

0007

*Original* File: ACT/015/015  
# 3 & 15/w/ncaps



RECEIVED

AUG 02 1985

Consolidation Coal Company  
Emery Mine  
P. O. Box 527  
Emery, Utah 84522  
(801) 286-2301

DIVISION OF OIL  
GAS & MINING

July 25, 1985

Mr. D. Wayne Hedberg  
Permit Supervisor/Reclamation Hydrologist  
State of Utah  
Division of Oil, Gas and Mining  
4241 State Office Building  
Salt Lake City, Utah 84114

Dear Mr. Hedberg,

This letter is being submitted to you in reference to our phone conversation on June 26, 1985 regarding the erosional problems with the inlet on the south side of sedimentation pond #5. Enclosed with this letter you will find:

- 1) A map showing the plan view of the watershed area.
- 2) The culvert design calculations.
- 3) A diagram of the culvert installation.

The contributing drainage area in question is 15.5 acres (as shown on the enclosed map). The peak flow in this area for a 10 yr-24 hr event would be 6.2 cfs and could be transmitted through an 18-inch diameter culvert without entrance head. The peak flow for a 100 yr - 24 hr event would be 15.6 cfs and could be transmitted through the 18-inch culvert with about 2.7 ft. of head. Comparatively, a 24-inch diameter culvert would flow about two-thirds full for the 10 yr - 24 hr event and would have about 0.4 ft. of entrance head under the 100 yr - 24 hr peak flow condition. In view of the erratic frequency of storms in this area of Utah, Consol has decided to use a 24-inch diameter culvert.

Installation of the culvert will require an end section at the inlet and shaping of the channel around the inlet to direct any runoff into the drop structure. A two foot high berm will be placed over the top of the culvert at the inlet to prevent runoff from the peak flow from going over the top of the structure. The runoff will be carried down the slope of the impoundment to the bottom of the pond by the culvert. The outlet will discharge onto bedrock thereby eliminating any need for an energy dissipator. To ensure prevention of piping and undercutting of the structure, 2000 pounds of bentonite clay will be mixed into the fill around the culvert and into the berm.

Page 2  
Mr. D. Wayne Hedberg  
July 25, 1985

Your written confirmation and acceptance of this plan in the near future will be greatly appreciated.

Sincerely,

*Stephen C. Drummond*

Stephen C. Drummond  
Mine Engineer  
Consolidation Coal Company  
Emery Mine

encl.

Emery Sediment Pond - S  
Inlet Culvert Design

10 year - 24 hour storm  
1.7" precipitation

100 year - 24 hour storm  
2.6" precipitation

CN = Curve Number = 80

CN = 80

$$S = \frac{1000}{CN} - 10$$

$$= \frac{1000}{80} - 10$$

$$= \underline{\underline{2.5}}$$

$$S = \frac{1000}{CN} - 10$$

$$= \frac{1000}{80} - 10$$

$$= \underline{\underline{2.5}}$$

L = 1490 ft Length of drainage area

L = 1490 ft

Y = % slope =  $\frac{6025 - 5950}{1490} (100)$

$$= \underline{\underline{5\%}}$$

Y = 5%

$t_L = \text{Lag time} = \frac{L^{0.8} (S+1)^{0.7}}{1900 Y^{0.5}}$

$$= \frac{(1490)^{0.8} (3.5)^{0.7}}{(1900)(5)^{0.5}}$$

$$= \underline{\underline{0.196 \text{ hrs}}}$$

$t_L = \frac{L^{0.8} (S+1)^{0.7}}{1900 Y^{0.5}}$

$$= \frac{(1490)^{0.8} (3.5)^{0.7}}{(1900)(5)^{0.5}}$$

$$= \underline{\underline{0.196 \text{ hrs}}}$$

$t_c = \text{Concentration time} = \frac{t_L}{0.6}$

$$= \frac{0.196}{0.6}$$

$$= \underline{\underline{0.33 \text{ hrs}}}$$

$t_c = \frac{t_L}{0.6}$

$$= \frac{0.196}{0.6}$$

$$= \underline{\underline{0.33 \text{ hrs}}}$$

Q = runoff volume = 0.4 in. - from figure 2.26  
in inches using P = 1.7" + CN = 80

Q = 1.0 in. from figure 2.26  
using P = 2.6" + CN = 80

A = Area = 15.5 Ac = 0.024 mi<sup>2</sup>

A = 15.5 Ac = 0.024 mi<sup>2</sup>

$q_p = \text{peak flow} = q_p' A Q$

$q_p = q_p' A Q$

$q_p' = \underline{\underline{650 \text{ cfs}/\text{second}/\text{sq. mi}/\text{in.}}$   
from figure 2.40

$= \underline{\underline{650 \text{ ft}^3/\text{second}/\text{sq. mi}/\text{in.}}$   
from figure 2.40

$q_p = 650 (0.024) 0.4$

$$= \underline{\underline{6.2 \text{ cfs.}}}$$

$q_p = 650 (0.024) 1.0$

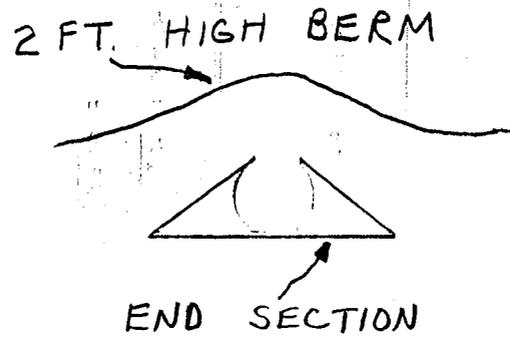
$$= \underline{\underline{15.6 \text{ cfs.}}}$$

Reference: "Hydrology & Sedimentology of Surface-mined Lands"  
Haan & Barfield

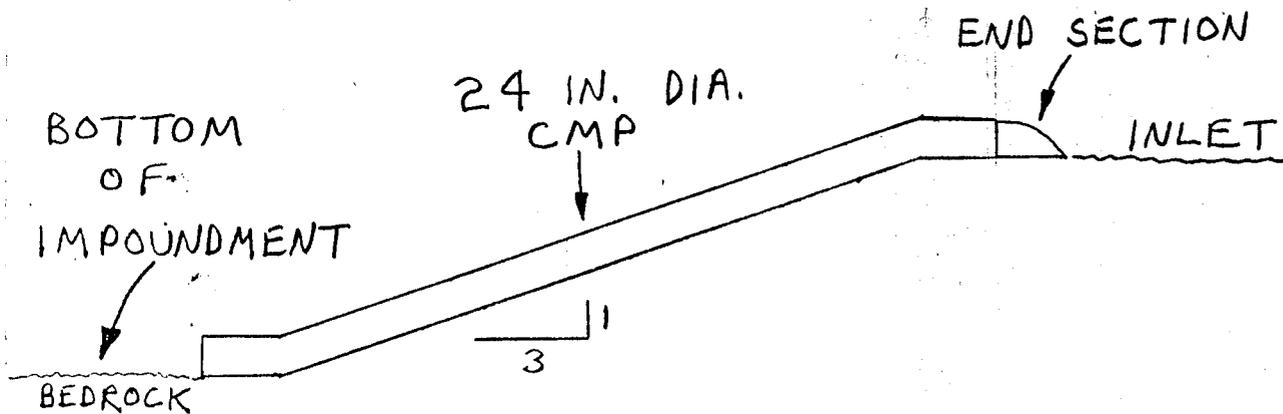
42,381 50 SHEETS 5 SQUARE  
42,382 100 SHEETS 5 SQUARE  
42,383 200 SHEETS 5 SQUARE  
NATIONAL

CULVERT INSTALLATION  
OF SED. POND # 5  
CONSOLIDATION COAL EMERY, UTAH

END VIEW OF INLET



SIDE VIEW OF CULVERT



SCALE - 1" = 10' V & H