PROPOSAL: FLOOD SEDIMENT AND EROSION

Los Alamos National Laboratories

15 June 2000
0900

General: Attached to this proposal are addendums No. 1 (Preliminary Line Item Cost Estimates), No. 2 (Figures), and No.3 (Management Approach).

Facility: Los Alamos Reservoir. The Los Alamos reservoir is located in Los Alamos Canyon, about 1 mile upstream of West Omega road. This dam was built in the 1940's and is an earthen structure approximately 170' wide by 85' in height, with a capacity behind the dam estimated to be approximately 25 acre feet. There is an existing spillway structure through the center of the dam, which is grossly undersized. There is a foot bridge leading to a hiking trail and another to the intake structure.

HSWA LANL 6/P/'00

Flood control recommendations: See Figure #1

1. In anticipation of large quantities of debris flowing into the reservoir, it is suggested that both the foot bridges be removed to prevent these from acting as debris collection points.
2. With an estimated runoff volume of 115 acre-feet, this dam will be expected to overtop. It is recommended that articulating concrete mattresses (4.5" thick upstream, 8.5" thick downstream) be placed from 30' below the crest on the upstream side of the dam, across the crest, and down to the toe of the downstream side of the dam. The articulating concrete mattress should be anchored at the manufacture's required locations.
3. The downstream side of the dam should be cleared and grubbed to prepare for placement of the articulating concrete mattresses (ACM).

Additional requirements: 1. In order to accurately calculate the quantity of materials required, a survey of the structure and surrounding area should be completed.


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Costs: The costs are based upon quick estimates of 1100 SY of ACM for downstream, 760 SY of ACM upstream, and 200 SY for ACM on crest. Remove the foot bridges and miscellaneous metal, and clear and grub the downstream face.

Facility description: TA-41 Box Culvert. Location is West Omega Road in the bottom of the Los Alamos Canyon. There is an existing 8' by 15' culvert in front of the TA-41 facility, partially enclosed. The culvert is not expected to hold the predicted capacity, and will potentially be congested with debris toward the beginning of the event. The purpose of advanced measures is to protect the facility by diverting water away from the facility.

Flood control recommendations: See Figure #2

1. As an expedient temporary measure to divert the water, standard highway ("jersey") barriers are suggested with a mass fill behind them to create a stable channel. Suggest that the barriers be placed on the north bank of the channel, directing water away from the facility, toward the parking lot with additional barriers placed at the beginning of the box culvert along the south side of the channel and along the entire length of the parking lot.

Additional requirements: A suggestion for further reducing potential damage to the TA-41 facility is to open the top side of the box culvert, creating a channel. This would allow of overtopping into the road. If this were done then the barriers would need to be on the facility side of the channel (north side).

Facility description: TA-02. This facility is located at the east end of West Omega Road. An open channel runs along the front of the TA-02 facility. The north edge of the channel is lined with concrete and the south edge has a gabion structure which is not tied back to high ground.

There is a fence encroaching into the channel along the upstream end of the channel, and a traffic bridge across the channel at both ends of the facility.

Flood control recommendations: See Figure #3

1. We are in concurrence with LANL about removing the upstream traffic bridge to allow for more capacity flow through the channel and to relieve debris collection.
2. Recommend that the existing gabion structure be tied back with an additional 6' foot long gabion structure at 90 degrees from the channel. Suggest that the gabion tie back leave off the top unit to encourage the excess flow through the pilot channel.
3. Recommend that a pilot channel be excavated off the existing channel to encourage excess flow toward the road and away from the facility.
4. Concur with current operations removing debris from upstream channel and removing/relocating fence line.
5. Power poles can be protected with a diamond shaped structures of highway barriers, stabilized with random fill.

Additional requirements: Suggest that the fence at the downstream boundary be looked at as a potential debris collection point and some emergency procedures be established for leaving the road gates open

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Facility description: Roadway enbankment over Two Mile Canyon at Highway 501 This is a normal roadway structure for crossing over a culvert, and was never intended to retain water. The culvert is undersized, and is not anticipated to allow passage of even high frequent post-burn discharges.

Flood control recommendations: See Figure #4

1. Recommend that the structure be armored to allow for overtopping flows, by placing articulated concrete mattresses (ACM) from toe to road level on both sides of the roadway. To stop seepage through the structure (which might cause a failure) it is recommended that the upstream ACM be installed with impervious liner under the blocks, and the downstream ACM be installed with pervious liner.

2. It is also recommended that a corrugated metal pipe (CMP), riser (CMP) perforated to allow inflow, be installed on the upstream end of the existing culverts. The diameter of this riser should be the same as the culvert and should extend 4' above the top of the culvert

3. The USFS has installed a trash rack upstream of Highway 501. In addition, it is suggested that some additional clearing and grubbing be done on both the upstream and downstream sides of the road.

Additional requirements: In order to estimate accurate quantities of materials, a more detailed survey or site visit will be required. The cost estimates and schedule are based upon a very rough estimate of quantities.

Facility description: Pajarito Canyon at Highway 501 This structure is another roadway for crossing over a culvert, and was never intended to retain water. The culvert is undersized and will not pass the estimated flows.

Flood control recommendations: Also see Figure #4

1. Recommend that the structure be armored to allow for overtopping flows. One solution is to place articulated concrete mattresses (ACM) from toe to road level on both sides of the roadway. To stop seepage through the structure (which might cause a failure) it is recommended that the upstream ACM be installed with impervious liner under the blocks, and the downstream ACM be installed with pervious liner.

2. It is also recommended that a riser, corrugated metal pipe (CMP) perforated to allow inflow, be installed on the upstream end of the existing culverts. The diameter of this riser should be the same as the culvert and should extend 4' above the top of the culvert

3. The USFS has installed a trash rack upstream of Highway 501. In addition, it is suggested that some additional clearing and grubbing be done on both the upstream and downstream sides of road.

Additional requirements: In order to estimate accurate quantities of materials, a more detailed survey or site visit will be required. The cost estimates and schedule are based upon a very rough estimate of quantities.

Facility description: Diversion from Pajarito to Canon de Valle In order to reduce the flow down Pajarito Canyon which might impact facilities and transport soil downstream, it was suggested that a diversion channel be excavated from the river upstream of highway 501 and be routed via topography down to the the borrow pit located near S site. The following recommendations are based upon the following assumptions: 1) That accurate topo will be available, 2) that at some point highway 501 will need to be crossed over or piped under, and that the channel will be engineered.

Flood control recommendations:

1. Based upon the flow provided by the USFS, it is estimated that the channel needs to be approximately 20' wide by 4' deep with side slopes of 2 to 1. The length of the channel is estimated to be approximately .5 miles . The channel should be lined with either wire wrapped or grouted rip rap.

2. The borrow pit will need to retain approximately 100 acre feet, the dimensions will be calculated during design. The outfall channel will discharge a the tributary of Canon del Valle.

3. Blasting may be required to excavate the channel.

Additional requirements: Traffic management will be a critical requirement.

Facility description: Abandon "Land Bridge" roadway fill on Anchor Ranch Road This structure is located downstream of highway 501 on Two Mile Canyon. This structure appears to have been built with large rock and will likely be susceptible to excessive seepage and potential failure.

Flood control recommendations: See Figure #5

1. LANL is contracting to get 5 core samples at 125' intervals, along the dam. These samples should be put through a sieve analysis and or tested for seepage and stability.
2. Recommend that an impervious liner be installed from the roadway to the toe of the upstream side and 30' upstream under the reinforced toe materials.
3. Recommend that the culvert be extended upstream approximately 30' and a 5' inlet structure be installed.
4. Recommend that a reinforced toe be installed on the upstream side of the roadway. The dimensions of this should be 1) a minimum of 10' in height, 2) 13' at the top width to allow for equipment and compaction, and 3) side slopes of 1:2.5.

Additional requirements: Design can be finalized as soon as the core sample data have been received. The above fix is based upon rough estimates and assumptions.

Facility description: Anchor Ranch Road. This structure is located within a secure area of the laboratories, and will require some extra steps to deal with this requirement.

Flood control recommendations: See Figure #6

1. To deal with the security issue and installing a new riser on the upstream end of the culvert, it is recommended that a man/trash rack be installed to the dimensions of 10'h by 5' by 5'. The 5' riser should fit easily within the this fabricated metal cage.

2. Recommend that ACM be used on both the upstream and downstream side of this roadway down to the toe. Upstream will need the impervious liner, and downstream will need the pervious liner

Additional requirements: Design can be finalize as soon as the core sample data has been received, the above fix is based upon rough estimates and assumptions.

Facility description: TA-18. This facility is located below where Two Mile Canyon and Pajarito Canyon come together next to Pajarito Road. This facility is highly sensitive, and must be protected from any threat of damage. The most sensitive building on this site is Kiva #1. LANL is currently contracting with Johnson Controls to build a sheet pile wall (.25" thickness) around this facility, tying in upstream to the north bank and tapering around the facility for approximately 1000 linear feet. The current design suggest that the sheet pile need to be 1' high near to the north edge and tapering to a height of 3' at the corner of the facility, then back down to 1' at the downstream of the wall. This height differential is to accommodate the security requirements of line of sight.

Flood control recommendations:

1. The sheet pile wall, to be effective against flooding and erosion, need to be of a consistent minimum, 5-foot height.
2. It is also recommended that fill material be plowed behind the sheet pile to help retain structural integrity when deflecting large debris around the wall.
3. The sheet pile wall should also have a tie back at the downstream end to discourage the scouring around the backside of the wall.

Additional requirements: none

Costs: No cost estimate done. LANL is currently contracting this work

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Facility description: Sedimentation Basins in Los Alamos and Pueblo Canyons Due to the potential high flows through these canyons, there is a high probability of transporting sediments downstream as far as Cochiti Lake. In order to prevent these materials from exiting DOE facilities or reaching the Rio Grande, the flows need to be slowed down enough to allow the sediment to precipitate.

Flood control recommendations: See Figure #7

1. It is recommended that a series of sediment basins be places strategically within each canyon to reduce .5 to 1' of head from the flow. In Los Alamos Canyon this flow would be routed to a secondary sediment basin of approximately 10 acre feet, and then allowed to flow out an a slower rate.
2. Preliminary estimates suggest that a 100' long channel approximately 20' wide by 3' high be cut into and out of the Los Alamos Canyon sediment basin. The downstream channel should be lined with gabion mattress, to protect from erosion. The sediment basin should have a capacity of 10 acre feet
3. As series of cascading basins, approximately 4 basins along each river.

Additional requirements: An accurate topographic map is needed to identify the locations of these sedimentation basins. Additional calculations and design considerations will be necessary to identify accurate quantities and costs

Costs: The estimate of 4 million for this work is very preliminary.

Facility description: TA-18. This facility is located below where Two Mile Canyon and Pajarito Canyon come together next to Pajarito Road. This facility is highly sensitive, and must be protected from any threat of damage. The most sensitive building on this site is Kiva #1. LANL is currently contracting with Johnson Controls to build a sheet pile wall (.25" thickness) around this facility, tying in upstream to the north bank and tapering around the facility for approximately 1000 linear feet. The current design suggest that the sheet pile need to be 1' high near to the north edge and tapering to a height of 3' at the corner of the facility, then back down to 1' at the downstream of the wall. This height differential is to accommodate the security requirements of line of sight.

Flood control recommendations:

1. The sheet pile wall, to be effective against flooding and erosion, need to be of a consistent minimum, 5-foot height.
2. It is also recommended that fill material be plowed behind the sheet pile to help retain structural integrity when deflecting large debris around the wall.
3. The sheet pile wall should also have a tie back at the downstream end to discourage the scouring around the backside of the wall.

Additional requirements: none

Costs: No cost estimate done. LANL is currently contracting this work

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Addendum No. 1

Figures

DOE Emergency Work Construction Cost Summary

		Time to Complete
1. Los Alamos Dam	$ 187,340.00	5 weeks
2. TA-41	71,000.00	1 week
3. TA-02	11,425.00	2 weeks
4. Hwy 501	121,000.00	5 weeks
5. Diversion Channel	2,453,500.00	4 weeks
6. Anchor Ranch Road	194,850.00	7 weeks
7. Abandoned Land Bridge	100,675.00	6 weeks
8. Los Alamos Detention Basin	2,000,000.00 (1)	4 weeks
9. Pueblo Canyon Detention Basins	2,000,000.00 (1)	4 weeks
10. Lower Pajarito Detention Basins		
Subtotal	7,139,790.00	
Contingency @ 25%	1,784,948.00	
Subtotal	8,924,738.00	
Contr E&D 10%	892,474.00	
Const S&A 6%	535,484.00 (2)	
Total	$10,352,696.00	

(1) Very preliminary estimates pending topographic data

(2) OH - $381,290

Addendum No. 2

(See Attached PowerPoint Figures)

Los Alamos Dam

PROPOSAL SCHEDULE

Item No.	Description	Estimated Quantity	Unit	Unit Price	Estimated Amount
0001	Diversion and Care of Water	Job	Sum	***	$11,500.00
0002	Clearing and Grubbing for Articulated Concrete Mattress	2,100	S.Y.	$1.50	$3,150.00
0003	Impervious Liner	2,100	S.Y.	$7.50	$15,750.00
0004	Articulated Concrete Mattress, CC 20	760	S.Y.	$54.00	$41,040.00
0005	Articulated Concrete Mattress, CC 35	200	S.Y.	$57.00	$11,400.00
0006	Articulated Concrete Mattress, CC 70	1,100	S.Y.	$75.00	$82,500.00
0007	Misc. removals, foot bridge railing, tainter gate	Job	Sum	***	$18,000.00
0008	Misc. Work	Job	Sum	***	$4,000.00
TOTAL AMOUNT					$187,340.00

TA-41

PROPOSAL SCHEDULE

Item No.	Description	Estimated Quantity	Unit	Unit Price		Estimated Amount
0001	Diversion and Care of Water	Job	Sum	***		$5,500.00
0002	Placement of Standard NM Hwy Jersey Barrier	600	L.F.	$75.00		$45,000.00
0003	Random Fill Material	400	C.Y.	$45.00		$18,000.00
0004	Misc. Work	Job	Sum	***		$2,500.00
TOTAL AMOUNT						$71,000.00

TA-02

PROPOSAL SCHEDULE

Item No.	Description	Estimated Quantity	Unit	Unit Price		Estimated Amount
0001	Diversion and Care of Water	Job		Sum	***	$3,750.00
0002	Clearing and Grubbing	100		S.Y.	$2.25	$225.00
0003	3' x 3' x 3' Gabion Basket	2		EA	$225.00	$450.00
0004	3' x 3' x 6' Gabion Basket	2		EA	$450.00	$900.00
0005	Construct Pilot Channel 15' wide x 2' deep	40		L.F.	$15.00	$600.00
0006	Remove and Relocate Existing Fence	200		L.F.	$15.00	$3,000.00
0007	Misc. Work	Job		Sum	***	$2,500.00
TOTAL AMOUNT						$11,425.00

Hwy 501
Pajarito & Two Mile

PROPOSAL SCHEDULE

Item No.	Description	Estimated Quantity	Unit	Unit Price	Estimated Amount
0001	Diversion and Care of Water (2 sites)	Job	Sum	***	$15,000.00
0002	Clearing and Grubbing for Articulated Concrete Mattress	1,400	S.Y.	$1.50	$2,100.00
0003	Impervious Liner	700	S.Y.	$7.50	$5,250.00
0004	Pervious Liner	700	S.Y.	$4.50	$3,150.00
0005	Articulated Concrete Mattress,CC 20	700	S.Y.	$54.00	$37,800.00
0006	Articulated Concrete Mattress, CC 70	700	S.Y.	$75.00	$52,500.00
0007	CMP Riser slotted, 4' high	2	EA	$600.00	$1,200.00
0008	Misc. Work	Job	Sum	***	$4,000.00
TOTAL AMOUNT					$121,00.00

Diversion Channel

PROPOSAL SCHEDULE

Item No.	Description	Estimated Quantity	Unit	Unit Price	Estimated Amount
0001	Diversion and Care of Water	Job	Sum	***	$22,500.00
0002	Clearing and Grubbing	66,000	C.Y.	$1.00	$66,000.00
0003	Channel Excavation	20,000	C.Y.	$6.75	$135,000.00
0004	Detention Basin Excavation	160,000	C.Y.	$5.75	$920,000.00
0005	Concrete lined low water crossing (100 CY)	Job	Sum	***	$70,000.00
0006	Wire Wrapped Riprap	8,000	C.Y.	$1.50	$1,200,000.00
0007	Misc. Work	Job	Sum	***	$40,000.00
TOTAL AMOUNT					$2,453,500.00

Abandoned Land Bridge

PROPOSAL SCHEDULE

Item No.	Description	Estimated Quantity	Unit	Unit Price	Estimated Amount
0001	Diversion and Care of Water	Job	Sum	***	$7,500.00
0002	Clearing and Grubbing	1,250	S.Y.	$1.50	$1,875.00
0003	Impervious Liner	6,600	S.Y.	$4.50	$29,700.00
0004	Random Fill	2,100	C.Y.	$27.00	$56,700.00
0005	Extend existing conduit	30	L.F.	$130.00	$3,900.00
0006	CMP Riser, slotted, 5' high	Job	Sum	***	$1,000.00
TOTAL AMOUNT					$100,675.00

Anchor Ranch Road

PROPOSAL SCHEDULE

Item No.	Description	Estimated Quantity	Unit	Unit Price	Estimated Amount
0001	Diversion and Care of Water	Job	Sum	***	$11,500.00
0002	Clearing and Grubbing for Articulated Concrete Mattress	2,350	S.Y.	$1.50	$3,525.00
0003	Impervious Liner	1,000	S.Y.	$7.50	$7,500.00
0004	Pervious Liner	1,350	S.Y.	$4.50	6,075.00
0005	Articulated Concrete Mattress, CC 20	1,000	S.Y.	$54.00	$54,000.00
0006	Articulated Concrete Mattress, CC 70	1,350	S.Y.	$75.00	$101,250.00
0007	10' H x 5' W x 5' D, Trash Rack around Riser	Job	Sum	***	$10,000.00
0008	CMP Riser, slotted 5' high	Job	Sum	***	$1,000.00
TOTAL AMOUNT					$194,850.00

Los Alamos Canyon Detention Basin

PROPOSAL SCHEDULE

Item No.	Description	Estimated Quantity	Unit	Unit Price	Estimated Amount
0001	Diversion and Care of Water	Job	Sum	***	$20,000.00
0002	Clearing and Grubbing	58,100	S.Y.	$1.50	$87,150.00
0003	Detention Basin Excavation Uncontaminated Soil	192,000	C.Y.	$8.50	$1,632,000.00
0004	Articulated Concrete Mattress, CC 20	5,000	S.Y.	$54.00	$270,000.00
0005	Misc. Work	Job	Sum	***	$5,000.00
TOTAL AMOUNT					$2,014,150.00

Hwy 501
Pueblo Canyon Detention Basins

PROPOSAL SCHEDULE

Item No.	Description	Estimated Quantity	Unit	Unit Price	Estimated Amount
0001	Diversion and Care of Water	Job	Sum	***	$75,000.00
0002	Clearing and Grubbing for Articulated Concrete Mattress	58,00	S.Y.	$1.25	$72,500.00
0003	Excavation	22,000	C.Y.	$5.00	$110,000.00
0004	Articulated Concrete Mattress, CC 20	29,000	S.Y.	$51.00	$1,479,000.00
0005	Leave Embankment	18,000	C.Y.	$7.00	$126,000.00
0006	Low Water Crossing	Job	Sum	***	$100,000.00
0007	Misc. Work	Job	Sum	***	$15,000.00
TOTAL AMOUNT					$1,977,500.00

Addendum No. 3

Management Approach

We propose to use one of our currently awarded indefinite delivery contracts awarded to Sundt Corporation. This $200 million unrestricted open-end, multi-year contract was awarded based on competitive procedures that considered all interested firms in the United States, and selection was based on safety, quality, and responsiveness.

Sundt Corporation is one of the largest heavy and highway civil contractors in the Southwest, with a very large fleet of heavy equipment. Annual revenue is approximately $500 million with about 25% earned by their heavy civil construction division. The firm started business in New Mexico in 1890 and constructed most of the support facilities at Los Alamos in the 1940s.

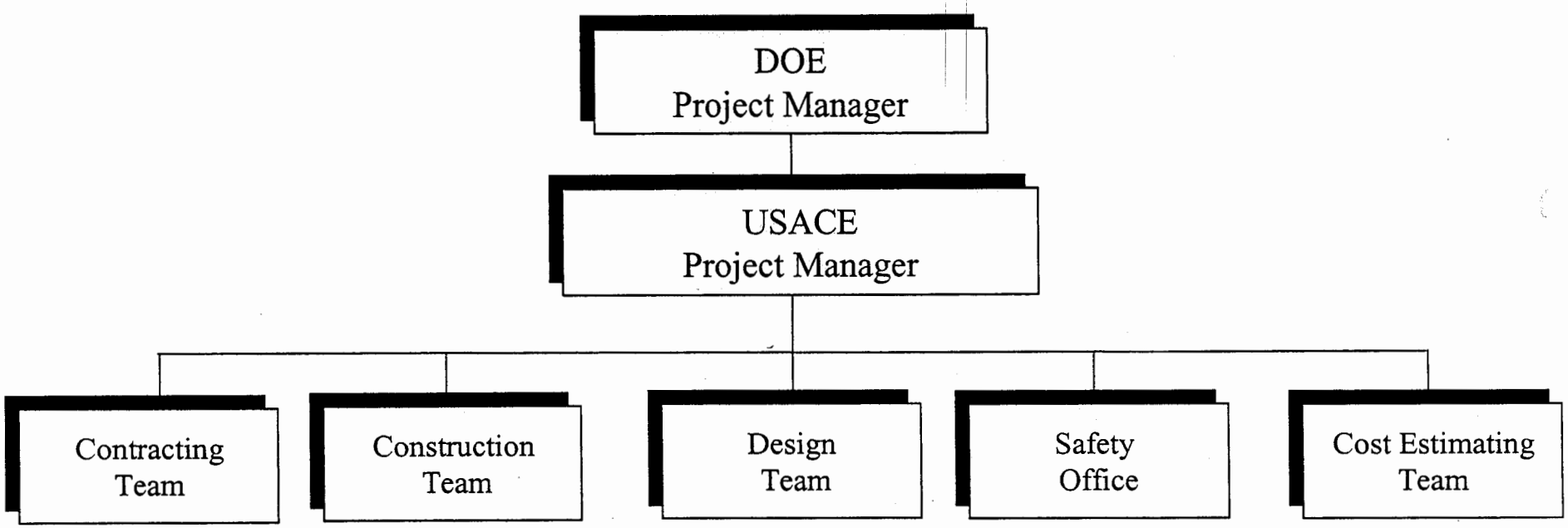
Sundt Corporation is currently on standby, waiting for a notice to proceed for this work. Heavy equipment and staff located in Albuquerque and on a highway project near Cuba, New Mexico, would be relocated to Los Alamos within 24 hours. URS Greiner, located in Albuquerque is the designer they would use to support this project.

We propose to issue a notice to proceed for on-site mobilization of equipment and initiation of design within an hour or so after funds are received. Within 24 hours after our notice to proceed, equipment and staff would arrive on site at Los Alamos.

As construction drawings are completed for various phases of work and approved by the Corps, DOE, and LANL, Sundt will be given a notice to proceed with the approved design. Sundt proposes to work all sites concurrently and intends to staff the project for 24-hour operation. The durations provided in this proposal have been coordinated with Sundt and assume 24-hour turnaround for approval of construction design drawings. Although all work under this task order could be performed by Sundt, for political reasons, we recommend that a small, low-risk segment of the tasking be set aside for competitive bidding by local firms. We are getting numerous Congressional requests representing local contractors asking why we have not used local contractors for any of our work.

The Corps of Engineers proposed on-site field organization is shown at Exhibit 3-2. A significant amount of the engineering would be accomplished in Albuquerque by the Corps of Engineers and URS Greiner. The Corps of Engineers is currently mobilizing technical staff from Corps offices throughout the United States, to support this effort using Corps of Engineers emergency funding for technical assistance. Many of these engineers have arrived and are familiarizing themselves with the area and project. The entire project delivery team functions are shown on Exhibit 3-1.

Project Delivery Team



- Contract Acquisition
  - Fixed Price
  - Design Build
  - Indefinite Delivery

A-E & Construction contracts

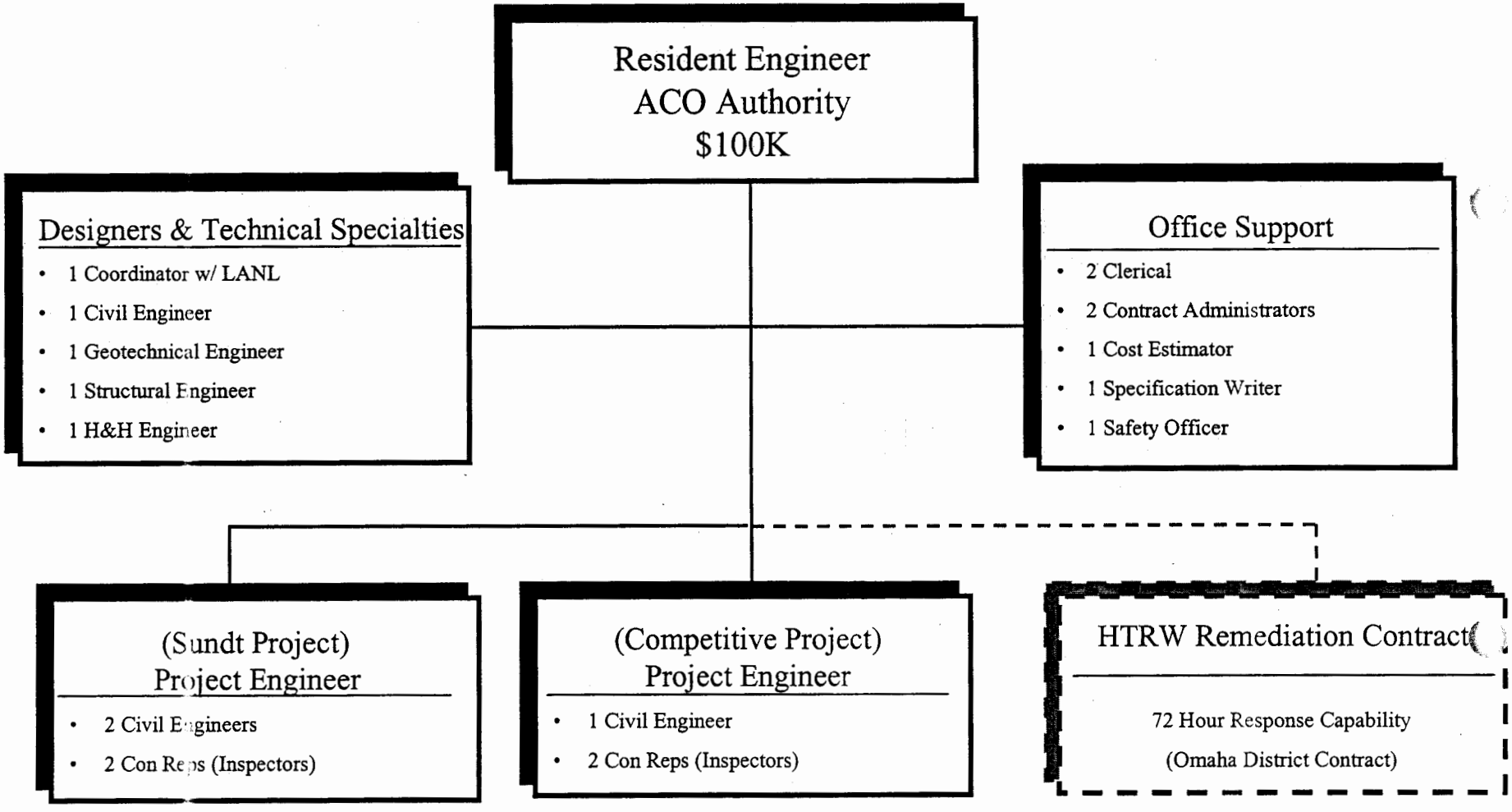
- Quality Assurance
- Scheduling & Fast Track
- Modifications & Claim processing
- Administrative Contracting Officer on Site
- Funds Control /status/reports
- Shop & material testing

- Plans & Specs Design
- Technical problem resolution
- Shop drawing review

- Zero Accident Program
- Job safety enforcement

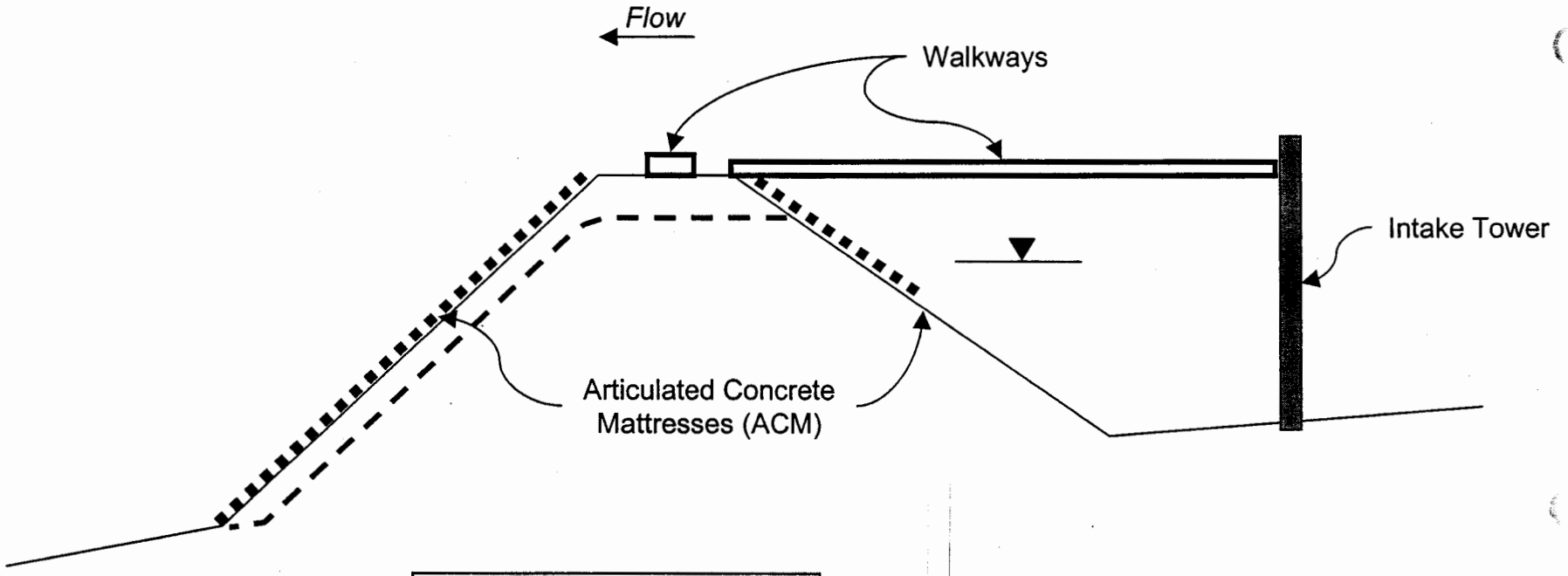
- Cost validation
- Modification support

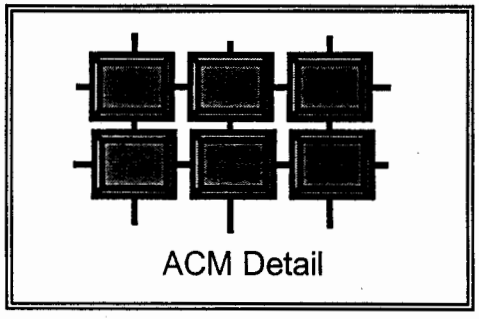
Initial On-Site Construction Team



Additional Technical & Contract Administration Support Provided in the Albuquerque District's Emergency Operations Center

Los Alamos Trip Report and Facility Evaluation





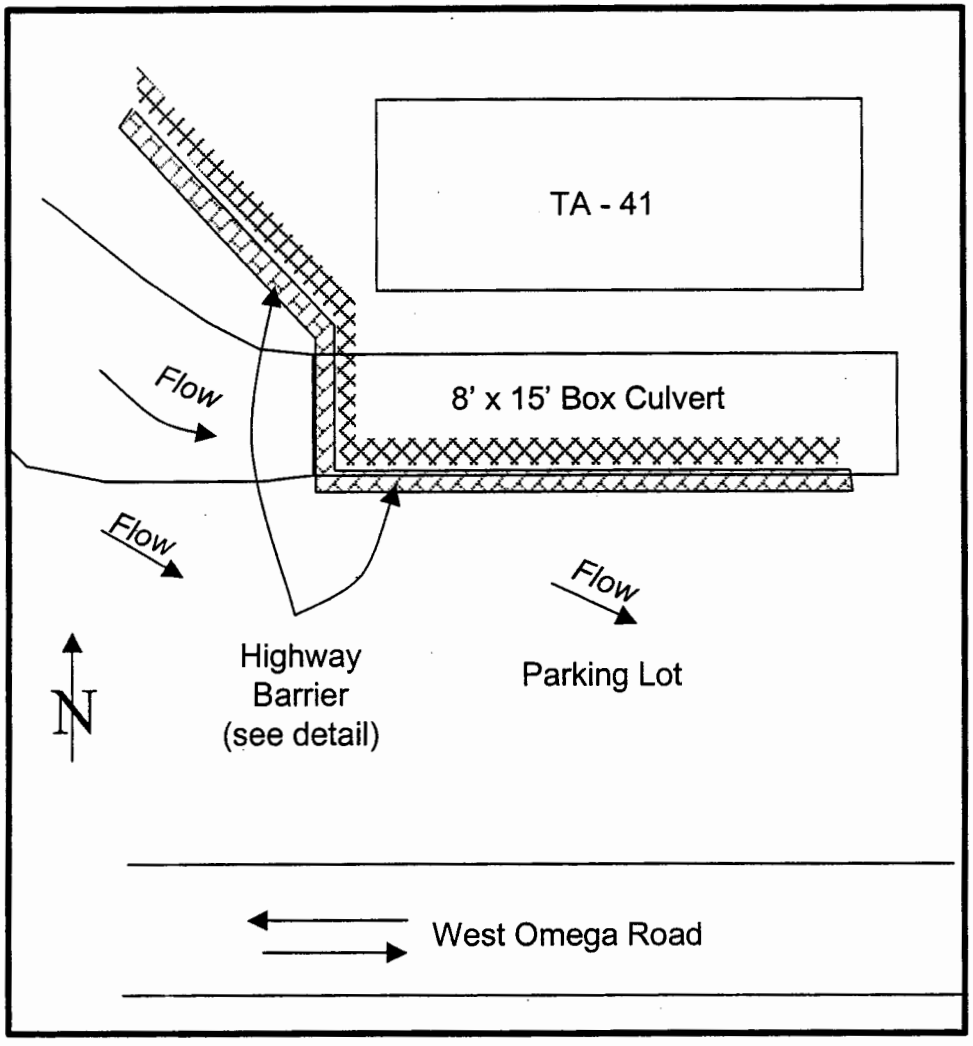
Albuquerque District

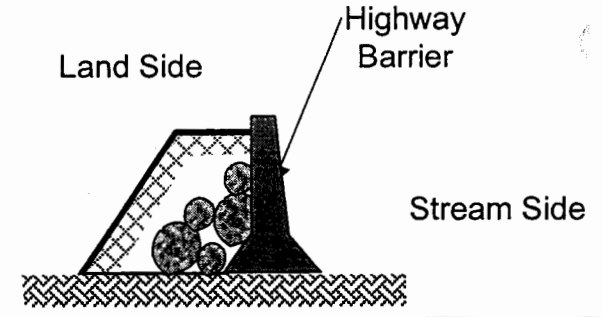
Not to Scale

Figure 1.

Los Alamos Dam

Los Alamos Trip Report and Facility Evaluation





Detail of Highway Barrier

(NTS)

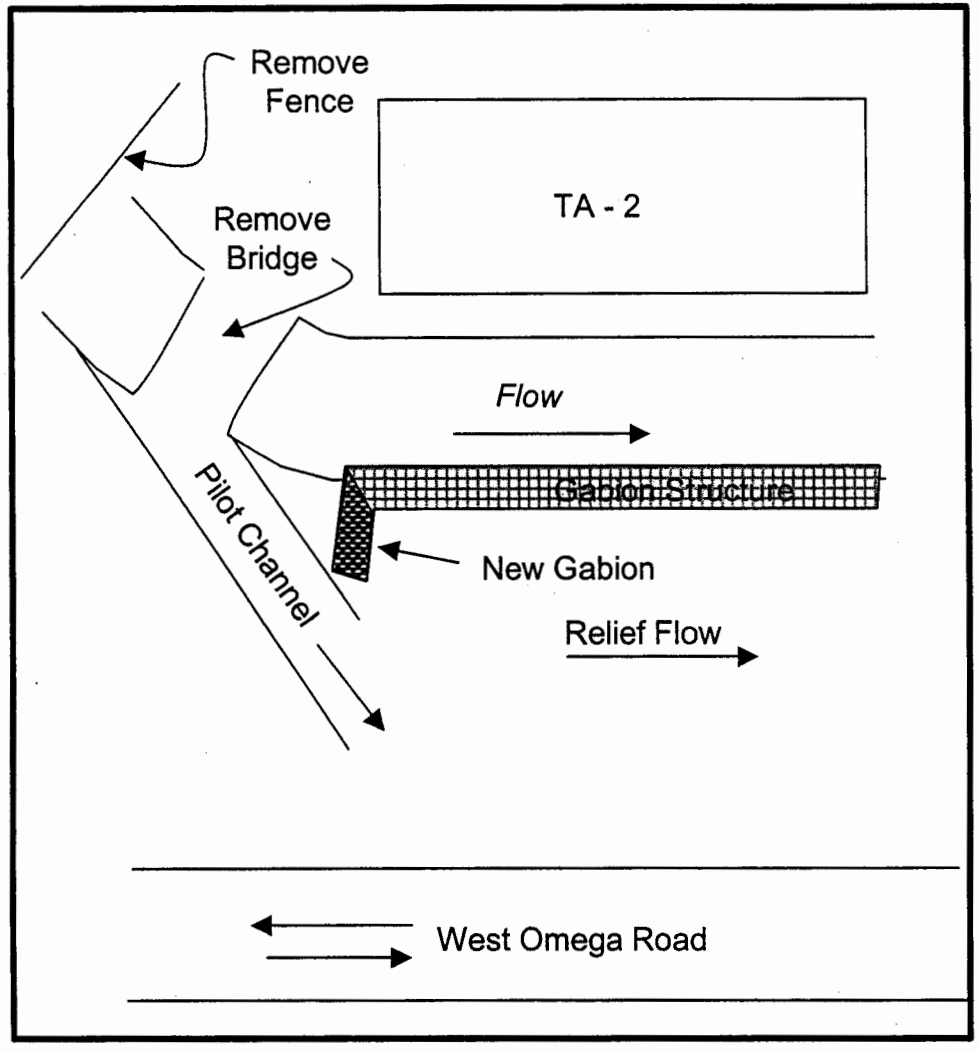
Albuquerque District

Not to Scale

Figure 2.

TA –41 Box Culvert

Los Alamos Trip Report and Facility Evaluation



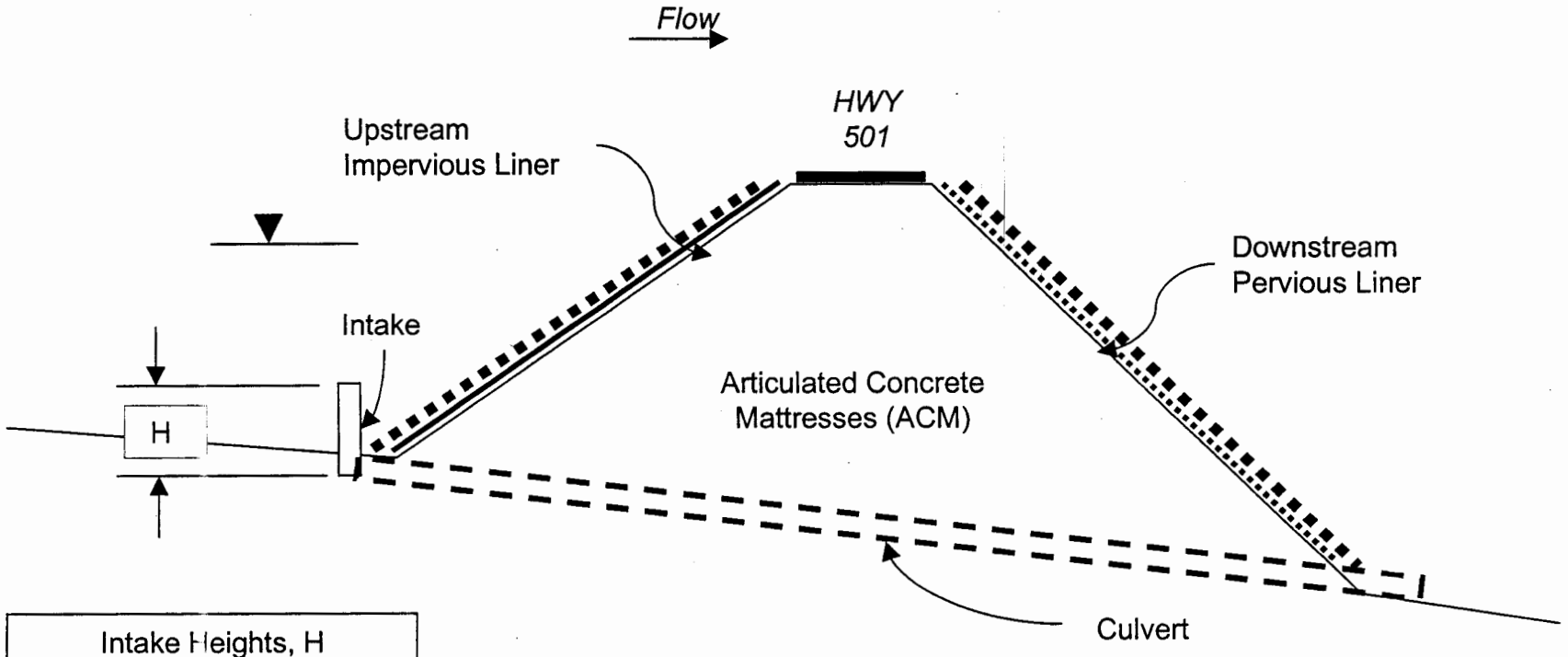
Albuquerque District

Not to Scale

Figure 3.

TA –02

Los Alamos Trip Report and Facility Evaluation



Intake Heights, H

Crossing	Ht
Two Mile@501	4'
Pajarito@501	6'

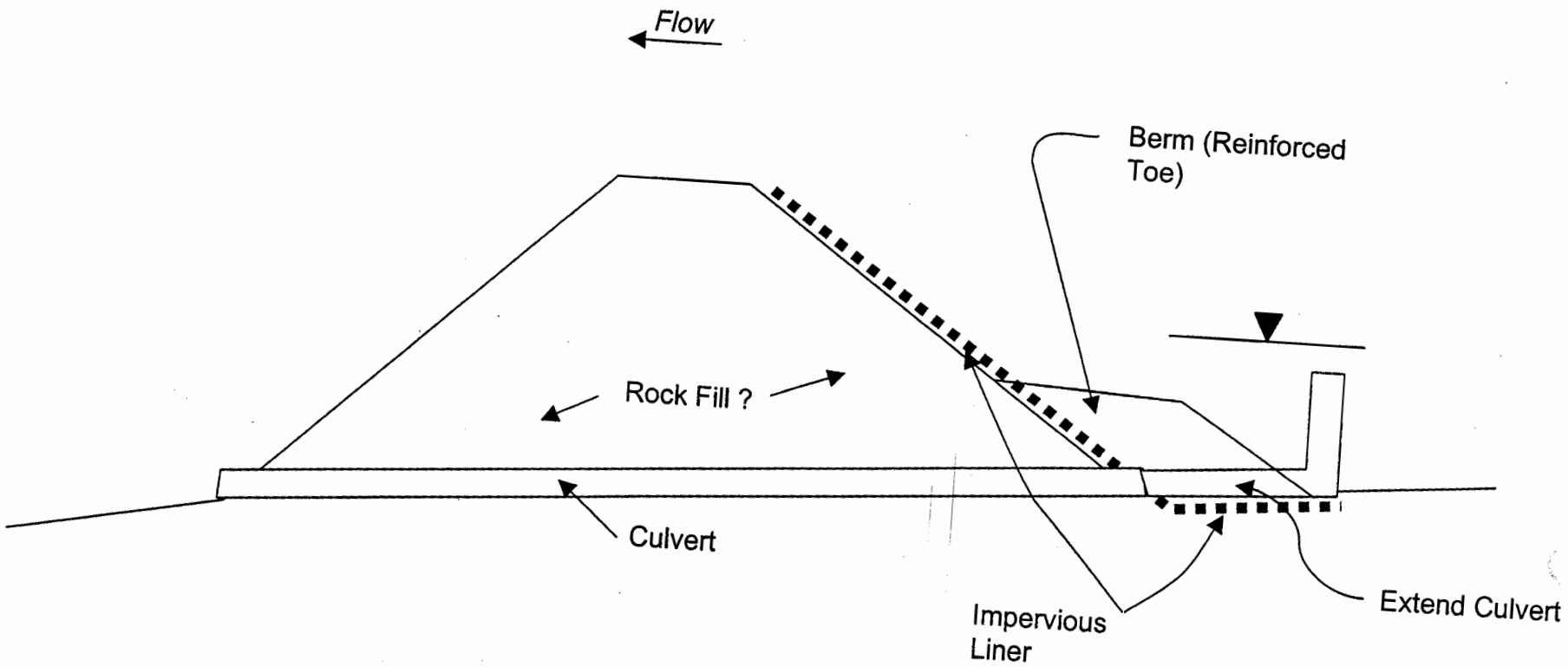
Albuquerque District

Not to Scale

Figure 4.

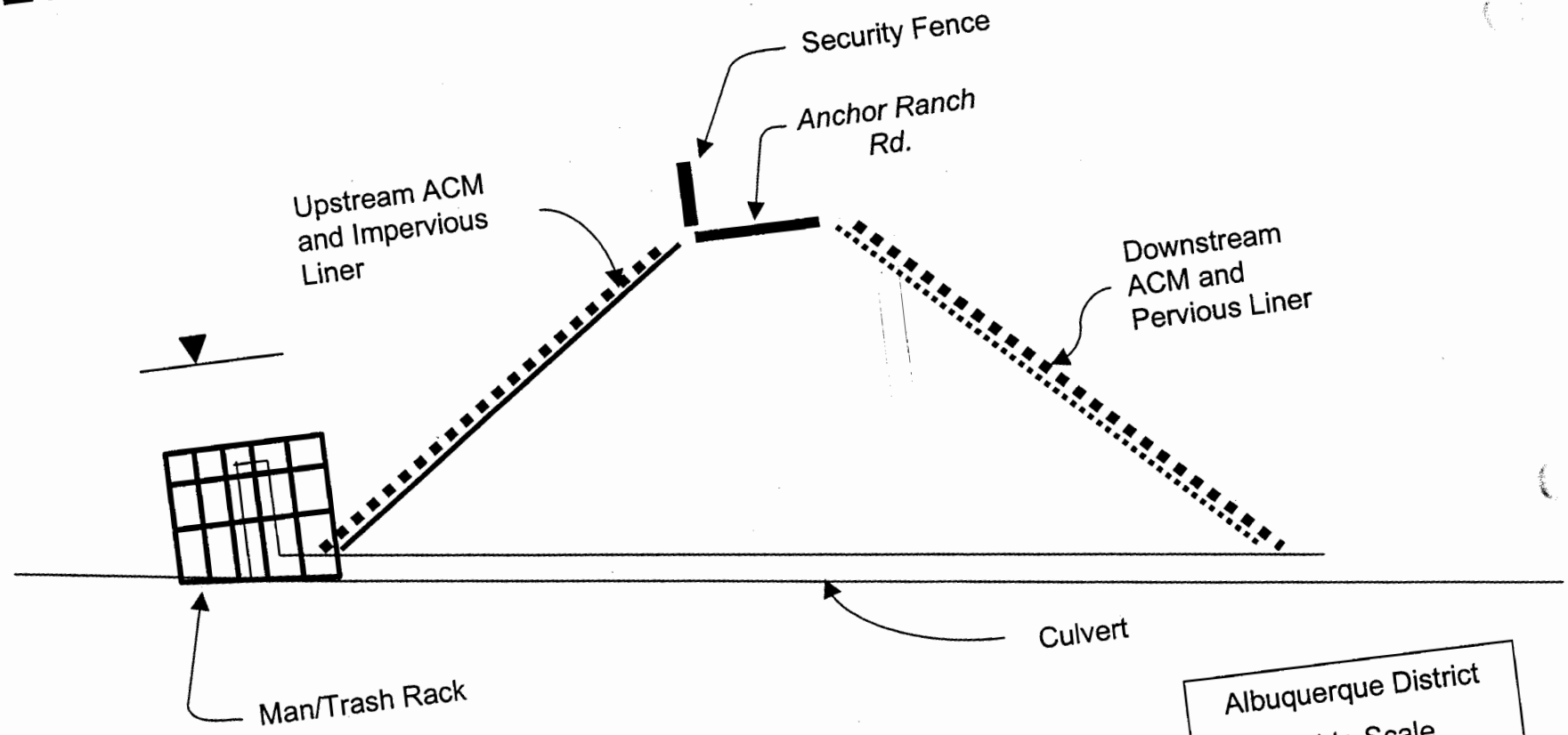
HWY 501 Roadway Protection

Los Alamos Trip Report and Facility Evaluation



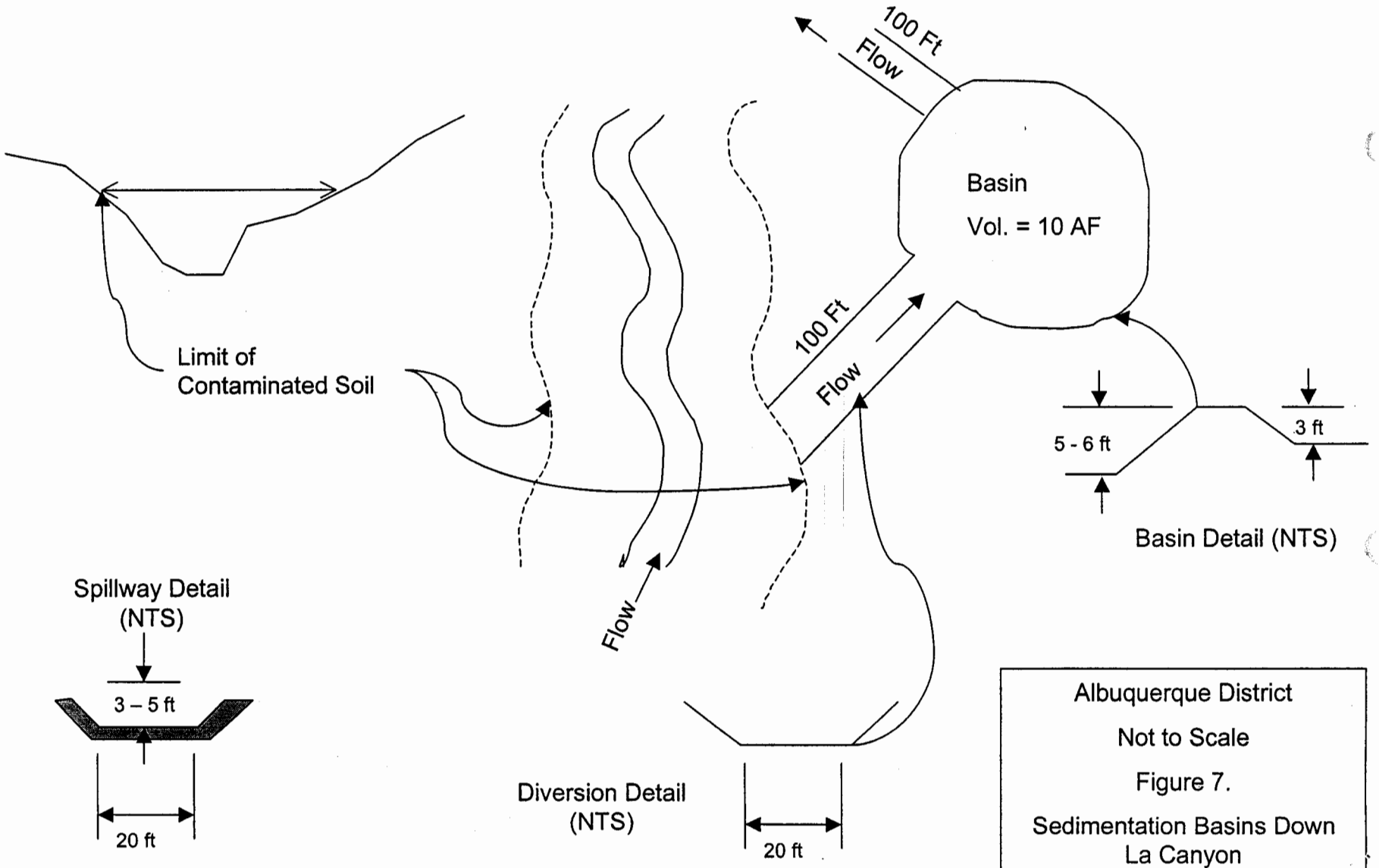
Albuquerque District
Not to Scale
Figure 5.
Abandon "Land Bridge"

Los Alamos Trip Report and Facility Evaluation

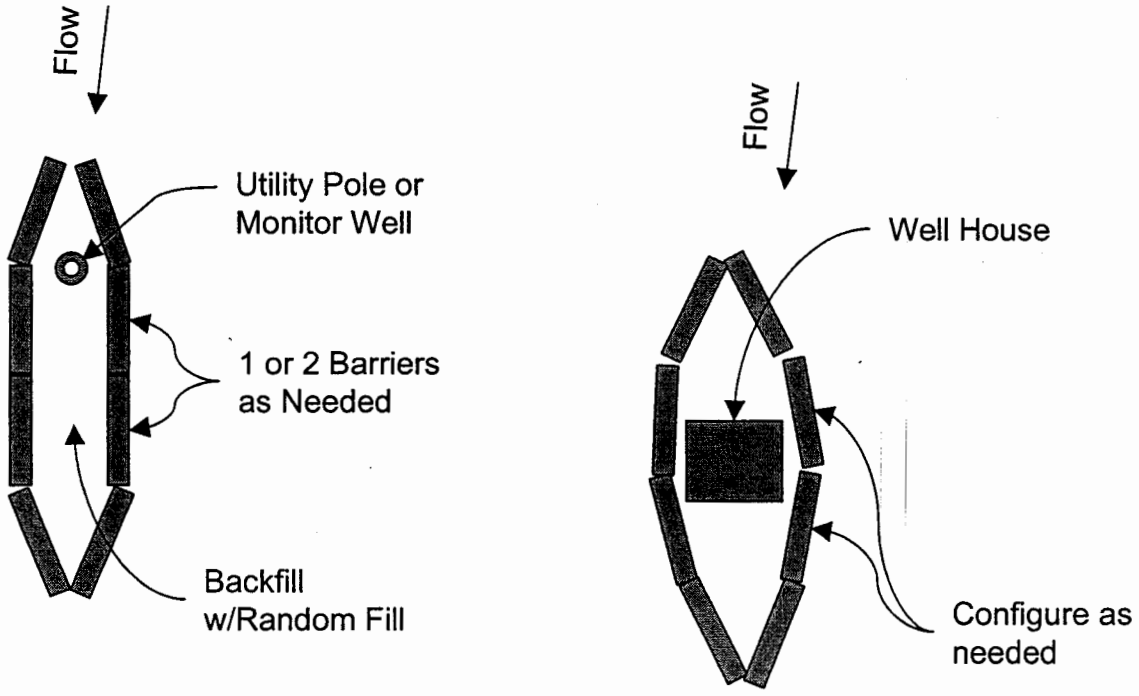


Albuquerque District
Not to Scale
Figure 6.
Anchor Ranch Road

Los Alamos Trip Report and Facility Evaluation



Los Alamos Trip Report and Facility Evaluation



Albuquerque District

Not to Scale

Figure 8.

Utility Protection

Los Alamos Trip Report and Facility Evaluation

Albuquerque District

Not to Scale

Figure 9.

Diversion from Pajarito to Canon de Valle