



**Alton Coal Development, LLC**

463 North 100 West, Suite 1

Cedar City, Utah 84720

Phone (435) 867-5331 • Fax (435) 867-1192

C/025/005 Incoming

cc: Keenan  
Priscilla  
Cheryl

October 13, 2015

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

**RECEIVED**

**OCT 14 2015**

**DIV. OF OIL, GAS & MINING**

Subject: **Engineer's Statement for the Reclaimed Robinson Gulch, Alton Coal Development, LLC, Coal Hollow Mine, Kane County, Utah, C/025/0005, Citation 16149**

Dear Mr. Haddock,

Alton Coal Development, LLC is providing a copy of the "Engineer's Statement for the Reclaimed Robinson Gulch". Citation 16149 was terminated on August 27<sup>th</sup> 2015, but requested a report by the certifying P.E. as to the adequacy of the as-built construction..

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

Sincerely

B. Kirk Nicholes  
Environmental Specialist

**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**

**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.

**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 following is a comparison of calculated flow characteristics for the ungrouted and grouted portions of the as-constructed channel verses the design calculations:

<b><u>Parameter</u></b>	<b><u>Upper (Ungouted)</u></b>		<b><u>Lower (Grouted)</u></b>	
	<b><u>Design</u></b>	<b><u>Actual</u></b>	<b><u>Design</u></b>	<b><u>Actual</u></b>
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 / 24-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.

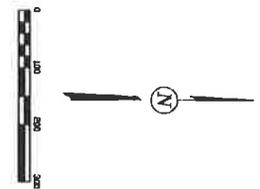
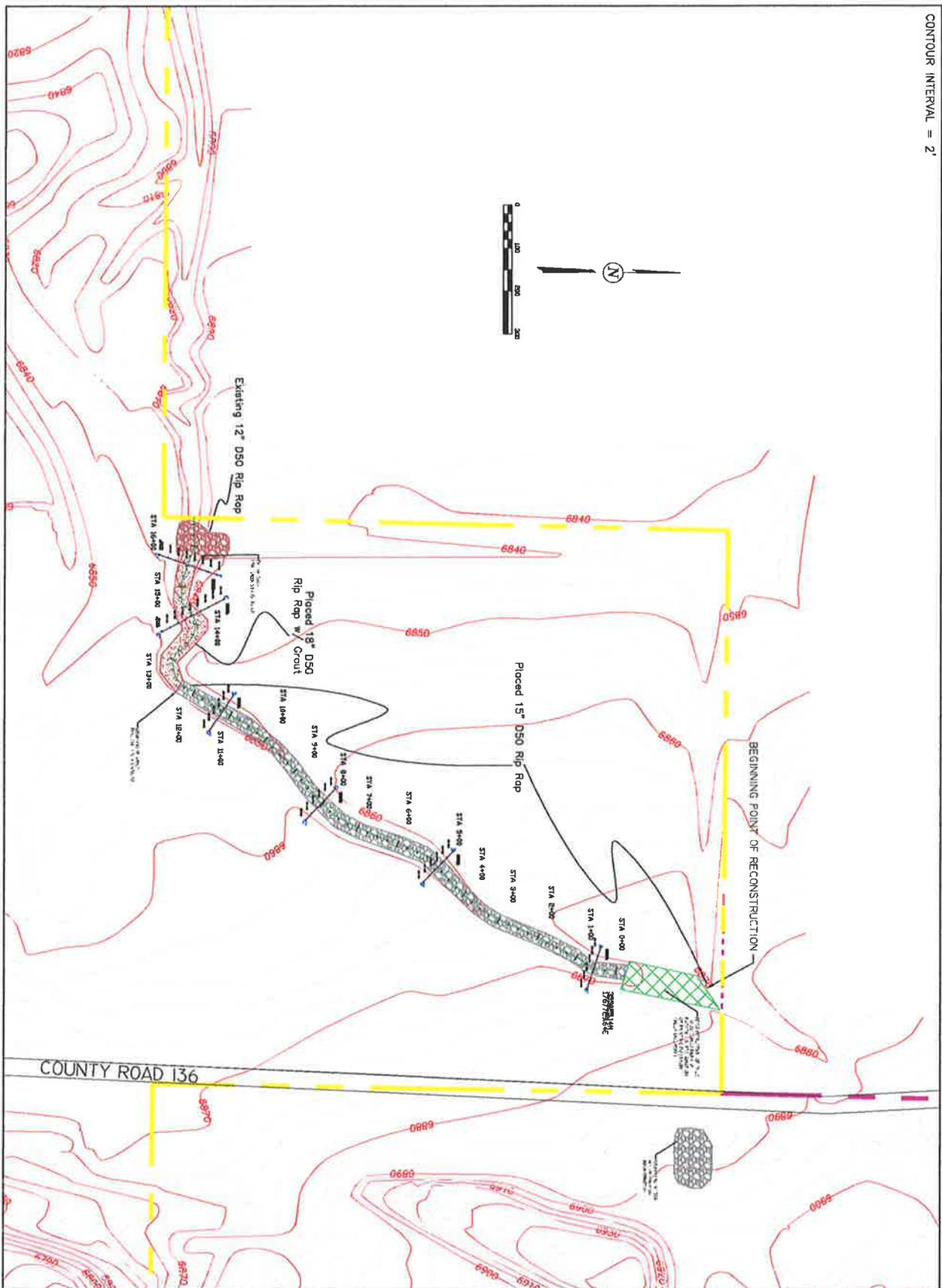


Dan W. Guy

Registered Professional Engineer

State of Utah No. 154168





**LEGEND:**

- PERMIT BOUNDARY
- FEDERAL COAL OWNERSHIP
- FOUND SECTION CORNER

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

REVISIONS	
DATE:	BY:

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

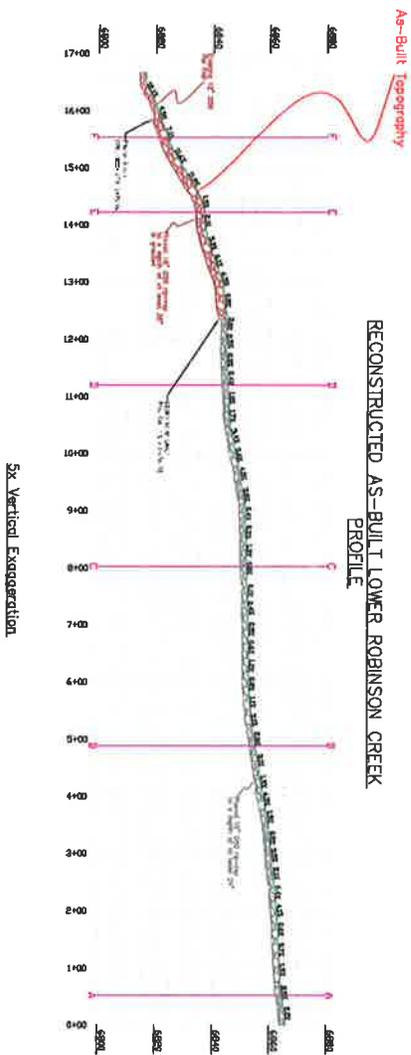
COAL HOLLOW PROJECT  
ALTON, UTAH

**FIGURE 1**



Coal Hollow Project

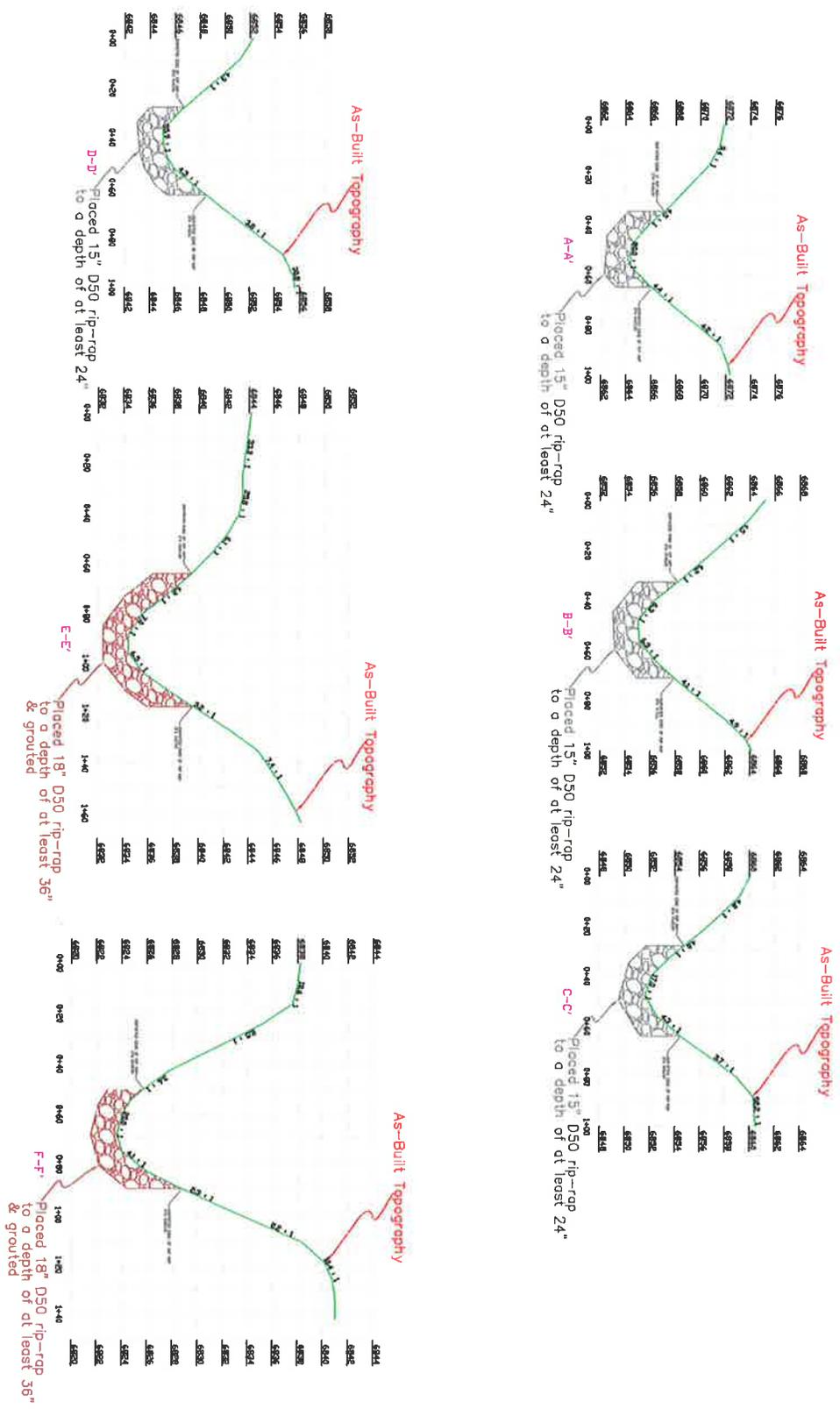
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RECONSTRUCTED AS-BUILT LOWER ROBINSON CREEK PROFILE

5x Vertical Exaggeration

Figure 2	DRAWN BY: A. CHRISTENSEN	CHECKED BY: DWG	<b>REVISIONS</b>		<b>ROBINSON CREEK RECONSTRUCTION AS-BUILT PROFILE</b>  COAL HOLLOW PROJECT ALTON, UTAH  <b>FIGURE 2</b>			
	DRAWING: 	DATE: 9/28/2015	DATE:	BY:				463 North 100 West, Suite 1 Cedar City, Utah 84720 Phone: (435)867-5331 Fax: (435)867-1192
	JOB NUMBER: 1400	SCALE: 1" = 100'	SHEET					



5x Vertical Exaggeration

<p>Figure 3</p> <p>JOB NUMBER: 1400</p>	<p>DRAWN BY: A. CHRISTENSEN</p>	<p>CHECKED BY: DWG</p>	<p>DATE: 9/28/2015</p>	<p>SCALE: 1" = 20'</p>	<p>SHEET</p>																				
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<p>ROBINSON CREEK RECONSTRUCTION AS-BUILT SECTION DETAILS</p> <p>COAL HOLLOW PROJECT ALTON, UTAH</p> <p>FIGURE 3</p>																									
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