

SECTION 21

WASTE DISPOSAL STRUCTURES AND FACILITIES

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SECTION 21

WASTE DISPOSAL STRUCTURES AND FACILITIES

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SECTION 21

WASTE DISPOSAL STRUCTURES AND FACILITIES

LIST OF EXHIBITS

EXHIBIT

NUMBER

EXHIBIT TITLE

[21-1](#)

West Hosteen Landfarm Design - Sheet 1

[21-1](#)

West Hosteen Landfarm Section Profile Design - Sheet 2

SECTION 21

WASTE DISPOSAL STRUCTURES AND FACILITIES

LIST OF REVISIONS DURING PERMIT TERM

REV. NUMBER	REVISION DESCRIPTION	DATE APPROVED
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21. WASTE DISPOSAL STRUCTURES AND FACILITIES

21.1 Landfarming of Petroleum Contaminated Soils

West Hosteen Landfarm – Area 3 washbay water and sludge containing petroleum products is managed at Navajo Mine using landfarming. When necessary, Petroleum Contaminated Soils (PCS) resulting from accidental spill and leaks are also managed using landfarming. The West Hosteen landfarm consists of one cell 110' x 185' with a 2' liner consisting of compacted clay material. Liner material is composed of suitable spoil that meets compaction specifications for a 1×10^{-7} cm/sec maximum hydraulic conductivity. A 6" buffer layer of uncompacted material is placed between the compacted liner and the petroleum contaminated soils. The landfarm is located and built so that surface flows will not enter the landfarm area. The landfarm cell is designed and constructed to contain a 100-yr. 6-hr. event. The process of landfarming includes natural aeration, volatilization, disking, and the periodic addition of water and nutrients to support bioactivity.

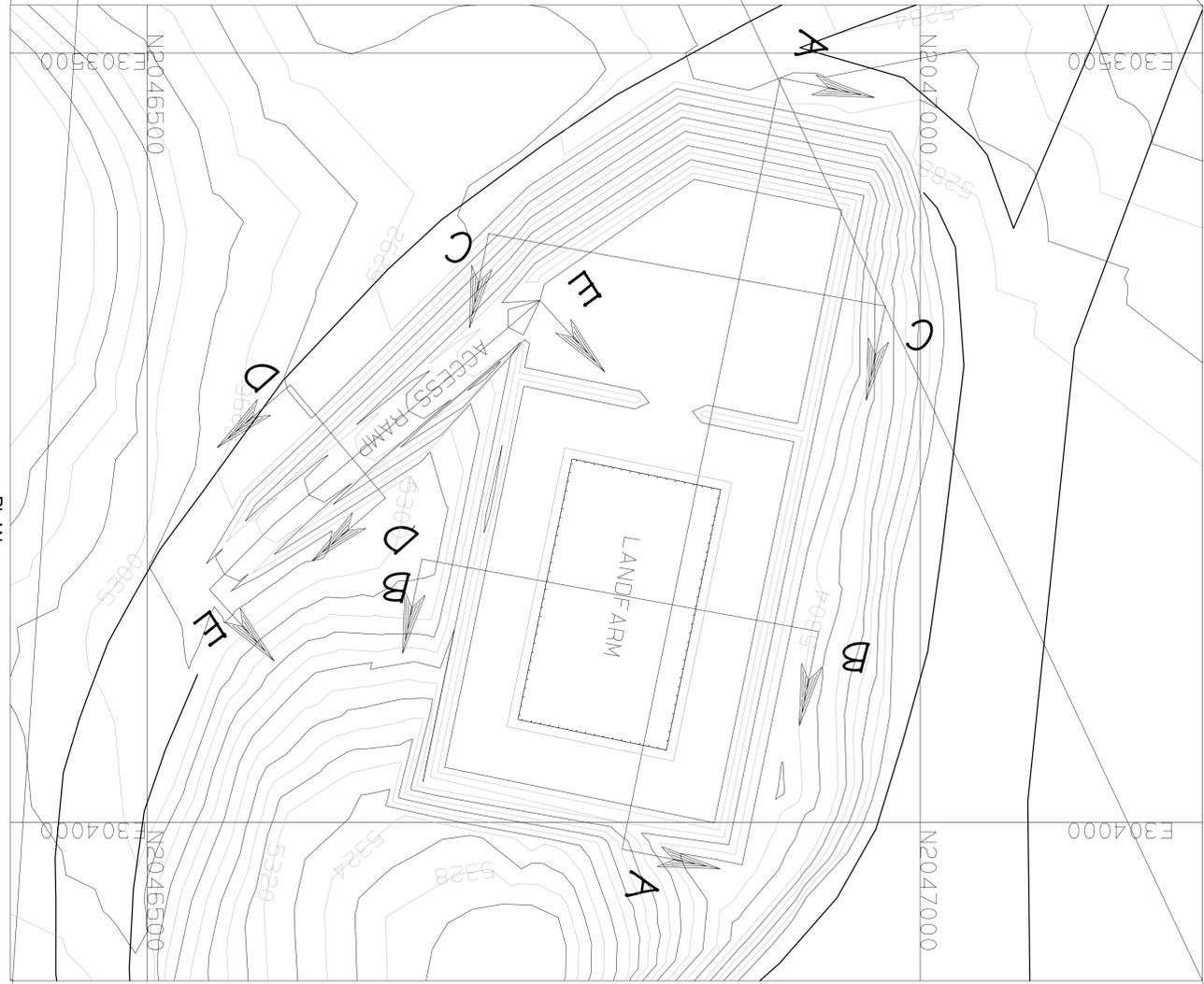
Based on technical experience with similar operations Navajo Mine expects the concentrations of petroleum hydrocarbons to be remediated within one year after placement into the landfarm. The performance of the landfarm will depend on the original hydrocarbon concentrations of the soil and the soil temperature conditions. Cooler temperatures slow the natural bio-remediation process.

The landfarm materials are limited to non-hazardous petroleum contaminated soils and floor dry (diatomaceous earth) with oil and diesel. Materials are analyzed if direct operator knowledge is unavailable to determine the level of contamination, non-hazardous waste classification, and remediation time necessary. Treatment of the soils will be considered complete when levels are demonstrated to be below 100-ppm total petroleum hydrocarbon levels required by the Navajo Nation. Soils will be analyzed and classified as a non-regulated soil and landfarm material will be spoiled. The landfarm location is shown on Exhibit 21-1 ([Sheet 1](#) and [Sheet 2](#)). No landfarm is located with 8 feet of any coal outcrop.

Once the landfarm is no longer needed, completion of the site will follow the applicable reclamation and revegetation activities found in Section 30 – Reclamation Plan.



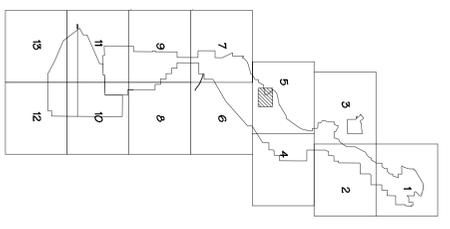
LOCATION MAP
SCALE: 1"=300'



PLAN
SCALE: 1"=50'

STAGE STORAGE DATA

ELEV feet	AREA ac-ft	VOLUME ac-ft	CUM. VOLUME ac-ft
5305	0.35	0.00	0.00
5306	0.39	0.37	0.37
5307	0.43	0.41	0.78
5308	0.48	0.45	1.23
5309	0.51	0.49	1.72
5310	0.55	0.53	2.25



NOTES
1. For information only, refer to Appendix 11-1 in the approved map.

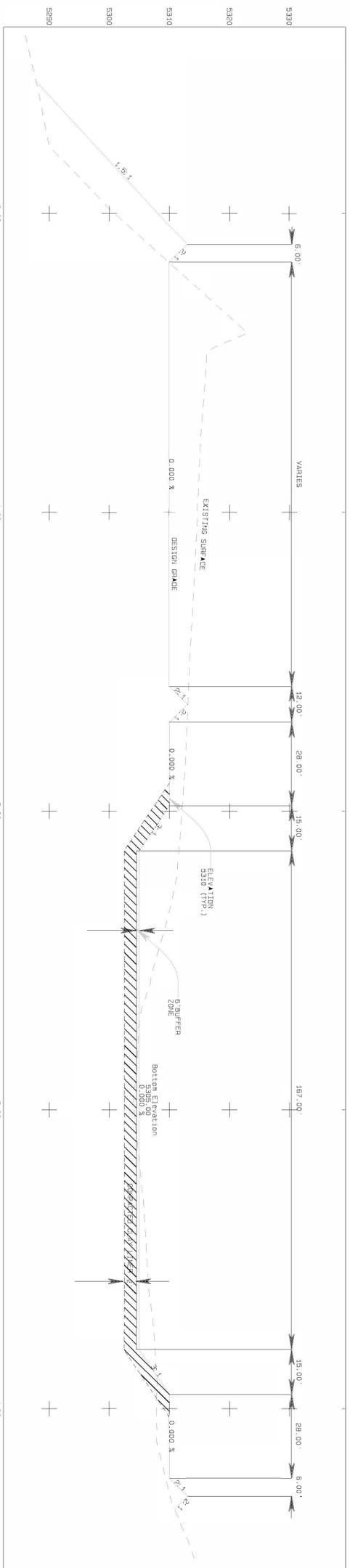
LEGEND

- ROAD
- TRAIL
- BUILDING
- FENCE
- IRRIGATION LINE
- CAVERT
- DAM
- DRAINAGE
- RAILROAD
- TREES
- POWER LINE
- SPOT ELEVATION
- INDEX CONTOUR
- INTERMEDIATE CONTOUR
- CONTROL
- LEASE

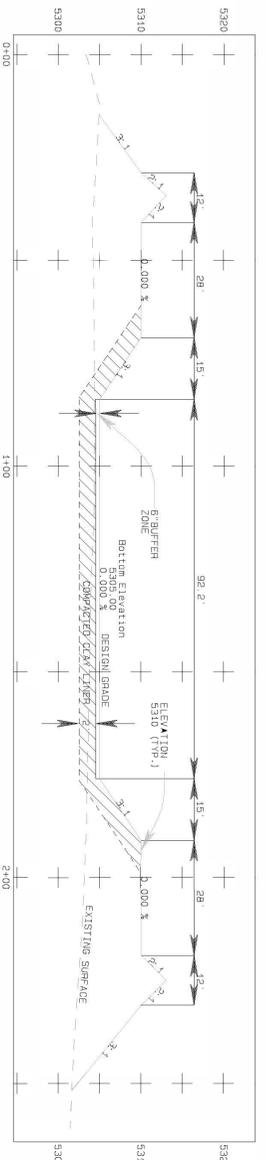
CERTIFICATION STATEMENT
I, Leonard Raymond, hereby certify that this drawing was reviewed by me and that the information shown is complete and accurate to the best of my knowledge.



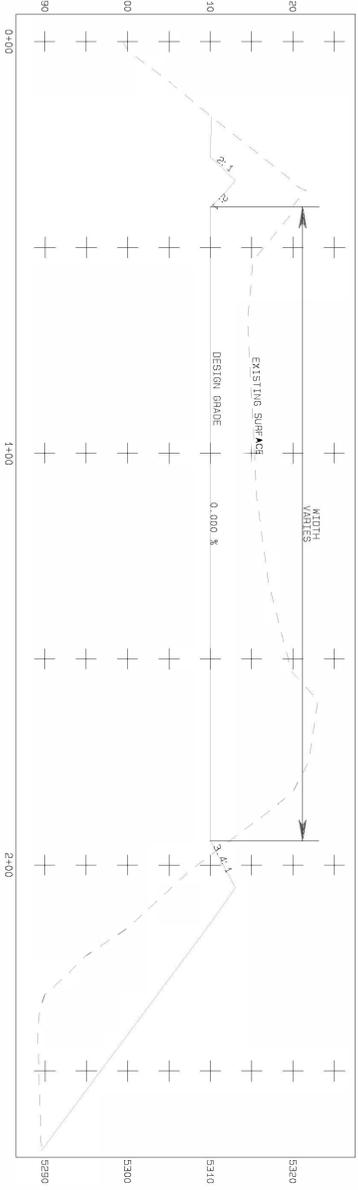
<p>EXHIBIT 21-1 WEST HOSTEEN LANDFARM DESIGN</p>	<p>LOCATION AND PLAN</p>	<p>BHP-NAVAJO COAL CO. PO BOX 155, FRUITLAND, NEW MEXICO, 87416</p>	<p>PROJECT MANAGER: Corey Nelson ENGR. of RECORD: Leonard Raymond REG. NO. 6600 SYRR of RECORD: REG. NO.</p>	<p>REVISION</p>	<p>DATE</p>
				<p>1 SUBMITTED TO GSM FOR APPROVAL</p>	<p>12/08/00</p>



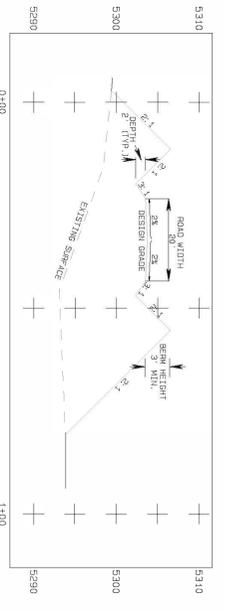
SECTION A-A



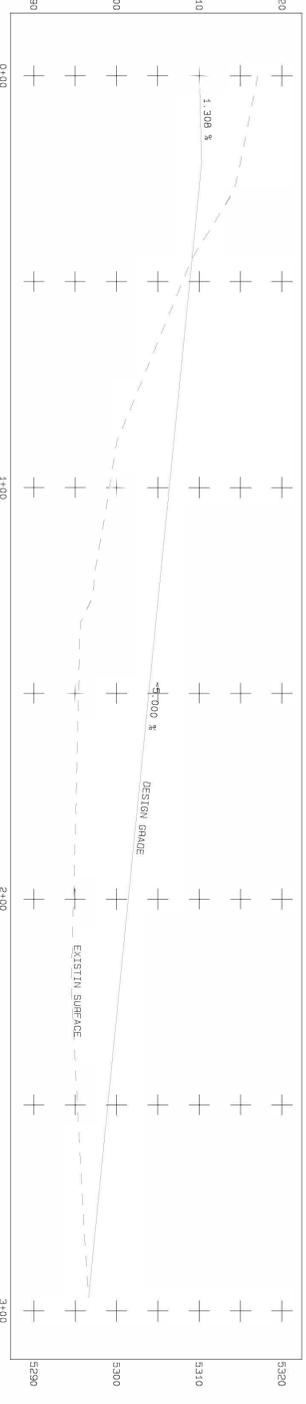
SECTION B-B



SECTION C-C



SECTION D-D



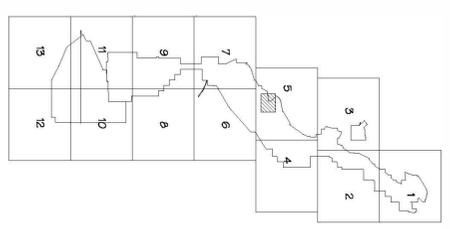
PROFILE E-E

SECTIONS AND PROFILE
HORIZONTAL: 1"=20'
VERTICAL: 1"=10'

LEGEND

- ROAD
- TRAIL
- BUILDING
- FENCE
- IRRIGATION LINE
- CULVERT
- DAM
- DRAINAGE
- RAILROAD
- TREES
- POWERTINE
- SPOT ELEVATION
- INDEX CONTOUR
- INTERMEDIATE CONTOUR
- LEASE

NOTES
1. For hydrology information refer to Appendix 11-1 in the approved RFP.



CERTIFICATION STATEMENT
I, Leonard Raymond, hereby certify that this drawing was reviewed by me and that the information shown is complete and accurate to the best of my knowledge.

