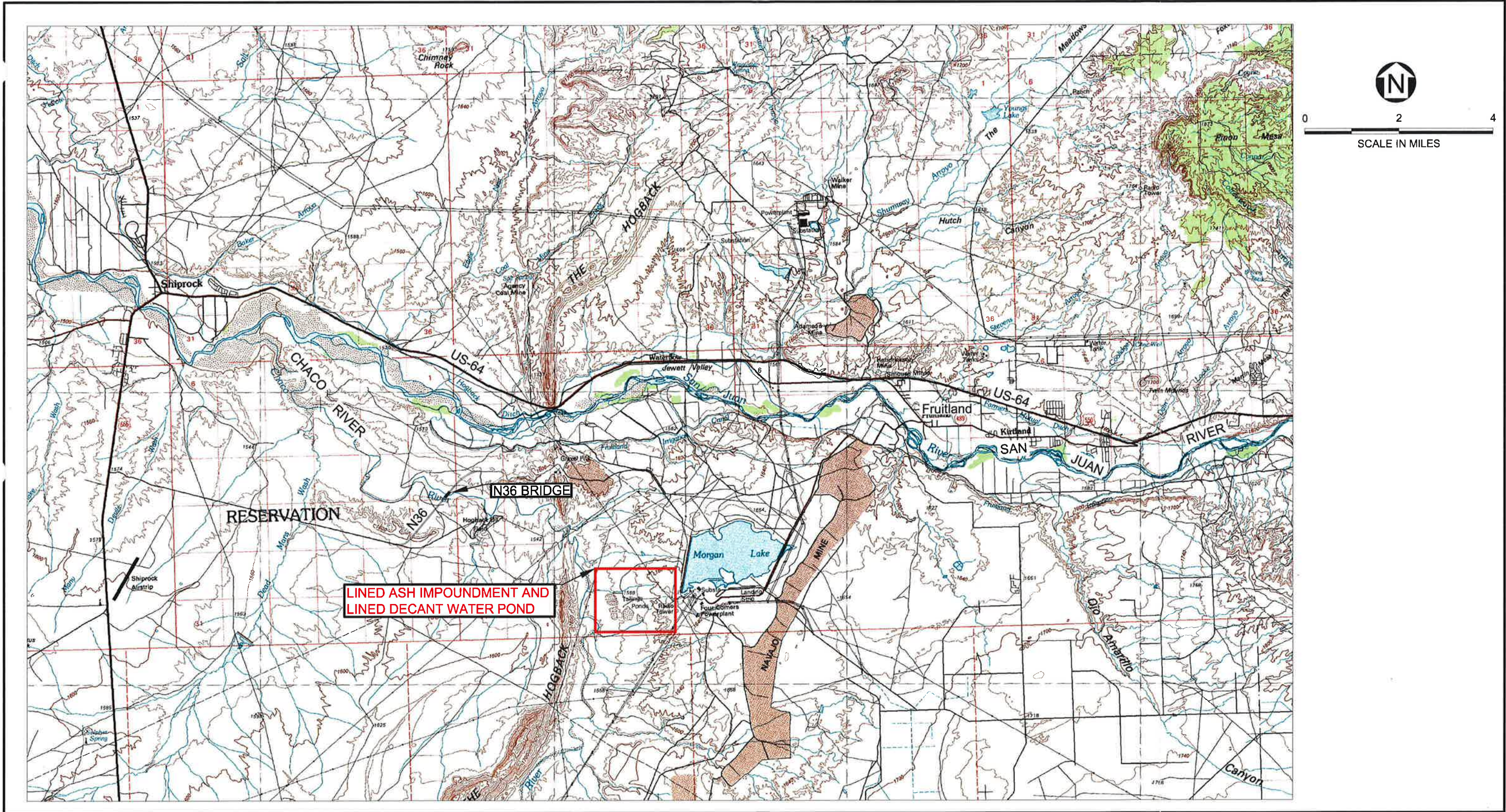
Elevation (ft)	Area (acres)	Capacity (acre-ft)
5206	40	120
5213.2	45	435
5216	46	517

Note: LDWP storage capacity information provided by Dam Owner's Certificate.

1.5 DIRECTIONS TO LAI AND LDWP

On US Highway 64, the turnoff to the Four Corners Power Plant is just west of mile marker 40. Turn South on County Road 6675 to the main gate of the Four Corners Power Plant. Location is approximately 8 miles along County Road 6675 (see Figure 4-1). Alternate access to County Road 6675 can be via Navajo Highway 36 (follow signs to Four Corners Power Plant).

The LAI and LDWP are located approximately 1 mile west-southwest of the power plant switchyard. There are two unpaved access roads. In event of an emergency, access to the LAI and LDWP will be facilitated and coordinated by the Emergency Coordinator.



Topography Provided By USGS: 30 X 60 Min Quadrangle Map, Farmington New Mexico - Colorado 1980.
National Geodetic Vertical Datum of 1929. Elevations shown are the nearest meter.
Contour Interval 20 meters.

Site Vicinity Map

1.6 EMERGENCY ACTION PLAN OVERVIEW

This EAP includes an identification of the extent of flood hazard in the event of a failure and structures at risk of damage from this flood. The Breach Analysis Report, which includes the details of the flood modeling analysis for the LAI and LDWP, is issued under a separate cover. This EAP directs emergency measures to known residential structures in the vicinity of the Chaco River (Figures 1-3 and 1-4). In addition, emergency management and response personnel should verify that no temporary or seasonal residences have been established within the floodplain. Figures 1-2A, B, and C show the notification flowcharts associated with the execution of this EAP.

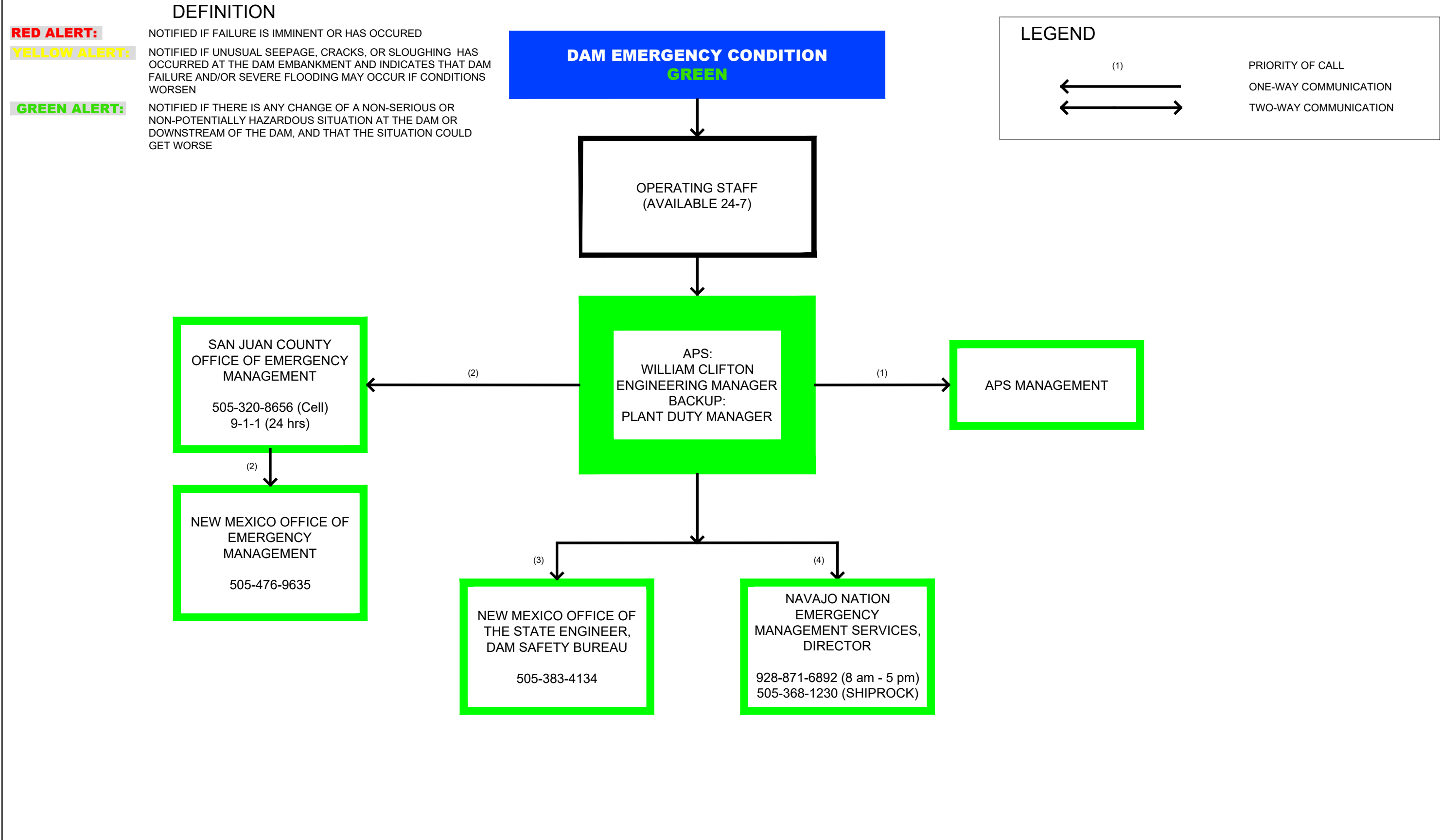
The five primary components of the LAI and LDWP EAP described in this document include:

Step	Primary Component	Expected Action		
1	Emergency Detection	Detection and Evaluation of Emergency Situation (see Section 2.0)		
2	Emergency Classification	Response Level Green : Unusual Event, Slowly Developing (see Section 2.2.1)	Response Level Yellow: Potential Dam Failure Situation, Rapidly Developing (see Section 2.2.2)	Response Level Red: Urgent, Dam Failure is Imminent or in Progress (see Section 2.2.3)
3	Notification and Classification	Alert Level Green Notification List (see Section 3.2)	Alert Level Yellow Notification List (see Section 3.2)	Alert Level Red Notification List (see Section 3.2)
4	Expected Actions	Refer to Table 4-1 (see Sections 3.0 and 4.0)		
5	Termination and Follow-up	See Section 3.4		

1.7 ACTIVATION CRITERIA

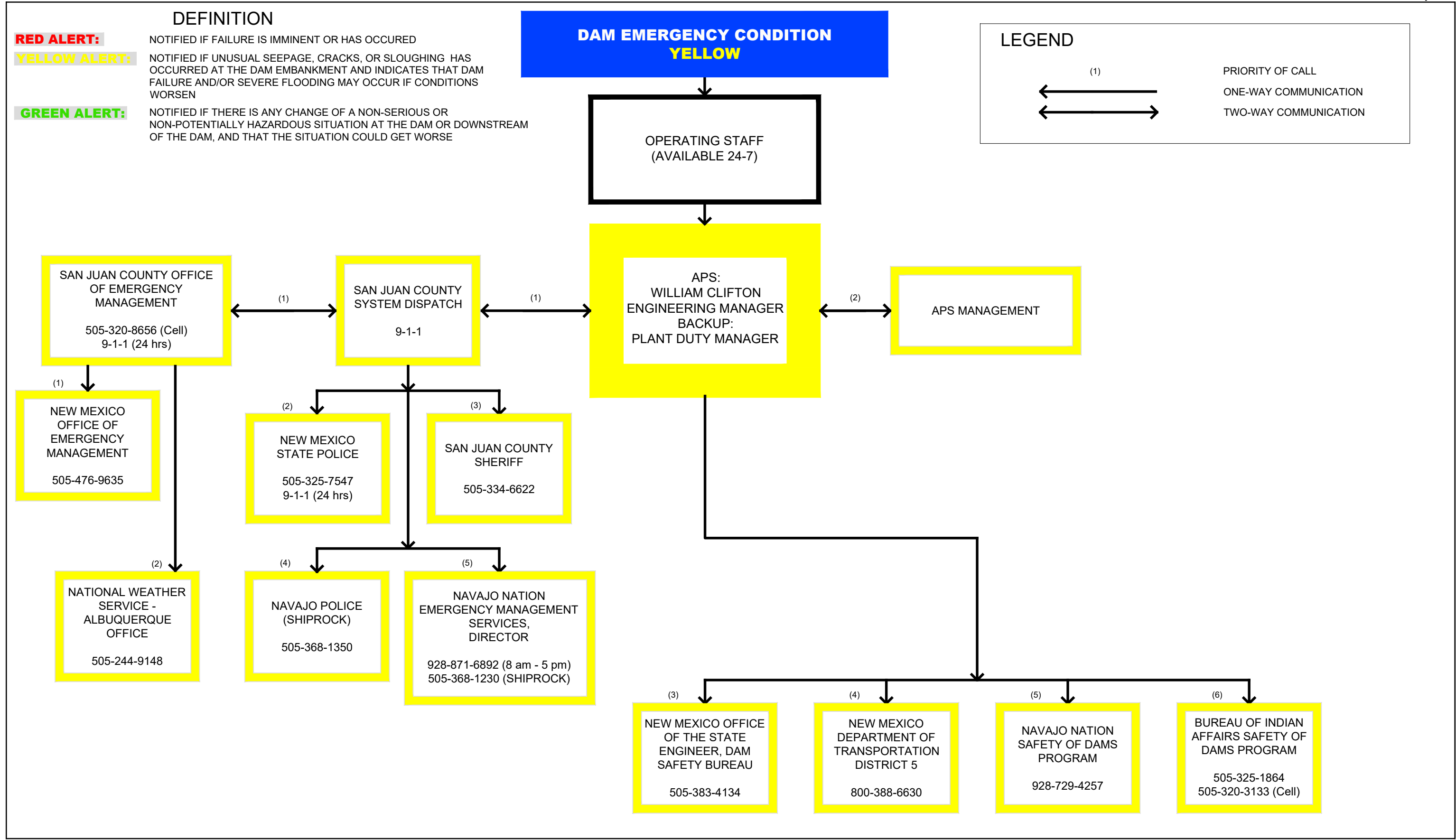
1. Unusual conditions at the LAI and/or LDWP are to be reported to the Engineering Manager or the Plant Duty Manager in the Engineering Manager's absence. This individual serves as the EAP Coordinator.
2. The EAP Coordinator (Engineering Manager) shall verify conditions at the LAI and/or LDWP facility, assign a monitor to the facility, and issue an alert if appropriate.
3. The EAP Coordinator (Engineering Manager) shall issue a Green Alert when there is something unusual happening at the facility and there may be potential for adverse impacts.

4. The EAP Coordinator (Engineering Manager) shall issue a Yellow Alert when there are significantly serious conditions confirmed at the facility such that these conditions could affect the integrity of the facility if left unresolved. The EAP Coordinator must initiate corrective measures to stabilize the facility. See Table 4-1, Emergency Action Guidelines (page 4-2).
5. The EAP Coordinator (Engineering Manager) shall issue a Red Alert when failure of the facility has occurred or is imminent.
6. The Notification Flowcharts shown in Figures 1-2A, B, and C identifies the notification sequence of emergency response personnel. See pages 3-2 through 3-7 for red, yellow, and green alert notification script.
7. Refer emergency response personnel to the evacuation mapping (Figures 1-3 and 1-4).
8. Appendix B provides forms for documentation of emergency events.



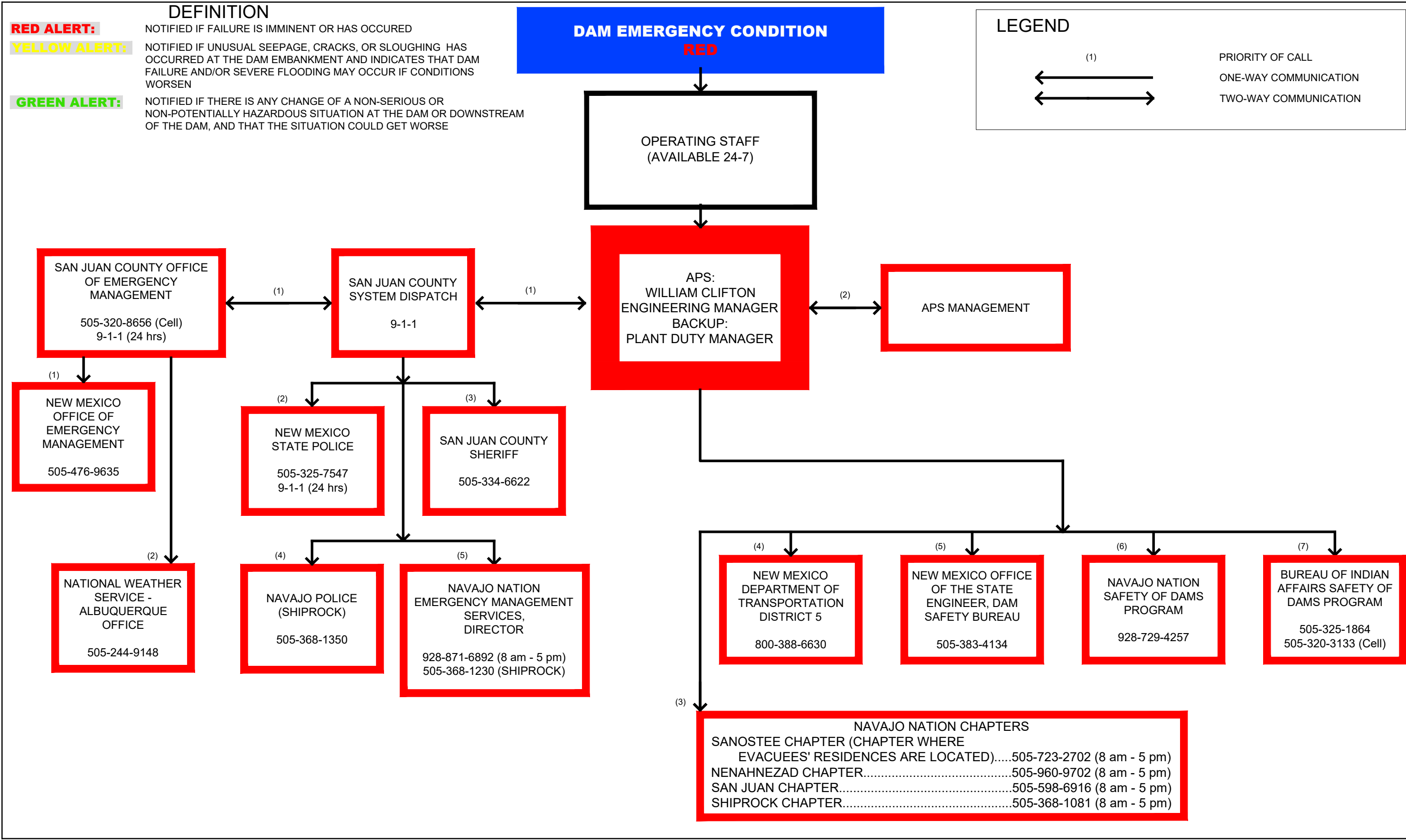
Green Alert Notification Flowchart

Figure 1-2A



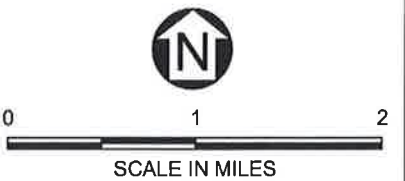
Yellow Alert Notification Flowchart

Figure 1-2B



Red Alert Notification Flowchart

Figure 1-2C



LEGEND

Evacuation Area

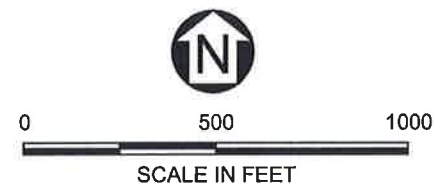
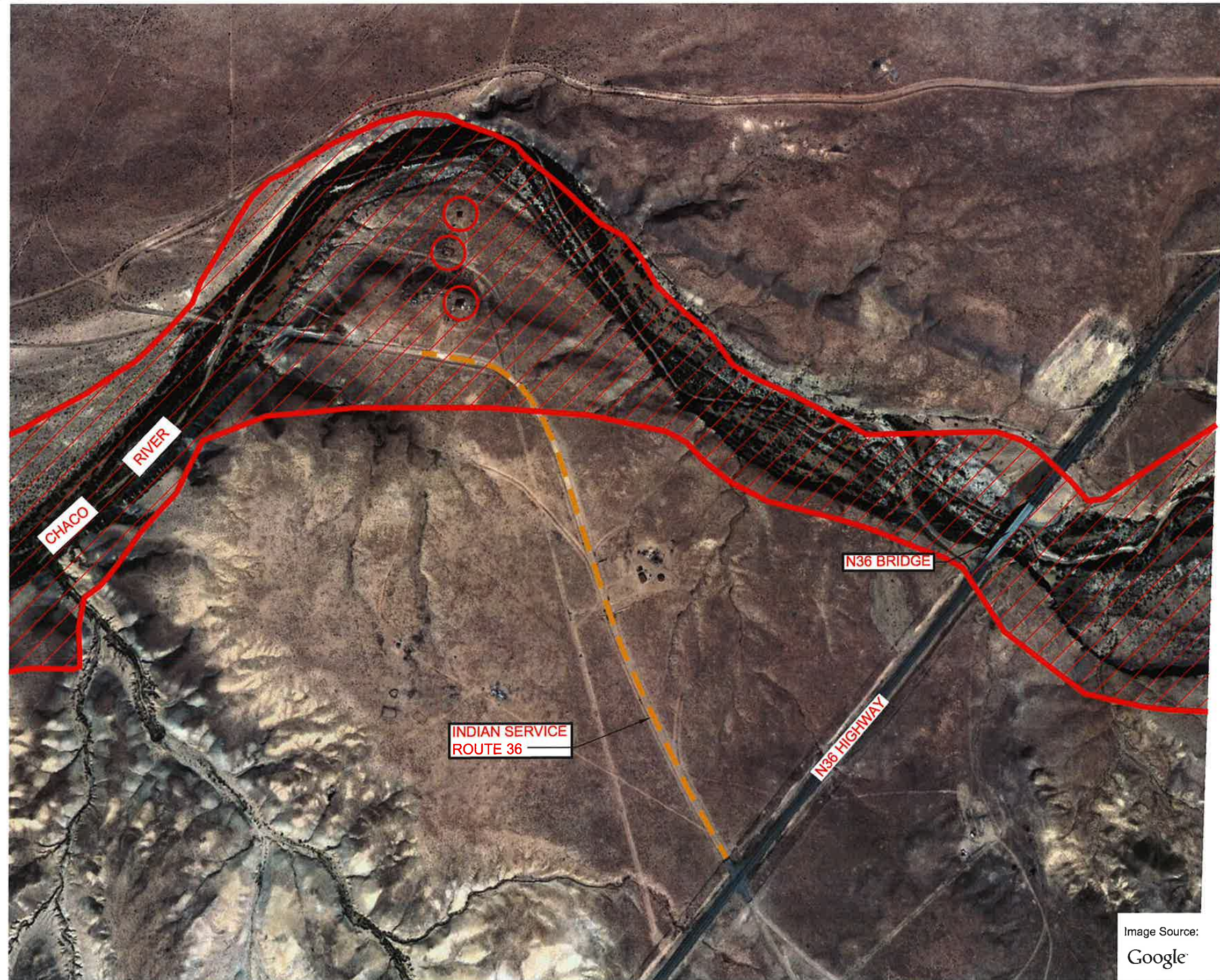
Notes:

REGION 1:
3 Residences
1 Bridge/Road Closure



1. 3 Residences Located on Indian Service Route 36
2. Bridge at Chaco River on N36 Highway to be Closed to Non-Emergency Traffic

REGION 2:
No Known Residences or Structures at Risk

Image Source:
Google



LEGEND

-  Existing House
-  Evacuation Area

Notes:

REGION 1:
3 Residences
1 Bridge/Road Closure

1. 3 Residences Located on Indian Service Route 36
2. Bridge at Chaco River on N36 Highway to be Closed to Non-Emergency Traffic

Location	Flood Wave Arrival Time	Flood Height Elevation
N36 Bridge	1 hour	5,007 feet

REGION 2:
No Known Residences or Structures at Risk

Image Source:
Google

2.0 EMERGENCY DETECTION, EVALUATION, AND CLASSIFICATION

2.1 EMERGENCY DETECTION AND EVALUATION

Early detection and evaluation of any emergency situation is crucial. The establishment of procedures for reliable and timely classification of an emergency situation is necessary in order to proceed with the appropriate course of action. It is better to activate the EAP while confirming the extent of the emergency than to wait for the emergency to occur. Some conditions involving the embankment, foundation, and structures of the LAI and/or LDWP that pose a potential emergency situation if not immediately detected and properly corrected are listed as follows:

- Settlement and subsidence
- High ash and/or water in the LAI and/or LDWP
- Elevated pore pressures in the foundation
- Sinkholes
- Cave-ins
- Seepage and boil
- Cracks in the embankment
- Slumping, Slides
- Erosion of embankment materials
- Movement of the drop inlet structure

Evaluation of these conditions must be immediate and should be followed by prompt corrective measures to avoid a worsening of the situation. Refer to the Decision Criteria Matrix for assistance in evaluation and classification of conditions. The discovery and/or detection of these conditions shall be relayed immediately to the EAP Coordinator (Engineering Manager).

2.2 EMERGENCY CLASSIFICATION

Definitions of Levels of Incident Severity

2.2.1 Response Level Green

- **SLOWLY DEVELOPING SITUATION**
- Something unusual is happening at the LAI and/or LDWP.
- There is the potential for impoundment breach.
- Current conditions are not serious, but could progress into a potential impoundment failure if it continues or intensifies.
- Initiate Level GREEN notifications (Flowchart: Fig 1-2A, GREEN phone list: p 3-3).

2.2.2 Response Level Yellow

- **RAPIDLY DEVELOPING SITUATION**
- Conditions are serious (more than a GREEN condition).
- Notify 24-hour operating staff (Refer to Notification Flowchart).
- The condition of the LAI and/or LDWP is becoming unstable.
- Initiate Level YELLOW notifications (Flowchart: Fig 1-2B, YELLOW phone list: p 3-4).
- Populations at risk SHOULD be notified to “standby”, prepare to leave, and await further instructions.
- Evacuations in low-lying areas may be required.

2.2.3 Response Level Red

- **FAILURE IS IMMINENT (it has been determined that the LAI and/or LDWP will fail), IS OCCURRING, OR HAS OCCURRED; LIFE THREATENING FLOOD WATERS ARE OR WILL BE RELEASED.**
- Life threatening releases will definitely affect populations at risk.
- Immediate evacuation of population at risk is necessary.
- Initiate Level RED notifications (Flowchart: Fig 1-2C, RED phone list: p 3-6).

Table 2-1 Decision Criteria Matrix⁽¹⁾**Determine if a situation is Developing or Imminent, then refer to the Notification Charts (Figures 1-2A, B & C)**

Problem	GREEN 1) There is a potential impoundment breach, and 2) No external assistance is needed from other agencies or jurisdictions. (Qualifiers – potential, slowly, progressing, can mitigate, some time is available)	YELLOW 1) There is immediate or inevitable impoundment breach, (Qualifiers – immediate, rapidly, sudden, complicated, little or no time is available before adverse impacts will occur)	RED Impoundment(s) failure: 1) Is imminent, 2) Is occurring, OR 3) Has occurred, OR Life threatening flooding is occurring or may occur.
Embankment Piping	Significant new or increased seepage or sand boils downstream from the embankment (new seep, boggy wet area, etc.).	Rapidly increasing seepage and/or transporting large quantities of materials. Sand boils rapidly increasing in size or number and/or rapidly increasing flows. Failure expected.	Impoundment(s) failure is imminent, is occurring or has occurred.
	Significant new or larger sinkhole(s), or crest settlement.	Sinkhole(s) or settlement rapidly increasing in size or number. Failure expected.	
	LDWP level is rapidly falling without apparent cause (no increase in pumping rates).	Whirlpool or other signs of the LDWP draining rapidly through the impoundment(s) or foundation.	
	New, stable, or slowly increasing seepage rates transporting some sediment and/or unusual discoloration (higher turbidity readings) of seepage flows.	Rapidly increasing seepage transporting large amounts of sediments. Failure expected.	
Embankment Cracking	New cracks or cracks significantly increased in length, width, or offset anywhere on the facility.	Rapidly increasing flow through crack(s) and transporting materials. Failure expected.	Impoundment(s) failure is imminent, is occurring, or has occurred.
	Cracking is the beginning of a large slide. Refer to Embankment Deformations below.	Refer to Embankment Deformations below.	
Embankment Deformations	Large deformations or slides. Potential for breach of impoundment(s).	Large deformations and breach of impoundment(s) is imminent or occurring.	Impoundment(s) failure is imminent, is occurring, or has occurred.

Problem	GREEN 1) There is a potential impoundment breach, and 2) No external assistance is needed from other agencies or jurisdictions. (Qualifiers – potential, slowly, progressing, can mitigate, some time is available)	YELLOW 1) There is immediate or inevitable impoundment breach, (Qualifiers – immediate, rapidly, sudden, complicated, little or no time is available before adverse impacts will occur)	RED Impoundment(s) failure: 1) Is imminent, 2) Is occurring, OR 3) Has occurred, OR Life threatening flooding is occurring or may occur.
Earthquake Occurs (LAI and LDWP are in a Moderate – Zone 2 damaging intensity) Immediate Facility Inspection Required	<i>An earthquake is felt or reported with a Richter magnitude (M) of: 4.0M or greater within a 10-mile radius or, 5.5M or greater in 60-mile radius or, 6.5M or greater within 100-mile radius. Refer to indicators for Embankment Piping, Embankment Cracking, and Embankment Deformations.</i>	Impoundment(s) are expected to fail due to vulnerability of facility and magnitude of earthquake. (Failure predicted by analysis.)	Impoundment(s) failure is imminent, is occurring, or has occurred.
High Water Level Condition	The impoundment levels reach crest elevation minus 2 feet.	The impoundment levels reach crest elevation minus 1 foot.	The impoundment levels reach or are within inches of crest elevation.
Bomb Detonation/Explosion or Act of War		Verified bomb threat or impending act of war that, if carried out, could result in damage to impoundment(s).	Detonated bomb or explosion that has resulted in damage to impoundment(s) or appurtenances.
Vandalism / Sabotage	Damages to the impoundment(s) or appurtenances with no impacts to the functioning of the impoundment	Damages to the impoundment(s) or appurtenances that has resulted in seepage flow. Refer to indicators for Embankment Piping, Embankment Cracking, and Embankment Deformations.	Impoundment(s) failure is imminent, is occurring, or has occurred.

NOTE: (1) Other problems on or near the impoundment(s), not affecting its structural integrity (auto accident, chemical spills, drowning, etc.) should be reported to the Navajo Nation Police, Fire & Rescue Services, and/or the Environmental Protection Agency.

3.0 GENERAL RESPONSIBILITIES UNDER EAP

The primary responsibility of the owner is to monitor the LAI and LDWP for potential problems, to mitigate any problems and to provide timely notification to emergency management officials so that a potential hazard to life, safety, and property may be avoided. The New Mexico Office of Emergency Management may also provide assistance with notification and coordination with regional entities as well as federal agencies.

This section outlines the responsibilities of the owner in detecting potential problems leading to the issuance of warning notifications, and provides guidelines for an effective emergency notification, evacuation, termination, and follow-up. It also describes the responsibilities of the designated EAP coordinator (Engineering Manager) that shall administer and coordinate all emergency activities provided in the emergency action plan. The EAP Coordinator may designate responsibilities to plant personnel as needed during emergency activities.

3.1 OWNER RESPONSIBILITIES

Detection of potential problems could be made by monitoring and surveillance. The following tasks are the owner's responsibilities in the monitoring and surveillance of the LAI and LDWP. Provided below are two conditions for which monitoring and surveillance are implemented.

3.1.1 Normal Conditions

- (a) The EAP Coordinator (Engineering Manager) or its authorized representatives should regularly conduct an on-site visual inspection of the LAI and LDWP, the impoundments control systems, and the toe area below the impoundments. This should be done at a minimum of once every month. Any abnormal or questionable conditions observed during the routine inspection should be brought to the attention of the New Mexico Office of the State Engineer Dam Safety Bureau. Inspection forms for both the LAI and LDWP are included in Appendix B and within the LAI and LDWP Operations and Maintenance Manual.
- (b) If any abnormal condition is found during a routine inspection of the LAI and LDWP, the EAP Coordinator (Engineering Manager) must immediately determine the level of emergency required. If the EAP Coordinator is unavailable, then the Plant Duty Manager must make this determination. Either a Green, Yellow, or Red Alert Warning should be issued by the EAP Coordinator depending on the emergency classification determined.

3.1.2 Unusual Event Conditions

- (a) The presence of sloughs, sinkholes, cracking, and/or new settlement is an unusual condition. In addition, possible failure of the LAI and/or LDWP can occur when unusual seepage is detected at the toe of the embankment, or in proximity of the primary outlet pipe(s) of the LAI. If seepage is pronounced or “muddy” in clarity, the EAP Coordinator (Engineering Manager) should issue a Green, Yellow, or Red Alert Warning as deemed appropriate.
- (b) The EAP Coordinator (Engineering Manager) should commence 24-hour continuous around-the-clock monitoring and surveillance of conditions at the site when:
 - (i) Any observed conditions that are considered “unusual” by the EAP Coordinator, Plant Duty Manager, or operations staff and that raise concerns on the structural integrity and stability of the embankment.
 - (ii) Following the occurrence of an earthquake in the general location of the LAI and LDWP (see Decision Criteria Matrix, p. 2-3).

The EAP Coordinator (Engineering Manager) will terminate the 24-hour surveillance of site conditions when:

- (i) Inspection by a registered professional engineer knowledgeable in earthen impoundment design determines that the LAI and LDWP condition is safe.
- (ii) The reservoir has been drained to a non-hazardous level.
- (iii) The Office of the State Engineer Dam Safety Bureau has been consulted and determines that the termination of the surveillance is appropriate.

3.2 RESPONSIBILITY FOR NOTIFICATION

As described in Section 2, emergencies are classified according to their severity and urgency. Notifications are done immediately at an instance when an emergency is determined. The order and chain of notification is provided in this section, which begins with the FCPP operations staff (see Figures 1-2A, B, and C Notification Flowchart and the communication directory).

A. Green Alert Warning

When the EAP Coordinator (Engineering Manager) observes or receives word of a problem or unusual situation at the LAI and LDWP, he should confirm the severity of the situation. After confirmation that the situation is potentially serious or hazardous at the LAI and/or LDWP and that the situation could get worse, he should issue a Green Alert warning.

The EAP Coordinator (Engineering Manager) will then begin the Green Alert notification by contacting the following, in order. Each contact shall be notified that there is a Green Alert warning at the LAI and/or LDWP and that appropriate procedures are being initiated.

GREEN ALERT CONTACT TELEPHONE NUMBERS APS RESPONSIBLE FOR CALLING	
APS Management	
San Juan County Office of Emergency Management	505-320-8656 (cell)
New Mexico Office of the State Engineer, Dam Safety Bureau	505-383-4134
Navajo Nation Emergency Management Services; Director	928-871-6892 505-368-1230 (Shiprock)
GREEN ALERT CONTACT TELEPHONE NUMBERS San Juan County Office of Emergency Management responsible for calling	
New Mexico Office of Emergency Management	505-476-9635

Sample Notification for a Green Alert Condition

The following text is a sample notification script prepared for the purpose of informing individuals or agencies of the Green Alert condition. This script shall be read or pre-recorded and activated when the notification procedure is initiated.

“This is (state your name and title). A GREEN ALERT condition has been issued for the LAI and LDWP dams located between Farmington and Shiprock at the Four Corners Power Plant. (Repeat above) This condition is considered a non-emergency at this time. Our Engineer is on site and we are coordinating activities with the Office of the State Engineer Dam Safety Bureau. (Describe situation). We are monitoring the situation in case conditions change to an emergency condition. Consult the LAI and LDWP Emergency Action Plan for further instructions. This is (state your name and title) and I can be reached at (give telephone number and/or radio information). Thank you.”

B. Yellow Alert Warning

When the EAP Coordinator (Engineering Manager) observes or receives word of a problem or unusual situation at the LAI and/or LDWP, he/she should confirm the severity of the situation. After confirmation that the situation is serious or hazardous at the LAI and/or LDWP and that the situation could get worse, he should issue a Yellow Alert warning.

A monitor should be assigned to the LAI and/or LDWP, if one is not already present at the site. The monitor will keep the EAP Coordinator (Engineering Manager) up to date on the conditions at the LAI and LDWP.

The EAP Coordinator (Engineering Manager) will then begin the Yellow Alert notification by contacting the following, in order. Each contact shall be notified that there is a Yellow Alert warning at the LAI and/or LDWP and that appropriate emergency procedures should be quickly initiated.

YELLOW ALERT CONTACT TELEPHONE NUMBERS APS RESPONSIBLE FOR CALLING	
San Juan County System Dispatch	9-1-1
APS Management	
New Mexico Office of the State Engineer, Dam Safety Bureau	505-383-4134
New Mexico Department of Transportation, District 5	800-388-6630
Navajo Nation Safety of Dams Program	928-729-4257
Bureau of Indian Affairs Safety of Dams Program	505-325-1864 Cell – 505-320-3133
YELLOW ALERT CONTACT TELEPHONE NUMBERS 9-1-1 System San Juan Dispatch Center responsible for calling	
San Juan County Office of Emergency Management	505-320-8656 (cell)
New Mexico State Police	505-325-7547
San Juan County Sheriff	505-334-6622
Navajo Police	505-368-1350
Navajo Nation Emergency Management Services; Director	928-871-6892 505-368-1230 (Shiprock)
YELLOW ALERT CONTACT TELEPHONE NUMBERS San Juan County Office of Emergency Management responsible for calling	
New Mexico Office of Emergency Management	505-476-9635
National Weather Service – Albuquerque Office	505-244-9148

Sample Notification for a Yellow Alert Condition

The following text is a sample notification script prepared for the purpose of informing individuals or agencies of the Yellow Alert condition. This script shall be read or pre-recorded and activated when the notification procedure is initiated.

“This is (state your name and title). We have an emergency condition for the LAI and LDWP dams located between Farmington and Shiprock at the Four Corners Power Plant. We have activated the Emergency Action Plan for the LAI and LDWP and are currently under A YELLOW ALERT. (Repeat above). We are implementing predetermined actions to respond to a rapidly developing situation that could result in dam failure. Please prepare to evacuate the area as shown on the Evacuation Map in the Emergency Action Plan (EAP) for the LAI and LDWP. We will advise you as soon as the situation is resolved or if the situation gets worse. This is (state your name and title) and I can be reached at (give telephone number and/or radio information). Thank you.”

C. Red Alert Warning

When the EAP Coordinator (Engineering Manager) monitors or receives word of a problem or unusual situation at the LAI and/or LDWP, he/she should confirm the severity of the situation. After confirmation that a failure is imminent, or occurring at the LAI and/or LDWP, he should issue a Red Alert warning.

The EAP Coordinator should assign an individual to monitor the LAI and/or LDWP, if one is not already present at the site. The operations staff will keep the EAP Coordinator up to date on the conditions at the site.

The EAP Coordinator will then begin the Red Alert notification by contacting the following, in order. Each contact shall be notified that there is a Red Alert warning at the LAI and/or LDWP and emergency procedures should be initiated.

RED ALERT CONTACT TELEPHONE NUMBERS APS RESPONSIBLE FOR CALLING	
San Juan County System Dispatch	9-1-1
APS Management	
Tse AlNaoztii (Sanostee) – Chapter where Evacuees’ Residences are located	505-723-2702
Nenahnezad Chapter	505-960-9702
San Juan Chapter	505-598-6916

Shiprock Chapter	505-368-1081
New Mexico Department of Transportation, District 5	800-388-6630
New Mexico Office of the State Engineer, Dam Safety Bureau	505-383-4134
Navajo Nation Safety of Dams Program	928-729-4257
Bureau of Indian Affairs Safety of Dams Program	505-325-1864 Cell – 505-320-3133
RED ALERT CONTACT TELEPHONE NUMBERS 9-1-1 System San Juan Dispatch Center responsible for calling	
San Juan County Office of Emergency Management	505-320-8656 (cell)
New Mexico State Police	505-325-7547
San Juan County Sheriff	505-334-6622
Navajo Police	505-368-1350
Navajo Nation Emergency Management Services; Director	928-871-6892 505-368-1230 (Shiprock)
RED ALERT CONTACT TELEPHONE NUMBERS San Juan County Office of Emergency Management responsible for calling	
New Mexico Office of Emergency Management	505-476-9635
National Weather Service – Albuquerque Office	505-244-9148

Sample Notification for a Red Alert Condition

The following text is a sample notification script prepared for the purpose of informing individuals or agencies of the Red Alert condition. This script shall be read or pre-recorded and activated when notification procedure is initiated.

“This is an emergency. This is (state your name and title). The LAI and LDWP dams located between Farmington and Shiprock at the Four Corners Power Plant are failing. Repeat: The LAI and LDWP dams at the Four Corners Power Plant are failing. Evacuate the low lying areas of Chaco Wash downstream of the Four Corners Power Plant to the San Juan River, the residences adjacent to the N-36 Bridge over Chaco Wash, and close the N-36 Bridge to traffic. We have activated the Emergency Action Plan for the LAI and LDWP and are currently under A RED ALERT. Reference the Evacuation Map in your copy of the Emergency Action Plan (EAP) for the LAI and LDWP. Please advise me on what I can do to help with the warnings and evacuations. This is (state your name and title) and I can be reached at (give telephone number and/or radio information). Thank you.”

3.3 RESPONSIBILITY FOR EVACUATION

The Navajo Police (Shiprock) shall be responsible for the evacuation of all downstream residents in the inundation zone as well as for coordinating the evacuation plans with other emergency personnel. The Police Department shall be assisted by the Shiprock Fire & Rescue in directing residents and the public to designated safe areas. It shall also be the responsibility of the Police Department to establish and manage all traffic controls, detours, and road closures in coordination with the New Mexico Department of Transportation (DOT) to facilitate the evacuation plan.

3.4 RESPONSIBILITY FOR TERMINATION AND FOLLOW-UP

Termination of emergency conditions in the inundation area shall be made by the New Mexico Office of Emergency Management after determination that the threat to the public has subsided. These conditions are different for the two emergency classifications:

A. Yellow Alert Warning

The cancellation of a Yellow Alert warning shall be made by the EAP Coordinator in consultation with the New Mexico Office of the State Engineer, Bureau of Dam Safety after validating the following conditions:

- The threat of impending failure has been downgraded to “no-threat”; or,
- The conditions that caused the Yellow Alert warning to be declared have stopped.

A follow-up evaluation should be conducted by all participants after the emergency is over. The results of the evaluation should be documented in a written report as a basis to improve and upgrade the existing EAP. Use the forms provided in Appendix B to document the tasks performed and the manpower used during the emergency.

B. Red Alert Warning

The cancellation of a Red Alert warning shall be made by the New Mexico Office of Emergency Management after validating the following conditions:

- The LAI and/or LDWP have failed and the flood wave has subsided.
- The flood-inundated areas have been secured.
- Disaster relief services are in place and operational.

Or

- The LAI and/or LDWP does not fail and the conditions that caused the Red Alert failure warning to be initiated have been mitigated or controlled.

AND

- The Office of the State Engineer Dam Safety Bureau has inspected the LAI and/or LDWP and determines that cancellation of a Red Alert warning is appropriate.

3.5 EAP COORDINATOR RESPONSIBILITY

The Engineering Manager shall be the designated EAP Coordinator who will be responsible for all EAP-related activities, including (but not limited to) the revisions to the EAP, establishing training seminars for operations staff and emergency personnel, and coordinating EAP exercises. The EAP Coordinator is the EAP contact if any involved parties have questions about the plan. In the event that the Engineering Manager is unavailable, the Plant Duty Manager is the back-up EAP Coordinator. The back-up EAP Coordinator shall be fully versed in all of the responsibilities of the EAP Coordinator and capable of implementation of the EAP.

3.6 COMMUNICATION METHODS

The EAP Coordinator and designated personnel will communicate on site via two-way radio, plant intercom, land-line phone, and/or mobile phone. Communication of emergency alert level and changes to status will be through use of phone communication (landline or wireless telephone). Email communication may be utilized, but only for back-up or follow-up purposes.

3.7 MAINTENANCE OF THE EAP

Without periodic maintenance, the EAP will become outdated and may no longer be workable. The document must be updated annually or as-needed. It is recommended that it be reviewed annually and after each emergency action notification. Changes that will require revision and update of the plan include:

- Changes in personnel of the various organizations
- Changes in communications systems
- Changes to the impoundment(s)
- Changes in land-use within the downstream inundation area that alter the potential threat to the public.

The plan should be exercised, so that those involved in its implementation may become familiar with their roles and responsibilities. This may include the following:

- Tabletop Exercise – A low level exercise which involves a meeting of the owner and state and local emergency management officials to look at simulated emergency events and discuss the procedures to be taken.
- Functional Exercise – A higher level exercise involving a test of the procedures required for an actual emergency action.

A review meeting between the APS (EAP Coordinator) and emergency responders shall be scheduled on an annual basis. The annual review meeting shall include verifying and updating all contact names and numbers in the EAP. It is recommended that the Tabletop exercise be performed every three (3) years with the Functional exercise being performed every five (5) years. After any exercise, the EAP document should be revised and corrected as necessary, at a frequency no greater than every 5 years. Further, at the conclusion of the Tabletop exercise, the participants should evaluate the need to undertake a Functional exercise based upon their experience with the Tabletop exercise.

3.8 GENERAL PROVISIONS

All persons and agencies listed in this EAP should maintain communication log books. The books should indicate the date, time, type of alert, the name and telephone number of the person calling, the name and telephone number of the person being called, a description of the problem, and any other pertinent information.

The lines of communication in the notification flowcharts (see Figures 1-2A, B, and C) and as listed above in the notification section are not one-way paths. The EAP participants should freely exchange new information and evacuation status updates, as necessary, to optimize the use of manpower and equipment resources.

4.0 PREPAREDNESS

Preparedness actions are considered in this EAP document to moderate or alleviate the effects of a failure and facilitate response to emergencies. This section identifies actions to be taken before any emergency call or warning is initiated.

4.1 MONITORING

LAI and LDWP monitoring is an essential component of the Emergency Action Plan for both preventative and responsive hazard mitigation. As part of routine operations, APS undertakes a myriad of monitoring tasks. First, operations staff overview the LAI and LDWP daily. Water and ash levels are recorded monthly. Security personnel periodically scan the LAI and LDWP via surveillance cameras. Monthly, foundation instrument (piezometer and settlement monument) readings are taken and the Engineering Manager overviews the LAI and LDWP.

Operations staff are trained to recognize abnormal conditions at the LAI and LDWP. The Plant Duty Managers have the authority to initiate a failure warning in the event that the EAP Coordinator (Engineering Manager) cannot be reached.

Key management shall be required to review this document annually and be thoroughly familiar with the information presented in this EAP.

As part of APS' routine monitoring, attention is given to the specific features that could threaten the longevity of the facility such as those listed in Table 4-1.

4.2 MITIGATION

Table 4-1 lists expected actions to take regarding potential problems, which may be observed during monitoring of the LAI and LDWP, which could be hazardous and require immediate action. Recommended actions are for emergency mitigation and issuance of a Green, Yellow, or Red Alert. If mitigation becomes necessary, an emergency command center will be set up at the Four Corners Power Plant in the Administration Building located at the front gate. The plant is located 18 miles west of Farmington as shown on Figure 4-1. If time permits the Owner's Engineer should be contacted for technical consultation and the Office of the State Engineer Dam Safety Bureau should be contacted to be made aware of the situation and be advised of any action taken. Emergency remedial actions outside the scope of activities listed below require Office of the State Engineer Dam Safety Bureau approval, if time permits.

Table 4-1 Emergency Action Guidelines

RESPONSE LEVEL GREEN: Non-Emergency, Unusual Event, Slow Developing	
No.	Task / Observations
A	<p>The Engineering Manager (EAP Coordinator) should inspect the dam. At a minimum, inspect the full length of the upstream slope, crest, downstream toe, and downstream slope. Also check the reservoir area, abutments, and downstream channel for signs of changing conditions. Setup 24-hour surveillance of the dam.</p> <p>IF INCREASED SEEPAGE, EROSION, CRACKING, OR SETTLEMENT IS OBSERVED, IMMEDIATELY REPORT THE OBSERVED CONDITIONS TO THE EAP COORDINATOR; REFER TO THE EMERGENCY LEVEL TABLE FOR GUIDANCE IN DETERMINING THE APPROPRIATE EVENT LEVEL FOR THE NEW CONDITION AND RECOMMENDED ACTIONS.</p>
B	Record all information, observations, and actions taken on the Event Log Form (Appendix A-1). Note the time of changing conditions. Document the situation with photographs and video if possible.
C	The Engineering Manager (EAP Coordinator) must contact their engineer and request an investigation of the situation and recommend corrective actions.
D	The Engineering Manager (EAP Coordinator) must contact the Office of the State Engineer Dam Safety Bureau, advise of the situation, what action is being proposed and obtain approval.
E	The Engineering Manager (EAP Coordinator) will advise the Local Emergency Manager if it is determined that the condition may possibly develop into a Emergency Level 2 (YELLOW ALERT NOTIFICATION) condition.

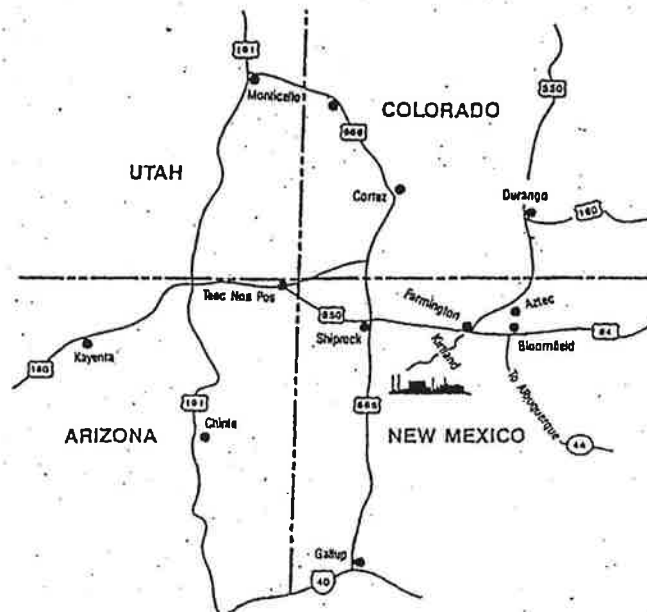
RESPONSE LEVEL YELLOW: Potential Dam Failure Situation; Rapidly Developing	
No.	Task / Observations
A	The Engineering Manager (EAP Coordinator) must contact their Engineer and the Office of the State Engineer Dam Safety Bureau to report the situation and, if time permits, request technical assistance from the Owner's Engineer to investigate the situation and recommend corrective actions. Office of the State Engineer Dam Safety Bureau's approval of any emergency remedial action outside the scope of activity listed below is required, if time permits.
B	The Engineering Manager (EAP Coordinator) must contact the Local Emergency Manager to inform him that the emergency action plan has been activated and if current conditions get worse, an emergency situation may require evacuation or warning. Preparations should be made for possible road closures, warnings and evacuations.
C	The Engineering Manager (EAP Coordinator) must provide updates to the Local Emergency Manager to assist in making timely decisions concerning the need for warnings and evacuations.
D	<p>If time permits, Engineering Manager (EAP Coordinator) should inspect the dam. At a minimum, inspect the full length of the upstream slope, crest, downstream toe, and downstream slope. Also check the reservoir area, abutments, and downstream channel for signs of changing conditions.</p> <p>IF PIPING, INCREASED SEEPAGE, EROSION, CRACKING, OR SETTLEMENT ARE OBSERVED, IMMEDIATELY REPORT THE OBSERVED CONDITIONS TO THEIR ENGINEER, REFER TO THE EMERGENCY LEVEL TABLE FOR GUIDANCE IN DETERMINING THE APPROPRIATE EVENT LEVEL FOR THE NEW CONDITION AND RECOMMENDED ACTIONS.</p>

E	Record all information, observations, and actions taken on the Event Log Form (Appendix B). Note the time of changing conditions. Document the situation with photographs and video if possible.	
F	If time permits, the following emergency remedial actions should be taken as appropriate. Immediate implementation of these remedial actions may delay, moderate, or prevent the failure of the dam. The remedial actions listed below do not require Office of the State Engineer approval prior to implementing the action. Time permitting, any remedial action should be developed through consultation with the Owner's Engineer and the Office of the State Engineer Dam Safety Bureau. Several of the listed adverse or unusual conditions may be apparent at the dam at the same time, requiring implementation of several modes of remedial actions. Close monitoring of the dam must be maintained to confirm the success of any remedial action taken at the dam.	
No.	Problem	Recommended Emergency Actions (Time permitting, these actions must be decided in consultation with Office of State Engineer Dam Safety Bureau)
1.	EMBANKMENT OVERTOPPING	<ol style="list-style-type: none"> 1. Place sandbags along the dam crest to increase freeboard. 2. Cover the dam crest and downstream slope with riprap, sandbags, plastic sheets, or other materials to provide erosion-resistant protection. 3. Attempt to lower the reservoir level as rapidly as possible to a level that stops or decreases the rate at which the water level in the reservoir is increasing. Pumping or siphoning would be required.
2.	SEEPAGE AND SINKHOLES	<ol style="list-style-type: none"> 1. Attempt to lower the reservoir level as rapidly as possible to a level that stops or decreases the seepage to a non-erosive velocity. Pumping or siphoning would be required. 2. Continue lowering the water level at a safe drawdown rate until the seepage stops. 3. If the entrance to the seepage origination point is observed in the reservoir (possible whirlpool) and is accessible, attempt to reduce the flow by plugging the entrance with readily available materials, including hay bales, bentonite, soil or rock fill, or plastic sheeting. 4. Cover the seepage exit area(s) with several feet of sand/gravel to hold fine-grained embankment or foundation materials in place. Alternatively, construct sandbag or other types of ring dikes around seepage exit areas to retain a pool of water, providing backpressure and reducing the erosive nature of the seepage. 5. Prevent vehicles and equipment from driving between the seepage exit points and the embankment to avoid potential loss from the collapse of an underground void.
3.	EMBANKMENT MOVEMENT	<ol style="list-style-type: none"> 1. Lower the reservoir to a safe level at a rate commensurate with the urgency and severity of the condition of the slide or slump. Pumping or siphoning would be required. 2. Repair settlement of the crest by placing sandbags or structural fill materials in the damaged area to restore freeboard. 3. Stabilize slides on the downstream slope by placing a soil or rock fill buttress against the toe area of the slide.
4.	EARTHQUAKE	<ol style="list-style-type: none"> 1. Immediately conduct a general overall visual inspection of the dam. 2. Perform field survey to determine if there has been any settlement and movement of the dam embankment, spillway and low level outlet works. 3. Drain reservoir if required.

RESPONSE LEVEL RED: Urgent; Dam Failure is Imminent or in Progress	
No.	Task / Observations
A	The Engineering Manager (EAP Coordinator) must immediately contact the Local Emergency Manager, the Office of the State Engineer Dam Safety Bureau and the Owner's Engineer.
B	The Local Emergency Manager shall lead the efforts to carry out warnings and evacuations of people at risk downstream from the dam (see "Evacuation Map" tab).
C	Emergency Management services personnel and Local Law Enforcement shall alert the general public and immediately evacuate at-risk people and close roads as necessary.
D	The Engineering Manager (EAP Coordinator) must maintain continuous communication and provide the Local Emergency Manager with updates of the situation to assist him in making timely decisions concerning warnings and evacuations.
E	Assure personnel monitoring the dam are safe and out of harm's way.

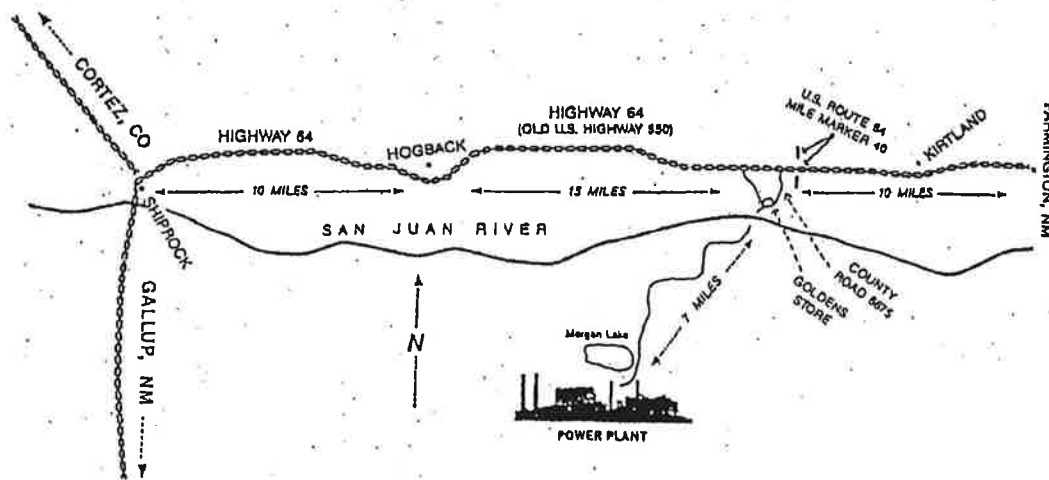
Arizona Public Service Plant Location

Four Corners Area Map



On U.S. 64, The Turnoff To The Plant Is Just West Of Mile Marker 40.

Turn South On County Road 6675 To The Plant Approximately 8 Miles.



Source: Morgan Lake Dam E.A.P. October 2004. Prepared By Stantec For Arizona Public Service Co.

Arizona Public Service Four Corners Power Plant Location and Directions

Figure 4-1

URS



NTS

If issuance of a RED ALERT becomes necessary, the emergency command center will be established at the San Juan County Office of Emergency Management, 209 South Oliver Avenue, Aztec, NM 87410 (Figure 4-2).

The following materials and equipment are available for emergency repairs to the LAI and LDWP:

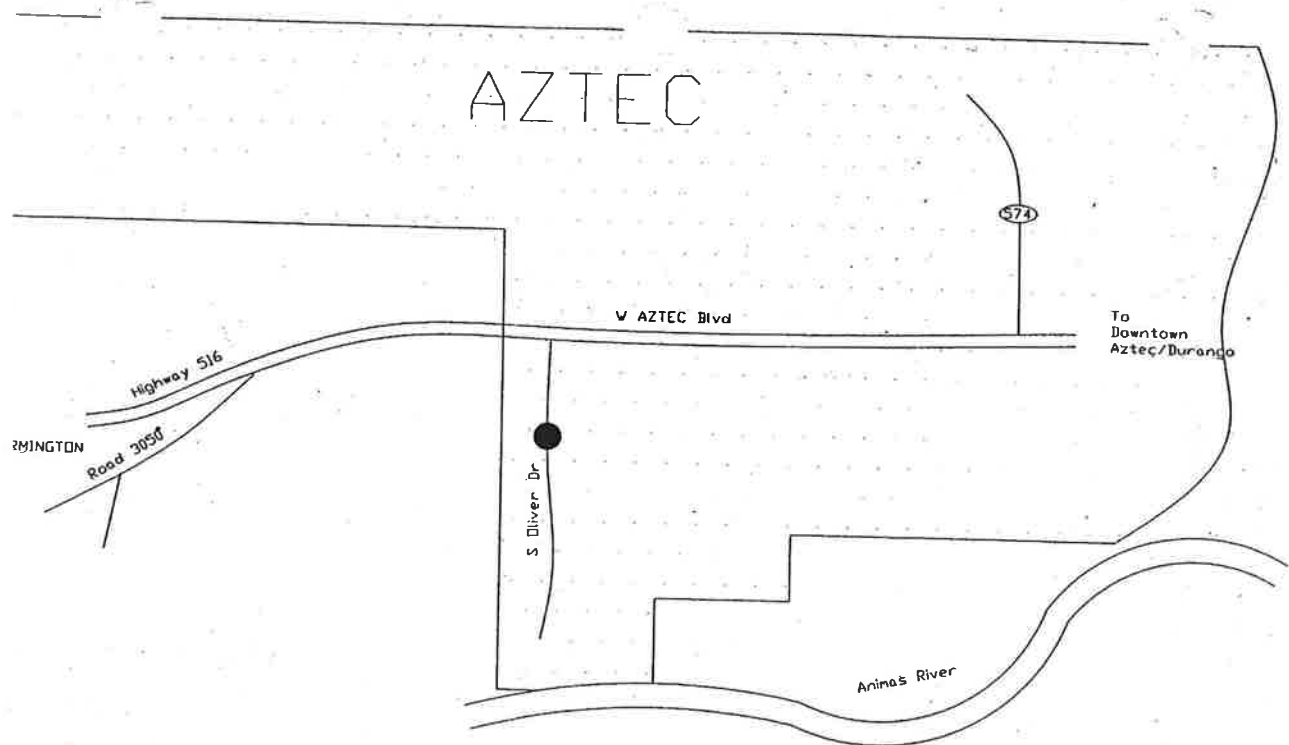
- sand bags: Stock in APS warehouse, APN-00076996
- plastic sheeting: Stock in APS warehouse, APN-59100780
- backhoe, excavator, loaders, off-road haul trucks. Access to riprap, gravel, sand, clay fill material: Stockpiled at the LAI and LDWP
 - APS Garage (backhoe and dump truck)
 - FHI – 505-598-8834 (main), 480-226-7960 (Giovanni Mioni – FHI General Foreman)
 - Kelly Contracting – 505-320-4580, x-291; 505-934-3415
 - Additional excavation and haul equipment available from North American Coal Corporation (Navajo Mine)
 - North American Coal Corporation (Navajo Mine) main number – 505-598-4200; Rick Ziegler, President, Bisti Fuels Company – 505-787-7020)
- emergency generator and lights for night work: APS maintenance and tool rooms; 322, 357
- shovels, wheelbarrows, other hand tools: APS tool rooms, 402, 482, 776 hay bales: NAPI Region II Farm Scales 505-566-2641
- Due to the proximity of the LAI and LDWP to the Navajo Mine, large earth-moving equipment and fill material is available on-site 365 days a year. APS's on-going working relationship with the Navajo Mine means that resources would be readily available to APS as needed.

The following steps will be taken by the operations staff if unusual conditions are reported at the LAI and/or LDWP:

- Quick deployment of operations staff and EAP Coordinator (Engineering Manager) to the LAI and/or LDWP site, if not already at the site.

- Assessment of the emergency situation and initiation of an alert notification if necessary.
- If unusual conditions are recorded/observed with the piezometer readings, more frequent readings should be initiated. The interval between readings should initially be of short duration (i.e., hourly) until it is established that stabilized conditions persist.

Recommended emergency actions associated with the LAI and LDWP problem could be made by following the guidelines provided in Table 4-1. Any actions associated with environmental impacts shall follow the proper NPDES permit requirements. The EAP Coordinator (Engineering Manager) shall be responsible for directing and implementing emergency mitigation measures.



San Juan County Office Of Emergency Management
209 South Oliver Avenue, Aztec, NM 87410

Directions From The Plant:

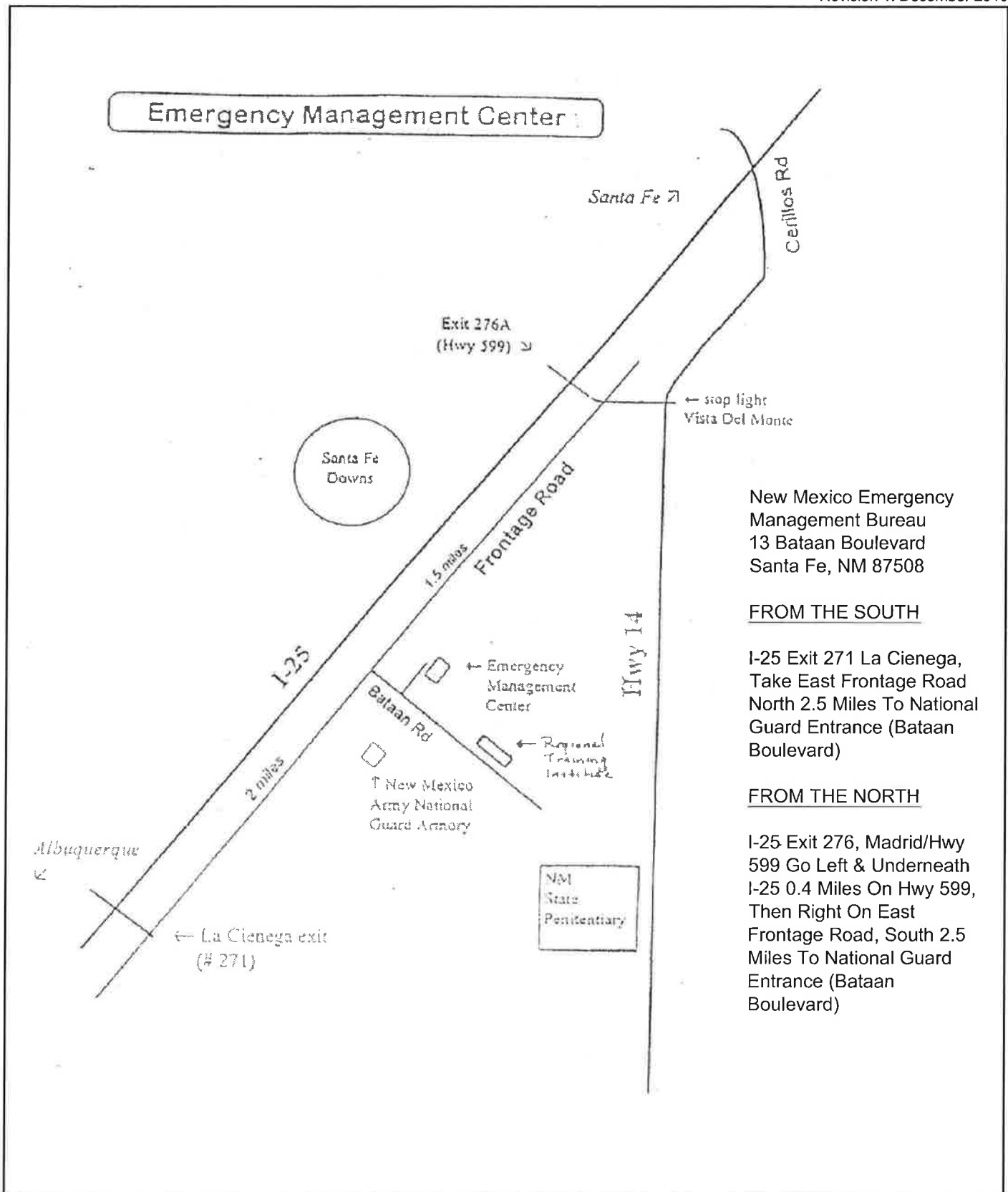
Head East On County Road 6675	8 Mi
Turn Right At US-64-E	11.5 Mi
Turn Left At S. Butler Ave	0.2 Mi
Turn Right At E. Main St	0.3 Mi
Continue On NM-516 N	4.0 Mi
Turn Right At S. Oliver Ave	413 Ft

Source: Morgan Lake Dam E.A.P. October 2004. Prepared
By Stantec For Arizona Public Service Co.

San Juan County Emergency Management Center Location and Directions

Figure 4-2





Source: Morgan Lake Dam E.A.P., October 2004. Prepared By Stantec For Arizona Public Service Co.

New Mexico Emergency Management Center Location and Directions

Figure 4-3

URS



NTS

5.0 EVACUATION MAP

The evacuation map prepared for the area downstream of the LAI and LDWP is an integral part of this Emergency Action Plan (EAP). The map is an essential tool for the evacuation and mitigation effort during a failure or flooding event.

The evacuation map presented in this document was originally prepared based on the “*LAI and LDWP Breach Analysis*” conducted for the Arizona Public Service Company, New Mexico by URS Corporation and accepted by NMOSE on July 16, 2009. The mapped inundation proceeds downstream to where the area subjected to these higher flows does not have permanent habitable structures nor land ownership/zoning that would predicate the likely occurrence of such structures based upon the 2006 aerial photography.

The evacuation area identified on the Evacuation Map is subdivided into two areas labeled Region 1 and Region 2. The area of evacuation labeled Region 1 includes four structures, three habitable structures and the N-36 Bridge, which were identified using 2006 aerial photography data. The structures are not considered at risk based on the inundation mapping developed and presented in the LAI and LDWP Breach Analysis (URS, 2009). These structures were included in the Evacuation Map based on conservative methods for drawing evacuation map boundaries, as suggested by the Association of State Dam Safety Officials (Journal of Dam Safety, 2008). Other structures built since the date of the aerial mapping and may be located within the mapped inundated area or within the Chaco floodplain downstream of the detailed study. Furthermore, habitable structures may be erected unbeknownst to the community anywhere within the mapped area or downstream within the floodplain of the Chaco River.

The breach analyses indicate that directly downstream of the LAI and LDWP, the time from the initial onset of rising water due to a failure of the impoundment and the peak water levels is extremely short (i.e., only a matter of minutes). The travel time for the floodwave becomes greater as it progresses downstream to the San Juan River (approximately 3.5 hours). In general, the areas within the middle of the Chaco River will have greater flow depths and velocities than those areas on the fringe of the floodplain. The breach analyses indicate that the majority of the inundation stays within the banks of the Chaco River downstream of the LAI and LDWP.

Summary Chart for Flood Inundation Maps

Structure	Approximate Arrival Time (hr)	Water Level Elevation (ft)
N36 Bridge	1	5,007
San Juan River	3.5	4,931

6.0 EAP DISTRIBUTION LIST

The following list provides the names of persons and organizations that are entitled to receive numbered copies of the LAI and LDWP Emergency Action Plan (see Table 6-1). The Arizona Public Service Company will provide each party listed below with periodic updates to the EAP, including current contacts, addresses and telephone numbers of all individuals, local and state agencies listed in the EAP on an annual basis.

Table 6-1 EAP Distribution List

No.	Name	Office	Address
1	Jeffrey Jenkins	APS Plant Manager	Four Corners Power Plant Mail Station 4900, PO Box 355 Fruitland, NM 87416
2	William Clifton	APS Engineering Manager (EAP Coordinator)	Four Corners Power Plant Mail Station 4900, PO Box 355 Fruitland, NM 87416
3	Dennis Carlson	APS Engineering	Four Corners Power Plant Mail Station 4900, PO Box 355 Fruitland, NM 87416
4	New Mexico State Emergency Operations Center	The Department of Homeland Security and Emergency Management	PO Box 2711 Santa Fe, NM 87502 13 Bataan Blvd Santa Fe, NM 87504
5	Charles Thompson, P.E.	New Mexico Office of the State Engineer, Dam Safety Bureau	PO Box 25102 Santa Fe, NM 87504-5102
6	Phillip Joe	Shiprock Police Department	PO Box 3849 Shiprock, NM 87420
7	Mike Mestas	San Juan System Dispatch Center	207 South Oliver Aztec, NM 87410
8	Director Jimson Joe	Navajo Emergency Management Services	PO Box 2908 Window Rock, AZ 86515
9	Brenda Todechine	Navajo Nation Safety of Dams	PO Box 678 Fort Defiance, AZ 86504
10	Chuck Nixon	BIA Attention: Chuck Nixon	PO Box 678 Fort Defiance, AZ 86504
11	Jerry Bodie	Tse AlNaoztii (Sanostee) Chapter, Navajo Nation	PO Box 219 Sanostee, NM 87461
12	Norman C. Begay	Nenahnezad Chapter, Navajo Nation	PO Box 438 Fruitland, NM 87416
13	Rickie Nez	San Juan Chapter, Navajo Nation	PO Box 1636 Fruitland, NM 87416

No.	Name	Office	Address
14	Duane H. Yazzie	Shiprock Chapter, Navajo Nation	PO Box 3810 Shiprock, NM 87420
15	Byron Conrad	APS Engineering	400 N. 5th Street Phoenix, AZ 85004
16	National Weather Service – Primary Contact	Albuquerque Office	2341 Clark Carr Loop, SE Albuquerque, NM 87106-5633 (505) 244-9148 (24-hour non- public number)
17	National Weather Service	Colorado Basin River Forecast Center – Salt Lake City Office	2242 W. North Temple Salt Lake City, UT 84116

ORGANIZATION, SIGNATURE & DATE

Printed Name and Title: BILL W. CLIFTON - ENGINEERING MANAGER

Printed Name and Title: _____

Printed Name and Title: _____

Printed Name and Title: _____

Printed Name and Title: _____

Printed Name and Title: _____

Printed Name and Title: _____

APPROVAL PAGE (Continued)

By my signature, I acknowledge that I, or my representative, have reviewed and approved this Emergency Action Plan for the LAI and LDWP located near Farmington, New Mexico and agree to the tasks and responsibilities assigned herein for my organization.

ORGANIZATION, SIGNATURE & DATE

8. _____
Signature Organization Date

Printed Name and Title:

9. _____
Signature Organization Date

Printed Name and Title:

10. _____ Signature _____ Organization _____ Date _____

Printed Name and Title: _____

11. _____ Signature _____ Organization _____ Date _____

Printed Name and Title: _____

12. _____ Signature _____ Organization _____ Date _____

Printed Name and Title: _____

13. _____ Signature _____ Organization _____ Date _____

Printed Name and Title: _____

14. _____ Signature _____ Organization _____ Date _____

Printed Name and Title: _____

APPROVAL PAGE (Continued)

By my signature, I acknowledge that I, or my representative, have reviewed and approved this Emergency Action Plan for the LAI and LDWP located near Farmington, New Mexico and agree to the tasks and responsibilities assigned herein for my organization.

ORGANIZATION, SIGNATURE & DATE

15. _____
Signature Organization Date

Printed Name and Title: _____

16. _____
Signature Organization Date

Printed Name and Title: _____

17. _____
Signature Organization Date

Printed Name and Title: _____

8.0 REFERENCES

This section provides the list of materials used in the preparation of the LAI and LDWP Emergency Action Plan.

- (1) Association of State Dam Safety Officials Journal of Dam Safety (2008). *Evacuation vs. Inundation: Which Map Should Your Emergency Action Plan Contain?* Volume 6, Issue 4 – 2008.
- (2) Federal Emergency Management Agency (1998). *Federal Guidelines for Dam Safety: Emergency Action Planning for Dam Owners*, prepared by the Interagency Committee on Dam Safety, October, pp. 34.
- (3) Stantec Consulting, Inc. (2002). *Morgan Lake Dam, Dam Failure Simulation*, prepared for the Arizona Public Service Company, New Mexico. August.
- (4) Stantec Consulting, Inc. (2004). *Emergency Action Plan for Morgan Lake Dam*, prepared for the Arizona Public Service Company, New Mexico. June. 3rd Revision, November 2006.
- (5) New York State Department of Environmental Conservation (1987). *An Owner's Guidance Manual For the Inspection and Maintenance of Dams in New York State*.

APPENDIX A

PLANS FOR TRAINING, EXERCISING, AND UPDATING THE EAP

A.1 PLANS FOR TRAINING AND EXERCISE

The LAI and LDWP owner (through its duly designated EAP Coordinator [Engineering Manager]) shall advise the involved agencies and parties of scheduled training or exercises (see Section 3.6 for types of exercise), and coordinate with the local communities involved to exercise all or portions of this EAP as part of Arizona Public Service Company's all-hazard exercise program schedule.

A.2 UPDATING OF THE EMERGENCY ACTION PLAN

The Emergency Action Plan shall be reviewed every year or as needed by the owner through its duly designated EAP Coordinator with the aim to improve and update the plan. Upgrading the plan shall incorporate feedback from emergency response agency officials resulting from the review and evaluation of the existing EAP or from the conduct of a drill or an exercise pertaining to the execution of the EAP.

During the review of the existing EAP, the owner (through its duly designated EAP Coordinator) shall have the following responsibilities:

- Conduct an on-site inspection and review of the flood inundation area for any increase in downstream development and revise the evacuation map, if needed.
- Review, revise, or improve surveillance conditions around the vicinity of the LAI and LDWP, as needed.
- Advise and coordinate with the designated consultant if population increases or development within the inundation area could impact the emergency response requirements. If so, a new or revised EAP shall be developed.
- Obtain concurrence from emergency response agency officials attesting to their continued understanding of their role(s) and involvement in the EAP.
- Submit the revised EAP document to the New Mexico Office of the State Engineer, Dam Safety Bureau for approval.

APPENDIX B
REPORT FORMS

This Appendix contains four report forms to be used by personnel involved in emergency activities. These report forms are used as means to compile relevant information on the flooding emergency associated with the failure of the LAI and/or LDWP. The information provided will catalog the steps undertaken and provide estimates of manpower and cost, which could streamline various action plans described in the document.

A. Situation Reports

When a flood emergency or disaster occurred involving the failure of the LAI and/or LDWP, the Situation Report should be forwarded to the Plant Manager of Environmental and Engineering and others as appropriate. Initial reports may be fragmentary. Data will be transmitted by reference to “line item” and be supplemented as additional information becomes available.

B. After-Action Report

- When emergency operations are ended, each involved department should submit the After-Action Report.
- Reports need to contain estimates of operational costs. Supplementary reports should be made as requested and as defined data becomes available.

C. Contact Log Sheet

This sheet should be completed by the person who is making the call to provide information on the emergency situation.

D. Dam Inspection Form

This form serves as an on-going indicator of seepage condition at the LAI and/or LDWP. It also serves to provide guidance to the inspection personnel.

SITUATION REPORT

Item

- 1 Report No. _____ Date/Time: _____
- 2 From: _____
- 3 To: _____
- 4 Nature of Emergency: _____
- 5 Location of Emergency: _____

- 6 Date/Time of Occurrence: _____
- 7 Casualties: a. Injured _____ b. Dead _____ c. Homeless _____
- 8 Property Damage: _____

- 9 Actions Taken (Details in Remarks):
a. Declaration of Emergency _____ c. Movement of People _____
b. Evacuation _____ d. Movement of Supplies _____
- 10 Assistance Required:
a. Personnel: Skill/Number _____
b. Equipment: Type/Number _____

c. Other Resources: _____

- 11 Is area accessible? _____

SITUATION REPORT (continued)

12. Communications Available: _____

13. Actions Taken by:

a. American Red Cross: _____

b. Others: _____

14. Remarks: _____

AFTER-ACTION REPORT

1. Department Making Report: _____
2. Period of Emergency Operations: _____
3. Nature of Emergency: _____
4. Departments or Jurisdictions which you supported:
 - a. _____ d. _____
 - b. _____ e. _____
 - c. _____ f. _____
5. What was your Emergency Support Function?

6. Manpower:
 - a. Total number of Employees participating in the Emergency Function:

 - b. Regular Man-hrs, Total: _____ c: Overtime Man-hrs, Total: _____
 - d. Employees Injured, No.: _____ e. Estimated Hours Lost: _____

ESTIMATED EMERGENCY MANPOWER EXPENDITURES

JOB TITLES	NUMBER OF PERSONS	ESTIMATED COST TO DEPARTMENT

AFTER-ACTION REPORT (continued)

7. Resources:

a. Expenditures of Department-owned Resources: Estimated Total: \$ _____

b. Expenditures for Emergency Requirements: Estimated Total: \$ _____

c. Description of Expended Materials: _____

8. Damage or Loss of Owned Property: Estimated Total: \$ _____

Description: _____

8. Summary of Activities Related to your Emergency Support Function:

Signed: _____
Department Representative

CONTACT LOG SHEET

Name: _____

Page: _____

Title: _____

Person Calling: _____

Date: _____

Title: _____

Time: _____

Phone Number: _____

Alert Status: Red Alert Yellow Alert Test
 (Circle One)

Description of Problem: (Location, Size, Current Conditions, etc.)

Notes:

Person Being Called: _____

Time: _____

Title: _____

Phone Number: _____

Notes:

CONTACT LOG SHEET (continued)

Person Being Called: _____ Time: _____

Title: _____ Phone Number: _____

Notes:

Person Being Called: _____ Time: _____

Title: _____ Phone Number: _____

Notes:

Person Being Called: _____ Time: _____

Title: _____ Phone Number: _____

Notes:

**Arizona Public Service Company (APS)
Four Corner Plant Power
4-C**

Dam Inspection Report

DAM NAME:	DATE OF INSPECTION:	COUNTY:
Lined Ash Impoundment		San Juan County

EARTH EMBANKMENT

	UPSTREAM	CROWN	DOWNSTREAM
ACCESS ROAD CONDITION			
EROSION			
SEEPAGE			
SLIDES, SLUMPS & CRACKS			
ANIMAL BURROWS			
EXISTING CONDITIONS			
DEBRIS & OBSTRUCTIONS			
LINER CONDITION			
REMARKS			

DESCRIBE CONDITION OF THE FOLLOWING ITEMS

DAM, STRUCTURE: (Check for erosion, location of cracking or spalling, if old or new, settlement, need for crack repairs)
CREST OF DAM: (Check for cracking or settlement, look at liner condition)
PUMPS, VALVES AND GATES. (check condition for leakage or vandalism)
OUTLET PIPE: (Check for damage from ice, logs, vandalism, condition of outlet pipe coating, outflow erosion issues.)
INSTRUMENTATION DATA: (check of piezometric and settlement data)

RECOMMENDATIONS

List work needed, how to be done, by whom, recommended completion date. If emergency, to what extent. ADDITIONAL COMMENTS.
--

Inspection Ordered By: William Clifton
Plant Engineering Manager / Dam Agent

Dennis Carlson, Systems Engineer III
Inspector's Name (Printed)

Arizona Public Service
Company – Address

Signature

Fruitland, New Mexico, 87416
City, State, Zip Code

Please submit this complete report and photographs of the dam, downstream channel, and deficiencies cited in the report to:

William Clifton, Engineering Manager
APS – Four Corners Power Plant

**Arizona Public Service Company (APS)
Four Corner Plant Power
4-C**

Dam Inspection Report

DAM NAME:	DATE OF INSPECTION:	COUNTY:
Lined Decant Water Pond		San Juan County

EARTH EMBANKMENT

	UPSTREAM	CROWN	DOWNSTREAM
ACCESS ROAD CONDITION			
EROSION			
SEEPAGE			
SLIDES, SLUMPS & CRACKS			
ANIMAL BURROWS			
EXISTING CONDITIONS			
DEBRIS & OBSTRUCTIONS			
LINER CONDITION			
REMARKS			

DESCRIBE CONDITION OF THE FOLLOWING ITEMS

DAM, STRUCTURE: (Check for erosion, location of cracking or spalling, if old or new, settlement, need for crack repairs)
CREST OF DAM: (Check for cracking or settlement, look at liner condition)
PUMPS, VALVES AND GATES. (check condition for leakage or vandalism)
OUTLET PIPE: (Check for damage from ice, logs, vandalism, condition of outlet pipe coating, outflow erosion issues.)
INSTRUMENTATION DATA: (check of piezometric and settlement data)

RECOMMENDATIONS

List work needed, how to be done, by whom, recommended completion date. If emergency, to what extent. ADDITIONAL COMMENTS.

Inspection Ordered By: William Clifton
Plant Engineering Manager / Dam Agent

Dennis Carlson, Systems Engineer III
Inspector's Name (Printed)

Arizona Public Service
Company – Address

Signature

Fruitland, New Mexico, 87416
City, State, Zip Code

Please submit this complete report and photographs of the dam, downstream channel, and deficiencies cited in the report to:

William Clifton, Engineering Manager
APS – Four Corners Power Plant

STANDARD OPERATING PROCEDURE**LEVEL 2**OPS-FC-45-EN-CM-0001 0446 PERFORM SEVEN-DAY COAL
COMBUSTION RESIDUAL (CCR) UNIT INSPECTIONS

Version 1

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**ATTACHMENT 2: 7-Day Inspection for CCR Surface Impoundments**

1 CCR Surface Impoundment Name – Check the box for the CCR Unit covered by this summary inspection form.

☐ FC – Lined Ash Impoundment

FC_SI_InspW_008_(Date)

Example:

FC_SI_InspW_008_2015Oct07

☐ FC – Lined Decant Water Pond

FC_SI_InspW_009_(Date)

Example:

FC_SI_InspW_009_2015Oct07

☐ FC – Combined Waste
Treatment Pond

FC_SI_InspW_012_(Date)

Example:

FC_SI_InspW_012_2015Oct07

2 Document the CCR Surface Impoundment Condition

	Is an Action Needed?				Condition Summary
	Monitor	Repair	Investigate	No Action	
a	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Water Level and Solids Level Do levels appear to be excessive?
					Dam Crest
b	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Signs of settlement, slides or depressions?
c	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Signs of misalignment?
d	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Are there signs of longitudinal or transverse cracking?
e	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Are there animal burrows?
f	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Is there vegetation present that impedes the visual inspection of the unit?
g	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Are there signs of erosion?
					Upstream Slope
h	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Are there signs of erosion?
i	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Is there vegetation present that impedes the visual inspection of the unit?
j	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Are there signs of longitudinal or transverse cracking?
k	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Does rip/rap appear inadequate (stone deterioration, etc.)?
l	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Signs of settlement, slides or depressions?
m	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Are there animal burrows?
					Downstream Slope
n	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Are there signs of erosion?
o	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Is there vegetation present that impedes the visual inspection of the unit?
p	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Are there signs of longitudinal or transverse cracking?
q	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Does rip/rap appear inadequate (stone deterioration, etc.)?
r	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Signs of settlement, slides or depressions?
s	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Are there animal burrows?
t	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Are there soft spots or boggy areas, or signs of water leakage?
u	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Is there movement beyond the toe?
					Abutment Contacts
v	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Are there signs of erosion?
w	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Are there signs of differential movement?
x	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Is cracking present?
y	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Signs of settlement, slides, depressions or bulges?
z	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Are there signs of seepage?
aa	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Are there animal burrows?

>>Inspection form continued, next page.>>

STANDARD OPERATING PROCEDURE

LEVEL 2

OPS-FC-45-EN-CM-0001 0446 PERFORM SEVEN-DAY COAL
COMBUSTION RESIDUAL (CCR) UNIT INSPECTIONS

Version 1

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3 Follow-up Documentation

	Yes	No	Not Applicable	
Was a CAR written?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	CAR #:
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	CAR #:

4 Signatures

INSPECTOR (QUALIFIED OPERATOR; QUALIFIED SHIFT SUPERVISOR; OR ENVIRONMENTAL)

Print: _____

Signature/Date: _____

SHIFT SUPERVISOR

Print: _____

Signature/Date: _____

ENVIRONMENTAL SITE SUPPORT

Print: _____

Signature/Date: _____

APPENDIX C
GLOSSARY OF TECHNICAL TERMS

ABUTMENT – The part of the valley’s hillside against which the dam abuts. Right and left abutments are those on respective sides of the dam, as an observer looks downstream.

BLOW DOWN OPERATIONS – The controlled release of lake water to maintain total dissolved solids and temperature of the lake water.

BOIL – A disturbance in the surface layer of soil caused by water escaping under pressure from behind a water-retaining structure such as a dam or a levee. The boil may be accompanied by deposition of soil particles (usually sand or silt) in the form of a ring (miniature volcano) around the area where the water escapes.

BREACH – An opening or a breakthrough of a dam sometimes caused by rapid erosion of a section of earth embankment by water.

CONDUIT – A pipe or a channel used to convey water through or around or under a dam.

CRACK IN THE EMBANKMENT – A fissure or an opening in the embankment.

CREST OF DAM – The crown of an overflow section of the dam. In the United States, the term “crest of dam” is often used when “top of dam” is intended. To avoid confusion, the terms “crest of spillway” and “top of dam” should be used for referring to the overflow section and dam proper, respectively.

CULVERT – A drain or waterway structure built transversely under a road, railway, or embankment. Culverts usually comprise a pipe or a covered channel of box section. A gallery or waterway constructed through any type of dam, which is normally dry but is used occasionally for discharging water; hence the terms scour culvert, drawoff culvert and spillway culvert.

DAM – A barrier built (typically across a watercourse) for impounding or diverting the flow of water.

DAM FAILURE – The uncontrollable release of dam’s impounded water. It is recognized that there are degrees of failure. Any malfunction or abnormality, outside the design assumptions and parameters, which adversely affect a dam’s primary function of impounding water, is properly considered a failure. Minor malfunctions or abnormalities can result in a sudden failure of a dam.

EARTH DAM (EARTHFILL DAM) – An embankment dam in which more than 50% of the total volume is comprised of compacted fine-grained earth.

FLDWAV – The FLDWAV program, developed by the National Weather Service (NWS), is a generalized flood routing program with the capability to model flows through a single stream or a system of interconnected waterways.

EMBANKMENTS – Fill material, usually earth or rock, placed with sloping sides.

EMERGENCY – A condition of serious nature which develops unexpectedly and endangers the structural integrity of a dam or endangers downstream property and human life. An emergency requires immediate action.

EMERGENCY ACTION PLAN (EAP) – A formal document that identifies potential emergency conditions at a dam and specifies preplanned actions to be followed to minimize property damage and loss of life. The EAP specifies actions the dam owner should take to moderate or alleviate the problems at the dam. The document contains procedures and information to assist the dam owner in issuing early warning and notification messages to responsible downstream emergency management authorities of the emergency situation. It also contains inundation maps to show the emergency management authorities of the critical areas for action in case of an emergency.

EMERGENCY POTENTIAL – Whenever people live in an area that could be flooded by the operation or failure of a dam, an emergency potential is assumed to exist.

EROSION – The removal or separation of materials from the embankment through the action of water or wind.

FACE – With reference to a structure, the external surface that limits the structure, e.g., the face of a wall or a dam.

FAILURE – An incident resulting in the uncontrolled release of water from an operating dam.

FOUNDATION OF DAM – The natural material on which the dam structure is placed.

GROIN – That area along the contact (or intersection) of the face of a dam with the abutment.

HAZARD – A situation that creates the potential for adverse consequences such as a loss of life, property damage, and adverse social and environmental impacts. Impacts may be for a defined area downstream of a dam from floodwaters released through spillways and outlet works of the dam or waters released by partial or complete failure of the dam. This could include an area

upstream of the dam from effects of backwater flooding or effects of landslides around the reservoir perimeter.

INUNDATION AREA – The downstream area that could be flooded or otherwise affected by the failure of a dam or large flows.

INUNDATION MAP – A map delineating the area that would probably be flooded in the event of a dam failure. This map must be prepared by a registered professional engineer.

NOTIFICATION – To promptly inform appropriate individuals or emergency agency about an emergency condition so they can initiate appropriate actions.

NORMAL WATER LEVEL (NORMAL WATER POOL) – For reservoir with a fixed overflow spillway crest, it is the lowest level of that crest.

OPERATOR – The person or position in a company or organization, who is responsible for a dam's operation and surveillance.

OUTLET – A constructed opening through which water can be safely discharged for a particular purpose from a reservoir.

OWNER – Any person, authority or agency that manages a dam or reservoir.

PMP (Probable Maximum Precipitation) – Theoretically, the greatest depth of precipitation for a given duration that is physically possible over a given size storm area at a particular geographic location at a certain time of the year.

PMF (Probable Maximum Flood) – The largest flood that may reasonably be expected to occur at a given point on a stream from the most severe combination of critical meteorological and hydrologic conditions that are reasonably possible on a particular watershed. This term identifies estimates of hypothetical flood characteristics (peak discharge, volume, and hydrograph shape) that are considered to be the most severe “reasonably possible” at a particular location, based on relatively comprehensive hydro meteorological analyses of critical runoff-producing precipitation (and snowmelt, if pertinent) and hydrologic factors favorable for maximum flood runoff. The maximum runoff condition resulting from the most severe combination of hydrologic and meteorological conditions that are considered reasonably possible for the drainage basin under study.

RIPRAP – A layer of large uncoursed stones, broken rock, boulders, pre-cast block, bags of cement, or other suitable material generally placed in random fashion on the upstream and downstream faces of embankment dams, stream banks, on a reservoir shore, on the sides of a channel, or other land surfaces to protect them from erosion or scour caused by current, wind, wave, and/or ice action. Very large riprap is sometimes referred to as “armoring.”

SEEPAGE – The movement of water that might occur through the dam, its foundation or its abutment. Small amounts of clear water seepage is normal. Increase in the amount of water flow or change in color is a concern for a dam’s safety.

SETTLEMENT – The degradation in the ground surface by subsidence or by sinking.

SINKHOLE – A natural depression in a land surface formed by the collapse of a cavern roof.

SLIDE – The movement of a mass of earth and/or down a slope. In embankments and abutments, this involves the separation of a portion of the slope from the surrounding materials.

SLUMPING – The sudden sinking or sliding of materials in the embankment.

SPILLWAY – A structure over or through which flows are conveyed and discharged. If gates control the flow, it is considered a controlled spillway; if the elevation of the spillway crest is the only control, it is considered an uncontrolled spillway.

SPILLWAY CHANNEL – A channel conveying water from the spillway crest to the river downstream.

THALWEG – Deepest part of a river channel in a cross section of a river profile. The path of deepest flow. Line connecting the deepest points along a riverbed. The lowest thread along the axial part of a valley. The middle or chief navigable channel of a waterway

TOE OF DAM – The junction of the downstream face of a dam with the ground surface. Also referred to as downstream toe. For an embankment dam, the junction of the upstream face with ground surface is called the upstream toe.

TOP OF DAM – The elevation of the uppermost surface of a dam, usually a road or walkway, excluding any parapet wall, railings, etc.

APPENDIX D
MEDIA ANNOUNCEMENT

Media Announcement

The media announcement associated with the failure of the LAI and LDWP is provided in this Appendix. The announcement contains three separate messages as follows: (1) a warning message; (2) an evacuation message; and (3) an incident resolved, safe return message.

Samples of the media announcement messages are provided below. These messages could be modified as necessary to fit the emergency situation.

Warning Message

“Reporting entity advises that due to the conditions developing at the LAI and LDWP at the Four Corners Power Plant, the public should avoid the area downstream of the impoundment(s) on the Chaco and San Juan Rivers.”

REPEAT PERIODICALLY

Evacuation Message

“Reporting entity is advising all residents living on the low lying sides of the Chaco River in the proximity of Towns of Shiprock and Cudei to evacuate and seek higher ground. Flooding from the LAI and LDWP at the Four Corners Power Plant could crest as high as 10 feet above the N36 bridge. Do not use the N36 bridge across the Chaco River unless directed by the highway department or police safety personnel. If you require shelter during this emergency you should report to (location of reception/mass care center).”

REPEAT PERIODICALLY

Incident Resolved, Safe To Return Message

“Reporting entity is advising residents of the area downstream of LAI and LDWP at the Four Corners Power Plant that the problem at the impoundment(s) has been resolved and that residents may return to their homes.”

REPEAT PERIODICALLY

APPENDIX E
INUNDATION MAP,
DRAWING EXHIBITS, AND
ELEVATION–AREA-CAPACITY CURVES

CONTENTS

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Figure E-1B	Simulated Flood Inundation Limits and Maximum Flow Depth for Scenario #1 (Detailed Area #1)
Figure E-1C	Simulated Flood Inundation Limits and Maximum Flow Depth for Scenario #1 (Detailed Area #2)
Figure E-1D	Simulated Flood Inundation Limits and Maximum Flow Depth for Scenario #1 (Detailed Area #2)
Figure E-2A	5280 Lift for the Lined Ash Impoundment Pond – Site Plan
Figure E-2B	5280 Lift for the Lined Ash Impoundment Pond – Longitudinal Cross Section (Sheet 24)
Figure E-2C	5280 Lift for the Lined Ash Impoundment Pond – Longitudinal Cross Section (Sheet 25)
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Figure E-3A	LAI EAC – Ash Storage
Figure E-3B	Basin H (LDWP) Elevation-Area-Capacity

INUNDATION MAP

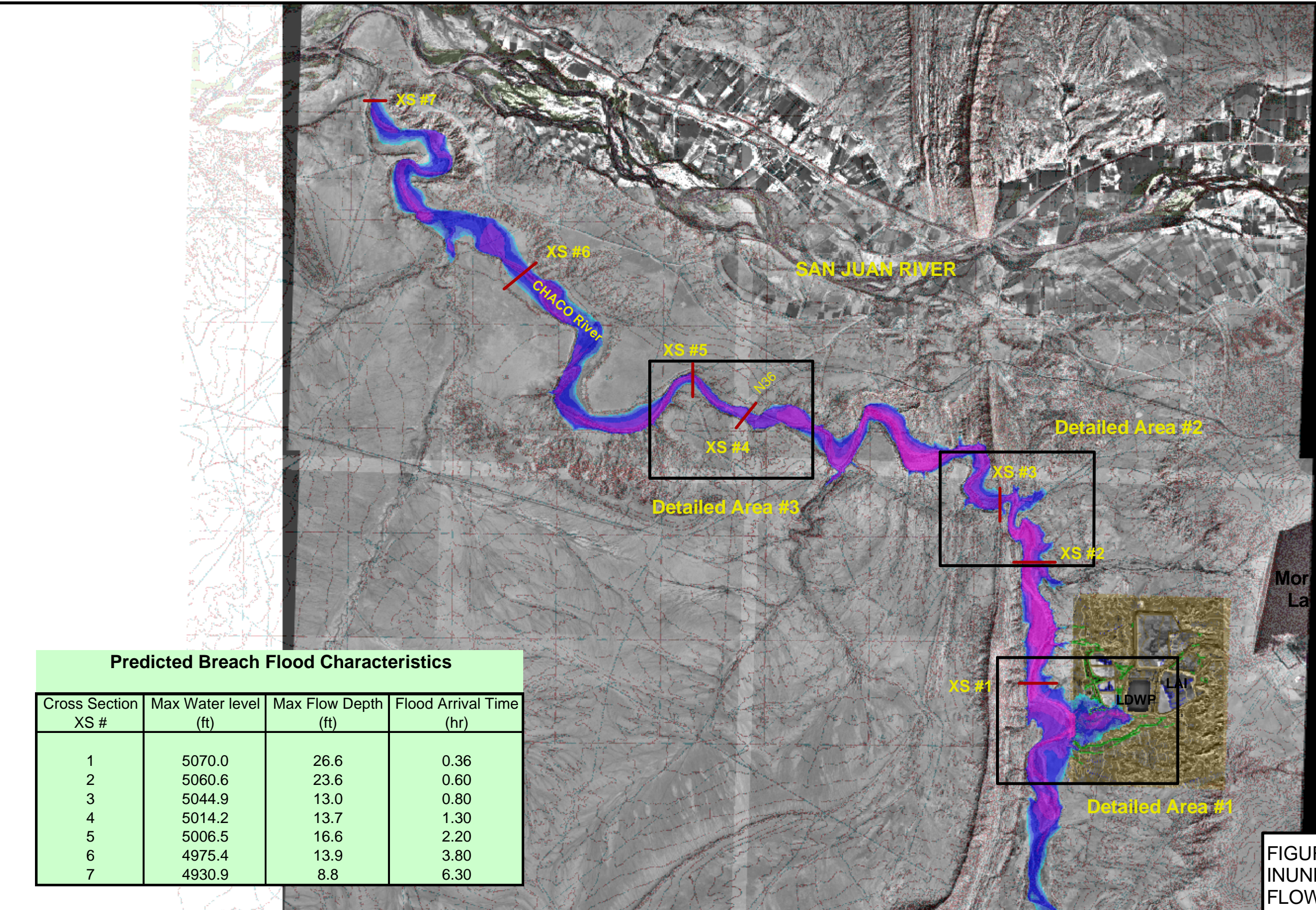


Figure E-1A

FIGURE 3-4: SIMULATED FLOOD INUNDATION LIMITS AND MAXIMUM FLOW DEPTH FOR SCENARIO #1

Predicted Breach Flood Characteristics			
Cross Section XS #	Max Water level (ft)	Max Flow Depth (ft)	Flood Arrival Time (hr)
1	5070.0	26.6	0.36
2	5060.6	23.6	0.60
3	5044.9	13.0	0.80
4	5014.2	13.7	1.30
5	5006.5	16.6	2.20
6	4975.4	13.9	3.80
7	4930.9	8.8	6.30

LEGEND

MAX FLOW DEPTH (FT)

<1

1-2.5

2.5-5

5-10

10-15

15-20

> 20

N

W

E

S

MAP SCALE

0

2,500

5,000

10,000

Feet

Note:

Due to the method, procedures, and assumptions used to develop the flooded areas, the limits of the flooding shown and wave travel times are approximate and should be used only as a guideline for establishing evacuation zones. Actual areas inundated will depend on actual failure conditions and may differ from areas shown on map.

DRAWN BY: CWV

CHECKED BY: FL

DATE: 3/24/2009

URS

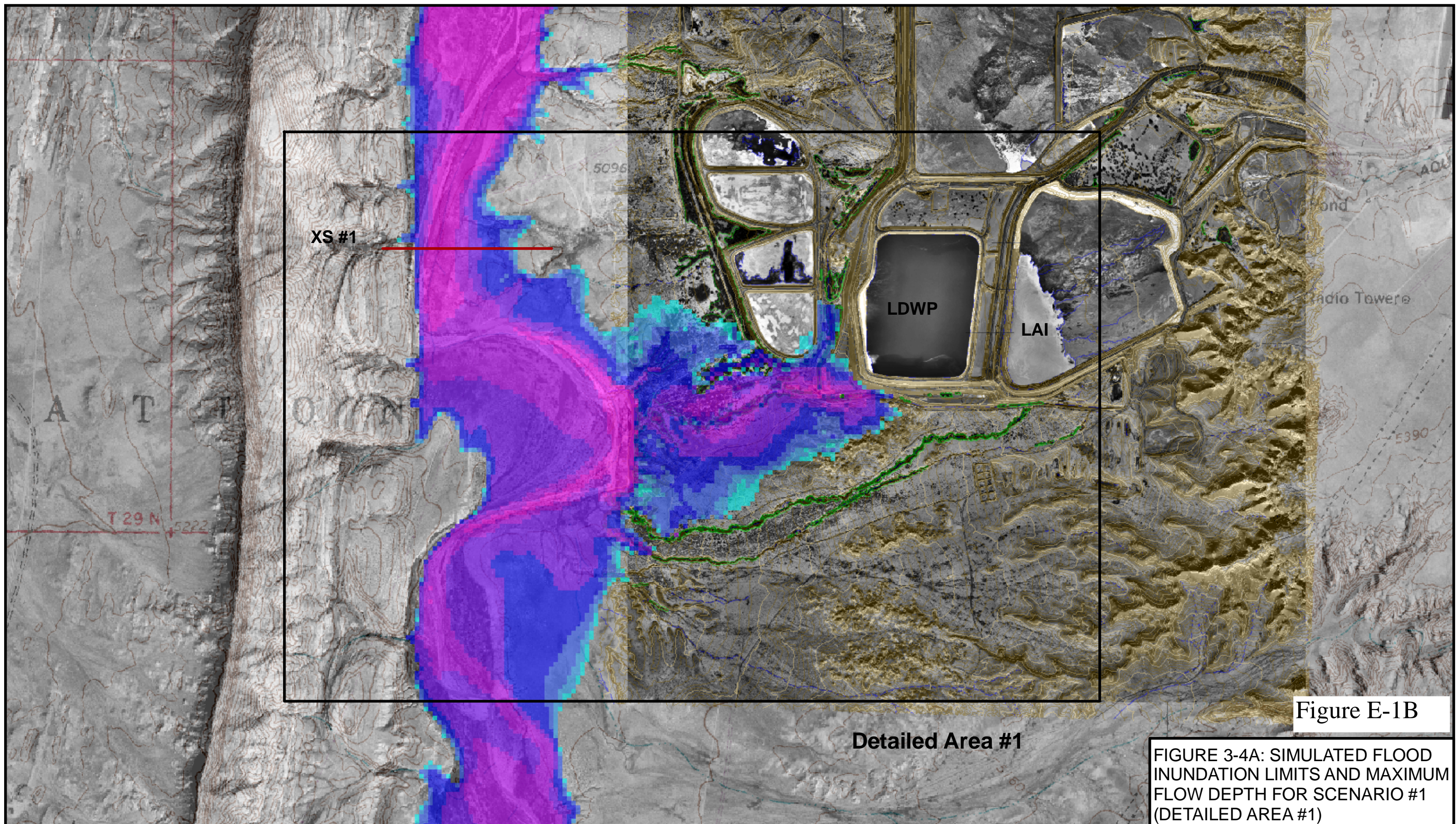


Figure E-1B

Detailed Area #1

FIGURE 3-4A: SIMULATED FLOOD INUNDATION LIMITS AND MAXIMUM FLOW DEPTH FOR SCENARIO #1 (DETAILED AREA #1)

<p>LEGEND</p> <p>MAX FLOW DEPTH (FT)</p> <p><1 1-2.5 2.5-5 5-10 10-15 15-20 >20</p>		<p>MAP SCALE</p> <p>0 500 1,000 2,000 Feet</p>	<p>Note: Due to the method, procedures, and assumptions used to develop the flooded areas, the limits of the flooding shown and wave travel times are approximate and should be used only as a guideline for establishing evacuation zones. Actual areas inundated will depend on actual failure conditions and may differ from areas shown on map.</p>	<p>DRAWN BY: CWV</p> <p>CHECKED BY: FL</p> <p>DATE: 4/30/2008</p>	
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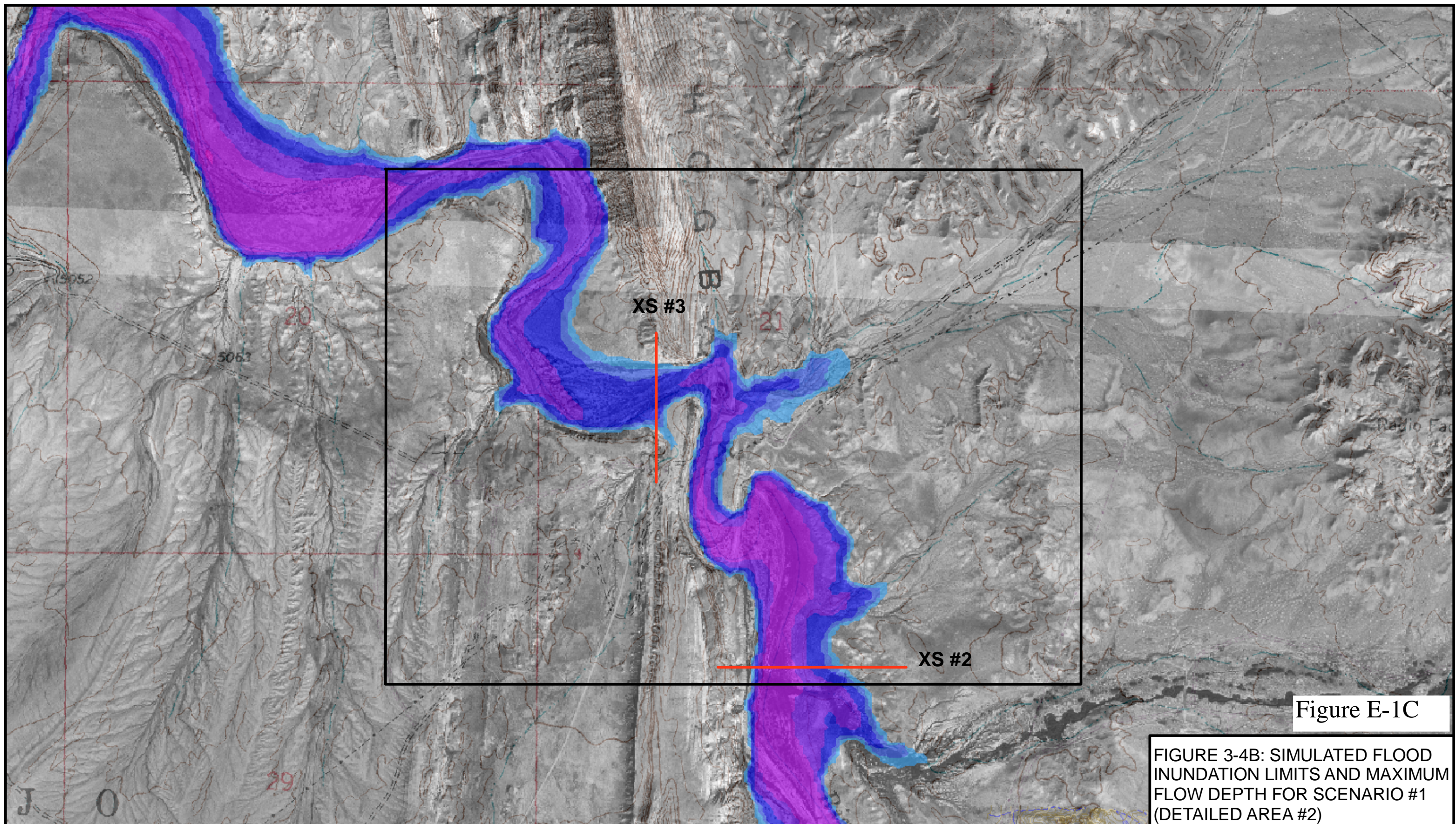
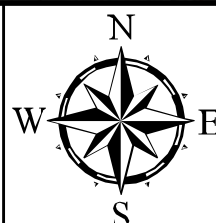
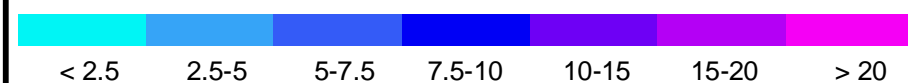


Figure E-1C

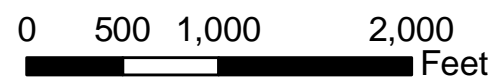
FIGURE 3-4B: SIMULATED FLOOD INUNDATION LIMITS AND MAXIMUM FLOW DEPTH FOR SCENARIO #1 (DETAILED AREA #2)

LEGEND

MAX FLOW DEPTH (FT)



MAP SCALE



Note: Due to the method, procedures, and assumptions used to develop the flooded areas, the limits of the flooding shown and wave travel times are approximate and should be used only as a guideline for establishing evacuation zones. Actual areas inundated will depend on actual failure conditions and may differ from areas shown on map.

DRAWN BY: CWV

CHECKED BY: FL

DATE: 4/30/2008

URS

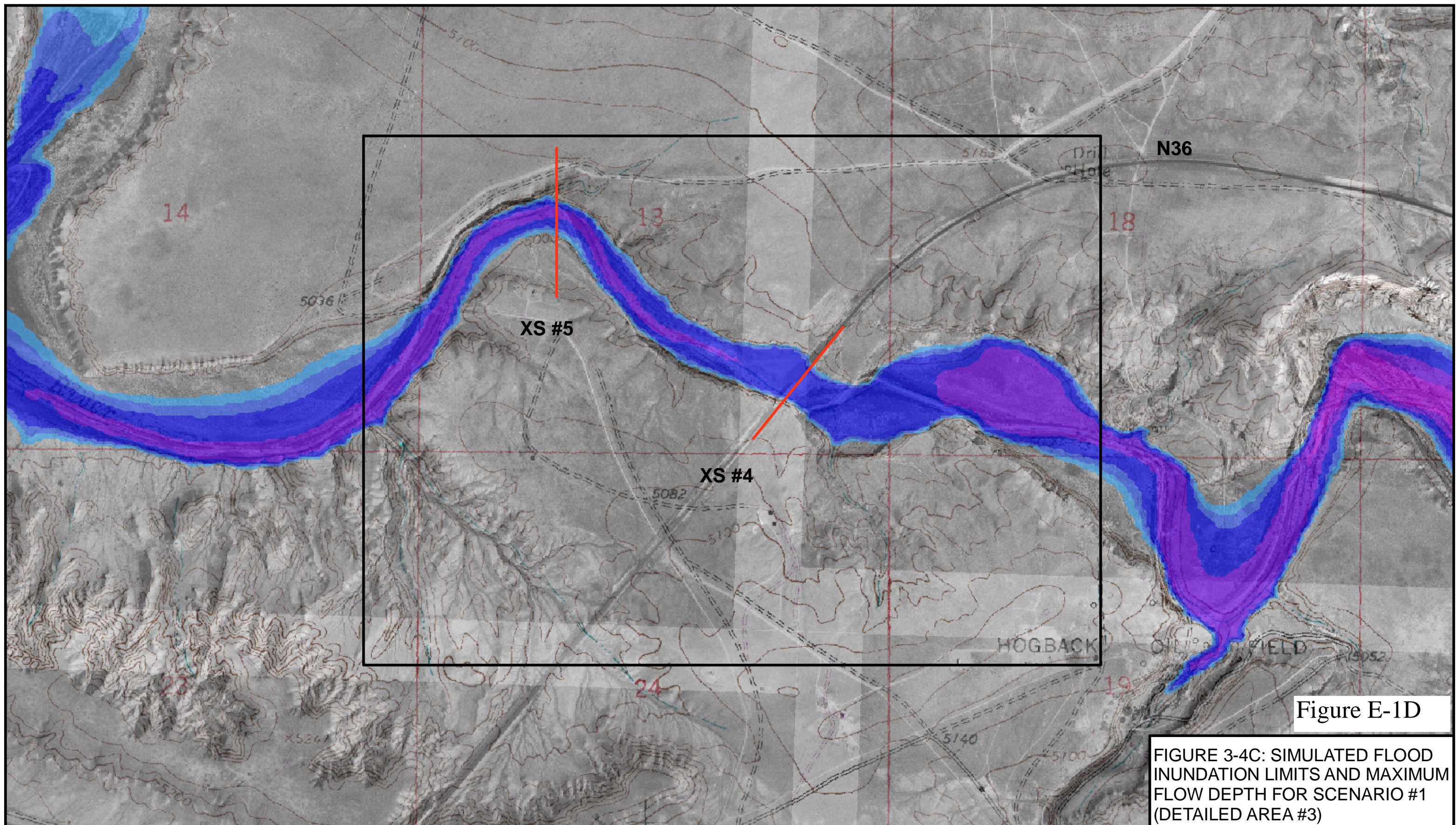
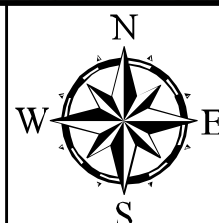
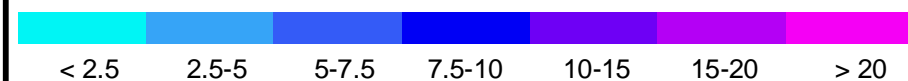


Figure E-1D

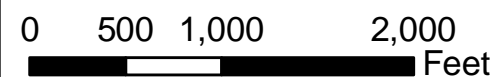
FIGURE 3-4C: SIMULATED FLOOD INUNDATION LIMITS AND MAXIMUM FLOW DEPTH FOR SCENARIO #1 (DETAILED AREA #3)

LEGEND

MAX FLOW DEPTH (FT)



MAP SCALE



Note: Due to the method, procedures, and assumptions used to develop the flooded areas, the limits of the flooding shown and wave travel times are approximate and should be used only as a guideline for establishing evacuation zones. Actual areas inundated will depend on actual failure conditions and may differ from areas shown on map.

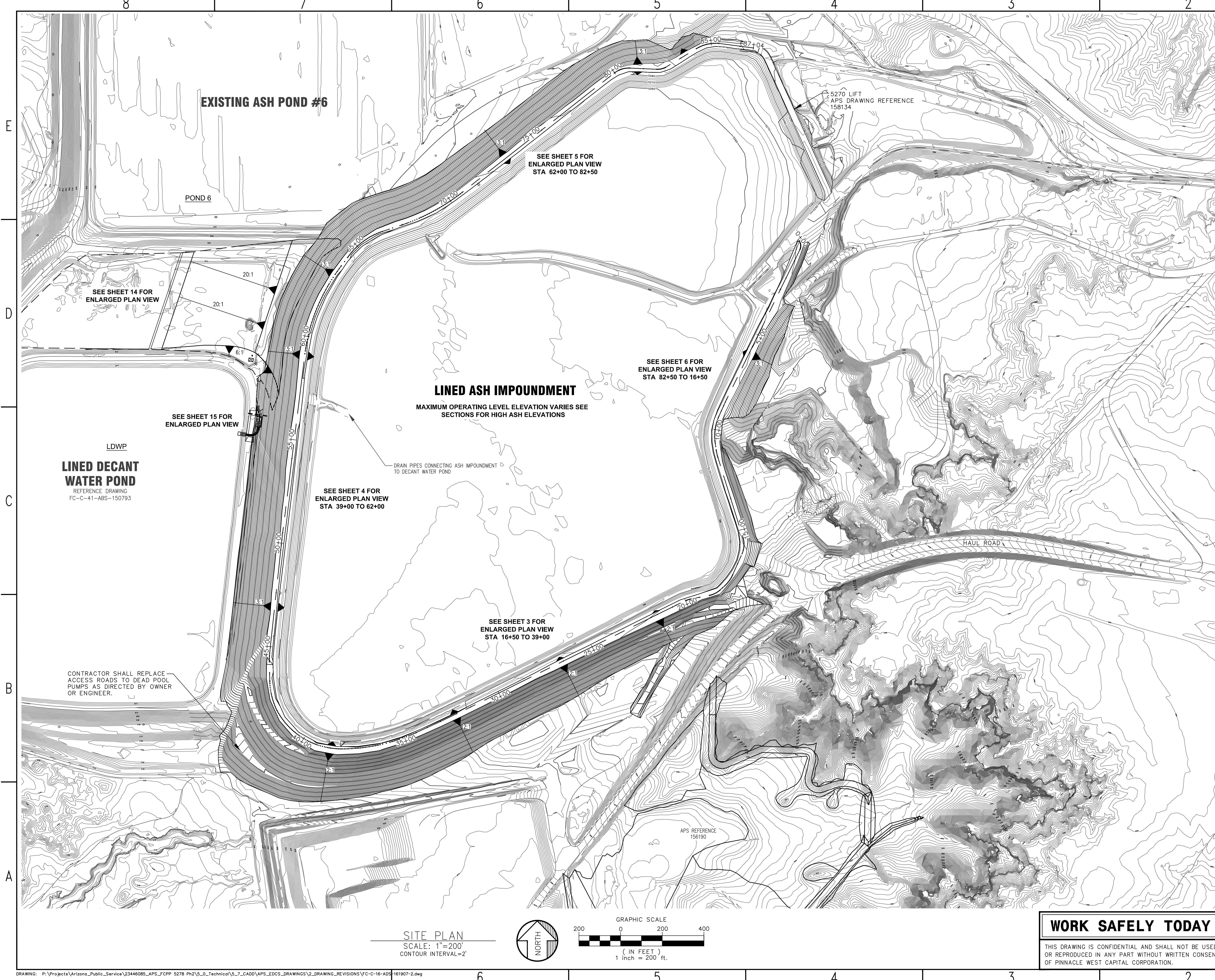
DRAWN BY: CWV

CHECKED BY: FL

DATE: 3/24/2009

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DRAWING EXHIBITS



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DATUM CONTROL
HV-53
(ACTUAL LOCATION OFF DRAWING
SEE BELOW FOR INFORMATION)

REFERENCE:
FLOWN BY AERIAL MAPPING CO, INC.
IN MAY, 2010
3141 WEST CLARENDON AVENUE
PHOENIX, AZ 85017

5275 LIFT AS-BUILT TOPO BY SOUDER,
MILLER AND ASSOCIATES ON 04-17-2013
5280 LIFT AS-BUILT TOPO BY SAKURA
ENGINEERING 125 WEST MAIN STREET
FARMINGTON, NEW MEXICO 87401

DATUM INFORMATION
CONTROL POINTS:
HV-53
SOUTHERN CALIFORNIA EDISON (SCE) BRASS CAP
NORTHING N2,070,519.859 EASTING E306,365.846 ELEVATION 5328.150'

NEW MEXICO STATE PLANE
TRANSVERSE MERCATOR-WEST ZONE
N.A.D. 1927
N.G.V.D. 1929

LEGEND
--- 5280 LIFT TOE
--- 5280 LIFT C
--- 5280 LIFT CREST

[Box] INDICATES ENLARGED PLAN VIEW

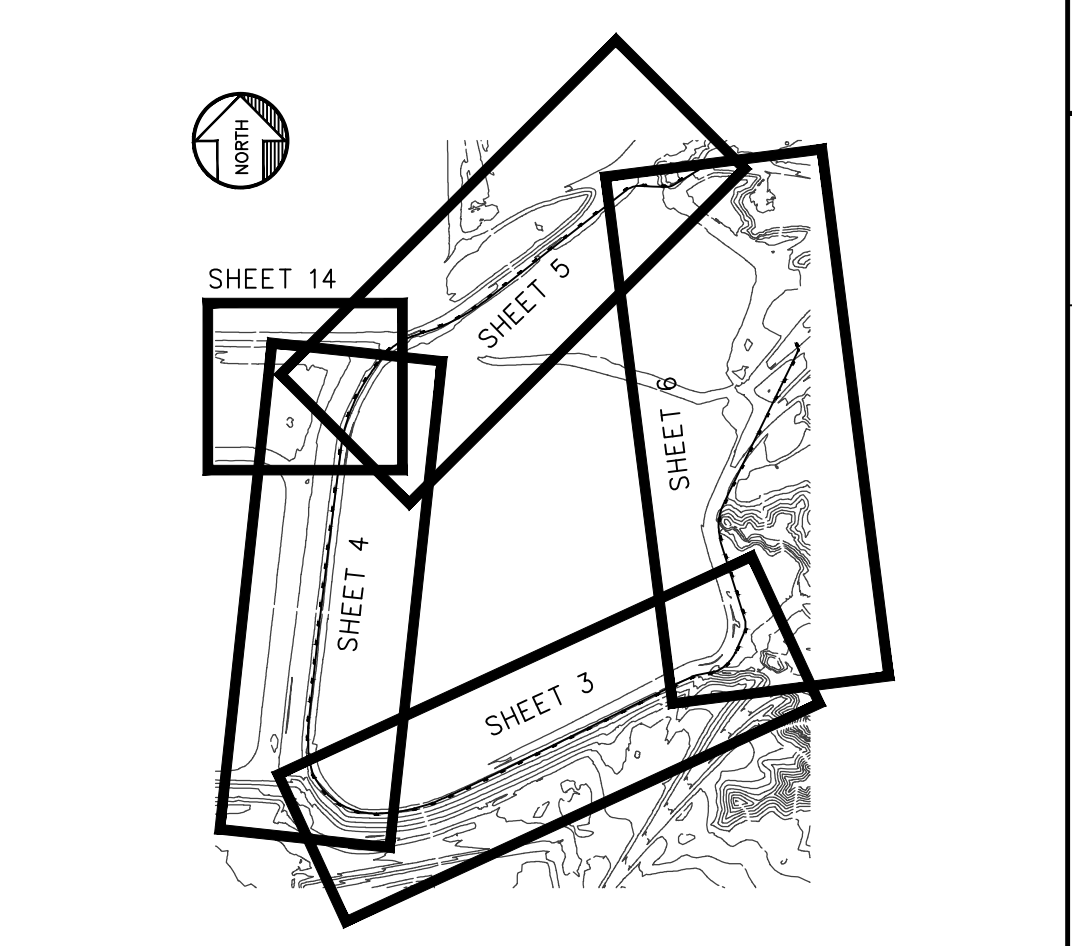

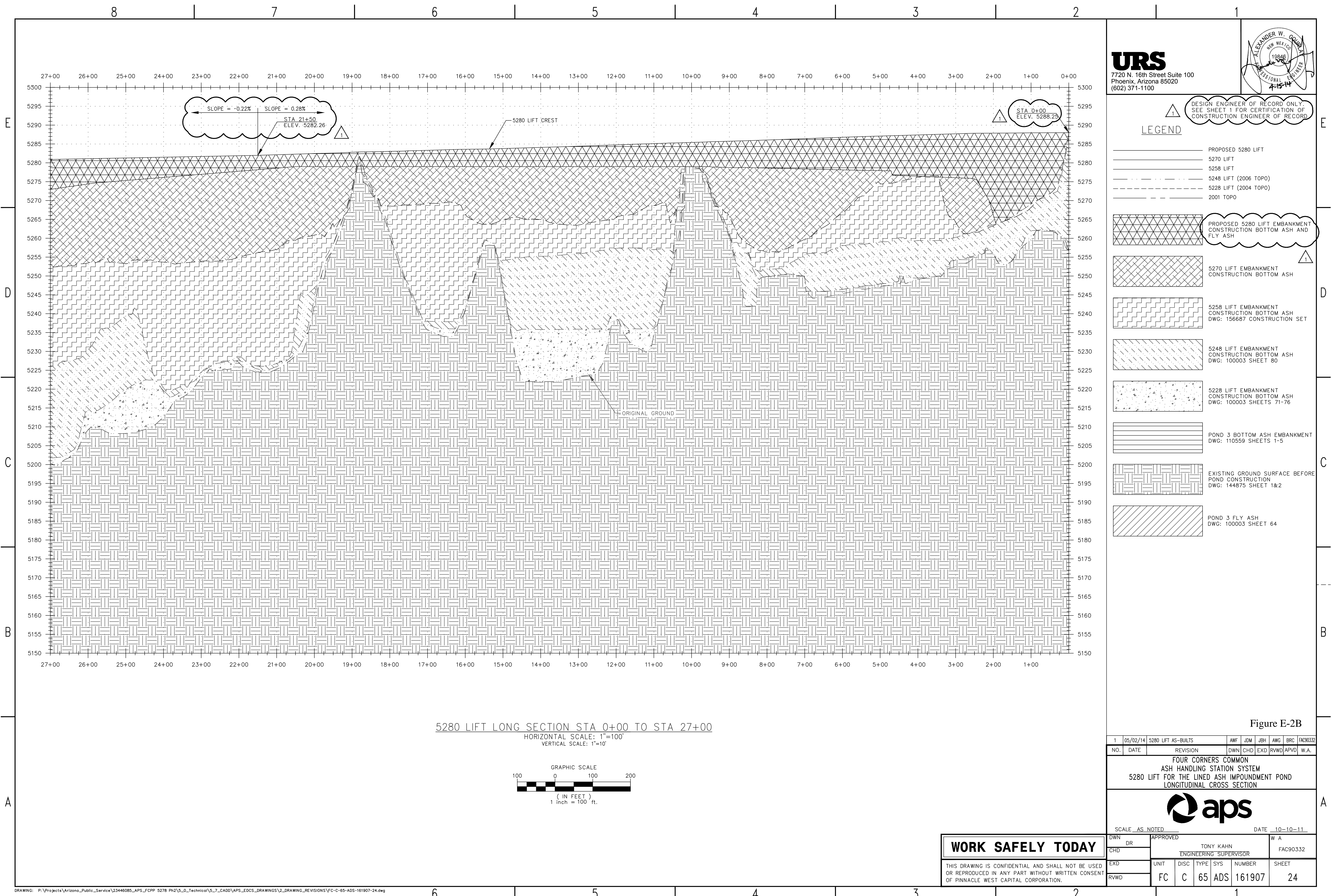
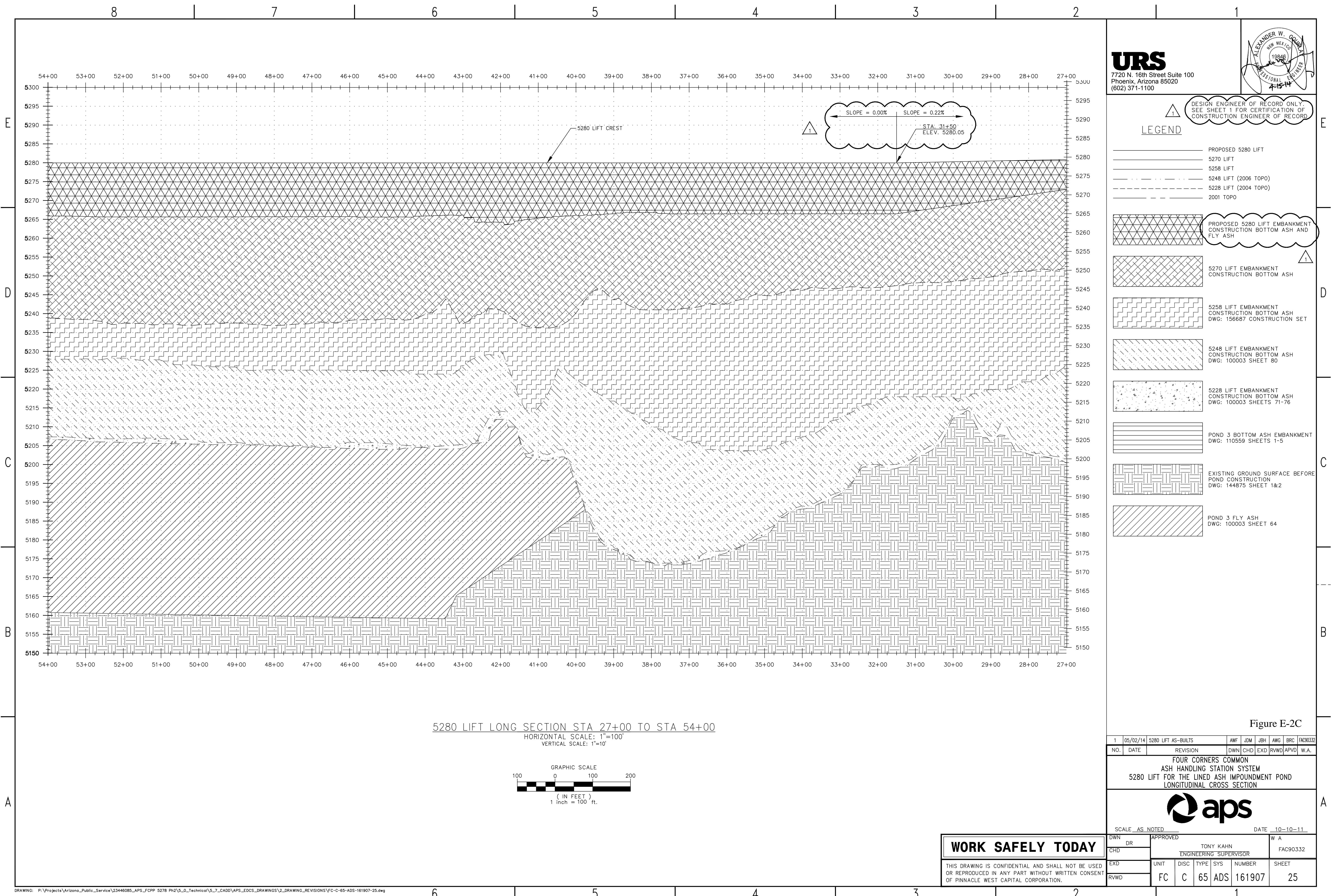
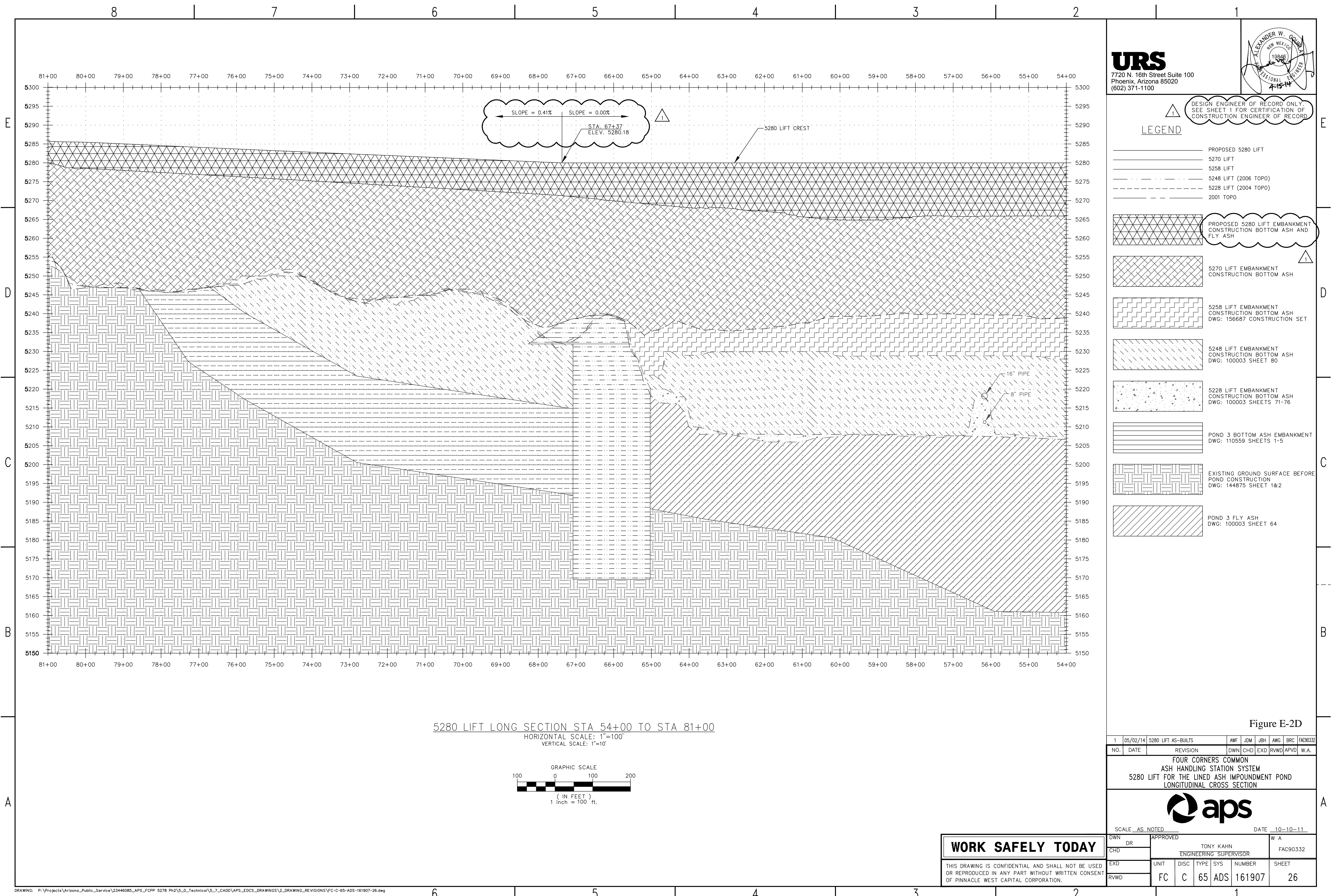


Figure E-2A

1	05/02/14	5280 LIFT AS-BUILTS	AWF	JDM	JBH	AWG	BRC	FAC90332
NO.	DATE	REVISION	DWN	CHD	EXD	RVWD	APVD	W.A.
FOUR CORNERS COMMON ASH HANDLING STATION SYSTEM 5280 LIFT FOR THE LINED ASH IMPOUNDMENT POND SITE PLAN								
								
SCALE AS NOTED			DATE 10-10-11					
DWN	DR	APPROVED					W A	
CHD		TONY KAHN ENGINEERING SUPERVISOR					FAC90332	
EXD		UNIT	DISC	TYPE	SYS	NUMBER	SHEET	
RVWD		FC	C	16	ADS	161907	2	

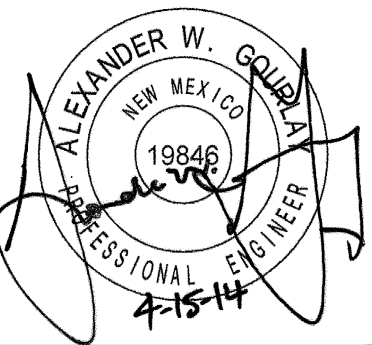






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LEGEND

- PROPOSED 5280 LIFT
- 5270 LIFT
- 5258 LIFT
- 5248 LIFT (2006 TOP0)
- 5228 LIFT (2004 TOP0)
- 2001 TOP0

PROPOSED 5280 LIFT EMBANKMENT
CONSTRUCTION BOTTOM ASH AND
FLY ASH

5270 LIFT EMBANKMENT
CONSTRUCTION BOTTOM ASH

5258 LIFT EMBANKMENT
CONSTRUCTION BOTTOM ASH
DWG: 156687 CONSTRUCTION SET

5248 LIFT EMBANKMENT
CONSTRUCTION BOTTOM ASH
DWG: 100003 SHEET 80

5228 LIFT EMBANKMENT
CONSTRUCTION BOTTOM ASH
DWG: 100003 SHEETS 71-76

POND 3 BOTTOM ASH EMBANKMENT
DWG: 110559 SHEETS 1-5

EXISTING GROUND SURFACE BEFORE
POND CONSTRUCTION
DWG: 144875 SHEET 1&2

POND 3 FLY ASH
DWG: 100003 SHEET 64

5280 LIFT LONG SECTION STA 54+00 TO STA 81+00

HORIZONTAL SCALE: 1"=100'
VERTICAL SCALE: 1"=10'

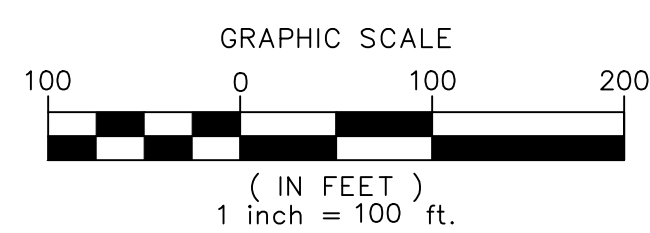


Figure E-2D

1	05/02/14	5280 LIFT AS-BUILTS	ANF	JDM	JBH	AWG	BRC	FAC90332
NO.	DATE	REVISION	DWN	CHD	EXD	RWVD	APVD	W.A.

FOUR CORNERS COMMON
ASH HANDLING STATION SYSTEM
5280 LIFT FOR THE LINED ASH IMPOUNDMENT POND
LONGITUDINAL CROSS SECTION



SCALE AS NOTED DATE 10-10-11

DWN	DR	APPROVED TONY KAHN ENGINEERING SUPERVISOR					W A
CHD							FAC90332
EXD		UNIT	DISC	TYPE	SYS	NUMBER	SHEET
RWVD		FC	C	65	ADS	161907	26

WORK SAFELY TODAY

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OF PINNACLE WEST CAPITAL CORPORATION.

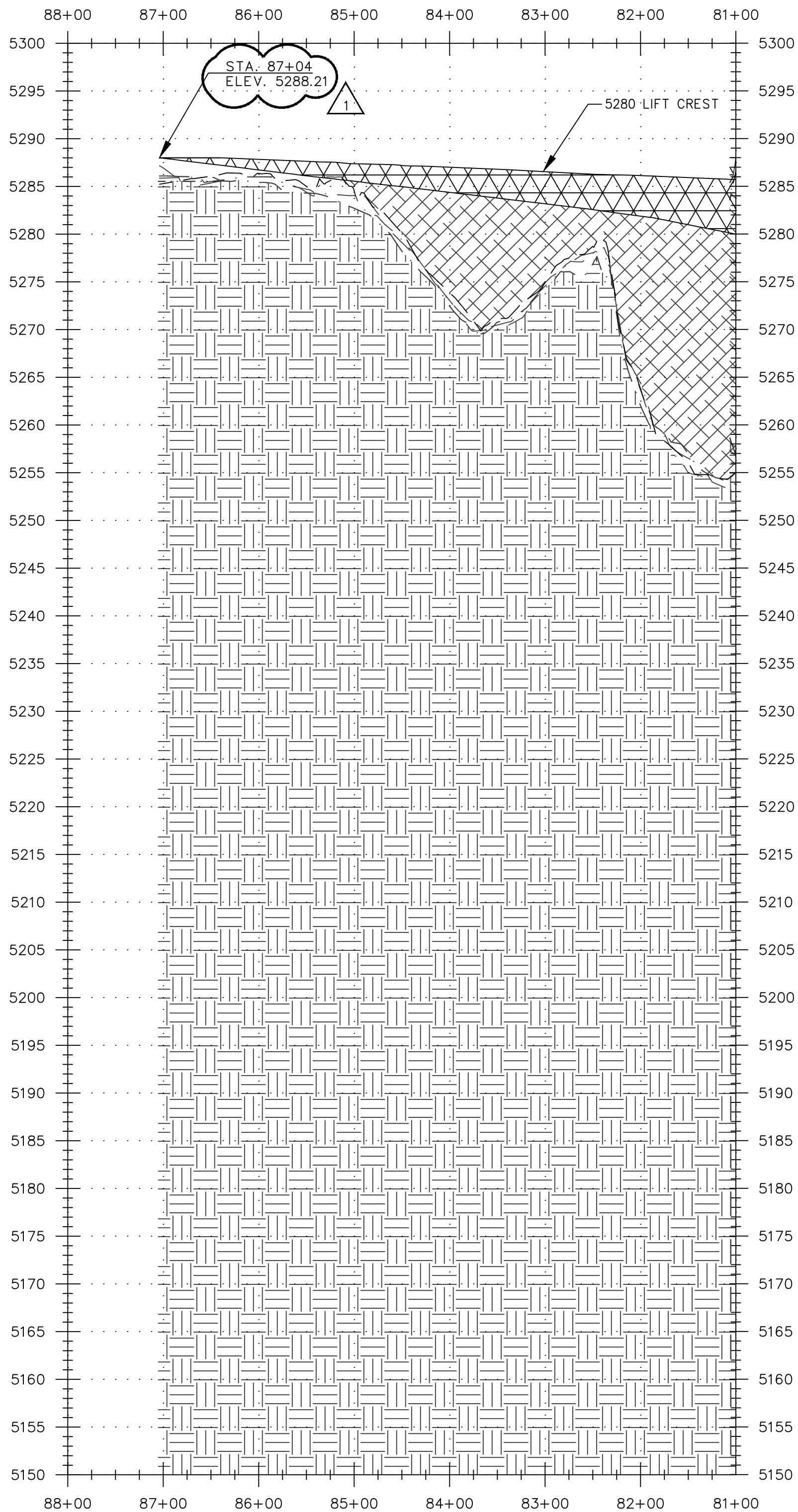
E

D

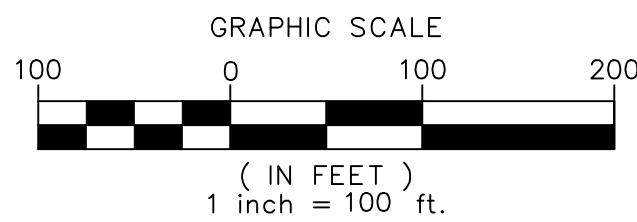
C

B

A



5280 LIFT LONG SECTION STA 81+00 TO STA 88+00
HORIZONTAL SCALE: 1"=100'
VERTICAL SCALE: 1"=10'



URS

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Phoenix, Arizona 85020
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1
LEGEND

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CONSTRUCTION ENGINEER OF RECORD

- PROPOSED 5280 LIFT
- 5270 LIFT
- 5258 LIFT
- 5248 LIFT (2006 TOP0)
- 5228 LIFT (2004 TOP0)
- 2001 TOP0

PROPOSED 5280 LIFT EMBANKMENT
CONSTRUCTION BOTTOM ASH AND
FLY ASH

5270 LIFT EMBANKMENT
CONSTRUCTION BOTTOM ASH

5258 LIFT EMBANKMENT
CONSTRUCTION BOTTOM ASH
DWG: 156687 CONSTRUCTION SET

5248 LIFT EMBANKMENT
CONSTRUCTION BOTTOM ASH
DWG: 100003 SHEET 80

5228 LIFT EMBANKMENT
CONSTRUCTION BOTTOM ASH
DWG: 100003 SHEETS 71-76

POND 3 BOTTOM ASH EMBANKMENT
DWG: 110559 SHEETS 1-5

EXISTING GROUND SURFACE BEFORE
POND CONSTRUCTION
DWG: 144875 SHEET 1&2

POND 3 FLY ASH
DWG: 100003 SHEET 64

Figure E-2E

1	05/02/14	5280 LIFT AS-BUILTS	AWF	JDM	JBH	AWG	BRC	FAC90332
NO.	DATE	REVISION	DWN	CHD	EXD	RWVD	APVD	W.A.

FOUR CORNERS COMMON
ASH HANDLING STATION SYSTEM
5280 LIFT FOR THE LINED ASH IMPOUNDMENT POND
LONGITUDINAL CROSS SECTION



SCALE AS NOTED DATE 10-10-11

WORK SAFELY TODAY

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OF PINNACLE WEST CAPITAL CORPORATION.

DWN	DR	APPROVED					W A
CHD		TONY KAHN ENGINEERING SUPERVISOR					FAC90332
EXD		UNIT	DISC	TYPE	SYS	NUMBER	SHEET
RWVD		FC	C	65	ADS	161907	27

ELEVATION-AREA-CAPACITY CURVES

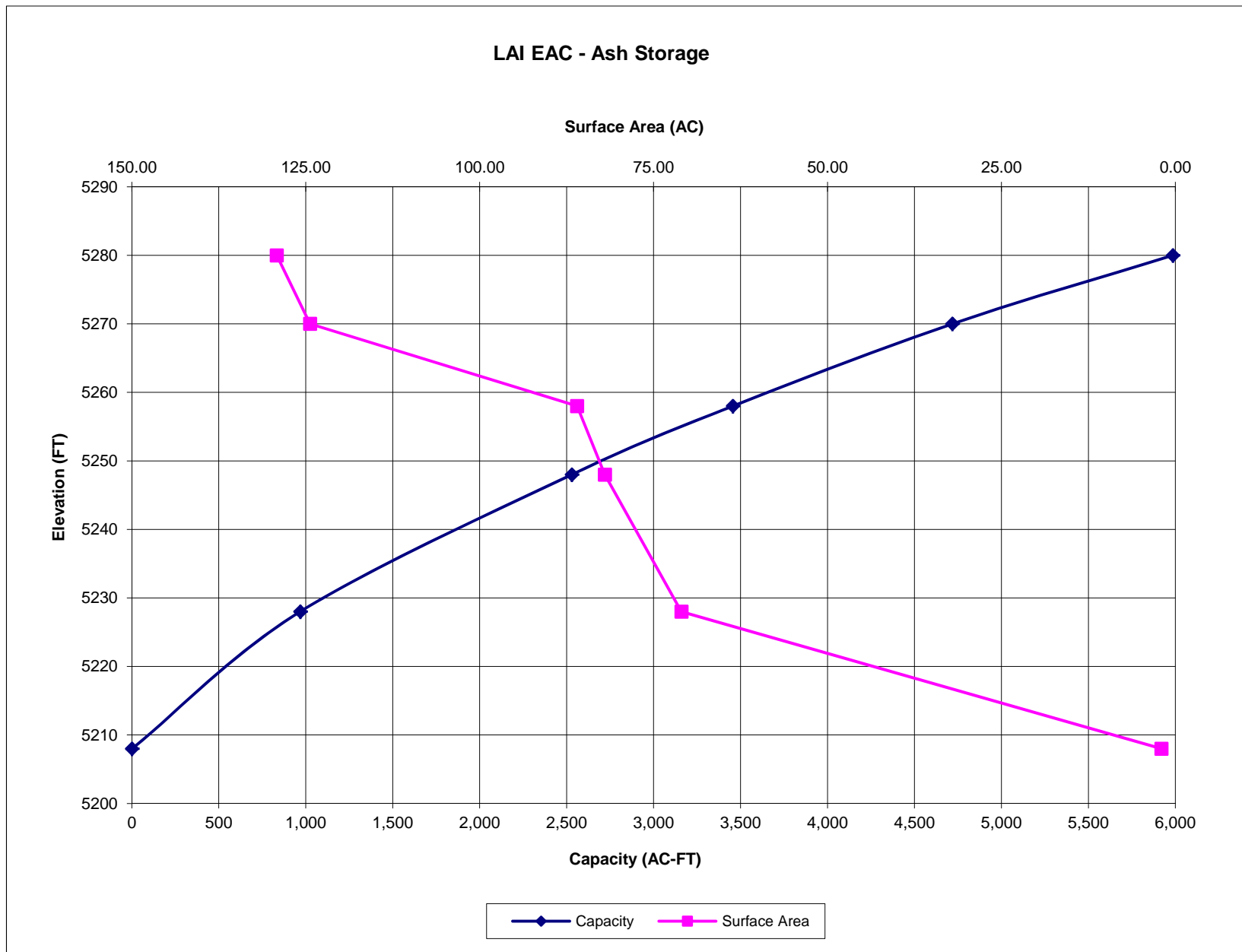


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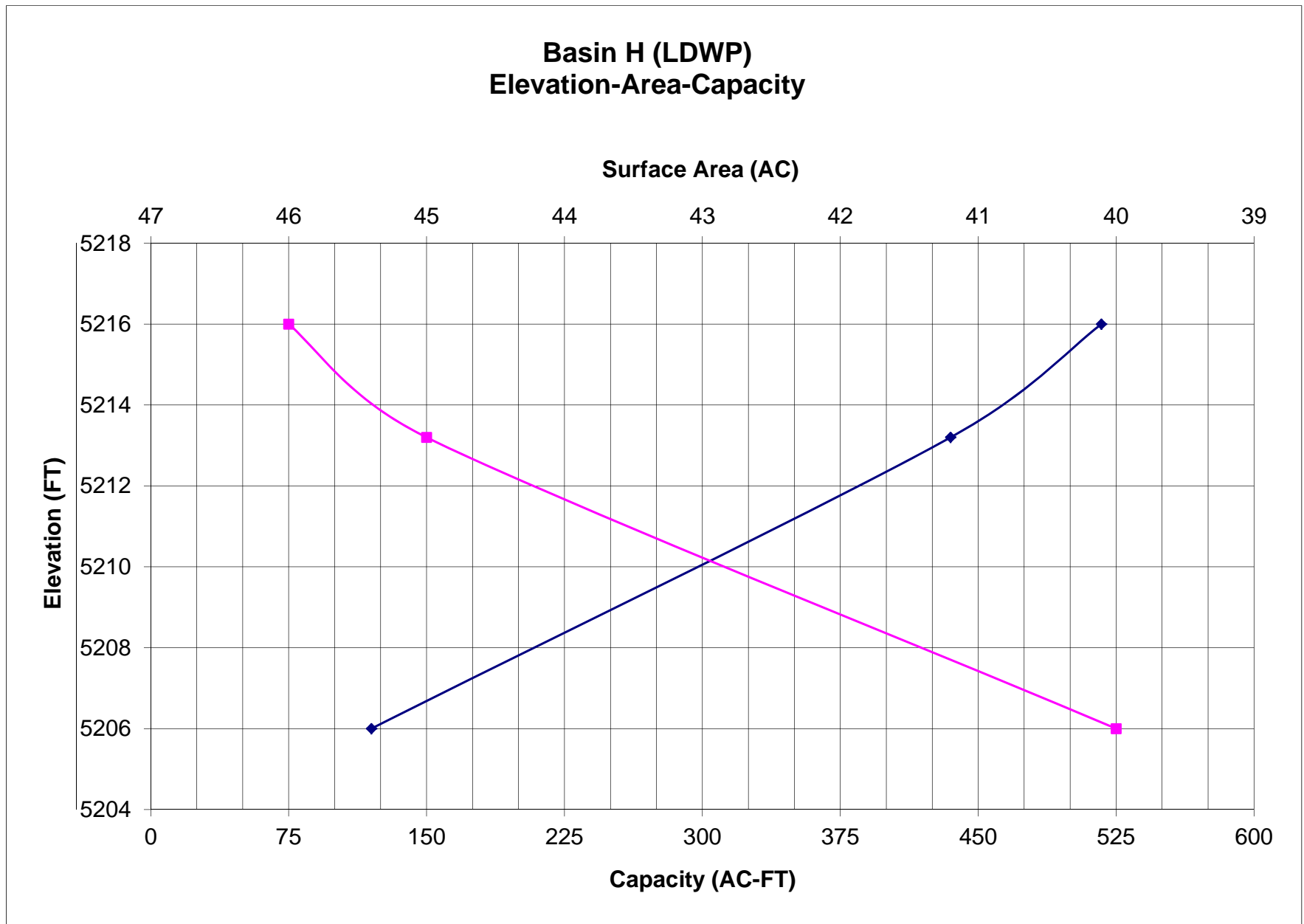


Figure E-3B