



Alton Coal Development, LLC

463 North 100 West, Suite 1

Cedar City, Utah 84720

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November 6, 2015

Daron R. Haddock
Coal Program Manager
Oil, Gas & Mining
1594 West North Temple, Suite 1210
Salt Lake City, UT 84114-5801

Subject: **Engineer's Statement for the Reclaimed Robinson Gulch, Alton Coal Development, LLC, Coal Hollow Mine, Kane County, Utah, C/025/0005, Task Id# 5018**

Dear Mr. Haddock,

Alton Coal Development, LLC is providing a copy of the "Engineer's Statement for the Reclaimed Robinson Gulch". This statement is an amendment to Appendix 5-10, was requested to be submitted under task id. # 5018 along with the attached C1:C2 form.

Please do not hesitate to contact me if you have any questions 435-691-1551.

Sincerely

B. Kirk Nicholes
Environmental Specialist

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APPLICATION FOR COAL PERMIT PROCESSING

Permit Change New Permit Renewal Exploration Bond Release Transfer

Permittee: Alton Coal Development, LLC

Mine: Coal Hollow Mine

Permit Number: C/025/0005

Title: Nov. Requested Engineers Statement Task 5018

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

Instructions: If you answer yes to any of the first eight questions, this application may require Public Notice publication.

- | | | |
|------------------------------|--|---|
| <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No | 1. Change in the size of the Permit Area? Acres: _____ Disturbed Area: _____ <input type="checkbox"/> increase <input type="checkbox"/> decrease. |
| <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No | 2. Is the application submitted as a result of a Division Order? DO# _____ |
| <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No | 3. Does the application include operations outside a previously identified Cumulative Hydrologic Impact Area? |
| <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No | 4. Does the application include operations in hydrologic basins other than as currently approved? |
| <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No | 5. Does the application result from cancellation, reduction or increase of insurance or reclamation bond? |
| <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No | 6. Does the application require or include public notice publication? |
| <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No | 7. Does the application require or include ownership, control, right-of-entry, or compliance information? |
| <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No | 8. Is proposed activity within 100 feet of a public road or cemetery or 300 feet of an occupied dwelling? |
| <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No | 9. Is the application submitted as a result of a Violation? NOV # _____ |
| <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No | 10. Is the application submitted as a result of other laws or regulations or policies?
<i>Explain:</i> _____ |
| <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No | 11. Does the application affect the surface landowner or change the post mining land use? |
| <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No | 12. Does the application require or include underground design or mine sequence and timing? (Modification of R2P2) |
| <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No | 13. Does the application require or include collection and reporting of any baseline information? |
| <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No | 14. Could the application have any effect on wildlife or vegetation outside the current disturbed area? |
| <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No | 15. Does the application require or include soil removal, storage or placement? |
| <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No | 16. Does the application require or include vegetation monitoring, removal or revegetation activities? |
| <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No | 17. Does the application require or include construction, modification, or removal of surface facilities? |
| <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No | 18. Does the application require or include water monitoring, sediment or drainage control measures? |
| <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No | 19. Does the application require or include certified designs, maps or calculation? |
| <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No | 20. Does the application require or include subsidence control or monitoring? |
| <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No | 21. Have reclamation costs for bonding been provided? |
| <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No | 22. Does the application involve a perennial stream, a stream buffer zone or discharges to a stream? |
| <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No | 23. Does the application affect permits issued by other agencies or permits issued to other entities? |
| <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No | 24. Does the application include confidential information and is it clearly marked and separated in the plan? |

Please attach three (3) review copies of the application. If the mine is on or adjacent to Forest Service land please submit four (4) copies, thank you. (These numbers include a copy for the Price Field Office)

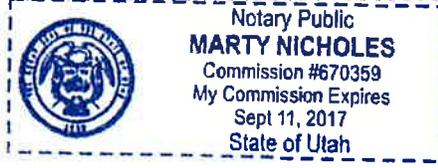
I hereby certify that I am a responsible official of the applicant and that the information contained in this application is true and correct to the best of my information and belief in all respects with the laws of Utah in reference to commitments, undertakings, and obligations, herein.

B. Kirk Nicholes Environmental Specialist 11/03/2015 *B. Kirk Nicholes*
 Print Name Position Date Signature (Right-click above choose certify then have notary sign below)

Subscribed and sworn to before me this 3 day of November, 2015

Notary Public: *Marty Nicholes*, state of Utah.

My commission Expires: 9-11-2017 }
 Commission Number: 670359 } ss:
 Address: 1670 E Millstone Cir }
 City: Enoch State: UT Zip: 84721 }



For Office Use Only: 	Assigned Tracking Number:	Received by Oil, Gas & Mining <div style="text-align: center; color: blue; font-weight: bold; font-size: 1.2em;">RECEIVED</div> <div style="text-align: center; color: red; font-weight: bold; font-size: 1.2em;">JAN 27 2016</div> <div style="text-align: center; color: blue; font-weight: bold; font-size: 1.2em;">DIV. OF OIL, GAS & MINING</div>
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Appendix 5-10

**EVALUATION AND EROSION CONTROL DESIGN
OF THE RECLAIMED
LOWER ROBINSON CREEK CHANNEL
COAL HOLLOW PROJECT**

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EVALUATION AND EROSION CONTROL DESIGN
OF THE RECLAIMED
LOWER ROBINSON CREEK CHANNEL
COAL HOLLOW PROJECT



BY
DAN W. GUY
REGISTERED PROFESSIONAL ENGINEER
STATE OF UTAH

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EVALUATION AND EROSION CONTROL DESIGN
OF THE RECLAIMED
LOWER ROBINSON CREEK CHANNEL
COAL HOLLOW PROJECT

General

This report was completed by Dan W. Guy, a registered professional engineer, State of Utah, DBA Dan W. Guy, P.E., 1926 Wide River Drive, St. George, Utah 84790.

Evaluation

The Lower Robinson Creek channel has been reclaimed and reseeded; however, it will not be connected to the original drainage for at least 3 growing seasons. Diversion Ditch 4 has been extended along the channel and will continue to divert runoff to Sediment Pond 3. This means the reclaimed channel will only see direct precipitation until vegetation is firmly established. The original design of the reclaimed channel is shown on drawings 5-20A and 5-21A of the MRP. These designs show a channel with 12" minimum rip-rap in the bottom 10' of the channel. The channel side slopes were to be 2H:1V in the rip-rap section, 10H:1V in the floodplain and 3H:1V to the top of the channel. The actual reclaimed channel has an average bottom width of 3.2', with average 2.36H:1V side slopes and an average depth of approximately 8.5'. No rip-rap was placed in the restored channel; however, the entire channel was seeded with the approved seed mix for the Coal Hollow Project (Table 3-37 of the MRP).

This evaluation was performed to assess the adequacy of the restored channel. It was based on an erodible soil with stable vegetation, using the 100 year – 6 hour design flow of 347 cfs, taken from MRP Appendix 5-3, "Lower Robinson Creek Culvert and Diversion Analysis", by Dr. James E. Nelson.

Calculations were performed using the Office of Surface Mining Storm Program 6.20, by Gary E. McIntosh. A conservative value of 5.0 fps was used as the allowable velocity in this channel to prevent erosion. This value was selected from Table 3.4, Permissible Velocities for Vegetated Channels, "Applied Hydrology and Sedimentology for Disturbed Areas", by Barfield, Warner and Haan. Based on a review of numerous websites and Table 3.1, Typical Values for Manning's n, in the above referenced "Applied Hydrology and Sedimentology for Disturbed Areas", by Barfield, Warner and Haan, a Manning's number (n) of 0.030 was considered reasonable for the vegetated channel.

The flow calculations were performed on the average channel configuration, based on 6 cross-sections taken along the length of the reclaimed channel. The following is a list of parameters used in the calculations:

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- Design Flow - 347 cfs
- Bottom Width - 3.2 ft.
- Side Slopes - 2.36H:1V
- Channel Slope - 1.83%
- Manning's n - 0.030

Using the above criteria, the calculated flow velocity would be 9.85 fps at a depth of 3.24 feet. Since this velocity is above the estimated allowable velocity of 5.0 fps for vegetated channels, a further evaluation was performed using adequately sized rip-rap along the existing length of the channel. The following criteria were used to evaluate the channel with rip-rap down to the point of transition to the main channel below. The reclaimed channel is shown on Figure 1 "Robinson Creek Reconstruction Plan View".

- Design Flow - 347 cfs
- Bottom Width - 3.2 ft.
- Side Slopes - 2.36H:1V
- Channel Slope - 1.83 %
- Manning's n - 0.035

Using the above criteria, the calculated flow velocity would be 8.78 fps at a depth of 3.47 feet. Based on the calculations, it is proposed to place 12" D50 rip-rap to a minimum depth of 24" along the length of this channel section. The rip-rap will be extended up the side slopes to provide protection for a minimum of 4 feet up from the channel bottom. The 12" D50 sizing is shown to be adequate for the calculated velocity and side slopes based on the Rip-Rap Chart in Figure 3.

Transition to Main Channel

At approximately location 1500' of the reclaimed channel, the configuration and slope change to blend into the main rip-rapped channel below. At this point, the reclaimed channel becomes more "U"-shaped with an approximate 4' bottom width, 1H:1V to 1.8H:1V side slopes and an average slope of 8.0%. When the design runoff of 347 cfs is routed through this section, calculations show a velocity of 18.24 fps at a depth of 2.50 feet. Since this is a steep slope and potentially very erosive section, it is proposed to provide additional protection through this transition area.

It is proposed to widen the channel throughout the transition area to at least a 15 foot bottom width with maximum 2H:1V side slopes. In addition, the channel gradient will be reduced by grading from Station 13+50 to Station 15+50. This section of channel will be lined with 18" D50 rip-rap to a minimum depth of 36" and extended up the side slopes to a depth of at least 3 feet above the channel bottom. The rip-rap will also be grouted for further protection. At the base of the regraded slope (Station 15+50) the transition area from Station 15+50 to Station 16+50 will be widened and deepened to provide an energy control basin at least 2 feet deep and approximately 50 feet wide by 100 feet long. The inlet to this basin will be fitted with at least 30" rocks spaced on approximately 4 foot centers across the channel. The entire basin will be lined with 18" D50 rip-rap and grouted.

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The flow characteristics through the transition zone were evaluated using the criteria after placement of the rip-rap with the above channel dimensions. The following are the parameters used:

- Design Flow - 347 cfs
- Bottom Width - 15.0 ft.
- Side Slopes - 2H:1V
- Channel Slope - 8.0%
- Manning's n - 0.038 (Considered conservative for large rock lining).

Using the above criteria, the calculated flow velocity would be 12.83 fps at a depth of 1.50 feet. The attached Rip-Rap Chart in Figure 3 shows that 18" D50 rock is considered adequate to resist displacement at the projected velocity in the transition area. This rip-rap and catchment basin will also tie into the existing, repaired outfall of the Robinson Creek diversion.

It should be noted that an additional erosion control method was evaluated for the transition zone utilizing multiple rock chutes to convey the runoff down the slope from Station 14+50 to Station 15+50, with a similar control basin at the bottom from Station 15+50 to Station 16+50. This method would also provide adequate erosion protection for the transition area; however, the above single rip-rapped slope was proposed because it provides a less complicated design and a more natural transition to the undisturbed drainage below.

The channel side slopes will be reseeded with the approved seed mix for the Coal Hollow Project after placement of the rip-rap and every year thereafter until vegetation cover is adequately established.

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**ENGINEER'S STATEMENT
FOR THE
RECLAIMED ROBINSON GULCH CHANNEL**

**ALTON COAL DEVELOPMENT, LLC
COAL HOLLOW PROJECT**

**BY
DAN W. GUY
REGISTERED PROFESSIONAL ENGINEER
STATE OF UTAH**

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ENGINEER'S STATEMENT
FOR THE
RECLAIMED ROBINSON GULCH CHANNEL

To Whom It May Concern:

Proposed (Upper Channel) - The design for the reclamation of the lower Robinson Gulch Channel was approved by the Utah Division of Oil, Gas & Mining as Appendix 5-10 in the Coal Hollow Project Mining and Reclamation Plan. In this plan, the upper approximately 1500' of the channel was to be reclaimed by placing at least 12" D50 rip-rap to a minimum depth of 24" along its length. The reclaimed channel was to have a bottom width of at least 3.2' with minimum 2.36H:1V side slopes and rip-rap up the side slopes for at least 4' up from the channel bottom.

Actual Reclamation (Upper Channel) - The channel has been slightly altered, resulting in a bottom width, ranging from 8.33' to 11.67', averaging 9.63', and flatter side slopes ranging from 4.01H:1V to 4.50H:1V, with an average of 4.26H:1V. The actual channel slope is 1.70%, which is also less than the design slope of 1.83%. The installed rip-rap was also considerably larger than design, with an estimated D50 of 15" to 18". Each of these factors is considered to be a positive asset for the reclaimed channel. Their combined effect will be to provide reduced flow depth, as well as reduced velocities and better erosion protection against the design flow. It should be noted that the rip-rap appears to be a very hard, non-slaking basaltic lava, and should provide long-term protection for the channel.

Proposed (Transition Area) - At approximately station 15+00 of the reclaimed channel, it turned and steepened to meet the main channel below. The proposed design was to widen the channel bottom to at least 15' with maximum 2H:1V side slopes. In addition, the channel gradient was to be reduced to approximately 8% by grading from Station 14+00 to 16+00. This section of the channel was to be lined with a minimum 18" D50 rip-rap to a minimum depth of 3' and extended at least 3' up the side slopes from the channel bottom. The rip-rap was to be grouted for further protection. At the base of the regraded slope, it was proposed install an energy control basin at least 2' deep and approximately 50' wide by 100' long. The inlet was to be fitted with at least 30" rocks on approximately 4' centers across the channel. The entire basin was to be lined with 18" D50 rip-rap and grouted. The rip-rap and catchment basin were also planned to tie into the existing, repaired outfall of the Robinson Creek diversion.

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Actual Reclamation (Transition Area) - The transition area has been regraded and re-sloped throughout its length. Existing curves in the drainage have been reduced along with a reduction of side slopes. The entire transition area and basin were rip-rapped with the same type rock as above, with a D50 of at least 18" - 20" and some rock up to 42". The reclaimed channel has an average 17.08' bottom width and average side slopes of 3.17H:1V. The entire area was also grouted as proposed. It should be noted that after the channel was regraded to reduce the slope and provide the tie-in to the existing diversion rip-rap, the remaining area for the catchment basin was less than proposed. As a result, there is not a well-defined basin in the grouted section. The grouted rip-rap is widened to 53' in the lower section, with flatter side slopes (6.5H:1V to 7.0H:1V). At the end of the grouted section, the reclaimed portion joins the rip-rap from the Robinson Diversion. At this point, the wider, grouted section and existing rip-rap combine to provide a catchment and reduce flow velocity, as proposed. It should also be noted that the rock in this area is considerable larger than proposed, adding to the protection and velocity reduction provided by the catchment.

As-Constructed Calculations - The entire reclaimed channel has been surveyed upon completion. The as-constructed plan, profile and channel sections are shown in attached Figures 1, 2 and 3, respectively. The average channel widths, slopes and side slopes mentioned above were taken directly from these figures. The 100-year / 6-hour design flow of 347 cfs used in these calculations was taken directly from the approved MRP Appendix 5-3, "Lower Robinson Creek Culvert and Diversion Analysis", by Dr. James E. Nelson. The design bottom widths, side slopes, channel slopes and Manning's n values were taken directly from the MRP Appendix 5-10, Evaluation and Erosion Control Design of the Reclaimed Lower Robinson Creek Channel", by Dan W. Guy, P.E.. The actual bottom widths, side slopes and channel slopes are the average values based on the as-built survey described above, and shown in Figures 1, 2 and 3 of this report. The Manning's n values remained the same as the design values.

Using the above described parameters, the flow velocities and depth calculations were then performed using the Office of Surface Mining, "Storm 6.20 Program" to determine the expected flow depths and velocities in trapezoidal channels. The following is a comparison of calculated flow characteristics for the ungrouted and grouted portions of the as-constructed channel verses the design calculations:

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<u>Parameter</u>	<u>Upper (UngROUTed)</u>		<u>Lower (Grouted)</u>	
	<u>Design</u>	<u>Actual</u>	<u>Design</u>	<u>Actual</u>
Flow	347 cfs	347 cfs	347 cfs	347 cfs
Bot. Width	3.2 ft.	9.63 ft.	15.0 ft.	17.08 ft.
Side Slopes	2.36H:1V	4.26H:1V	2H:1V	3.78H:1V
Channel Slope	1.83%	1.70%	8.0%	6.57%
Manning's n	0.035	0.035	0.038	0.038
Flow Velocity	8.78 fps	7.41 fps	12.38 fps	10.90 fps
Flow Depth	4.00 ft.	2.37 ft.	1.50 ft.	1.42 ft.

The above calculations show the reclaimed channel to be wider than the approved design with milder side slopes and less gradient, resulting in a reduction of flow velocity and depth from the 100- year / 6-hour storm event used for design.

Conclusion - I have made at least 3 site visits to evaluate the reclaimed Lower Robinson Gulch channel during various stages of its construction. In each case, any needed corrections or enhancements were discussed to ensure the channel would meet the design requirements. Based on these visits, as well as the additional measurements and as-constructed survey data, it is my opinion that the reclaimed Lower Robinson Creek channel meets or exceeds the protection in the approved design in Appendix 5-10.



Dan W. Guy

Registered Professional Engineer

State of Utah No. 154168

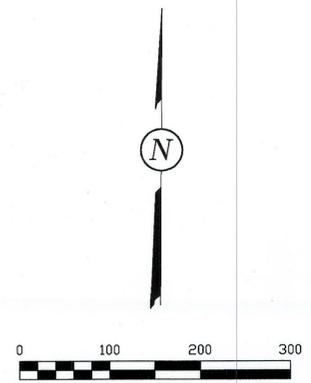
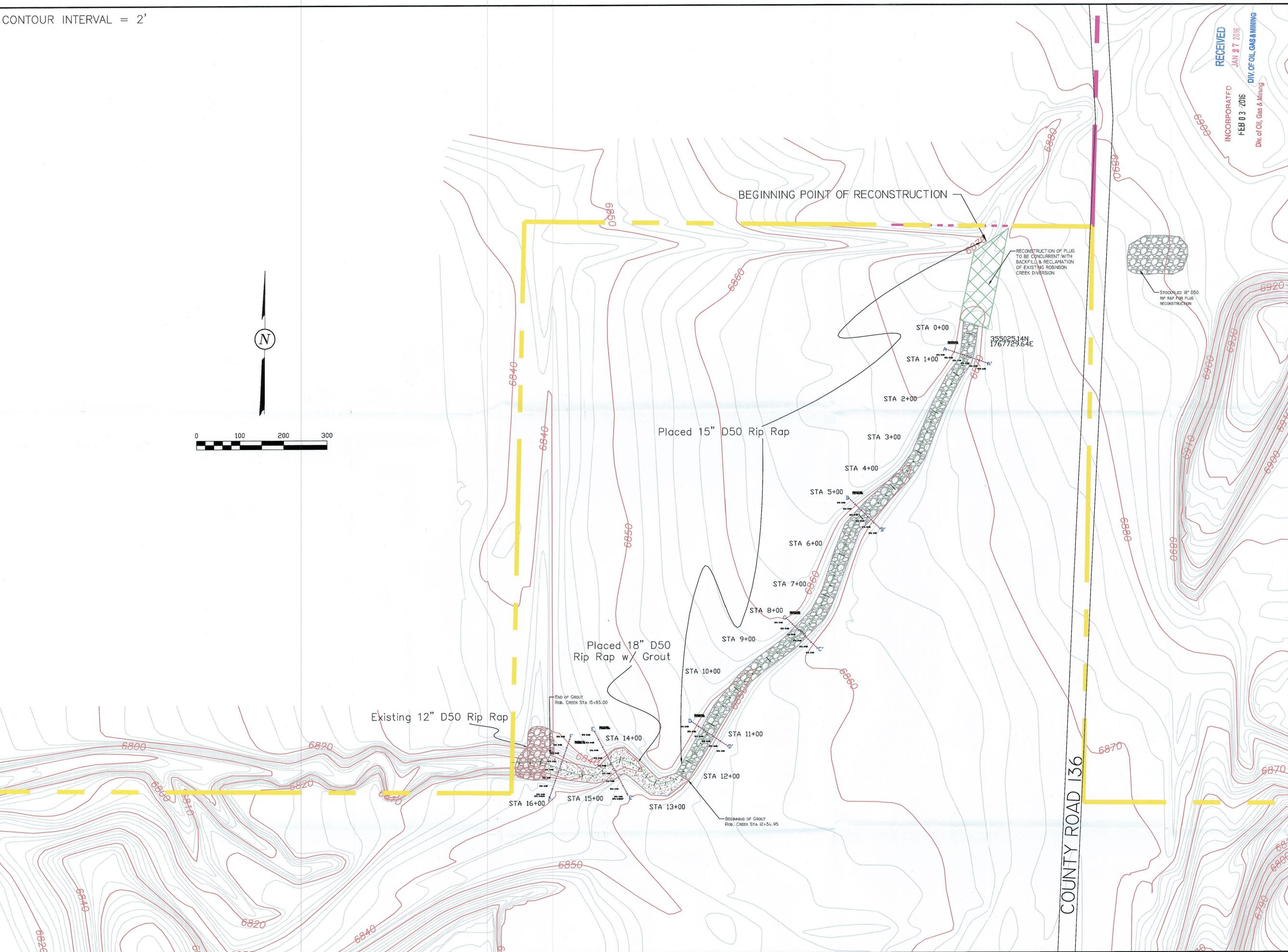


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CONTOUR INTERVAL = 2'



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**ROBINSON CREEK
RECONSTRUCTION
AS-BUILT
PLAN VIEW**

COAL HOLLOW
PROJECT
ALTON, UTAH

FIGURE 1

REVISIONS	
DATE:	BY:

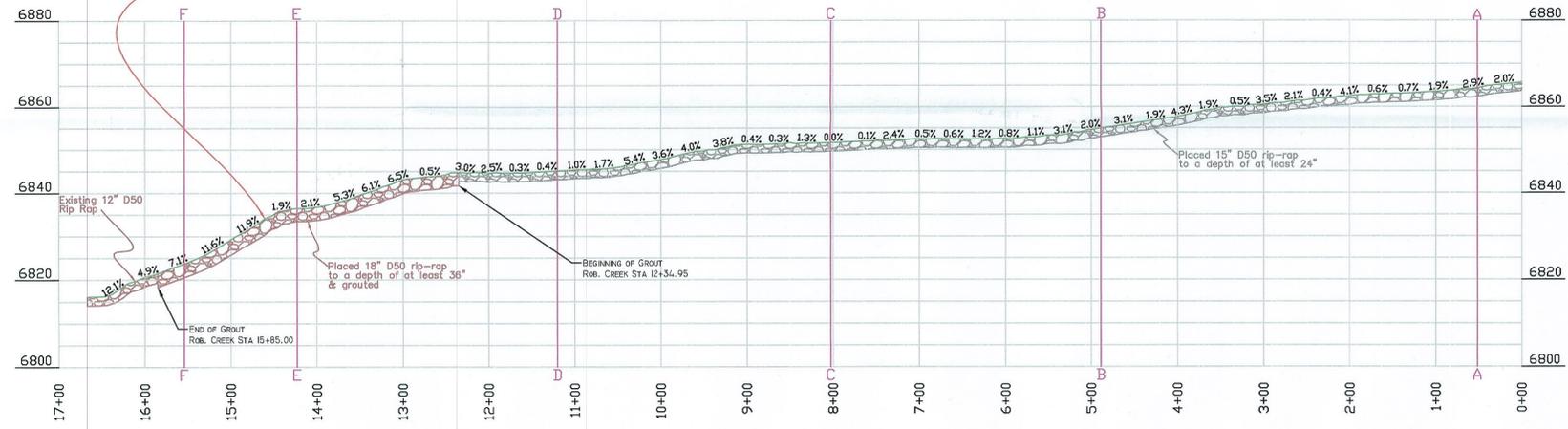
DRAWN BY: A. CHRISTENSEN	CHECKED BY: DWG
DRAWING: Figure 1	DATE: 9/30/2015
JOB NUMBER: 1400	SCALE: 1" = 100' Printed on 24" x 36"
	SHEET

LEGEND:

	PERMIT BOUNDARY
	FEDERAL COAL OWNERSHIP FOUND SECTION CORNER

As-Built Topography

RECONSTRUCTED AS-BUILT LOWER ROBINSON CREEK
PROFILE



5x Vertical Exaggeration

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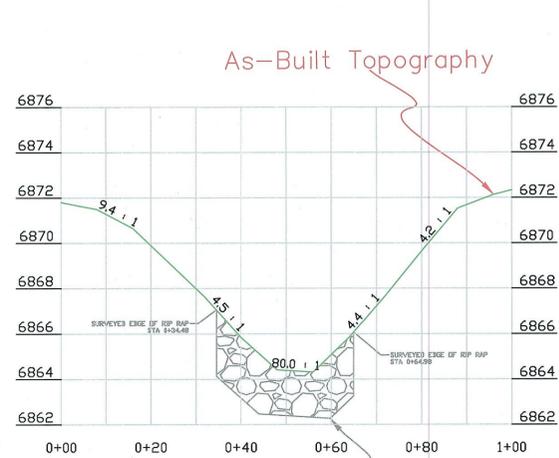
ROBINSON CREEK
RECONSTRUCTION
AS-BUILT
PROFILE

COAL HOLLOW
PROJECT
ALTON, UTAH

FIGURE 2

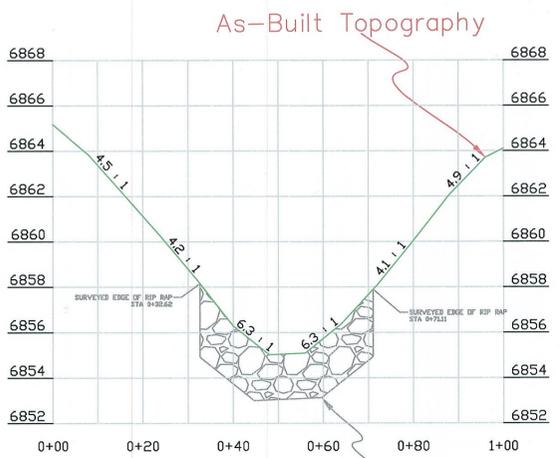
REVISIONS	
DATE:	BY:

DRAWN BY: A. CHRISTENSEN	CHECKED BY: DWG
DRAWING: Figure 2	DATE: 9/28/2015
JOB NUMBER: 1400	SCALE: 1" = 100'
	SHEET



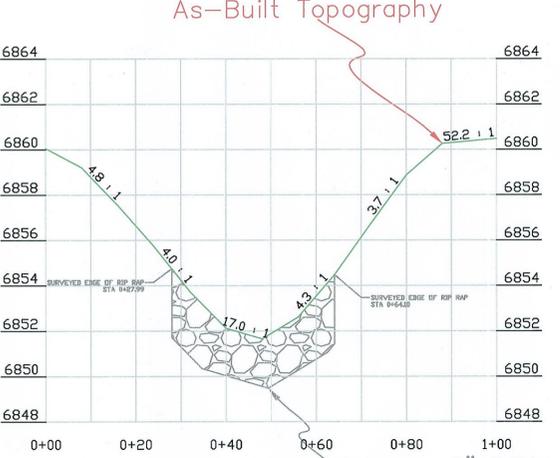
As-Built Topography

A-A' Placed 15" D50 rip-rap to a depth of at least 24"



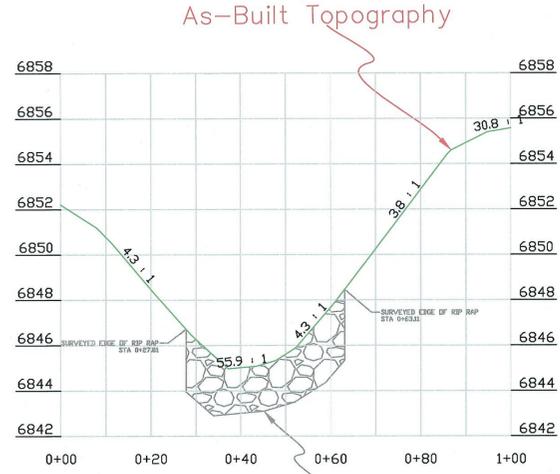
As-Built Topography

B-B' Placed 15" D50 rip-rap to a depth of at least 24"



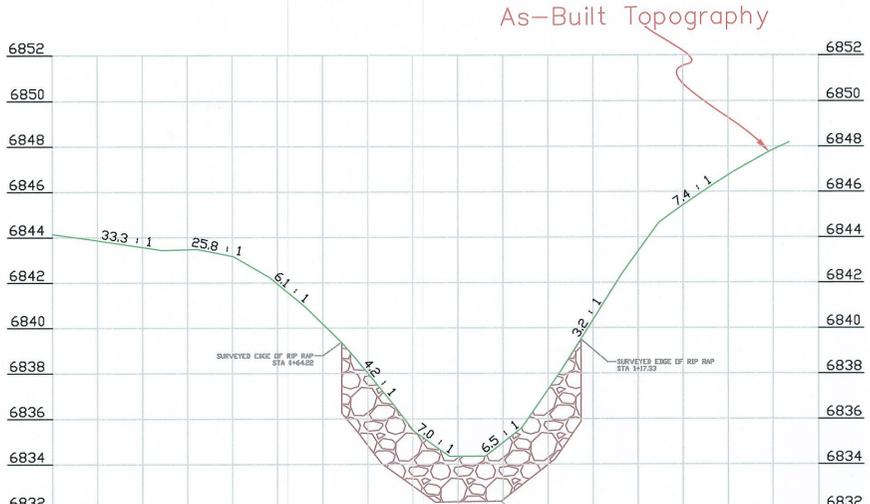
As-Built Topography

C-C' Placed 15" D50 rip-rap to a depth of at least 24"



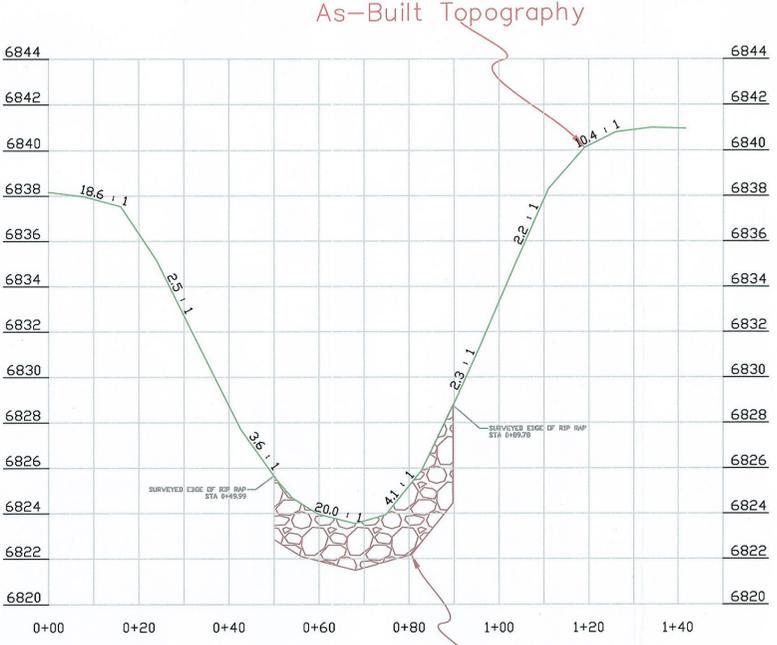
As-Built Topography

D-D' Placed 15" D50 rip-rap to a depth of at least 24"



As-Built Topography

E-E' Placed 18" D50 rip-rap to a depth of at least 36" & grouted

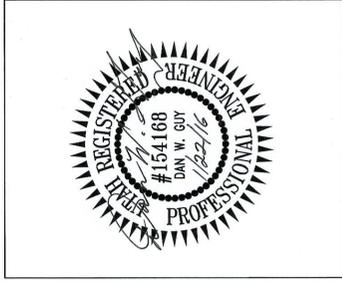


As-Built Topography

F-F' Placed 18" D50 rip-rap to a depth of at least 36" & grouted

5x Vertical Exaggeration

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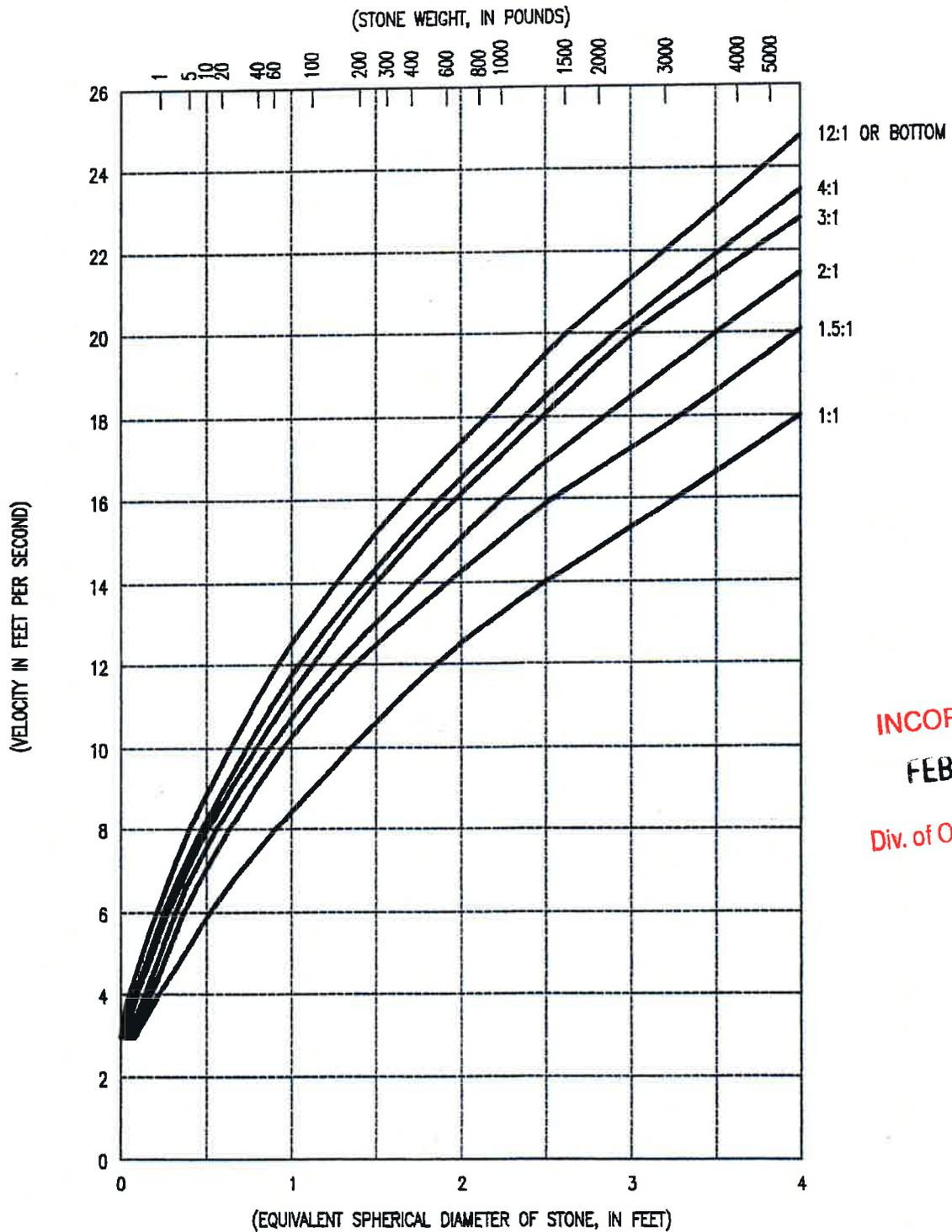


ROBINSON CREEK
 RECONSTRUCTION
 AS-BUILT
 SECTION DETAILS
 COAL HOLLOW
 PROJECT
 ALTON, UTAH
 FIGURE 3

REVISIONS	DATE:	BY:

DRAWN BY:	CHECKED BY:
A. CHRISTENSEN	DWG
DRAWING:	DATE:
Figure 3	9/28/2015
JOB NUMBER:	SCALE:
1400	1" = 20'
	SHEET

RIP-RAP CHART



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SIZE OF STONE THAT WILL RESIST DISPLACEMENT FOR VARIOUS VELOCITIES AND SIDE SLOPES

NOTE:

ADAPTED FROM REPORT OF SUBCOMMITTEE ON SLOPE PROTECTION, AM. SOC. CML ENGINEERS PROC. JUNE 1948.
 FOR STONE WEIGHING 165 LBS. PER CUBIC FEET.

Figure 4