WEST RIDGE MINE
007/041

ALTERNATE HIGHWALL RECLAMATION PLAN
RESPONSE TO T.A.
DIVISION ORDER 00A-7

SUBMITTED: MAY 31, 2004

File in:
☐ Confidential
☐ Shelf
☒ Expandable
Refer to Record No 0014 Date 053104
In C/0070041 Incoming
For additional information

0014

WEST RIDGE
RESOURCES, INC.

P.O. BOX 1077
PRICE, UTAH 84501
PHONE: (435) 888-4000
FAX: (435) 888-4002

May 31, 2004

Utah Coal Program
Utah Division of Oil, Gas and Mining
1594 West North Temple, Suite 1210
P.O. Box 145801
Salt Lake City, UT 84114-5801

Incoming
C/007/0041 OK
1940

Re: Response to Highwall TA, Division Order 00A-7, West Ridge Mine, C/007/0041

Dear Sirs,

WEST RIDGE Resources, Inc. is enclosing 5 copies of its response to the latest Highwall Technical Analysis for the Division Order 00A-7. Also, attached is a check sheet explaining the changes made and a synopsis of the response to each of the separate TA items.

The original Appendix 5-9 (Agapito Report) has been eliminated and needs to be discarded, and has been replaced with a new Appendix 5-9 (Alternate Highwall Reclamation Plan). The previously submitted Appendix 5-10 has been eliminated.

The required C1/C2 forms are also enclosed.

Call me at 435-564-4015 if you have any questions.

Sincerely

Gary E. Gray
Agent/Engineer

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JUN 01 2004
DIV. OF OIL, GAS & MINING

Mine # C/007/0041
File Incoming
Record # 0014
Doc. Date 5-31-04
Recd. Date 6-1-04

Form DOGM - C1 (Last Revised May 20, 2004) File Folder # 3

APPLICATION FOR PERMIT PROCESSING

Permit Change X	New Permit ☐	Renewal ☐	Transfer ☐	Exploration ☐	Bond Release ☐	Permit Number: C/007/041
of Proposal: Response to T/A						Mine: WEST RIDGE MINE
						Permittee: WEST RIDGE RES.

Description, include reason for application and timing required to implement:

Division Order.

Instructions: *If you answer yes to any of the first 8 questions (gray), submit the application to the Salt Lake Office. Otherwise, you may submit it to your reclamation*

[redacted]

☐ Yes	X No	9. Is the application submitted as a result of a Violation? NOV # N-02-49-1-1
☐ Yes	X No	10. Is the application submitted as a result of other laws or regulations or policies? Explain: Request by Division.
☐ Yes	X No	11. Does the application affect the surface landowner or change the post mining land use?
☐ Yes	X No	12. Does the application require or include underground design or mine sequence and timing? (Modification of R2P2?)
☐ Yes	X No	13. Does the application require or include collection and reporting of any baseline information?
☐ Yes	X No	14. Could the application have any effect on wildlife or vegetation outside the current disturbed area?
☐ Yes	X No	15. Does application require or include soil removal, storage or placement?
☐ Yes	X No	16. Does the application require or include vegetation monitoring, removal or revegetation activities?
☐ Yes	X No	17. Does the application require or include construction, modification, or removal of surface facilities?
X Yes	☐ No	18. Does the application require or include water monitoring, sediment or drainage control measures?
X Yes	☐ No	19. Does the application require or include certified designs, maps, or calculations?
☐ Yes	X No	20. Does the application require or include subsidence control or monitoring?
☐ Yes	X No	21. Have reclamation costs for bonding been provided for?
☐ Yes	X No	22. Does application involve a perennial stream, a stream buffer zone or discharges to a stream?
☐ Yes	X No	23. Does the application affect permits issued by other agencies or permits issued to other entities?

X Attach 5 complete copies of the application.

I hereby certify that I am a responsible official of the applicant and that the information contained in this application is true and correct to the best of my information and belief in all respects with the laws of Utah in reference to commitments, undertakings, and obligations, herein.

Signed - Name - Position - Date

Subscribed and sworn to before me this 26 day of May 2004

Notary Public

My Commission Expires: Jan 10 2 2006

Attest: STATE OF UTAH COUNTY OF Carbon

RADA J. ROGERS
NOTARY PUBLIC • STATE of UTAH
2150 N. LUNDY LANE
CLEVELAND, UT 84518
COMM. EXPIRES 10-2-2006

Received by Oil, Gas & Mining
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ASSIGNED TRACKING NUMBER

Form DOGM - C2 (Last Revised 6/93)

File Folder # 3

Application for Permit Processing
Detailed Schedule of Changes to the MRP

Title of Application:

Response to T/A

Permit Number: C/007/041

Mine: WEST RIDGE MINE

Permittee: WEST RIDGE RES.

Provide a detailed listing of all changes to the mining and reclamation plan which will be required as a result of this proposed
permit application. Individually list all maps and drawings which are to be added, replaced, or removed from the plan. Include changes of the table of contents, section of the plan, pages, or other information as needed to specifically locate, identify and revise the existing mining and reclamation plan. **Include page, section and drawing numbers as part of the description.**

			DESCRIPTION OF MAP, TEXT, OR MATERIALS TO BE CHANGED
☐ ADD	X REPLACE	☐ REMOVE	Page 5-47
☐ ADD	X REPLACE	☐ REMOVE	Page 5-iv
X ADD	☐ REPLACE	☐ REMOVE	Appendix 5-9
☐ ADD	☐ REPLACE	☐ REMOVE	
☐ ADD	☐ REPLACE	☐ REMOVE	
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Any other specific or special instructions required for insertion of this proposal into the Mining and Reclamation Plan?

APPENDIX 5-9

ALTERNATE
HIGHWALL AREA RECLAMATION
USING A
SMALLER VERTICAL ANGLE SLOPE

WEST RIDGE MINE

UTAH REGISTERED
#154168
DAN W. GUY
5/26/05
PROFESSIONAL ENGINEER

I. Introduction

The Division has requested an evaluation of an alternate to the approved reclamation plan for the portal highwall area utilizing a smaller vertical angle slope.

This evaluation is based on lessening the reclaimed highwall slope to 31.2° to 33.6°. This would be accomplished by shifting the proposed main channel approximately 40' to the northwest during final reclamation. This channel shift would occur only at cross-section stations 23+00 through 28+00 [Plate 1] to allow the lessening of the reclaimed highwall slope.

All topsoil handling and placement, and revegetation practices of the reclaimed slope of the highwall area will be done according to the existing approved reclamation plan. Implementation of this alternate reclamation plan will affect a small portion of the approved experimental practice area. Insitu topsoil in this affected area will be salvaged at the time of final reclamation in accordance with the approved plan.

II. Proposed Plan

Under this scenario, the main channel would be relocated approximately 40' to the northwest between cross-section stations 24+00 and 28+00 during final reclamation. The highwall would then be backfilled, compacted, topsoiled and reseeded in the same manner as the other cutslopes on the site. Calculations show that by reducing the reclaimed highwall angle to 33.61° or less, and using the proposed backfill material, a factor of safety of greater than 2.4 can be attained for saturated conditions and greater than 3.6 for dry, normal conditions.

The proposed shift in the reclaimed channel will affect an area of the experimental practice "in-situ" topsoil of approximately 400' in length by 80' in width, or approximately 0.74 acres. This represents approximately 7.41% of the overall experimental practice area. The culvert and any available in-situ topsoil will be removed from this area during final reclamation. The topsoil will be replaced, and the restored channel will be rip-rapped to provide erosion protection through the reclaimed area.

The proposed area of relocation is shown on Plate 1 and the proposed new reclaimed cross-sections are shown on Plate 2.

III. Calculations

Stability calculations were performed using the Hoek Method from Rock Slope Engineering. Under this method, stability projections can be made using known soil characteristics such as density, cohesion and internal friction angle, as well as proposed slope height. This information can then be plotted on the provided circular failure charts to determine factors of safety for both Dry and Saturated Conditions.

Density, cohesion and internal friction angle of the proposed backfill material were taken

directly from sample results from the proposed backfill material taken by West Ridge and Agapito personnel in December 2002. Slope heights and angles were measured directly from Plates 1 and Plate 2. The relevant numbers for the calculations are listed for each cross section on Table 1 of this report. These numbers were then applied to the equations on the Circular Failure Charts No. 1 and No. 5 to determine the Static Safety Factor for Dry and Saturated Conditions, respectively (Figures 1 and 2).

Based on the proposed soil characteristics and highwall slope angles, Factors of Safety for Dry Conditions run from a minimum of 3.62 to 4.30, and a minimum of 2.41 to 2.70 for Saturated Conditions.

As a double check on the stability of the reclaimed highwall, calculations were also run using soil samples taken by Agapito from the source area of the pad material, in 2002. The numbers are considerably more conservative and were used simply to show the highwall can be properly reclaimed with even the weaker soil types previously proposed. Using these sites, the reclaimed highwall would still have a Factor of Safety from 1.98 to 2.26 under Dry Conditions and from 1.32 to 1.50 under Saturated Conditions. (See Table 2)

IV. Summary

Factors of Safety for the complete highwall reclamation at West Ridge Mine can be significantly increased by shifting the proposed reclaimed highwall toe approximately 40' to the northwest. Using recently tested sample results and new proposed reclaimed slope angles, the static safety factor of the reclaimed highwall can be increased to a minimum of 3.62 to4.30 for Dry Conditions and a minimum of 2.41 to 2.70 for Saturated Conditions.

This proposed change would affect a small portion of the experimental practice "in-situ" topsoil area; however, the impact would be minor (approximately 7.41% of the experimental practice area), and topsoil could still be salvaged and replaced on this area during final reclamation.

This proposal would allow for complete and stable highwall reclamation without the need for special drains, special material and placement methods and specialized planting. However, this alternative would also require the Division to grant an AOC variance. It may also increase the possibility of future, post bond-release channel erosion due to a storm event exceeding the design of the reclaimed channel.

Table 1
Using proposed backfill material.
Move Reclaimed Channel 40' to NW

Station	24+00	25+00	26+00	27+00
Toe	7045	7042	7042	7.44
Top	7150	7130	7130	7130
VD (H)	105	88	88	86
HD	158	140	140	142
Slope Angle	33.61°	32.15°	32.15°	31.20°
Safety Factor (Dry)	3.62	4.17	4.17	4.30
Safety Factor (Saturated)	2.41	2.65	2.65	2.70

Hoek Method - Rock Slope Engineering

*Density (γ) = 138 lb/ft^3
*Cohesion (c) = 1877 psf (Backfill)
*Friction Angle (ϕ) = 54°

*Based on sample results of proposed highwall backfill material taken by West Ridge and Agapito personnel in December 2002.

Table 2
Stability check using previous soil samples.
Move Reclaimed Channel 40' to NW

Station	24+00	25+00	26+00	27+00
Toe	7045	7042	7042	7.44
Top	7150	7130	7130	7130
VD (H)	105	88	88	86
HD	158	140	140	142
Slope Angle	33.61°	32.15°	32.15°	31.20°
Safety Factor (Dry)	1.98	2.14	2.14	2.26
Safety Factor (Saturated)	1.32	1.44	1.44	1.50

Hoek Method - Rock Slope Engineering

*Density (γ) = 121.6 lb/ft^3
*Cohesion (c) = 771.7 psf
*Friction Angle (ϕ) = 38.4°

*Based on sample results of soil samples from the source area of the pad material analyzed by Agapito personnel in 2002.

C=Cohesion-psf

Y=Density-pcf

H=Slope Height-ft.

ϕ=Internal Friction Angle

(DRYCONDITIONS)

CIRCULAR FAILURE CHART NUMBER 1

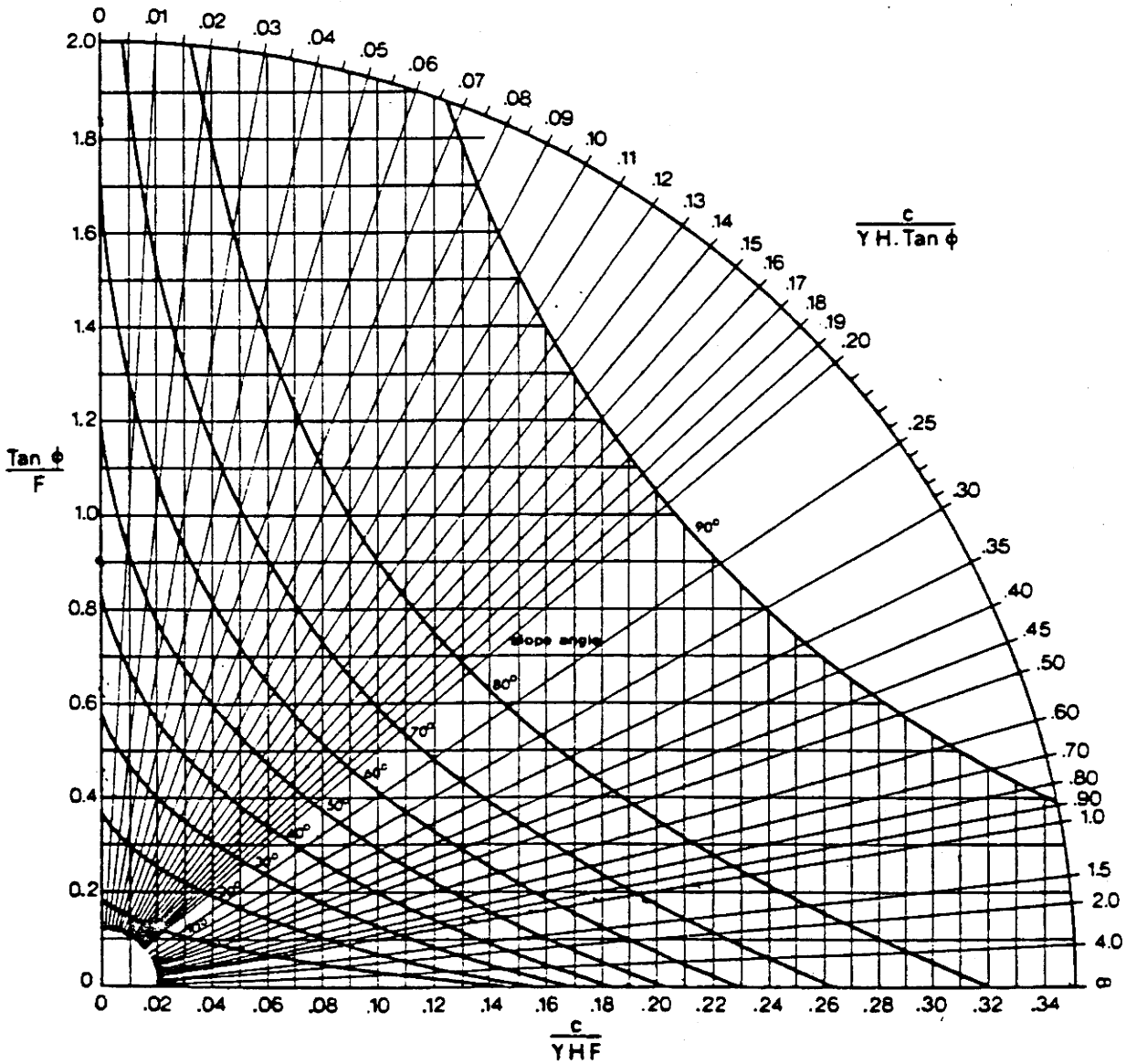


Figure 1

C=Cohesion-psf

Y=Density-pcf

H=Slope Height-ft.

Φ=Internal Friction Angle

(SATURATED CONDITIONS)

CIRCULAR FAILURE CHART NUMBER 5

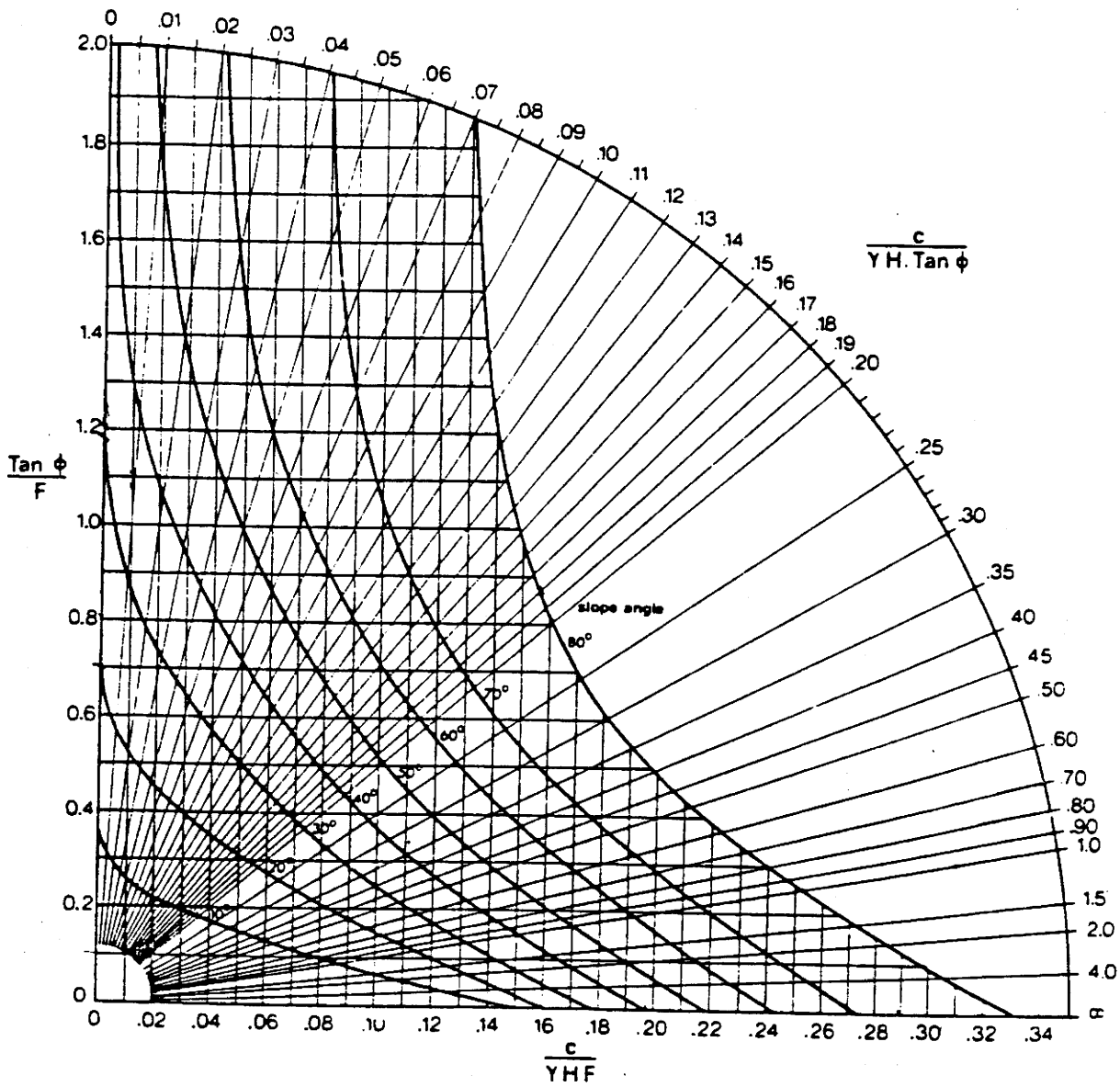


Figure 2

Hydrologic Design

Under this alternate highwall reclamation scenario, approximately 500' of the main channel in the right fork will be reconstructed, as shown on Map 5-6 (Alt.). The reconstruction will occur between cross-section stations 23+00 and 28+00 (See Maps 5-6 (Alt.) and 5-6B (Alt.).

At the request of the Division, the channel in this area will not be rip-rapped. It is proposed to construct a natural appearing channel with a minimum 12' bottom width and approximately 2:1 sides slopes, with a minimum depth of 3.5'. A typical section of the proposed channel is shown on Figure 3 of this Appendix.

Construction of the channel will start by removing topsoil from the channel site and stockpiling it for use on the reclaimed highwall area. The channel will then be excavated and the material also stockpiled for backfilling. Since the channel is in a rocky area, it is likely enough rock will be exposed to create a natural armor on the channel. As an added precaution against erosion 2 additional steps will be taken during construction:

(1) Small drop rock structures approximately 1' high, will be constructed at least every 100' through the reconstructed channel area. These structures will be built by placing rocks no less than 18" D_{50} across the bottom of the channel;

(2) Additional large rocks (18" D_{50} or greater) will be placed along the reclaimed highwall side of the channel to protect against scouring of the reclaimed toe of slope. Large rocks may also be placed randomly in the channel bottom to create a more natural appearance.

A typical section of the rock drop structures and rock placement is shown on Figure 4.

Channel Design

As shown on Map 5-9 "Mine Site Reclamation" and on Map 5-9 (Alt.), the proposed channel reconstruction area is within the reclaimed channel area designated RC-GG. Channel RC-GG is discussed in Appendix 7-4, under Section 4, "Design of Drainage Control Structures for Reclamation Hydrology". As shown on Tables 21, 22 and 23 of Appendix 7-4, the design of RC-GG is based on the following:

100 year/6 hour runoff	-	69.98 cfs
Bottom Width	-	12 ft.
Side Slopes	-	2H:1V
Channel Slope	-	6.4%
Reclaimed Depth	-	3.5 ft.
Manning's No.	-	0.035
Flow Velocity	-	7.70 fps
Required Area	-	9.09 ft^2
Flow Depth	-	0.68 ft.

Since all details and support calculations for this channel are provided in Appendix 7-4, they are not repeated here.

Summary

The proposed reconstruction of approximately 500' of the main right fork channel will be completed using native materials. Drop structures of approximately 1' in height will be constructed of rock at not less than 100' intervals through the reconstructed channel area. Large rocks will also be placed along the highwall side of the channel and at random locations in the channel bottom for both erosion protection and aesthetics.

The proposed channel size, 12' wide x 3.5" deep with 2:1 side slopes, will carry the projected 100 year/6 hour event runoff at a depth of approximately 0.68 feet and a velocity of approximately 7.70 fps. While the velocity may be considered potentially erosive, the rocky area and drop structures should offset the adverse effects. The projected velocity is based on the characteristics of the pre-existing natural channel assuming a constant slope and no drop structures, with a 100 year/6 hour event.

FIGURE 3
TYPICAL SECTION
OF
RECONSTRUCTED CHANNEL

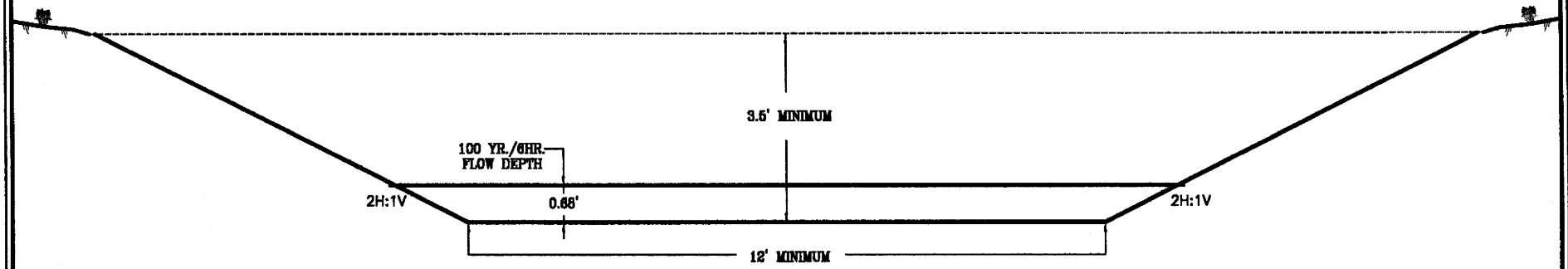
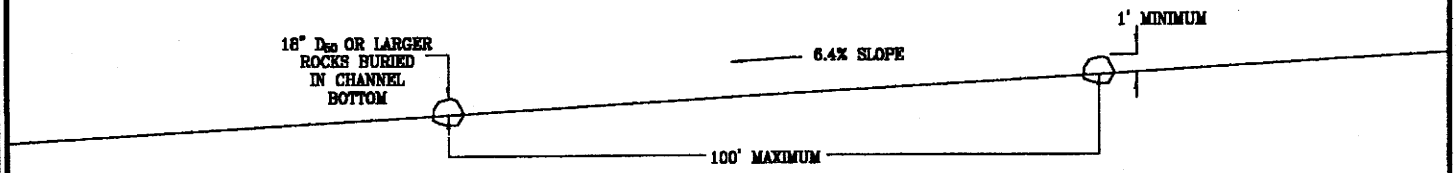
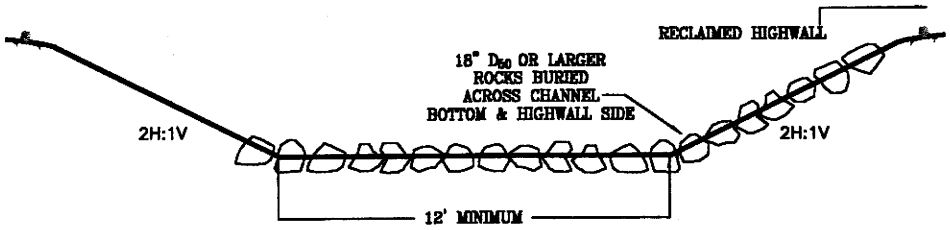


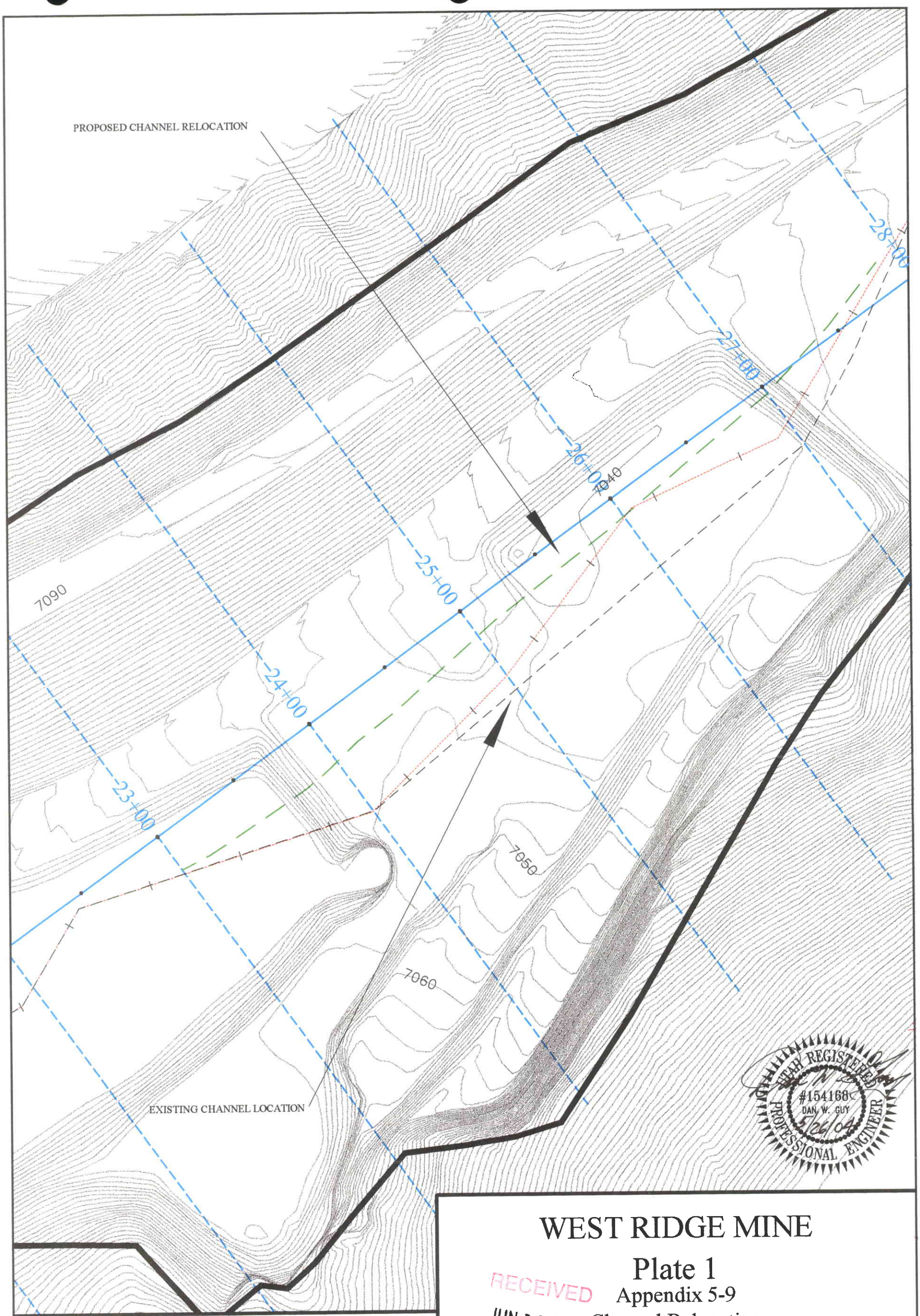
FIGURE 4
TYPICAL SECTION
OF
ROCK DROP STRUCTURE



PROFILE



SECTION



WEST RIDGE MINE

Plate 1

Appendix 5-9

Channel Relocation

for

Alternate Highwall Reclamation

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Legend:

Original Channel Location: - - - - - -

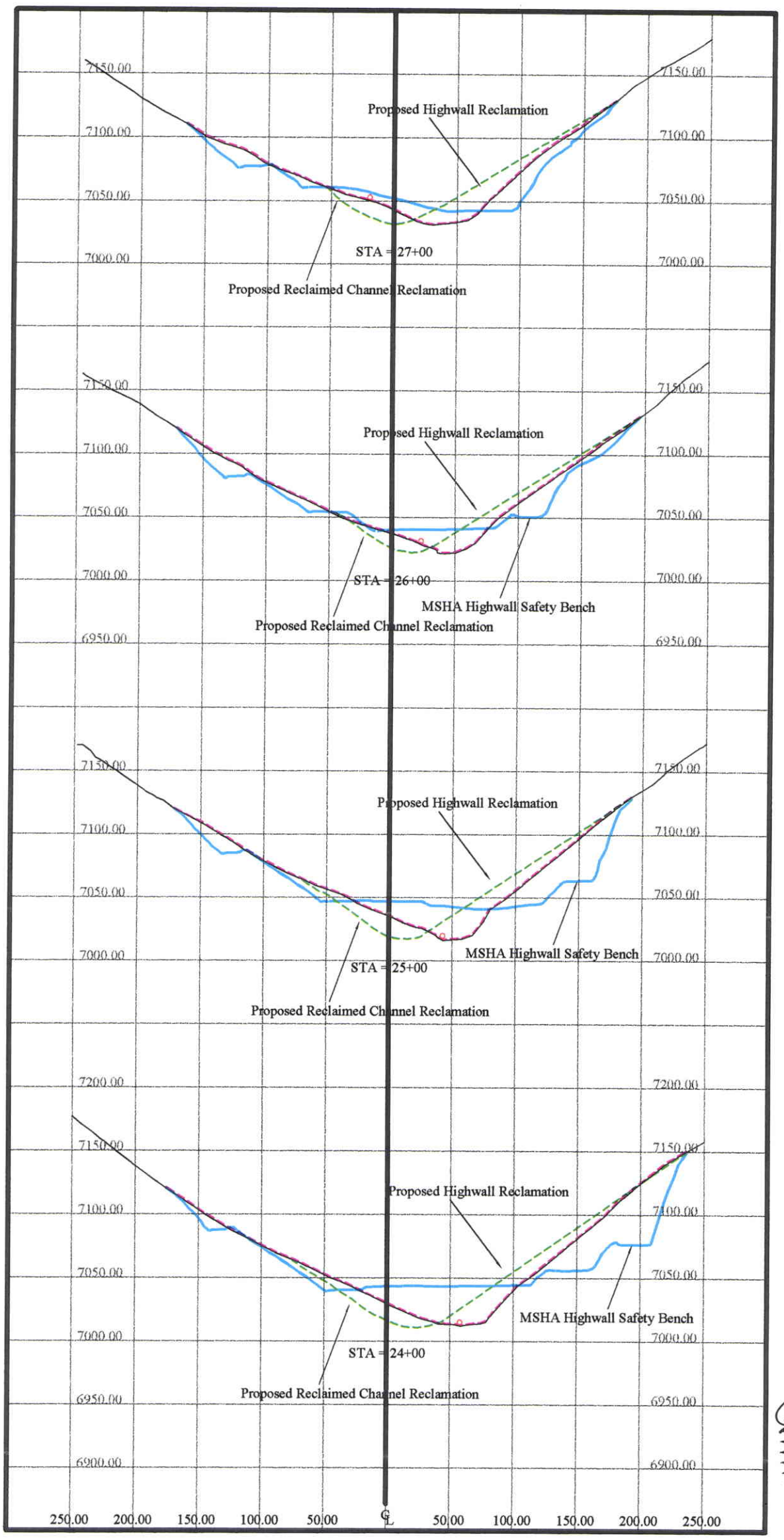
Alternate Channel Relocation: — — —

Culvert: - - - - - -

Re: Map 5-6
Volume B

SCALE: 1" = 50'

ACAD REF: Map 1 REV: 1 DATE: 05/12/04



Scale: 1" = 100'

Map 5-6B in Volume B

Legend:

- Original Surface
- As Constructed Surface
- Approved Reclaimed Surface
- Alternate Reclaimed Surface
- Bypass Culvert

WEST RIDGE MINE

Plate 2

Appendix 5-9

Alternate Reclaimed Highwall Cross-Sections

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ACAD REF: Plate 2 REV: 1 DATE: 05/26/04

DISTURBED AREA BOUNDARY

APPROXIMATE GEOTEXTILE BOUNDARY

ORIGINAL (AND RECLAIMED) SURFACE CONTOUR WITHIN GEOTEXTILE AREA

APPROVED RECLAMATION SURFACE CONTOUR

ALTERNATE RECLAMATION SURFACE CONTOUR

RESTORED CHANNEL

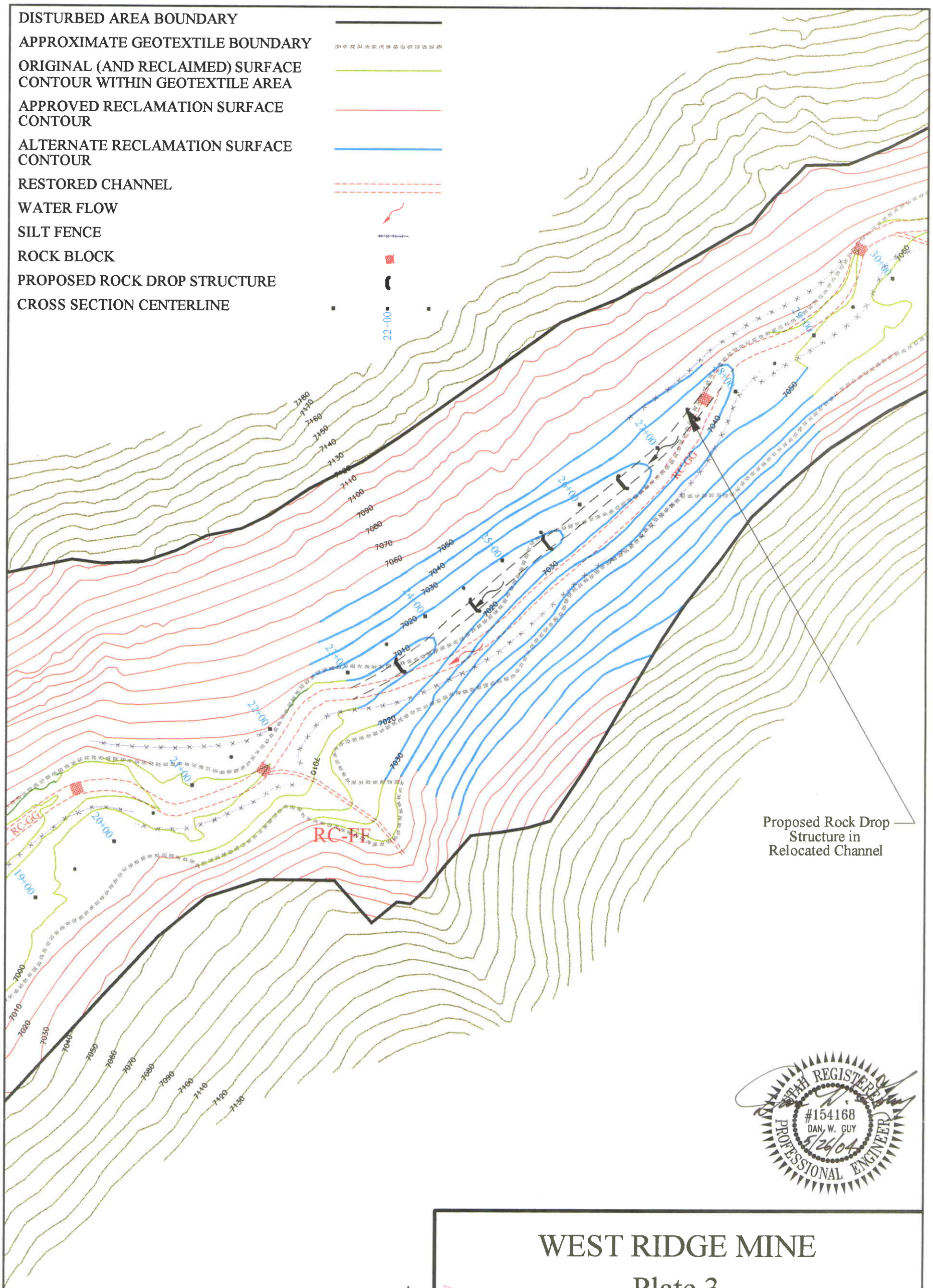
WATER FLOW

SILT FENCE

ROCK BLOCK

PROPOSED ROCK DROP STRUCTURE

CROSS SECTION CENTERLINE



Note: Refer to Maps 5-6A, 5-6B and 5-6C in Volume B for Minesite reclamation cross sections.

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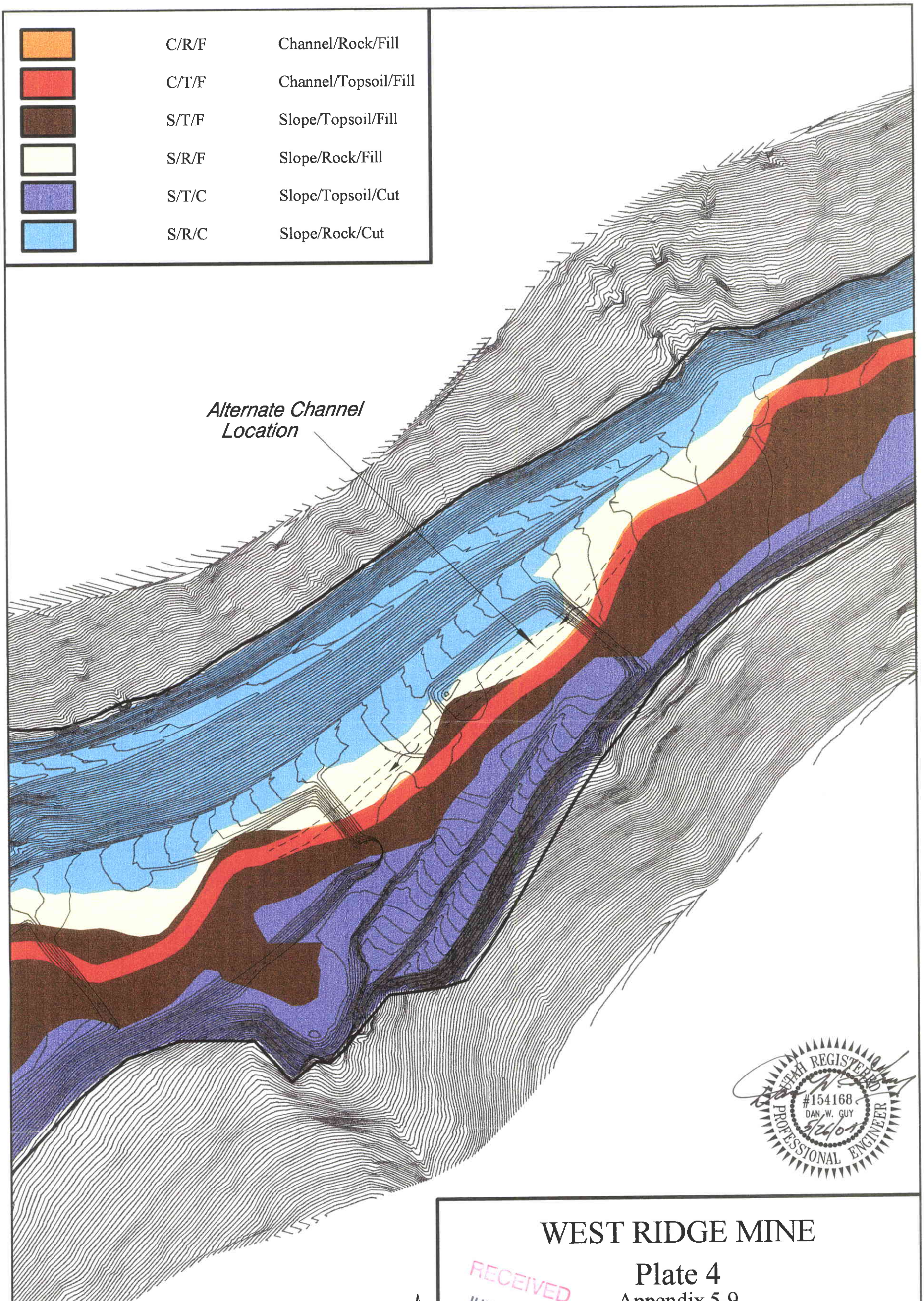
WEST RIDGE MINE

Plate 3

Appendix 5-9
Alternate Reclamation
for
Highwall Area

Scale: 1" = 100' Re: Map 5-9 in Volume B ACAD REF: Map 1 REV: 1 DATE: 05/12/04

C/R/F	Channel/Rock/Fill
C/T/F	Channel/Topsoil/Fill
S/T/F	Slope/Topsoil/Fill
S/R/F	Slope/Rock/Fill
S/T/C	Slope/Topsoil/Cut
S/R/C	Slope/Rock/Cut



UTAH REGISTERED #154168 DAN W. GUY 5/26/04 PROFESSIONAL ENGINEER

Note: Contours depict as-built surface.

N

WEST RIDGE MINE

Plate 4

Appendix 5-9

Construction/Reclamation Area-Types

Alternate Highwall Reclamation

RECEIVED JUN 01 2004 DIV. OF OIL, GAS & MINING

Scale: 1" = 100'

Re: Map 5-10 in Volume B

ACAD REF: Map 4

REV: 1

DATE: 05/26/04

West Ridge Mine
Response to Division Order
C/007/041-D000A-7
Technical Analysis

General

1- Appendix 5-10 (Previously Submitted) has been re-written and submitted as a new Appendix 5-9.

2- Previously submitted Appendix 5-9 (Agapito Proposal) has been eliminated and replaced with new Appendix 5-9 (Alternate Highwall Area Reclamation). Previously submitted Appendix 5-10 is also eliminated.

Summary of Deficiencies (T/A)

R645-301-742.300,

Provide the above-cited corrections so the Maps 5-6B, and Maps 1 and 2 from Appendix 5-10 consistently reflect the same information;

Maps have been corrected and reflect latest As-Constructed information.

R645-301-241,

The plan should indicate the approximate area of the highwall reclamation site and the required topsoil volume to achieve a twelve to eighteen inch topsoil replacement depth;

Topsoil replacement on the highwall area will be done as per approved plan (and depth) for the minesite.

R645-301-242.120,

Pocking and planting of trees as described in Appendix 5-9 will not likely be achieved due to the geogrid installation every 1.5 feet. A more realistic statement of pocking depth and tree planting should be described for Appendix 5-9;

N/A - Previously submitted Appendix 5-9 has been eliminated. Highwall area revegetation will be as the approved plan.

R645-301-541.400, **The permittee must either provide the Division charts of displacement versus shear stress <u>that show a peak value</u>. The Permittee may use another generally accepted method for determining the internal friction angle and the cohesive strength of the test material if desired;**

N/A - Previously submitted Appendix 5-9 has been eliminated.

R645-301-542.200, **The permittee must provide the Division with material specifications for the geogrid, the geosynthetic composite drain material and the geotextile fabric. The permittee must include discussions of the effective life of each of those materials as well as whether or not any of the designs stability requirements could be affected following the termination of each of the materials effective lives;**

N/A - Previously submitted Appendix 5-9 has been eliminated.

R645-301-553, **The permittee must provide the Division with a rigorous testing plan that will show whether all unconsolidated materials will or will not meet the design parameters for the reclaimed highwall;**

N/A - Previously submitted Appendix 5-9 has been eliminated.

R645-301-553.130, **Regardless of the reclamation scenario chosen (appendix 5-9 or appendix 5-10), the application should include the results of multiple tests of the composited backfill samples for Mohr-Coulomb stress criteria to verify the extreme values reported;**

N/A - Previously submitted Appendix 5-9 has been eliminated.

R645-301-553.130, **The permittee must conduct tests to determine the angle of repose of all unconsolidated materials that will be part of the reclaimed highwall slope area.**

N/A - Previously submitted Appendix 5-9 has been eliminated.

R645-301742.211, **Provide the requested channel design information to demonstrate there will be no additional contributions of suspended solids and sediment to stream-flow outside the permit area;**

Channel design information is provided in the revised Appendix 5-9.

R645-301-742.312, 742.314, 742.321, 732.322, 742.323, 742.324

Per the above-cited discussion, provide maps, cross sections, calculations, and designs for the proposed reclamation channel;

Maps, cross sections, calculations and designs for the proposed reclamation channel are provided in the revised Appendix 5-9.

R645-301-742.320, **Appendix 5-10 does not address the requirements for the need to obtain a stream alteration permit from the Utah State Engineers office;**

It has been previously determined by the State Engineer that a stream alteration permit is not required at this site.

R645-301-214.200, **In the Backfilling and Grading section of the mining and reclamation plan, the Permittee must indicate that both Appendix 5-9 and Appendix 5-10 exist as reclamation options;**

N/A - Previously submitted Appendix 5-9 has been eliminated.

R645-301-218,

(1) The acreage of Buried RO/RL Travessilla Complex Areas to be affected by the implementation of Appendix 5-10 should be indicated such that the Division may determine the significance of the alteration to the experimental practice;

As indicated in revised Appendix 5-9 the proposed channel relocation would affect approximately 0.74 acres of the experimental practice area; however, the topsoil would still be protected until final reclamation, then salvaged and replaced.

TABLE OF CONTENTS- APPENDICES
R645-301-500 CHAPTER 5

APPENDIX NUMBER	DESCRIPTION
APPENDIX 5-1	Reclamation Bond Calculations
APPENDIX 5-2*	Letter from Carbon County Commission
APPENDIX 5-3*	Resource Recovery and Protection Plan (R2P2)
APPENDIX 5-3A	SITLA Mine Plan Approval
APPENDIX 5-4*	Stability Evaluation for Construction and Reclaimed Slopes, West Ridge Mine
APPENDIX 5-5	Construction/Reclamation Plan
APPENDIX 5-6	Spill Prevention Control and Countermeasure Plan (SPCC)
APPENDIX 5-7	Pump House Reclamation and Sediment Control
APPENDIX 5-8*	Letter Regarding Pre-Subsidence Survey (Mayo and Associates)
APPENDIX 5-9	Alternate Highwall Reclamation Plan

*Not included on disk

As portions of the mineyard are regraded, topsoil will be re-applied and the area gouged to contain runoff and sediment. The area will then be reseeded and mulched. This will be done for the entire reclaimed area. Map 5-9, Mine Site Reclamation, shows the reclamation drainage plan. See Appendix 7-4 for the design details regarding reclaimed channels.

Drainage from the reclaimed areas will be treated prior to entering the undisturbed drainage in the reestablished channels. Surface gouging, silt fences, and straw bales will be utilized for sediment treatment.

Restoration of the drainage channels will seek to present a natural appearance to the drainage while providing a suitable channel configuration. The designs presented are for a permanent structure and calculated for a 100 year, 6 hour event.

The reclaim channel side slopes, widths, and gradients have been designed to closely resemble the premining channel and the channel above and below the disturbed area. The reclaimed channel will be capable of passing the same flow as the undisturbed channel above and below the reclaimed area. As no riparian zone exists along the drainage channel, the regraded slopes will be hydroseeded and mulched with the same treatment used on the yard areas.

In response to a request from the Division an alternate to the approved highwall reclamation plan using a lesser slope is included in Appendix 5-9.