



*Risk Reduction & Environmental Stewardship Division
Water Quality & Hydrology Group (RRES-WQH)
PO Box 1663, MS K497
Los Alamos, New Mexico 87545
(505) 665-1859/Fax: (505) 665-9344*

Date: February 10, 2003
Refer to: RRES-WQH: 03-034

Mr. Curt Frischkorn
Ground Water Protection Bureau
New Mexico Environment Department
1190 St. Francis Drive
P.O. Box 26110
Santa Fe, New Mexico 87502

Mr. Bret Lucas
Surface Water Quality Bureau
New Mexico Environment Department
1190 St. Francis Drive
P.O. Box 26110
Santa Fe, New Mexico 87502

SUBJECT: NOTICE OF INTENT TO DISCHARGE (NOI) FOR PERMEABLE REACTIVE BARRIER (PRB) OPERATION

Dear Messrs. Frischkorn and Lucas:

Enclosed is a Notice of Intent to Discharge (NOI) that has been prepared for submittal to the New Mexico Environmental Department (NMED) pursuant to 20 NMAC 6.2.1201 of the New Mexico Water Quality Control Commission (NMWQCC) Regulations (Enclosure 1). The NOI is being submitted to provide coverage for the operation of the Permeable Reactive Barrier (PRB) in Mortandad Canyon. A related NOI covering pumping of groundwater from the Permeable Reactive Barrier during installation was submitted on February 6, 2003.

This project is being undertaken in order to demonstrate a unique technology for treatment of shallow groundwater. Enclosure 2 provides a Project Description of the PRB. Associated maps, site plans, and PRB design diagrams are included in Enclosure 3.

Please contact Mark Haagenstad (505) 665-2014 or Mike Saladen (505) 665-6085 should you have questions or require additional information.

Sincerely,

Steven R. Rae
Group Leader
Water Quality & Hydrology Group

SR:MH/tml



TA-03

Messrs. Frischkorn and Lucas
RRES-WQH:03-034

- 2 -

February 10, 2003

SR:MH/tml

Enclosures: a/s

- Cy: J. Young, NMED/HWB, Santa Fe, New Mexico, w/enc.
- S. Yanicak, NMED/DOE/OB, w/enc., MS J993
- J. Vozella, DOE/OLASO, w/o enc., MS A316
- G. Turner, DOE/OLASO, w/enc., MS A316
- B. Ramsey, RRES-DO, w/o enc., MS J591
- K. Hargis, RRES-DO, w/o enc., MS J591
- D. Stavert, RRES-EP, w/o enc., MS J591
- A. Pratt, RRES-DO, w/o enc, MS J591
- M. Saladen, RRES-WQH, w/o enc., MS K497
- M. Haagenstad, RRES-WQH, w/enc., MS K497
- S. Veenis, RRES-WQH, w/enc., MS K497
- RRES-WQH File, w/enc., MS K497
- IM-5, w/enc., MS A150



ENCLOSURE 1

NOTICE OF INTENT

1. **Name and address of facility making the discharge.**

Los Alamos National Laboratory
Risk Reduction and Environmental Stewardship – Environmental Characterization and
Remediation Group (RRES-ECR)
P.O. Box 1663
Los Alamos, New Mexico 87545

2. **Location of the discharge (In Township, Range and Section, if available).**

The location for the installation of the Permeable Reactive Barrier (PRB) in Mortandad Canyon is
(see Enclosure 3):
Latitude: 35°51'49"
Longitude: 106°16'39"

3. **The means of discharge. (To lagoon, Flowing stream, Water course, Arroyo, Septic tank, other).**

Installation of PRB (See Enclosure 2).

4. **The estimated concentration of contaminants (if any) in the discharge.**

See Enclosure 2

5. **The type of operation from which the discharge is derived.**

This project is being undertaken in order to demonstrate a unique technology for treatment of shallow groundwater. Enclosure 2 provides a Project Description of the PRB. Associated maps, site plans, and PRB design diagrams can be viewed in Enclosure 3. A trench approximately 30 feet long, 30 feet in depth and 20 feet in width will be excavated for installation of the reactive barrier. Additionally, slurry walls (approximately 3 feet wide and 30 feet deep) will extend from the reactive barrier to the canyon sidewalls. Mortandad Canyon is an ephemeral tributary to the Rio Grande. The total area of disturbed watercourse is approximately 4 feet wide by 20 feet long, totaling 80 square feet.

6. **The estimated flow to be discharged per day.**

See Enclosure 2

7. **The estimated depth to Ground-Water (if available)**

Approximately 30 feet.

Signed: 

Date: Feb. 10, 2003

Steven Rae, Group Leader
Risk Reduction and Environmental Stewardship Division
Water Quality and Hydrology Group

ENCLOSURE 2

Permeable Reactive Barrier Within Mortandad Canyon

Project Description:

The PRB multi-barrier is designed to remove radionuclides (americium-241, plutonium-238, -239, and strontium-90), nitrate, and perchlorate from the groundwater within Mortandad Canyon. The PRB will consist of a gate and funnel constructed of sheet piling. The gate is designed as a braced cofferdam, which consists of sheet piling, driven through the alluvium layer and founded into the underlying tuff. The gate will contain four sequential media cells consisting of lava rock gravel, Mineral apatite, 10% cotton seed meal/65% pecan shells/25% pea gravel (Biobarrier) by volume, and limestone as specified by LANL. The purpose of the funnel is to direct the groundwater so that the majority of groundwater will flow through the gate. This funnel consists of a row of sheet piles driven through the alluvium and into the underlying Bandelier tuff. A series of sampling ports and monitoring wells will be installed upgradient, downgradient, and within the reactive gate. One upgradient well and three down-gradient wells are proposed, continuously screened within the alluvium. The upgradient well will be placed 5 ft upstream of the PRB gate, aligned with the midpoint of the gate. The downgradient wells will be spaced 5 ft apart located 5 ft downstream of the gate. Alternatively, two outside wells may be placed 10 feet downstream of the gate to form a triangular configuration of downgradient monitor wells. These wells will provide the capability to monitor groundwater flow parameters and characteristics throughout the alluvium. The upgradient and downgradient wells will be installed following construction of the PRB. The stream channel within Mortandad Canyon will be redirected to prevent surface water from flowing over the gate.

Expected Waste:

Approximately 562 yds³ of sediment will be excavated from within the gate. 185 yds³ of this sediment will be returned to the gate as cover over the reactive media, the remaining 377 yds³ of sediment will be considered Low Level Rad (LLR) Waste and transported to TA-54's Area G. This LLR waste will be staged at Area G and used as pit fill and cover material. Disposable PPE used during the project will be disposed of as industrial waste at a regulated landfill. Total volume of disposable PPE used during the project will be approximately 3 yds³. Per DOE Order 5400.5(a), the PPE used during the handling of excavated sediments may require disposal at TA-54's Area G, it is estimated that this specific waste stream would be less than one 55 gal drum (1/3 yds³).

ENCLOSURE 2

RANGE OF RESULTS FOR SOIL SAMPLES FROM PRB TEST BOREHOLES

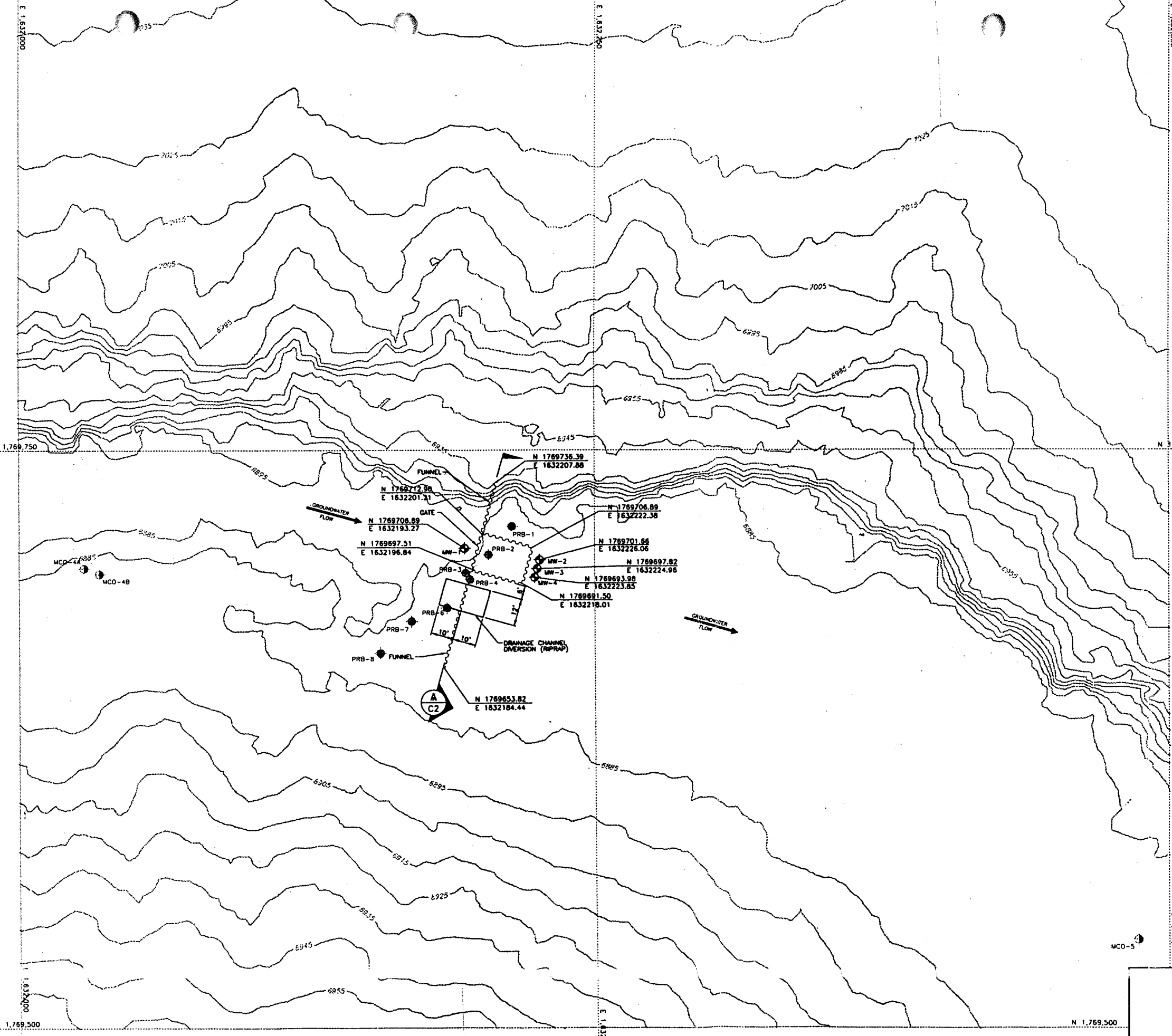
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metals	arsenic	leachate	mg/l	0.1	0.016	U	PRB-6-S6, 6-S11
metals	barium	leachate	mg/l	0.79	0.22	B	PRB-3-S8
metals	cadmium	leachate	mg/l	0.05	0.0018		PRB-1-S7, 3-S13, 6-S6
metals	chromium	leachate	mg/l	0.01	0.0032	B	PRB-3-S8
metals	lead	leachate	mg/l	0.03	0.03		PRB-1-S7, 1-S12, 3-S8, 3-S13, 6-S6, 6-S11
metals	mercury	leachate	mg/l	0.02	0.02		PRB-1-S12, 1-S12, 3-S8, 3-S13, 6-S6, 6-S11
metals	selenium	leachate	mg/l	0.05	0.022	U	PRB-3-S8, 6-S6
metals	silver	leachate	mg/l	0.1	0.006	U	PRB-3-S13
RADCHEM-GS	americum-241	soil	pCi/g	0.52	0.026	U	PRB-6-S10
RADCHEM-GS	cesium-137	soil	pCi/g	0.096	-0.021		PRB-6-S5
RADCHEM-LS	tritium	soil	pCi/g	3.51	0.99		PRB-6-S10
RADCHEM-AS	plutonium-238	soil	pCi/g	0.04	0.02	LT	PRB-3-S7
RADCHEM-AS	plutonium-239	soil	pCi/g	0.217	0.015		PRB-3-S7
RADCHEM-05	strontium-90	soil	pCi/g	0.9	0.25		PRB-6-S10

mg/l = milligram per liter

pCi/g = picoCuries per gram

ENCLOSURE 3

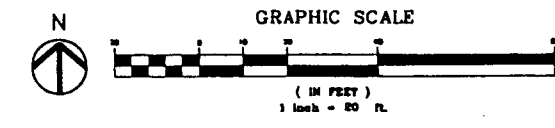
PRB Site Maps, Plans, and Diagrams



- NOTES:**
1. DATA SUBJECT TO REVISION.
 2. CONTOUR DATA PROVIDED BY LANL, EES-6, DATED JUNE 2001 FROM LIDAR SURVEY CONDUCTED JULY 2000.
 3. STATE PLANE COORDINATE SYSTEM, NEW MEXICO CENTRAL ZONE 1983 NORTH AMERICAN DATUM.
 4. GRID PROVIDES NEW MEXICO STATE PLANE COORDINATES IN FEET.
 5. GRID INTERVAL, IN FEET: 250.
 6. CONTOUR INTERVAL, IN FEET: 10.

- LEGEND:**
- PRB-1 ● BORING LOCATIONS (JUNE 2001)
 - MCO-4B ● EXISTING MONITORING WELL
 - MW-1 ● NEW PROPOSED MONITORING WELL

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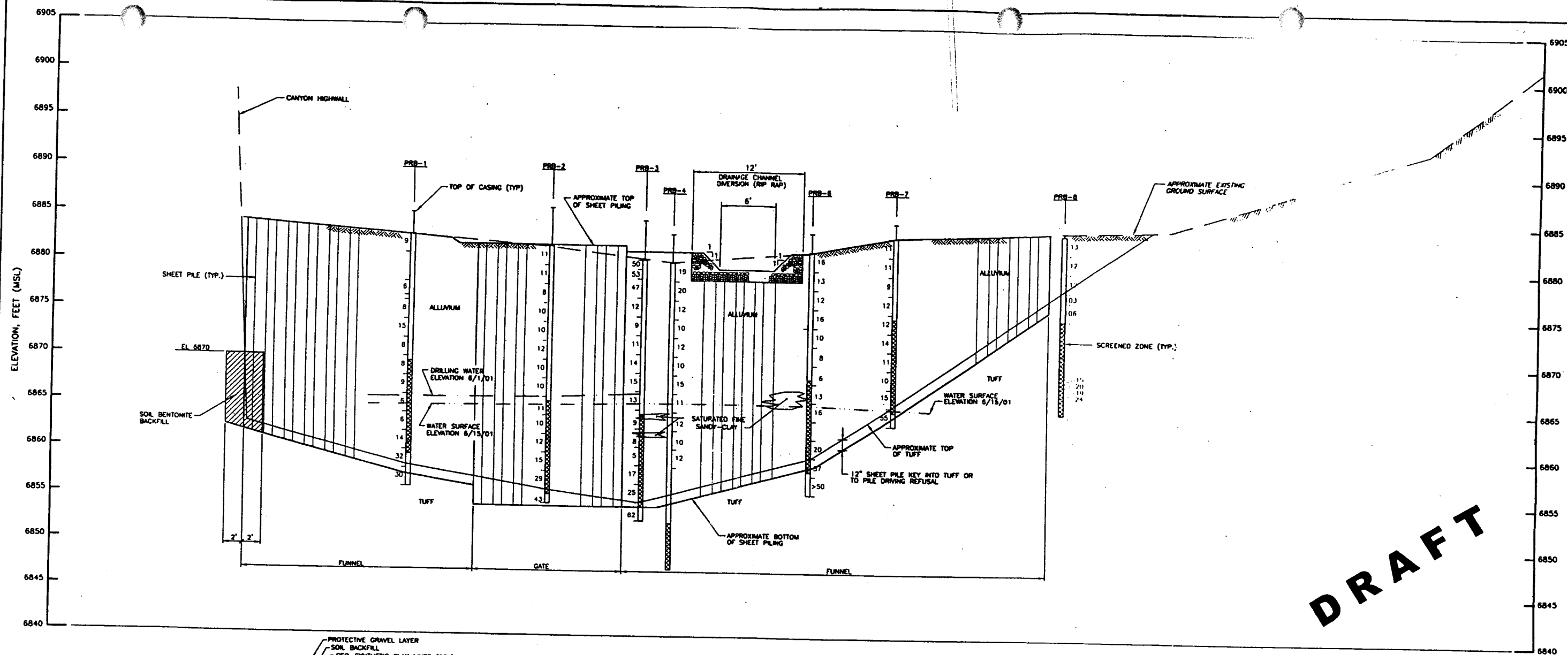


MULTIPLE PERMEABLE REACTIVE BARRIER MORTANDAD CANYON		DRAWN	STRITMATTER
SITE PLAN		DESIGN	P. INGERSOLL
TA-5		CHECKED	W.T. CHAN
DATE 07-27-01		DATE	07-27-01

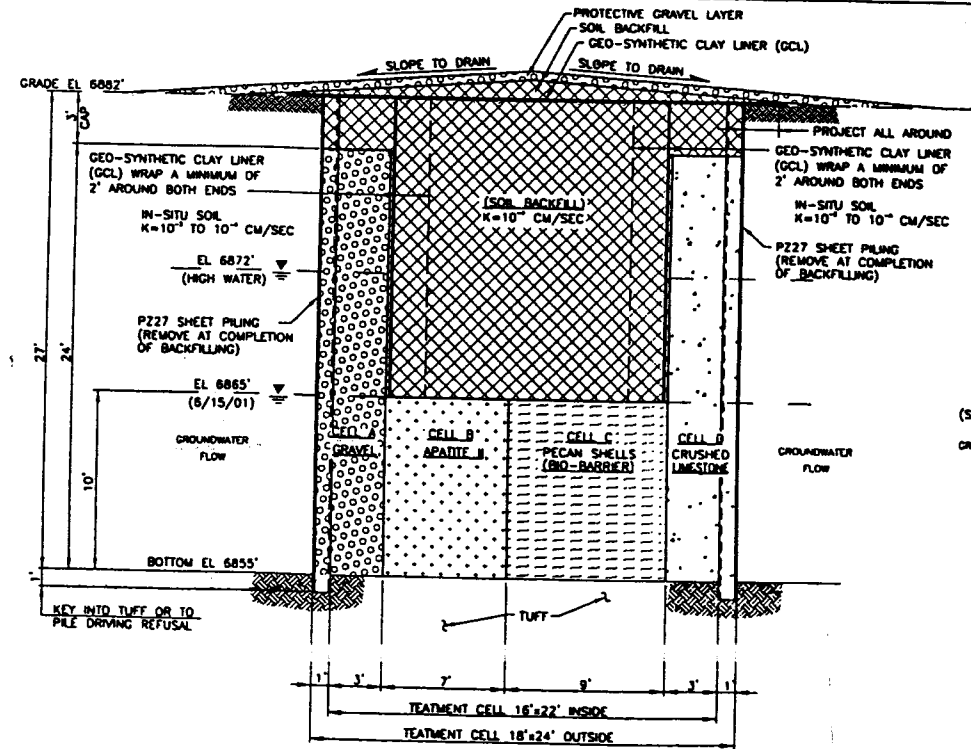
SUBMITTED DARREN HEADOWS	APPROVED FOR RELEASE JOHN KASZUBA
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Los Alamos		Los Alamos National Laboratory Los Alamos, New Mexico 87545		C1	OF 1
CLASSIFICATION	REVIEWER	DATE 07-27-01		PROJECT ID	DRAWING NO
826732	826732-D4	826732		826732-D4	826732-D4

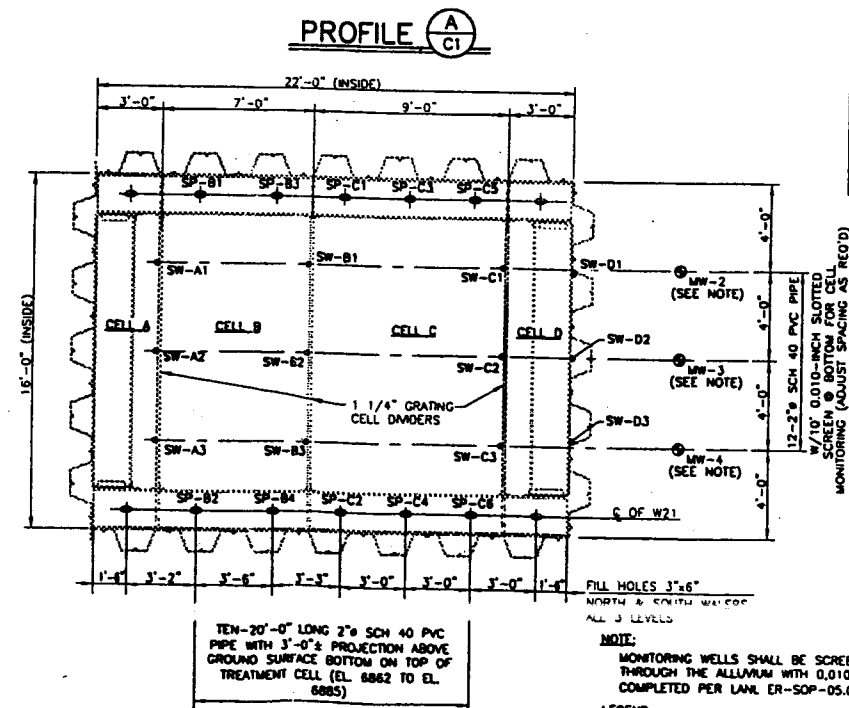
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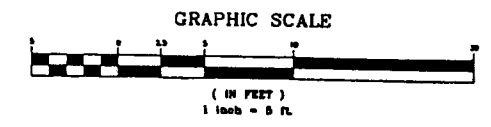


GATE CROSS SECTION



SAMPLING/MONITORING PLAN

LEGEND:
 50] STANDARD PENETRATION TEST BLOW COUNT PER GIVEN INTERVAL



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 Date: 07/27/01
 Author: J. Cham

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MULTIPLE PERMEABLE REACTIVE BARRIER MORTANDAD CANYON
 PROFILE, GATE CROSS SECTION AND SAMPLING/MONITORING PLAN

DRAWN	A SMITH
DESIGN	P. INGERSOLL
CHECKED	W.T. CHAM
DATE	07-27-01

TA-5

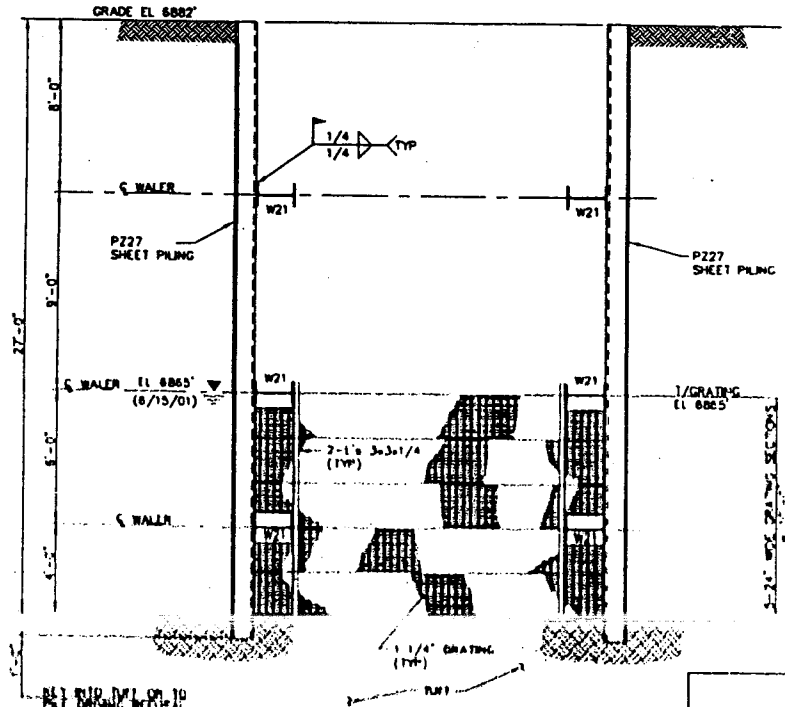
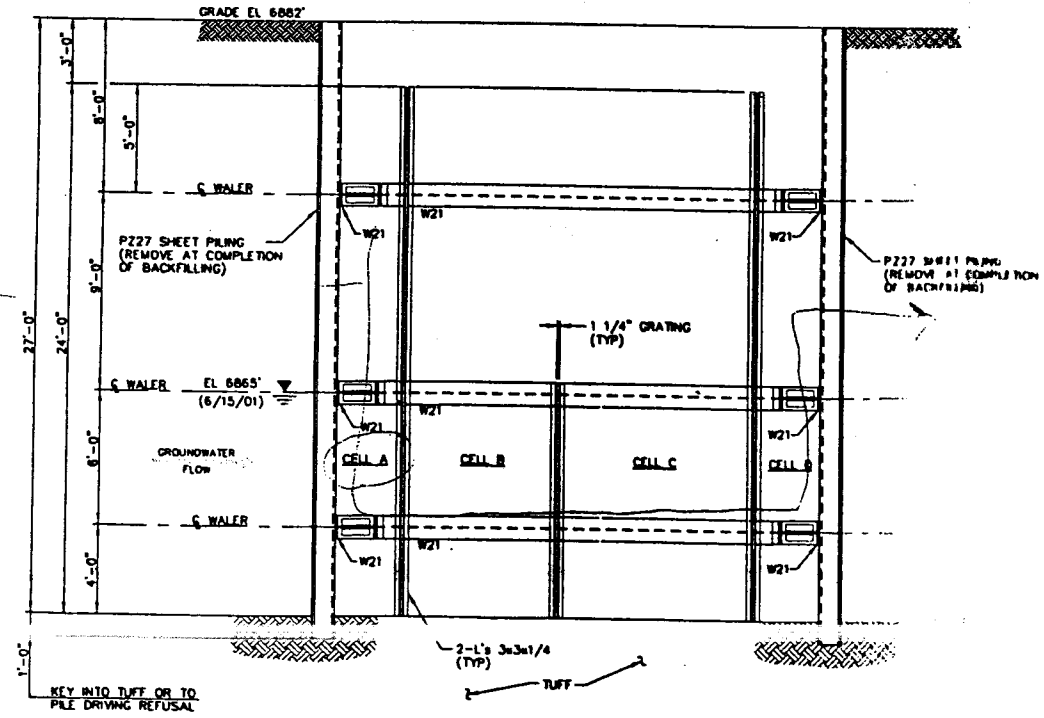
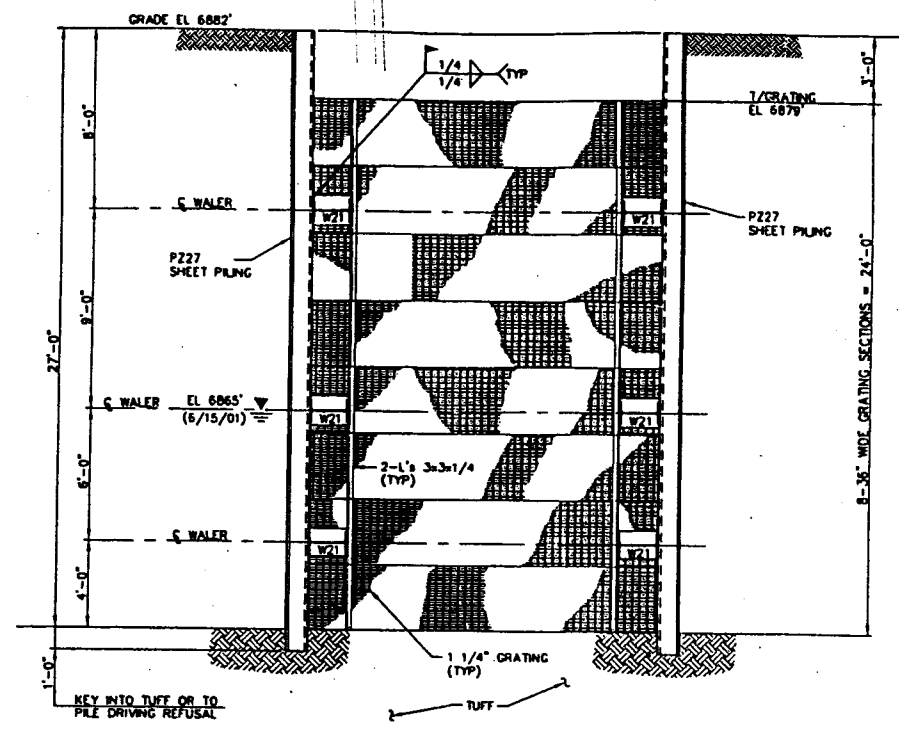
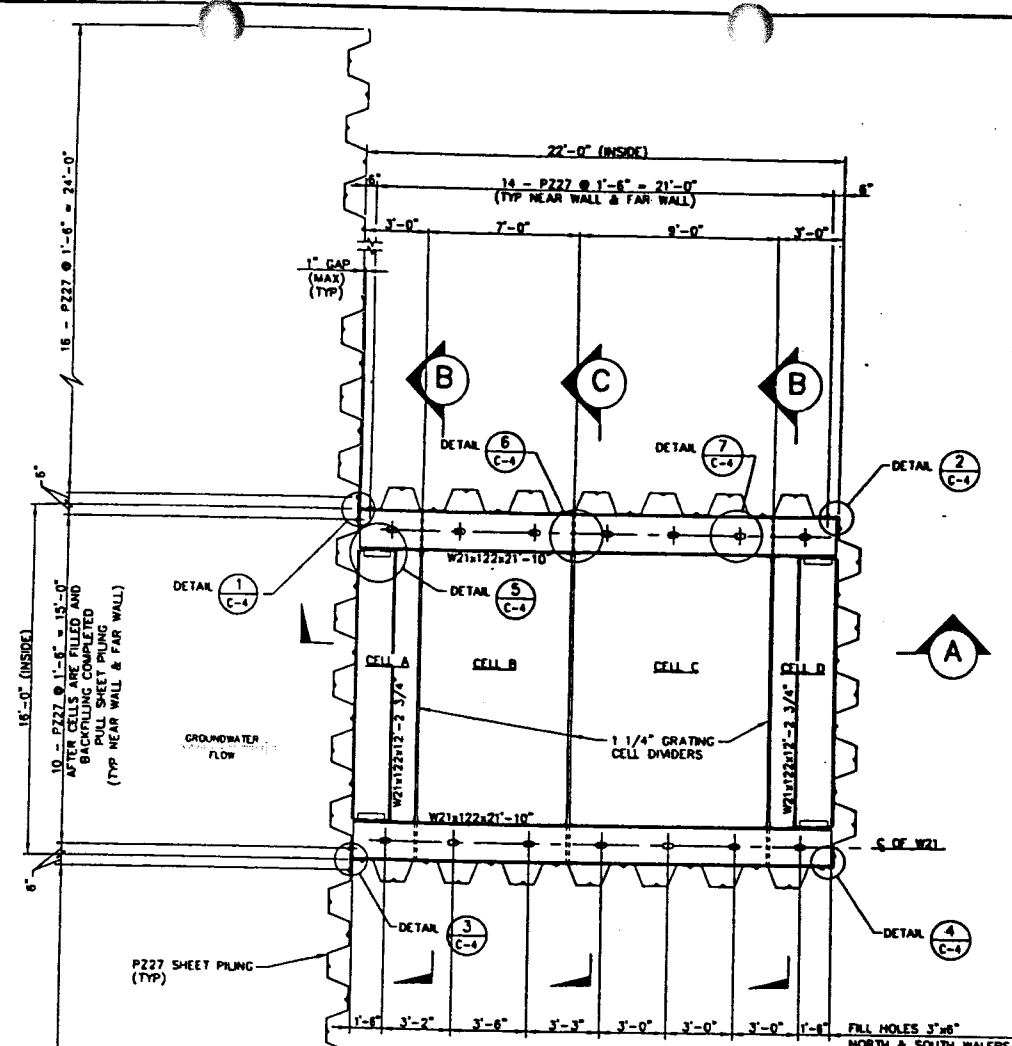
SUBMITTED: DARREN MEADOWS
 APPROVED FOR RELEASE: JOHN KASZUBA

Los Alamos Los Alamos National Laboratory
 Los Alamos, New Mexico 87545

CLASSIFICATION: REVIEWER: PROJECT ID: 826732 DRAWING NO: 826732-D1 SHEET: 3 OF 3 DATE: 07-27-01

GENERAL NOTES

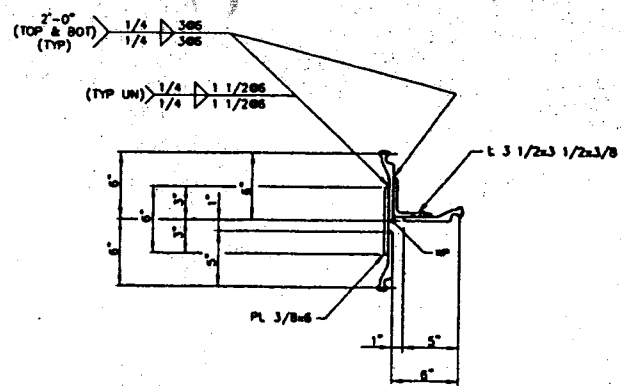
- FABRICATE AND ERECT ALL WORK IN ACCORDANCE WITH AMERICAN INSTITUTE OF STEEL CONSTRUCTION, INC.(AISC) SPECIFICATION FOR STRUCTURAL STEEL BUILDINGS - ALLOWABLE STRESS DESIGN AND PLASTIC DESIGN, AND THE CODE OF STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES.
- PERFORM ALL WELDING IN ACCORDANCE WITH AMERICAN WELDING SOCIETY (AWS) D1.1, STRUCTURAL WELDING CODE - STEEL.
- STRUCTURAL STEEL: ASTM A36
- WELDING ELECTRODES: AWS E6010 OR AWS E70XX
- SHEET PILING: ASTM A328
- SHEET PILING JOINTS SHALL BE COATED WITH A-50 WATERSTOP
- GRATING SHALL BE RECTANGULAR WELDED STEEL GRATING, NON-REVERSIBLE TYPE, WITH 1-1/4" x 3/16" BEARING BARS ON 1-3/16" CENTERS AND CROSSINGS ON 4" HIGH CENTERS.
- REACTIVE GATE MATERIAL DESCRIPTION:
 CELL A - FILTRATION GRAVEL (LAW ROCK)
 CELL B - APATITE II
 CELL C - BIO-BARRIER (PECAN SHELLS)
 CELL D - CRUSHED LAMSTONE



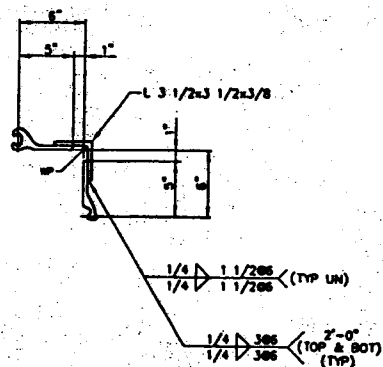
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ITT CORPORATION									
MULTIPLE PERMEABLE REACTIVE BARRIER MORTANDAD CANYON								DRAWN	STRIMATTER
GATE AND FUNNEL PLAN AND SECTIONS								DESIGN	P. INGERSOLL
GATE AND FUNNEL PLAN AND SECTIONS								CHECKED	W.T. CHAN
SUBMITTED BARRIE MADDON				APPROVED FOR RELEASE JOHN RASZUBA					
Los Alamos								SHEET	4
Los Alamos National Laboratory Los Alamos, New Mexico 87545								C3	C
LABORATION				INVENTOR		DATE		07-27-	
PROJECT NO				DRAWING NO		DATE		RI	
826732				826732-D3					

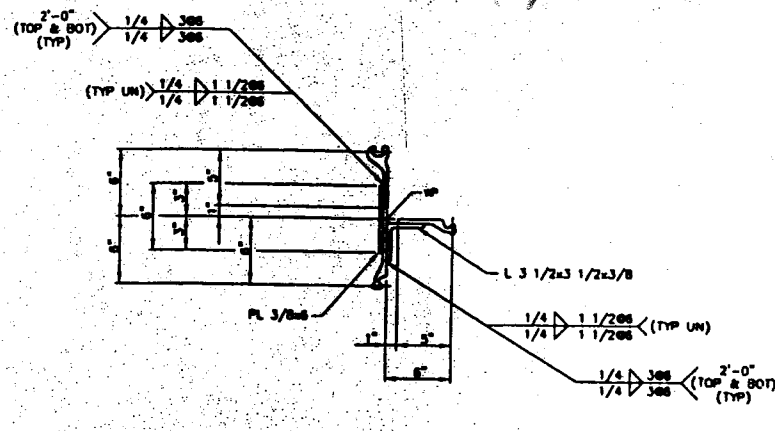
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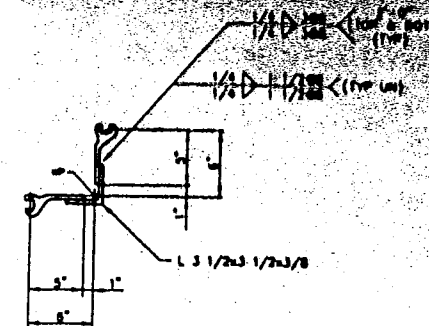
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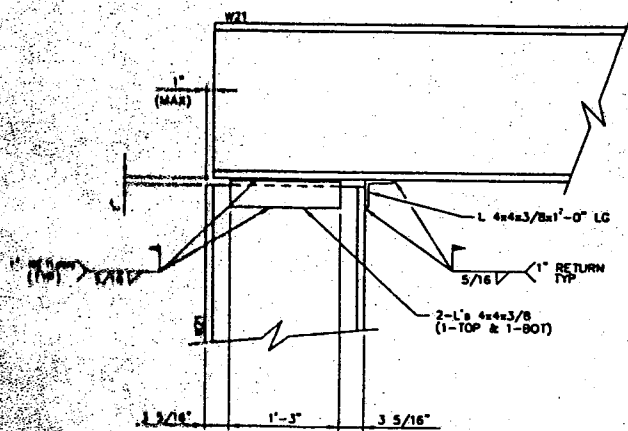
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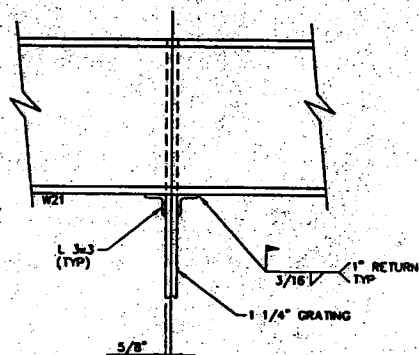
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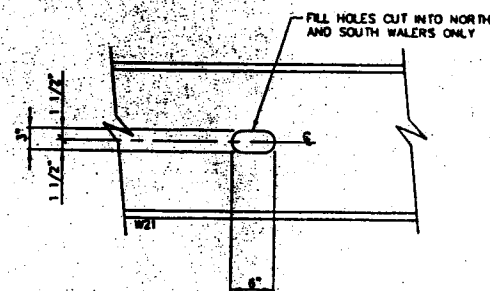
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C-3
SCALE: 1" = 1'-0"



DETAIL 6
C-3
SCALE: 1" = 1'-0"



DETAIL 7
C-3
SCALE: 1" = 1'-0"

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ITT CORPORATION	
MULTIPLE PERMEABLE REACTIVE BARRIER MORTANDAD CANYON	
GATE AND FUNNEL DETAILS	
DRAWN	STRIMATTER
DESIGN	P. INGERSOLL
CHECKED	W.T. CHAN
DATE	07-27-01
SUBMITTED	APPROVED FOR RELEASE
JAMES HARRISON	

Los Alamos		SHEET 5 OF 5
Los Alamos National Laboratory Los Alamos, New Mexico 87543		C4
CLASSIFICATION		REVIEWER
PROJECT ID		DATE 07-27-01
826732		DRAWING NO
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