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COVOL
ENGINEERED FUELS, LC

January 14, 2008

Ms. Mary Ann Wright
Associate Director, Mining
Utah Division of Oil Gas and Mining
1594 West North Temple
Salt Lake City, Utah 84114

Incoming
C/007/0045 OK
#2899

RE: Mine Permit Application
Covol Engineered Fuels, LC
Wellington Dry-Coal Cleaning Facility

Dear Ms. Wright:

Covol Engineered Fuels, LC (Covol) is submitting the enclosed mine permit application for Covol's Wellington Dry-Coal Cleaning Facility as requested by the Utah Division of Oil, Gas and Mining. The facility is located approximately two miles west of Wellington, UT.

The application addresses the requirements in Utah Administrative Code R645-301. If you have any questions regarding the application, please call me at (801) 984-3770.

Sincerely,

Gina Rau

Gina Rau
Environmental Manager

Enclosure

cc: Mike Gipson – Covol Engineered Fuels, LC – Wellington, UT Facility

RECEIVED
JAN 15 2008
DIV. OF OIL, GAS & MINING

10653 S. River Front Parkway
Suite 300
South Jordan, UT 84095
P: 801.984.3790
F: 801.984.9460

File in:
C/0070045, 2008, Incoming
Refer to:
☐ Confidential
☒ Shelf
☐ Expandable
Date 1/14/2008 For additional information

APPLICATION FOR COAL PERMIT PROCESSING

Permit Change ☐ New Permit ☒ Renewal ☐ Exploration ☐ Bond Release ☐ Transfer ☐

Permittee: Covol Engineered Fuels, LC
Mine: Wellington Dry-Coal Cleaning Facility **Permit Number:** _____
Title: New Permit Application
Description, Include reason for application and timing required to implement:
Covol is submitting an application for a new mine permit as requested by DOGM.

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

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

Please attach four (4) review copies of the application. If the mine is on or adjacent to Forest Service land please submit five (5) 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.

R. Keith Thompson
Print Name

Sign Name, Position, Date

Subscribed and sworn to before me this 11 day of January, 2008

Notary Public
My commission Expires: May 10, 2009
Attest: State of Utah } ss:
County of Salt Lake

Notary Public
AMBER B. GIBBS
10653 South River Front Pkwy #300
South Jordan, Utah 84095
My Commission Expires
May 10, 2009
State of Utah

For Office Use Only:	Assigned Tracking Number:	Received by Oil, Gas & Mining
		RECEIVED JAN 15 2008 DIV. OF OIL, GAS & MINING

Form DOGM- C1 (Revised March 12, 2002)

APPLICATION FOR COAL PERMIT PROCESSING
Detailed Schedule Of Changes to the Mining And Reclamation Plan

Permittee: Covol Engineered Fuels, LC
Mine: Wellington Dry-Coal Cleaning Facility **Permit Number:** _____
Title: New Permit Application

Provide a detailed listing of all changes to the Mining and Reclamation Plan, which is required as a result of this proposed permit application. Individually list all maps and drawings that are added, replaced, or removed from the plan. Include changes to the table of contents, section of the plan, or other information as needed to specifically locate, identify and revise the existing Mining and Reclamation Plan. Include page, section and drawing number as part of the description.

			DESCRIPTION OF MAP, TEXT, OR MATERIAL TO BE CHANGED
☒ Add	☐ Replace	☐ Remove	New permit application
☐ Add	☐ Replace	☐ Remove	
☐ Add	☐ Replace	☐ Remove	
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Any other specific or special instruction required for insertion of this proposal into the Mining and Reclamation Plan.	Received by Oil, Gas & Mining
No	RECEIVED JAN 15 2008 DIV. OF OIL, GAS & MINING

Permit Application for the Wellington Dry-Coal Cleaning Facility

COVOL Engineered Fuels, LC
10653 South River Front Parkway
Suite 300
South Jordan, Utah 84095

January 2008

☐ Confidential
☒ Shelf
☐ Expandable
Refer to Record No 0001 Date 01/4/2008
In C/0070045, 2008, Incoming
For additional information

Permit Application for the Wellington Dry-Coal Cleaning Facility

COVOL Engineered Fuels, LLC
South Jordan, Utah

January 2008

EarthFax EarthFax Engineering, Inc.

7324 South Union Park Avenue, Suite 100
Midvale, Utah 84047
www.earthfax.com

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CHAPTER 1

LEGAL, FINANCIAL, COMPLIANCE, AND RELATED INFORMATION

1.10 Minimum Requirements

1.1.1 Introduction

This chapter of the COVOL Dry-Coal Cleaning Facility permit application provides information regarding the ownership and control of the permit area. The compliance status of the operator at other locations is also provided herein. The facility covered by this permit application has been in operation since January 2006.

1.1.2 Identification of Interests

COVOL Engineered Fuels, LLC (hereafter referred to as "COVOL") is a subsidiary of Headwaters Energy Services Corporation, 10653 South River Front Parkway, Suite 300, South Jordan, Utah. COVOL is the operator of the dry coal cleaning facility located in Carbon County, Utah. The facility is located within Section 14, Township 15 South, Range 10 East, SLBM, approximately 2 miles west of Wellington, Utah.

1.1.1.1 Business Entity

COVOL is a limited liability company. Headwaters Energy Services Corporation and Headwaters Incorporated are corporations.

1.1.2.2 Applicant and Operator

APPLICANT: COVOL Engineered Fuels, LC
10653 South River Front Parkway, Suite 300
South Jordan, Utah 84095
(801) 984-3777

OPERATOR: COVOL Engineered Fuels, LC
1865 West Ridge Road
Wellington, Utah 84654
(435) 613-1631

1.1.2.3 Officers and Directors

The directors and officers of Headwaters, Incorporated (FEIN 87-0547337) are:

Board of Directors (all own <5%):

Name	Date position was assumed
Kirk A. Benson	01/01/1999
James A. Hickeroff	08/01/1997
R. Sam Christensen	01/01/2003
William S. Dickenson	01/01/2003
E.J. Jake Garn	01/01/2002
Malyn K. Malquist	01/01/2003
Raymond J. Weller	07/01/1991
Blake O. Fisher, Jr.	11/01/2004

Officers (all own <5%):

Name	Title	Date position was assumed
Kirk A. Benson	Chairman of the Board and Chief Executive Officer	01/01/1999
Steven G. Stewart	Chief Financial Officer and Treasurer	09/04/2007
Harlan M. Hatfield	Vice President and Secretary	07/01/1998

The director and officers of Headwaters Energy Services Corporation (FEIN 80-0380929) are:

Director (owns <5%): Steven G. Stewart (Position assumed 09/04/2007)

Officers (all own <5%):

Name	Title	Date position was assumed
Steven G. Stewart	Chief Financial Officer and Chairman of the Board	09/04/2007
Kenneth R. Frailey	President	08/18/2004
Harlan M. Hatfield	Vice President and Assistant Secretary	04/09/2003
Curtis J. Brown	Secretary	08/18/2004
Jason T. Day	Assistant Secretary	05/12/2004

The officers (all own <5%) of COVOL (FEIN 90-0221443) are:

Name	Title	Date position was assumed
Kenneth R. Frailey	President and Manager	08/24/2004
Steven G. Stewart	Corporate Financial Officer	09/04/2007
Evan J. O'Neil	Vice President	06/01/2006
Keith Thompson	Vice President	08/09/2004
Harlan M. Hatfield	Manager	06/01/2006
Curtis J. Brown	Officer	08/09/2004
Jason T. Day	Officer	08/09/2004

The addresses and phone numbers for the officers and directors of Headwaters, Incorporated, Headwaters Energy Services Corporation, and COVOL are the same as the applicant.

Written correspondence to Headwaters, Incorporated or COVOL regarding the operations should be addressed to:

Gina Rau
Environmental Manager
Headwaters, Incorporated
10653 South River Front Parkway, Suite 300
South Jordan, Utah 84095
(801) 984-3770

1.1.2.4 Coal Mining and Reclamation Operation Permit Applications

The following list represents all permits issued to COVOL, along with applicable identification numbers of applications or permits:

Permit	Issuing Authority	Status
UPDES Permit (No. UTR000685)	Utah Dept. Environmental Quality, Division of Water Quality	Approved
Approval Order (DAQE# AN2952001-03)	Utah Dept. Environmental Quality, Division of Air Quality	Approved
Certificate of Insurance and Business Authorization	Utah Industrial Development Commission	Approved

The COVOL operations permit number is to be determined by the Utah Division of Oil, Gas, and Mining ("DOGM"), which is the issuing authority for the facility.

The following permits and operations are held by the indicated subsidiary companies of Headwaters Energy Services Corporation:

COVOL Fuels No.2, LLC (Kentucky)

Permit	Issuing Authority	Status
Air Permit	Kentucky Division of Air Quality	Issued
KPDES Permit	Kentucky Division of Water	Pending
Mine Permit No. 889-8004	Kentucky Division of Mine Permit	Operator Revision – Pending

COVOL Fuels No.3, LLC (Kentucky)

Permit	Issuing Authority	Status
Mine Permit No.	Kentucky Division of Mine Permit	Operator Revision – Pending

1.1.2.5 Legal or Equitable Owner of the Surface and Mineral Properties to be Mined

Covol Engineered Fuels, LC is the legal and equitable owner of the entire 30-acre surface parcel included within the permit area. There will be no mining at this facility. Thus, there mineral properties will not be affected by the operation. A property ownership map of the permit and adjacent areas is presented as Figure 5-2. No area within the lands to be affected by the facility is under a real estate contract.

1.1.2.6 Owners of Record of Property Contiguous to Proposed Permit Area

The following owners of surface lands are contiguous to the permit boundary:

High Country Forest Products
8243 Old Federal Road
Montgomery, Alabama 36117

Wellington City
150 West Main Street
Price, Utah 84501

Carbon County School District
75 East 400 North
Price, Utah 845001

State of Utah
203 State Capitol Building
Salt Lake City, Utah 84114

Circle K Ranch
P.O. Box 700
Price, Utah 84501

Sacco Brothers Land
1655 West 2100 North
Helper, Utah 84526

Denver and Rio Grande Western Railroad
1700 Farnham Street
10th Floor South
Omaha, Nebraska 68102

1.1.2.7 MSHA Numbers

The MSHA number for the operation is: 42-02398

1.1.2.8 Interest in Contiguous Lands

The applicant neither owns nor controls, directly or indirectly, a legal equitable interest in any lands contiguous to the permit area.

1.1.3 Violation Information

Neither the company nor any major stockholder of the company having any interest, either legal or equitable, in the COVOL facility have had a State or Federal mining permit suspended or revoked or a security deposited in lieu of bond revoked.

1.1.4 Right-of-Entry Information

Since the facility is located on lands owned by the operator, no right of entry is required.

1.1.5 Status of Unsuitability Claims

Since there is no mining at this facility, the issue of unsuitability claims is not applicable.

1.1.6 Permit Term

The following information is presented to identify permit term requirements and stipulations. The Applicant began operating the facility in January 2006 using an air-jig method to process coal-bearing materials. Termination of operations will be determined by economic conditions. The timing of this termination is, therefore, unknown. It is anticipated that the Applicant will operate at the site for a period in excess of 5 years.

The anticipated total acreage to be affected during operations is 30 acres. The disturbed area to be reclaimed is 30 acres. Since the land occupied by the facility has been zoned for general industrial use, complete site reclamation will not be required (See chapter 5).

1.1.7 Insurance and Proof of Publication

Certificates of Insurance issued to COVOL are provided in Appendix 8-1. COVOL will submit to DOGM a copy of a newspaper advertisement, in accordance with R645-300-121.100 once the application is determined by DOGM to be administratively complete.

1.1.8 Filing Fee

The permit filing fee will be paid upon submittal of the application.

1.20 Permit Application Format and Contents

The permit application contains clear, concise, current information, in the format of the DOGM regulations.

1.30 Reporting of Technical Data

All technical data submitted in the permit application is accompanied by the names of persons or organizations that collected and analyzed the data. The technical data also contains the dates of collection and analysis of the data, and descriptions of the method used to collect and analyze data. A professional qualified in the subject, planned or directed the technical analyses.

1.40 Maps and Plans

The maps submitted in this permit application correspond to the format required by the regulations.

1.50 Completeness

The Applicant believes the information in this application to be complete and correct.

CHAPTER 2
SOILS

2.10 Introduction

This chapter contains pertinent information relating to identification, management, and reclamation activities associated with the soil resources present in the disturbed area of the COVOL Dry-Coal Cleaning Facility.

2.20 Environmental Description

The COVOL Dry-Coal Cleaning Facility lies in central Utah in the lowlands south of the Book Cliffs and north of the San Rafael Swell. Topography is dominated by broad plains and pediment surfaces dissected by small drainages. The dominant surficial geologic formation at the site is the Mancos Shale, of which the Blue Gate member is present at the surface in this location. The Blue Gate member is dominated by shales with some siltstones and minor sandstone bedding. The drainages are often filled with alluvial and slope wash deposits (Weiss et al, 1990). Surface elevations at the site range from about 5,530 to about 5,500 feet above sea level. Due to thin soils and shortage of irrigation water, most areas near the facility are not used to grow crops.

Soils in the area have formed from residual shale particles that mixed as they migrated down slope. Soils are usually shallow to very shallow, and consist predominantly of silty clay loams. The inherent erosion hazard from water is moderate (Jensen and Borchert, 1988).

2.2.1 Prime Farmland Investigation

No prime farmland soils are located within the COVOL Dry-Coal Cleaning Facility disturbed area (Jensen and Borchert, 1988). In surrounding undisturbed areas, native vegetation is very sparse. Furthermore, the disturbed area has been zoned for general industrial use by Carbon County, which allows for coal-cleaning activities at this site.

2.2.2 Soil Survey

In accordance with the agreement between DOGM and COVOL, soils data for the COVOL Dry-Coal Cleaning Facility disturbed area have been taken from previously published information (Jensen and Borchert, 1988). Soil survey data are presented in Appendix 2-1, and are herein summarized in Sections 2.2.2.1 and 2.2.2.2. Survey data include the following information: taxonomic classification, typical pedon, ranges of mineral and particle size characteristics, competing series, and geographic setting (Appendix 2-1).

2.2.2.1 Soils Map

Figure 2-1 delineates the soil types present in the disturbed and adjacent areas.

2.2.2.2 Soil Identification

According to the Soil Survey of Carbon Area, Utah (Jensen and Borchert, 1988), the COVOL Dry-Coal Cleaning Facility disturbed area is located largely on soils classified as the Persayo-Chipeta Complex with some soils classified as the Killpack Clay Loam on its eastern edge. The Persayo-Chipeta Complex consists of light brownish-grey, shallow, well-drained soils that formed in shale. Permeability is slow to moderately slow. The potential for water erosion is moderate to high, and the potential for blowing soil is moderate. Large-scale agricultural use or revegetation of the Persayo-Chipeta Complex is not considered practical due to its fine texture and the low amount of precipitation that it receives (Jensen and Borchert, 1988). Additional information for the Persayo and Chipeta soils is included in Appendix 2-1.

The Killpack Clay Loam consists of grayish-brown, moderately deep, well-drained soils that have formed as residuum from shale. Permeability is slow. The potentials for water erosion and blowing soil are moderate. Like the Persayo-Chipeta Complex, revegetation of the Killpack Clay Loam is not considered practical due to its fine texture and the low amount of precipitation that it receives (Jensen and Borchert, 1988). Additional information for the Killpack Clay Loam is included in Appendix 2-1.

2.2.2.3 Soil Description

In accordance with the agreement between COVOL and DOGM, no site-specific soil survey was performed. Thus, no further descriptions of soils are included.

2.2.2.4 Soil Productivity

Under favorable conditions, Jensen and Borchert (1988) indicate that Killpack soils can produce 700 lb/acre (dry weight) of rangeland vegetation. They report that production rates of 500 and 300 lb/acre can be expected under normal and unfavorable conditions. The Persayo-Chipeta Complex has a rangeland vegetation productivity of 300 to 400 lb/acre under favorable conditions, dropping to 100 to 150 lb/acre under unfavorable conditions.

2.2.3 Prime Farmland Soil Characterization

The published soil survey indicates that soil within the disturbed area does not qualify as prime farmland (Jensen and Borchert, 1988).

2.2.4 Substitute Topsoil

The Applicant segregated topsoil from the site prior to disturbance and, therefore, does not propose to use substitute topsoil during reclamation. Since the use of substitute topsoil is not anticipated, no field trials or other tests of suitability are anticipated.

2.30 Operation Plan

2.3.1 General Requirements

2.3.1.1 Removing and Storing Soil Methods

The COVOL Dry-Coal Cleaning Facility has been operating periodically since January 2006. At the time the facilities were constructed, topsoil was segregated and stored in a stockpile

located within the main yard of the facility. Due to the thin nature (less than 6 inches thick) and relatively poor quality of the soil, it was not segregated by soil horizon. All of the segregated soil will be treated as topsoil in compliance with R614-201-234.300.

2.3.1.2 Suitability of Topsoil Substitutes/Supplements

No topsoil substitutes or supplements are planned to be used at the facility.

2.3.1.3 Testing of Topsoil Handling and Reclamation Procedures

The facility is located in an area zoned for general industrial purposes, and is expected to be used for other industrial activities after the dry-coal cleaning operation is shut down. Hence, total site reclamation is not anticipated.

For those areas of the site where reclamation will occur, COVOL will exercise care to guard against erosion during and after application of topsoil and will employ the necessary measures to ensure the stability of topsoil on graded slopes. Erosion control measures will include surface roughening and erosion mat placement on slope areas thought to be unstable. The Applicant will fill, regrade, or otherwise stabilize any rills or gullies deeper than 9 inches which form in areas which have been regraded and topsoiled. The areas adjacent to any rills or gullies which have been filled, regraded or otherwise stabilized will be reseeded or stabilized appropriately.

2.3.1.4 Construction, Modification, Use, and Maintenance of Topsoil Stockpiles

The topsoil storage pile at the facility consists of approximately 500 cubic yards of soil that was removed from the ground surface during site grading prior to constructing the facility. Since the topsoil averaged less than six inches thick, it was not segregated before it was stockpiled. The stockpiled materials were placed on a stable surface in the southeast portion of the permit area. The stockpile will be protected from wind and water erosion by being revegetated with a quick growing vegetative cover (proposed seed mix minus the shrubs and trees) and by installing silt fencing below the stockpile to help trap sediment coming off the stockpile. A marker will be placed on the pile to indicate that it contains topsoil. This topsoil will not be moved or disturbed until required for redistribution during final reclamation.

2.3.2 Topsoil and Subsoil Removal

2.3.2.1 Topsoil Removal and Segregation

It is not anticipated that additional soil disturbances will occur at the site. However, if such disturbances do occur, all topsoil thicker than 6 inches will be removed prior to disturbance as a separate layer from the subsoil, segregated, and stockpiled separately. Topsoil less than 6 inches thick will be removed according to Section 2.3.2.3.

2.3.2.2 Poor Topsoil

Topsoil that is of an insufficient quantity, or of poor quality (for sustaining vegetation), will be removed as a separate layer and segregated. Such operations will be done with approval of DOGM and in compliance with R614-301-233.100.

2.3.2.3 Thin Topsoil

Topsoil to be removed that is less than 6 inches thick will be removed with the immediately underlying unconsolidated materials. This material mixture will be treated as topsoil.

2.3.2.4 Minor Disturbances Not Requiring Topsoil Removal

Small Structures. Topsoil will not be removed prior to construction resulting in only minor disturbances. Such construction activities include work on small structures such as power poles, signs, fence lines, and other small structures.

Vegetation. COVOL will not remove topsoil for minor disturbances where such activity will not destroy vegetation or cause erosion.

2.3.2.5 Subsoil Segregation

Due to the poor quality of the subsoil, the B and C soil horizons will not be individually segregated and stockpiled.

2.3.2.6 Timing

Soil removal will take place after all vegetation has been removed that could interfere with soil salvage. Surface disturbance activities will take place after the soil has been removed.

2.3.2.7 Topsoil and Subsoil Removal Under Adverse Conditions

In areas of surface disturbance where sufficient topsoil is present, topsoil and subsoil will be removed separately and segregated, except where natural conditions render such operations hazardous.

Conventional Machines. In localities where steep grades, adverse terrains, severe rockiness, limited depth of soils, or other adverse conditions exist that render soil removal and segregation activities using conventional machines hazardous, soils will not be salvaged and stockpiled.

Substitute Topsoil. Importing of substitute topsoil will not be required.

2.3.3 Topsoil Substitutes and Supplements

2.3.3.1 Overburden Materials Supplementing and/or Replacing Topsoil

No overburden materials will be used in site reclamation.

2.3.3.2 Suitability of Topsoil Substitutes and Supplements

No topsoil substitutes or supplements are planned for use at the facility.

2.3.3.3 Physical and Chemical Analyses

No topsoil substitutes or supplements are planned for use at the facility. Hence, no physical or chemical analyses of substitute material are anticipated.

2.3.3.4 Testing of Substitute Topsoil

Since it will not be used at the site, no testing of substitute topsoil is anticipated.

2.3.4 Topsoil Storage

2.3.4.1 Topsoil Stockpiling

Topsoil that was removed from the area during site grading is stored in an on-site stockpile (Section 2.3.1.4). Any topsoil removed from the site in the future will be stockpiled for later use in reclamation operations when it is impractical to promptly redistribute the topsoil on regraded areas.

2.3.4.2 Stockpiled Topsoil

Stable Stockpile Site. The topsoil removed from the site is stored in a small stockpile (approximately 5,500 square feet), located in a stable area in the southeern portion of the permit area.

Protection from Contaminants and Compaction. Stockpiled topsoil will be located in areas away from traffic that might introduce contaminants and unnecessary compaction.

Wind and Water Erosion Protection. The topsoil stockpile will be protected from wind and water erosion by prompt establishment and maintenance of a vegetative cover. Silt fencing will be installed below the stockpile to help trap sediment runoff from the stockpile.

Topsoil Redistribution. No stockpiled topsoil will be moved until redistributed during reclamation operations unless approved by DOGM.

2.3.4.3 Topsoil Stockpile Relocation

Stockpiled topsoil in jeopardy of being detrimentally affected in terms of its quantity and quality by facility operations may be temporarily redistributed.

Host Site. Topsoil relocation may occur provided that such action does not permanently adversely affect topsoil of the host site.

Topsoil Suitability. Topsoil relocation may occur provided the topsoil is retained in a condition more suitable for redistribution than if stockpiled.

2.40 Reclamation Plan

2.4.1 General Requirements

Topsoil redistribution, amendments, and stabilization are discussed below.

2.4.2 Soil Redistribution

2.4.2.1 Soil Redistribution Practices

Under the industrial post-operation land-use scenario, it is not anticipated that the site will undergo significant redistribution of soil resources following facility shutdown. Soil salvaged to date will remain in a protected stockpile for use by the future site owner/operator. For limited areas of the site that may be reclaimed, the topsoil will be redistributed following removal of all structures not part of the post-operation land use and regrading of the site. As described in 2.4.2.3, roads, storm water impoundments, and their appurtenant drainage channels will be left in place to support the post-operation land use.

2.4.2.2 Regrading

Since the facility is located in an industrial area and the site is essentially level, site regrading will not be performed following its closure. The topographic configuration of the plant area will be left essentially unchanged for the subsequent landowner.

2.4.2.3 Topsoil Redistribution on Impoundments and Roads

On-site storm water impoundments and roads will be left in place to support the post-operation land use.

2.4.3 Soil Nutrients and Amendments

No soil nutrients or amendments will be applied.

2.4.4 Soil Stabilization

2.4.4.1 Protection and Stabilization of Surface Areas

The site has no unstable grades. Since there will be no substantial regrading of the site upon closure, no protection or stabilization of surface areas will be required.

2.4.4.2 Mulch Application

In support of the post-operation land use, no substantial regrading or redistribution of topsoil is anticipated upon site closure. If topsoil is redistributed over an area, revegetation of this soil will be promoted via surface roughening and (potentially) the application of erosion mats, rather than through the application of mulch.

2.4.4.3 Rills and Gullies

Low slope angles and drainage diversions retained on the site will minimize the potential for rills and gullies to form following closure.

2.50 Performance Standards

2.5.1 Topsoil, Subsoil, and Topsoil Supplements Management

All topsoil, subsoil, and topsoil supplements shall be managed as outlined in Sections 2.30 and 2.40.

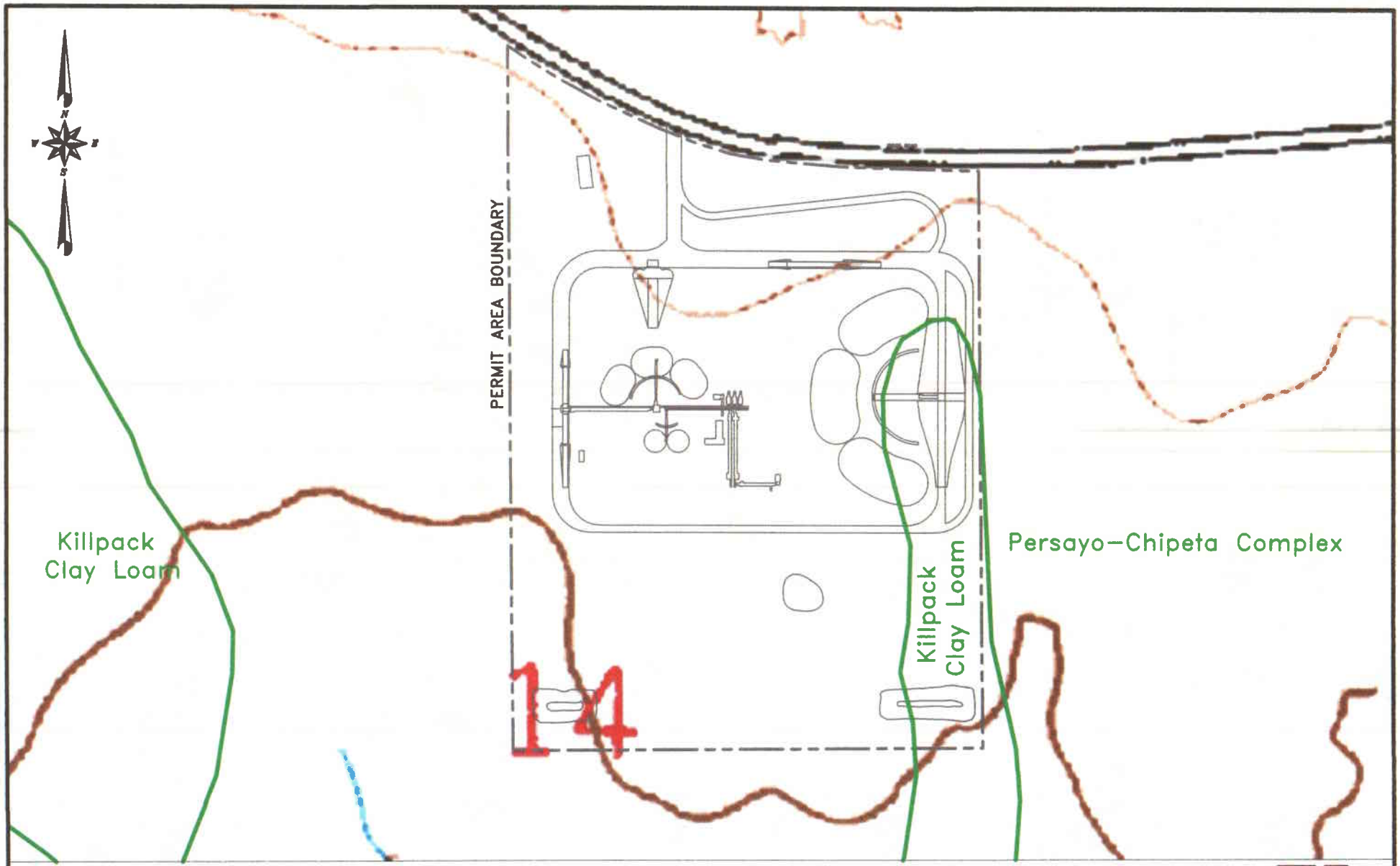
2.5.2 Stockpiled Topsoil and Subsoil

All stockpiled topsoil and subsoil will be managed according to plans outlined in Sections 2.30 and 2.40.

REFERENCES

Jensen, Earl H. and James W. Borchert, 1988. Soil Survey of Carbon Area, Utah. U.S. Department of Agriculture Soil Conservation Service. 294 pp.

Weiss, Malcolm P., Irving J. Witkind, and William B. Cashion, 1990. Geologic Map of the Price 30' X 60' Quadrangle, Carbon, Duchesne, Uintah, Utah, and Wasatch Counties, Utah. U.S. Geological Survey Miscellaneous Investigations Series Map I-1981. 1:100,000 scale.



BASE MAP: 7.5' USGS QUADRANGLE
PRICE, UTAH 1972
SOILS: USDA NRCS, WEB SOIL SURVEY

FIGURE 2–1. SOILS MAP

EarthFax

G:\UC1091\02 - Permit application\Drawings\FIG2-1WDCC dwg, 8.5x11, 1/11/2008 8:34:02 AM

APPENDIX 2-1

Published Soil Survey Information

Official Series Description - CHIPETA Series

CHIPETA SERIES

The Chipeta series consists of very shallow and shallow, well drained, slowly permeable soils that formed in residuum and colluvium from shale. Chipeta soils are on upland pediments and hills and have slopes of 0 to 35 percent. The average annual precipitation is about 7 inches and the mean annual temperature is about 50 degrees F.

TAXONOMIC CLASS: Clayey, mixed, active, calcareous, mesic, shallow Typic Torriorthents

TYPICAL PEDON: Chipeta silty clay loam -cultivated. (Colors are for air-dry soil unless otherwise noted.)
Ap--0 to 5 inches; light brownish gray (2.5Y 6/2) silty clay loam, dark grayish brown (2.5Y 4/2) moist; weak fine ubangular blocky structure; hard, firm, sticky and plastic; few fine and medium roots; few fine discontinuous pores; violently effervescent; slightly alkaline (pH 7.7); clear smooth boundary. (1 to 5 inches thick)
C--5 to 13 inches; light brownish gray (2.5Y 6/2) silty clay, dark grayish brown (2.5Y 4/2) moist; moderate medium and fine subangular blocky structure; hard, very firm, sticky and plastic; few fine and medium roots; few large continuous pores, few fine discontinuous pores; violently effervescent; slightly alkaline (pH 7.6); clear wavy boundary. (6 to 10 inches thick)
Cy--13 to 17 inches; light brownish gray (2.5Y 6/2) silty clay, dark grayish brown (2.5Y 4/2) moist; weak, moderately thick platy structure parting to weak medium blocky; hard, very firm, sticky and plastic; few fine and medium roots; many fine crystals and mycelia-like veins of gypsum; 20 percent unweathered shale fragments; violently effervescent; slightly alkaline (pH 7.4); gradual irregular boundary. (3 to 5 inches thick)
Cr--17 inches; weathered marine shale.

TYPE LOCATION: Emery County, Utah; 1 mile south and 1-1/2 miles east of Castle Dale, 1,000 feet south and 20 feet east of the northwest corner, sec. 11, T. 19 S., R. 8 E.

RANGE IN CHARACTERISTICS:
Soil moisture regime: Typic Aridic.
Soil temperature regime: Mesic.
Depth to shale: 5 to 20 inches.
Salinity: moderate to strong.
Particle-size control section: 35 to 50 percent clay.
Mean annual soil temperatures: 49 to 57 degrees F.
Reaction: slightly alkaline to strongly alkaline.

A horizon:
Hue: 10YR to 5Y
Value: 5 to 8 dry, 3 to 6 moist
Chroma: 2 to 4
Texture: loam or silty clay loam

C horizon:
Hue: 10YR to 5Y
Value: 4 to 6 dry, 3 to 5 moist
Chroma: 1 to 4
Textures: silty clay loam or silty clay
Gypsum: 0.5 to 10 percent and gypsum crystal ranges from few to many.

COMPETING SERIES: This is the Chipenhill series. Chipenhill soils have more than 10 percent gypsum.

GEOGRAPHIC SETTING: These soils are on gently sloping to steep upland pediments and hills. Slopes are complex and range from 0 to 35 percent. These soils formed in residuum from alkaline marine shales containing gypsum. The climate is semiarid. The mean annual temperature is 45 to 55 degrees F. The freeze-free period ranges from 90 to 160 days. Mean annual precipitation ranges from 5 to 11 inches.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the Killpack, Persayo, and Libbings soils.
Killpack soils: have fine-silty particle-size control sections.
Persayo soils: have loamy particle-size control sections.
Libbings soils: have a salic horizon.

DRAINAGE AND PERMEABILITY: Well drained; medium to very high runoff; slow permeability.

USE AND VEGETATION: A few of the smoother areas of deeper soil are irrigated and used for growing grain and hay crops. Potential vegetation is mat saltbush and galleta.

DISTRIBUTION AND EXTENT: Western Colorado, Wyoming, eastern Utah, and New Mexico. LRR D, MLRA 34. The series is extensive.

MLRA OFFICE RESPONSIBLE: Lakewood, Colorado

SERIES ESTABLISHED: Uncompahgre Valley Area, Colorado, 1910.

REMARKS:
All pH values given are of soil paste.
Diagnostic horizons and features recognized in this pedon are:
Ochric epipedon-the zone from the surface to 5 inches (Ap horizon)
Shallow feature-weathered shale at 17 inches (Cr horizon)
Taxonomic version: Seventh Edition, 1996.

National Cooperative Soil Survey
U.S.A.

Official Series Description - KILLPACK Series

KILLPACK SERIES

The Killpack series consists of moderately deep, well drained, slowly permeable soils that formed in alluvium and residuum from saline marine shale. Killpack soils are on sideslopes and toeslopes of rolling shale hills. Slopes are 1 to 25 percent. Average annual precipitation is about 7 inches and mean annual temperature is about 52 degrees F.

TAXONOMIC CLASS: Fine-silty, mixed, active, calcareous, mesic Typic Torriorthents

TYPICAL PEDON: Killpack clay loam, cropland. (Colors are for air-dry soil unless otherwise noted.)
Ap--0 to 9 inches; brownish gray (2.5Y 5/2) clay loam, dark grayish brown (2.5Y 4/2) moist; weak medium and fine granular structure; hard, firm, slightly sticky and slightly plastic; common fine roots; common fine pores; strongly calcareous; mildly alkaline (pH 7.8); clear smooth boundary. (6 to 9 inches thick)
C--9 to 23 inches; light brownish gray (2.5Y 6/2) clay loam, grayish brown (2.5Y 5/2) moist; moderate coarse subangular blocky parting to weak fine subangular blocky structure; hard, firm, sticky and plastic; few fine roots; few fine pores; strongly calcareous; mildly alkaline (pH 7.7); gradual wavy boundary. (8 to 21 inches thick)
Cy--23 to 29 inches; light brownish gray (2.5Y 6/2) silty clay loam, grayish brown (2.5Y 5/2) moist; massive; hard, very firm, sticky and plastic; few fine roots; strongly calcareous; mildly alkaline (pH 7.7); many gypsum crystals 5 to 15mm in diameter; gradual wavy boundary. (6 to 10 inches thick)
Cr--29 inches; light brownish gray weathered shale.

TYPE LOCATION: Emery County, Utah; 2 miles northwest of Elmo, northeast of the Elmo road and the Cleveland-Price road; 2,450 feet north and 300 feet east of the SW corner of sec. 30, T. 16 S., R. 10 E.

RANGE IN CHARACTERISTICS: Soil temperatures are more than 47 degrees F. Depth to shale bedrock ranges from 20 to 40 inches. There is a few to common gypsum crystals accumulated immediately above the shale. Clay minerals are mixed but dominantly illite and kaolinite. The particle-size control section ranges from silty clay loam to silt loam with 18 to 35 percent clay.
The A horizon has hue of 10YR through 5Y, dry value of 5 or 6, moist value of 4 or 5, and chroma of 2 through 4.
The C horizon has hue of 10YR through 5Y, value of 5 through 7 dry, 3 through 7 moist, and chroma of 2 through 4.
The Cy horizon has the same color as the C horizon and contains 5 to 15 percent shale channers.

COMPETING SERIES: These are the Rosney, Sagers and Swingler series. Rosney, Sagers and Swingler soils are deeper than 40 inches to bedrock.

GEOGRAPHIC SETTING: These soils are on the gentle sideslopes of rolling shale hills. Slope gradients range from 1 to 25 percent. Killpack soils formed in alluvium and residuum from saline marine shale. The climate is semiarid with mean annual temperature of 47 to 55 degrees F. Mean annual precipitation ranges from 5 to 11 inches.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the Chipeta, Persayo, Billings and Libbings soils. Chipeta and Persayo soils are less than 20 inches deep over shale. Billings soils are very deep and developed in alluvium. Libbings soils have salic horizons above a depth of 20 inches.

DRAINAGE AND PERMEABILITY: Well drained; medium to rapid runoff; slow permeability.

USE AND VEGETATION: Cultivated areas are used for grain, alfalfa hay, and irrigated pasture. The remaining areas are used for rangeland. Potential vegetation is shadscale, greasewood, galleta grass, and gardner saltbush.

DISTRIBUTION AND EXTENT: Eastern Utah and western Colorado. The series is moderately extensive.

MLRA OFFICE RESPONSIBLE: Lakewood, Colorado

SERIES ESTABLISHED: Emery County, Utah, 1972.

REMARKS: The pH values were determined of soil paste.

National Cooperative Soil Survey
U.S.A.

Official Series Description - PERSAYO Series

PERSAYO SERIES

The Persayo series consists of shallow, well drained soils on hills, terraces, and ridges. These soils formed in thin sediments weathered from underlying soft sedimentary bedrock. Slopes are 1 to 45 percent. The mean annual precipitation is about 9 inches and the mean annual temperature is about 51 degrees F.

TAXONOMIC CLASS: Loamy, mixed, active, calcareous, mesic, shallow Typic Torriorthents

TYPICAL PEDON: Persayo silty clay loam - grassland. (Colors are for dry soil unless otherwise noted.)
A--0 to 4 inches; light yellowish brown (2.5Y 6/3) silty clay loam, light olive brown (2.5Y 5/3) moist; moderate fine granular structure, weak platy in the upper 1/2 inch; soft, very friable; calcareous; moderately alkaline (pH 8.2); gradual smooth boundary. (3 to 7 inches thick)
C--4 to 14 inches; light yellowish brown (2.5Y 6/4) silty clay loam, light olive brown (2.5Y 5/4) moist; weak medium subangular blocky structure parting to moderate fine granules; hard, very friable; few small calcium sulfate crystals; calcareous; moderately alkaline (pH 8.2) gradual smooth boundary. (7 to 14 inches thick)
Cr--14 inches; calcareous; gray and yellow shale and siltstone.

TYPE LOCATION: Montrose County, Colorado; 0.1 mile north of the southeast corner of Sec. 22, T. 51 N., R. 10 W.

RANGE IN CHARACTERISTICS:
These soils are dry in all parts of the moisture control section for more than three-fourths of the time that the soil temperature is above 41 degrees F.
Moisture regime: Typic Aridic.
Mean annual soil temperature: 47 to 58 degrees F.
Mean summer soil temperature: 60 to 75 degrees F.
Depth to paralithic contact: 4 to 20 inches.
Organic carbon: approximately .4 percent.
The sand/clay ratio: less than 1 to about 3.
Exchangeable sodium: typically less than 3 percent, but tends to increase as depth increases and differs among pedons.
Calcium carbonate equivalent: 5 to 14 percent. Calcium sulfate: less than 1 to about 10 percent.
Particle-size control section (weighted average): Texture: silt loam, loam, clay loam, or silty clay loam.
Clay content: 18 to 35 percent.
Silt content: 30 to 65 percent.
Sand content: 5 to 45 percent.
Coarse fragments: usually less than 5 percent and range from 0 to 15 percent.

A horizon
Hue: 10YR to 5Y
Value: 5 to 7 dry, 4 to 6 moist
Chroma: 2 through 4
Reaction: slightly to strongly alkaline
Consistence: soft to slightly hard.
C horizon
Hue: 10YR through 5Y
Value: 5 or 6 dry, 4 or 5 moist
Chroma: 2 to 4
Reaction: slightly alkaline to strongly alkaline. It contains some visible calcium carbonate and gypsum which are not concentrated into a definite horizon of secondary accumulation and are considered to be characteristics of the parent sediments rather than pedogenic.

COMPETING SERIES: This is the Shalet series. Shalet soils have hues redder than 7.5YR.

GEOGRAPHIC SETTING: These soils are on upland hills, terraces, and ridges. Slopes range from 1 to 45 percent. The soil formed in thin sediments weathered from underlying soft sedimentary bedrock. Elevation ranges from 5,000 to 6,800 feet. At the type location mean annual precipitation is 7 to 11 inches with peak periods of precipitation occurring during the late summer. Mean annual temperature ranges from 47 to 53 degrees F., and mean summer temperature is about 66 to 70 degrees F. Frost-free period ranges from 95 to 150 days. In Utah this soil has a mean annual precipitation of 6 to 8 inches, mean annual temperature of 48 to 50 degrees, and a frost-free season of 115 to 140 days at an elevation of 5,300 to 6,200 feet.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the Chipeta and Menoken soils. Chipeta soils have more than 35 percent clay in the series control section. Menoken soils lack bedrock above a depth of 20 inches and have cambic horizons.

DRAINAGE AND PERMEABILITY: Well drained; medium to rapid runoff; moderate or moderately slow permeability.

USE AND VEGETATION: These soils are used almost exclusively for native pastureland. Native vegetation is salt sage, greasewood, shadscale, and scattered grasses.

DISTRIBUTION AND EXTENT: Western Colorado and Wyoming, northwestern New Mexico, and eastern Utah. The series is of large extent. MLRA 35.

MLRA OFFICE RESPONSIBLE: Lakewood, Colorado

SERIES ESTABLISHED: Western Colorado Reconnaissance, W95, 1939.

REMARKS: Diagnostic horizons and features recognized in this pedon are: Paralithic contact - at about 14 inches. Classified according to Keys to Soil Taxonomy Ninth Edition, 2003

National Cooperative Soil Survey
U.S.A.

CHAPTER 3
BIOLOGY

3.10 Introduction

This chapter provides a general description of the biological resources found in the vicinity of the COVOL Dry-Coal Cleaning Facility, and describes measures taken to protect biological resources adjacent to the permit area. Information concerning biological resources in the area was obtained from a literature search and consultation with the Utah Division of Wildlife Resources ("DWR"). Much of the information on biological resources presented in this chapter was taken from the mining and reclamation plan ("M&RP") associated with the Savage Coal Terminal, which is located 0.3 miles north of the COVOL facility (Savage Services Corporation, 1983). Since the Savage Coal Terminal occupies a very similar landscape, and is located directly across Ridge Road from the COVOL facility, biological conditions are similar at both sites.

Unlike many coal mining operations which are located in previously undisturbed areas, the COVOL Dry-Coal Cleaning facility occupies property that is zoned for general industrial purposes. Reclamation of the site will make it available for future industrial use rather than restoring the site to its undisturbed condition. Also unlike many coal mining operations, the area impacted by the facility is almost exclusively limited to the disturbed area boundary. No subsidence, groundwater, or surface water impacts are expected to extend off site. This is due to environmental controls that include runoff, sediment, and fugitive dust management, fencing off the permit area, and proper waste disposal. Thus, while biological resources inside the permit boundary may have been affected by current uses of the property, efforts have been taken to protect biological resources in the undisturbed areas adjacent to the permit boundary.

3.1.1 Vegetative, Fish and Wildlife Resources

General vegetative, fish and wildlife resource conditions in the vicinity of the COVOL Dry-Coal Cleaning Facility are discussed in Section 3.20.

3.1.2 Potential Impact to Vegetative, Fish and Wildlife Resources

Potential impacts to vegetative, fish and wildlife resources and the associated mitigation plans are presented in Sections 3.30 and 3.40 of this application.

3.1.3 Description of Reclamation Plan

The plan to reclaim vegetative, fish and wildlife resources to a condition suitable for the post-operations land use is presented in Section 3.40.

3.20 Environmental Description

3.2.1 Vegetation Information

3.2.1.1 Plant Communities Within the Proposed Permit Area

According to the M&RP for the nearby Savage Coal Terminal, the area is dominated by a saltbush vegetative community (Savage Services Corporation, 1983). The most common species found in undisturbed areas adjacent to the site are shadscale (*Atriplex confertifolia*), greasewood (*Sarcobatus vermiculatus*), matbush (*Atriplex corrugata*), and galleta (*Hilaria jamesii*).

3.2.1.2 Land Productivity Prior to Mining

The total vegetative coverage, as measured in undisturbed areas near the Savage Coal Terminal, is 18.8% (Savage Services Corporation, 1983). It is expected that previously undisturbed areas at the COVOL facility would have had a similar vegetative coverage.

3.2.2 Fish and Wildlife Information

According to the Savage Coal Terminal M&RP, undisturbed areas generally support "limited wildlife habitat," which is mainly due to the lack of precipitation, unproductive soils, and sparse vegetation. Disturbed areas support even less wildlife. No habitats of unusually high value have been identified in the area (Savage Services Corporation, 1983).

Undisturbed areas near the COVOL facility provide habitat for lizards, lagomorphs, burrowing rodents, and predators of these animals (Savage Services Corporation, 1983). Despite its proximity to the Price River, the poor vegetative cover precludes the area from serving as a stopover area for migrating birds. Wildlife species observed in the vicinity of the nearby Savage Coal Terminal include white-tailed prairie dog (*Cynomys leucurus*), black-tailed jackrabbit (*Lepus californicus*), white-tailed jackrabbit (*Lepus townsendi*), and desert cottontail (*Sylvilagus audoboni*). Signs from other species that were not directly observed included badger (*Taxidea taxus*) and coyote (*Canus latrans*). No raptors were observed (Savage Services Corporation, 1983). Given the lack of perennial surface water, there is no fish habitat within the permit area.

3.2.2.1 Level of Detail

The scope and level of detail within this document are sufficient to design the protection and enhancement plan for wildlife and fish in the area.

3.2.2.2 Site-specific Resource Information

In accordance with the agreement with DOGM, no site-specific biological field surveys have been conducted to support this document. However, a request was submitted to the Utah Division of Wildlife Resources (DWR) to search its databases for threatened, endangered, or sensitive species within the disturbed area. In a letter dated May 12, 2007 (a copy of which is contained in Appendix 3-1), the DWR reported that it had no records of such species located at

the COVOL Dry-Coal Cleaning Facility. This letter also states that three species listed on the Utah Sensitive Species list (burrowing owl, bluehead sucker, and white-tailed prairie dog) do occur within the general vicinity of the COVOL facility. Due to the environmental controls emplaced at the site, it is anticipated that impacts, if any, will be minimal to any of these species which may exist outside the permitted area boundary.

3.2.2.3 Fish and Wildlife Service Review

If requested, the applicant authorizes the release of information pertaining to Section 3.2.2 and 3.3.3 to the U.S. Fish and Wildlife Service Regional and Field office for their review.

3.2.3 Maps and Aerial Photographs

No maps or aerial photographs will be used to address the biological resources of the permit area.

3.30 Operation Plan

3.3.1 Measures Taken to Disturb the Smallest Practicable Area

No disturbance is anticipated beyond the fenced area that constitutes the disturbed and permit area boundary. All areas within the fence may be used for active operations. Thus, interim revegetation of the site is not feasible. The area within the fence is the smallest practicable area of disturbance for this operation.

3.3.2 Description of Anticipated Impacts of Subsidence

There will be no subsidence associated with the COVOL Dry-Coal Cleaning Facility.

3.3.3 Plan to Minimize Disturbances and Adverse Impacts

Species existing in the area of the nearby Savage Coal Terminal are limited to small mammals and songbirds, which appear to tolerate coal processing operations (Savage Services Corporation, 1983). To protect larger species, the fence around the COVOL facility will be maintained during operations. No disturbance will occur outside of that fenced area. Furthermore, runoff control measures will be maintained to preclude off-site surface-water impacts. Other protective measures within the disturbed area boundary include adhering to clean industrial hygiene procedures, properly disposing of all waste (papers, cans, bottles, etc.), and instructing employees not to hunt or harass wildlife. Thus, measures have been implemented to minimize adverse impacts to fish and wildlife and related environmental resources.

3.40 Reclamation Plan

As a zoned industrial site, the post-operation land use will be industrial. Hence, substantial post-operation revegetation of the site is not anticipated. However, a proposed seed mix, application rate, and other plans have been developed in the event that areas of the site require revegetation to support the post-operation land use (see Section 3.4.1). Aspects of the reclamation plan related to fish and wildlife are discussed in Section 3.4.2.

3.4.1 Revegetation

Due to the future industrial use of the site following coal-cleaning operations, it is not anticipated that substantial revegetation will occur. The precise areas to be revegetated will be determined in consultation with the future site owner. Areas requiring revegetation will be treated as outlined below.

3.4.1.1 Schedule and Timetable

Any revegetation of the site will begin after the plant growth medium has been replaced. To the extent feasible, seeding will occur in the late fall, just prior to the onset of snow fall. If this schedule is not feasible, grasses and forbs will be planting in the late spring (May or early June), while shrubs and seedlings will be planted in the late summer through early fall (late August through early October).

3.4.1.2 Descriptions

Species and Amounts of Seed. All revegetated areas will be planted with the seed mix specified in Table 3-1.

Method Used for Planting and Seeding. Revegetation will be performed using broadcast methods.

Mulching Techniques. No mulch will be applied.

Irrigation, Pest, and Disease Control. No persistent pesticides will be used in the permit area unless previously approved by DOGM.

Measures Proposed for Revegetation Success. Revegetation success will be monitored visually. The revegetated areas will be inspected for plant growth and erosion. The operator will apply additional seed mix as deemed necessary.

3.4.1.3 Greenhouse Studies, Field Trials or Other Equivalent Studies

If DOGM requires additional testing for the purpose of demonstrating that reclamation as required by the State Program can be accomplished according to information given in this document, the applicant will comply.

3.4.2 Fish and Wildlife

3.4.2.1 Enhancement Measures

Wildlife habitat will be enhanced during reclamation through the use of runoff controls to prevent excessive erosion and through the use of a seed mix that includes plants that are indigenous to the area.

3.4.2.2 Plants Used for Wildlife Habitat

The post-operation land use will be industrial. Hence, the reclamation plan has not been specifically developed to support a fish and wildlife post-operation land use.

3.4.2.3 Cropland

Cropland is not a post-operation land use.

3.4.2.4 Residential, Public Service and Industrial Land Use

Although the post-operation land use is industrial, the site is not of sufficient size to permit the effective use of greenbelts and other substantial wildlife enhancements in reclamation.

3.50 Performance Standards

3.5.1 General Requirements

The Applicant commits to conduct all operations in accordance with Sections R645-301-330 through R645-301-340 of the regulations.

3.5.2 Contemporaneous Reclamation

Given the limited extent of areas within the permit boundary that are not in active use, contemporaneous reclamation is not considered practical at the facility.

3.5.3 Revegetation: General Requirements

As noted above, in order to support the post-operation industrial land use, only limited areas of the site will be reclaimed following the COVOL operations. This revegetation plan complies with the requirement that a vegetative cover will be established on all reclaimed areas. The vegetative cover will be in accordance with the approved permit and reclamation plan.

3.5.3.1 Vegetative Cover

For areas that will be revegetated, the seed mix is intended to provide vegetative cover that will be diverse, effective, and permanent. The seed mix was selected with to be compatible with the climate, potential seedbed quality, and drought tolerance.

Native Species. The vegetative mixture will be comprised of species native to the area. The seeds will be purchased from suppliers who will certify their purity, germination, hard seed, and percentages of maximum weed seed contents.

Extent of Cover. The vegetative cover will be at least equal in extent to the natural vegetation.

Stabilizing. The vegetative cover mixture was selected to provide erosional stability equivalent to that of adjacent undisturbed areas.

3.5.4 Revegetation: Timing

Areas intended for revegetation will be reclaimed during the first normal period for favorable planting conditions after replacements of the plant-growth medium, as discussed in Section 3.4.1.1.

3.5.5 Revegetation: Mulching and Other Soil Stabilizing Practices

Due to the limited extent of revegetation, no mulching or other soil stabilizing practices are anticipated. If excessive erosion occurs, however, the soil will be stabilized using a method approved by DOGM.

3.5.6 Revegetation: Standards for Success

The standards for revegetation success are detailed in Section 3.4.1.2.

3.5.6.1 Success of Revegetation

The success of revegetation will be judged on the effectiveness of the vegetation for post-operation land use and the standards outlined in Section 3.5.3. Success will be determined visually by both the operator and a DOGM representative.

3.5.6.2 Standards for Success

Standards of success will be applied in accordance with the approved post-operation industrial land use.

Grazing Land or Pasture Land. No areas within the permit area are designated as grazing or pasture lands.

Cropland. No area within the permit area is designated as cropland.

Fish and Wildlife Habitat. No area within the permit area is designated as fish and wildlife habitat.

Industrial, Commercial or Residential. The entire permit area is designated as industrial. Revegetation of the site as described in Section 3.40 will adequately control erosion.

Previously Disturbed Areas. There is no previously disturbed area within the permit boundary.

3.5.6.3 Siltation Structure Maintenance

Siltation structures will be maintained until removal is authorized by DOGM and the disturbed areas have been stabilized and revegetated. For additional details on siltation structures, see Section 5.4.2.

3.5.6.4 Removal of Siltation Structures

To more adequately support the post-operation industrial land use, the siltation structures will remain on site following closure of the COVOL facility.

3.5.7 Revegetation: Extended Responsibility Period

COVOL will be responsible for revegetation success during the extended responsibility period or until the property is sold to another company for industrial purposes, whichever is sooner. The period of extended responsibility will begin after the last year of augmented seeding, fertilization, irrigation, or other revegetation work, excluding husbandry as approved by DOGM. Vegetation parameters will equal or exceed the approved success standard during the last two years of the responsibility period. The success standards are outlined in Sections 3.5.6.1 and 3.5.6.2 of this application.

COVOL will comply with DOGM-approved husbandry practices, consisting of normal conservation practices within the region of the operation. These practices may include disease, pest, and vermin control; pruning; reseeding; and transplanting.

3.5.8 Protection of Fish, Wildlife, and Related Environmental Values

This plan is designed to minimize disturbances and adverse impacts on fish, wildlife and their related environments. COVOL will periodically educate their employees about wildlife needs and their importance. Given the lack of permanent surface water in the permit and adjacent areas, there are no fisheries within the permit area.

3.5.8.1 Existence of Endangered or Threatened Species

There are no known endangered or threatened species within the permit area. Therefore, facility operations will not result in the destruction or adverse modification of critical habitats. If State- or Federally-listed endangered or threatened species are discovered in the permit area in the future, the presence of these species will be reported to DOGM upon their discovery. Operations thereafter, including site reclamation, will proceed in accordance with appropriate DOGM stipulations.

3.5.8.2 Bald and Golden Eagles

No suitable bald or golden eagle habitat exists in the permit and adjacent areas. If such habitat is discovered in the future, COVOL will promptly report such habitat to DOGM and will proceed with operations thereafter in accordance with appropriate DOGM stipulations.

3.5.8.3 Taking of Endangered or Threatened Species

The applicant understands that there is no permission implied by these regulations for taking of endangered or threatened species, their nests, or eggs.

3.5.8.4 Replacement of Wetland and Riparian Vegetation

No wetland or riparian habitat exists in the permit or adjacent areas, nor has any such habitat been disturbed by this operation.

3.5.8.5 Manmade Wildlife Protection Measures

Electric Power Lines. Power lines to and within the permit area are buried which eliminates electrocution hazards to raptors.

Potential Barriers. The permit area is limited in aerial extent and is located in an area zoned for industrial use. A chain link fence has been constructed to keep wildlife from entering the facility and being exposed to the industrial hazards located within. Given the limited area of the facility, wildlife can easily migrate around the outside of the fence if needed.

Pond Protection. The perimeter facility fence excludes large wildlife from encountering the sedimentation ponds. No site ponds contain hazardous concentrations of toxic-forming materials.

REFERENCES

Savage Services Corporation, 1983. Formerly Beaver Creek Coal Company. *Underground Mining Permit Application and Mining and Reclamation Plan for the C.V. Spur Coal Processing and Loadout Facility, Carbon County, Utah.* Submitted to the Utah Division of Oil, Gas, and Mining.

TABLE 3-1

Revegetation Seed Mixture

Scientific Name	Common Name	Application Rate (pls lb/acre)
	Shrubs	
Atriplex gardnen var. cuneata	Castle Valley saltbush	2.0
Atriplex corrugata	Mat saltbush	3.0
Atriplex confertifolia	Shadscale	4.0
Chrysothamnus nauseosis	Rubber rabbitbrush	0.3
Ceratoides lanata	Winterfat	4.0
Sarcobatus vermiculatus	Greasewood	0.5
	Forbs	
Eriogonum inflatum	Desert trumpet	1.0
Helianthus annuus	Annual sunflower	4.0
Oenothera caespitosa	Evening primrose	0.3
Sphaeraicea coccinea	Globemallow	0.5
	Grasses	
Bouteloua gracilis	Blue grama	0.5
Elymus lanceolatus	Thickspike wheatgrass	2.0
Elymus cinereus	Great Basin wildrye	2.0
Elymus smithii	Western wheatgrass	1.0
Hilaria jamesii	Galleta	2.0
Sporobolus airoides	Alkalai sacaton	0.2
Stipa comata	Needle and thread	3.0
Stipa hymenoides	Indian ricegrass	2.0
Distichlis spicata	Saltgrass	0.5
TOTAL		**32.8**

APPENDIX 3-1

Letter from Utah Division of Wildlife Resources

JON M. HUNTSMAN, JR.
Governor

GARY R. HERBERT
Lieutenant Governor

State of Utah
DEPARTMENT OF NATURAL RESOURCES

MICHAEL R. STYLER
Executive Director

Division of Wildlife Resources

JAMES F. KARPOWITZ
Division Director

May 12, 2007

Ari Menitove
EarthFax Engineering, Inc.
7324 Union Park Avenue
Midvale, Utah 84047

Subject: Species of Concern Near the Coal Processing Facility, Wellington

Dear Ari Menitove:

I am writing in response to your email dated May 9, 2007 regarding information on species of special concern proximal to the coal processing facility located west of Wellington, Carbon County, Utah (Section 14 of Township 15 South, Range 10 East).

The Utah Division of Wildlife Resources (UDWR) does not have records of occurrence for any threatened, endangered, or sensitive species within the project area noted above. However, in the vicinity there are recent records of occurrence for burrowing owl, bluehead sucker, and white-tailed prairie-dog. All of the aforementioned species are included on the *Utah Sensitive Species List*.

The information provided in this letter is based on data existing in the Utah Division of Wildlife Resources' central database at the time of the request. It should not be regarded as a final statement on the occurrence of any species on or near the designated site, nor should it be considered a substitute for on-the-ground biological surveys. Moreover, because the Utah Division of Wildlife Resources' central database is continually updated, and because data requests are evaluated for the specific type of proposed action, any given response is only appropriate for its respective request.

In addition to the information you requested, other significant wildlife values might also be present on the designated site. Please contact UDWR's habitat manager for the southeastern region, Chris Wood, at (435) 636-0279 if you have any questions.

Please contact our office at (801) 538-4759 if you require further assistance.

Sincerely,

Sarah Lindsey

Sarah Lindsey
Information Manager
Utah Natural Heritage Program

cc: Chris Wood, SERO

1594 W. North Temple, Suite 2110, PO Box 146301, Salt Lake City, UT 84114-6301
telephone (801) 538-4700 • facsimile (801) 538-4709 • TTY (801) 538-7458 • *www.wildlife.utah.gov*

UTAH DNR WILDLIFE RESOURCES

CHAPTER 4
LAND USE AND AIR QUALITY

4.10 Land Use

4.1.1 Environmental Description

4.1.1.1 Premining Land Use

The northern 10 acres within the permit area were purchased by Covol Engineered Fuels, LC from Terra Systems Inc. in 2003. The southern 20 acres within the permit area were sold to Covol Engineered Fuels, LC in 2005 by Price City. Both parcels were previously undeveloped. Due to its high alkaline and saline content, the land is poorly suited for agriculture. Construction of the facility was initiated in July 2005, and limited operations began in January 2006.

Land Use Map. Zoned land use in the vicinity of the site is indicated on Figure 4-1.

Land Capability. The land capability of the permit and adjacent areas is suited to its current industrial zoning status. The soils are composed primarily of alkaline, saline, weathered shale that do not readily support agricultural activities. The Natural Resources Conservation Service indicates that these soils have a poor revegetation potential due to the lack of precipitation and infertile soil properties (Jensen and Borchert, 1988). The native vegetation consists of a salt desert community that is poorly suited for wildlife and livestock use.

Land Use Description. According to the development code of Carbon County, Utah (Carbon County, 2003), the surface lands are zoned I-2 (General Industrial) as follows:

> *"The I-2 General Industrial zone has been established for the purpose of providing a place where firms engaged in mining and related activities, and/or heavy manufacturing,*

processing and fabrication of goods and materials, can locate with minimum conflict or deleterious effect on surrounding properties and the natural environment, and with a high degree of protection from encroachment of residential and commercial uses. It is also the intent of this zone to promote the economic well being of the people within the County and to broaden the tax base."

Cultural and Historic Resources Information. The site area is not conducive to human historic habitation or use. No cultural or historic resources are known to have existed in the permit area prior to facility construction.

4.1.1.2 Previous Mining Activity

No previous mining activity occurred in the permit area.

4.1.2 Reclamation Plan

4.1.2.1 Postmining Land Use Plan

The land occupied by the COVOL Dry Coal Cleaning Facility will adequately support future industrial land uses after operations are complete and the site has been graded, topsoil has been stockpiled, and drainage controls have been constructed. The Applicant intends that the post-operational land uses will be consistent with the land use plans approved by Carbon County. Final reclamation activities will be completed in a manner consistent with that intended post-operation land use and in accordance with Carbon County zoning ordinances.

4.1.2.2 Land Owner or Surface Manager Comments

COVOL owns and operates the facility. Thus, surface land owner comments are not required. All operations will be conducted in accordance with applicable local, State, and Federal regulations.

4.1.2.3 Suitability and Capability

Final fills will not contain excess spoils.

4.1.3 Performance Standards

4.1.3.1 Postmining Land Use

The proposed post-operations land uses will be industrial. The land is capable of supporting such a land use.

4.1.3.2 Determining Premining Uses of Land

The post-operations land use is the same as that which existed before the operation began.

4.1.3.3 Criteria for Alternative Postmining Land Uses

No alternative post-operations land uses are anticipated.

4.1.4 Alternative Land Use

No alternative post-operations land uses are anticipated.

4.20 Air Quality

This section includes descriptions of plans to comply with the Clean Air Act and applicable Utah or federal statutes and regulations pertaining to air quality standards.

4.2.1 Air Quality Standards

COVOL's operations are being conducted in compliance with the requirements of the Clean Air Act and the Utah Air Quality Regulations.

4.2.2 Compliance Efforts

Air emissions from the facility comply with applicable local, state, and federal standards, and are permitted with the Utah Division of Air Quality (DAQ) under Approval Order (AO) DAQE#AN2952001-05 issued on June 30, 2005. Under the permit, the facility qualifies as a minor source of particulate emissions. Controls at the facility include dust suppression of the roadways with water, a telescoping drop chute on the primary stacking conveyor, enclosed screen and crusher, and fixed discharge chutes on the stacking conveyors and at the truck loadout stations. A copy of the AO is included in Appendix 4-1. This permit allows for 7.12 tons of PM_{10} emissions per year, provided that COVOL complies with the stipulations of the permit. These stipulations are summarized in the following paragraphs.

Fabric Filter Baghouses. All of the exhaust from the air cleaning tables is channeled through baghouses before being discharged to the atmosphere. The fabric filters used in each baghouse will comply with the specifications for porosity and differential pressure as specified in the AO.

Opacity. Visible emissions from the components of the facility are restricted to the following opacity limits:

- Crushers: 15%
- Screens: 10%

- Conveyor Transfer Points: 10%
- Baghouse Exhaust Stacks: 10%
- Haul Road Traffic/Vehicles: 20%
- All other points: 20%

Process Limitations. The facility is limited to processing no greater than 1,500,000 tons of coal per rolling 12-month period.

Fugitive Dust Controls. Standard procedures, including water and/or chemical treatment of roads and other areas with vehicle traffic, will be followed in accordance with the AO. Storage piles will also be sprayed with water as necessary. In-plant haul roads will be limited to a total length of 0.69 miles, with a speed limit of 10 miles per hour. They will be paved and swept as needed, as per the AO.

Other Controls. Conveyors and stackers are covered or enclosed. Discharge chutes have been installed on radial stacker conveyor drops and truck loadouts at the alternate product loading hopper and the product storage silo.

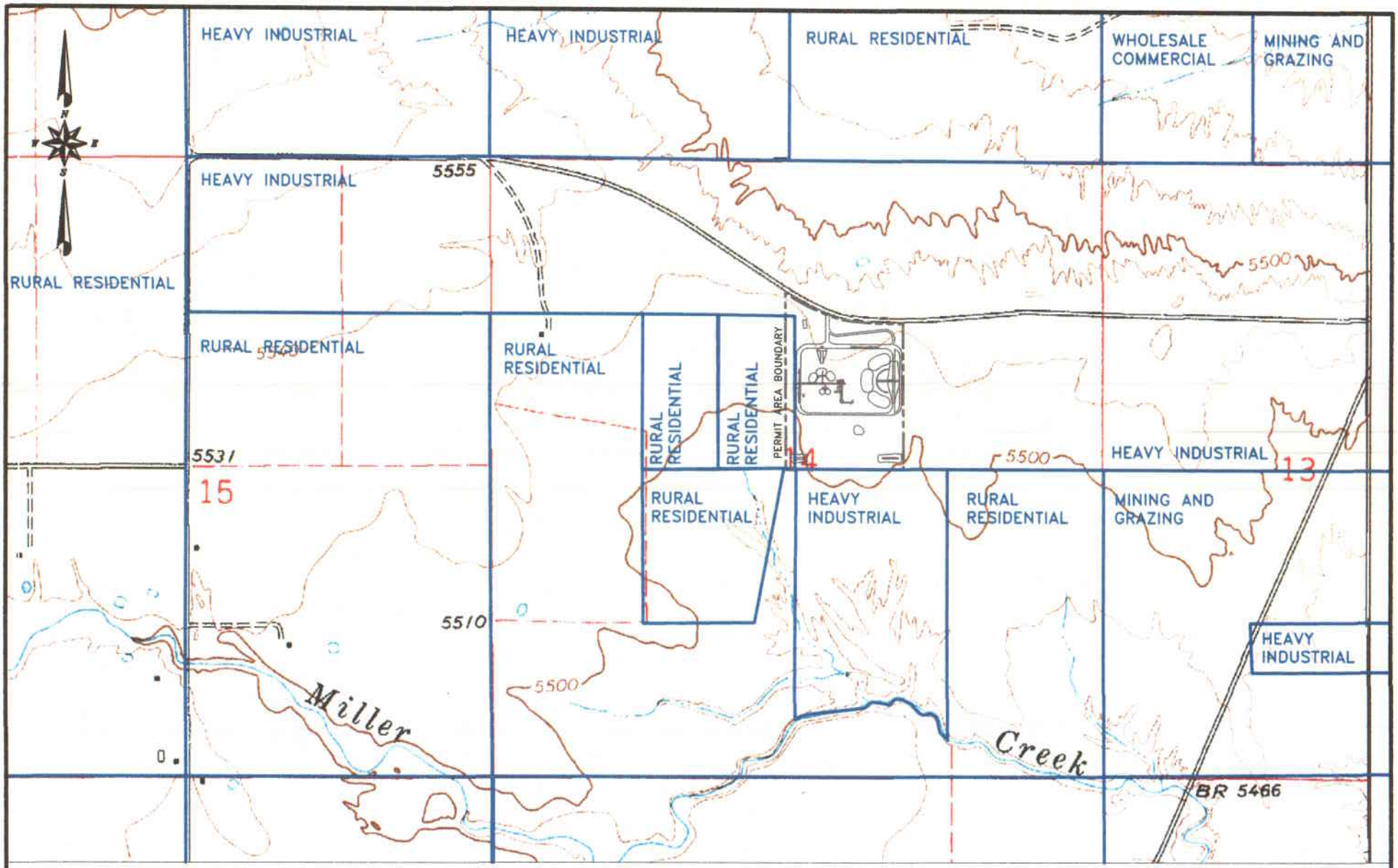
4.2.3 Monitoring Program

DOGM does not require an air monitoring program for the COVOL Dry-Coal Cleaning Facility at this time. A monitoring program has been established with the DAQ under AO# AN2952001-05. The program includes the installation of manometers to measure the differential pressures across the filters in the baghouses, a protocol for measuring opacity from fugitive dust road emissions, and specifies the types of records to be maintained for control measures that are applied. Additional details for the DAQ air monitoring program are included in the AO document, which is included in Appendix 4-1.

REFERENCES

Carbon County, 2003. The Development Code for Carbon County, Utah. Revised March 2003.

Jensen, Earl H. and James W. Borchert, 1988. Soil Survey of Carbon Area, Utah. U.S. Department of Agriculture Soil Conservation Service. 294 pp.



BASE MAP: 7.5' USGS QUADRANGLE
PRICE, UTAH 1972

LAND USE INFORMATION TAKEN FROM THE CARBON COUNTY GEOGRAPHIC INFORMATION SYSTEM, ACCESSED OCTOBER 2007

0' 1200'

FIGURE 4-1. LAND USE MAP

EarthFax

G:\UC1091\02 - Permit application\Drawings\FIG4-1WDCC.dwg, 8.5x11, 1/11/2008 8:39:38 AM

APPENDIX 4-1

Utah Division of Air Quality
Approval Order

State of Utah

Department of
Environmental Quality

Dianne R. Nielson, Ph.D.
Executive Director

DIVISION OF AIR QUALITY
Richard W. Sprott
Director

JON M. HUNTSMAN, JR.
Governor

GARY HERBERT
Lieutenant Governor

DAQE-AN2952003-05

June 30, 2005

Keith Thompson
COVOL Engineered Fuels LLC
10653 South Riverfront Parkway, Suite 300
Sandy, Utah 84095

Dear Mr. Thompson:

Re: Approval Order: Modification of Approval Order DAQE# AN2952001-03, by Adding Equipment and Increasing Blended Coal Production, Carbon County – CDS B ATT; NSPS; TITLE V Minor Project Code: N2952-003

The attached document is the Approval Order (AO) for the above-referenced project.

Future correspondence on this Approval Order should include the engineer's name as well as the DAQE number as shown on the upper right-hand corner of this letter. Please direct any technical questions you may have on this project to Mr. Tim De Julis. He may be reached at (801) 536-4012.

Sincerely,

Richard W. Sprott, Executive Secretary
Utah Air Quality Board

RWS:TD:re

cc: Southeastern Utah District Health Department
Mike Owens, EPA Region VIII

STATE OF UTAH

Department of Environmental Quality

Division of Air Quality

APPROVAL ORDER: Modification of Approval Order DAQE# AN 2952001-03 by Adding Equipment

Prepared By: Tim De Julis, Engineer
(801) 536-4012
tdejulis@utah.gov

APPROVAL ORDER NUMBER

DAQE-AN2952003-05

Date: June 30, 2005

COVOL Engineered Fuels LLC
Source Contact
Keith Thompson
(801) 984-9400

Richard W. Sprott
Executive Secretary
Utah Air Quality Board

Abstract

Covol Engineered Fuels, LC (CEF), proposes to modify the existing, blended coal preparation plant in Wellington, Carbon County, by adding equipment items, and increasing annual production. The plant will process as much as 1,500,000 tons of coal per year, utilizing crushers, screens, and air tables to create three different quality, blended coal products. Carbon County is an attainment area of the National Ambient Air Quality Standards (NAAQS) for all pollutants. New Source Performance Standards (NSPS) apply to this source (40 CFR 60 Subpart A, and Subpart Y). National Emission Standards for Hazardous Air Pollutants (NESHAP) and Maximum Available Control Technology (MACT) regulations do not apply to this source. Title V of the 1990 Clean Air Act applies to this minor source. This source does not require a Title V operating permit.

The emissions, in tons per year, will change as follows: PM_{10} (+ 7.12).

The changes in emissions will result in the following, in tons per year, potential to emit totals: PM_{10} = 7.91

The project has been evaluated and found to be consistent with the requirements of the Utah Administrative Code Rule 307 (UAC R307). A public comment period was held in accordance with UAC R307-401-4 and no comments were received. This air quality Approval Order (AO) authorizes the project with the following conditions, and failure to comply with any of the conditions may constitute a violation of this order.

General Conditions:

1. This Approval Order (AO) applies to the following company:

   Corporate Office Location
   Covol Engineered Fuels, LC
   10653 South Riverfront Parkway, Suite 300
   Sandy, Utah 84095

   Phone Number (801) 984-9400
   Fax Number (801) 984-9460

   The equipment listed in this AO shall be operated at the following location:

   1865 West Ridge Road, Wellington, Carbon County

   Universal Transverse Mercator (UTM) Coordinate System: UTM Datum NAD27
   4,374.55 kilometers Northing, 520.27 kilometers Easting, Zone 12

2. All definitions, terms, abbreviations, and references used in this AO conform to those used in the Utah Administrative Code (UAC) Rule 307 (R307), and Title 40 of the Code of Federal Regulations (40 CFR). Unless noted otherwise, references cited in these AO conditions refer to those rules.

3. The limits set forth in this AO shall not be exceeded without prior approval in accordance with R307-401.

4. Modifications to the equipment, or processes approved by this AO that could affect the emissions covered by this AO must be reviewed, and approved in accordance with R307-401-1.

5. All records referenced in this AO, or in applicable NSPS, which are required to be kept by the owner/operator, shall be made available to the Executive Secretary or Executive Secretary's representative upon request, and the records shall include the two-year period prior to the date of the request. Records shall be kept for the following minimum periods:

A.	Emission inventories	Five years from the due date of each emission statement or until the next inventory is due, whichever is longer.
B.	All other records	Two years

6. CEF shall install the various coal preparation equipment items listed in condition 8, and shall conduct its operations of the coal preparation plant in accordance with the terms, and conditions of this AO, which was written pursuant to CEF's Notice of Intent submitted to the Division of Air Quality (DAQ) on February 9, 2005, and additional information submitted to the DAQ on February 17, 2005, March 4, 2005, March 7, 2005, March 9, 2005, March 11, 2005, March 15, 2005, April 8, 2005, April 13, 2005, April 15, 2005, and April 19, 2005.

7. This AO shall replace the AO (DAQE-AN2952001-03) dated December 18, 2003.

8. The approved installations shall consist of the following equipment (or equivalent*):

A. Coal handling/ Preparation Equipment 40 CFR 60 Subpart Y
One (1) Crusher
One (1) Screen
Two (2) Feed Hoppers
Three (3) Air Tables
Various Conveyor Belts, or Radial Stacking Devices

B. Three (3) Fabric Filter Baghouses

C. One (1) Material Storage Silo
Capacity: 200 tons

D. Various Off-highway Equipment items **
Front-end Loaders

* Equivalency shall be determined by the Executive Secretary.

** This equipment is listed for informational purposes only.

9. The three baghouses shall control process streams from the air cleaning tables. All exhaust air from the air cleaning tables shall be routed through one of the three baghouses before being vented to the atmosphere. All filtered material collected within each

baghouse shall discharge to an enclosed conveyance device. The fabric filters installed in each baghouse shall have porosity of 0.5 micrometers, or use equivalent technology as determined by the Executive Secretary.

10. A manometer or magnehelic pressure gauge shall be installed to measure the differential pressure across the fabric filters in each baghouse. Static pressure differential across the fabric filter shall be between 1.5 to 6.0 inches of water column. The pressure gauge shall be located such that an inspector /operator can safely read the indicator at any time. The reading shall be accurate to within plus or minus 1.0 inches water column. The instrument shall be calibrated according to the manufactures instructions at least once every 12 months. Intermittent recording of the reading is required on a once per operational day basis.

11. CEF shall notify the Executive Secretary in writing when the installation of the equipment listed in Condition #8 has been completed and is operational, as an initial compliance inspection is required. To insure proper credit when notifying the Executive Secretary, send your correspondence to the Executive Secretary, attn: Compliance Section.

    If construction and/or installation has not been completed within eighteen months from the date of this AO, the Executive Secretary shall be notified in writing on the status of the construction and/or installation. At that time, the Executive Secretary shall require documentation of the continuous construction and/or installation of the operation and may revoke the AO in accordance with R307-401-11.

Limitations and Tests Procedures

12. Visible emissions from the following emission points shall not exceed the following values:

    A. All crushers - 15% opacity
    B. All screens - 10% opacity
    C. All conveyor transfer points - 10% opacity
    D. All baghouse exhaust stacks - 10% opacity
    E. All other points - 20% opacity

    Opacity observations of emissions from stationary sources shall be conducted according to 40 CFR 60, Appendix A, Method 9.

    For sources that are subject to NSPS, opacity shall be determined by conducting observations in accordance with 40 CFR 60.11(b) and 40 CFR 60, Appendix A, Method 9.

13. The following limit shall not be exceeded:

    1,500,000 tons of coal processed per rolling 12-month period

    To determine compliance with a rolling 12-month total the owner/operator shall calculate a new 12-month total by the twentieth day of each month using data from the previous 12

months. Records of production shall be kept for all periods when the plant is in operation. Coal production shall be determined by examination of CEF billing records, and/or weight receipts. The records of coal production shall be kept on a daily basis.

Roads, and Fugitive Dust

14. The facility shall abide by all applicable requirements of R307-205 for Fugitive Emission and Fugitive Dust sources.

15. Visible fugitive dust emissions from haul-road traffic and mobile equipment in operational areas shall not exceed 20% opacity. Visible emissions determinations for traffic sources shall use procedures similar to Method 9. The normal requirement for observations to be made at 15-second intervals over a six-minute period, however, shall not apply. Six points, distributed along the length of the haul road or in the operational area, shall be chosen by the Executive Secretary, or the Executive Secretary's representative. An opacity reading shall be made at each point when a vehicle passes the selected points. Opacity readings shall be made 1/2 vehicle length, or greater behind the vehicle, and at approximately 1/2 the height of the vehicle, or greater. The accumulated six readings shall be averaged for the compliance value.

16. All unpaved operational areas that are used by mobile equipment shall be water sprayed, and/or chemically treated to control fugitive dust. An application of water, or chemical treatment shall be used. Treatment shall be of sufficient frequency, intensity, and duration to maintain the surface material in a damp/moist condition unless it is below freezing. The opacity shall not exceed 20% during all times the areas are in use. If chemical treatment is to be used, the plan must be approved by the Executive Secretary. Records of water, and/or chemical treatment shall be kept for all periods when the plant is in operation. The records shall include the following items:

    A. Date
    B. Number of treatments made, dilution ratio, and quantity
    C. Rainfall received, if any, and approximate amount
    D. Time of day treatments were made
    E. Records of temperature if the temperature is below freezing.

17. The in-plant haul roads shall be paved, and shall be periodically swept, or sprayed clean as dry conditions warrant, or as determined necessary by the Executive Secretary. Records of cleaning paved roads shall be kept for periods the plant is in operation. The records shall include the following items:

    A. Date of cleaning(s)
    B. Time of day cleaning(s) were performed

18. The haul road shall not exceed 0.69 miles in combined length, and the vehicle speed along the haul road shall not exceed 10 miles per hour.

19. The storage piles shall be watered to minimize generation of fugitive dusts, as dry conditions warrant, or as determined necessary by the Executive Secretary. Records of water, and/or chemical treatment shall be kept for all periods when the plant is in operation.

20. All conveyors, and radial stacking devices shall be covered, or enclosed along their length. The radial stacker conveyor drop, the truck loading chutes at the product storage silo, and the alternate product loading hopper shall be equipped with telescoping discharge tubes.

Federal Limitations and Requirements

21. In addition to the requirements of this AO, all applicable provisions of 40 CFR 60, New Source Performance Standards (NSPS) Subpart A, 40 CFR 60.1 to 60.18, and Subpart Y, 40 CFR 60.250 to 60.254 (Standards of Performance for Coal Preparation Plants) apply to this installation.

Records & Miscellaneous

22. At all times, including periods of startup, shutdown, and malfunction, owners and operators shall, to the extent practicable, maintain and operate any equipment approved under this Approval Order including associated air pollution control equipment in a manner consistent with good air pollution control practice for minimizing emissions. Determination of whether acceptable operating and maintenance procedures are being used will be based on information available to the Executive Secretary which may include, but is not limited to, monitoring results, opacity observations, review of operating and maintenance procedures, and inspection of the source. All maintenance performed on equipment authorized by this AO shall be recorded.

23. The owner/operator shall comply with R307-150 Series. Inventories, Testing and Monitoring.

24. The owner/operator shall comply with R307-107. General Requirements: Unavoidable Breakdowns.

The Executive Secretary shall be notified in writing if the company is sold or changes its name.

This AO in no way releases the owner or operator from any liability for compliance with all other applicable federal, state, and local regulations including R307.

A copy of the rules, regulations and/or attachments addressed in this AO may be obtained by contacting the Division of Air Quality. The Utah Administrative Code R307 rules used by DAQ, the Notice of Intent (NOI) guide, and other air quality documents and forms may also be obtained on the Internet at the following web site:
http://www.airquality.utah.gov/

The annual emissions estimations below include point source, fugitive dust, and road dust emissions, and do not include fugitive emissions, tail pipe emissions, or grandfathered emissions. These emissions are for the purpose of determining the applicability of Prevention of Significant Deterioration, non-attainment

area, maintenance area, and Title V source requirements of the R307. They are not to be used for determining compliance.

The Potential To Emit (PTE) emissions for CEF's Wellington coal preparation plant are currently calculated at the following values:

Pollutant	Tons/yr
PM_{10}	7.91

Approved By:

Richard W. Sprott, Executive Secretary
Utah Air Quality Board

CHAPTER 5

ENGINEERING

5.10 Introduction

This chapter provides a discussion of general engineering aspects, an operation plan, a reclamation plan, design criteria, and performance standards related to the COVOL Dry-Coal Cleaning Facility. The existing and proposed facilities have been or will be designed, located, constructed, maintained, and reclaimed in accordance with the operation and reclamation plans.

It should be noted that this facility is used for coal cleaning and is not a coal mine. Thus, several of the sections in this chapter that refer to mining operations are not applicable and have been noted as such.

5.1.1 General Requirements

This permit application includes descriptions of the proposed coal cleaning and facility reclamation operations together with the appropriate maps, plans, and cross sections. Methods and calculations utilized to achieve compliance with the design criteria are also presented.

5.1.2 Certification

Where required by the regulations, cross sections and maps in this permit application have been prepared by or under the direction of, and certified by, qualified registered professional engineers or land surveyors. As appropriate, these persons were assisted by experts in the fields of hydrology, geology, biology, etc.

5.1.2.1 Cross Sections and Maps

Previously Mined Areas. There are no previously mined areas near the facility.

Surface Facilities. A general site map showing the locations of structures, coal cleaning equipment, conveyors, and piles in addition to surface drainage is shown on Plate 5-1. This map includes the locations of topsoil and coal material stockpiles, alternate product piles, runoff control structures, and sedimentation ponds. Except for the sedimentation ponds, no other water treatment facilities exist at the site. Plate 5-1 also shows the locations of air pollution control equipment.

The following facilities or activities do not exist or occur within the permit area:

- Coal mining,
- Excess spoil,
- Durable rock fills,
- Permanent storage/disposal of coal mine waste,
- Coal processing waste banks, dams, or embankments, and
- Disposal of non-coal (non-waste rock) waste

Surface Configurations. The topography noted on Plate 5-1 is based on pre-disturbance data. Site grading at the facility has been minimal, and there are a handful of material stockpiles as shown on Plate 5-1. Site reclamation is expected to involve only minor amounts of earthwork.

Hydrology. Certified maps and cross sections associated with the hydrology of the COVOL Dry-Coal Cleaning Facility area are provided in Chapter 7.

Geology. Certified maps and cross sections associated with the geology of the COVOL Dry-Coal Cleaning Facility area are provided in Chapter 6.

5.1.2.2 Plans and Engineering Designs

All plans and engineering designs presented in this permit application were prepared by or under the direction of and certified by a qualified registered professional engineer.

Excess Spoil. No excess spoil will be generated from the permit area.

Durable Rock Fills. No durable rock fills will exist in the permit area.

Coal Mine Waste. No coal mine waste will be permanently stored in the permit area.

Impoundments. Two impoundments are present at the site – one in the southeast corner and one in the southwest corner (see Plate 5-1). They are intended to temporarily contain runoff from the disturbed areas of the site. They were designed and certified by a professional engineer using current, prudent, engineering practices.

Primary Roads. All roads within the permit area are considered primary roads as defined in R645-301-527.120. These roads have been certified by a professional engineer as meeting the requirements of R645-301-534.200 and R645-301-742.420 (see Appendix 5-1).

Variance from Approximate Original Contour. There has been no significant variance from the original contour at this facility. Thus, no variance from the approximate original contour of the site is being requested. Since the facility is located on land zoned for heavy industrial use, future industrial uses of the property will benefit from any site grading which has already been performed.

5.1.3 Compliance with MSHA Regulations and MSHA Approvals

5.1.3.1 Coal Processing Waste Dams and Embankments

No coal processing waste dams or embankments exist within the permit area.

5.1.3.2 Impoundments and Sedimentation Ponds

No impoundments or sedimentation ponds in the permit area meet the size criteria of 30 CFR 77.216(a).

5.1.3.3 Underground Development Waste, Coal Processing Waste, and Excess Spoil

No underground development waste, coal processing waste, or excess spoil is disposed of in the permit area.

5.1.3.4 Refuse Piles

There is no permanent coal refuse stored in the permit area.

5.1.3.5 Underground Openings to the Surface

There are no underground openings within the permit area.

5.1.3.6 Discharges to Underground Mines

No discharges occur from the surface to underground mine workings in the permit area.

5.1.3.7 Surface Coal Mining and Reclamation Activities

No surface coal mining and reclamation activities occur in the permit area.

5.1.3.8 Coal Mine Waste Fires

If any coal mine waste fires occur within the permit area, these will be reported immediately to MSHA and DOGM. Immediate remedial action will be taken as deemed necessary by COVOL to protect public health and safety as well as the environment. Following initial remedial efforts, a long-term plan will be formulated in discussion with MSHA and DOGM to extinguish any existing fires and prevent future fires.

5.1.4 Inspections

5.1.4.1 Excess Spoil

Excess spoil is not generated at the COVOL Dry-Coal Cleaning Facility.

5.1.4.2 Refuse Piles

No permanent refuse piles will be located in the permit area.

5.1.4.3 Impoundments

Inspections of the sedimentation ponds associated with the COVOL Dry-Coal Cleaning Facility will be made at least quarterly. A report of inspection will be prepared by a qualified individual and maintained on site after each inspection.

No new impoundments are planned for construction at the site. If new impoundments are constructed, they will be inspected during and after construction in accordance with R645-301-514.300.

All sedimentation ponds associated with the COVOL Dry-Coal Cleaning Facility will be inspected annually by a registered professional engineer. A certified report will be prepared by a registered professional engineer and submitted to DOGM shortly after each inspection. This report will indicate whether or not the impoundment has been constructed and maintained as designed and in accordance with the approved plan and the R645 rules. The report will also include a discussion of any apparent instability, structural weakness or other hazardous conditions, depth and elevation of any impounded waters, existing storage capacity, existing or required monitoring procedures and instrumentation, and any other aspects of the structure affecting stability, as noted during the inspection. A copy of the inspection report will be maintained at the facility office.

No impoundments that are subject to 30 CFR 77.216 currently exist or are planned within the permit area. If impoundments subject to 30 CFR 77.216 are constructed in the future, these impoundments will be inspected in accordance with 30 CFR 77.216-3.

5.1.5 Reporting and Emergency Procedures

5.1.5.1 Slides

Due to the relatively level plant site, the potential for slides is essentially nonexistent. However, if a slide occurs within the permit area that may have a potential adverse effect on the public, property, health, safety, or the environment, COVOL will notify DOGM by the fastest available means following discovery of the slide and will comply with any remedial measures required by DOGM.

5.1.5.2 Impoundment Hazards

If any examination or inspection of an impoundment discloses that a potential hazard is associated with that impoundment that may have an adverse effect on the public, property, health, safety, or the environment, the person who examined the impoundment will promptly inform DOGM of the finding and of the emergency procedures formulated for public protection and remedial action. If adequate procedures cannot be formulated or implemented, DOGM will be notified immediately.

5.1.5.3 Temporary Cessation of Operations

Prior to a temporary cessation of operations within the permit area that will last for a period of 30 days or more or as soon as it is known that a temporary cessation will extend beyond 30 days, COVOL will submit to DOGM a notice of intention to cease or abandon operations. This notice will include the following:

- A statement of the exact tonnage of coal which has been cleaned by the facility prior to cessation of operations,
- A discussion of the extent and kind of reclamation activities which will have been accomplished prior to cessation of operations, and
- An identification of the regrading, revegetation, environmental monitoring, and water treatment activities that will continue during the temporary cessation.

During the temporary cessation, COVOL will support and maintain all surface access and will also secure all facilities.

5.20 Operation Plan

5.2.1 General

5.2.1.1 Cross Sections and Maps

Previously Mined Areas. There are no active, inactive, or abandoned underground workings, including openings to the surface, within the permit and adjacent areas. No previously surface-mined areas exist within the permit area.

Existing Surface and Subsurface Facilities and Features. Plate 5-1 depicts the following information:

- The location of surface and subsurface features within, passing through, or passing over the permit area, including major electric transmission lines and pipelines (no agricultural drainage tile fields exist within the permit area),
- Each public road located in or within 100 feet of the permit area, and
- The location of each sedimentation pond within the permit area (there are no permanent water impoundments, coal processing waste dams, or coal processing embankments within the permit area).

Buildings located in the permit area are noted on Plate 5-1, while those within 1,000 feet of the permit area are noted on Figure 5-1, including an identification of the current use of the buildings.

Landowner, Right-of-Entry, and Public Interest. Figure 5-2 shows the boundaries of lands and the names of present owners of record of those lands, both surface and subsurface, included in or contiguous to the permit area. COVOL has a legal right to operate on all of the lands within the permit area. Operations are conducted within 100 feet of a public road.

Mining Sequence and Planned Subsidence. No mining will occur at this facility. Therefore, no subsidence is anticipated.

Land Surface Configuration. Only minor grading of the site has occurred from its pre-disturbance condition. Original site elevations across the facility dropped approximately 30 feet from north to south, resulting in an average slope of approximately 2% (see Plate 5-1).

Surface Facilities. Plate 5-1 shows the locations of the following surface facilities:

- Buildings, utility corridors, and facilities to be used,
- Coal weighing, unloading, separating, stacking, and loading facilities,
- Air emissions controls,
- Sedimentation ponds,
- Roads, and
- Stockpile areas.

The disturbed area shown on Plate 5-1 is the same as the land area for which a performance bond or other guarantee has been posted.

The location of the topsoil stockpile is shown on Plate 5-1. No permanent coal processing waste banks, dams, or embankments exist in the permit area. Similarly, no permanent spoil or coal preparation waste sites exist in the permit area.

General refuse that is generated on site is stored in dumpsters at the locations indicated on Plate 5-1. This waste consists predominantly of paper, cardboard, and miscellaneous garbage. This non-hazardous, non-toxic, non-coal, non-waste rock refuse is disposed of periodically at the East Carbon Development Company landfill.

Transportation Facilities. Roads that have been constructed, used, or maintained by COVOL in the permit area for the mining and reclamation operations are shown on Plate 5-1. All of the conveyors in the permit area are also shown. Drainage structures associated with the roads are discussed in Section 7.5.2.2. A standard road cross section is provided on Figure 5-3.

5.2.1.2 Signs and Markers

Permit Identification Signs. A permit identification sign has been placed so that it is visible from where the facility access road joins Ridge Road. The sign measures 4 feet by 8 feet and contains the following information:

- The name, business address, and telephone number of the permittee and
- The permanent program permit number as obtained from DOGM.

The sign will be retained and maintained until after the release of all bonds for the permit area.

Perimeter Markers. The perimeter of the facility (disturbed area boundary) is marked with a fence.

Buffer Zone Markers. Since the facility is not located near a perennial or intermittent stream channel, there are no stream buffer zone markers at the site.

Topsoil Markers. A marker will be placed on the topsoil stockpile indicating that it contains topsoil.

5.2.2 Coal Recovery

Coal recovery at the COVOL Dry-Coal Cleaning Facility is performed using air and vibratory methods to derive useable grades of coal from high-ash coal delivered from nearby coal mining operations.

5.2.3 Mining Methods

No mining occurs at this facility. This is a dry-coal cleaning facility in which coal is brought from off-site mine sources and processed into a value-added product.

5.2.4 Blasting and Explosives

Blasting and explosives will not be used at the site.

5.2.5 Subsidence

There will be no underground mining or subsidence at this facility. Hence, no pre-subsidence survey will be conducted, no areas need to be protected from subsidence, no subsidence control plan will be developed, no subsidence control measures will be implemented, no subsidence damage repair will be performed, and no public notice of underground mining activities will be required.

5.2.6 Mine Facilities

Although the COVOL Dry-Coal Cleaning Facility is not a mine, it contains coal processing equipment that is detailed in the following sections.

5.2.6.1 Mine Structures and Facilities

The COVOL Dry-Coal Cleaning Facility was constructed from July 2005 to January 2006. The facility layout is noted on Plate 5-1. Table 5-1 lists the existing structures at the facility. All structures are actively maintained and are in good functional condition. All of the structures were constructed specifically for use as coal cleaning facilities, have been used and maintained since construction, and are considered adequate to meet the requirements of R645-301.

Selected structures and facilities will be removed following operations in accordance with the reclamation plan discussed in Section 5.40.

5.2.6.2 Utility Installation and Support Facilities

Utility Installations. All operations will be conducted to prevent damage, destruction, or disruption of services provided by electric lines, telephone transmission stations, water lines, and sewer lines which pass over, under, or through the permit area. Since there is no planned subsidence on site, all utilities are located within non-subsidence zones.

Support Facilities. Support facilities at the COVOL Dry-Coal Cleaning Facility will be operated in accordance with the permit issued for the facility. Support facilities will be located, maintained, and used in a manner that:

- Prevents or controls erosion and siltation, water pollution, and damage to public or private property,
- To the extent possible, using the best technology currently available, minimizes damage to fish, wildlife, and related environmental values, and
- Minimizes additional contributions of suspended solids to stream flow or runoff outside the permit area.

All support facilities will be removed following operations in accordance with the reclamation plan discussed in Section 5.40.

Water Pollution Control Facilities. Water pollution control facilities at the COVOL Dry-Coal Cleaning Facility consist of two sedimentation ponds and the appurtenant structures associated with them. Also, a septic system handles sanitary waste from the site office building. The sedimentation ponds and the septic system will remain intact for the next land user following operations. Site reclamation is discussed in Section 5.40.

The sedimentation ponds and appurtenant structures have been constructed as discussed in Chapter 7 and are used and maintained as discussed in Section 5.3.3.7.

5.2.7 Transportation Facilities

5.2.7.1 Road Classification

The access road that leads to the facility from Ridge Road is used to transport coal and is classified as a primary road. Interior roads at the facility are also used to transport coal and classified as primary.

5.2.7.2 Description of Transportation Facilities

No surface conveyors (other than those used to transfer and temporarily stockpile coal and byproduct) or rail systems have been or will be constructed, used, or maintained within the permit area.

Road Specifications. Cross sections and profiles of roads that are used or maintained by COVOL are provided in Figure 5-3. Information regarding road drainage is presented in Chapter 7.

The facility access road (Ridge Road) is a paved county road that extends from State Highway 10, just south of Price, Utah to U.S. Highway 191 in Wellington, Utah (a distance of approximately 7 miles).

The facility haul road encircles the facility which includes a broad area in which materials are stockpiled (see Plate 5-1). Once full operations commence and are sustained, these roads will be paved pursuant to the Utah Division of Air Quality Approval Order for the operation.

Drainageway Alterations. No alterations or relocations of natural drainageways are required within the permit area to accommodate the needs of transportation systems.

5.2.8 Handling and Disposal of Coal, Excess Spoil, and Coal Mine Waste

5.2.8.1 Coal Handling and Transportation

No coal is mined at the site. All coal is trucked to the site, where it is weighed, cleaned, temporarily stockpiled, and trucked off site to its end-use destination.

5.2.8.2 Overburden

No overburden is removed, handled, stored, or transported within the permit area.

5.2.8.3 Spoil, Coal Processing Waste, Non-Coal Waste, and Mine Development Waste

Excess Spoil. No spoil is generated at the COVOL Dry-Coal Cleaning Facility.

Coal Processing Waste. The facility will incorporate all of its "coal processing waste" into one of its end products. Hence, this material is considered a product and not a waste. The facility is operated so that all of the coal cleaning products and byproducts are marketable. This is accomplished by blending various grades of coal so that they satisfy the ash requirements of its customers. Thus, the plant will be operated without requiring permanent storage of coal processing waste.

Non-Coal Mine Waste. Non-coal waste generated in the permit area is temporarily stored in dumpsters and is regularly collected to be disposed of at the East Carbon Development Company landfill. No non-coal waste is permanently disposed of within the permit area. No non-coal waste that is defined as hazardous in 40 CFR 261 is currently generated at the facility. If such waste is generated in the future, it will be handled in accordance with the requirements of Subtitle C of the Resource Conservation and Recovery Act and any implementing regulation.

Underground Development Waste. No underground development waste is generated at the COVOL Dry-Coal Cleaning Facility.

Minimization of Acid, Toxic, and Fire Hazards. The sources of coal at the COVOL Dry-Coal Cleaning Facility are located in the Book Cliffs, Wasatch Plateau, and Emery Coal Fields, which historically have not produced acid or toxic coals. Furthermore, coal is only temporarily stored at this facility, and sediment and precipitation runoff is controlled by drainage ditches and sedimentation ponds. Thus, it is anticipated that hazards due to acid or toxic coal are minimized.

Because debris that is generated at the mine site is only temporarily stored at the facility, there is no significant potential for this debris to spontaneously combust. Fire extinguishers are kept on mobile equipment in the mine yard to extinguish any fires that may occur. No waste materials that constitute a fire hazard (i.e. grease, lubricants, paints, and flammable liquids) are accumulated where the temporary stockpiles are located.

5.2.8.4 Dams, Embankments, and Impoundments

No dams, embankments, or impoundments are used for the handling or disposal of coal, overburden, excess spoil, or coal mine waste in the permit area.

5.2.9 Management of Mine Openings

There are no mine openings at the COVOL Dry-Coal Cleaning Facility.

5.30 Operational Design Criteria and Plans

5.3.1 General

This application contains a general plan for each sedimentation pond within the permit area. No other water impoundments or coal processing waste banks, dams, or embankments exist in the permit area. Since subsidence will not occur at the site, and no underground mining has occurred beneath the site, no damage will result to facility structures due to subsidence.

5.3.2 Sediment Control

Sediment-control measures for the COVOL Dry-Coal Cleaning Facility are described in Section 7.3.2. The sedimentation structures at the facility consist of two sedimentation ponds on the southeast and southwest corners of the yard, and a system of drainage ditches that report to them. Runoff-control structures have been designed to convey runoff in a non-erosive manner.

In addition to the use of sedimentation ponds and properly designed runoff-control facilities, sediment yields in the permit area are minimized by disturbing the smallest practicable area during the construction or modification of surface facilities, and contemporaneously reclaiming areas suitable for such reclamation.

5.3.3 Impoundments

5.3.3.1 Slope Stability

Except for small berms along the crests, the sedimentation ponds are constructed below grade. Slope stability analyses are, therefore, not necessary.

5.3.3.2 Foundation Considerations

The sedimentation ponds are constructed below grade in stable, natural soil. Cross sections of the sedimentation ponds are presented in Chapter 7 of this document.

5.3.3.3 Slope Protection

The outslopes and inslopes of the sedimentation ponds are periodically inspected for signs of surface erosion. The inlets and outlets of the ponds are armored with rip rap.

5.3.3.4 Embankment Faces

Sedimentation pond inslopes will be revegetated to protect erosion. Riprap has also been placed to protect pond slopes and embankments near the discharge structures.

5.3.3.5 Highwalls

No highwalls are located within the permitted boundary.

5.3.3.6 MSHA Criteria

No sedimentation ponds in the permit area meet the size criteria of 30 CFR 216(a).

5.3.3.7 Pond Operation and Maintenance Plans

Each sedimentation pond is designed in accordance with R645-301-740. Details of these designs are presented in Chapter 7.

The sedimentation ponds are operated as containment structures, with spillways to discharge water during a storm that exceeds the design capacity. Excess water following a runoff

event is held in the ponds until the suspended sediment settles. Water then evaporates, soaks into the ground, or is decanted using a portable pump. Water that is pumped from the ponds will be used for dust suppression at the site.

Inspections of the sedimentation ponds are conducted on a quarterly basis (see Section 5.1.4.3). Maintenance that is required to keep the ponds in good working condition is performed on an as-needed basis.

Sediment is removed from the ponds when it accumulates to 60 percent of the design sediment storage volume. If coal collects in the ponds, this coal will be processed in the coal cleaning facility. Non-coal sediment will be blended with the byproduct material.

5.3.4 Roads

5.3.4.1 Location, Design, Construction, Reconstruction, Use, Maintenance, and Reclamation

Control of Damage to Public or Private Property. All roads used by COVOL were designed in accordance with applicable county and facility-use requirements. By designing according to these standards, damage to public or private property has been minimized.

Road Surfacing. The surface of the facility access road from Ridge Road to the office trailer and the haul road within the permit area is currently surfaced with gravel and is maintained to minimize ruts and pot holes (see Section 5.2.7.2). Once full operations have commenced and are sustained, all roads within the facility will be paved with an asphalt/rock chip surface. No acid- or toxic-forming materials have been or will be used in the road surfaces.

Slope Stability. There are two road embankments within the permit area. One embankment has been constructed for the truck dump hopper and one embankment has been constructed for the alternate loadout hopper. No road slope stability issues have been noted at the

site. Given the low profile of these structures and their historic stability, no slope stability analyses of road embankments are considered necessary.

5.3.4.2 Environmental Protection and Safety

Safety and environmental protection were primary concerns during the design and construction of the access road. The grade, width, and surface materials used for the roads were selected to be appropriate for the planned duration and use of the roads.

5.3.4.3 Primary Roads

The facility access road has been designed, constructed and will be maintained to meet the requirements of Utah Administrative Rules R645-301-358, R645-301-527.100, R645-301-527.230, R645-301-534.100, R645-301-534.200, R645-301-542.600, R645-301-542.600, and R645-301-762. Furthermore, the road has the following characteristics:

- It is located on a stable surface,
- It has been constructed with a sufficiently durable surface for the traffic volume and vehicle speeds on the road,
- It is routinely maintained, and
- Culverts have been designed, constructed, and are maintained to withstand the loads imparted by the vehicle traffic on the road.

5.3.5 Spoil

No spoil is generated in the permit area.

5.3.6 Coal Mine Waste

Since there is no coal mining at this facility, there is no generation of coal mine waste. The COVOL Dry-Coal Cleaning Facility has been designed to operate so that all "coal processing waste" is converted into a marketable product. Therefore, this material is considered a product, not a waste. This is accomplished by blending various grades of coal products for use at client locations. Although some of the material that is temporarily stockpiled at the site may be considered "coal processing waste," no permanent storage of this material occurs on site. Since these piles are frequently disturbed, no compaction is necessary.

5.3.7 Regraded Slopes

Reclamation of this facility will not involve significant regrading of slopes.

5.40 Reclamation Plan

5.4.1 General

5.4.1.1 Commitment

Upon the permanent cessation of operations at the COVOL Dry-Coal Cleaning Facility, COVOL will reclaim the site so that it is compatible with future industrial uses for which the property is zoned. This will include removal of any remnants of coal stockpiles, coal residue, and coal processing structures and equipment. Stockpiled topsoil will be redistributed over the areas not intended for re-disturbance by the future site owner and these areas will be revegetated using the approved seed mix. Since future uses of the property are expected to benefit from existing site improvements, much of the site, including roads, parking areas, utilities, fencing, drainage control structures, and the septic system will be left in place.

5.4.1.2 Surface Coal Mining and Reclamation Activities

No surface coal mining and reclamation activities will be conducted in the permit area.

5.4.1.3 Underground Coal Mining and Reclamation Activities

No underground coal mining and reclamation activities will be conducted in the permit area.

5.4.1.4 Environmental Protection Performance Standards

The plan presented herein is designed to meet the requirements of R645-301 and the environmental protection performance standards of the State Program.

5.4.2 Narratives, Maps, and Plans

5.4.2.1 Reclamation Timetable

A timetable for the completion of each major step in the reclamation plan is presented in Table 5-2.

5.4.2.2 Plan for Backfilling, Soil Stabilization, Compacting, and Grading

Since reclamation is intended to restore the site for future industrial use, no significant backfilling, soil stabilization, compacting, or grading will occur. Any residual coal and remaining coal piles will be removed and either sold as a product or properly disposed of. It is anticipated that the volume of materials to be removed will not exceed 1,500 cubic yards. After the coal processing equipment is removed, stockpiled topsoil will be redistributed over the disturbed areas not intended for re-disturbance by the future site owner and these areas will be revegetated using the approved seed mix. The sedimentation ponds and appurtenant ditches will be left in place for the next landowner.

5.4.2.3 Final Surface Configuration Maps and Cross Sections

It is intended that the final surface configuration will be very similar to the current site. The site office and processing structures will be removed. However, no extensive site regrading is anticipated.

5.4.2.4 Removal of Temporary Structures

Coal processing equipment and structures will be removed during reclamation. To the extent possible, these structures and facilities will be salvaged. Those materials requiring off-site disposal will be placed in a licensed landfill. Final decisions regarding salvage or disposal of structures and equipment will be made just prior to reclamation following an assessment of the salvageability of the structures and equipment.

To support the continuing industrial use of the site, several structures will be left in place. These structures include the following:

- Septic system,
- Roads and parking areas,
- Truck dump and loadout hopper embankments,
- Diversions, culverts, and sedimentation ponds, and
- Perimeter fence

5.4.2.5 Removal of Sedimentation Ponds

The sedimentation ponds will be left in place for the future landowner.

5.4.2.6 Roads

All roads and parking areas within the permit area will be left in place for the future landowner.

5.4.2.7 Final Abandonment of Mine Openings and Disposal Areas

There are no mine openings or disposal areas within the permit area.

5.4.2.8 Estimated Cost of Reclamation

The estimated cost to reclaim the COVOL Dry-Coal Cleaning Facility is provided in Chapter 8.

5.50 Reclamation Design Criteria and Plans

5.5.1 Casing and Sealing of Underground Openings

There are no underground openings within the permit area.

5.5.2 Permanent Features

5.5.2.1 Small Depressions

Site reclamation will be performed to restore the facility for future industrial use. Roads and diversions will be left in place. Due to the low slope angles present at the site and the presence of roads and diversions to intercept surface runoff, small depressions will not be necessary.

5.5.2.2 Permanent Impoundments

No permanent coal or coal waste impoundments exist within the permitted boundary. The two sedimentation ponds will be left intact for the future landowner.

5.5.3 Backfilling and Grading

Plans for backfilling and grading of the site upon reclamation have been presented in Section 5.4.2.2. This plan was designed to comply with the applicable requirements of R645-301-500 and R645-301-700. As indicated in Section 5.4.2.2, backfilling and grading operations will be conducted in a controlled manner.

5.5.3.1 Disturbed Area Backfilling and Grading

Approximate Original Contour. The disturbed area will not be significantly altered from the approximate original contour.

Elimination of Highwalls, Spoil Piles, and Depressions. No highwalls or spoil piles exist at the site. Two depressions that serve as sedimentation ponds will be left intact for the future landowner.

Slope Stability. No slopes exist within the permitted boundary that will require regrading.

Erosion and Water Pollution. Existing sediment-control structures will be left in place to minimize water pollution and erosion. Additional water-quality concerns do not exist at the site (see Chapter 7).

Post-Mining Land Use. The disturbed area will be backfilled and regraded in a manner that supports the post-mining industrial land use.

5.5.3.2 Spoil and Waste

Spoil. No spoil is generated within the permit area.

Refuse Piles. No refuse piles exist within the permit area.

Coal Processing Waste. Coal processing waste within the permit area is blended so that it can be sold for offsite uses. It is possible that small quantities (less than 1,500 yd^3) of coal processing waste will be present during reclamation. If so, this waste will either be sold as a byproduct or properly disposed of at an offsite location.

5.5.3.3 Exposed Coal Seams, Acid- and Toxic-Forming Materials, and Combustible Materials

Exposed Coal Seams. No coal seams will be exposed as part of this operation.

Acid- and Toxic-Forming Materials. No acid-forming materials exist at the site.

Combustible Materials. No combustible materials will be exposed as part of coal cleaning operations. All combustible materials that are used or produced during operations will be disposed of off site at a proper disposal facility.

5.5.3.4 Cut-and-Fill Terraces

No cut and fill terraces are present at the facility.

5.5.3.5 Highwalls From Previously Mined Areas

No highwalls exist within the permit area.

5.5.3.6 Approximate Original Contour

The facility has been constructed in a relatively flat area, part of which was previously used for industrial purposes. Only minor alterations have been made to the original contour to level the site and to achieve proper drainage of storm water runoff. Since the site remains relatively level, the existing contour approximates the original contour. In addition, the site will be used for industrial purposes following reclamation of the facility; therefore, no substantial regrading of the site is needed during reclamation.

5.5.3.7 Backfilling and Grading - Thin Overburden

No surface coal mining and reclamation activities involving thin overburden occur within the permit area.

5.5.3.8 Backfilling and Grading - Thick Overburden

No surface coal mining and reclamation activities involving thick overburden occur within the permit area.

5.5.3.9 Regrading of Settled and Revegetated Fills

No regrading of settled and revegetated fills is anticipated in the permit area.

5.60 Performance Standards

Coal mining and reclamation operations at the COVOL Dry-Coal Cleaning Facility will be conducted in accordance with the approved permit and the requirements of R645-301-510 through R645-301-553.

TABLE 5-1

Permit Area Structures

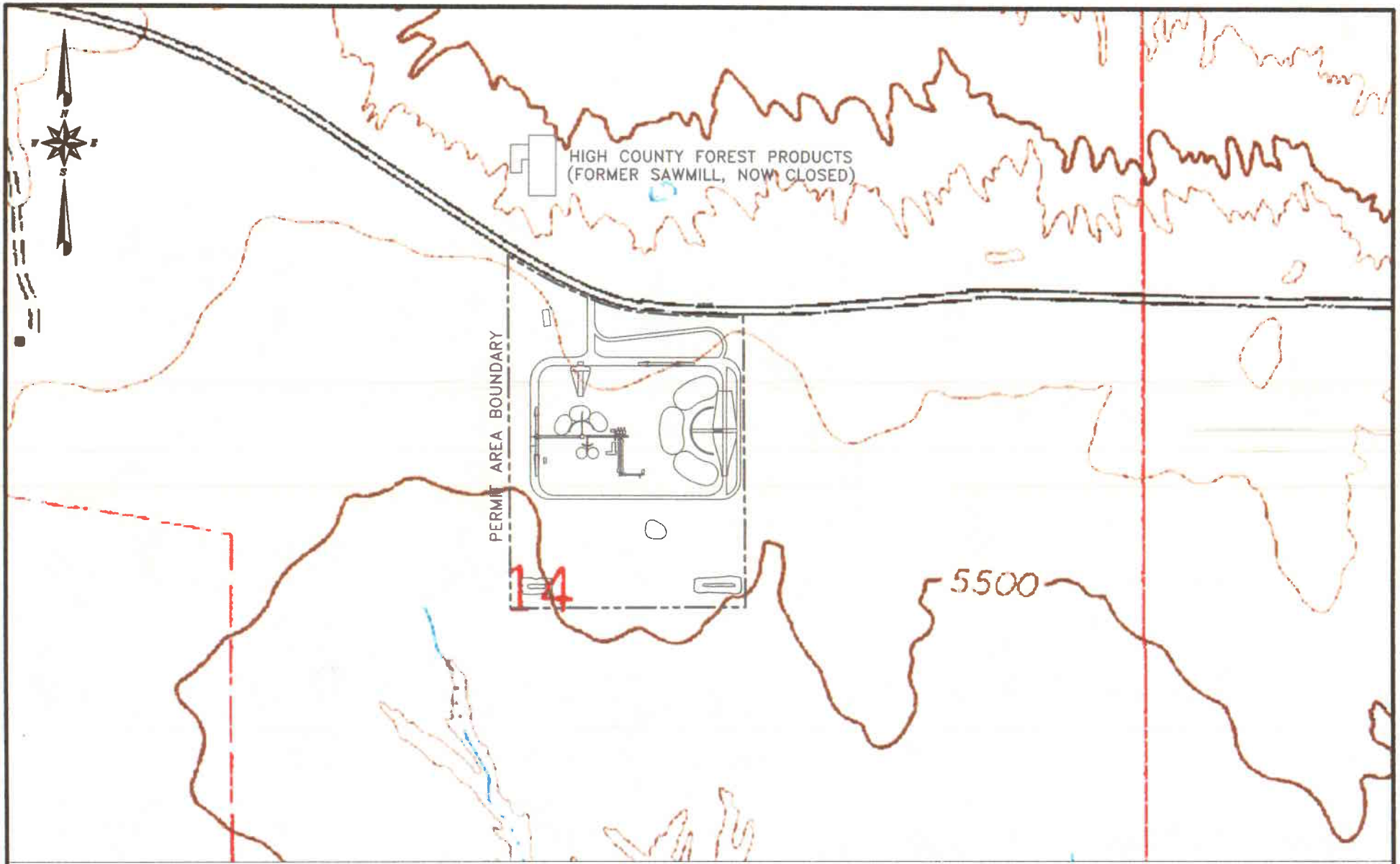
Structure[a]
Truck Scale (TS-1)
Truck Scale (TS-2)
Truck Dump Hopper
Blending Hopper
Plant Feed Hopper
Alternate Truck Loading Hopper
Radial Stacker Feed Conveyor (C-01)
Plant Feeder Conveyor (C-02)
Screen Feed Conveyor (C-03)
Fines Feed Conveyor (C-04)
Coarse Feed Conveyor (C-05)
By-Product Conveyor (C-06)
Product Conveyor (C-07)
200 Ton Bin Feed Conveyor
Self-Cleaning Belt Magnet
Screen with Support Structure
Crusher with Support Structure
Air Jigs with Fans and Support Structure
Bag Houses with Fans
Collected Dust Transport System
Raw Feed Radial Stacker (RS-01)
Product Radial Stacker (RS-02)
By-Product Radial Stacker (RS-03)
Diverter Gate
200 Ton Bin
Loading Chutes with Flow Control Gates

[a] See Plate 5-1 for location within the facility

TABLE 5-2

Revegetation Timetable

Activity	Approximate Time
Stockpile residual coal-bearing materials on site	½ week
Process residual coal-bearing materials in facility	2 weeks
Remove coal and process byproduct	½ week
Remove coal-processing equipment • Conveyors C-1 through C-8 • Radial stackers RS-1 through RS-3 • Air jig/baghouse • Crusher • Truck dump • Silo • Plant feed hopper • Alternate loadout hopper • Truck scales TS-1 and TS-2	4 weeks
Remove remaining structures to be retained	1 week
Grade minor areas and spread topsoil	½ week
Revegetate regraded areas	½ week
APPROXIMATE TOTAL TIME	9 weeks



BASE MAP: 7.5' USGS QUADRANGLE
PRICE, UTAH 1972

FIGURE 5-1. BUILDINGS IN AND WITHIN 1000 FEET OF PERMIT AREA

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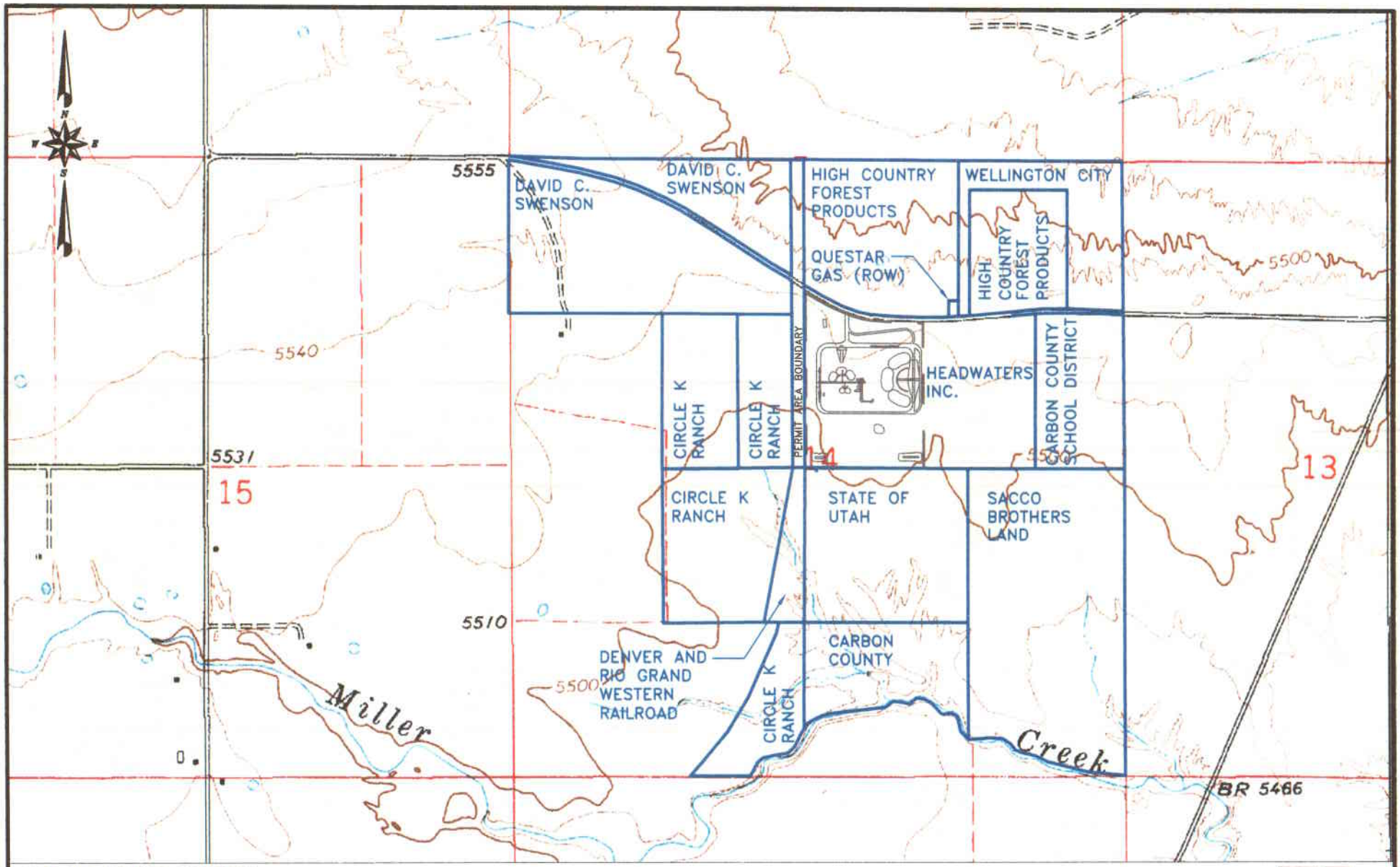

BASE MAP: 7.5' USGS QUADRANGLE
PRICE, UTAH 1972

OWNERSHIP: INFORMATION TAKEN FROM THE CARBON COUNTY GEOGRAPHIC INFORMATION SYSTEM

0' 1200'

FIGURE 5-2. LAND OWNERSHIP

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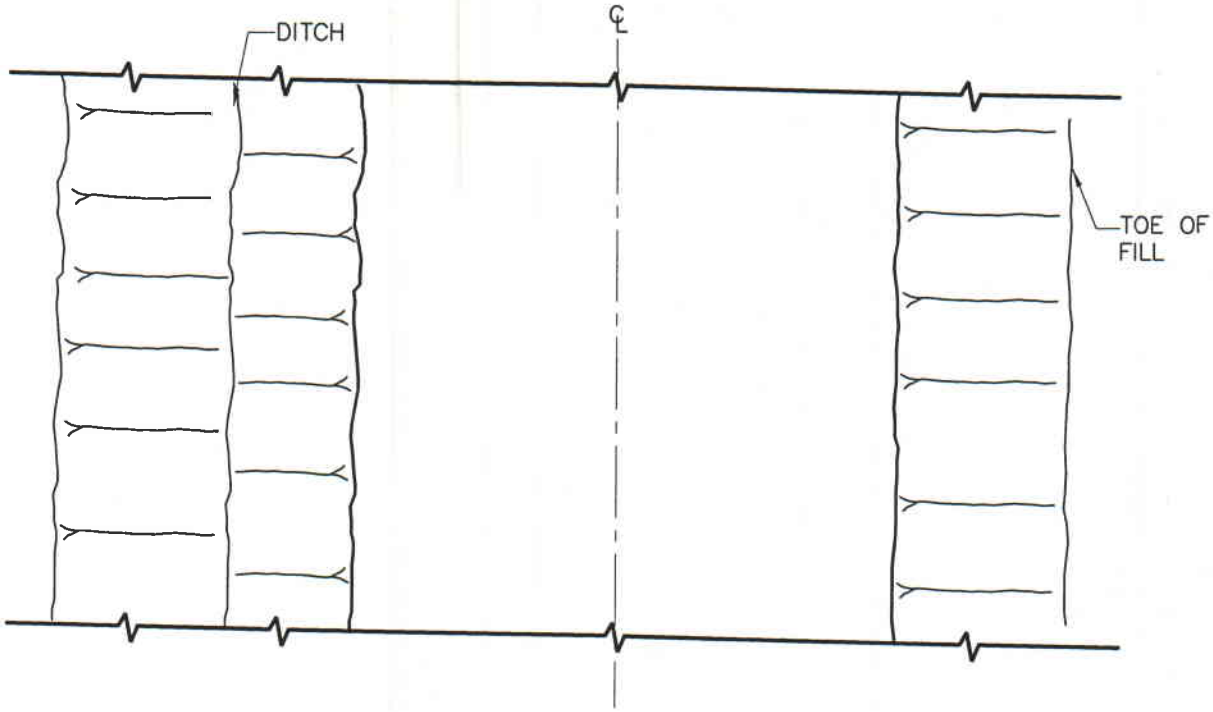
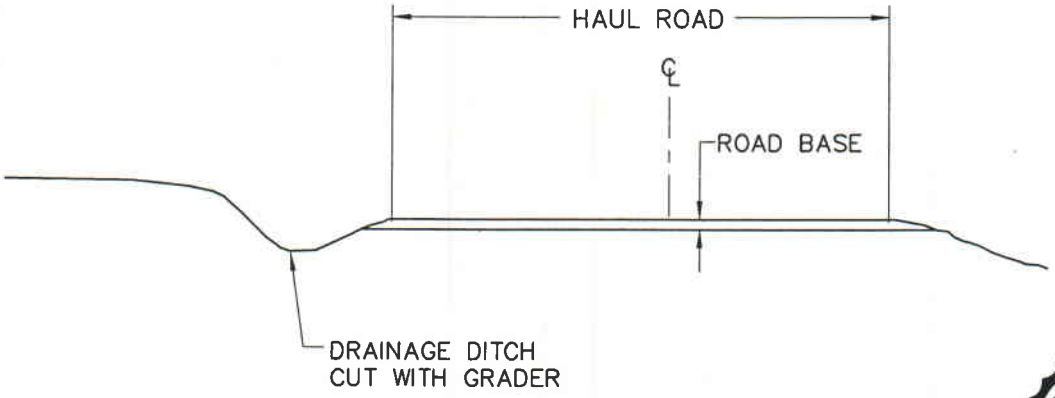


PLAN VIEW
NTS



SECTION
NTS

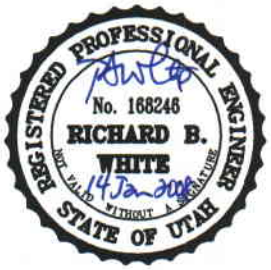


FIGURE 5–3. STANDARD ROAD CROSS–SECTION

EarthFax

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APPENDIX 5-1

Road Certification

EarthFax

EarthFax
Engineering, Inc.
Engineers/Scientists
7324 So. Union Park Ave.
Suite 100
Midvale, Utah 84047
Telephone 801-561-1555
Fax 801-561-1861
www.earthfax.com

January 14, 2008

Ms. Gina Rau
Environmental Manager
COVOL Engineered Fuels, LC
10653 South River Front Parkway, Suite 300
South Jordan, Utah 84095

Subject: Wellington Dry-Coal Cleaning Facility
Road Certification

Dear Ms. Rau:

I have examined the roadways associated with the Wellington Dry-Coal Cleaning Facility of COVOL Engineered Fuels. Based on my field evaluation and understanding of operations at the site, it is my opinion that the roadways, as constructed, provide adequate environmental protection and safety appropriate for their planned life and use. If the type and size of equipment that is typically used at the site is operated in a safe manner, it is my opinion that the roadway grades, widths, and surface materials will adequately serve the facility's needs.

It is further my opinion that the roadways have been constructed to provide adequate drainage control through the use of ditches and culverts. I have reviewed the hydrologic calculations associated with these structures and believe that their design is sufficient to pass the peak runoff safely from the 100-year, 6-hour precipitation event.

Based on my review, I hereby certify that the roads meet the requirements of R645-301-534.200 and R645-301-742.420.

Please contact me if you have any questions.

Sincerely,

Richard B. White, P.E.
President
EarthFax Engineering, Inc.

REGISTERED PROFESSIONAL ENGINEER
No. 168246
RICHARD B. WHITE
14 Jan 2008
STATE OF UTAH

CHAPTER 6
GEOLOGY

6.10 Introduction

This chapter presents a description of the geologic resources in the area of the COVOL Dry-Coal Cleaning Facility. Since no coal is being mined and no exploration activities are being conducted in the permit area, this chapter includes only general geologic information compiled from previously published documents.

6.1.1 General Requirements

The geologic resources in the COVOL Dry-Coal Cleaning Facility area are discussed in Sections 6.2.1 through 6.2.7 of this chapter.

6.1.2 Certification

All maps, plans, and cross-sections presented in this chapter, as required by the Utah Administrative Rules, have been certified by a professional engineer.

6.20 Environmental Description

This section presents a description of the geologic resources in the area of the COVOL Dry-Coal Cleaning Facility.

6.2.1 General Requirements

This section presents information concerning the regional and site-specific geology of the COVOL Dry-Coal Cleaning Facility area.

6.2.2 Cross Sections, Maps and Plans

Figure 6-1 presents a map and generalized stratigraphic section of the geology of the site area. Since there is no coal mining or exploration at the site, coal seam data such as outcrop lines, bedding plane orientations, and drillhole information are not shown.

No oil, gas, or water wells are known to exist within a quarter mile of the permit area.

6.2.3 Geologic Determinations

Since there is no mining at the site, no information has been provided concerning the acid or toxic forming characteristics of the site strata. The geologic information required by DOGM to make a determination as to whether the reclamation plan can be accomplished is presented in Section 6.2.4. Since no mining will occur at the site, no subsidence control program has been prepared.

6.2.4 Geologic Information

6.2.4.1 Regional Setting

The COVOL Dry-Coal Cleaning Facility is located in Castle Valley, about 3.5 miles west of the town of Wellington, Utah. Castle Valley is bordered on the north and east by the Book Cliffs, on the south by the San Rafael Swell, and on the west by the Wasatch Plateau. Castle Valley is a

broad plain dissected by several drainages. Elevations in Castle Valley range from about 5,300 feet in the drainage bottoms to about 6,300 feet near the foot of the Wasatch Plateau.

Stratigraphy. All rock units in the vicinity of the COVOL Dry-Coal Cleaning Facility are sedimentary (Figure 6-1). No igneous or metamorphic units are found in the area. The surficial strata in the area consist of the Mancos Shale, which was deposited during the Upper Cretaceous Age of the Mesozoic Era. The depositional history of this formation consisted of three marine transgressions (represented as shale in the rock record) separated by two major marine regressions (represented as sandstone deltaic deposits in the rock record – see Maxfield, 1976).

The COVOL Dry-Coal Cleaning Facility is constructed primarily on Quaternary slope wash and weathered material from the Blue Gate Shale Member of the Mancos Shale (Weiss et al., 1990). The Blue Gate Shale Member is underlain by the Ferron Sandstone Member at a depth of approximately 700 feet beneath the site, as indicated from a well log from a nearby gas production well (DOGM, 2007). A brief description of the geologic units that underlie the permit area is included below.

According to Weiss et al. (1990), Quaternary slope wash deposits in the area consist of light- to dark-gray, unconsolidated to weakly cemented, thin- to thick-bedded, and faintly cross-bedded detritus that form broad, gently sloping sheets. Clast sizes include clay, silt, sand, granules, and some pebbles. This unit ranges up to 25 feet thick.

The Blue Gate Member of the Mancos Shale consists of light bluish gray and gray thin- to medium-bedded shale and shaly siltstone with a few thin interlayered sandstone beds. This unit is relatively impermeable and contains a high gypsum content. It is up to 2,000 feet thick in the region, but is estimated to be approximately 700 feet thick beneath the permit area, as indicated above.

The Ferron Sandstone Member of the Mancos Shale consists of an upper and a lower sandstone unit separated by a middle unit of shale. It is estimated that the unit is approximately 55 feet thick beneath the permit area. The sandstones are typically light brown, thin- and even-bedded, cross-bedded, very fine grained to fine-grained sandstone and contain many large rounded concretions. The middle shale unit is light- to dark-gray, thin-to medium-bedded, even-bedded shale and shaly siltstone.

Structure. Stratigraphic units in the area dip 3 to 6 degrees to the northwest (Maxfield, 1976). There are no major faults in the vicinity of the permit area (Weiss et al., 1990).

Geomorphology. Castle Valley is described as a crescent-shaped series of interconnected lowlands along the northern and western border of the San Rafael Swell (Weiss et al., 1990). There is relatively little topographic relief in this lowland, but several erosional remnant pediment surfaces exist up to a few hundred feet above the surrounding topography. These pediment surfaces are capped by sandstone and limestone boulders and gravels derived from the Book Cliffs, and range up to dozens of feet in thickness.

Surface and Groundwater Impact. Surface and groundwater impacts are discussed in Chapter 7 of this document.

Coal Geology. No coal will be extracted by this operation. No coal-bearing units are known to exist at the site.

6.2.4.2 Test Boring and Drillhole Data (overburden removed)

No mining or coal exploration will occur in the permit area.

6.2.4.3 Test Boring and Drillhole Data (overburden not removed)

No mining or coal exploration will occur in the permit area.

6.2.5 Additional Geologic Information

It is not anticipated that any additional geologic data will need to be collected for this site.

6.2.6 Sampling Waivers

COVOL does not request a sampling waiver for this site.

6.2.7 Description of the Overburden Thickness and Lithology

No mining or coal exploration will occur in the permit area.

6.30 Operation Plan

6.3.1 Casing and Sealing of Exploration Holes

No exploration holes will be drilled in the permit area.

6.3.2 Subsidence Monitoring

Since there will be no mining or exploration at this facility, subsidence will not occur as a result of facility operations. Therefore, a subsidence monitoring program is not required.

6.40 Performance Standards

6.4.1 Exploration and Drillholes

No coal exploration will occur in the permit area.

6.4.2 Monuments and Surface Markers of Subsidence Monitoring Points

Since there will be no mining or exploration at this facility, subsidence will not occur as a result of existing facility operations. Therefore, no subsidence monuments or surface markers are required.

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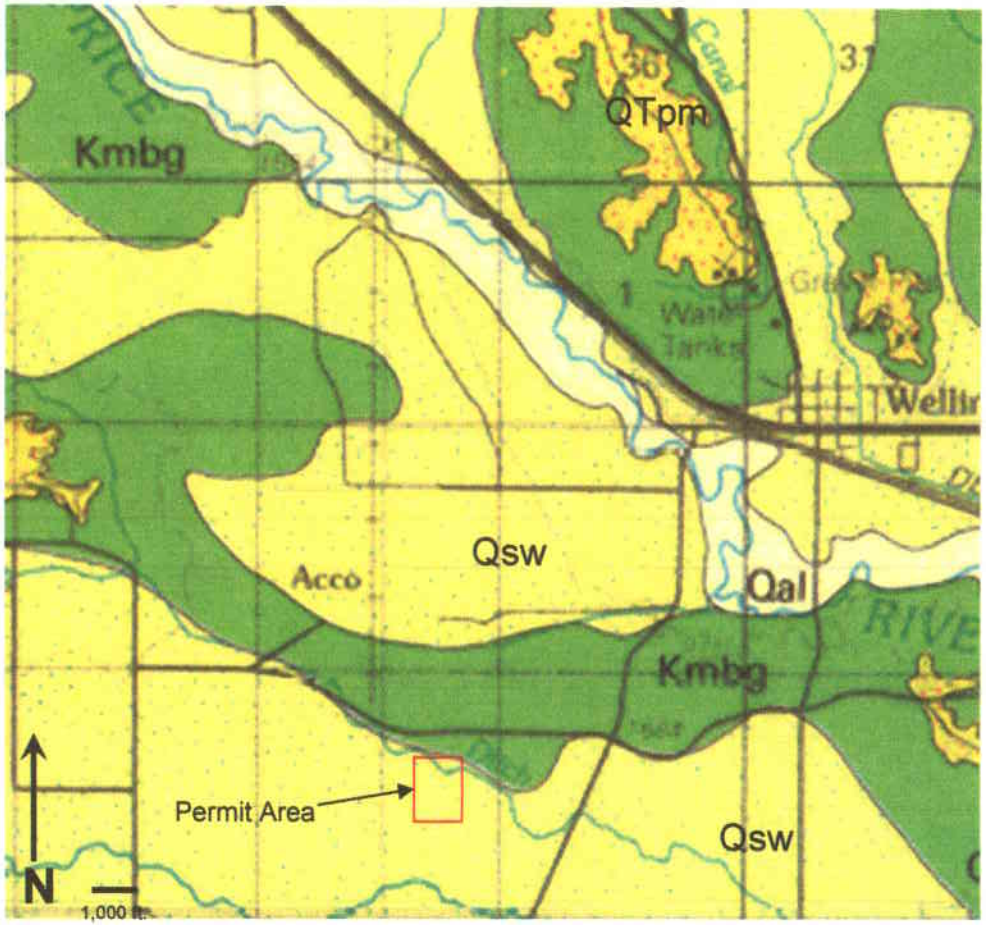


Adapted from Geologic Map of the Price 30'X60'Quadrangle, Carbon, Duchesne, Uintah, Utah, and Wasatch Counties, Utah. By Malcolm P. Weiss et al., 1990. USGS Misc. Invest. Series Map I-1981. 1:100,000 scale

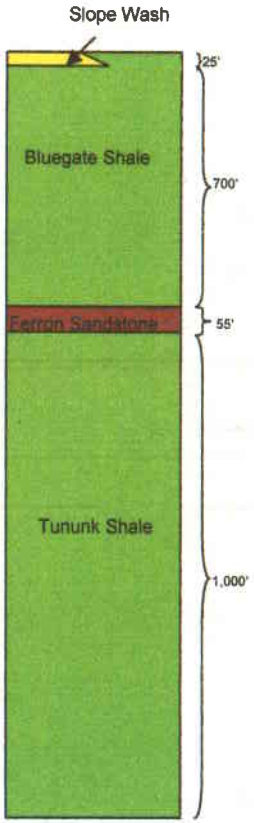
LEGEND

Qsw: Slope-wash deposits (Quaternary) – Light to dark- gray, unconsolidated to weakly cemented, thin- to thick-bedded faintly crossbedded detritus. Consists of clay, silt, sand, granules, and some pebbles. Forms broad, gently sloping sheets. Thicknesses range from a thin veneer to as much as 25 ft.

QTpm: Pediment mantle (Holocene to Miocene?) – Light-brown to brown, gray, or locally reddish brown, unconsolidated to well-cemented sediments of fluvial origin. Consists of a poorly bedded mixture of silt, sand, granules, pebbles, cobbles, and boulders. Chiefly siltstone and sandstone clasts. Unit ranges from about 10 ft to more than 150 ft thick.

Qal: Alluvium (Quaternary) – Dark brown to gray, thin to thick bedded, locally massive, crossbedded in places. Unconsolidated. Consists of clay, silt, sand, pebbles, and sparse cobbles of fluvial origin. Forms narrow to broad deposits. Thickness ranges widely, generally less than 50 ft.

Kmbg: Bluegate Member of Mancos Shale – Light-bluish-gray and gray, thin- to medium-bedded shale and shaly siltstone. Sparse interlayered thin sandstone beds. Up to 2,000 feet thick in some areas. Approx. 700 ft thick beneath the permit area.



Generalized Geologic Cross Section of Permit Area

EarthFax

FIGURE 6-1. AREA GEOLOGIC MAP AND STRATIGRAPHIC SECTION

CHAPTER 7
HYDROLOGY

7.10 Introduction

7.1.1 General Requirements

This chapter presents a description of:

- Existing hydrologic resources within the permit and adjacent areas;
- Proposed operations and the potential impacts to the hydrologic balance;
- Methods of compliance with design criteria;
- Applicable hydrologic performance standards; and
- Hydrologic reclamation plans for the COVOL Dry-Coal Cleaning Facility.

7.1.2 Certification

All appropriate maps, plans, and cross sections presented in this chapter have been certified by a qualified, registered professional engineer.

7.1.3 Inspection

Impoundments associated with the mining and reclamation operations will be inspected as described in Section 5.1.4.3 of this document.

7.20 Environmental Description

7.2.1 General Requirements

This section presents a description of the pre-operational hydrologic resources within the permit and adjacent areas that may be affected or impacted by the operation and reclamation of the facility and site.

7.2.2 Cross Sections and Maps

7.2.2.1 Location and Extent of Subsurface Water

Based on published information and logs of nearby wells, groundwater is potentially located in both shallow, perched Quaternary unconsolidated deposits above bedrock and in the Ferron Sandstone Member of the Mancos Shale, which is approximately 700 feet below the ground surface at the permit area. These two potential water-bearing units are separated by the Bluegate Shale Member of the Mancos Shale, which is highly impermeable. A generalized hydrostratigraphic cross section of the permit and adjacent areas is presented in Figure 7-1.

Shallow, perched groundwater may occur in the area in disconnected, unconsolidated materials that overly relatively impermeable bedrock. The primary sources of recharge to these layers are precipitation, infiltration from losing reaches of streams, irrigation, and groundwater discharge from bedrock. These water-bearing units generally range in thickness from a few feet to up to several tens of feet. Groundwater in these units generally contains high total dissolved solids ("TDS") concentrations (Gloyn et al., 2003). Groundwater monitoring wells and a French drain installed at the Savage Coal Terminal, located approximately 0.25 miles north of the COVOL Dry-Coal Cleaning Facility, were constructed from 6 to 20 feet deep into this these materials. Water samples from these wells often contain over 2,000 mg/L TDS (Savage Services Corporation, 1983).

The Ferron Sandstone consists of very fine-grained, silty sandstone with abundant interbedded carbonaceous shale. It is located about 700 feet below the ground surface of the permit area, and is approximately 80 feet thick in the region (Gloyn et al, 2003). A coal-bed methane well constructed in Township 14S Range 10E, SLBM (one township north of the permit area) and completed in the Ferron Sandstone contained 6,500 to 9,000 mg/L TDS (Gloyn et al, 2003). Another well drilled into the Ferron Sandstone about 0.3 miles north of the coal cleaning facility did not encounter any groundwater (source: DOGM Oil and Gas Well Database).

7.2.2.2 Location of Surface Water Bodies

A map showing the location of surface water bodies in the area, including the only nearby water right, is provided in Figure 7-2. A listing of water rights data is presented in Appendix 7-1. The only water right filed in the vicinity of the facility is for stock watering on Miller Creek. This map also shows the locations of the facility sedimentation ponds, which are the only permitted discharge locations at the site.

7.2.2.3 Locations of Monitoring Stations

No surface or groundwater monitoring stations have been installed for this facility. Groundwater resources are not used at or near the site, and it is unlikely that they are impacted by activities within the permit area. The shallow Quaternary sediments beneath the site are not beneficially used and likely contain poor quality water. The facility uses municipal water and site runoff is controlled in accordance with the R645 rules and a Storm Water Pollution Prevention Plan. There are no perennial water bodies within the permit or adjacent areas.

7.2.2.4 Location and Depth of Water Wells

No water-supply wells or groundwater monitoring wells exist in the permit or adjacent areas.

7.2.2.5 Surface Topography

Surface topographic features in the permit and adjacent areas are shown on Plate 5-1. Note that, other than the sedimentation ponds, the topography shown on this map was surveyed prior to site grading at the facility. The size and locations of the sedimentation ponds are based on a survey performed by EIS Environmental and Engineering Consulting (EIS, 2007) and superimposed on the pre-existing topography. The site is relatively flat and only minor site regrading was performed to facilitate the drainage of storm water runoff. Since the existing site contours approximate the original site contours and the sedimentation ponds have a great deal of extra capacity, the hydrology calculations discussed in this chapter should adequately represent site conditions.

7.2.3 Sampling and Analysis

In accordance with the agreement between COVOL and DOGM, no groundwater sampling has been conducted at this facility.

7.2.4 Baseline Information

Surface water, groundwater, and climatic resource information is presented in this section to assist in determining the baseline hydrologic conditions which exist in the area of the facility. This information provides background data on the hydrologic balance of the area.

7.2.4.1 Groundwater Information

A brief discussion of groundwater information is included in section 7.2.2.1 of this document. Groundwater in the vicinity of the COVOL Dry-Coal Cleaning facility has been found in localized shallow, perched zones within unconsolidated surficial materials weathered from the Bluegate Shale and within the Ferron Sandstone. Based on the findings from groundwater monitoring wells drilled for the nearby Savage Coal Terminal, shallow groundwater is saline,

contains high levels of dissolved solids, and is generally poorly suited for drinking or irrigation (Savage Services Corporation, 1983).

7.2.4.2 Surface Water Information

The COVOL Dry-Coal Cleaning Facility is located on land that drains to the south toward Miller Creek. Drainage occurs as overland flow or in ephemeral washes that flow in direct response to precipitation events. Miller Creek is a small perennial stream that feeds into the Price River in Wellington, Utah. The Price River is a tributary of the Green River. Stream gage data collected from 1972 to 1986 shows that the average annual flow volume of the Price River just below its confluence with Miller Creek is 105,565 acre-feet (Utah Division of Water Resources, 2000). No historical stream gage data exists for Miller Creek.

As part of the UPDES permit, water samples will be collected from the sedimentation ponds before any impounded water is released. A copy of the UPDES Permit is included in Appendix 7-2. Published water quality data for the Price River show a decrease in water quality as it flows from the Wasatch Plateau toward the Green River. This decrease is attributed to the presence of soluble minerals in the surrounding rocks (principally the Mancos Shale), saline soils, and irrigation return flows (Savage Services Corporation, 1983). Typical TDS values are 400 mg/L in the upper reaches of the Price River, 600 to 2,400 mg/L near Wellington, and 2,000 to 4,000 mg/L at Woodside, which is several miles downstream (Savage Services Corporation, 1983).

7.2.4.3 Geologic Information

Geologic information related to the permit and adjacent areas is presented in Chapter 6 of this document.

7.2.4.4 Climatological Information

Based on regional data collected from June 1980 to January 2005, normal annual precipitation at the permit area is about 9.2 inches per year. Most of this precipitation occurs during July through September as a result of summer thunderstorms (Western Regional Climate Center - http://www.wrcc.dri.edu/index.html).

The station closest to the facility that reports wind data is located at the airport at Price, Utah (approximately 5 miles west of the facility). The average annual wind speed at this location between 1996 and 2006 was 6.8 mph (Western Regional Climate Center web site).

The normal annual temperature at the Price Warehouses, Utah station (located 5 miles west of the facility) is 49.9° F. Seasonally, this temperature varies from a normal monthly low of 13.4° F in January to a normal monthly high of 90.0° F in July (Western Regional Climate Center web site).

7.2.4.5 Supplemental Information

No supplemental information is required at this time.

7.2.4.6 Survey of Renewable Resource Lands

The existence and recharge of aquifers in the permit and adjacent areas is discussed in Sections 7.2.2.1 and 7.2.4.1 of this document.

7.2.4.7 Alluvial Valley Floor Requirements

Information regarding the presence or absence of alluvial valley floors in the permit and adjacent areas is presented in Chapter 9 of this document.

7.2.5 Baseline Cumulative Impact Area Information

Since the hydrologic impact of the operations will be insignificant, no revisions are needed to the Cumulative Hydrologic Impact Assessment of the area.

7.2.6 Modeling

No numerical groundwater or surface water modeling was conducted in support of this document.

7.2.7 Alternative Water Source Information

No surface mining has been or will be conducted in the permit and adjacent areas. Therefore, this section does not apply to the COVOL Dry-Coal Cleaning Facility.

7.2.8 Probable Hydrologic Consequences

This section addresses the probable hydrologic consequences of coal cleaning and reclamation operations in the permit and adjacent areas. Mitigating measures are discussed generally in this section and as well as in Section 7.3 of this document.

7.2.8.1 Potential Impacts to Surface and Groundwater

Potential impacts of coal cleaning on the quality and quantity of surface and groundwater flow are discussed in the facility's Storm Water Pollution and Prevention Plan and may include the following:

- Coal fines, equipment fuels and fluids from the truck dump and coal storage area;
- Equipment fuels and fluids from the front end loader;

- Coal fines and lubricant from the conveyor belt; and
- Coal fines and lubricant from the silo.

A copy of the SWP3 is included in Appendix 7-3. These potential impacts are addressed in the following sections of this document.

7.2.8.2 Baseline Hydrologic and Geologic Information

Baseline geologic information is presented in Chapter 6 of this document. Baseline hydrologic information is presented in Sections 7.2.4.1 and 7.2.4.2 of this document.

7.2.8.3 PHC Determination

Potential Impacts to the Hydrologic Balance. Potential impacts to the hydrologic balance are addressed in the following subsections of this document.

Acid- or Toxic- Forming Materials. No acid- or toxic-forming materials are present at the COVOL Dry-Coal Cleaning Facility.

Sediment Yield. The potential impact of mining and reclamation on sediment yield is an increase in sediment in the surface waters downstream from disturbed areas. Sediment-control measures (such as sedimentation ponds, drainage ditches, etc.) have been designed and constructed to minimize this impact. All runoff from the facility is directed toward one of two on-site sedimentation ponds that allow for sediment to settle. The ponds contain spillways to control discharge in the unlikely event that the ponds overflow. All runoff controls are regularly inspected (see Section 5.1.4) and maintained. The facility operates under UPDES Permit UTR000685, and also has a Storm Water Pollution Prevention Plan and a Spill Prevention Control and Countermeasure Plan. Copies of these permits are attached in Appendices 7-2, 7-3, and 7-4 respectively.

Acidity, Total Suspended Solids, and Total Dissolved Solids. Probable impacts of operations on the acidity and total suspended solids concentrations of surface and groundwater in the permit and adjacent areas were addressed previously in this section.

Flooding or Streamflow Alteration. The disturbed area is isolated from surrounding areas by runoff control structures such as earthen berms, diversion ditches, and sedimentation ponds. Runoff from all disturbed areas flows to sedimentation ponds prior to discharge to adjacent undisturbed drainages. Since there will be no mining or exploration at this site, there will be no impact on flooding or stream flows due to subsidence.

Groundwater and Surface Water Availability. Runoff controls at the site will minimize impacts to adjacent surface resources. As noted in Section 7.2.4.2, impacts to groundwater are also considered to be insignificant due to a combination of limited groundwater resources, poor groundwater quality, and relatively impermeable geologic materials at the site. Furthermore, the coal cleaning facility uses limited amounts of water, thereby further minimizing potential adverse impacts to surface and groundwater.

Potential Hydrocarbon Contamination. Diesel fuel, oils, greases, and other hydrocarbon products are stored and used at the site for a variety of purposes. Diesel is stored in an above-ground tank that is provided with secondary containment. Spills onto the ground have the potential to occur during filling of the storage tank or filling of mobile equipment. Similarly, spills from drums containing greases and other oils may potentially occur during use at the site.

The probable future extent of the contamination caused by diesel and oil spillage is expected to be small for four reasons. First, all tanks and drums are stored in secondary containment structures that prevent leaks from reaching the ground. Second, spills caused by filling operations outside of the secondary containment structures will be minimized due to the economic value of the product. Third, because the tanks and drums are located above ground, leakage from

the tanks can be readily detected and repaired. Finally, the Spill Prevention Control and Countermeasure Plan included in Appendix 7-4 mandates inspection, training, and operational measures to minimize the extent of contamination resulting from the use of hydrocarbons at the site.

Road Salting. No salting of the haul road occurs within the permit area. Hence, no impact will result from this action in the permit or adjacent areas.

Coal Haulage. Coal is hauled on the haul road within the permit area. Coal spillage will be promptly picked up. In addition to spills, wind may carry coal dust or small pieces of coal away from the open top of coal trucks. The impact from fugitive coal dust is considered to be insignificant due to the fugitive dust control measures implemented at the site.

7.2.9 Cumulative Hydrologic Impact Assessment (CHIA)

Information is provided in this application that will allow DOGM to update a Cumulative Hydrologic Impact Assessment if necessary.

7.30 Operation Plan

7.3.1 General Requirements

This permit application includes an operation plan which addresses the following:

- Groundwater and Surface Water Protection and Monitoring Plan
- Design Criteria and Plans
- Performance Standards
- Reclamation Plan.

7.3.1.1 Hydrologic-Balance Protection

Groundwater Protection. No acid or toxic materials are disposed of at the site. COVOL will manage operations to prevent or control discharges of pollutants to the groundwater.

Surface Water Protection. A runoff control plan has been implemented to minimize, to the extent possible, additional contributions of suspended solids to streamflow outside the permit area, and otherwise prevent water pollution. COVOL will maintain adequate runoff- and sediment-control facilities to protect local surface waters.

7.3.1.2 Water Monitoring

Groundwater Monitoring. No groundwater monitoring is conducted at this facility.

Surface Water Monitoring. No streams exist within permit or adjacent areas. Therefore, only storm water will be monitored. Surface water monitoring is conducted in the permit and adjacent areas in accordance with the requirements of the UPDES permit.

7.3.1.3 Acid- and Toxic-Forming Materials

Acid- and toxic-forming materials are not permanently stored at the COVOL Dry-Coal Cleaning Facility. In the event that acid- or toxic-forming materials are brought to the facility, they will be handled appropriately.

7.3.1.4 Transfer of Wells

No wells exist at the facility.

7.3.1.5 Discharges

Two UPDES discharges are associated with the COVOL Dry-Coal Cleaning Facility – one for each sedimentation pond.

7.3.1.6 Stream Buffer Zones

The facility is not located within 100 feet of any perennial or intermittent stream channels. Thus, no buffer zones have been designated.

7.3.1.7 Cross Sections and Maps

The locations of water rights for current users of surface water in the general area are provided on Figure 7-2. Discharges associated with the sedimentation ponds are located as presented on this figure.

7.3.1.8 Water Rights and Replacement

Since there is no surface mining at the COVOL Dry-Coal Cleaning Facility, this section does not apply.

7.3.2 Sediment Control Measures

The existing sediment control measures within the permit area have been designed, constructed, and maintained to prevent additional contributions of sediment to streams or to runoff outside the permit area. In addition, they have been designed to meet applicable effluent limitations, and minimize erosion. The structures to be used for the runoff control at the site include diversion channels, sedimentation ponds, containment berms, silt fences, and road diversions and culverts.

7.3.2.1 Siltation Structures

The siltation structures within the permit area consist of the sedimentation ponds described in Section 7.3.2.2.

7.3.2.2 Sedimentation Ponds

Two sedimentation ponds store precipitation runoff from the facility. Ordinarily, runoff collected in these ponds is allowed to evaporate or percolate into the ground. Sediment that accumulates in the ponds will be removed as needed. Runoff may be pumped out of the sediment ponds and used for dust suppression in accordance with the air quality permit .

Compliance Requirements. All sedimentation ponds will be maintained until the site is reclaimed or transferred to a future landowner. The sedimentation ponds were designed to contain sediment in addition to the runoff resulting from the 10-year, 24-hour storm event. The spillways for the sedimentation ponds were designed to adequately pass the peak flow resulting from the 25-year, 6-hour precipitation event.

MSHA Requirements. The sedimentation ponds at the site do not meet the size criteria of MSHA requirements defined in 30 CFR 77.216.

7.3.2.3 Diversions

The objective of the runoff control plan is to isolate, to the maximum degree possible, runoff from disturbed areas from that of undisturbed areas. All diversion ditches are maintained with adequate erosion protection in the ditch sections where flow velocities are great enough that a ditch lining is necessary. Adequate ditch capacities are maintained in all ditch sections. Culverts are kept free of debris. Detailed diversion design is presented in Section 7.4.2.

7.3.2.4 Road Drainage

Road drainage facilities include diversion ditches, culverts, and containment berms. Additional road drainage design information is presented in Section 7.4.2. All road drainage diversions will be maintained and repaired as needed following the occurrence of a large storm event. Culvert inlets and outlets will be kept clear of sediment and other debris.

7.3.3 Impoundments

7.3.3.1 General Plans

There are two sedimentation ponds operating at the facility as described in Section 7.3.2.2.

Certification. All maps and cross sections of the sedimentation ponds have been prepared by or under the direction of and certified by a qualified, registered, professional engineer.

Maps and Cross Sections. The topography and cross sections for the sedimentation ponds are located on Plate 7-1. The geometry of drainage channels and the sedimentation ponds were measured in the field, and placed on the map using an aerial photograph of the site.

Narrative. A description of each sedimentation pond is presented in Sections 7.3.2.2 and 7.4.2 of this document.

Subsidence Survey Results. Since there is no mining at the site, a subsidence survey is not presented.

Hydrologic Impact. The hydrologic and geologic information required to assess the hydrologic impacts of the impoundments can be found in Section 7.2.4 and Chapter 6, respectively.

Design Plans and Construction Schedule. There are no additional impounding structures proposed for the facility at this time. Designs of all existing structures are described in this document.

7.3.3.2 Permanent and Temporary Impoundments

Requirements. Impoundments at the facility consist of the two sedimentation ponds. These ponds will be retained following closure of the site for use by the future landowner to control runoff from the property. They have been designed and constructed using current, prudent, engineering practices. Since they have been constructed below grade, they are considered to be stable. Specific hydrologic design criteria for each impoundment are presented in Section 7.4.3. Each impoundment will be inspected regularly based on the schedule contained in Section 5.1.4.3.

Hazard Notifications. The sedimentation ponds will be examined for structural weakness and erosion at least four times per year.

7.3.4 Discharge Structures

The discharge structures at the site include the spillways on the sedimentation ponds. These discharge structures are described in Section 7.4.4.

7.3.5 Disposal of Excess Spoil

There is no excess spoil generated at the facility.

7.3.6 Coal Mine Waste

No coal mine waste is stored at the facility.

7.3.7 Noncoal Mine Waste

Non-coal mine waste is not stored and disposed of on site (see Chapter 5).

7.3.8 Temporary Casing and Sealing of Wells

There are no groundwater monitoring wells at the facility.

7.40 Design Criteria and Plans

7.4.1 General Requirements

This section includes site-specific plans that incorporate minimum design criteria for the control of drainage from disturbed and undisturbed areas. Refer to Appendix 7-5 for a description of the hydrologic design methods used to design the sedimentation ponds and diversion structures at the facility.

7.4.2 Sediment Control Measures

7.4.2.1 General Requirements

Design. Existing sediment control measures have been designed, constructed and maintained to:

- Prevent additional contributions of sediment to stream flow or to runoff outside the permit area,
- Meet the effluent limitations defined in R645-301-751, and
- Minimize erosion to the extent possible.

Measures and Methods. The sediment control measures at the facility include:

- Retention of sediment within the disturbed area
- Diversion of runoff using channels or culverts through disturbed areas to prevent additional erosion
- Provide straw bale dikes, riprap, dugout ponds, silt fencing, and other measures that reduce overland flow velocities, reduce runoff volumes or trap sediment.

7.4.2.2 Siltation Structures

General Requirements. Additional contributions of suspended solids and sediment to stream flow or runoff outside the permit area is being prevented to the extent possible using two sedimentation ponds as siltation structures. They are located in the southeast and southwest corners of the disturbed area. Each structure has been certified by a qualified registered professional engineer. They have been designed, constructed and maintained as described in Chapter 5 and Sections 7.3.3 and 7.4.3.

Sedimentation Ponds. The sedimentation ponds are designed to work individually. One pond receives runoff from the eastern portion of the disturbed area, and one pond receives runoff from the western portion of the disturbed area. The sedimentation ponds within the downstream portion of the disturbed area. Neither of the ponds is located within a perennial stream channel.

Sediment Storage Volume. The sedimentation ponds were designed to contain sediment in addition to runoff from the design storm event. The expected annual sediment volume reporting to each of the sedimentation ponds was calculated using a modified form of the Universal Soil Loss Equation developed specifically for conditions in Utah (Israelsen et al., 1984). As indicated in Table 7-1 and Appendix 7-6, the calculated annual sediment volume deposited in the eastern sedimentation pond is 333 cubic feet, and the calculated annual sediment volume deposited in the western sedimentation pond is 134 cubic feet.

The east and west sedimentation ponds have been constructed to store 16,930 and 12,730 cubic feet of sediment, respectively. These volumes correspond to approximately 51 and 95 years of average annual sediment storage for the east and west ponds, respectively. The practical effect of the substantial sediment storage life of the ponds will be to provide excess runoff storage during the period of facility operation. Based on a bottom elevation of 5,493.8 feet in the east sedimentation pond and 5,498.2 feet in the west sedimentation pond, the elevation in each sedimentation pond corresponding to the maximum sediment storage is 5,498.6 feet in the east pond (4.8 feet above the bottom) and 5,505.4 feet in the west pond (7.2 feet above the bottom). The 60% sediment cleanout elevations for the east and west sedimentation ponds are 5,497.3 feet and 5,503.4 feet, respectively (3.5 and 5.2 feet above the bottoms, respectively). Refer to Appendix 7-6 for sediment storage calculations.

Detention Time. Given the substantial storage volume of the ponds relative to standard site requirements, an adequate detention time will be provided in each pond to allow the effluent to meet UPDES limitations. Prior to discharge of pond water to the adjacent area, this water will be sampled to ensure that it meets the above-referenced effluent limitations. Water may be periodically pumped from the ponds and used for dust suppression within the permit area.

Design Runoff Event. The sedimentation ponds are designed to fully contain runoff resulting from the 10-year, 24-hour precipitation event. The drainage characteristics, including contributing area, runoff curve number, and hydraulic length were calculated as shown in Appendix 7-6. The runoff storage volumes for the design event were calculated to be 36,970 and 14,850 cubic feet for the east and west ponds, respectively. In order to contain runoff from the design precipitation event and the design sediment volume, the elevations of the spillways were located at 5,503.8 feet and 5,508.0 feet for the east and west sedimentation ponds, respectively.

Sediment Removal. Sediment will be removed from the when the sediment level reaches an elevation corresponding to 60% of the total sediment storage volume. As noted in Plate 7-1 and Appendix 7-6, the 60% clean-out elevation is 5,497.3 feet and 5,503.4 feet for the east and

west sedimentation ponds, respectively. Sediment that contains a significant amount of coal will be processed at the coal cleaning facility. Sediment that contains an insignificant amount of coal will be blended with byproduct produced at the facility.

Excessive Settlement. The sedimentation ponds within the permit area were excavated into natural soil. Excessive settlement has not been observed and, given the excavated construction, is not anticipated in the future at either sedimentation pond.

Embankment Material. Sedimentation pond embankment materials are free of sod, large roots, frozen soil, and acid- or toxic forming coal-processing waste.

Compaction. During construction the sedimentation ponds, the limited embankments were compacted using standard construction practices.

MSHA Sedimentation Ponds. The sedimentation ponds at the site do not meet the size criteria of MSHA requirements defined in 30 CFR 77.216.

Sedimentation Pond Spillways. Each sedimentation pond is equipped with a swale on its downstream side that serves as a spillway. Each spillway is trapezoidal in cross section and measures approximately 2 feet deep and 1 foot wide with 1H:1V side slopes. These spillways were designed to safely discharge the peak flow resulting from the 25-year, 6-hour precipitation event (see Appendix 7-6). The design spillway event was modeled using HydroCAD 8.5 computer software. Since the sedimentation ponds contain sufficient volume to contain several years' worth of sediment yield, it is likely that the ponds will not spill during COVOL operations.

In the eastern pond, the peak inflow during the 25-year, 6-hour precipitation was calculated to be 9.99 cubic feet per second ("cfs"), and the peak outflow through the spillway was calculated to be 2.29 cfs with a peak velocity of 2.01 feet per second ("fps"). Since the peak outflow velocity is less than approximately 5 fps, it is considered non-erosive, and erosion protection is not required.

The peak stage during this event was calculated to be 5,504.3 feet (10.5 feet above the pond bottom).

In the western pond, the peak inflow during the 25-year, 6-hour precipitation was calculated to be 3.24 cfs, and the peak outflow was calculated to be 0.04 cfs with a peak velocity of 0.46 fps. Since the peak outflow velocity is less than approximately 5 fps, it is considered non-erosive, and erosion protection is not required. The peak stage during this event was calculated to be 5,508.03 feet (9.8 feet above the pond bottom).

Other Treatment Facilities. There are no other water treatment facilities within the permit area.

Exemptions. No exemptions to the requirements of R645-301-742.200 and R645-301-763 are being sought by this application.

7.4.2.3 Diversions

General Requirements. The diversions within the permit area consist of drainage ditches and culverts. All diversions within the permit area have been designed to minimize adverse impacts to the hydrologic balance, to prevent material damage outside the permit area, and to assure the safety of the public. They have been designed, located, constructed, maintained, and used to:

- Be stable
- Provide protection against flooding and resultant damage to life and property
- Prevent, to the extent possible, additional contributions of suspended solids to stream flow outside the permit area
- Comply with all applicable local, state, and federal laws and regulations

Peak discharge rates from the drainages within the permit area were calculated for use in determining the adequacy of the existing diversion ditches and culverts. Since the diversions will

remain in place for the future landowner following cessation of COVOL operations, runoff was calculated assuming permanent diversion structures based on the 100-year, 6-hour precipitation event of 1.74 inches. Curve numbers were based on those defined in Appendix 7-6. A description of the methods used to determine the peak discharge rates is presented in Appendix 7-7.

Watershed boundaries for the facility are presented on Plate 7-2. The disturbed area boundary is surrounded by a berm along the upstream edge and its sides in order to divert runoff around the site. Thus, the watersheds that drain the facility consist only of disturbed areas. The watershed contributing to the east sedimentation pond has been divided into five sub-watersheds which total 17.4 acres in area. The watershed contributing to the west sedimentation pond has been divided into three sub-watersheds which total 7.0 acres in area. The remaining 5.6 acres of the site are situated along the edges of the facility, outside of the diversion ditches, and is not disturbed. All of the area within the watersheds reporting to the ditches and the sedimentation ponds has been considered to be disturbed in the hydrology calculations.

The size and location of each existing diversion ditch and culvert were mapped using an aerial photograph of the site and verified in the field. All diversions are shown on Plate 7-2. The capacity and freeboard of each diversion ditch were determined based on the minimum ditch slope, while the maximum velocity and need for erosion protection were verified based on the maximum ditch slope. The capacity of each culvert was determined using the minimum culvert slope and the outlet velocity and riprap protection was verified using the culvert outlet slope. Slopes were measured from a pre-construction contour map of the site. A description of the methods used to determine diversion capacities, flow velocities, and erosion protection requirements is presented in Appendix 7-5. All diversion calculations are presented in Appendix 7-7.

Diversion of Perennial and Intermittent Streams. There are no diversions of perennial or intermittent streams at the facility.

Diversion Ditches and Culverts. A summary table of the geometry, channel slope, peak discharge, erosion protection, maximum flow velocity and minimum depth values for each diversion ditch and culvert at the facility is presented in Table 7-2. Diversion hydrology calculations are detailed in Appendix 7-7. Each ditch and culvert has been constructed to safely pass the peak flow resulting from the 100-year, 6-hour precipitation event. A description of the diversion ditches and culverts within the facilities area is presented below. The ditches are named according to the watersheds that they drain. Ditches prefixed by the letter "E" ultimately report to the east sedimentation pond, and ditches prefixed by the letter "W" ultimately report to the west sedimentation pond. Since some watersheds are drained by culverts instead of ditches, the ditches are not numbered strictly chronologically. Refer to Plate 7-2 for the locations of each watershed and diversion structure.

- **Ditch E-1 (Upper)**. This ditch exists on the east edge of the permit area just within the permit area boundary. It conveys runoff from the northern portion and eastern edge of the site southward toward the east sedimentation pond. This V-shaped ditch is approximately 1,100 feet long, is 1.5 feet deep, and has 1H:1V side slopes. It begins at the outlet of culvert C-1 and continues to the outlet of culvert C-2.

- **Ditch E-1 (Lower)**. This ditch conveys runoff southward from the outlet of culvert C-2 to the inlet of the east sedimentation pond. This V-shaped ditch is approximately 700 feet long, has 1.5H:1V side slopes, and is 1.5 feet deep.

- **Ditch E-3**. This ditch conveys runoff from the southeastern corner of the inner yard to the east sedimentation pond. This trapezoidal ditch has an eastern side slope of 1H:1V and a western side slope of 2.5H:1V. It is 1.5 feet deep, has a 6-inch bottom width, and is approximately 550 feet long.

- **Ditch E-4**. This ditch conveys runoff southward from the region between the top of the truck dump hopper embankment and the road on the east edge of the permit area. This V-shaped ditch has an eastern side slope of 3H:1V and a western side slope of 1H:1V. It is one foot deep and approximately 950 feet long.

- **Ditch E-5**. This ditch conveys runoff eastward along the southern edge of the permit area toward the east sedimentation pond. It captures runoff from the eastern watershed of the inner yard that is not captured by ditch E-3. Ditch E-5 is V-shaped with 4H:1V side slopes. It is 1 foot deep and approximately 515 feet long.

- **Ditch W-1 (Upper)**. This ditch runs along the west edge of the permit area just within the permit area boundary. It conveys runoff from the northern portion and western edge of the site southward toward the west sedimentation pond. This V-shaped ditch has 2H:1V side slopes. It is 2 feet deep and approximately 1,400 feet long. It begins just west of the northwest corner of the yard access road and extends to the outlet of culvert C-3.

- **Ditch W-1 (Lower)**. This ditch runs from the outlet of culvert C-3 to the inlet of the west sedimentation pond. It conveys runoff from the W-1 (Upper) Ditch and the W-2 Ditch into the west sedimentation pond. Ditch W-1 (Lower) is V-shaped with 2H:1V side slopes. It is 2 feet deep and approximately 700 feet long.

- **Ditch W-2**. This ditch runs on the east side of the silo and its access road, and drains the area located to the east. It drains into culvert C-3, which feeds into Ditch W-1 (Lower). Ditch W-2 is V-shaped with a western side slope of 4.5H:1V and an eastern side slope of 1H:1V. It is 1 foot deep and approximately 1,050 feet long.

- **Ditch W-3**. This ditch conveys runoff westward along the southern edge of the permit area toward the west sedimentation pond. It captures runoff from the area south of the perimeter access road that drains toward the west sedimentation pond. Ditch W-3 is V-shaped with 4H:1V side slopes. It is 1 foot deep and approximately 395 feet long

- **Culvert C-1**. This culvert conveys runoff under the truck turn-around road in the northeastern corner of the site. It provides drainage for the area enclosed by the road embankments for the yard perimeter road and the truck turn-around. The culvert is 45 feet long and consists of 18-inch diameter corrugated polyethylene pipe. Riprap with a median diameter of 3 inches will be placed in the channel bottom for a distance of 10 feet downstream from the culvert outlet to provide erosion protection.

- **Culvert C-2**. This culvert conveys runoff under the road in the southeastern corner of the permit area. It provides drainage for the area enclosed by the road embankments for the yard perimeter road and the truck dump hopper. The culvert is 45 feet long and consists of 18-inch diameter corrugated polyethylene pipe.

- **Culvert C-3**. This culvert conveys runoff under the road in the southwestern corner of the permit area. It provides a route for drainage from Ditch W-2 to travel under the road and into Ditch W-1 (Lower). The culvert is 30 feet long and is constructed from 18-inch diameter corrugated polyethylene pipe. Riprap with a median diameter of 3 inches will be placed in the channel bottom for a distance of 10 feet downstream from the culvert outlet to provide erosion protection.

7.4.4.1 Erosion Protection

Each discharge structure was evaluated to determine the adequacy of the existing riprap and the hydraulic capacity of the structure during the 25-year, 6-hour precipitation event. The calculations for the discharge structures within the facilities area are presented in Appendix 7-6. Peak discharges from all of the discharge structures during their design events did not exceed 5 feet per second (fps). Thus, the flows are considered non-erosive.

7.4.4.2 Design Standards

All discharge structures within the permit area were designed and constructed according to standard engineering design procedures.

7.4.5 Disposal of Excess Spoil

There is no excess spoil within the permit area.

7.4.6 Coal Mine Waste

7.4.6.1 General Requirements

There is no coal mine waste that is permanently stored on site.

7.4.6.2 Refuse Piles

There are no refuse piles at the facility.

7.4.6.3 Impounding Structures

There are no impounding structures within the permit area that are constructed of coal mine waste or are used to impound coal mine waste.

7.4.6.4 Return of Coal Processing Waste to Underground Workings

There are no underground workings at this facility.

7.4.7 Disposal of Noncoal Mine Waste

Disposal of noncoal waste is discussed in Chapter 5.

7.4.8 Casing and Sealing of Wells

There are no wells located at the facility.

7.50 Performance Standards

All operations and reclamation will be conducted to minimize disturbance to the hydrologic balance within the permit and adjacent areas, prevent material damage to the hydrologic balance outside the permit area, and support approved post operations land uses.

7.5.1 Water Quality Standards and Effluent Limitations

Discharges of water from disturbed areas will be in compliance with all applicable Utah and federal water quality laws and regulations and with applicable effluent limitations for coal mining contained in 40 CFR Part 434.

7.5.2 Sediment Control Measures

All sediment control measures will be located, maintained, constructed and reclaimed according to plans and designs presented in Sections 7.3.2, 7.4.2, and 7.6.0.

7.5.2.1 Siltation Structures and Diversions

Siltation structures and diversions will be located, maintained, constructed and reclaimed according to plans and designs presented in Sections 7.3.2, 7.4.2, and 7.6.3.

7.5.2.2 Road Drainage

All roads will be located, designed, constructed, reconstructed, used, maintained and reclaimed according to plans and designs presented in Sections 7.3.2.4, 7.4.2.4, and 7.6.2. All roads have been designed to:

- Control or prevent erosion and siltation by maintaining or stabilizing all exposed surfaces in accordance with current, prudent engineering practices;
- Control or prevent additional contributions of suspended solids to stream flow or runoff outside the permit area;
- Neither cause nor contribute to, directly or indirectly, the violation of effluent standards given under Section 7.5.1.
- Minimize the diminution to or degradation of the quality or quantity of surface- and ground-water systems;
- Refrain from significantly altering the normal flow of water in streambeds or drainage channels.

7.5.3 Impoundments and Discharge Structures

Impoundments and discharge structures will be located, maintained, constructed and reclaimed as described in Sections 7.3.3, 7.3.4, 7.4.3, 7.4.5, and 7.6.0.

7.5.4 Disposal of Excess Spoil, Coal Mine Waste and Noncoal Mine Waste

Handling and disposal of coal mine waste and noncoal mine waste is described in Sections 7.3.6, 7.3.7, 7.4.6, 7.4.7, 7.6.0 and Chapter 5.

7.5.5 Casing and Sealing of Wells

There are no wells located at the facility.

7.60 Reclamation

7.6.1 General Requirements

A detailed reclamation plan for the facility is presented in Section 5.40. In general, COVOL will ensure that all temporary structures are removed and reclaimed. Permanent diversions will be maintained properly and will meet the requirements of the approved reclamation plan for permanent structures and impoundments. COVOL will renovate the diversion structures if necessary to meet the requirements of R614-301 and R614-302 and to conform to the approved reclamation plan.

7.6.2 Roads

All site roads will be retained for use under the operational industrial land use.

7.6.2.1 Restoring the Natural Drainage Patterns

The facility does not interfere with natural drainage patterns that require restoration.

7.6.2.2 Reshaping Cut and Fill Slopes

There are no cut and fill slopes located at the facility.

7.6.3 Siltation Structures

7.6.3.1 Maintenance of Siltation Structures

All siltation structures will be maintained in accordance with the approved reclamation plan.

7.6.3.2 Removal of Siltation Structures

It is anticipated that siltation structures at the site will be retained following reclamation, for use by the future landowner, in accordance with the reclamation plan presented in Section 5.40.

7.6.4 Structure Removal

A timetable for the removal of each structure is presented in Table 5-2.

7.6.5 Permanent Casing and Sealing of Wells

There are no wells located at the facility.

REFERENCES

EIS Environmental and Engineering Consulting, 2007. COVOL Engineered Fuels Wellington Plant Site Sediment Pond Calculations. Unpublished Consultant's Report. Prepared by J.T. Paluso, P.E.

Gloyn, R.W., D.E. Tablet, B.T. Tripp, C.E. Bishop, C.D. Morgan, J.W. Gwynn, and R.E. Blackett, 2003. Energy, Mineral, and Groundwater Resources of Carbon and Emery Counties, Utah. Bulletin 132, Utah Geological Survey, Utah Department of Natural Resources. Salt Lake City, Utah.

Israelsen, C. Earl, Joel E. Fletcher, Frank W. Haws, and Eugene K. Israelsen, 1984. Erosion and Sedimentation in Utah: A Guide for Control. Utah Water Research Laboratory, College of Engineering, Utah State University. Hydraulics and Hydrology Series UWRL/H-84/03.

Savage Services Corporation, 1983. Formerly Beaver Creek Coal Company. *Underground Mining Permit Application and Mining and Reclamation Plan for the C.V. Spur Coal Processing and Loadout Facility, Carbon County, Utah.* Submitted to the Utah Division of Oil, Gas, and Mining.

Utah Division of Water Resources, 2000. Utah State Water Plan: West Colorado River Basin. Utah Department of Natural Resources, Division of Water Resources. Salt Lake City, Utah.

TABLE 7-1

Summary of Sedimentation Pond Data

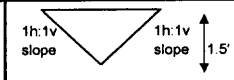
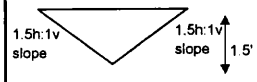
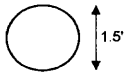
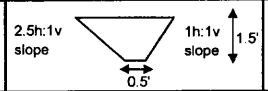
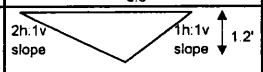
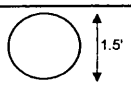
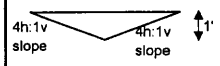
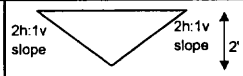
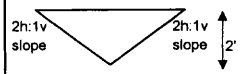
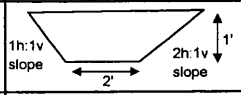
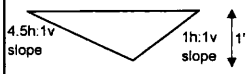
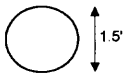
	East Pond	West Pond
Assumed bottom elevation (ft)	5,493.8	5,498.2
Assumed crest elevation (ft)	5,505.8	5,510.0
Total Storage Capacity (ft^3)	53,900	36,070
Calculated Annual Sediment Volume (ft^3)	333	134
10-Year, 24-Hour Precip. Runoff Volume (ft^3)	36,970	14,850
Sediment Storage Capacity (ft^3)	16,930	21,220
60% Sediment Storage Cleanout Volume (ft^3)	10,160	12,730
Sediment Cleanout Elevation (ft)	5,498.6	5,505.4
Peak Stage of 10-Year, 24-Hour Precipitation Event Plus 60% Sediment Storage Capacity (ft)	5,503.0	5,506.4
Invert elevation of 3-foot wide armored spillway (ft)	5,503.7	5,508.0
Peak Pond Inflow Due to 25-Year, 6-Hour Precipitation Event (cfs)	9.99	3.24
Peak Pond Outflow due to 25-Year, 6-Hour Precipitation Event (cfs)	2.29	0.08
Peak Pond Outflow Velocity due to 25-Year, 6-Hour Precipitation Event (fps)	2.0	0.5
Peak Stage of 25-Year, 6-Hour Precipitation Event Following a 10-Year, 24-Hour Precipitation Event with Pond Full to 60% of Sediment Storage Capacity (ft)	5,504.3	5,508.0

Notes:

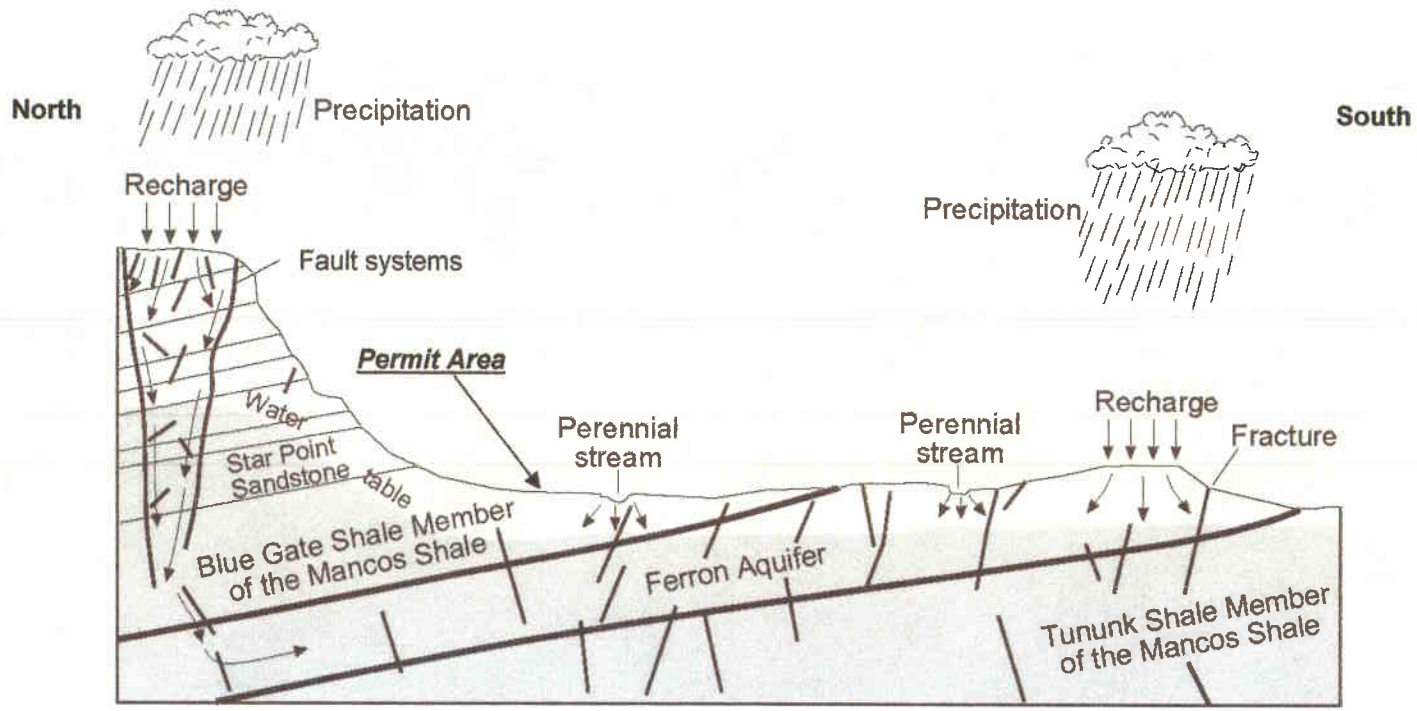
- Refer to Appendix 7-6 for calculations related to sedimentation pond design
- Pond dimensions were surveyed by EIS Environmental and Engineering Consulting in November 2007. Absolute elevations were assumed by superimposing the survey data on the pre-construction topography provided by Mine and Mill Engineering. Each pond has a berm extending approximately 2 ft above the ground surface.

TABLE 7-2

Summary of Drainage Ditch and Culvert Data

Channel	X-section	100yr 6hr Peak Flow (cfs)	Avg. Slope (ft/ft)	Manning's n	Max. Flow Depth (ft)	Max. Velocity (fps)	D_{50} Riprap (in)
Upper E-1 Ditch		3.37	0.015	0.035	1.17	3.03	Not required
Lower E-1 Ditch		3.44	0.016	0.035	0.94	3.10	Not required
Culvert C-1		2.70	0.030	0.020	0.49	5.39	3" at outlet
E-3 Ditch		9.41	0.018	0.035	1.12	4.04	Not required
E-4 Ditch		2.20	0.016	0.035	0.77	2.49	Not required
Culvert C-2		1.27	0.028	0.020	0.34	4.20	Not required
E-5 Ditch		9.49	0.009	0.035	0.97	4.00	Not required
Upper W-1 Ditch		2.88	0.015	0.035	0.83	3.06	Not required
Lower W-1 Ditch		5.13	0.009	0.035	1.09	3.05	Not required
W-2 Ditch		5.32	0.016	0.035	0.72	3.89	Not required
W-3 Ditch		3.52	0.016	0.035	0.96	3.00	Not required
Culvert C-3		4.68	0.033	0.020	0.64	6.47	3" at outlet

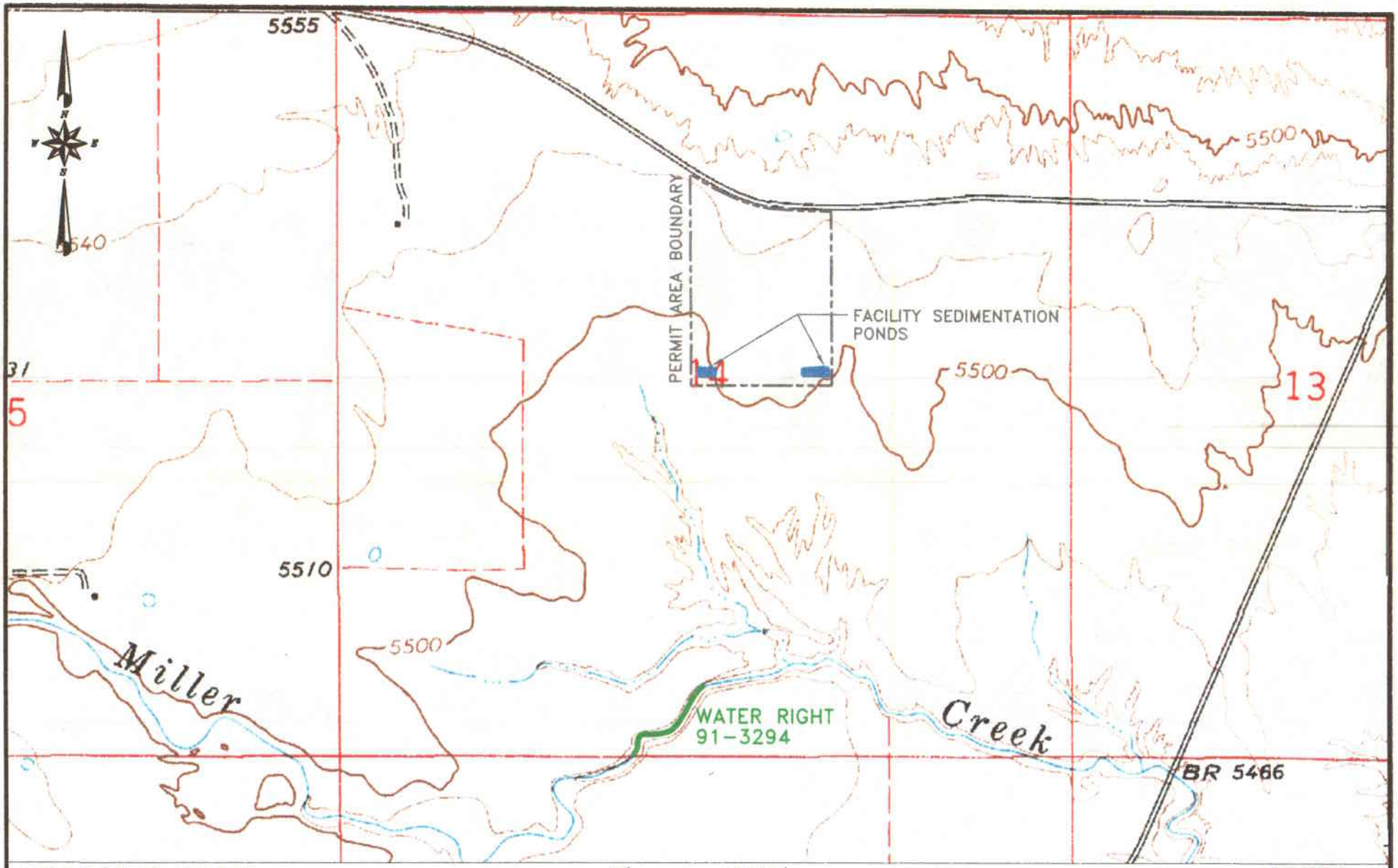
Refer to Appendix 7-7 for drainage channel and culvert hydrology calculations
All culverts constructed of corrugated HDPE, and have a projecting inlet
Peak stages in culverts are taken as the inlet condition



Adapted from Gloyn et al., 2003

FIGURE 7-1. GENERALIZED AREA HYDROSTRATIGRAPHIC CROSS-SECTION

EarthFax



BASE MAP: 7.5' USGS QUADRANGLE
PRICE, UTAH 1972

0' 1000'

FIGURE 7-2. SURFACE WATER RIGHTS AND PERMITTED FACILITY DISCHARGE LOCATIONS

EarthFax

G:\UC1091\02 - Permit application\Drawings\FIG7-2WDCC.dwg, 8.5x11, 1/14/2008 9:05:51 AM

APPENDIX 7-1

Water Rights Data

Form 114
25M 4-63

IN THE SEVENTH JUDICIAL DISTRICT COURT, IN AND FOR THE COUNTY OF CARBON STATE OF UTAH

IN THE MATTER OF THE GENERAL DETERMINATION OF RIGHTS TO THE USE OF WATER, BOTH SURFACE AND UNDERGROUND, WITHIN THE DRAINAGE AREA OF THE PRICE RIVER AND OF THE DRAINAGE AREA OF THE GREEN RIVER FROM THE CONFLUENCE OF THE PRICE AND GREEN RIVERS TO THE CONFLUENCE OF THE GREEN AND COLORADO RIVERS EXCLUDING THE DRAINAGE AREA OF THE SAN RAFAEL RIVER IN UTAH.

STATEMENT OF WATER USER'S CLAIM
CODE NO. 91 SERIAL NO. 5294
MAP NO. 75b

NOTE: This blank is sent to you in accordance with Utah Law. The information called for herein will be used in connection with the adjudication of water rights on the above mentioned drainage area. All questions applicable to your claim must be answered fully, and one copy of this form must be filed with the Clerk of the District Court at Price, Utah, within sixty (60) days from date of service of the attached Notice. A copy shall be filed with the State Engineer, State Capitol, Salt Lake City. Failure to file the attached Statement of the Water User's Claim with the Clerk of the District Court within the time stated will forever bar and estop you from asserting any right to the use of water from said drainage area.

1. Name of Claimant Bonnie Jensen Interest Claimed full
2. Address c/o T. N. Jensen, Price, Utah
3. Name of particular spring, spring area, stream, well, tunnel or drain from which water is diverted is Miller Creek in Carbon County.
4. Priority date claimed 1876/1869 Date when water was first used
   Date when work on diverting system was first begun Date when diverting system was completed
   Nature of work
5. Class of Right (Indicate by X):
   (a) X Right to surface water initiated by beneficial use before 1903 Claim No.
   (b) Right to underground water initiated before 1935 Claim No.
   (c) Right decreed by court, cite title of case
   (d) Application filed, State Engineer's Office No. Cert. of App. No.
   (e) Right acquired by adverse use prior to 1939
6. Nature (Indicate by X), Amount, and Annual Period of Use (by month & day):
   (a) Irrigation Sec. Ft. from to (both dates incl.)
   (b) X Stockwatering 300 CATTLE Sec. Ft. from January 1 to December 31 (both dates incl.)
   (c) Domestic Sec. Ft. from to (both dates incl.)
   (d) Municipal Sec. Ft. from to (both dates incl.)
   (e) Sec. Ft. from to (both dates incl.)
7. Direct Flow Appropriation (must be described with reference to U. S. Government Survey Corner)
   (a) Point of diversion from spring, spring area, stream, well, tunnel, drain stock water directly on stream from point where stream enters SE¼SW¼, Sec. 14, T15S, R10E, SLB&M, to point where stream leaves SE¼SW¼, Sec. 14, T15S, R10E, SLB&M.
   (b) Description of spring area
   (c) Point of rediversion or point of return to natural channel
   (d) If flow is intermittently diverted, list by number or description, all rights involved
8. Where water is used for irrigation purposes:
   (a) Area irrigated in legal subdivisions of land by 40-acre tract. (All sources of water for same land or lands must be described in each instance by name or claim number)
   (b) Do you get water under a ditch owned by several users. If so, give names of all users and divisions of interest
9. Where water is used for Stockwatering:
   (a) Number of each kind of stock watered All Cattle
   (b) All sources of water for same stock. (Describe by name or claim number)
10. Where water is used for Domestic:
   (a) Number of families or their equivalent All sources of water for same use. (Describe by name or claim number)

APPENDIX 7-2

Utah Pollutant Discharge
Elimination System Permit

State of Utah

Department of Environmental Quality

Dianne R. Nielson, Ph.D.
Executive Director

DIVISION OF WATER QUALITY
Walter L. Baker, P.E.
Director

Water Quality Board
Joe Piccolo, *Chair*
Paula Doughty, Vice-Chair
David F. Echols
Neil K. Kochenour
Darrell H. Mensel
LeLand J. Myers
Dianne R. Nielson
Jay Ivan Olsen
Gregory L. Rowley
Ronald C. Sims
Daniel C. Snarr
Walter L. Baker,
Executive Secretary

JON M. HUNTSMAN, JR.
Governor

GARY HERBERT
Lieutenant Governor

January 08, 2007

Mr. Keith Thompson
Vice President
Covol Engineered Fuels, LC
10653 South River Front Parkway, Suite 300
South Jordan, Utah 84095

Dear Mr. Thompson:

Subject: Utah Pollutant Discharge Elimination System (UPDES) Multi-Sector General Permit for Storm Water Discharges Associated with Industrial Activity, Coverage No. **UTR000685.**

Our office received your "notice of intent" (NOI) for **Covol Engineered Fuels, LC** to obtain coverage under the *UPDES Multi-Sector General Permit for Storm Water Discharges Associated with Industrial Activity, General Permit No. UTR000000* on November 30, 2006. The received NOI is for the Covol Fuels facility located at, 1865 West Ridge Road, Wellinton, Utah, Carbon County. This letter confirms your coverage under the general permit; the permit coverage number for the facility is **No. UTR000685.** Please use this number in any future correspondence associated with this project.

This coverage is effective **January 01, 2007** and expires at midnight, **December 31, 2011.**

The permit requires a Storm Water Pollution Prevention Plan (SWP3). Maintaining a current copy of the SWP3 at the site is a requirement of the permit. Monitoring is also required as outlined in appendix II requirements. Please review these requirements if you are not familiar with them. A copy of the general permit and appendix requirements can be found on our website at http://www.waterquality.utah.gov/updes/stormwater.htm.

Storm water discharge monitoring report (SWDMR) forms are enclosed for your convenience. These forms may be used to record visual and/or analytical monitoring results.

As the agency charged with the administration of issuing UPDES Permits, we are

continuously looking for ways to improve our quality of service to you. Please take a few moments to complete the enclosed questionnaire, and return it in the enclosed, self-addressed, postage paid, envelope. The results will be used to improve our quality and responsiveness and give us feed back on customer satisfaction.

If you have any questions concerning this letter or your permit coverage please do not hesitate to contact me by phone at (801) 538-9325 or by e-mail at mmgeorge@utah.gov. Thank you.

Sincerely,

Mike George, Environmental Scientist
Permits & Compliance Section

Enclosure

U:\WQ\PERMITS\Mgeorge\wp\storm water\group 4\covolfuels2007.doc

APPENDIX 7-3

Storm Water Pollution
Prevention Plan

STORM WATER POLLUTION PREVENTION PLAN

(Revision 2 – 11/03/05)

and

NOI Storm Water Discharges Associated with Construction Activities

and

NOI Multi-Sector General Permit (MSGP) for Storm Water Discharges Associated with Industrial Activities

COVOL ENGINEERED FUELS, LC

PREPARED BY:

EIS Environmental & Engineering Consulting

DECEMBER 2004

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Section 1.0 General Site Information

COVOL Engineered Fuels, LC (COVOL) is planning to construct and operate a new coal cleaning facility in Carbon County, Utah. The new facility will be located in Section 14, Township 15 South, Range 10 East, Salt Lake Base & Meridian. This facility will be located approximately five miles south of Price, Utah. Refer to the attached Location Map in Appendix A. The facility lies in an undeveloped, rural area on a 30 acre site. Approximately 15 acres will be used for this new operation. The adjacent land on the east, west, and south remains undeveloped. Across the road to the west are coal transfer facilities where coal is stored, loaded, and unloaded for shipment. Across the road and to the north is Carbon County Lumber Company.

The site slopes to the southeast and the surrounding ground consists of native soil with sparse vegetation. The soil is classified as Persayo-Badland Association Soils, which consist of gently sloping and rolling hills, well drained, moderately fine textured and medium textured soils over shale. The area receives approximately 9.5-inches of precipitation annually. The regional groundwater flow is east toward the Price River which lies approximately two miles northeast of the facility. Refer to the Location Map in Appendix A.

This site was previously permitted by Terra Systems Incorporated (TSI). In compliance with the provisions of the Utah Water Quality Act, Title 19, Chapter 5, Utah Code Annotated 1953, TSI was issued a General Storm Water UPDES Permit UTR101090 on August 20, 2003, for this Wellington Plant Site. COVOL has purchased this site from TSI and will use different processing techniques. COVOL will receive coal from various sources around the Carbon/Emery area. COVOL will take this coal with varying qualities and by using air jigs will improve the final quality. The cleaning facility will be divided into three areas: feedstock material handling and storage systems, coal cleaning equipment, and finished product material handling and storage system. It is anticipated that this facility will process approximately 1,500,000 ton per year.

Feedstock Handling

Incoming coal trucks will be weighed at the truck scale and dump their loads at the truck dump hopper. Refer to the Site Plan in Appendix A. This high ash coal will be moved via conveyors and dumped in the inventory pile with a radial stacker. The radial stacker will be positioned to segregate and pile multiple sources/qualities of coal.

Coal Cleaning

High ash coal will be fed into the feed hopper via a rubber-tired front end loader. This material will be transported by conveyor to a screen for separation. Coarse or oversized material can be processed through the crusher to be sized to 2" minus. The feed streams (coarse and fine) are then fed into an air jig separation unit where the coal is separated from the rock and ash using air and vibration to perform the separation. The air jig is covered by a hood connected to a bag house (one bag house for each air jig) to prevent any fugitive dust particles from escaping into the atmosphere. Finished product is transferred to an inventory pile or silo via one set of conveyors and the byproduct is transferred to a pile via another set of conveyors. The bag house dust can be combined either with

the byproduct stream or the finished product stream depending on the required specifications.

Finished Product Handling
The finished product may be stored in the silo which is situated over the site haul road. A designated amount of product stored in the silo will be charged into trucks to be shipped to its final destination. Alternately, finished material from a segregated finished product pile may be fed into the product silo via the feed/blending hoppers or be loaded directly into trucks, for transportation, via the truck ramp and hopper.

Storm Water Pollution Prevention Plan

It has been determined that the permittee has a regulated storm water discharge as per UAC R317.8. Therefore, conditions governing storm water discharges apply. The permittee shall develop a storm water pollution plan. The receiving water for this facility is the Price River. Refer to Appendix D for Guidelines Associated with Storm Water Discharge from Construction Activities.

Section 2.0 Content of Plan

Section 2.1.1 Pollution Prevention Team

The facility will be operated two shifts per day. Each shift will have three employees, a shift foreman and two operators. During each shift the pollution prevention team at the facility will be comprised of these three individuals.

The shift foreman will be responsible to coordinate a spill response, oversee good housekeeping and best management practices. His responsibilities will also include monitoring, if required, and ensuring compliance with aforementioned permit. The on shift operators will be required to inspect and maintain all diversion and appurtenant structures to ensure proper control and treatment of storm water runoff prior to leaving the site.

All employees will be properly trained in their various areas and will be given the proper notification numbers and contact personnel to comply with the requirements of the permit. Refer to Section 2.4.1 Employee Training.

Section 2.2.1 Site Map

Included in Appendix A is a Site Map showing the proposed surface facilities. Additional features on the map include storm water flow directions, berm, and sediment pond locations. Final engineering on this facility is presently being completed. Surface contours will be modified to direct all surface flows towards the sediment ponds located in the southeast and southwest corners of the project. An earthen berm will be constructed to contain all runoff from the site. All surface structures will be located inside the berm. This will prevent any potential contamination from leaving the site.

Section 2.2.2 Material Inventory

Description of Potential Pollutant Sources

The potential sources which may reasonably be expected to add pollutants to storm water discharges from the site are those disturbed areas which facilitate the operation. The surface facilities are shown on the Site Plan drawing. The Potential Pollution Sources are listed in the following table.

Potential Pollution Source	Potential Pollutants	Likelihood of Contact
Truck Dump	Coal Fines, Equipment Fuels and Fluids	Low potential, No known spill or leak
Coal Storage Area	Coal Fines, Equipment Fuels and Fluids	Low potential, No known spill or leak
Front End Loader	Equipment Fuels and Fluids	Low potential, No known spill or leak
Conveyor Belt	Coal Fines, Lubricant	Low potential, No known spill or leak
Silo	Coal Fines, Lubricant	Low potential, No known spill or leak

All runoff will be contained by the berm surrounding the site. This runoff will report to the sediment ponds. Coal fines in the storage areas are very fine-grained, therefore some storm events could potentially cause enough surface flow to transport the fines to the sediment ponds.

.

Drainage

The Site Plan drawing provides the drainage direction and the location of the proposed sediment ponds and berms. Berms will be constructed to prevent storm water from leaving the site. Runoff from Ridge Road (County Road) will be diverted around the property. The sediment ponds will remove pollutants from storm water runoff and will discharge to the south, if necessary. After construction both the berms and sediment ponds will be inspected on a quarterly basis to insure that they are operating correctly.

Section 2.3.1 Best Management Identifications (BMP)

BMPs	Brief Description of Activities	Implementation of BMP
Good Housekeeping	Pick-up Trash, Use of absorbent materials to clean up minor spills. Training of staff in cleanup procedures.	Training of staff during annual training or as needed.
Preventative Maintenance	Maintain sediment control measures. Maintain equipment and machinery. Maintain fuel stations, coal pile and surface drainage..	Inspect and Maintain contours to drain to sediment controls
Inspections	Quarterly inspection of runoff control measures.	Quarterly Inspections or as needed after storm events.
Spill Prevention Response	Fuel tanks will be contained. Absorbent materials available for spill clean up.	Clean up or maintain as needed.
Sediment and Erosion Control	Inspection of ponds and berms, at least quarterly or after/during storm event greater than .5 inches.	Sample ponds during runoff event if ponds are discharging or will discharge. Clean ponds when necessary.
Management of Runoff	Off site runoff diverted around disturbed and storage areas. Disturbed and storage areas treated by sediment ponds or berm.	Inspect, maintain and repair as needed.

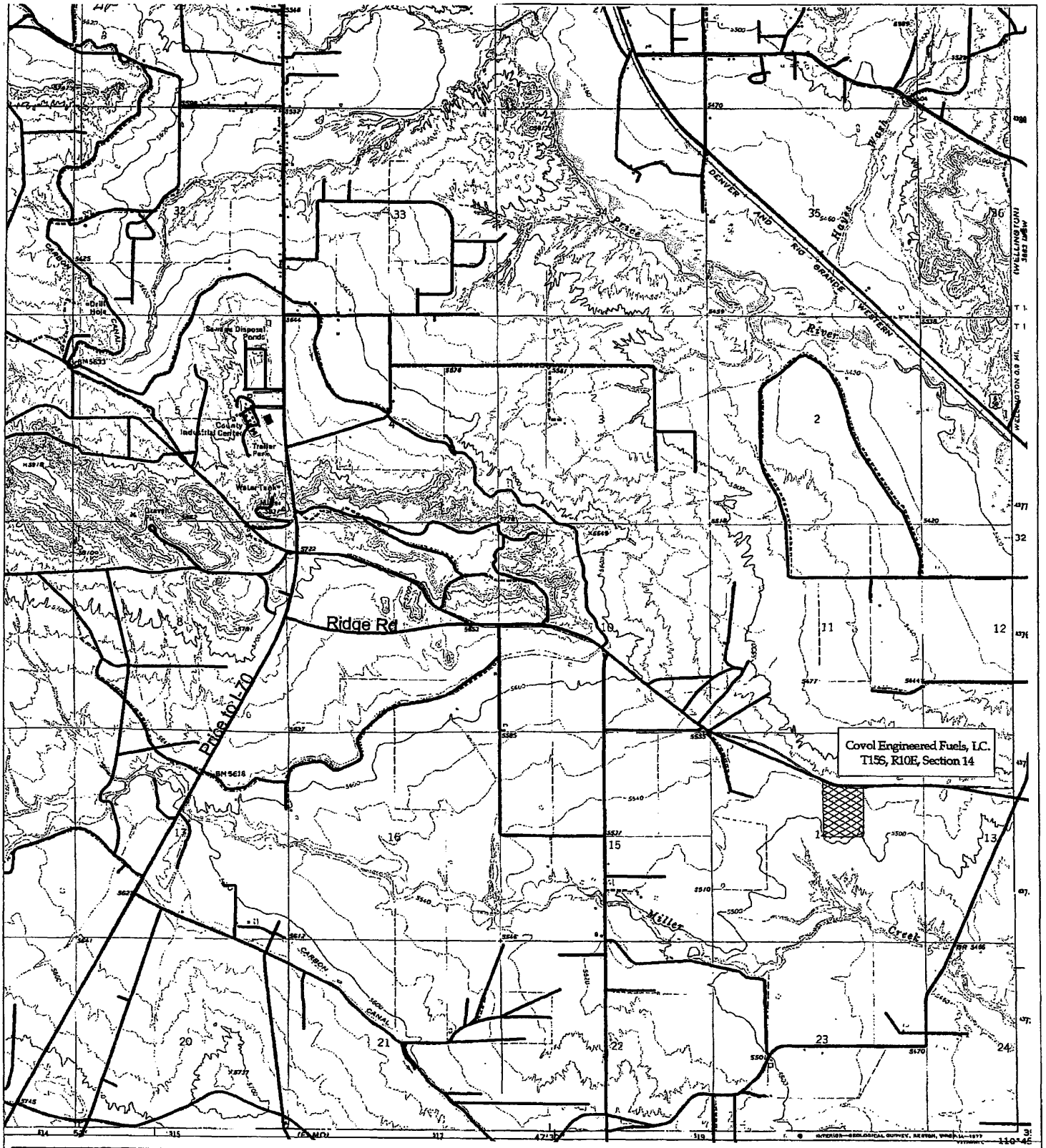
Section 2.4.1 Employee Training

Training topics will include, but not be limited to Spill Prevention and Response, Spill Reporting Procedures, Good Housekeeping, Material Management Practices, and Storm Water Sampling Procedures.

Employees will be provided training regarding the prevention and control of spillage of fuels and oils associated with machinery and equipment. Employees will be advised to not overfill fuel tanks while fueling equipment or vehicles. Employees will assist fuel vendors to watch tank gauges and not overfill bulk tanks.

APPENDIX A

DRAWINGS



Legend

Roads

Covol

N

Location Map

2000 0 2000 4000 Feet

Drawn By: K. Nash
Designed By. J.T. Paluso

EIS Environmental & Engineering Consulting
31 North Main Street
Helper, Utah 84526

APPENDIX B

NOI-STORM WATER DISCHARGES ASSOCIATED WITH CONSTRUCTION ACTIVITIES

STATE OF UTAH, DEPARTMENT OF ENVIRONMENTAL QUALITY, DIVISION OF WATER QUALITY
288 North 1460 West, P.O. Box 144870, Salt Lake City, Utah 84114-4870 (801)538-6146

NOI

Notice of Intent (NOI) for Storm Water Discharges Associated with Construction Activity Under the UPDES General Permit No. UTR100000. SEE REVERSE FOR INSTRUCTIONS

Submission of this Notice of Intent constitutes notice that the party(s) identified in Section I of this form intends to be authorized by UPDES General Permit No. UTR100000 issued for storm water discharges associated with construction activity in the State of Utah. Becoming a permittee obligates such discharger to comply with the terms and conditions of the permit. ALL NECESSARY INFORMATION MUST BE PROVIDED ON THIS FORM.

I. OPERATOR INFORMATION

Name (Main operator): COVOL ENGINEERED FUELS, LC Phone: 801-984-9400

Address: 10653 S. RIVERFRONT PARKWAY Status of Owner/Operator: P

City: SOUTH JORDAN State: UT Zip: 84095

Contact Person: KEITH THOMPSON Phone: 801-984-9400

Name (1st Co-permittee): _____ Phone: _____

Address: _____ Status of Owner/Operator:

City: _____ State: _____ Zip: _____

Contact Person: _____ Phone: _____

Name (2nd Co-permittee): _____ Phone: _____

Address: _____ Status of Owner/Operator:

City: _____ State: _____ Zip: _____

Contact Person: _____ Phone: _____

Name (3rd Co-permittee): COVOL ENGINEERED FUELS, LC Phone: _____

Address: _____ Status of Owner/Operator:

City: _____ State: _____ Zip: _____

Contact Person: _____ Phone: _____

Please copy this form if you have more co-permittees than what is allowed on this form.

II. FACILITY SITE / LOCATION INFORMATION

Is the facility located on Indian Lands? (Y or N) N

Name: COVOL ENGINEERED FUELS, LC

Project No. (if any): _____

Address: 1865 WEST RIDGE ROAD County: CARBON

City: WELLINGTON State: UT Zip: 84542

Latitude: 39 31 27 Longitude: 110 45 58

III. SITE ACTIVITY INFORMATION

Municipal Separate Storm Sewer System (MS4) Operator Name: _____

Receiving Water Body: PRICE RIVER

How far to the nearest water body? 2 MILES

List the Number of any other UPDES permits at the site: _____ _____

IV. TYPE OF CONSTRUCTION (Check all that apply)

1. ☐ Residential 2. ☐ Commercial 3. X Industrial 4. ☐ Road 5. ☐ Bridge 6. ☐ Utility 7. ☐ Contouring, Landscaping

8. ☐ Other (Please list) _____

V. BEST MANAGEMENT PRACTICES

Identify proposed Best Management Practices (BMPs) to reduce pollutants in storm water discharges: (Check all that apply)

1. ☐ Silt Fences 2. X Sediment Pond 3. ☐ Seeding/Preservation of Vegetation 4. ☐ Mulching/Geotextiles 5. ☐ Check Dams 6. X Structural Controls (Berms, Ditches, etc.)

7. ☐ Other (Please list) _____

VI. ADDITIONAL INFORMATION REQUIRED

A storm water pollution prevention plan has been prepared for this site and is to the best of my knowledge in Compliance with State and/or Local Sediment and Erosion Plans and Requirements.

Project Start Date:	Completion Date:	Estimated Area to be Disturbed (in Acres):	(Y or N) Y (A pollution prevention plan is required to be on hand before submittal of the NOI)
02/01/05	08/01/05	15	

VII. CERTIFICATION:

I certify under penalty of law that I have read and understand the *Part I.B.* eligibility requirements for coverage under the general permit for storm water discharges from construction activities.

I further certify that to the best of my knowledge, all discharges and BMPs that have been scheduled and detailed in a pollution prevention plan will satisfy requirements of *Part I.B.*, and *Part III.* of this permit.

I understand that continued coverage under this storm water general permit is contingent upon maintaining eligibility as provided for in *Part I.B.*

I also certify under penalty of law that this document and all attachments were prepared under the direction or supervision of those who have place their signature below, in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Print Name (of responsible person for the main operator from first page): KEITH THOMPSON – V.P. COVOL ENGINEERED FUELS, LC **Date:** _____

Signature: _____

Print Name (of responsible person for the 1st co-permittee from first page): _____ **Date:** _____

Signature: _____

Print Name (of responsible person for the 2nd co-permittee from first page): _____ **Date:** _____

Signature: _____

Print Name (of responsible person for 3rd co-permittee from first page): _____ **Date:** _____

Signature: _____

Amount of Permit Fee Enclosed: $100.00

APPENDIX C

NOI-MULTI-SECTOR GENERAL PERMIT FOR STORM WATER DISCHARGES ASSOCIATED WITH INDUSTRIAL ACTIVITIES

STATE OF UTAH, DEPARTMENT OF ENVIRONMENTAL QUALITY, DIVISION OF WATER QUALITY
288 North 1460 West, P.O. Box 144870, Salt Lake City, Utah 84114-4870 (801)538-6146

NOI

Notice of Intent (NOI) for Coverage Under the UPDES General Multi-Sector Storm Water Permit for Discharges Associated with Industrial Activity, Permit No. UTR000000. **INSTRUCTIONS ON BACK PAGE**

Submission of this Notice of Intent constitutes notice that the party identified in Section I of this form intends to be authorized by a UPDES permit issued for storm water discharges associated with industrial activity in the State of Utah. Becoming a permittee obligates such discharger to comply with the terms and conditions of the permit. ALL NECESSARY INFORMATION MUST BE PROVIDED ON THIS FORM. **A different NOI form is provided for construction activities disturbing over 5 acres.**

I. FACILITY OPERATOR INFORMATION

Name: COVOL ENGINEERED FUELS, LC Phone: 801-984-9400

Address: 10653 S. RIVERFRONT PARKWAY Status of Owner/Operator: P

City: SOUTH JORDAN State: U T Zip: 84095

Facility Contact Person: KEITH THOMPSON Phone: 801-984-9400

Facility Contact Person Title: VP COVOL ENGINEERED FUELS, LC

II. FACILITY SITE/LOCATION INFORMATION

Is the facility located on Indian Lands? (Y or N) N

Name: COVOL ENGINEERED FUELS, LC

Address: 1865 WEST RIDGE ROAD County: CARBON

City: WELLINGTON State: UT Zip: 84542

Latitude: 3 9 3 1 2 7 Longitude: 1 1 0 4 5 5 8 Quarter: S E
Section: 1 4 Township: 1 5 S Range: 1 0 E

Site Contact Person: KEITH THOMPSON Phone: 801-984-9400

Site Contact Person Title: C E O

III. SITE ACTIVITY INFORMATION

Name of Municipality which Operates the Storm Sewer System: _____

Receiving Water Body: PRICE RIVER

Is there existing quantitative storm water discharge data? NO
s

Is the facility required to do analytical monitoring? (See permit conditions Part V. and Sector monitoring requirements.) Yes

Is the facility required to do visual monitoring? (See permit conditions near the end of applicable Sector(s); Appendix A to AD) Yes

Is the facility required to submit monitoring data or retain it on site? (Submit) ☒ (Retain on site) ☒

Is This a New Facility, or is it an Existing Facility? (New) ☒ (Existing) ☐

If This is an Existing Facility, and the Start-up Date was After Oct. 1992, Please Fill in the Start-up Month: Month (Jan, Feb., etc.): _____ Year: _____

SIC or Designated Activity Code: Primary: 12 2nd: _____ 3rd: _____ 4th: _____

If You Have Other Existing UPDES Permits, Enter Permit #'s: _____

IV. SECTOR IDENTIFICATION:

The General Multi-Sector Permit covers all industrial activity that is required by law to be covered by a storm water permit. On the following pages the sectors are listed with a description of the industrial activity that is covered by that sector. Please check each sector that covers industrial activities which occur at your site. The sector covered in Appendix AD is the catch-all sector and should only be used if positively no other sector covers your industrial activity. If you should select AD, please call the Storm Water Coordinator at DWQ to discuss the need for choosing Sector AD (Non-Classified Facilities).

IV. SECTOR IDENTIFICATION: The General Multi-Sector Permit covers all industrial activity that is required by law to be covered by a storm water permit. On the following pages the sectors are listed with a description of the industrial activity that is covered by that sector. Please check each sector that covers industrial activities which occur at your site. The sector covered in Appendix AD is the catch-all sector and should only be used if positively no other sector covers your industrial activity. If you should select AD, please call the Storm Water Coordinator at DWQ to discuss the need for choosing Sector AD (Non-Classified Facilities).

☐ **A. Timber Products Facilities** -- establishments [generally classified under Standard Industrial Classification (SIC) Major Group 24] that are engaged in cutting timber and pulpwood, merchant sawmills, lath mills, shingle mills, cooperage stock mills, planing mills, and plywood and veneer mills engaged in producing lumber and wood basic materials; and establishments engaged in wood preserving or in manufacturing finished articles made entirely of wood or related materials, except for wood kitchen cabinet manufacturers (SIC Code 2434), which are addressed under sector W.

☐ **B. Paper and Allied Products Manufacturing Facilities** -- facilities engaged in the manufacture of pulps from wood and other cellulose fibers and from rags; the manufacture of paper and paperboard into converted products, such as paper coated off the paper machine, paper bags, paper boxes and envelopes; and establishments primarily engaged in manufacturing bags of plastic film and sheet. These facilities are commonly identified by Standard Industrial Classification (SIC) Major Group 26.

☐ **C. Chemical and Allied Products Manufacturing Facilities** -- 1) Basic industrial inorganic chemicals (including SIC 281), 2) Plastic materials and synthetic resins, synthetic rubbers, and cellulosic and other humanmade fibers, except glass (including SIC 282), 3) Soap and other detergents and in producing glycerin from vegetable and animal fats and oils; specialty cleaning, polishing, and sanitation preparations; surface active preparations used as emulsifiers, wetting agents, and finishing agents, including sulfonated oils; and perfumes, cosmetics, and other toilet preparations (including SIC 284), 4) Paints (in paste and ready-mixed form); varnishes; lacquers; enamels and shellac; putties, wood fillers, and sealers; paint and varnish removers; paint brush cleaners; and allied paint products (including SIC 285), 5) Industrial organic chemicals (including SIC 286), 6) Nitrogenous and phosphatic basic fertilizers, mixed fertilizer, pesticides, and other agricultural chemicals (including SIC 287), 7) Industrial and household adhesives, glues, caulking compounds, sealants, and linoleum, tile, and rubber cements from vegetable, animal, or synthetic plastics materials; explosives; printing ink, including gravure ink, screen process ink, and lithographic; miscellaneous chemical preparations, such as fatty acids, essential oils, gelatin (except vegetable), sizes, bluing, laundry sours, writing and stamp pad ink, industrial compounds, such as boiler and heat insulating compounds, metal, oil, and water treatment compounds, waterproofing compounds, and chemical supplies for foundries (including facilities with SIC 289), 8) Ink and paints, including china painting enamels, india ink, drawing ink, platinum paints for burnt wood or leather work, paints for china painting, artists' paints and artists' water colors (SIC 3952, limited to those listed; for others see sectorY.), 9) Medicinal chemicals and pharmaceutical products, including the grading grinding and milling of botanicals (including SIC 283).

☐ **D. Asphalt Paving, Roofing Materials, and Lubricant Manufacturing Facilities** -- 1) facilities engaged in manufacturing asphalt paving and roofing materials, including those facilities commonly identified by Standard Industrial Classification (SIC) codes 2951 and 2952, 2) portable asphalt plant facilities (also commonly identified by SIC code 2951), 3) facilities engaged in manufacturing lubricating oils and greases, including those facilities classified as SIC code 2992. Not covered are: 1) petroleum refining facilities, including those that manufacture asphalt or asphalt products and that are classified as SIC code 2911 (see sector I.), 2) oil recycling facilities (see sector N.), and 3) fats and oils rendering (see sectorU.).

☐ **E. Glass, Clay, Cement, Concrete, and Gypsum Product Manufacturing Facilities** -- manufacturing flat, pressed, or blown glass or glass containers; manufacturing hydraulic cement; manufacturing clay products including tile and brick; manufacturing of pottery and porcelain electrical supplies; manufacturing concrete products; manufacturing gypsum products; nonclay refractories; and grinding or otherwise treating minerals and earths. This section generally includes the following types of manufacturing operations: flat glass, (SIC code 3211); glass containers, (SIC code 3221); pressed and blown glass, not elsewhere classified, (SIC code 3229); glass products made of purchased glass (SIC code 3231) where material handling equipment or activities, raw materials, intermediate products, final products, waste materials, by-products, or industrial machinery are exposed to storm water; hydraulic cement, (SIC code 3241); brick and structural clay tile, (SIC code 3251); ceramic wall and floor tile, (SIC code 3253); clay refractories, (SIC code 3255); structural clay products not elsewhere classified (SIC code 3259); vitreous china plumbing fixtures, and china and earthen ware fittings and bathroom accessories (SIC code 3261); vitreous china table and kitchen articles (SIC code 3262); fine earthenware table and kitchen articles (SIC code 3263); porcelain electrical supplies, (SIC code 3264); pottery products, (SIC code 3269); concrete block and brick, (SIC code 3271); concrete products, except block and brick (SIC code 3272); ready-mix concrete, (SIC code 3273); lime (SIC code 3274); gypsum products, (SIC code 3275); cut stone and stone products (SIC code 3281); abrasive products (SIC code 3291); asbestos products (SIC code 3292); minerals and earths, ground or otherwise treated, (SIC code 3295); mineral wool (SIC code 3296); nonclay refractories, (SIC code 3297); and nonmetallic mineral products not elsewhere classified (SIC code 3299).

☐ **F. Primary Metals Facilities** -- coking operations, sintering plants, blast furnaces, smelting operations, rolling mills, casting operations, heat treating, extruding, drawing, or forging of all types of ferrous and nonferrous metals, scrap, and ore. Coverage includes the following types of facilities: 1) Steel works, blast furnaces, and rolling and finishing mills including: steel wiredrawing and steel nails and spikes; cold-rolled steel sheet, strip, and bars; and steel pipes and tubes (SIC code 331), 2) Iron and steel foundries, including: gray and ductile iron, malleable iron, steel investment, and steel foundries not elsewhere classified (SIC code 332), 3) Primary smelting and refining of nonferrous metals, including: primary smelting and refining of copper, and primary production of aluminum (SIC code 333), 4) Secondary smelting and refining of nonferrous metals (SIC code 334), 5) Rolling, drawing, and extruding of nonferrous metals, including: rolling, drawing, and extruding of copper; rolling, drawing, and extruding of nonferrous metals, except copper and aluminum; and drawing and insulating of nonferrous wire (SIC code 335), 6) Nonferrous foundries (castings), including: aluminum die-castings, nonferrous die-castings, except aluminum, aluminum foundries, copper foundries, and nonferrous foundries, except copper and aluminum (SIC code 336), 7) Miscellaneous primary metal products, not elsewhere classified, including: metal heat treating, and primary metal products, not elsewhere classified (SIC code 339).

☐ **G. Metal Mines (Ore Mining and Dressing)** -- active and inactive metal mining and ore dressing facilities [Standard Industrial Classification (SIC) Major Group 10] if the storm water has come into contact with, or is contaminated by, any overburden, raw material, intermediate product, finished product, byproduct, or waste product located on the site of the operation. SIC Major Group 10 includes establishments primarily engaged in mining, developing mines, or exploring for metallic minerals (ores) and also includes all ore dressing and beneficiating operations, whether performed at mills operated in conjunction with the mines served or at mills, such as custom mills, operated separately. For the purposes of this part of the permit, the term "metal mining" includes all ore mining and/or dressing and beneficiating operations, whether performed at mills operated in conjunction with the mines served or at mills, such as custom mills, operated separately. All storm water discharges from inactive metal mining facilities and the storm water discharges from the following areas of active, and temporarily inactive, metal mining facilities are the only discharges covered by this section of the permit: topsoil piles; offsite haul/access roads if off active area; onsite haul roads if not constructed of waste rock or if spent ore and mine water is not used for dust control; runoff from tailings dams/dikes when not constructed of waste rock/tailings and no process fluids are present; concentration building, if no contact with material piles; mill site, if no contact with material piles; chemical storage area; docking facility, if no excessive contact with waste product; explosive storage; reclaimed areas released from reclamation bonds prior to December 17, 1990; and partially/inadequately reclaimed areas or areas not released from reclamation bonds. Not covered are: 1) active metal mining facilities that are subject to the effluent limitation guidelines for the Ore Mining and Dressing Point Source Point Source Category (40 CFR Part 440). Coverage under this permit does not include adit drainage or contaminated springs or seeps at active facilities, temporarily inactive facilities, or inactive facilities. Also see permit conditions, Limitations on Coverage, *Part I.B.3.* 2) Storm water discharges associated with an industrial activity that the *Executive Secretary* has determined to be, or may reasonably be expected to be, contributing to a violation of a water quality standard, 3) Storm water discharges associated with industrial activity from inactive mining operations occurring on Federal lands where an operator cannot be identified.

☐ **H. Coal Mines and Coal Mine-Related Facilities** -- coal mining-related areas (SIC Major Group 12) if they are not subject to effluent limitations guidelines under *40 CFR Part 434*. Not covered are: inactive mining activities occurring on Federal lands where an operator cannot be identified.

☐ **I. Oil and Gas Extraction Facilities** -- oil and gas facilities listed under Standard Industrial Classification (SIC) Major Group 13 which are required to be permitted under *UAC R317-8-3.8(2)(a)3.* These include oil and gas exploration, production, processing, or treatment operations, or transmission facilities that discharge storm water contaminated by contact with or that has come into contact with any overburden raw material, intermediate products, finished products, by-products or waste products located

on the site of such operations." Industries in SIC Major Group 13 include the extraction and production of crude oil, natural gas, oil sands and shale; the production of hydrocarbon liquids and natural gas from coal; and associated oil field service, supply and repair industries. This section also covers petroleum refineries listed under SIC code 2911. Contaminated storm water discharges from petroleum refining or drilling operations that are subject to nationally established BAT or BPT guidelines found at 40 CFR 419 and 435 respectively are not included. [Note that areas eligible for coverage at petroleum refineries will be very limited because the term ``contaminated runoff," as defined under 40 CFR 419.11, includes ``... runoff which comes into contact with any raw material, intermediate product, finished product, by-product or waste product located on petroleum refinery property." Areas at petroleum refineries which may be eligible for permit coverage, provided discharges from these areas are not co-mingled with ``contaminated runoff," include: vehicle and equipment storage, maintenance and refueling areas. Most areas at refineries will not be eligible for coverage including: raw material, intermediate product, by-product, waste material, chemical, and material storage areas; loading and unloading areas; transmission pipelines, and, processing areas.] Not covered are: inactive oil and gas operations occurring on Federal lands where an operator cannot be identified are not covered by this permit.

☐ **J. Mineral Mining and Processing Facilities** -- active and inactive mineral mining and processing facilities (generally identified by Standard Industrial Classification (SIC) Major Group 14). Not covered are: 1) facilities associated with industrial activity which are subject to an existing effluent limitation guideline (*40 CFR Part 436*), 2) inactive mineral mining activities occurring on Federal lands where an operator cannot be identified are not eligible for coverage under this permit.

☐ **K. Hazardous Waste Treatment Storage or Disposal Facilities** -- facilities that treat, store, or dispose of hazardous wastes, including those that are operating under interim status or a permit under subtitle C of RCRA. [Disposal facilities that have been properly closed and capped, and have no significant materials exposed to storm water, are considered inactive and do not require permits (*UAC R317-8-3.8(6)(c)*).]

☐ **L. Landfills and Land Application Sites** -- waste disposal at landfills, land application sites, and open dumps that receive or have received industrial wastes. Open dumps are solid waste disposal units that are not in compliance with Sate/Federal criteria established under RCRA Subtitle D. Not covered are: inactive landfills, land application sites, and open dumps occurring on Federal lands where an operator cannot be identified.

☐ **M. Automobile Salvage Yards** -- facilities engaged in dismantling or wrecking used motor vehicles for parts recycling or resale and for scrap (SIC Code 5015).

☐ **N. Scrap Recycling and Waste Recycling Facilities** -- facilities that are engaged in the processing, reclaiming and wholesale distribution of scrap and waste materials such as ferrous and nonferrous metals, paper, plastic, cardboard, glass, animal hides (these types of activities are typically identified as SIC code 5093). Facilities that are engaged in reclaiming and recycling liquid wastes such as used oil, antifreeze, mineral spirits, and industrial solvents (also identified as SIC code 5093) are also covered under this section. Separate permit requirements have been established for recycling facilities that only receive source-separated recyclable materials primarily from non-industrial and residential sources (also identified as SIC 5093) (e.g., common consumer products including paper, newspaper, glass, cardboard, plastic containers, aluminum and tin cans). This includes recycling facilities commonly referred to as material recovery facilities (MRF).

☐ **O. Steam Electric Power Generating Facilities** -- steam electric power generating facilities, including coal handling areas. Non-storm water discharges subject to effluent limitations guidelines are not covered by this permit. Storm water discharges from coal pile runoff subject to numeric limitations are eligible for coverage under this permit, but are subject to the limitations established by *40 CFR 423*. Not covered are: ancillary facilities such as fleet centers, gas turbine stations, and substations that are not contiguous to a steam electric power generating facility are not covered by this permit. Heat capture co-generation facilities are not covered by this permit; however, dual fuel co-generation facilities are included.

☐ **P. Vehicle Maintenance or Equipment Cleaning areas at Motor Freight Transportation Facilities, Passenger Transportation Facilities, Petroleum Bulk Oil Stations and Terminals, the United States Postal Service, or Railroad Transportation Facilities** -- ground transportation facilities and rail transportation facilities (generally identified by Standard Industrial Classification (SIC) codes 40, 41, 42, 43, and 5171), that have vehicle and equipment maintenance shops (vehicle and equipment rehabilitation, mechanical repairs, painting, fueling and lubrication) and/or equipment cleaning operations are eligible for coverage under this section. Also covered under this section are facilities found under SIC code 4221-4225 (public warehousing and storage) that do not have vehicle and equipment maintenance shops and/or equipment cleaning operations but have areas (exclusive of access roads and rail lines) where material handling equipment or activities, raw materials, intermediate products, final products, waste materials, by-products or industrial machinery are exposed to storm water.

☐ **Q. Vehicle Maintenance Areas and Equipment Cleaning Areas of Water Transportation Facilities** -- water transportation facilities that have vehicle (vessel) maintenance shops and/or equipment cleaning operations. The water transportation industry includes facilities engaged in foreign or domestic transport of freight or passengers in deep sea or inland waters; marine cargo handling operations; ferry operations; towing and tugboat services; and marinas (facilities commonly identified by SIC code Major Group 44).

☐ **R. Ship or Boat Building and Repair Yards** -- facilities engaged in ship building and repairing and boat building and repairing (SIC code 373).

☐ **S. Vehicle Maintenance Areas, Equipment Cleaning Areas or Airport Deicing Operations located at Air Transportation Facilities** -- establishments and/or facilities including airports, air terminals, air carriers, flying fields, and establishments engaged in servicing or maintaining airports and/or aircraft (generally classified under Standard Industrial Classification (SIC) code 45) which have vehicle maintenance shops, material handling facilities, equipment cleaning operations or airport and/or aircraft deicing/anti-icing operations. For the purpose of this permit, the term "deicing" is defined as the process to remove frost, snow, or ice and "anti-icing" is the process which prevents the accumulation of frost, snow, or ice. Only those portions of the facility or establishment that are either involved in vehicle maintenance (including vehicle rehabilitation, mechanical repairs, painting, fueling, and lubrication), equipment cleaning operations, or deicing/anti-icing operations are addressed under this section.

☐ **T. Wastewater Treatment Works** -- treatment works treating domestic sewage or any other sewage sludge or wastewater treatment device or system, used in the storage, treatment, recycling, and reclamation of municipal or domestic sewage, including lands dedicated to the disposal of sewage sludge that are located within the confines of the facility with a design flow of 1.0 MGD or more, or required to have an approved pretreatment program under *40 CFR Part 403*.

☐ **U. Food and Kindred Products Facilities** -- food and kindred products processing facilities (commonly identified by Standard Industrial Classification (SIC) code 20), including: meat products; dairy products; canned, frozen and preserved fruits, vegetables, and food specialties; grain mill products; bakery products; sugar and confectionery products; fats and oils; beverages; and miscellaneous food preparations and kindred products and tobacco products manufacturing (SIC Code 21), except for storm water discharges identified under paragraph I.B.3. where industrial plant yards; material handling sites; refuse sites; sites used for application or disposal of process wastewaters; sites used for storage and maintenance of material handling equipment; sites used for residential treatment, storage, or disposal; shipping and receiving areas; manufacturing buildings; and storage areas for raw material and intermediate and finished products are exposed to storm water and areas where industrial activity has taken place in the past and significant materials remain. For the purposes of this paragraph, material handling activities include the storage, loading, and unloading, transportation, or conveyance of any raw material, intermediate product, finished product, by-product, or waste product.

☐ *V. **Textile Mills, Apparel and other Fabric Product Manufacturing Facilities** – Textile Mill Products, of and regarding facilities and establishments engaged in the preparation of fiber and subsequent manufacturing of yarn, thread, braids, twine, and cordage, the manufacturing of broad woven fabrics, narrow woven fabrics, knit fabrics, and carpets and rugs from yarn; processes involved in the dyeing and finishing of fibers, yarn fabrics, and knit apparel; the integrated manufacturing of knit apparel and other finished articles of yarn; the manufacturing of felt goods (wool), lace goods, nonwoven fabrics; miscellaneous textiles, and other apparel products (generally described by SIC codes 22 and 23). This section also covers facilities engaged in manufacturing finished leather and artificial leather products (SIC 31, except 3111).*

☐ *W. **Furniture and Fixture Manufacturing Facilities** – facilities involved in the manufacturing of: wood kitchen cabinets (generally described by SIC code 2434); household furniture (generally described by SIC code 251); office furniture (generally described by SIC code 252); public buildings and related furniture (generally described by SIC code 253); partitions, shelving, lockers, and office and store fixtures (generally described by SIC code 254); and miscellaneous furniture and fixtures (generally described by SIC code 259).*

☐ *X. **Printing and Publishing Facilities** – newspaper, periodical, and book publishing or publishing and printing (SIC Codes 2711-2731); book printing (SIC Code 2732); miscellaneous publishing (SIC Code 2741); commercial printing, lithographic (SIC Code 2752); commercial printing, gravure (SIC Code 2754); commercial printing, not elsewhere classified (SIC Code 2759); manifold business forms, greeting cards, bankbooks, looseleaf binders and devices, bookbinding and related work, and typesetting (SIC Codes 2761-2791); and, plate making and related services (SIC Code 2796).*

☐ *Y. **Rubber and Miscellaneous Plastic Product Manufacturing Facilities** – rubber and miscellaneous plastic products manufacturing facilities (SIC major group 30) and miscellaneous manufacturing industries, except jewelry, silverware, and plated ware (SIC major group 39, except 391).*

☐ *Z. **Leather Tanning and Finishing Facilities** – leather tanning, currying and finishing (commonly identified by Standard Industrial Classification (SIC) code 3111). Discharges from facilities that make fertilizer solely from leather scraps and leather dust are also covered under this section.*

☐ *AA. **Facilities That Manufacture Metal Products including Jewelry, Silverware and Plated Ware** – fabricated metals industry listed below, except for electrical related industries: fabricated metal products, except machinery and transportation equipment, SIC 34, and jewelry, silverware, and plated ware (SIC Code 391).*

☐ *AB. **Facilities That Manufacture Transportation Equipment, Industrial or Commercial Machinery** – transportation equipment, industrial or commercial machinery manufacturing facilities (commonly described by SIC Major Group 35 except SIC 357, and SIC Major Group 37, except SIC 373). Common activities include: industrial plant yards; material handling sites; refuse sites; sites used for application or disposal of process wastewaters; sites used for storage and maintenance of material handling equipment; sites used for residual treatment, storage, or disposal; shipping and receiving areas; manufacturing buildings; storage areas for raw material and intermediate and finished products; and areas where industrial activity has taken place in the past and significant materials remain and are exposed to storm water.*

☐ *AC. **Facilities That Manufacture Electronic and Electrical Equipment and Components, Photographic and Optical Goods** – facilities that manufacture: electronic and other electrical equipment and components, except computer equipment (SIC major group 36); measuring, analyzing, and controlling instruments; photographic, medical and optical goods; watches and clocks (SIC major group 38) and computer and office equipment (SIC code 357).*

☐ ***AD. Non-Classified Facilities** – facilities that meet the definition of storm water associated with industrial activity (UAC R317-8-3.8(6)(c) & (d),* except for construction activities as defined under *UAC R317-8-3.8(6)(d)10.*) but, can not be classified in another industrial sector (i.e., sectors A to AC), and are not excluded from permit coverage elsewhere in this permit; or, the *Executive Secretary* has designated as needing a storm water permit under *UAC R317-8-3.8(1)(a)5.* Should conditions at a facility covered by this section change and industrial activities in another section(s) contained in sectors A to AC apply, the facility shall comply with any and all applicable monitoring and pollution prevention plan requirements of the other section(s) in addition to those contained in this section. The monitoring and pollution prevention plan terms and conditions of this permit are additive for industrial activities being conducted at the same industrial facility (co-located industrial activities). The operator of the facility shall determine which monitoring and pollution prevention plan section(s) of this permit (if any) are applicable to the facility.

***V. CERTIFICATION**: I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.*

Print Name: KEITH THOMPSON *Date:*

Signature: *Amount of Permit Fee Enclosed:* $ 200.00

APPENDIX D

GUIDELINES ASSOCIATED WITH STORM WATER DISCHARGES

Guidelines Associated with Storm Water Discharge from Construction Activities

Prevent a mixture of non storm water discharge with construction storm water discharge.

All discharges under this permit must be made up entirely of storm water, unless the mixed discharge meets UPDES standards which include TDS, TSS, pH, Total Iron. Water discharges may not contain detergents, oils, greases, toxic or hazardous materials, or solvents.

If storm water containing any of the following components is released from the site, the plant manager or foreman must be **notified immediately**.

Detergents
Oils
Greases
Toxic or hazardous materials, or
Solvents
Concrete
Asphalt

The plant manager must immediately notify the Division of Water Quality of the release, **if** the release is **in excess of established reportable quantities**.

(801) 538-6146 OR (801) 536-4123 (24 Hour Number)

Erosion and Sediment Controls

Erosion and Sediment Controls must be constructed and maintained during construction activities.
Sediment will be removed at a sufficient frequency to minimize offsite impacts.
Sediment will be removed from berms and ponds when the designed capacity has been reduced by 50%.

Stabilization Practices

Preserve existing vegetation.
Incorporate seeding, mulching, geotextiles, and other appropriate measures to stabilize disturbed soils.
Divert flows from exposed soils with silt fences, earth dikes, swales, sediment traps or basins.

Inspections

Qualified personnel will inspect disturbed areas of the construction site at least once every fourteen days (14), before anticipated storm events and within 24 hours of a storm event that is 0.5 inches or greater. Unless site is in an **arid period**, then inspections shall be conducted at least **once every month**.

Inspections shall include:

Drainage Systems
Sediment Control Measures
Erosion
Offsite Sediment Tracking by Vehicles

Inspection Reports will include:

Inspectors Name, Date of Inspection, Major Observations, Actions Taken to Repair Sediment Structures, Incidents of Non Compliance

Reports will be retained for three years (3) after the completion of the construction project.

APPENDIX E

NOT-NOTICE OF TERMINATION FOR STORM WATER DISCHARGES ASSOCIATED WITH CONSTRUCTION ACTIVITY

STATE OF UTAH, DEPARTMENT OF ENVIRONMENTAL QUALITY, DIVISION OF WATER QUALITY
288 North 1460 West, P.O. Box 144870, Salt Lake City, Utah 84114-4870

NOT

Notice of Termination (NOT) for Storm Water Discharges Associated with Construction Activity Under the UPDES General Permit No. UTR100000. **SEE REVERSE FOR INSTRUCTIONS**

Submission of this Notice of Termination constitutes notice that the operator identified in Section II of this form is no longer authorized to discharge storm water associated with industrial activity under the UPDES program. ALL NECESSARY INFORMATION MUST BE PROVIDED ON THIS FORM.

I. Permit Information

UPDES Storm Water General Permit Number: UTR101090

Check Here if You are No Longer the Operator of the Facility: X Check Here if the Storm Water Discharge is Being Terminated:

II. Facility Operator Information

Name: TERRA SYSTEMS INC Phone: 435-637-2470

Address: P. O. BOX 1673

City: PRICE State: UT Zip: 84501

III. Facility Site/Location Information

Name: TERRA SYSTEMS INC

Address: 1865 WEST RIDGE ROAD County: CARBON

City: WELLINGTON State: UT Zip: 84542

Latitude: 39 31 27 Longitude: 110 45 58

IV. Certification: I certify under penalty of law that either: a) all storm water discharges associated with construction activity from the portion of the identified facility where I was an operator have ceased or have been eliminated or b) I am no longer an operator at the construction site and a new operator has assumed operational control for those portions of the construction site where I previously had operational control. I understand that by submitting this notice of termination, I am no longer authorized to discharge storm water associated with construction activity under this general permit, and that discharging pollutants in storm water associated with construction activity to waters of the State is unlawful under the State of Utah Water Quality Act where the discharge is not authorized by a UPDES permit. I also understand that the submittal of this notice of termination does not release an operator from liability for any violations of this permit or the Water Quality Act.

Print Name: CLAYTON TIMOTHY

Date: 12/30/04

Signature: FOR TERRA SYSTEMS, INC.
Jay K. Mann

APPENDIX 7-4

Spill Prevention, Control and
Countermeasure Plan

SPILL PREVENTION CONTROL AND COUNTERMEASURE PLAN

COVOL ENGINEERED FUELS, LC
1865 WEST RIDGE ROAD
WELLINGTON, UT 84542

ORIGINAL DATE OF PLAN/P.E. CERTIFICATION: November 2005

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1. FACILITY OWNER AND OPERATOR

A. Corporate Headquarters, Address, and Telephone:

Headwaters Incorporated
10653 So. River Front Parkway, Suite 300
Salt Lake City, Utah 84095
(801) 984-9400

B. Facility Operator, Address, and Telephone:

Covol Engineered Fuels, LC
1865 West Ridge Road
Wellington, UT 84542
Telephone: (435) 613-1631

2. FACILITY CONTACT(S):

Name	Title	Telephone
Mike Gipson	Plant Manager	(435) 613-1631

3. FACILITY CONFORMANCE [112.7(a)]:

A. Conformance [112.7 (a)(1)]

The facility intends to comply with the requirements of this Section. Details regarding the compliance with the requirements of Section 112.7 (a) are contained in this SPCC Plan.

The facility is new as of November 2005 and has not experienced any leaks or spill events. Should the facility experience spills they will be documented, reported according to applicable regulations and discussed in future updates of this plan.

B. Deviation from Requirements [112.7 (a)(2)]

The Facility does not plan to deviate from the requirements of Section 112.7 (a); therefore no variance is being requested.

C. Facility Description [112.7 (a)(3)]

Covol Engineered Fuels, LC operates a coal cleaning facility at 1865 West Ridge Road, Wellington, Utah. The facility produces coal-related products for commercial sale.

The facility has an area for feedstock handling and storage, an area containing coal cleaning equipment and an area for finished product storage. The facility is fenced with locked gate access.

In order to facilitate processing operations an aboveground storage tank within a secondary containment structure has been installed at a centralized location. Equipment maintenance needs will be taken care of offsite. Used oil will not be accumulated on site. There are no

underground oil storage tanks (UST) at this facility. The overall facility layout is shown in Figure 3-1, Facility Site Map, including the petroleum product storage area.

Facility Product Storage Inventory (Typical Volumes) [112.7(a)(3)(i)]:

ABOVEGROUND STORAGE

Tank ID No.	Contents	Volume (gallons)
Tank No. 1	Diesel Fuel	8,500
Drums/Containers (number varies)	Oil and Grease	5 to 55 per drum/container
	Total Fixed Storage Volume:	8,500 gallons
	Variable Storage Volume:	Up to 500 gallons
	Total Storage Volume:	9,000 gallons

Discharge Prevention Measures [112.7(a)(3)(ii)]

A secondary containment has been constructed for the single diesel storage tank and another for the storage of various sized drums and containers, to prevent any spilled petroleum products in storage from reaching water of the United States. In addition, berms, culverts, ditches and detention ponds constructed to control stormwater runoff would also prevent oil from leaving the site. See Section 13 for loading and unloading procedures.

Discharge and Drainage Controls [112.7(a)(3)(iii)]

The nearest water body is the Price River, approximately two miles east of the Facility.

Berms, drainage ditches, and culverts direct operational area drainage into detention ponds. These detention ponds have the potential to receive and hold operational drainage and an unexpected release of oil from equipment or the oil storage areas. Figure 3-1 shows the facility layout and surface drainage direction of flow.

The Facility has been designed whereby drainage from undisturbed watershed areas is diverted away from the operational area with the use of berms, culverts, and diversion ditches.

Countermeasures [112.7(a)(3)(iv)]

Ideally, spill prevention measures would prevent a spill from occurring at the facility. However, a spill may still occur. Using the procedures listed below minor spills that are confined to small areas will be cleaned up as part of the ordinary operating procedure

Procedures to follow in the event of a spill:

- Terminate source of flow - plugging and/or closing valve(s).
- Confine spill - berming, and trenching.
- Prevent from entering waterway.
- Notify Plant Manager or Plant Supervisor.
- Clean up - Absorb liquid with absorptive material before removing contaminated soil and other media.

- Disposal - Dispose of absorbent material and contaminated media only after conferring with the Plant Manager.
- Report – Complete the facility Spill Reporting Form (Appendix E), report clean-up activities identify cause and determine remedial action. Evaluate whether or not the spill must be reported to EPA Region 8 (for two or more spills in excess of 42 gallons each within a 12 month period or a single spill in excess of 1,000 gallons).

Direct Countermeasures

Direct countermeasures outlined below have been designed to mitigate the possibility of oil reaching a waterway. Employees will undertake these countermeasures immediately and especially when there is danger of oil entering a waterway or in case of a spill of significant size. Countermeasures include the necessary action to terminate the source of the flow of oil.

Dig a trench or dike, build a berm, use appropriate oil-absorbent materials or do whatever else is necessary to confine the area or to stop oil from entering a waterway. After this is accomplished, immediately initiate the reporting procedure. After the countermeasures and reporting functions have been accomplished, cleanup will begin as detailed below:

Who to Contact for Cleanup

In the case of small spill less than 10 gallons and confined to the facility area, the cleanup operation will be conducted by Plant employees under the direction of the Plant Manager.

In the case of a spill over 10 gallons, the Plant Manager and the Regional Environmental Manager must be notified. If the Plant Manager decides outside help is required the Plant Manager can contact one of the following contactors.

Nielson Construction
750 East Ridge Road
Price, Utah 84501
(435) 636-8514

Rocky Mountain Excavation
6065 East North Coal Creek Road
Wellington, Utah 84542
(435) 637-9322

Cleanup Materials and Equipment

Spill control equipment at the facility includes absorbent pads and booms, granular absorbent material, shovels, and various earth moving equipment. A spill kit containing absorbent materials will be placed adjacent to the containment area.

Clean-up Procedures

For a spill on gravel or soil, it may be possible to absorb some of the liquid with absorptive material before removing the gravel or soil. All contaminated gravel or soil must be removed and discarded properly.

A spill on solid surfaces may be collected with absorptive materials and then cleaned thoroughly with rags. Sufficient quantities of absorbent material will be maintained adjacent to the containment area and other cleanup equipment will be available at the facility to accomplish cleanup.

Disposal of Contaminated Materials [112.7(a)(3)(v)]

When cleaning up diesel or oil, all spent cleanup material such as rags, absorbents, blankets, booms, and etc., must be disposed of in accordance with company's approved procedures.

Contact List and Phone Numbers [112.7(a)(3)(vi)]

When a petroleum spill in excess of 10 gallons is detected the following company personnel will be notified:

- Plant Manager, (435) 613-1631
- Plant Supervisor, (435) 613-1631
- Steven Van Ootegham, Regional Environmental Manager, (801) 984-3777

Reportable Spill Under 110 or 112

According to SPCC rule Section 112.4 (a) facilities that store, transfer, use or consume oil and oil productions (112.1(b) are accountable to report spills or releases of oil that enters into or upon the navigable water of the United States or adjoining shorelines in harmful quantities.

A spill becomes reportable to the appropriate regulatory agency whenever a SPCC regulated facility has a:

(1) discharge of more than 1,000 U.S. gallons of oil in a single discharge as described in 112.1(b)

or

(2) discharge of more than 42 gallons of oil as described in 112.1(b) in each of 2 discharges within any 12-month period.

The following agencies will be verbally notified in the event of a spill of oil that may be harmful as defined in 40 CFR 110 and 112. Verbal notification to the agencies must be made within 24 hours of a legally reportable spill. In Utah, legally reportable spills are reported to:

U.S. Environmental Protection Agency
Denver Place, Suite 1300
999 18th Street
Denver, CO 80202-2413
Permits and Technical Support Branch
(800) 227-8917

Utah Division of Environmental Quality
Division of Environmental Response and Remediation
168 North 1950 West
P.O. Box 144840
Salt Lake City, UT 84114-4840
(801) 536-4123

These agencies may require follow-up written reports depending on the magnitude and quantity of the spill. The Regional Environmental Manager will be responsible for coordinating agency(s) notification and correspondence with regulatory agency(s) following an incident.

The National Response Center requires notification if a discharge of oil causes a discoloration or "sheen" on the surface of water, violates water quality standards or causes a sludge or emulsion to be deposited beneath the surface or on the adjoining shorelines.

National Response Center (800) 424-8802 or (202)267-2675

A spill is defined as a discharge of oil in harmful quantities into navigable water of the United States or adjoining shorelines. (40CFR 112.2) Harmful Quantity means any discharge of oil into or upon waters of the United States that may be harmful to the public health or welfare of the United State, including discharges of oil that violate applicable water quality standards or cause a film or sheen upon or discoloration of the surface of the water or adjoining shoreline or cause sludges or emulsion to be deposited beneath the surface of the water or upon adjoining shorelines. (40 CFR 110.3).

Not Reportable Under 110 or 112

Small spills not reportable under 40 CFR 110 and 112 will be cleaned up as noted above.

D. Reporting Procedure [112.7 (a)(4)]

A spill becomes reportable to the appropriate regulatory agency whenever a SPCC regulated facility has a:

(1) discharge of more than 1,000 U.S. gallons of oil in a single discharge as described in 112.1(b)

or

(2) discharge of more than 42 gallons of oil as described in 112.1(b) in each of 2 discharges within any 12-month period.

When reporting discharges, the following information should be provided to the agencies:

The Company name, address and phone number.
Responsible company/person, including their address and telephone number.
Date, time, and type of incident (e.g., discharge or fire).
Quantity and type of material discharged.

Address of facility.
Waterways affected, if any, including amount of hazardous substance reaching water.
Description of circumstances causing discharge.
Description of methods used to stop and contain spill.
Describe actions used to remove and mitigate the effects of the discharge.
Description and estimate of any third party damages.
If applicable, any injuries associated with spill.
Procedures, methods, and precautions instituted to prevent a recurrence.
And the estimated quantity and disposition of recovered materials, if any.
Other pertinent information specific to the discharge.

A copy of the reporting form is provided in Appendix E.

E. Response Plan [112.7 (a)(5)]

The procedures to be used when responding to a spill are contained in Section 3 and Appendix E.

4. POTENTIAL SPILL PREDICTIONS, VOLUMES, RATES, AND CONTROL [112.7 (b)]

The potential for a spill or releases to leave the property is slight due to the redundant controls and the size of the facility relative to the volumes stored on site and the porous nature of the soils at the site. The initial control for Tank #1 is the tank's secondary containment. The initial control for the various oil containers stored at the facility is the secondary containment. Backup containment exists in the berms, diversion/drainage ditches, and detention ponds at the facility. The location and layout of facility 's prevention measures are shown on Figure 3-1.

POTENTIAL SPILL PREDICTIONS, VOLUMES, RATES AND CONTROL [112.7(b)]

Source	**#1 Diesel Tank**	**#2 Various Containers (5 to 55 gallons)**
Type of Failure	Rupture, Hose, Valve Failure	Rupture/puncture
Volume (Gallons)	8,500	55
Rate (Gallons/hour)	Variable – event dependent	Variable – event dependent
Direction of Flow	Containment or Southwest	Containment or Southwest
Net Secondary Containment (Gallons)		67.3

5. DRAINAGE CONTROL DIVERSION STRUCTURES AND CONTAINMENT [112.7 (c)]

The diesel storage tank and other oil containers are enclosed within a steel secondary containment structure. The containment structures are capable of holding the volume of the largest oil container within each structure, plus the 25-year, 24-hour storm precipitation event for uncovered containment areas (approximately 2.2 inches of precipitation). The containment structures will have drains with locking valves.

6. DRAINAGE CONTROL [112.8(b)]

A. Facility Drainage Systems and Equipment

The initial control for the diesel tank is it's secondary containment. Backup containment exists in the berms, diversion/drainage ditches, and detention ponds for the facilities. The tank containment has no connections to a sewer system.

To maintain containment capacity, when no oil sheen is present, the operator will manually drain or pump water from the secondary containment to one of the detention ponds. The required information associated with each drainage event will be recorded. When oil sheen is present the content of the containment structure will be collected by a licensed recycling or disposal company.

Surface water drainage reports to one of the two detention ponds, which provides control and treatment prior to release from the site. When oil is present, it will be collected with absorbent materials (pads, booms, etc.) or skimmed off for disposal or recycling at a licensed facility.

B. Final Discharge of Drainage

Prior to discharge, runoff from the facility reports to one of the detention ponds. The ponds are equipped with a spillway, which acts as an outlet control structure to provide detention time prior to final discharge. Drainage features are shown on Figure 3-1.

The detention ponds are checked periodically during normal operations and during storm events. If present, oil is removed with absorbent booms or pads or skimmed off for disposal or recycling at a licensed facility.

7. BULK STORAGE TANKS AND SECONDARY CONTAINMENT [112.8(c)]

A. Tank Compatibility

The storage tank is constructed of carbon steel with painted exterior and is compatible with the material stored inside. The tank conforms to all applicable building and fire codes.

B. Containment Volume for Storage Tanks

The containment structure is capable of containing the volume in the largest tank/container within the containment area plus the 25-year, 24-hour storm precipitation event. The net volume for secondary containment structures is shown in Table 4-1. Calculation sheets for the net volume of the secondary containment are contained in Appendix A.

Secondary containment protection for service trucks, equipment, fueling facilities, loading/unloading areas are provided by berms, drainage/diversion ditches, and detention ponds.

C. Containment Area Inspection and Drainage of Stormwater

When required prior to manually draining or pumping accumulated water from the secondary containment, the operator will perform a careful visual examination of accumulated water for oil or oil sheen. Further requirements for draining of secondary containment areas by the operators are contained on the Drainage Discharge Report Form in Appendix B. Record keeping requirements for these forms are discussed in Section 6, Part E.

The ponds are all constructed and operated as described above. The ponds are inspected periodically and during storm events. If oil is present, it is removed with the use of absorbent materials (pads, booms, etc.) or skimmed off for off-site disposal.

D. Corrosion Protection of Buried Metallic Storage Tanks

Not applicable - No underground storage tanks or buried oil conveyance piping.

E. Corrosion Protection of Partially Buried Metallic Storage Tanks

Not applicable - No partially buried storage tanks.

F. Aboveground Tank Periodic Inspection

Users/operators visually observe tanks, supports, and foundations for signs of deterioration and/or leaks which might cause a release or accumulation of hydrocarbons within the tank's secondary containment. Concerns are reported to the Plant Manager or Plant Supervisor. Visible leaks from tank seams, rivets, or bolts that may lead to accumulation of oil within the secondary containment are repaired.

Fifty-five gallon drums and five-gallon cans on-site are observed for excessive external corrosion on a regular basis. Formal inspection of drums includes moving the drum so that all exterior surfaces can be observed. Any drum with rust blisters or flakes of rust is replaced.

Fixed storage tanks and secondary containment structures are inspected annually following the Facility Inspection Checklist contained in Appendix C. Record keeping requirements for these forms are discussed in Section 10.

G. Control of Leakage Through Internal Heating Coils

Not applicable.

H. Good Engineering Practices

Each container to be filled is inspected manually to ensure sufficient volume prior to the start of the filling process. The supplier and/or facility personnel will monitor the tank and gauges during the entire filling process of bulk storage containers to ensure it is not over filled (40CFR112.8(c)(8)(iv).

I. Observation of Disposal Facilities for Effluent Discharge

Secondary containment structures are routinely observed during operation and are inspected annually. Any oil present is removed prior to manual draining or pumping by using absorbent materials (pads, booms, etc.) or skimmed for off-site disposal.

System failure will require shut down by supplier or facility operator until the problem can be corrected. A release during loading/unloading or from a service truck will drains to the detention ponds where it will be collected and removed as discussed in Section 6, Part A.

J. Visible Oil Leak Corrections from Tank Seams and Gaskets

Visible oil leaks from tank seams, rivets, or bolts that may lead to accumulation of oil within the secondary containment is reported to the Plant Manager of Plant Supervisor and repaired by plant personnel. If repairs cannot be made immediately, temporary repairs are performed until permanent repairs are made. Plant personnel will clean up oil released following completion of the repairs.

K. Appropriate Positions of Mobile Oil Storage Tanks

Not Applicable.

8. FACILITY TRANSFER OPERATIONS [112.8(d)]

Not Applicable. No buried or aboveground pipeline.

A. Buried Piping Installation Protection and Examination

Not Applicable.

B. Not-In-Service and Standby Service Terminal Connections

Loading and unloading terminal connections to storage tanks are capped when not in use. There are no out of service lines at this facility.

C. Pipe Supports Design

Steel pipe supports, where required, are anchored to the localized secondary containment floors and walls. Pipelines are short and contained within the containment structure. This eliminates the need for expansion loops.

D. Aboveground Valve and Pipeline Examination

Users/operators visually observe piping and valves for signs of deterioration and/or leaks when in use. Any sign of deterioration or leakage that might cause a release or accumulation of oil inside a containment area is reported to the Plant Manager or Plant Supervisor. Visible leaks at flanges, valves, or fittings, which may lead to accumulation of oil in the secondary containment, are promptly repaired.

Valves are inspected annually by following the Facility Inspection Checklist contained in Appendix C. Record keeping requirements for these forms are discussed in Section 10.

E. Vehicle Traffic

The tank is aboveground, anchored, and contained within a secondary containment structure. The tank location and containment assist in protecting the tank from vehicular traffic.

9. PRACTICALITY OF INSTALLATION OF REQUIRED STRUCTURES [112.7(d)]

Secondary containment is practical and currently in use for all storage tanks and oil containers at this facility.

10. INSPECTIONS, TESTS AND RECORDS [112.7(e)]

In addition to annual inspections, the storage tanks and corresponding secondary containment systems containing petroleum product are inspected by an engineer every five years in conjunction with the review and re-certification of this SPCC plan. Inspection of the loading/unloading facilities and security features are also included. These inspections are documented and signed by the inspector on the Facility Inspection Checklist. Blank checklists are contained in Appendix C and completed checklists are maintained for three years in Appendix F.

11. PERSONNEL TRAINING AND SPILL PREVENTION PROCEDURES [112.7(f)]

A. Personnel instructions [112.7(f)(1)]

All new employees are trained in spill prevention and are made familiar with the SPCC Plan as part of their initial training. Regular refresher safety training also addresses spill prevention and response. Training records for personnel are maintained at the facility.

B. Designated Person Accountable for Spill Prevention [112.7(f)(2)]

The Plant Manager is the designated responsible person accountable for spill prevention.

C. Spill Prevention Briefings [112.7(f)(3)]

Spill prevention issues are regular topics at safety meetings, thus fulfilling the requirement of annual spill prevention briefings. In the event of a spill, spill prevention policies would be reviewed following the spill response. The spill response process will be reviewed and suggestions for improvement discussed.

12. SITE SECURITY [112.7(g)]

A. Fencing [112.7(g)(1)]

The Facility is fenced and gated. The gate to the facility remains open during operating hours and shut and locked when the facility is not in operation.

B. Flow Valves Locked [112.7(g)(2)]

All drain valves permitting an outward flow of fuel from storage tanks and local secondary containment drains have on-off type valves that remain securely locked in the closed position when not in use.

C. Starter Controls Locked [112.7(g)(3)]

The facility has a fixed tank storage area with a fueling station for equipment. The fueling station has manual locks to control fueling.

D. Pipeline Loading/Unloading Connections Securely Capped [112.7(g)(4)]

All loading and unloading connections on storage tanks are capped with threaded or cam type caps. These caps are removed only during filling or draining operations and are replaced at the end of the operation.

E. Lighting Adequate to Detect Spills [112.7(g)(5)]

The facility has yard lights sufficient to illuminate storage, maintenance, and fueling areas. These yard lights are sufficient to observe any release, vandalism, or equipment problems during nighttime operations.

13. FACILITY LOADING/UNLOADING OPERATIONS [112.7(h)]

Loading/unloading procedures for supplier tank trucks meet or exceed the minimum requirements and regulations of the Department of Transportation as set forth in 40 CFR 112.7. No rail tank cars are used at this facility.

Though the loading/unloading area does not have localized secondary containment the area is provided secondary containment by the berms, drainage/diversion ditches, and detention ponds that protect the operational facility as previously discussed in Sections 3 and 6.

A. Secondary Containment for Vehicles Adequate [112.7(h)(1)]

The tank truck loading/unloading areas are unpaved. These areas do not have localized secondary containment features. However, all areas drain to a detention pond. This pond has sufficient volume to store the entire contents of the largest single compartment of a tanker truck servicing the facility (approximately 10,000 gallons) or piece of equipment being fueled (approximately 175 gallons) except in the event of a 25-year storm event. In the event of a 25-year 24-hour storm, absorbent booms will be deployed at the pond overflow spillway to provide capture and additional storage for oil products.

B. Warning System for Vehicles [112.7(h)(2)]

Warning and instructions for loading/unloading are posted on all tank truck, including instructions for disconnecting all flexible transfer lines. Supplier personnel are present during all loading/unloading of storage tanks. Operating personnel are present during all fueling

operations for equipment. These personnel assure all lines are properly connected and disconnected as necessary.

C. Vehicles Examined for Lowermost Drainage Outlets Before Leaving [112.7(h)(3)]

Prior to the departure of any tank truck from the loading/unloading areas, the lower most drain and all outlets of the tank truck will be checked for leakage. If necessary, valves and fittings will be tightened, adjusted, or replaced to prevent leakage during transit. Supplier personnel present during the loading/unloading operation will ensure these procedures are followed.

14. BRITTLE FRACTURE EVALUATION [112.7(i)]

If a tank at the facility is repaired, modified, experiences a change in service or fails, the tank will be evaluated for the risk of brittle fracture or other means of failure. If a risk of failure exists appropriate action will be taken.

15. ADDITIONAL REQUIREMENTS FROM STATE RULES AND REGULATIONS [112.7(j)]

The State of Utah does not have any additional regulations related to oil spill prevention beyond that which are currently found in the Federal Regulations. This SPCC Plan has been prepared based on the Federal Regulations and as such it addresses all pertinent Utah Regulations.

Professional Engineer Certification:

I hereby certify:

I am familiar with the requirements of 40 CFR Part 112:

- I have visited and examined the facility;
- The plan has been prepared in accordance with good engineering practice, including consideration of applicable industry standards, and with the requirements of part 40 CFR 112;
- Procedures for required inspections and testing have been established; and the plan is adequate for the facility.

Printed Name of Registered Professional Engineer	Signature of Registered Professional Engineer
Date	Registration Number

(Seal)

SPILL PREVENTION CONTROL AND COUNTERMEASURE COMPLIANCE PLAN REVIEW RECORD

In accordance with 40 CFR 112.5(b), a review and evaluation of this SPCC Plan is conducted at least once every five years. As a result of this review and evaluation, Covol Engineered Fuels, LC will amend the SPCC Plan within six months of the review if the plan is ineffective. Any amendment to the SPCC Plan shall be certified by a Professional Engineer within six months after a change in the facility design, construction, operation, or maintenance occurs which materially affects the facility's potential for the discharge of oil into or upon the navigable water of the United States or adjoining shorelines.

Review Dates	**Signature**
1. No later than: November 2010*	_____
2. No later than: November 2015*	_____
3. No later than: November 2020*	_____
4. No later than: November 2025*	_____

- SPCC Plan reviewed, amended and certified by a Registered Professional Engineer per 40 CFR112.3 (d).

CERTIFICATION

Facility:

Covol Engineered Fuels, LC
1865 West Ridge Road
Wellington, UT 84542
Telephone: (435) 613-1631

Owner:

Headwaters Incorporated
10653 So. River Front Parkway
South Jordan, UT 84095
Telephone: (801) 984-9400

Management Approval:

This Spill Prevention Control and Countermeasure Plan (SPCC) was prepared to satisfy the requirements of 40 CFR Part 112. I approve of this plan and have the authority to commit the necessary resources to fully implement this Plan, which will be put into practice as described. Covol Engineered Fuels, LC is committed to the prevention of discharges of oil to navigable waters and the environment, and maintains the highest standards for spill prevention control and countermeasures through regular review, updating, and implementation of this Spill Prevention Control and Countermeasure Plan.

Printed Name	Title
Signature	Date

APPENDIX 7-5

Hydrologic Design Methods

HYDROLOGIC DESIGN METHODS FOR THE COVOL DRY-COAL CLEANING FACILITY

1.0 INTRODUCTION

The purpose of this report is to present the methodology used during hydrologic calculations for the main facilities area of the COVOL Dry-Coal Cleaning Facility Complex. The hydrologic calculations performed include runoff volumes and peak discharges, sediment storage calculations, existing sedimentation pond capacity, and existing diversion structure adequacy. The adequacy of existing erosion control methods is also addressed.

This report is divided into six sections including the introduction. The methods for determining runoff volumes and peak discharge rates are presented in Section 2.0. A discussion of the sedimentation ponds is contained in Section 3.0. Sections 4.0 and 5.0 describe diversion structures and methods of erosion protection. References are presented in Section 6.0.

2.0 RUNOFF CALCULATIONS

The disturbed area boundaries and watersheds at the facility are shown on Plate 7-2 of the permit application.

Data obtained from these watersheds were input to a computer modeling program called HydroCAD 8.5 developed by HydroCAD Software Solutions to generate runoff hydrographs which were used for the design of drainage diversions and inflow/outflow hydrographs for the sedimentation ponds. HydroCAD models runoff using the rainfall-runoff function and triangular unit hydrograph of the U.S. Soil Conservation Service (1972). The SCS Type B rainfall distribution was used to generate the hydrographs for the 6-hour precipitation events.

The design calculations for diversion structures were verified based on the 100-year, 6-hour storm event. The design calculations for the sedimentation ponds design storm capacity were verified using the 10-year, 24-hour storm event. The design calculations for the sedimentation pond outlet structure capacity were verified using the 25-year, 6-hour storm event.

According to the U.S. Soil Conservation Service (1972), the algebraic and hydrologic relations between storm rainfall, soil moisture storage, and runoff can be expressed by the equations,

$$Q = \frac{(P - 0.2S)^2}{P+0.8S} \qquad (1)$$

and

$$S = \frac{1000}{CN - 10} \qquad (2)$$

where Q = direct runoff volume (inches)
S = watershed storage factor (inches)
P = rainfall depth (inches)
CN = runoff curve number (dimensionless)

It should be noted that (a) Equation (1) is valid only for $P \geq 0.2S$ (otherwise Q=0), (b) Equation (2), as stated, is in inches, with the values of 1000 and 10 carrying the dimensions of inches, although metric conversions are possible, and (c) CN is only a convenient transformation of S to establish a scale of 0 to 100 and has no intrinsic meaning.

The curve numbers for disturbed and undisturbed areas at the facility were based on published values for sites with similar conditions (Mockus, 1969). An average curve number of 87 was assumed for the disturbed area, which corresponds to dirt roads for hydrologic soil group C.

The translation of the runoff depth to an outflow hydrograph is accomplished in the codes using the triangular unit hydrograph of the U.S. Soil Conservation Service (1972). This unit hydrograph is shown in Figure 1 along with a typical curvilinear hydrograph. It is characterized by its time to peak (T_p), recession time (T_r), time of base (T_b), and the relations between these parameters (i.e., $T_r=1.67T_p$; $T_b=2.67T_p$). Thus, from the geometry of a triangle, the incremental runoff (Q) can be defined by the equation,

$$Q = \frac{(2.67T_p)(q_p)}{2} \tag{3}$$

or

$$q_p = \frac{0.75(Q)}{T_p} \tag{4}$$

where q_p = peak flow rate (dimensioned according to Q and T)

When Q is expressed in inches and T_p in hours, q_p will be in inches per hour. The flow at any time $0<t<T_r$ may be determined by simple linear proportioning of the triangular unit hydrograph. The time to peak is related to the familiar expression time of concentration (T_c) by the equation,

$$T_c + t = 1.7T_p \tag{5}$$

in which the factor 1.7 is an empirical finding cited by the U.S. Soil Conservation Service (1972).

The time of concentration may be estimated by several formulas. For this report, T_c was determined from the following equations (U.S. Soil Conservation Service, 1972):

$$L = \frac{l^{0.8}(S+1)^{0.7}}{1900Y^{0.5}} \tag{6}$$

and

$$T_c = 1.67L \tag{7}$$

where

L = watershed lag (hours)
l = hydraulic length of the watershed, or distance along the main channel to the watershed divide (feet)
S = watershed storage factor defined in Equation (2)
Y = average watershed slope (percent)
T_c = time of concentration (hours)

The precipitation values for the design storm events were obtained from the National Oceanic and Atmospheric Administration (NOAA) Atlas 14 Precipitation Frequency Map (NOAA, 2006). The precipitation data are presented in Table 1.

3.0 SEDIMENTATION PONDS

3.1 Pond Capacity

The capacity of each pond is designed based on runoff and sediment storage volumes. The ponds are designed to completely contain the 10-year, 24-hour storm at the required sediment storage capacity. Division of Oil, Gas and Mining regulations (2006), R614-301-742.221.31 and 742.221.36 require that adequate sediment control be provided and maintained by periodic sediment removal.

3.1.1 Runoff Volume. The runoff calculations for those watersheds contributing to the sediment trap and sedimentation pond were performed as described in Section 2.0. Each analysis was conducted for the 10-year, 24-hour storm event presented in Table 1.

3.1.2 Sediment Storage. The required sediment storage volumes for the sedimentation ponds were based on a modified version of the Soil Conservation Service (SCS) Universal Soil Loss Equation (USL) developed specifically for Utah by Isrealsen et al. (1984). The equation determines the expected annual weight of soil erosion per acre of land based on precipitation, soil erodibility, slope lengths and steepnesses, and erosion controls at the site.

3.2 Spillway Analysis

The sedimentation ponds are constructed with spillways that will pass the peak runoff from the 25-year, 6-hour storm event presented in Table 1. The spillways are constructed as rip-rap lined trapezoidal channels. The spillways for the sedimentation pond are presented on Plate 7-1 of the permit application. The discharge capacities of the spillways were modeled with HydroCAD 8.5, which employs the methodology described below.

The discharge capacity of the rip-rapped overflow spillways was calculated using a method developed by the U.S. Soil conservation Service (1968) and expanded by Haan et al. (1994) for broad-crested weirs. According to this methodology, the critical specific energy head (H_{ec}) is determined for selected values of the energy head of water in the pond (H_p). The discharge capacity of the spillway is then calculated for the standard 100-foot wide rectangular section from the equation,

$$q_r = (0.544)(g^{0.5})(H_{ec}^{1.5})(100) \tag{8}$$

where q_r = discharge for standard 100-foot rectangular section (cubic feet per second) and all other parameters have been previously defined. The flow is then corrected for a trapezoidal section using the equation.

$$q = [(1.5b + zH_{ec})/150](q_r) \tag{9}$$

where q = corrected discharge (cubic feet per second)
b = bottom width of channel (feet)
z = channel side slope (run over rise - dimensionless)

4.0 DIVERSION STRUCTURES

4.1 Diversion Ditches

The location of diversion ditches are presented on Plate 7-2 of the permit application. The ditches are labeled based on a description of the area drained.

Diversions were designed to convey runoff from a disturbed drainage area. Some ditch sections are rip-rapped with rock to reduce erosion. Ditches are routinely maintained by removing sediment and replacing rip-rap when necessary.

The ditch capacity and flow velocity was calculated using HydroCAD 8.5, which uses the Manning and continuity equations (see Haan et al., 1994):

$$V = \frac{1.486}{n} R^{0.67} S^{0.50} \tag{10}$$

and

$$Q = AV \tag{11}$$

where
V = velocity (feet per second)
R = hydraulic radius (feet)
S = hydraulic slope (feet per foot)
n = roughness coefficient
Q = discharge (cubic feet per second)
A = flow area (square feet)

Peak discharges for the undisturbed drainage areas were calculated as described in Section 2.0. Values of Manning's Roughness Coefficient required for the solution of Equation (10) were obtained by comparing local conditions with tabulated values provided by Haan et al. (1994). An average roughness coefficient of 0.035 was representative of most ditches.

The diversion ditch geometries were measured in the field and approximated with trapezoidal or triangular ditch cross sections. The hydraulic slope of each ditch was either measured in the field or approximated from the topographic base maps (scale: 1"=50'). The capacity of each ditch was verified using a minimum slope value and solving for the depth of flow. The maximum flow velocity for each ditch was calculated using the maximum ditch slope measured from the topographic base maps. All of the calculated flow velocities were 5 feet per second or less, and thus were considered acceptable for unlined ditches without erosion protection.

4.2 Culverts

The location of diversion culverts are presented on Plate 7-2 of the permit application. The culverts are labeled based on a description of the area drained. The location, size, and slope of each culvert were verified in the field.

Peak discharges for the 100-year, 6-hour storm event were calculated as described in Section 2.0. The adequacy of each culvert was determined using a nomograph prepared by the U.S. Department of Transportation (1977). This nomograph for circular culverts with inlet control is presented in Figure 2. Based on the known culvert size, entrance type, and peak discharge, the headwater depth/diameter ratio was determined from the nomograph. If this value was 1.0 or less, the culvert was considered adequate to pass the design discharge rate. If the ratio was greater than 1.0, a closer inspection of the culvert geometry and entrance was necessary.

Exit velocities from each circular culvert were modeled with HydroCAD 8.5. A roughness coefficient of 0.020 was used for the calculations which can be considered typical for corrugated polyethylene pipe (Haan et al., 1994).

5.0 RIPRAP PROTECTION

The use of riprap to line drainage ditches, culvert outlets or spillways is required when flow velocities exceed approximately 5 feet per second. Calculations to determine the adequacy of existing riprap sections are based on a method defined by the U.S. Department of Transportation (1978).

The size of stone needed to protect a diversion channel or spillway from erosion by a current moving parallel to the channel is determined by the use of Figure 3. The size of stone (k) is determined by a trial-and-error method which consists of first estimating a stone size.

Using the peak velocity in the dich, enter Figure 3 and read the stone size for the channel side slope (not the hydraulic slope, unless it is steeper than the side slope of the ditch). The stone size from Figure 3 is the 50 percent (median) size, by weight, of a well-graded mass of stone with a unit weight of 165 pounds per cubic foot. If the stone size from Figure 3 agrees with the assumed stone size, it is correct. If not, the procedure is repeated until agreement is achieved.

6.0 REFERENCES

Haan, C.T., B.J. Barfield and J.C. Hayes. 1994. Design Hydrology and Sedimentology for Small Catchments. Academic Press. San Diego, California.

Isrealsen, C. Earl, Joel E. Fletcher, Frank W. Haws, and Eugene K. Isrealsen, 1984. Erosion and Sedimentation in Utah: A Guide for Control. Utah Water Research Laboratory, College of Engineering, Utah State University. Hydraulics and Hydrology Series UWRL/H-84/03.

Mockus, Victor, 1969. National Engineering Handbook, Section 4, Chapter 9. Hydrologic Soil-Cover Complexes. U.S. Soil Conservation Service.

NOAA, 2006. Precipitation-Frequency Atlas of the United States, Atlas 14, Volume 1, Version 4. National Weather Service, Silver Spring, Maryland.

U.S. Department of Transportation. 1977. Hydraulic Charts for the Selection of Highway Culverts. Hydraulic Engineering Circular No. 5. Federal Highway Administration. Washington, D.C.

U.S. Department of Transportation. 1978. Use of Riprap for Bank Protection. Hydraulic Engineering Circular No. 11. Federal Highway Administration. Washington, D.C.

U.S. Soil Conservation Service. 1968. Hydraulics of Broad-Crested Spillways. Technical Release No. 39. U.S. Government Printing Office. Washington, D.C.

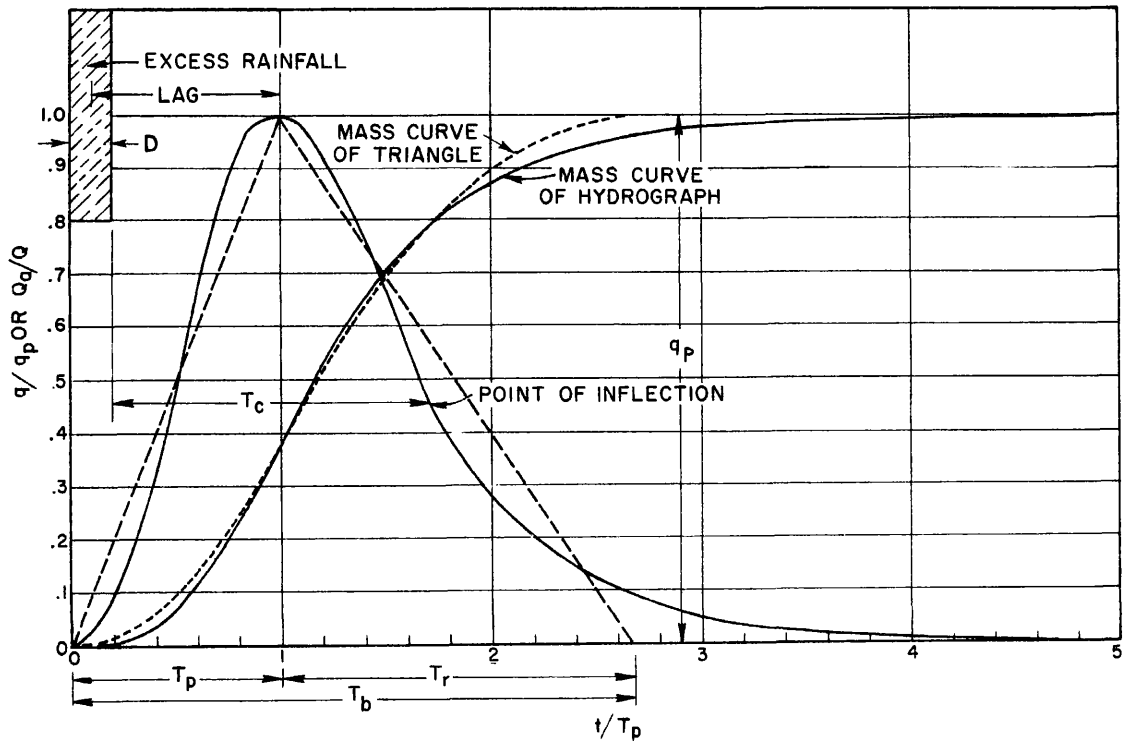
Utah Division of Oil, Gas and Mining. 2006. Utah Coal Mining Regulations. Utah Division of Oil, Gas and Mining. Salt Lake City, Utah.

TABLE 1

Precipitation Data for the COVOL
Dry-Coal Cleaning Facility

Frequency (years)	Duration (hours)	Precipitation (inches)
10	24	1.57
100	6	1.74
25	6	1.29

Reference: NOAA, 2006.



Source: NRCS National Engineering Handbook, Part 630

FIGURE 1. CURVILINEAR AND TRIANGULAR UNIT HYDROGRAPHS.

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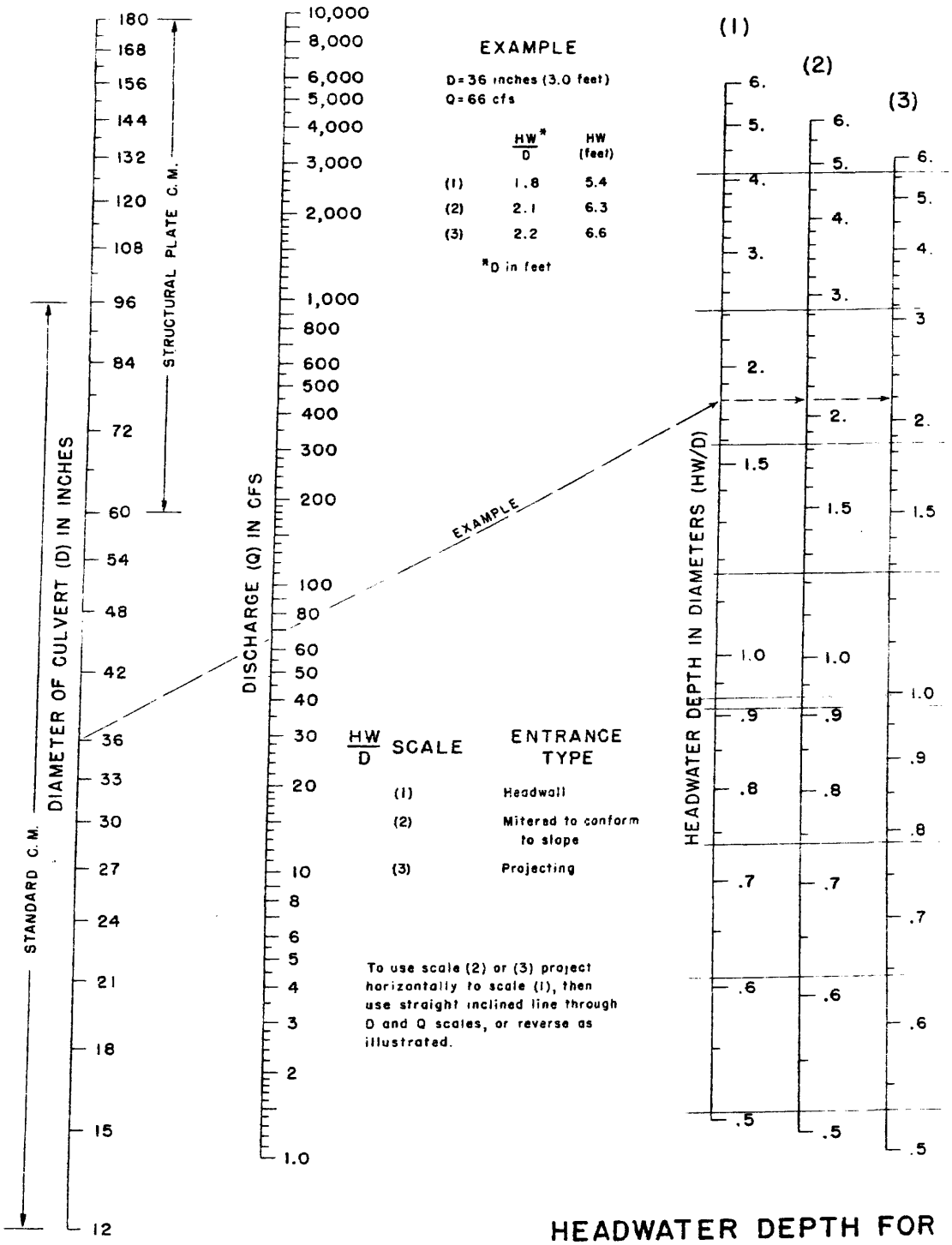

HEADWATER DEPTH FOR C. M. PIPE CULVERTS WITH INLET CONTROL

BUREAU OF PUBLIC ROADS JAN. 1963

Source: FHWA Hyd. Eng. Circular No. 5

FIGURE 2. CIRCULAR CULVERT CAPACITY CHART

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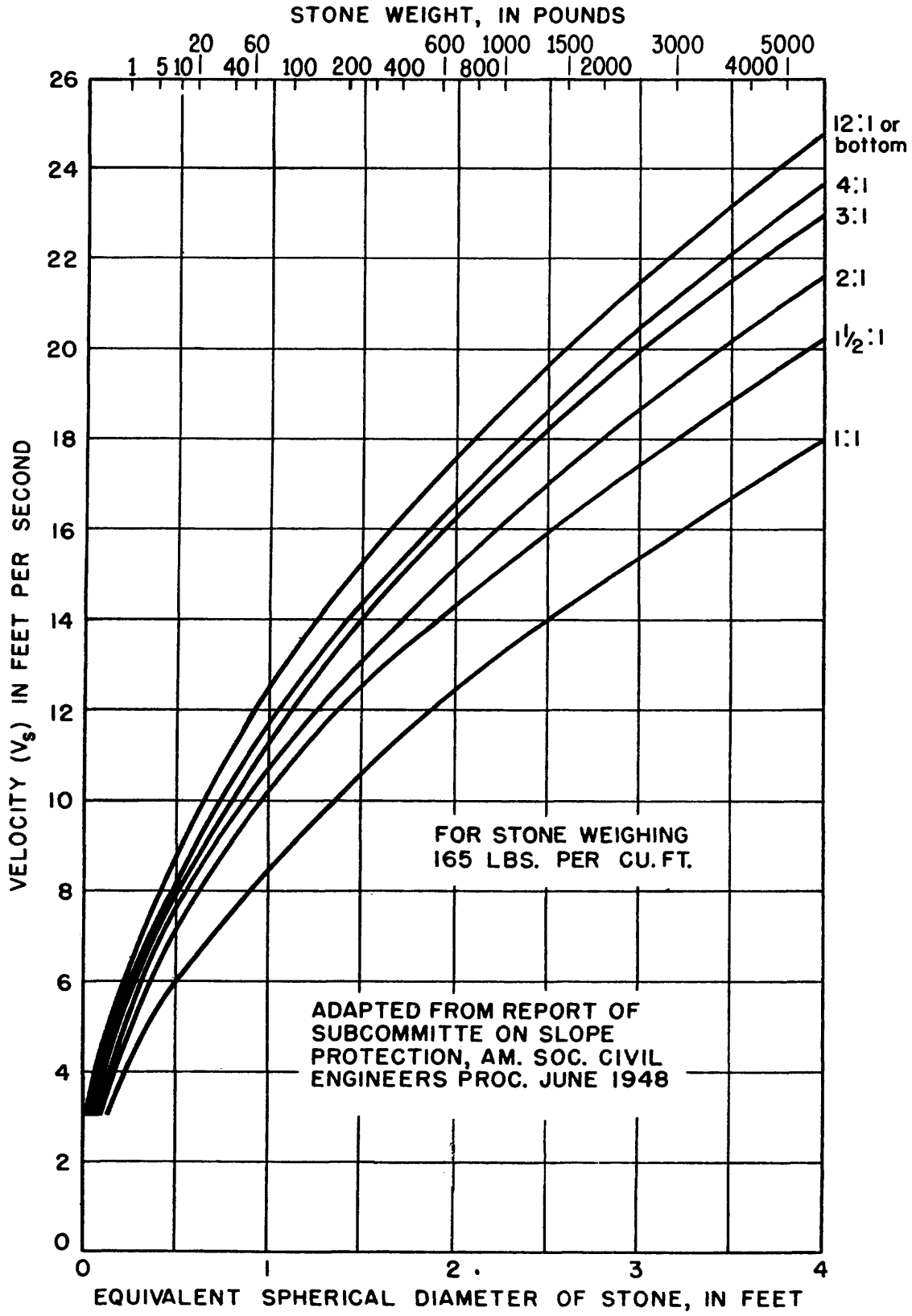

Source: FHWA Hyd. Eng. Circular No. 11

FIGURE 3. RIPRAP SIZING CHART

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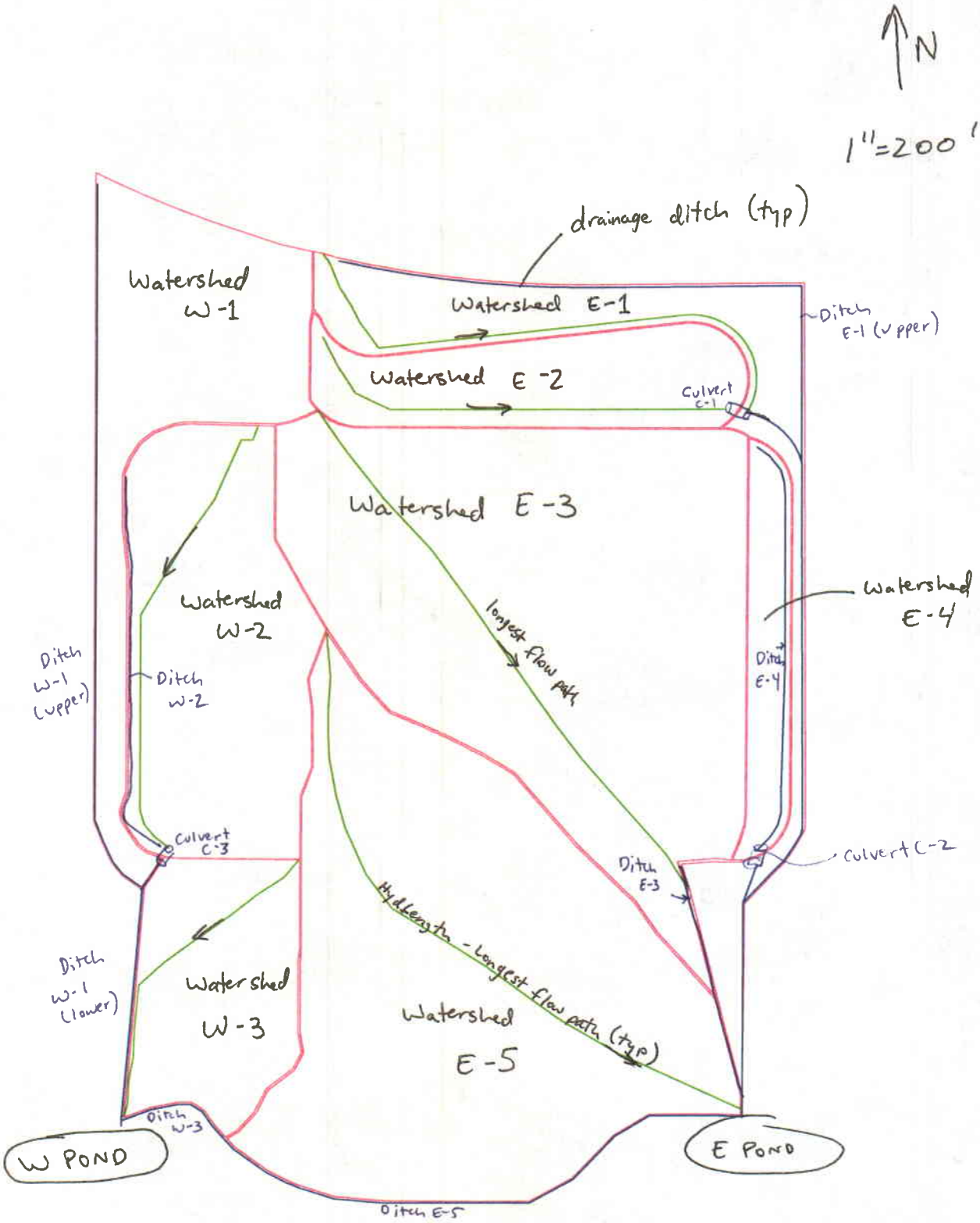
APPENDIX 7-6

Sedimentation Pond Hydrology Calculations



COVOL DRY COAL CLEANING FACILITY

WATERSHED MAP

WATERSHED HYDROLOGY MODEL SUMMARIES
COVOL ENGINEERED FUELS
WELLINGTON DRY-COAL CLEANING FACILITY

Watersheds Reporting to East Sedimentation Pond

Watershed	Area (ft^2)	Avg. Slope (%)	Curve Number	Hydraulic Length (ft)	10-Year, 24-Hour Storm Runoff Volume (ft^3)	25-Year, 6-Hour Storm Runoff Volume (ft^3)
E-1	88,103	0.021	87	1,752	4,290	2,902
E-2	66,123	0.021	87	581	3,220	2,178
E-3	28,991	0.03	87	1,091	14,120	9,552
E-4	29,947	0.25	87	561	1,458	986
E-5	285,103	0.025	87	925	13,882	9,391

Watersheds Reporting to West Sedimentation Pond

Watershed	Area (ft^2)	Avg. Slope (%)	Curve Number	Hydraulic Length (ft)	10-Year, 24-Hour Storm Runoff Volume (ft^3)	25-Year, 6-Hour Storm Runoff Volume (ft^3)
W-1	105,474	0.025	87	1,297	5,136	3,474
W-2	128,724	0.025	87	635	6,268	4,240
W-3	70,836	0.027	87	447	3,449	2,333

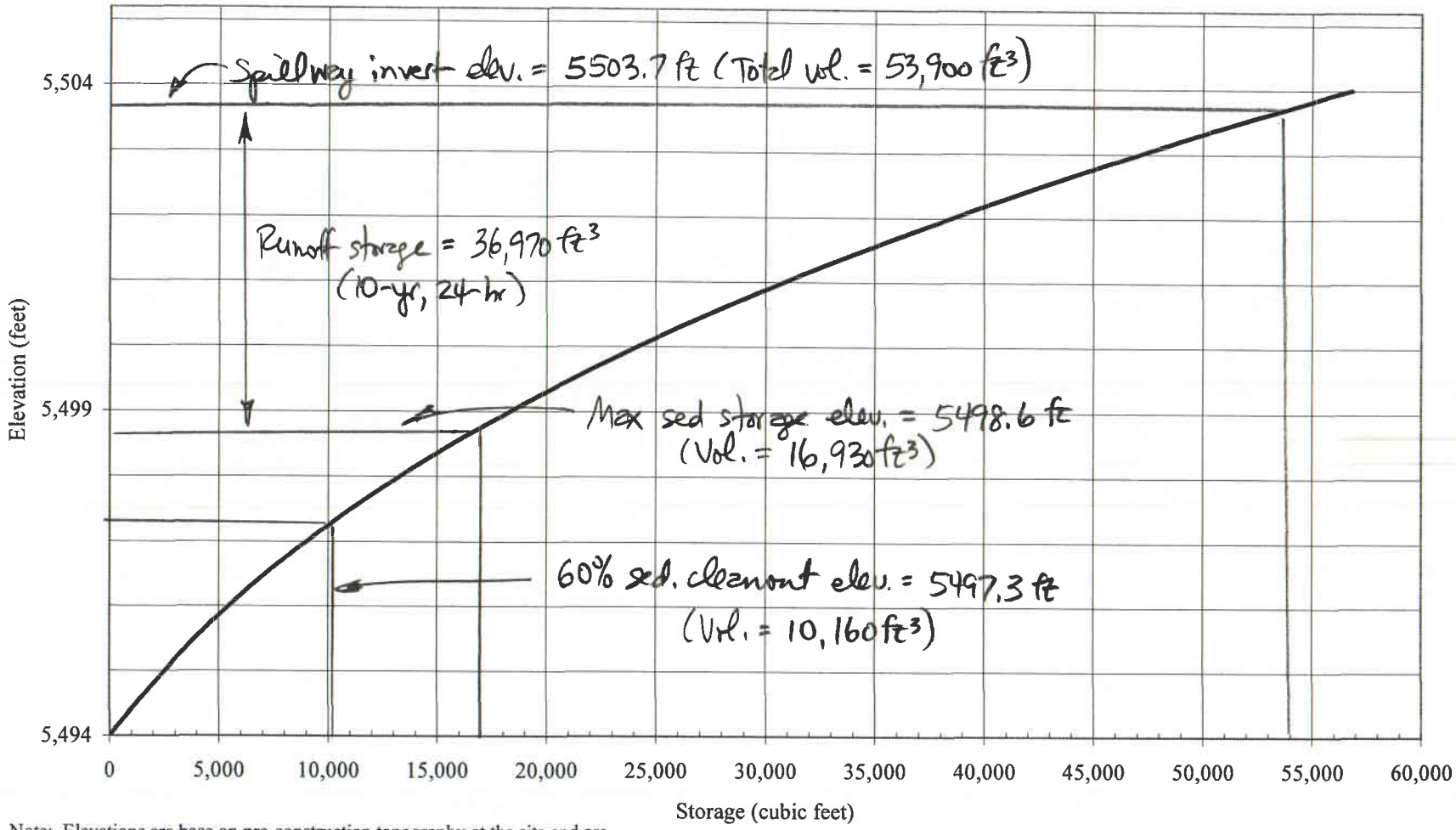
Note: Curve Number assumed to be 87, which corresponds to a dirt road designation for Hydrologic Soil Group C (National Engineering Handbook, Section 4, Chapter 9)
Refer to attached HydroCAD 8.5 output for additional information

SEDIMENT YIELD CALCULATIONS
COVOL ENGINEERED FUELS
WELLINGTON DRY-COAL CLEANING FACILITY

Watershed	Area (sq ft)	R	K	LS	VM	A (tons/ac/yr)	Density (pcf)	Annual Sediment Volume (cubic ft/yr)
East Pond	759,267	8	0.37	0.24	1.48	1.051	110	333
West Pond	305,033	8	0.37	0.24	1.48	1.051	110	134

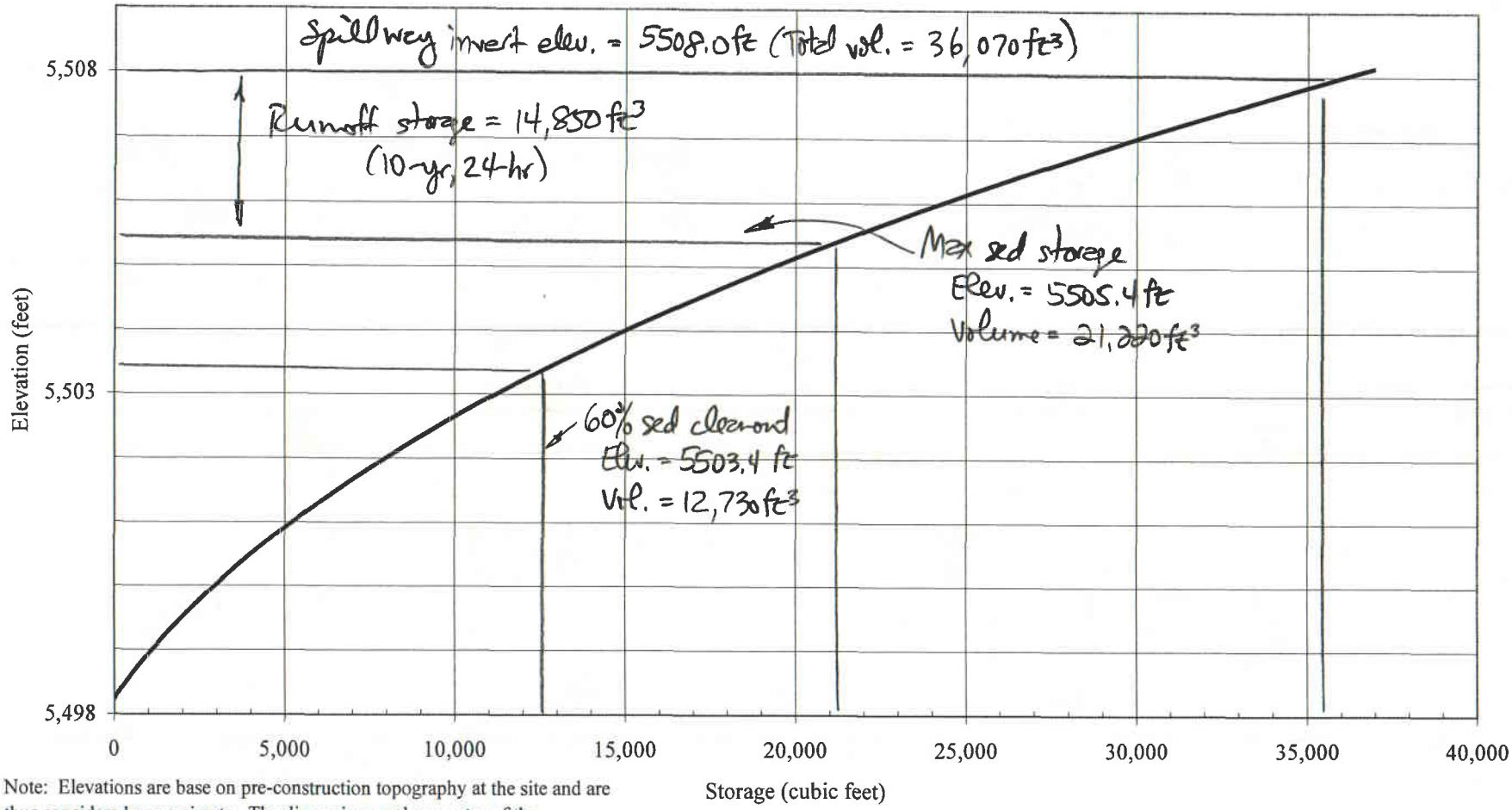
Notes
A = R K LS VM, after Isrealsen et al, 1984
R is the rainfall factor, and is taken from a map in Isrealson et al., 1984
K is the soil erodibility factor for the Persayo-Chipeta Complex, as published by the NRCS
LS is the topographic factor, which is based on the length and steepness of the slope at the site. A slope length of 100 feet and a simple slope steepness of 2.5% was used. The value of LS was taken from Isrealsen et al., 1984, Table 2.
VM is the erosion control factor, which was taken to be 1.48, which is the value for compacted fill as specified by Israelsen, et al., 1984, Table 3.
Density assumed to be 110 pcf
Reference:

Isrealsen, C. Earl, Joel E. Fletcher, Frank W. Haws, and Eugene K. Isrealsen, 1984. *Erosion and Sedimentation in Utah: A Guide for Control*. Utah Water Research Laboratory, College of Engineering, Utah State University. Hydraulics and Hydrology Series UWRL/H-84/03.



Note: Elevations are base on pre-construction topography at the site and are thus considered approximate. The dimensions and geometry of the sedimentation pond were surveyed by EIS Environmental and Engineering Consultants in November 2007. The bottom of the sedimentation pond was measured to be 10.2 feet below the surrounding ground surface, which is at an elevation of approximately 5,504.0 feet.

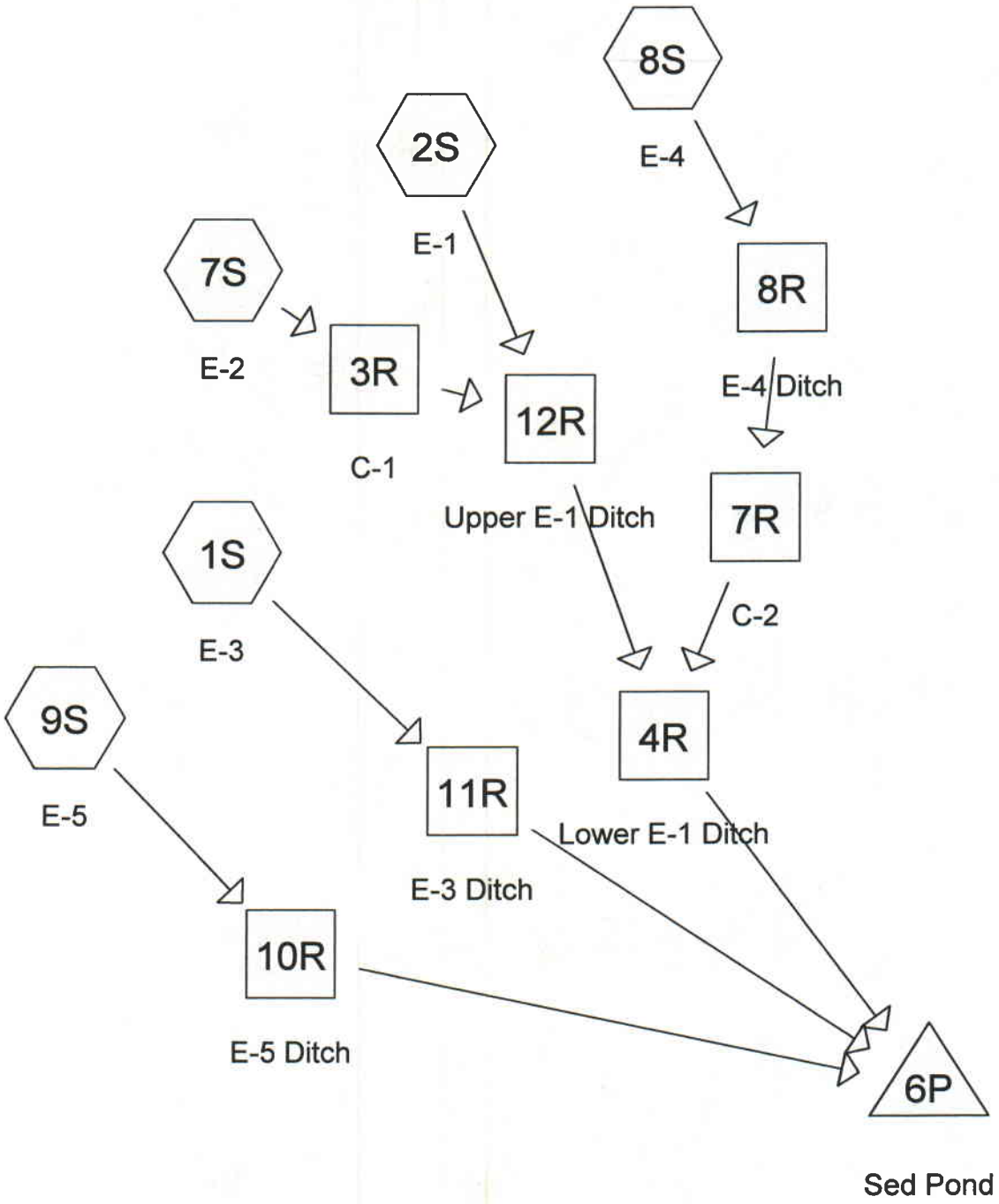
EAST POND STAGE VS. STORAGE



Note: Elevations are base on pre-construction topography at the site and are thus considered approximate. The dimensions and geometry of the sedimentation pond were surveyed by EIS Environmental and Engineering Consultants in November 2007. The bottom of the sedimentation pond was measured to be 9.8 feet below the surrounding ground surface, which is at an elevation of approximately 5,508.0 feet.

WEST POND STAGE VS. STORAGE

East Sedimentation Pond
10yr-24 hour Storm Runoff Model



Subcat Reach Pond Link

Drainage Diagram for 10yr-24hr East Pond
Prepared by {enter your company name here}, Printed 12/31/2007
HydroCAD® 8.50 s/n 003900 © 2007 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
759,267	87	(1S,2S,7S,8S,9S)
759,267		**TOTAL AREA**

Time span=0.00-30.00 hrs, dt=0.05 hrs, 601 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: E-3 Runoff Area=289,991 sf 0.00% Impervious Runoff Depth=0.58"
Flow Length=1,091' Slope=0.0300 '/' Tc=15.5 min CN=87 Runoff=4.81 cfs 14,120 cf

Subcatchment2S: E-1 Runoff Area=88,103 sf 0.00% Impervious Runoff Depth=0.58"
Flow Length=1,752' Slope=0.0210 '/' Tc=27.1 min CN=87 Runoff=1.05 cfs 4,290 cf

Subcatchment7S: E-2 Runoff Area=66,123 sf 0.00% Impervious Runoff Depth=0.58"
Flow Length=581' Slope=0.0210 '/' Tc=11.2 min CN=87 Runoff=1.28 cfs 3,220 cf

Subcatchment8S: E-4 Runoff Area=29,947 sf 0.00% Impervious Runoff Depth=0.58"
Flow Length=561' Slope=0.2500 '/' Tc=3.2 min CN=87 Runoff=0.78 cfs 1,458 cf

Subcatchment9S: E-5 Runoff Area=285,103 sf 0.00% Impervious Runoff Depth=0.58"
Flow Length=925' Slope=0.0250 '/' Tc=14.9 min CN=87 Runoff=4.82 cfs 13,882 cf

Reach 3R: C-1 Avg. Depth=0.33' Max Vel=4.37 fps Inflow=1.28 cfs 3,220 cf
D=18.0" n=0.020 L=40.0' S=0.0300 '/' Capacity=11.83 cfs Outflow=1.27 cfs 3,220 cf

Reach 4R: Lower E-1 Ditch Avg. Depth=0.62' Max Vel=3.58 fps Inflow=2.08 cfs 8,968 cf
n=0.022 L=287.0' S=0.0171 '/' Capacity=21.75 cfs Outflow=2.05 cfs 8,968 cf

Reach 7R: C-2 Avg. Depth=0.24' Max Vel=3.57 fps Inflow=0.64 cfs 1,458 cf
D=18.0" n=0.020 L=40.0' S=0.0300 '/' Capacity=11.83 cfs Outflow=0.64 cfs 1,458 cf

Reach 8R: E-4 Ditch Avg. Depth=0.41' Max Vel=2.58 fps Inflow=0.78 cfs 1,458 cf
n=0.022 L=561.0' S=0.0159 '/' Capacity=11.47 cfs Outflow=0.64 cfs 1,458 cf

Reach 10R: E-5 Ditch Avg. Depth=0.62' Max Vel=2.88 fps Inflow=4.82 cfs 13,882 cf
n=0.022 L=746.0' S=0.0091 '/' Capacity=15.92 cfs Outflow=4.33 cfs 13,882 cf

Reach 11R: E-3 Ditch Avg. Depth=0.78' Max Vel=4.51 fps Inflow=4.81 cfs 14,120 cf
n=0.022 L=283.0' S=0.0194 '/' Capacity=9.33 cfs Outflow=4.69 cfs 14,120 cf

Reach 12R: Upper E-1 Ditch Avg. Depth=0.73' Max Vel=3.36 fps Inflow=1.93 cfs 7,510 cf
n=0.022 L=720.0' S=0.0150 '/' Capacity=4.14 cfs Outflow=1.80 cfs 7,509 cf

Pond 6P: Sed Pond Peak Elev=5,502.55' Storage=44,872 cf Inflow=10.55 cfs 36,970 cf
Outflow=0.00 cfs 0 cf

Total Runoff Area = 759,267 sf Runoff Volume = 36,970 cf Average Runoff Depth = 0.58"
100.00% Pervious = 759,267 sf 0.00% Impervious = 0 sf

Summary for Subcatchment 1S: E-3

Runoff = 4.81 cfs @ 12.09 hrs, Volume= 14,120 cf, Depth= 0.58"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=1.57"

	Area (sf)	CN	Description
*	289,991	87	
	289,991		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.5	1,091	0.0300	1.17		**Lag/CN Method,**

Summary for Subcatchment 2S: E-1

Runoff = 1.05 cfs @ 12.22 hrs, Volume= 4,290 cf, Depth= 0.58"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=1.57"

	Area (sf)	CN	Description
*	88,103	87	
	88,103		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
27.1	1,752	0.0210	1.08		**Lag/CN Method,**

Summary for Subcatchment 7S: E-2

Runoff = 1.28 cfs @ 12.04 hrs, Volume= 3,220 cf, Depth= 0.58"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=1.57"

	Area (sf)	CN	Description
*	66,123	87	
	66,123		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.2	581	0.0210	0.86		**Lag/CN Method,**

Summary for Subcatchment 8S: E-4

[49] Hint: Tc<2dt may require smaller dt

Runoff = 0.78 cfs @ 11.94 hrs, Volume= 1,458 cf, Depth= 0.58"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=1.57"

	Area (sf)	CN	Description
*	29,947	87	
	29,947		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.2	561	0.2500	2.96		**Lag/CN Method,**

Summary for Subcatchment 9S: E-5

Runoff = 4.82 cfs @ 12.08 hrs, Volume= 13,882 cf, Depth= 0.58"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=1.57"

	Area (sf)	CN	Description
*	285,103	87	
	285,103		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.9	925	0.0250	1.04		**Lag/CN Method,**

Summary for Reach 3R: C-1

[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 66,123 sf, 0.00% Impervious, Inflow Depth = 0.58"
Inflow = 1.28 cfs @ 12.04 hrs, Volume= 3,220 cf
Outflow = 1.27 cfs @ 12.04 hrs, Volume= 3,220 cf, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.37 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 1.51 fps, Avg. Travel Time= 0.4 min

Peak Storage= 12 cf @ 12.04 hrs, Average Depth at Peak Storage= 0.33'
Bank-Full Depth= 1.50', Capacity at Bank-Full= 11.83 cfs

18.0" Diameter Pipe, n= 0.020 Corrugated PE, corrugated interior
Length= 40.0' Slope= 0.0300 '/'
Inlet Invert= 5,520.70', Outlet Invert= 5,519.50'

Summary for Reach 4R: Lower E-1 Ditch

[62] Warning: Exceeded Reach 7R OUTLET depth by 0.48' @ 12.25 hrs
[61] Hint: Exceeded Reach 12R outlet invert by 0.62' @ 12.15 hrs

Inflow Area = 184,173 sf, 0.00% Impervious, Inflow Depth = 0.58"
Inflow = 2.08 cfs @ 12.15 hrs, Volume= 8,968 cf
Outflow = 2.05 cfs @ 12.19 hrs, Volume= 8,968 cf, Atten= 1%, Lag= 2.6 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.58 fps, Min. Travel Time= 1.3 min
Avg. Velocity = 1.49 fps, Avg. Travel Time= 3.2 min

Peak Storage= 166 cf @ 12.17 hrs, Average Depth at Peak Storage= 0.62'
Bank-Full Depth= 1.50', Capacity at Bank-Full= 21.75 cfs

0.00' x 1.50' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 1.5 '/' Top Width= 4.50'
Length= 287.0' Slope= 0.0171 '/'
Inlet Invert= 5,508.70', Outlet Invert= 5,503.80'

Summary for Reach 7R: C-2

[52] Hint: Inlet/Outlet conditions not evaluated
[62] Warning: Exceeded Reach 8R OUTLET depth by 0.10' @ 0.00 hrs

Inflow Area = 29,947 sf, 0.00% Impervious, Inflow Depth = 0.58"
Inflow = 0.64 cfs @ 12.04 hrs, Volume= 1,458 cf
Outflow = 0.64 cfs @ 12.04 hrs, Volume= 1,458 cf, Atten= 1%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.57 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 1.17 fps, Avg. Travel Time= 0.6 min

Peak Storage= 7 cf @ 12.04 hrs, Average Depth at Peak Storage= 0.24'
Bank-Full Depth= 1.50', Capacity at Bank-Full= 11.83 cfs

18.0" Diameter Pipe, n= 0.020 Corrugated PE, corrugated interior
Length= 40.0' Slope= 0.0300 '/'
Inlet Invert= 5,509.90', Outlet Invert= 5,508.70'

Summary for Reach 8R: E-4 Ditch

Inflow Area =	29,947 sf,	0.00% Impervious,	Inflow Depth =	0.58"	
Inflow =	0.78 cfs @	11.94 hrs,	Volume=	1,458 cf	
Outflow =	0.64 cfs @	12.04 hrs,	Volume=	1,458 cf,	Atten= 17%, Lag= 5.7 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.58 fps, Min. Travel Time= 3.6 min
Avg. Velocity = 0.97 fps, Avg. Travel Time= 9.7 min

Peak Storage= 143 cf @ 11.98 hrs, Average Depth at Peak Storage= 0.41'
Bank-Full Depth= 1.20', Capacity at Bank-Full= 11.47 cfs

0.00' x 1.20' deep channel, n= 0.022
Side Slope Z-value= 2.0 1.0 '/' Top Width= 3.60'
Length= 561.0' Slope= 0.0159 '/'
Inlet Invert= 5,518.70', Outlet Invert= 5,509.80'

Summary for Reach 10R: E-5 Ditch

Inflow Area =	285,103 sf,	0.00% Impervious,	Inflow Depth =	0.58"	
Inflow =	4.82 cfs @	12.08 hrs,	Volume=	13,882 cf	
Outflow =	4.33 cfs @	12.20 hrs,	Volume=	13,882 cf,	Atten= 10%, Lag= 7.6 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.88 fps, Min. Travel Time= 4.3 min
Avg. Velocity = 1.04 fps, Avg. Travel Time= 12.0 min

Peak Storage= 1,136 cf @ 12.13 hrs, Average Depth at Peak Storage= 0.62'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 15.92 cfs

0.00' x 1.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 4.0 '/' Top Width= 8.00'
Length= 746.0' Slope= 0.0091 '/'
Inlet Invert= 5,510.60', Outlet Invert= 5,503.80'

‡

Summary for Reach 11R: E-3 Ditch

Inflow Area = 289,991 sf, 0.00% Impervious, Inflow Depth = 0.58"
Inflow = 4.81 cfs @ 12.09 hrs, Volume= 14,120 cf
Outflow = 4.69 cfs @ 12.12 hrs, Volume= 14,120 cf, Atten= 2%, Lag= 1.8 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.51 fps, Min. Travel Time= 1.0 min
Avg. Velocity = 1.83 fps, Avg. Travel Time= 2.6 min

Peak Storage= 300 cf @ 12.10 hrs, Average Depth at Peak Storage= 0.78'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 9.33 cfs

0.00' x 1.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 2.5 1.0 '/' Top Width= 3.50'
Length= 283.0' Slope= 0.0194 '/'
Inlet Invert= 5,509.50', Outlet Invert= 5,504.00'

Summary for Reach 12R: Upper E-1 Ditch

[62] Warning: Exceeded Reach 3R OUTLET depth by 0.51' @ 12.25 hrs

Inflow Area = 154,226 sf, 0.00% Impervious, Inflow Depth = 0.58"
Inflow = 1.93 cfs @ 12.07 hrs, Volume= 7,510 cf
Outflow = 1.80 cfs @ 12.19 hrs, Volume= 7,509 cf, Atten= 7%, Lag= 7.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.36 fps, Min. Travel Time= 3.6 min
Avg. Velocity = 1.39 fps, Avg. Travel Time= 8.6 min

Peak Storage= 388 cf @ 12.13 hrs, Average Depth at Peak Storage= 0.73'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 4.14 cfs

0.00' x 1.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 1.0 '/' Top Width= 2.00'
Length= 720.0' Slope= 0.0150 '/'
Inlet Invert= 5,519.50', Outlet Invert= 5,508.70'

Summary for Pond 6P: Sed Pond

Inflow Area = 759,267 sf, 0.00% Impervious, Inflow Depth = 0.58"
Inflow = 10.55 cfs @ 12.16 hrs, Volume= 36,970 cf
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 100%, Lag= 0.0 min

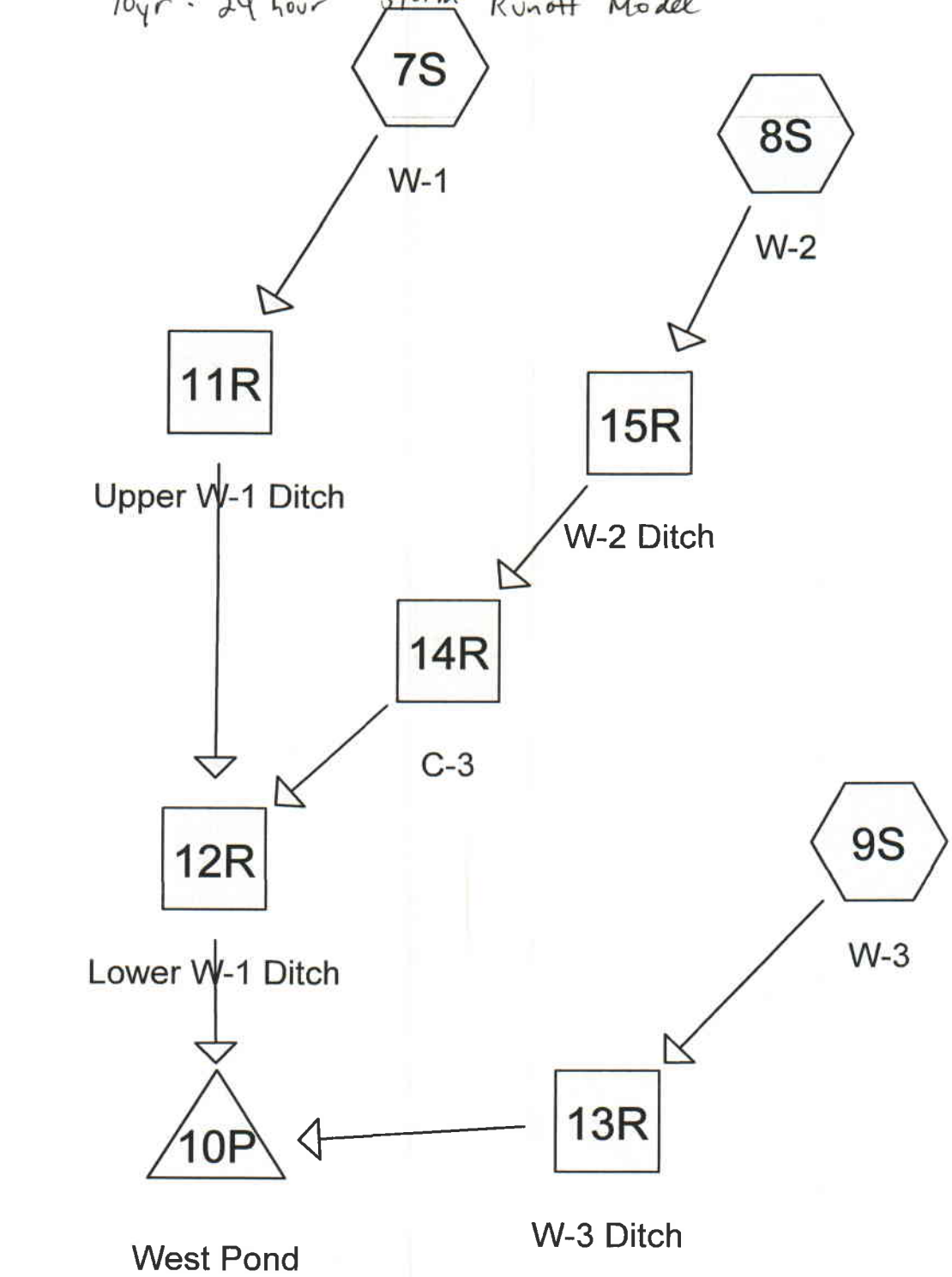
Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Starting Elev= 5,496.50' Surf.Area= 3,700 sf Storage= 7,903 cf
Peak Elev= 5,502.55' @ 30.00 hrs Surf.Area= 8,845 sf Storage= 44,872 cf (36,969 cf above start)

Plug-Flow detention time= (not calculated: initial storage excedes outflow)
Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	5,493.80'	56,820 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
5,493.80	2,550	0	0
5,494.80	2,601	2,576	2,576
5,495.80	3,214	2,908	5,483
5,496.80	3,909	3,562	9,045
5,497.80	4,637	4,273	13,318
5,498.80	5,425	5,031	18,349
5,499.80	6,243	5,834	24,183
5,500.80	7,158	6,701	30,883
5,501.80	8,125	7,642	38,525
5,502.80	9,087	8,606	47,131
5,503.80	10,291	9,689	56,820

West Sedimentation Pond
10yr - 24 hour Storm Runoff Model



Subcat Reach Pond Link

Drainage Diagram for 10yr-24hr West Pond
Prepared by {enter your company name here}, Printed 12/31/2007
HydroCAD® 8.50 s/n 003900 © 2007 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
305,034	87	(7S,8S,9S)
305,034		**TOTAL AREA**

Time span=0.00-30.00 hrs, dt=0.05 hrs, 601 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment7S: W-1 Runoff Area=105,474 sf 0.00% Impervious Runoff Depth=0.58"
Flow Length=1,297' Slope=0.0250 '/' Tc=19.5 min CN=87 Runoff=1.54 cfs 5,136 cf

Subcatchment8S: W-2 Runoff Area=128,724 sf 0.00% Impervious Runoff Depth=0.58"
Flow Length=635' Slope=0.0250 '/' Tc=11.0 min CN=87 Runoff=2.50 cfs 6,268 cf

Subcatchment9S: W-3 Runoff Area=70,836 sf 0.00% Impervious Runoff Depth=0.58"
Flow Length=447' Slope=0.0270 '/' Tc=8.0 min CN=87 Runoff=1.55 cfs 3,449 cf

Reach 11R: Upper W-1 Ditch Avg. Depth=0.49' Max Vel=2.95 fps Inflow=1.54 cfs 5,136 cf
n=0.022 L=963.0' S=0.0145 '/' Capacity=60.48 cfs Outflow=1.38 cfs 5,136 cf

Reach 12R: Lower W-1 Ditch Avg. Depth=0.72' Max Vel=2.96 fps Inflow=3.15 cfs 11,403 cf
n=0.022 L=320.0' S=0.0088 '/' Capacity=46.92 cfs Outflow=3.06 cfs 11,403 cf

Reach 13R: W-3 Ditch Avg. Depth=0.44' Max Vel=2.88 fps Inflow=1.55 cfs 3,449 cf
n=0.022 L=160.0' S=0.0156 '/' Capacity=13.77 cfs Outflow=1.46 cfs 3,449 cf

Reach 14R: C-3 Avg. Depth=0.45' Max Vel=5.35 fps Inflow=2.36 cfs 6,268 cf
D=18.0" n=0.020 L=40.0' S=0.0325 '/' Capacity=12.31 cfs Outflow=2.35 cfs 6,268 cf

Reach 15R: W-2 Ditch Avg. Depth=0.20' Max Vel=2.72 fps Inflow=2.50 cfs 6,268 cf
n=0.022 L=500.0' S=0.0158 '/' Capacity=37.48 cfs Outflow=2.36 cfs 6,268 cf

Pond 10P: West Pond Peak Elev=5,503.96' Storage=14,852 cf Inflow=3.50 cfs 14,853 cf
Outflow=0.00 cfs 0 cf

Total Runoff Area = 305,034 sf Runoff Volume = 14,853 cf Average Runoff Depth = 0.58"
100.00% Pervious = 305,034 sf 0.00% Impervious = 0 sf

Summary for Subcatchment 7S: W-1

Runoff = 1.54 cfs @ 12.13 hrs, Volume= 5,136 cf, Depth= 0.58"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=1.57"

	Area (sf)	CN	Description
*	105,474	87	
	105,474		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.5	1,297	0.0250	1.11		**Lag/CN Method,**

Summary for Subcatchment 8S: W-2

Runoff = 2.50 cfs @ 12.04 hrs, Volume= 6,268 cf, Depth= 0.58"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=1.57"

	Area (sf)	CN	Description
*	128,724	87	
	128,724		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.0	635	0.0250	0.96		**Lag/CN Method,**

Summary for Subcatchment 9S: W-3

Runoff = 1.55 cfs @ 12.00 hrs, Volume= 3,449 cf, Depth= 0.58"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=1.57"

	Area (sf)	CN	Description
*	70,836	87	
	70,836		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.0	447	0.0270	0.93		**Lag/CN Method,**

Summary for Reach 11R: Upper W-1 Ditch

Inflow Area = 105,474 sf, 0.00% Impervious, Inflow Depth = 0.58"
Inflow = 1.54 cfs @ 12.13 hrs, Volume= 5,136 cf
Outflow = 1.38 cfs @ 12.29 hrs, Volume= 5,136 cf, Atten= 10%, Lag= 9.6 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.95 fps, Min. Travel Time= 5.4 min
Avg. Velocity = 1.18 fps, Avg. Travel Time= 13.6 min

Peak Storage= 456 cf @ 12.20 hrs, Average Depth at Peak Storage= 0.49'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 60.48 cfs

0.00' x 2.00' deep channel, n= 0.022
Side Slope Z-value= 2.0 '/' Top Width= 8.00'
Length= 963.0' Slope= 0.0145 '/'
Inlet Invert= 5,524.80', Outlet Invert= 5,510.80'

Summary for Reach 12R: Lower W-1 Ditch

[62] Warning: Exceeded Reach 11R OUTLET depth by 0.24' @ 12.15 hrs
[62] Warning: Exceeded Reach 14R OUTLET depth by 0.39' @ 12.35 hrs

Inflow Area = 234,198 sf, 0.00% Impervious, Inflow Depth = 0.58"
Inflow = 3.15 cfs @ 12.15 hrs, Volume= 11,403 cf
Outflow = 3.06 cfs @ 12.21 hrs, Volume= 11,403 cf, Atten= 3%, Lag= 3.5 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.96 fps, Min. Travel Time= 1.8 min
Avg. Velocity = 1.15 fps, Avg. Travel Time= 4.6 min

Peak Storage= 333 cf @ 12.18 hrs, Average Depth at Peak Storage= 0.72'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 46.92 cfs

0.00' x 2.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 2.0 '/' Top Width= 8.00'
Length= 320.0' Slope= 0.0088 '/'
Inlet Invert= 5,510.80', Outlet Invert= 5,508.00'

Summary for Reach 13R: W-3 Ditch

Inflow Area = 70,836 sf, 0.00% Impervious, Inflow Depth = 0.58"
Inflow = 1.55 cfs @ 12.00 hrs, Volume= 3,449 cf
Outflow = 1.46 cfs @ 12.03 hrs, Volume= 3,449 cf, Atten= 5%, Lag= 1.7 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.88 fps, Min. Travel Time= 0.9 min
Avg. Velocity = 1.13 fps, Avg. Travel Time= 2.4 min

Peak Storage= 84 cf @ 12.01 hrs, Average Depth at Peak Storage= 0.44'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 13.77 cfs

0.00' x 1.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 4.5 1.0 '/' Top Width= 5.50'
Length= 160.0' Slope= 0.0156 '/'
Inlet Invert= 5,510.50', Outlet Invert= 5,508.00'

Summary for Reach 14R: C-3

[52] Hint: Inlet/Outlet conditions not evaluated
[62] Warning: Exceeded Reach 15R OUTLET depth by 0.27' @ 12.15 hrs

Inflow Area = 128,724 sf, 0.00% Impervious, Inflow Depth = 0.58"
Inflow = 2.36 cfs @ 12.12 hrs, Volume= 6,268 cf
Outflow = 2.35 cfs @ 12.12 hrs, Volume= 6,268 cf, Atten= 1%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.35 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.77 fps, Avg. Travel Time= 0.4 min

Peak Storage= 18 cf @ 12.12 hrs, Average Depth at Peak Storage= 0.45'
Bank-Full Depth= 1.50', Capacity at Bank-Full= 12.31 cfs

18.0" Diameter Pipe, n= 0.020
Length= 40.0' Slope= 0.0325 '/'
Inlet Invert= 5,512.10', Outlet Invert= 5,510.80'

Summary for Reach 15R: W-2 Ditch

Inflow Area = 128,724 sf, 0.00% Impervious, Inflow Depth = 0.58"
Inflow = 2.50 cfs @ 12.04 hrs, Volume= 6,268 cf
Outflow = 2.36 cfs @ 12.12 hrs, Volume= 6,268 cf, Atten= 6%, Lag= 4.9 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.72 fps, Min. Travel Time= 3.1 min
Avg. Velocity = 0.71 fps, Avg. Travel Time= 11.8 min

Peak Storage= 433 cf @ 12.07 hrs, Average Depth at Peak Storage= 0.20'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 37.48 cfs

4.00' x 1.00' deep channel, n= 0.022
Side Slope Z-value= 2.0 1.0 '/' Top Width= 7.00'
Length= 500.0' Slope= 0.0158 '/'
Inlet Invert= 5,520.00', Outlet Invert= 5,512.10'

Summary for Pond 10P: West Pond

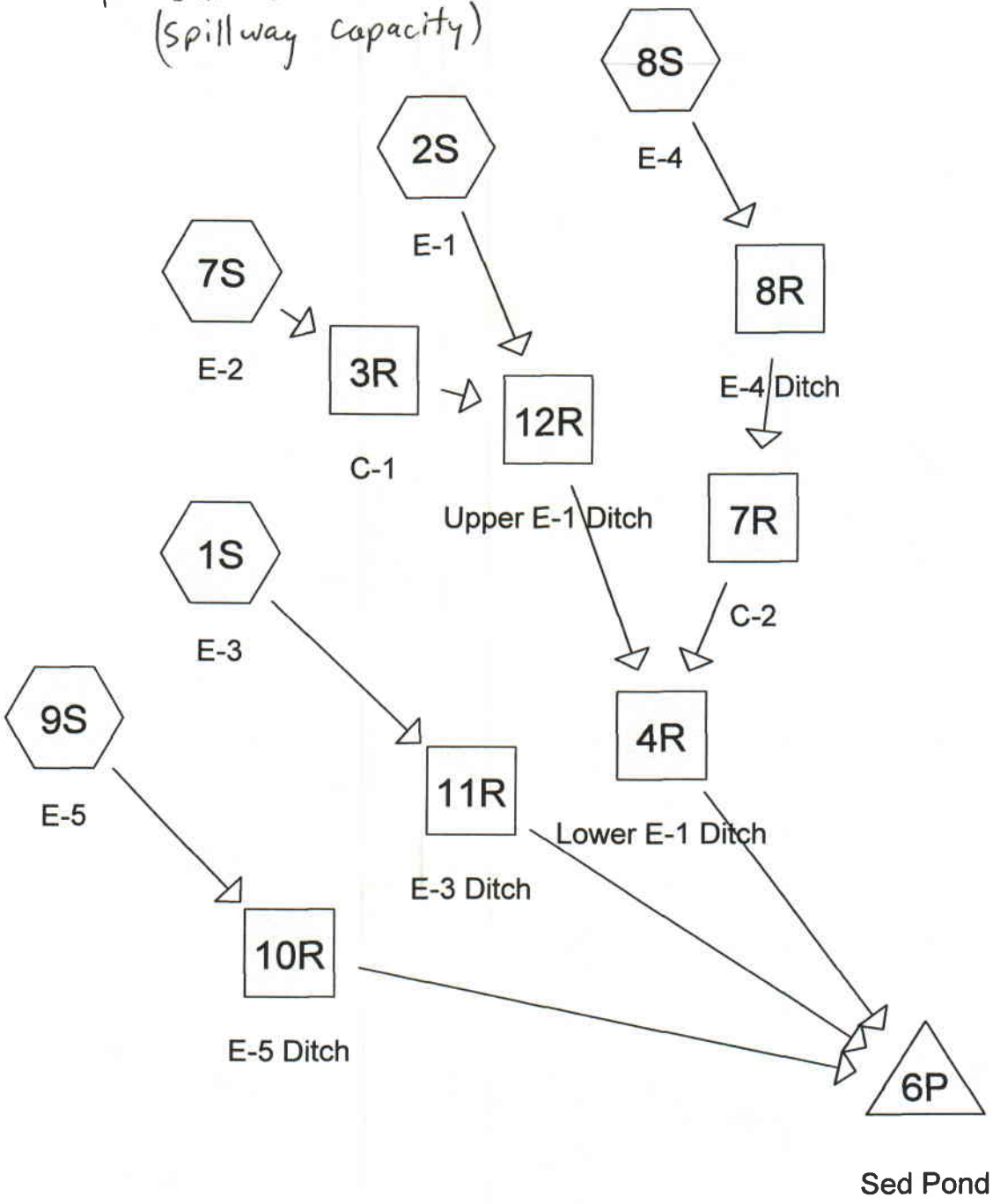
Inflow Area = 305,034 sf, 0.00% Impervious, Inflow Depth = 0.58"
Inflow = 3.50 cfs @ 12.18 hrs, Volume= 14,853 cf
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 100%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 5,503.96' @ 30.00 hrs Surf.Area= 4,030 sf Storage= 14,852 cf

Plug-Flow detention time= (not calculated: initial storage excedes outflow)
Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	5,498.23'	36,065 cf	**17.00'W x 78.00'L x 9.77'H Prismatoid Z=2.0**

East Sedimentation Pond
25yr - 6hr Storm Runoff Model
(Spillway Capacity)



Subcat Reach Pond Link

Drainage Diagram for 25yr-6hr East Pond
Prepared by {enter your company name here}, Printed 12/31/2007
HydroCAD® 8.50 s/n 003900 © 2007 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
759,267	87	(1S,2S,7S,8S,9S)
759,267		**TOTAL AREA**

Time span=0.00-40.00 hrs, dt=0.05 hrs, 801 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: E-3 Runoff Area=289,991 sf 0.00% Impervious Runoff Depth=0.40"
Flow Length=1,091' Slope=0.0300 '/' Tc=15.5 min CN=87 Runoff=4.88 cfs 9,552 cf

Subcatchment2S: E-1 Runoff Area=88,103 sf 0.00% Impervious Runoff Depth=0.40"
Flow Length=1,752' Slope=0.0210 '/' Tc=27.1 min CN=87 Runoff=0.98 cfs 2,902 cf

Subcatchment7S: E-2 Runoff Area=66,123 sf 0.00% Impervious Runoff Depth=0.40"
Flow Length=581' Slope=0.0210 '/' Tc=11.2 min CN=87 Runoff=1.42 cfs 2,178 cf

Subcatchment8S: E-4 Runoff Area=29,947 sf 0.00% Impervious Runoff Depth=0.40"
Flow Length=561' Slope=0.2500 '/' Tc=3.2 min CN=87 Runoff=1.16 cfs 986 cf

Subcatchment9S: E-5 Runoff Area=285,103 sf 0.00% Impervious Runoff Depth=0.40"
Flow Length=925' Slope=0.0250 '/' Tc=14.9 min CN=87 Runoff=4.98 cfs 9,391 cf

Reach 3R: C-1 Avg. Depth=0.35' Max Vel=4.46 fps Inflow=1.42 cfs 2,178 cf
D=18.0" n=0.020 L=40.0' S=0.0300 '/' Capacity=11.83 cfs Outflow=1.40 cfs 2,178 cf

Reach 4R: Lower E-1 Ditch Avg. Depth=0.59' Max Vel=3.47 fps Inflow=1.84 cfs 6,066 cf
n=0.022 L=287.0' S=0.0171 '/' Capacity=21.75 cfs Outflow=1.82 cfs 6,066 cf

Reach 7R: C-2 Avg. Depth=0.26' Max Vel=3.73 fps Inflow=0.77 cfs 986 cf
D=18.0" n=0.020 L=40.0' S=0.0300 '/' Capacity=11.83 cfs Outflow=0.75 cfs 986 cf

Reach 8R: E-4 Ditch Avg. Depth=0.44' Max Vel=2.73 fps Inflow=1.16 cfs 986 cf
n=0.022 L=561.0' S=0.0159 '/' Capacity=11.47 cfs Outflow=0.77 cfs 986 cf

Reach 10R: E-5 Ditch Avg. Depth=0.61' Max Vel=2.86 fps Inflow=4.98 cfs 9,391 cf
n=0.022 L=746.0' S=0.0091 '/' Capacity=15.92 cfs Outflow=4.22 cfs 9,391 cf

Reach 11R: E-3 Ditch Avg. Depth=0.78' Max Vel=4.53 fps Inflow=4.88 cfs 9,552 cf
n=0.022 L=283.0' S=0.0194 '/' Capacity=9.33 cfs Outflow=4.77 cfs 9,552 cf

Reach 12R: Upper E-1 Ditch Avg. Depth=0.70' Max Vel=3.26 fps Inflow=1.75 cfs 5,080 cf
n=0.022 L=720.0' S=0.0150 '/' Capacity=4.14 cfs Outflow=1.60 cfs 5,080 cf

Pond 6P: Sed Pond Peak Elev=5,504.27' Storage=61,731 cf Inflow=9.99 cfs 25,009 cf
Outflow=2.29 cfs 18,184 cf

Total Runoff Area = 759,267 sf Runoff Volume = 25,009 cf Average Runoff Depth = 0.40"
100.00% Pervious = 759,267 sf 0.00% Impervious = 0 sf

Summary for Subcatchment 1S: E-3

Runoff = 4.88 cfs @ 3.18 hrs, Volume= 9,552 cf, Depth= 0.40"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type II 24-hr 6.00 hrs Rainfall=1.29"

	Area (sf)	CN	Description
*	289,991	87	
	289,991		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.5	1,091	0.0300	1.17		**Lag/CN Method,**

Summary for Subcatchment 2S: E-1

Runoff = 0.98 cfs @ 3.34 hrs, Volume= 2,902 cf, Depth= 0.40"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type II 24-hr 6.00 hrs Rainfall=1.29"

	Area (sf)	CN	Description
*	88,103	87	
	88,103		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
27.1	1,752	0.0210	1.08		**Lag/CN Method,**

Summary for Subcatchment 7S: E-2

Runoff = 1.42 cfs @ 3.12 hrs, Volume= 2,178 cf, Depth= 0.40"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type II 24-hr 6.00 hrs Rainfall=1.29"

	Area (sf)	CN	Description
*	66,123	87	
	66,123		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.2	581	0.0210	0.86		**Lag/CN Method,**

Summary for Subcatchment 8S: E-4

[49] Hint: Tc<2dt may require smaller dt

Runoff = 1.16 cfs @ 3.01 hrs, Volume= 986 cf, Depth= 0.40"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type II 24-hr 6.00 hrs Rainfall=1.29"

	Area (sf)	CN	Description
*	29,947	87	
	29,947		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.2	561	0.2500	2.96		**Lag/CN Method,**

Summary for Subcatchment 9S: E-5

Runoff = 4.98 cfs @ 3.17 hrs, Volume= 9,391 cf, Depth= 0.40"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type II 24-hr 6.00 hrs Rainfall=1.29"

	Area (sf)	CN	Description
*	285,103	87	
	285,103		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.9	925	0.0250	1.04		**Lag/CN Method,**

Summary for Reach 3R: C-1

[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 66,123 sf, 0.00% Impervious, Inflow Depth = 0.40"
Inflow = 1.42 cfs @ 3.12 hrs, Volume= 2,178 cf
Outflow = 1.40 cfs @ 3.12 hrs, Volume= 2,178 cf, Atten= 1%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.46 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.99 fps, Avg. Travel Time= 0.3 min

Peak Storage= 13 cf @ 3.12 hrs, Average Depth at Peak Storage= 0.35'
Bank-Full Depth= 1.50', Capacity at Bank-Full= 11.83 cfs

18.0" Diameter Pipe, n= 0.020 Corrugated PE, corrugated interior
Length= 40.0' Slope= 0.0300 '/'
Inlet Invert= 5,520.70', Outlet Invert= 5,519.50'

Summary for Reach 4R: Lower E-1 Ditch

[62] Warning: Exceeded Reach 7R OUTLET depth by 0.46' @ 3.35 hrs
[61] Hint: Exceeded Reach 12R outlet invert by 0.59' @ 3.30 hrs

Inflow Area =	184,173 sf,	0.00% Impervious,	Inflow Depth =	0.40"	
Inflow =	1.84 cfs @	3.27 hrs,	Volume=	6,066 cf	
Outflow =	1.82 cfs @	3.32 hrs,	Volume=	6,066 cf,	Atten= 1%, Lag= 2.9 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.47 fps, Min. Travel Time= 1.4 min
Avg. Velocity = 1.48 fps, Avg. Travel Time= 3.2 min

Peak Storage= 151 cf @ 3.29 hrs, Average Depth at Peak Storage= 0.59'
Bank-Full Depth= 1.50', Capacity at Bank-Full= 21.75 cfs

0.00' x 1.50' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 1.5 '/' Top Width= 4.50'
Length= 287.0' Slope= 0.0171 '/'
Inlet Invert= 5,508.70', Outlet Invert= 5,503.80'

Summary for Reach 7R: C-2

[52] Hint: Inlet/Outlet conditions not evaluated
[62] Warning: Exceeded Reach 8R OUTLET depth by 0.10' @ 0.00 hrs

Inflow Area =	29,947 sf,	0.00% Impervious,	Inflow Depth =	0.40"	
Inflow =	0.77 cfs @	3.11 hrs,	Volume=	986 cf	
Outflow =	0.75 cfs @	3.12 hrs,	Volume=	986 cf,	Atten= 2%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.73 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 1.39 fps, Avg. Travel Time= 0.5 min

Peak Storage= 8 cf @ 3.12 hrs, Average Depth at Peak Storage= 0.26'
Bank-Full Depth= 1.50', Capacity at Bank-Full= 11.83 cfs

18.0" Diameter Pipe, n= 0.020 Corrugated PE, corrugated interior
Length= 40.0' Slope= 0.0300 '/'
Inlet Invert= 5,509.90', Outlet Invert= 5,508.70'

Summary for Reach 8R: E-4 Ditch

Inflow Area =	29,947 sf,	0.00% Impervious,	Inflow Depth =	0.40"	
Inflow =	1.16 cfs @	3.01 hrs,	Volume=	986 cf	
Outflow =	0.77 cfs @	3.11 hrs,	Volume=	986 cf,	Atten= 34%, Lag= 6.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.73 fps, Min. Travel Time= 3.4 min
Avg. Velocity = 1.03 fps, Avg. Travel Time= 9.1 min

Peak Storage= 166 cf @ 3.06 hrs, Average Depth at Peak Storage= 0.44'
Bank-Full Depth= 1.20', Capacity at Bank-Full= 11.47 cfs

0.00' x 1.20' deep channel, n= 0.022
Side Slope Z-value= 2.0 1.0 '/' Top Width= 3.60'
Length= 561.0' Slope= 0.0159 '/'
Inlet Invert= 5,518.70', Outlet Invert= 5,509.80'

Summary for Reach 10R: E-5 Ditch

Inflow Area =	285,103 sf,	0.00% Impervious,	Inflow Depth =	0.40"	
Inflow =	4.98 cfs @	3.17 hrs,	Volume=	9,391 cf	
Outflow =	4.22 cfs @	3.31 hrs,	Volume=	9,391 cf,	Atten= 15%, Lag= 8.3 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.86 fps, Min. Travel Time= 4.3 min
Avg. Velocity = 0.93 fps, Avg. Travel Time= 13.4 min

Peak Storage= 1,116 cf @ 3.23 hrs, Average Depth at Peak Storage= 0.61'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 15.92 cfs

0.00' x 1.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 4.0 '/' Top Width= 8.00'
Length= 746.0' Slope= 0.0091 '/'
Inlet Invert= 5,510.60', Outlet Invert= 5,503.80'

‡

Summary for Reach 11R: E-3 Ditch

Inflow Area =	289,991 sf,	0.00% Impervious,	Inflow Depth =	0.40"	
Inflow =	4.88 cfs @	3.18 hrs,	Volume=	9,552 cf	
Outflow =	4.77 cfs @	3.21 hrs,	Volume=	9,552 cf,	Atten= 2%, Lag= 2.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.53 fps, Min. Travel Time= 1.0 min
Avg. Velocity = 2.05 fps, Avg. Travel Time= 2.3 min

Peak Storage= 304 cf @ 3.20 hrs, Average Depth at Peak Storage= 0.78'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 9.33 cfs

0.00' x 1.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 2.5 1.0 '/' Top Width= 3.50'
Length= 283.0' Slope= 0.0194 '/'
Inlet Invert= 5,509.50', Outlet Invert= 5,504.00'

Summary for Reach 12R: Upper E-1 Ditch

[62] Warning: Exceeded Reach 3R OUTLET depth by 0.49' @ 3.40 hrs

Inflow Area =	154,226 sf,	0.00% Impervious,	Inflow Depth =	0.40"	
Inflow =	1.75 cfs @	3.16 hrs,	Volume=	5,080 cf	
Outflow =	1.60 cfs @	3.30 hrs,	Volume=	5,080 cf,	Atten= 8%, Lag= 8.7 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.26 fps, Min. Travel Time= 3.7 min
Avg. Velocity = 1.38 fps, Avg. Travel Time= 8.7 min

Peak Storage= 354 cf @ 3.23 hrs, Average Depth at Peak Storage= 0.70'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 4.14 cfs

0.00' x 1.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 1.0 '/' Top Width= 2.00'
Length= 720.0' Slope= 0.0150 '/'
Inlet Invert= 5,519.50', Outlet Invert= 5,508.70'

Summary for Pond 6P: Sed Pond

[62] Warning: Exceeded Reach 4R OUTLET depth by 0.09' @ 4.10 hrs
[62] Warning: Exceeded Reach 10R OUTLET depth by 0.16' @ 4.00 hrs
[61] Hint: Exceeded Reach 11R outlet invert by 0.27' @ 3.85 hrs

Inflow Area =	759,267 sf,	0.00% Impervious,	Inflow Depth =	0.40"	
Inflow =	9.99 cfs @	3.27 hrs,	Volume=	25,009 cf	
Outflow =	2.29 cfs @	3.85 hrs,	Volume=	18,184 cf,	Atten= 77%, Lag= 34.7 min
Primary =	2.29 cfs @	3.85 hrs,	Volume=	18,184 cf	

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Starting Elev= 5,503.00' Surf.Area= 9,328 sf Storage= 48,972 cf
Peak Elev= 5,504.27' @ 3.85 hrs Surf.Area= 10,663 sf Storage= 61,731 cf (12,759 cf above start)

Plug-Flow detention time= (not calculated: initial storage excedes outflow)
Center-of-Mass det. time= 75.1 min (311.7 - 236.6)

Volume	Invert	Avail.Storage	Storage Description
#1	5,493.80'	78,991 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

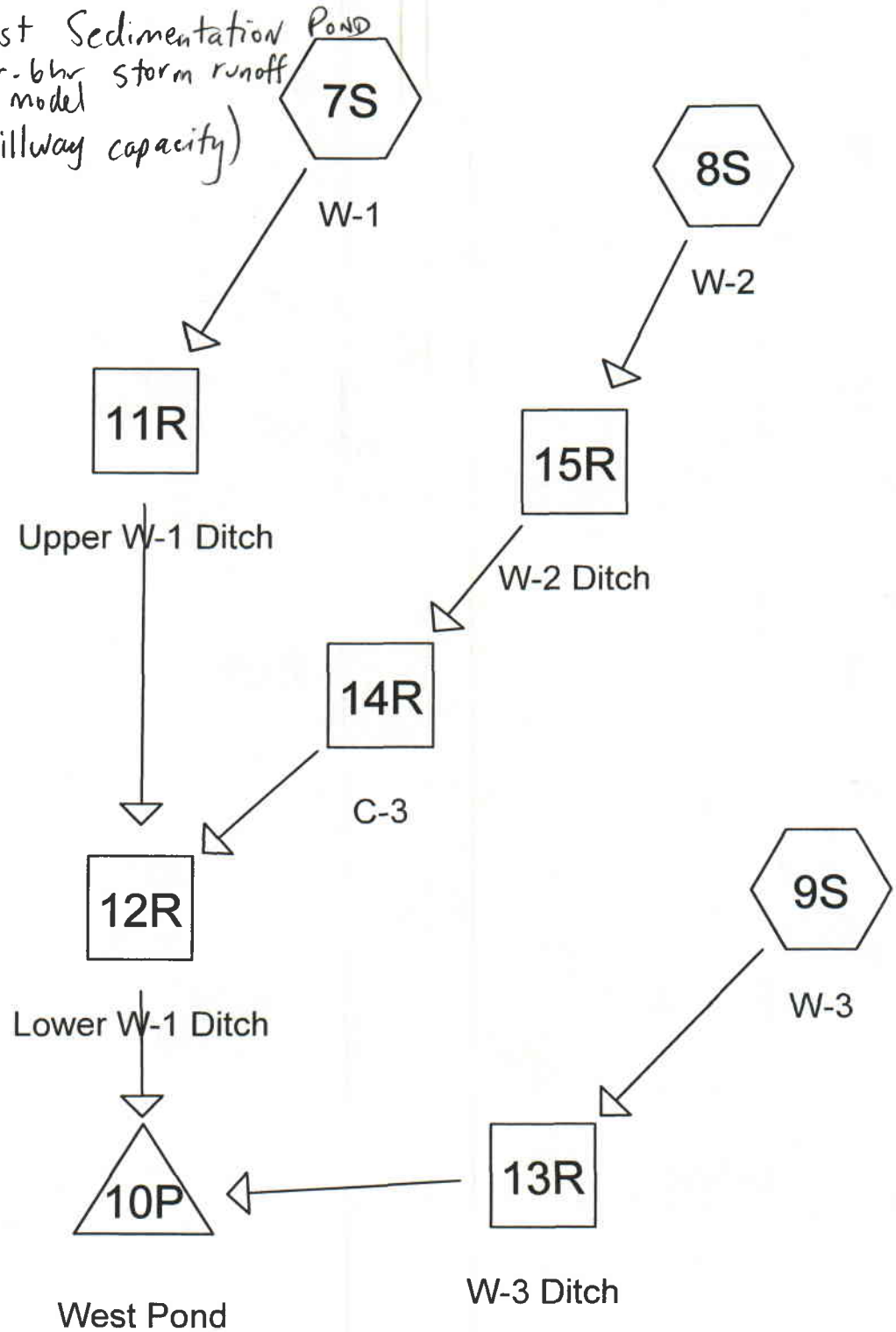
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
5,493.80	2,550	0	0
5,494.80	2,601	2,576	2,576
5,495.80	3,214	2,908	5,483
5,496.80	3,909	3,562	9,045
5,497.80	4,637	4,273	13,318
5,498.80	5,425	5,031	18,349
5,499.80	6,243	5,834	24,183
5,500.80	7,158	6,701	30,883
5,501.80	8,125	7,642	38,525
5,502.80	9,087	8,606	47,131
5,503.80	10,291	9,689	56,820
5,505.80	11,880	22,171	78,991

Device	Routing	Invert	Outlet Devices
#1	Primary	5,503.70'	**2.0' long x 3.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50

Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68
2.72 2.81 2.92 2.97 3.07 3.32

Primary OutFlow Max=2.29 cfs @ 3.85 hrs HW=5,504.27' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 2.29 cfs @ 2.01 fps)

West Sedimentation Pond
25yr-6hr storm runoff model
(spillway capacity)



Subcat Reach Pond Link

Drainage Diagram for 25yr-6hr West Pond
Prepared by {enter your company name here}, Printed 12/31/2007
HydroCAD® 8.50 s/n 003900 © 2007 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
305,034	87	(7S,8S,9S)
305,034		**TOTAL AREA**

Time span=0.00-30.00 hrs, dt=0.05 hrs, 601 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment7S: W-1 Runoff Area=105,474 sf 0.00% Impervious Runoff Depth=0.40"
Flow Length=1,297' Slope=0.0250 '/' Tc=19.5 min CN=87 Runoff=1.50 cfs 3,474 cf

Subcatchment8S: W-2 Runoff Area=128,724 sf 0.00% Impervious Runoff Depth=0.40"
Flow Length=635' Slope=0.0250 '/' Tc=11.0 min CN=87 Runoff=2.79 cfs 4,240 cf

Subcatchment9S: W-3 Runoff Area=70,836 sf 0.00% Impervious Runoff Depth=0.40"
Flow Length=447' Slope=0.0270 '/' Tc=8.0 min CN=87 Runoff=1.81 cfs 2,333 cf

Reach 11R: Upper W-1 Ditch Avg. Depth=0.48' Max Vel=2.90 fps Inflow=1.50 cfs 3,474 cf
n=0.022 L=963.0' S=0.0145 '/' Capacity=60.48 cfs Outflow=1.31 cfs 3,474 cf

Reach 12R: Lower W-1 Ditch Avg. Depth=0.70' Max Vel=2.90 fps Inflow=2.84 cfs 7,714 cf
n=0.022 L=320.0' S=0.0088 '/' Capacity=46.92 cfs Outflow=2.79 cfs 7,714 cf

Reach 13R: W-3 Ditch Avg. Depth=0.47' Max Vel=3.03 fps Inflow=1.81 cfs 2,333 cf
n=0.022 L=160.0' S=0.0156 '/' Capacity=13.77 cfs Outflow=1.73 cfs 2,333 cf

Reach 14R: C-3 Avg. Depth=0.46' Max Vel=5.47 fps Inflow=2.54 cfs 4,240 cf
D=18.0" n=0.020 L=40.0' S=0.0325 '/' Capacity=12.31 cfs Outflow=2.52 cfs 4,240 cf

Reach 15R: W-2 Ditch Avg. Depth=0.21' Max Vel=2.80 fps Inflow=2.79 cfs 4,240 cf
n=0.022 L=500.0' S=0.0158 '/' Capacity=37.48 cfs Outflow=2.54 cfs 4,240 cf

Pond 10P: West Pond Peak Elev=5,508.03' Storage=36,279 cf Inflow=3.24 cfs 10,047 cf
Outflow=0.08 cfs 407 cf

Total Runoff Area = 305,034 sf Runoff Volume = 10,047 cf Average Runoff Depth = 0.40"
100.00% Pervious = 305,034 sf 0.00% Impervious = 0 sf

Summary for Subcatchment 7S: W-1

Runoff = 1.50 cfs @ 3.23 hrs, Volume= 3,474 cf, Depth= 0.40"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type II 24-hr 6.00 hrs Rainfall=1.29"

	Area (sf)	CN	Description
*	105,474	87	
	105,474		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.5	1,297	0.0250	1.11		**Lag/CN Method,**

Summary for Subcatchment 8S: W-2

Runoff = 2.79 cfs @ 3.12 hrs, Volume= 4,240 cf, Depth= 0.40"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type II 24-hr 6.00 hrs Rainfall=1.29"

	Area (sf)	CN	Description
*	128,724	87	
	128,724		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.0	635	0.0250	0.96		**Lag/CN Method,**

Summary for Subcatchment 9S: W-3

Runoff = 1.81 cfs @ 3.08 hrs, Volume= 2,333 cf, Depth= 0.40"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type II 24-hr 6.00 hrs Rainfall=1.29"

	Area (sf)	CN	Description
*	70,836	87	
	70,836		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.0	447	0.0270	0.93		**Lag/CN Method,**

Summary for Reach 11R: Upper W-1 Ditch

Inflow Area = 105,474 sf, 0.00% Impervious, Inflow Depth = 0.40"
Inflow = 1.50 cfs @ 3.23 hrs, Volume= 3,474 cf
Outflow = 1.31 cfs @ 3.41 hrs, Volume= 3,474 cf, Atten= 13%, Lag= 10.3 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.90 fps, Min. Travel Time= 5.5 min
Avg. Velocity = 1.17 fps, Avg. Travel Time= 13.7 min

Peak Storage= 436 cf @ 3.31 hrs, Average Depth at Peak Storage= 0.48'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 60.48 cfs

0.00' x 2.00' deep channel, n= 0.022
Side Slope Z-value= 2.0 '/' Top Width= 8.00'
Length= 963.0' Slope= 0.0145 '/'
Inlet Invert= 5,524.80', Outlet Invert= 5,510.80'

Summary for Reach 12R: Lower W-1 Ditch

[62] Warning: Exceeded Reach 11R OUTLET depth by 0.24' @ 3.25 hrs
[62] Warning: Exceeded Reach 14R OUTLET depth by 0.37' @ 3.45 hrs

Inflow Area = 234,198 sf, 0.00% Impervious, Inflow Depth = 0.40"
Inflow = 2.84 cfs @ 3.24 hrs, Volume= 7,714 cf
Outflow = 2.79 cfs @ 3.31 hrs, Volume= 7,714 cf, Atten= 2%, Lag= 4.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.90 fps, Min. Travel Time= 1.8 min
Avg. Velocity = 1.09 fps, Avg. Travel Time= 4.9 min

Peak Storage= 314 cf @ 3.27 hrs, Average Depth at Peak Storage= 0.70'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 46.92 cfs

0.00' x 2.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 2.0 '/' Top Width= 8.00'
Length= 320.0' Slope= 0.0088 '/'
Inlet Invert= 5,510.80', Outlet Invert= 5,508.00'

Summary for Reach 13R: W-3 Ditch

Inflow Area = 70,836 sf, 0.00% Impervious, Inflow Depth = 0.40"
Inflow = 1.81 cfs @ 3.08 hrs, Volume= 2,333 cf
Outflow = 1.73 cfs @ 3.11 hrs, Volume= 2,333 cf, Atten= 4%, Lag= 1.9 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.03 fps, Min. Travel Time= 0.9 min
Avg. Velocity = 1.35 fps, Avg. Travel Time= 2.0 min

Peak Storage= 98 cf @ 3.10 hrs, Average Depth at Peak Storage= 0.47'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 13.77 cfs

0.00' x 1.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 4.5 1.0 '/' Top Width= 5.50'
Length= 160.0' Slope= 0.0156 '/'
Inlet Invert= 5,510.50', Outlet Invert= 5,508.00'

Summary for Reach 14R: C-3

[52] Hint: Inlet/Outlet conditions not evaluated
[62] Warning: Exceeded Reach 15R OUTLET depth by 0.27' @ 3.25 hrs

Inflow Area = 128,724 sf, 0.00% Impervious, Inflow Depth = 0.40"
Inflow = 2.54 cfs @ 3.21 hrs, Volume= 4,240 cf
Outflow = 2.52 cfs @ 3.21 hrs, Volume= 4,240 cf, Atten= 1%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.47 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.94 fps, Avg. Travel Time= 0.3 min

Peak Storage= 19 cf @ 3.21 hrs, Average Depth at Peak Storage= 0.46'
Bank-Full Depth= 1.50', Capacity at Bank-Full= 12.31 cfs

18.0" Diameter Pipe, n= 0.020
Length= 40.0' Slope= 0.0325 '/'
Inlet Invert= 5,512.10', Outlet Invert= 5,510.80'

Summary for Reach 15R: W-2 Ditch

Inflow Area = 128,724 sf, 0.00% Impervious, Inflow Depth = 0.40"
Inflow = 2.79 cfs @ 3.12 hrs, Volume= 4,240 cf
Outflow = 2.54 cfs @ 3.21 hrs, Volume= 4,240 cf, Atten= 9%, Lag= 5.6 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.80 fps, Min. Travel Time= 3.0 min
Avg. Velocity = 0.85 fps, Avg. Travel Time= 9.9 min

Peak Storage= 453 cf @ 3.16 hrs, Average Depth at Peak Storage= 0.21'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 37.48 cfs

4.00' x 1.00' deep channel, n= 0.022
Side Slope Z-value= 2.0 1.0 '/' Top Width= 7.00'
Length= 500.0' Slope= 0.0158 '/'
Inlet Invert= 5,520.00', Outlet Invert= 5,512.10'

Summary for Pond 10P: West Pond

[61] Hint: Exceeded Reach 12R outlet invert by 0.03' @ 6.55 hrs
[62] Warning: Exceeded Reach 13R OUTLET depth by 0.02' @ 6.80 hrs

Inflow Area = 305,034 sf, 0.00% Impervious, Inflow Depth = 0.40"
Inflow = 3.24 cfs @ 3.30 hrs, Volume= 10,047 cf
Outflow = 0.08 cfs @ 6.53 hrs, Volume= 407 cf, Atten= 97%, Lag= 194.3 min
Primary = 0.08 cfs @ 6.53 hrs, Volume= 407 cf

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Starting Elev= 5,506.40' Surf.Area= 5,499 sf Storage= 26,424 cf
Peak Elev= 5,508.03' @ 6.53 hrs Surf.Area= 6,588 sf Storage= 36,279 cf (9,855 cf above start)

Plug-Flow detention time= (not calculated: initial storage excedes outflow)
Center-of-Mass det. time= 186.7 min (425.4 - 238.6)

Volume	Invert	Avail.Storage	Storage Description
#1	5,498.23'	50,624 cf	**17.00'W x 78.00'L x 11.77'H Prismatoid Z=2.0**

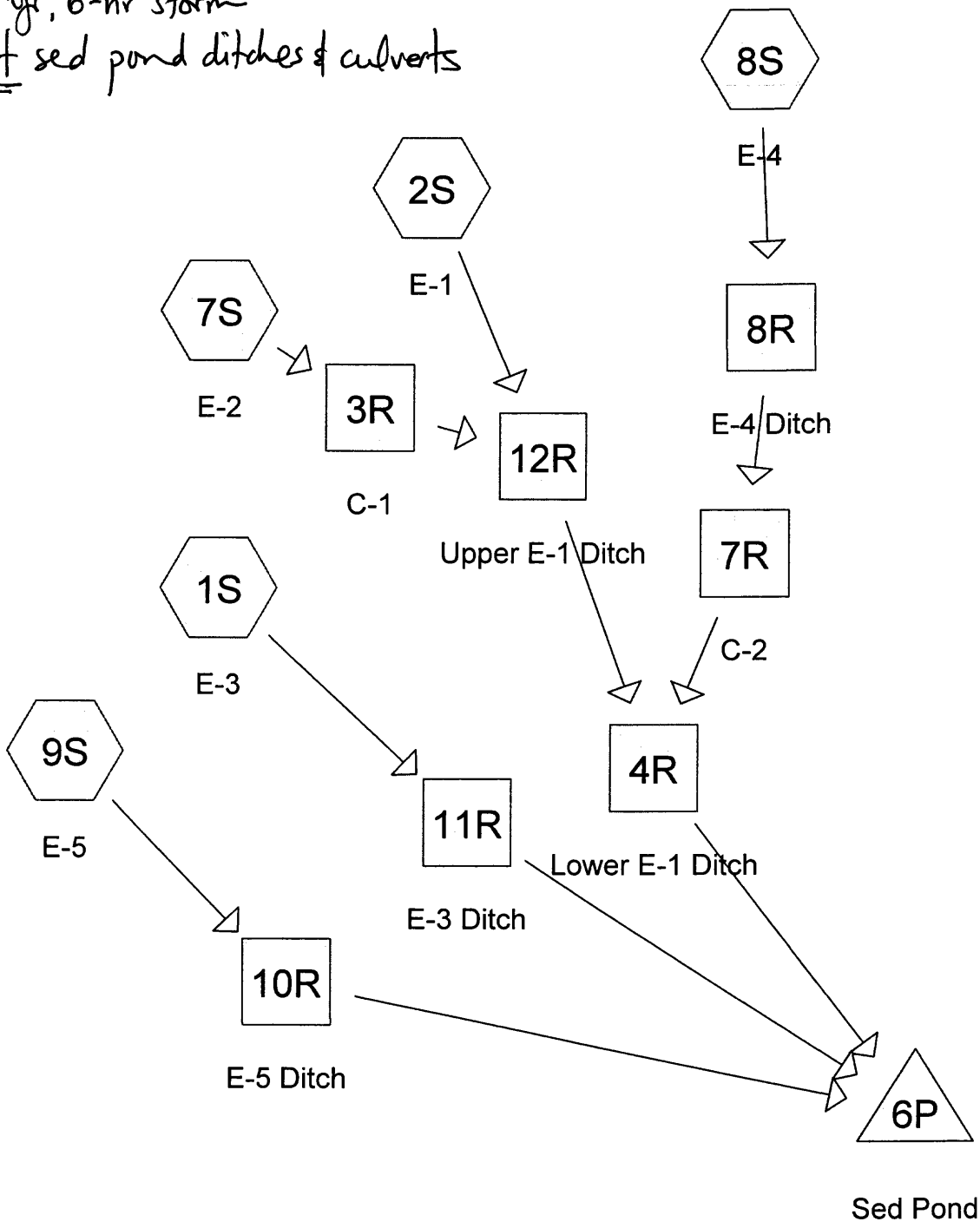
Device	Routing	Invert	Outlet Devices
#1	Primary	5,508.00'	**3.0' long x 2.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Primary OutFlow Max=0.04 cfs @ 6.53 hrs HW=5,508.03' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 0.04 cfs @ 0.46 fps)

APPENDIX 7-7

Drainage Channel and Culvert
Hydrology Calculations

Drainage ditch hydro calcs.
100-yr, 6-hr storm
East sed pond ditches & culverts



Subcat Reach Pond Link

Drainage Diagram for 100yr-6hr East Pond
Prepared by EarthFax Engineering, Inc., Printed 1/14/2008
HydroCAD® 8.50 s/n 003900 © 2007 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
759,267	87	(1S,2S,7S,8S,9S)
759,267		**TOTAL AREA**

Time span=0.00-30.00 hrs, dt=0.05 hrs, 601 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: E-3 Runoff Area=289,991 sf 0.00% Impervious Runoff Depth=0.71"
Flow Length=1,091' Slope=0.0300 '/' Tc=15.5 min CN=87 Runoff=9.41 cfs 17,098 cf

Subcatchment 2S: E-1 Runoff Area=88,103 sf 0.00% Impervious Runoff Depth=0.71"
Flow Length=1,752' Slope=0.0210 '/' Tc=27.1 min CN=87 Runoff=1.88 cfs 5,195 cf

Subcatchment 7S: E-2 Runoff Area=66,123 sf 0.00% Impervious Runoff Depth=0.71"
Flow Length=581' Slope=0.0210 '/' Tc=11.2 min CN=87 Runoff=2.70 cfs 3,899 cf

Subcatchment 8S: E-4 Runoff Area=29,947 sf 0.00% Impervious Runoff Depth=0.71"
Flow Length=561' Slope=0.2500 '/' Tc=3.2 min CN=87 Runoff=2.20 cfs 1,766 cf

Subcatchment 9S: E-5 Runoff Area=285,103 sf 0.00% Impervious Runoff Depth=0.71"
Flow Length=925' Slope=0.0250 '/' Tc=14.9 min CN=87 Runoff=9.49 cfs 16,810 cf

Reach 3R: C-1 Avg. Depth=0.49' Max Vel=5.39 fps Inflow=2.70 cfs 3,899 cf
D=18.0" n=0.020 L=40.0' S=0.0300 '/' Capacity=11.83 cfs Outflow=2.68 cfs 3,899 cf

Reach 4R: Lower E-1 Ditch Avg. Depth=0.89' Max Vel=2.87 fps Inflow=3.44 cfs 10,862 cf
n=0.035 L=287.0' S=0.0171 '/' Capacity=13.67 cfs Outflow=3.40 cfs 10,862 cf

Reach 7R: C-2 Avg. Depth=0.34' Max Vel=4.20 fps Inflow=1.27 cfs 1,766 cf
D=18.0" n=0.020 L=40.0' S=0.0275 '/' Capacity=11.32 cfs Outflow=1.24 cfs 1,769 cf

Reach 8R: E-4 Ditch Avg. Depth=0.65' Max Vel=2.22 fps Inflow=2.20 cfs 1,766 cf
n=0.035 L=561.0' S=0.0159 '/' Capacity=7.21 cfs Outflow=1.27 cfs 1,766 cf

Reach 10R: E-5 Ditch Avg. Depth=0.91' Max Vel=2.35 fps Inflow=9.49 cfs 16,810 cf
n=0.035 L=746.0' S=0.0091 '/' Capacity=10.01 cfs Outflow=7.79 cfs 16,810 cf

Reach 11R: E-3 Ditch Avg. Depth=1.05' Max Vel=3.77 fps Inflow=9.41 cfs 17,098 cf
n=0.035 L=283.0' S=0.0194 '/' Capacity=21.95 cfs Outflow=9.05 cfs 17,098 cf

Reach 12R: Upper E-1 Ditch Avg. Depth=1.06' Max Vel=2.70 fps Inflow=3.37 cfs 9,093 cf
n=0.035 L=720.0' S=0.0150 '/' Capacity=7.67 cfs Outflow=3.02 cfs 9,093 cf

Pond 6P: Sed Pond Peak Elev=5,502.54' Storage=44,769 cf Inflow=18.07 cfs 44,770 cf
Outflow=0.00 cfs 0 cf

Total Runoff Area = 759,267 sf Runoff Volume = 44,768 cf Average Runoff Depth = 0.71"
100.00% Pervious = 759,267 sf 0.00% Impervious = 0 sf

Summary for Subcatchment 1S: E-3

Runoff = 9.41 cfs @ 3.17 hrs, Volume= 17,098 cf, Depth= 0.71"

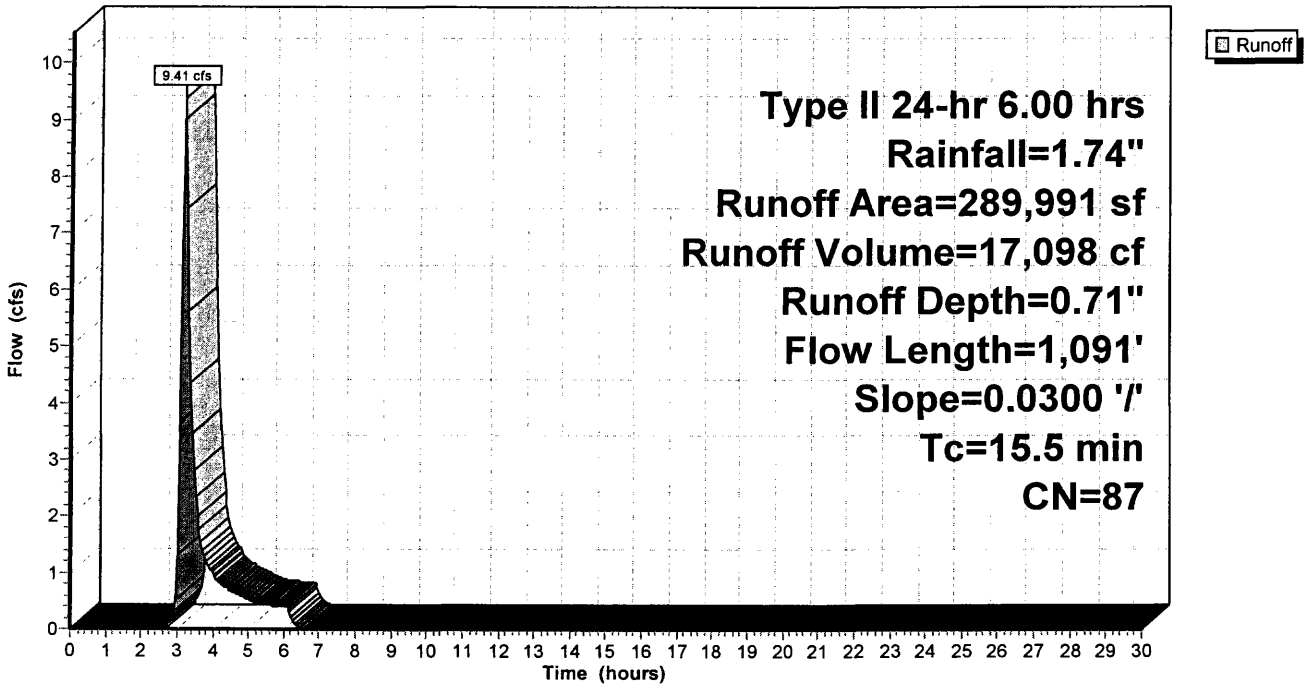
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type II 24-hr 6.00 hrs Rainfall=1.74"

	Area (sf)	CN	Description
*	289,991	87	
	289,991		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.5	1,091	0.0300	1.17		**Lag/CN Method,**

Subcatchment 1S: E-3

Hydrograph



Summary for Subcatchment 2S: E-1

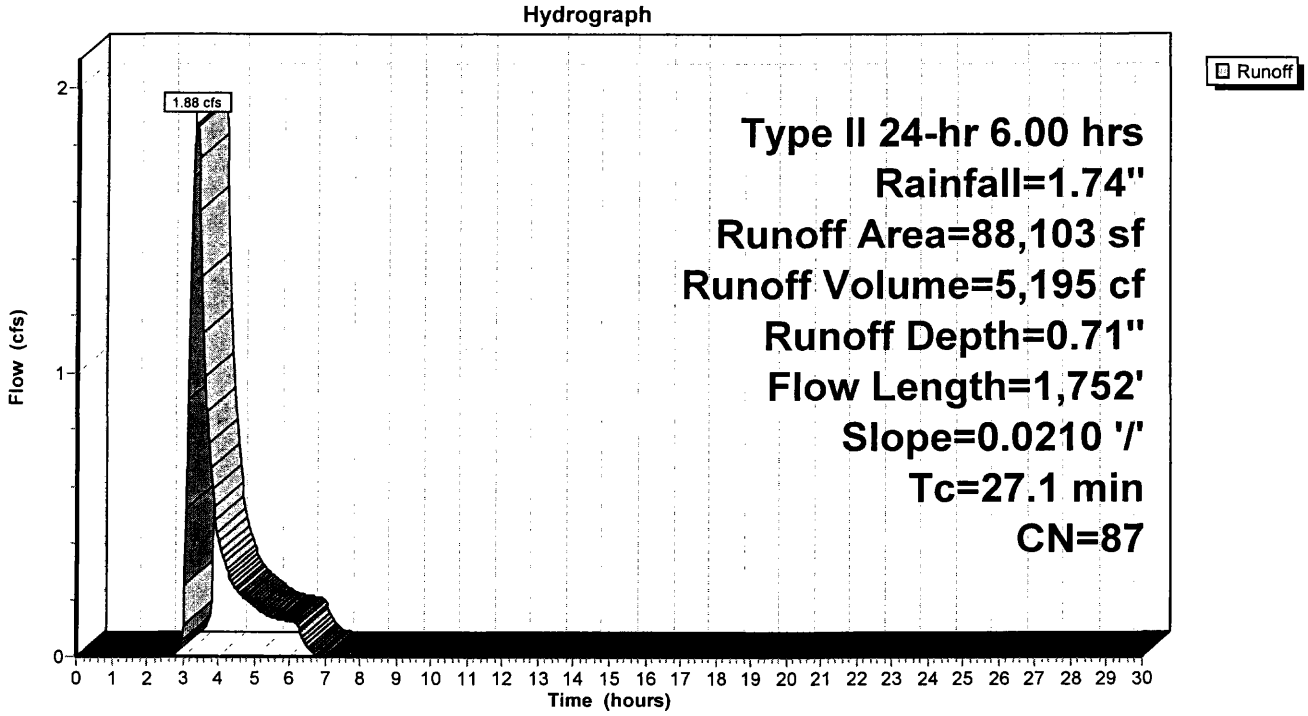
Runoff = 1.88 cfs @ 3.33 hrs, Volume= 5,195 cf, Depth= 0.71"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type II 24-hr 6.00 hrs Rainfall=1.74"

	Area (sf)	CN	Description
*	88,103	87	
	88,103		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
27.1	1,752	0.0210	1.08		**Lag/CN Method,**

Subcatchment 2S: E-1



Summary for Subcatchment 7S: E-2

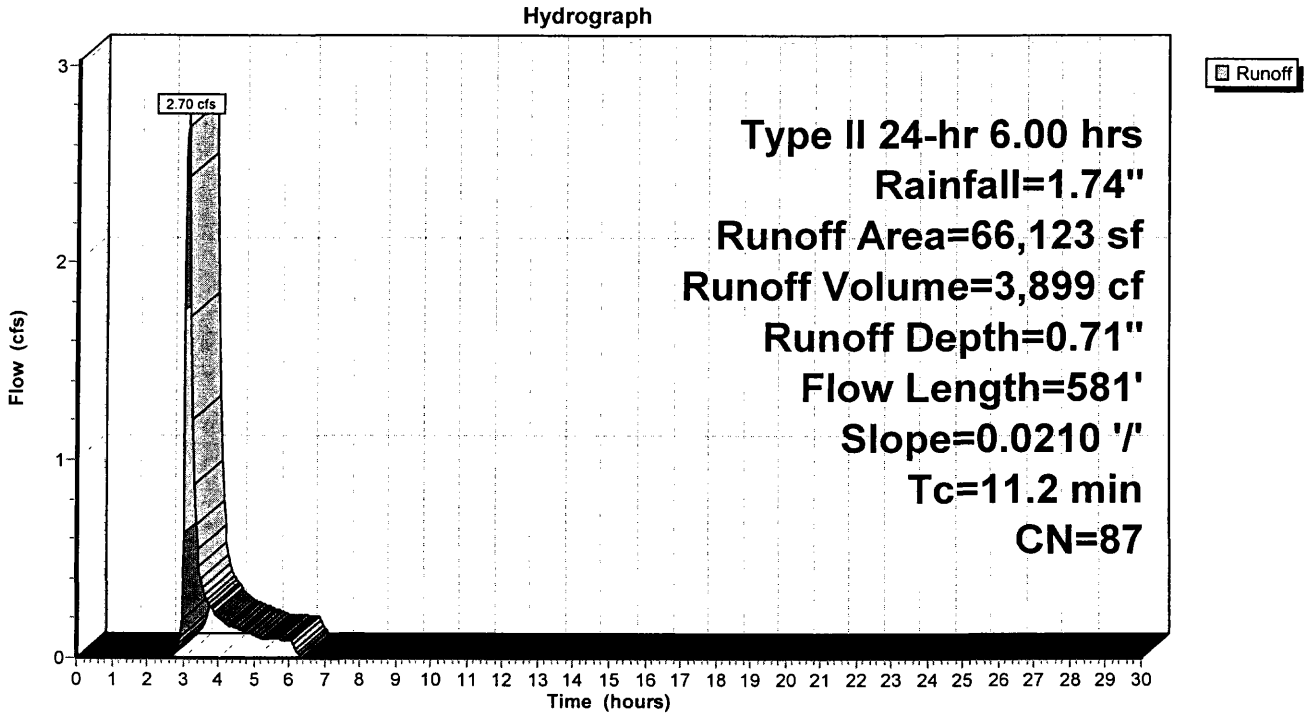
Runoff = 2.70 cfs @ 3.12 hrs, Volume= 3,899 cf, Depth= 0.71"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type II 24-hr 6.00 hrs Rainfall=1.74"

	Area (sf)	CN	Description
*	66,123	87	
	66,123		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.2	581	0.0210	0.86		**Lag/CN Method,**

Subcatchment 7S: E-2



Summary for Subcatchment 8S: E-4

[49] Hint: Tc<2dt may require smaller dt

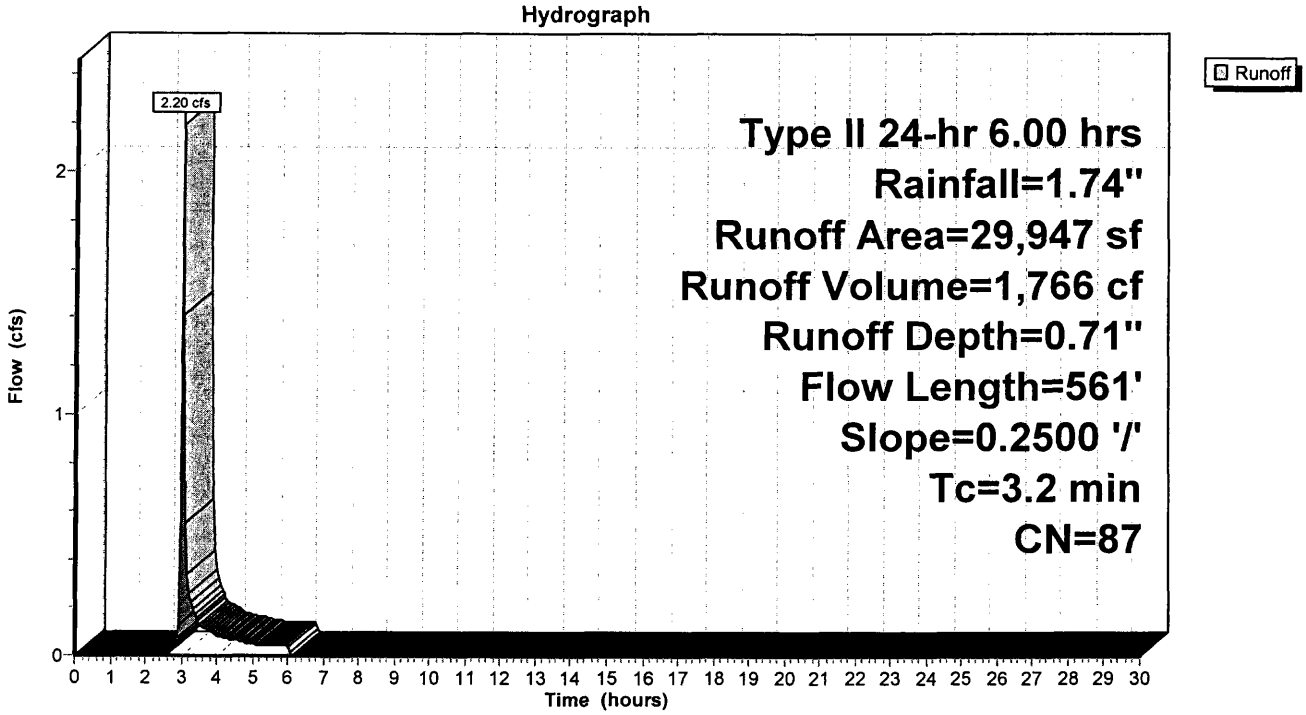
Runoff = 2.20 cfs @ 3.01 hrs, Volume= 1,766 cf, Depth= 0.71"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type II 24-hr 6.00 hrs Rainfall=1.74"

	Area (sf)	CN	Description
*	29,947	87	
	29,947		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.2	561	0.2500	2.96		**Lag/CN Method,**

Subcatchment 8S: E-4



Summary for Subcatchment 9S: E-5

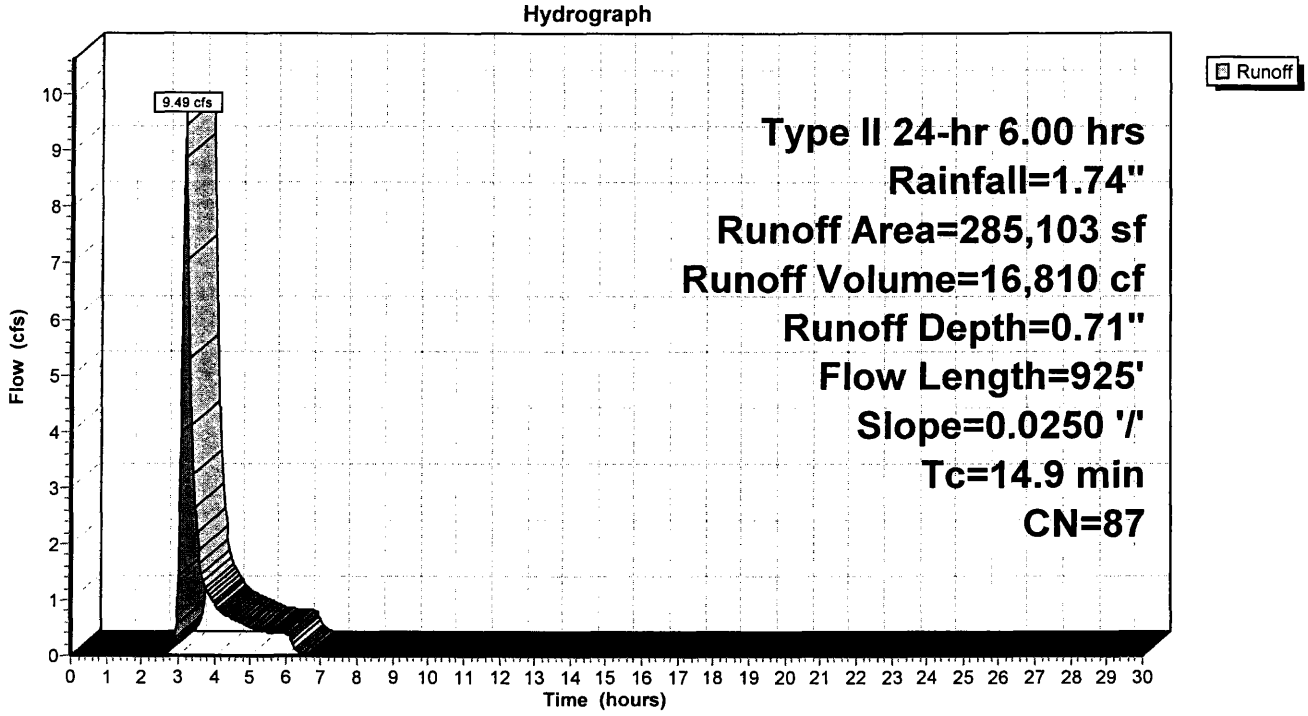
Runoff = 9.49 cfs @ 3.16 hrs, Volume= 16,810 cf, Depth= 0.71"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type II 24-hr 6.00 hrs Rainfall=1.74"

	Area (sf)	CN	Description
*	285,103	87	
	285,103		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.9	925	0.0250	1.04		**Lag/CN Method,**

Subcatchment 9S: E-5



Summary for Reach 3R: C-1

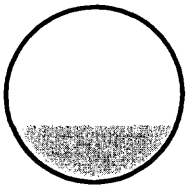
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area =	66,123 sf,	0.00% Impervious,	Inflow Depth =	0.71"	
Inflow =	2.70 cfs @	3.12 hrs,	Volume=	3,899 cf	
Outflow =	2.68 cfs @	3.12 hrs,	Volume=	3,899 cf,	Atten= 1%, Lag= 0.2 min

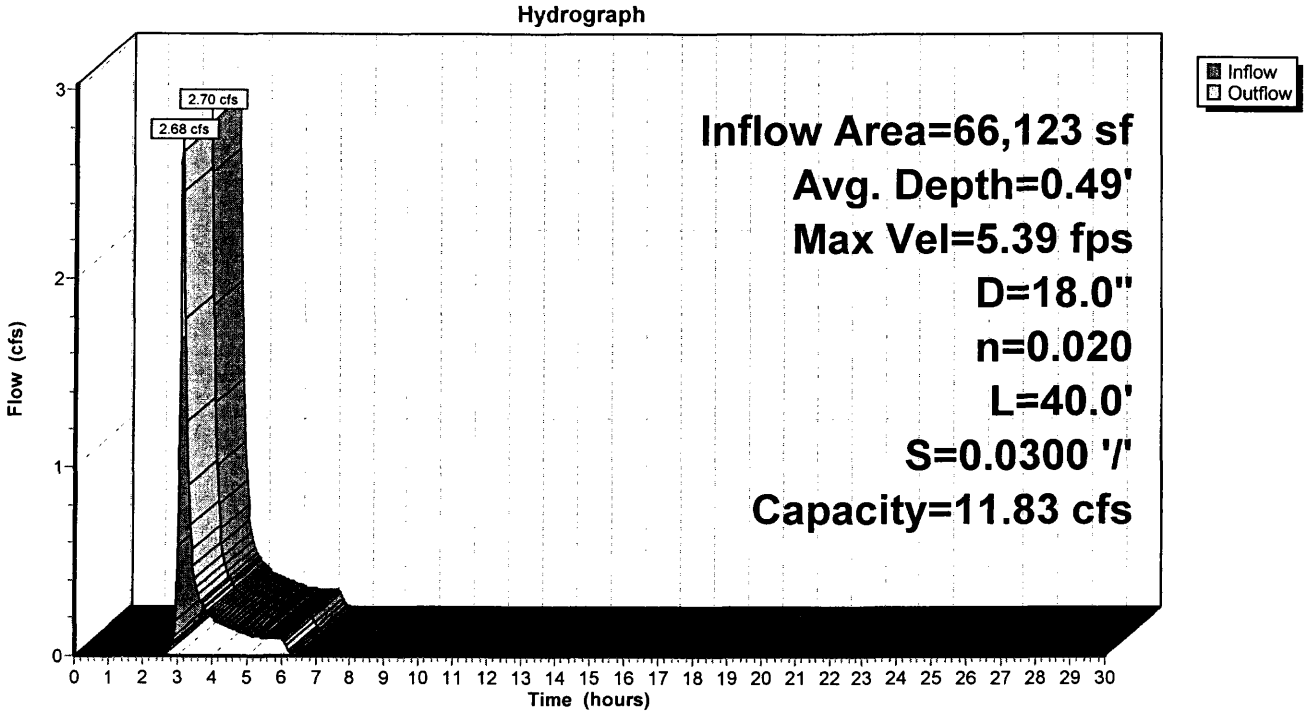
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.39 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 2.26 fps, Avg. Travel Time= 0.3 min

Peak Storage= 20 cf @ 3.12 hrs, Average Depth at Peak Storage= 0.49'
Bank-Full Depth= 1.50', Capacity at Bank-Full= 11.83 cfs

18.0" Diameter Pipe, n= 0.020 Corrugated PE, corrugated interior
Length= 40.0' Slope= 0.0300 '/'
Inlet Invert= 5,520.70', Outlet Invert= 5,519.50'



Reach 3R: C-1



Summary for Reach 4R: Lower E-1 Ditch

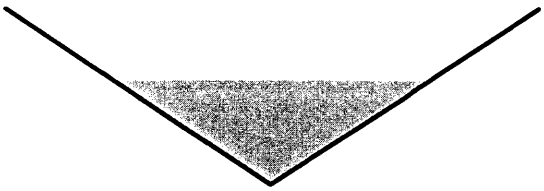
[62] Warning: Exceeded Reach 7R OUTLET depth by 0.71' @ 3.35 hrs
[61] Hint: Exceeded Reach 12R outlet invert by 0.89' @ 3.30 hrs

Inflow Area =	184,173 sf,	0.00% Impervious,	Inflow Depth =	0.71"	
Inflow =	3.44 cfs @	3.28 hrs,	Volume=	10,862 cf	
Outflow =	3.40 cfs @	3.34 hrs,	Volume=	10,862 cf,	Atten= 1%, Lag= 3.5 min

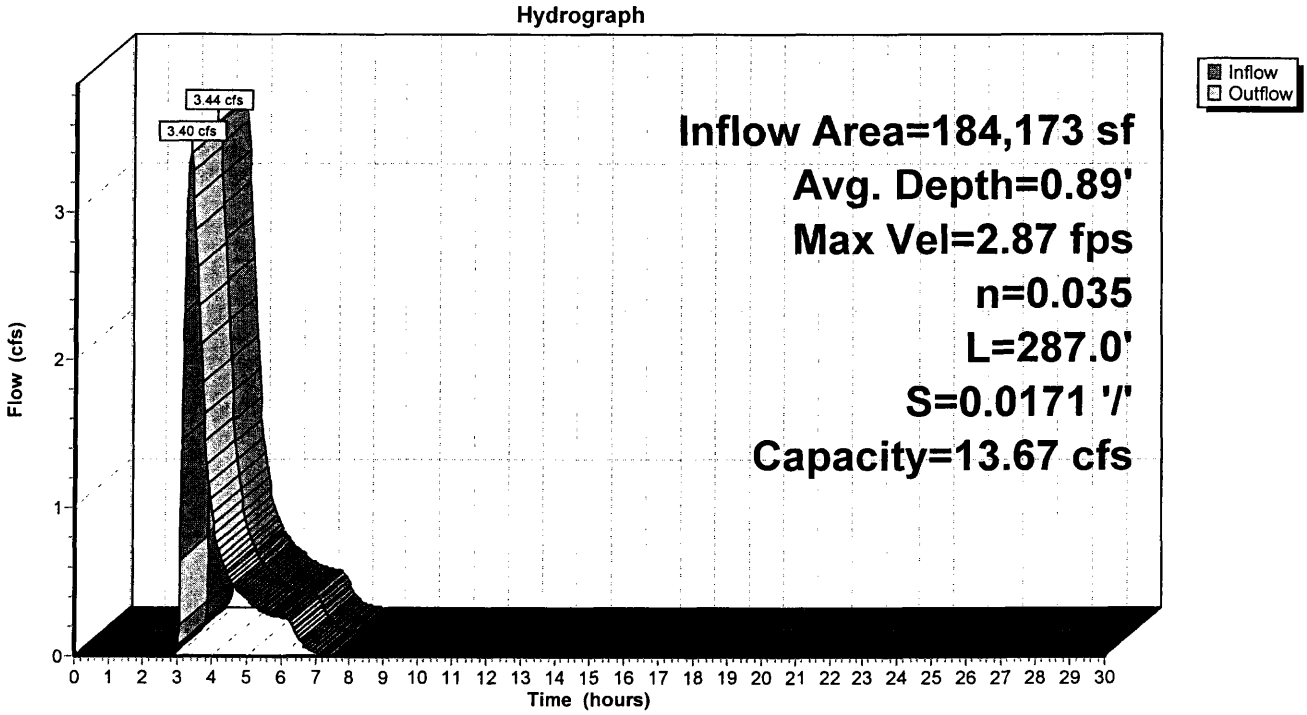
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.87 fps, Min. Travel Time= 1.7 min
Avg. Velocity = 0.98 fps, Avg. Travel Time= 4.9 min

Peak Storage= 344 cf @ 3.31 hrs, Average Depth at Peak Storage= 0.89'
Bank-Full Depth= 1.50', Capacity at Bank-Full= 13.67 cfs

0.00' x 1.50' deep channel, n= 0.035
Side Slope Z-value= 1.5 '/' Top Width= 4.50'
Length= 287.0' Slope= 0.0171 '/'
Inlet Invert= 5,508.70', Outlet Invert= 5,503.80'



Reach 4R: Lower E-1 Ditch



Summary for Reach 7R: C-2

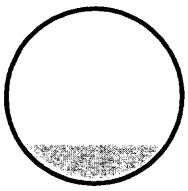
[52] Hint: Inlet/Outlet conditions not evaluated
[61] Hint: Exceeded Reach 8R outlet invert by 0.33' @ 3.15 hrs

Inflow Area =	29,947 sf,	0.00% Impervious,	Inflow Depth =	0.71"	
Inflow =	1.27 cfs @	3.13 hrs,	Volume=	1,766 cf	
Outflow =	1.24 cfs @	3.14 hrs,	Volume=	1,769 cf,	Atten= 2%, Lag= 0.2 min

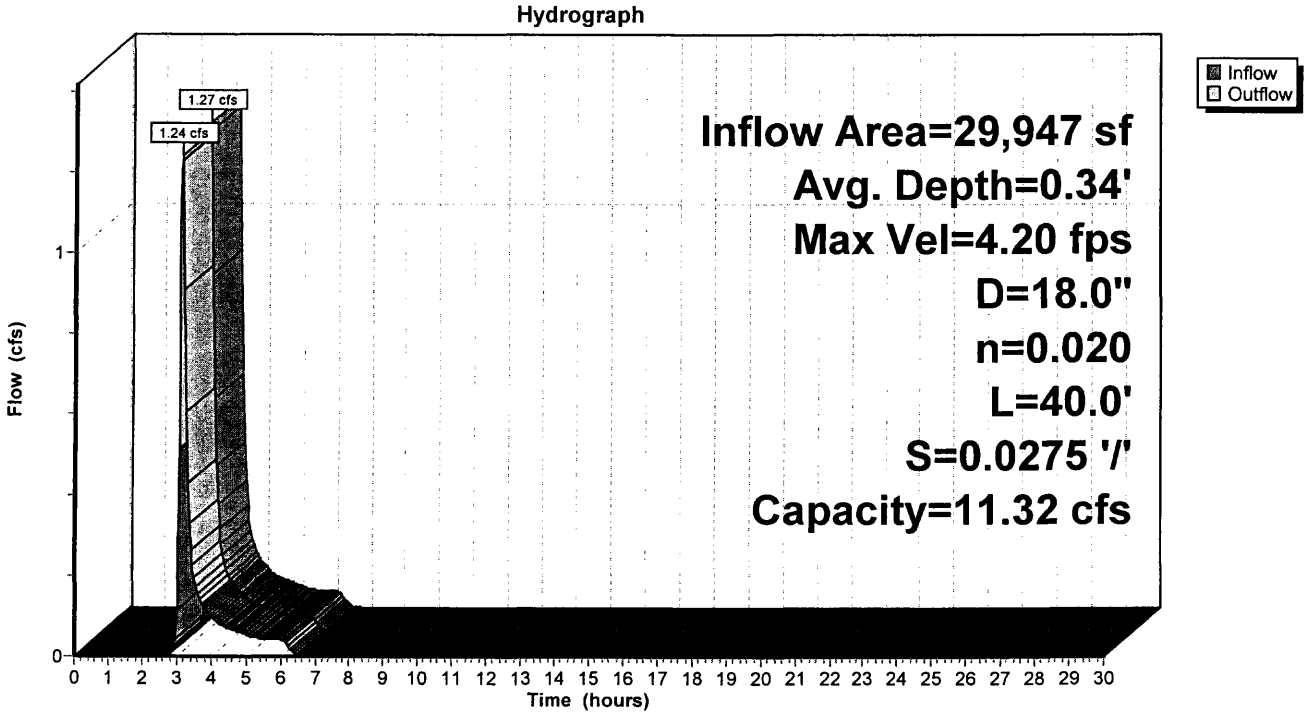
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 4.20 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 1.42 fps, Avg. Travel Time= 0.5 min

Peak Storage= 12 cf @ 3.13 hrs, Average Depth at Peak Storage= 0.34'
Bank-Full Depth= 1.50', Capacity at Bank-Full= 11.32 cfs

18.0" Diameter Pipe, n= 0.020 Corrugated PE, corrugated interior
Length= 40.0' Slope= 0.0275 '/'
Inlet Invert= 5,509.80', Outlet Invert= 5,508.70'



Reach 7R: C-2



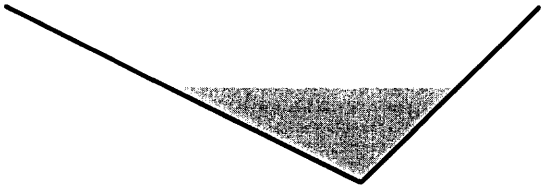
Summary for Reach 8R: E-4 Ditch

Inflow Area =	29,947 sf,	0.00% Impervious,	Inflow Depth =	0.71"	
Inflow =	2.20 cfs @	3.01 hrs,	Volume=	1,766 cf	
Outflow =	1.27 cfs @	3.13 hrs,	Volume=	1,766 cf,	Atten= 42%, Lag= 7.5 min

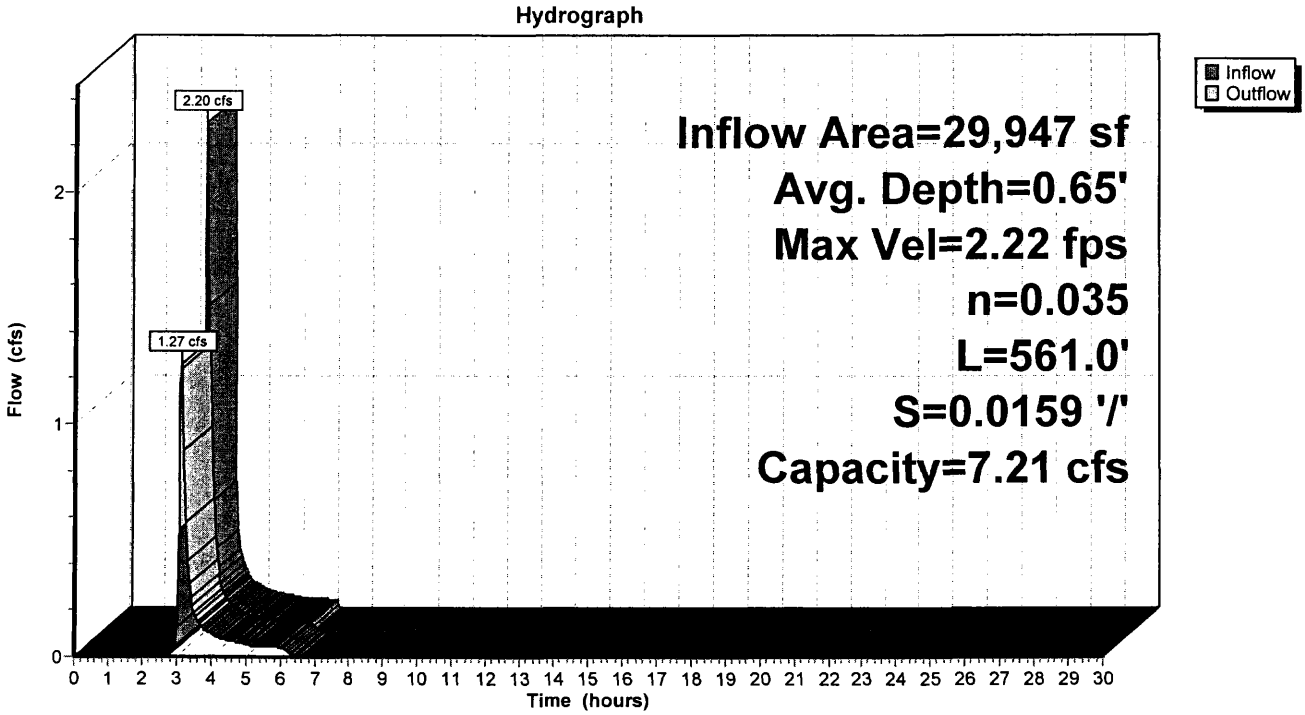
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.22 fps, Min. Travel Time= 4.2 min
Avg. Velocity = 0.71 fps, Avg. Travel Time= 13.2 min

Peak Storage= 359 cf @ 3.06 hrs, Average Depth at Peak Storage= 0.65'
Bank-Full Depth= 1.20', Capacity at Bank-Full= 7.21 cfs

0.00' x 1.20' deep channel, n= 0.035
Side Slope Z-value= 2.0 1.0 '/' Top Width= 3.60'
Length= 561.0' Slope= 0.0159 '/'
Inlet Invert= 5,518.70', Outlet Invert= 5,509.80'



Reach 8R: E-4 Ditch



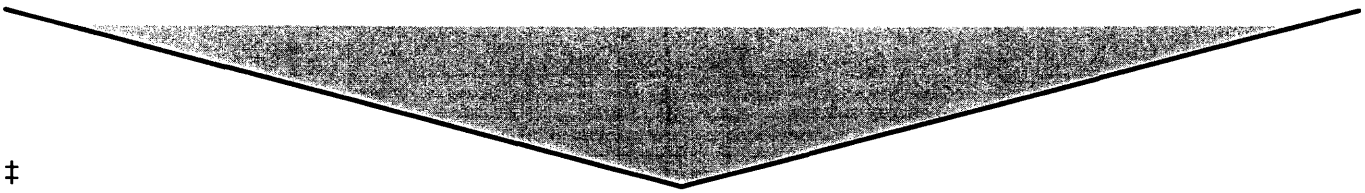
Summary for Reach 10R: E-5 Ditch

Inflow Area =	285,103 sf,	0.00% Impervious,	Inflow Depth =	0.71"	
Inflow =	9.49 cfs @	3.16 hrs,	Volume=	16,810 cf	
Outflow =	7.79 cfs @	3.32 hrs,	Volume=	16,810 cf,	Atten= 18%, Lag= 9.6 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.35 fps, Min. Travel Time= 5.3 min
Avg. Velocity = 0.60 fps, Avg. Travel Time= 20.8 min

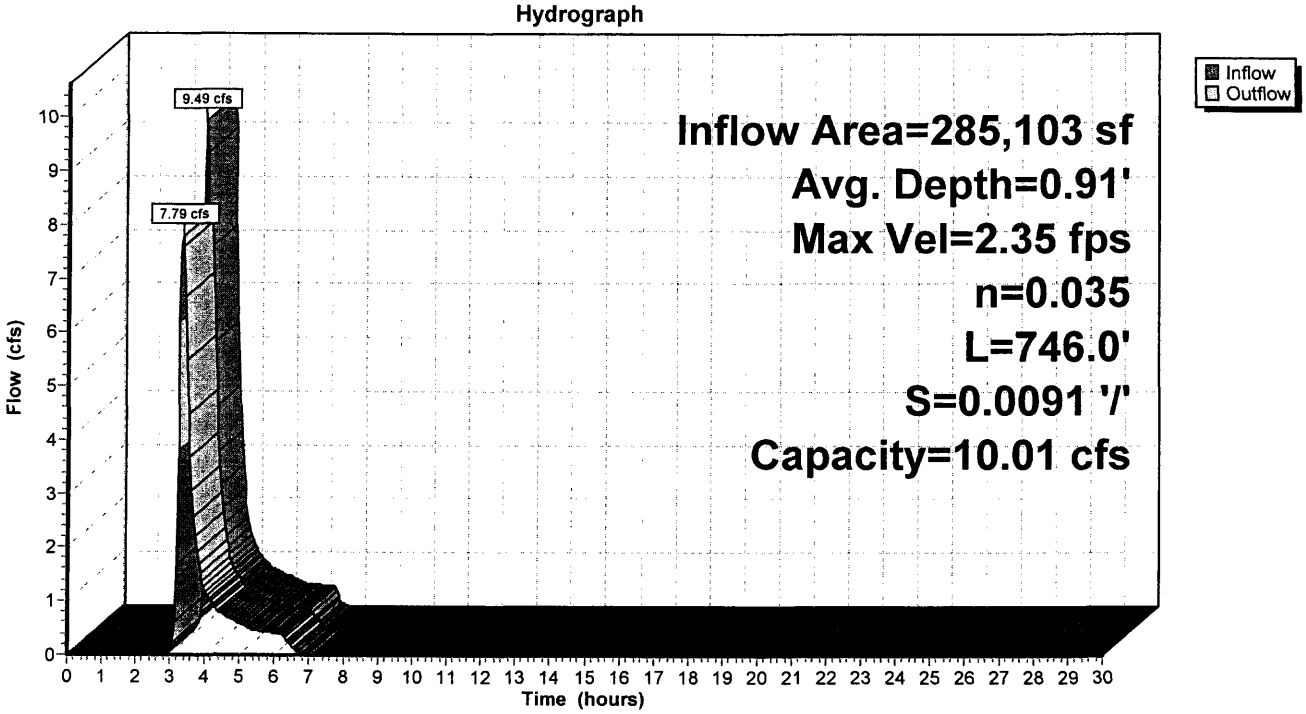
Peak Storage= 2,486 cf @ 3.24 hrs, Average Depth at Peak Storage= 0.91'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 10.01 cfs

0.00' x 1.00' deep channel, n= 0.035
Side Slope Z-value= 4.0 '/' Top Width= 8.00'
Length= 746.0' Slope= 0.0091 '/'
Inlet Invert= 5,510.60', Outlet Invert= 5,503.80'



‡

Reach 10R: E-5 Ditch



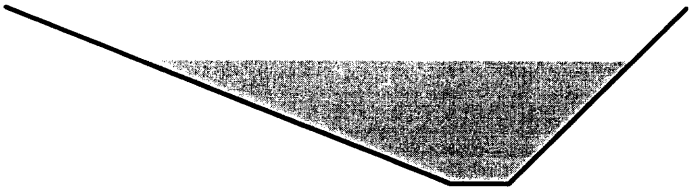
Summary for Reach 11R: E-3 Ditch

Inflow Area =	289,991 sf,	0.00% Impervious,	Inflow Depth =	0.71"	
Inflow =	9.41 cfs @	3.17 hrs,	Volume=	17,098 cf	
Outflow =	9.05 cfs @	3.21 hrs,	Volume=	17,098 cf,	Atten= 4%, Lag= 2.5 min

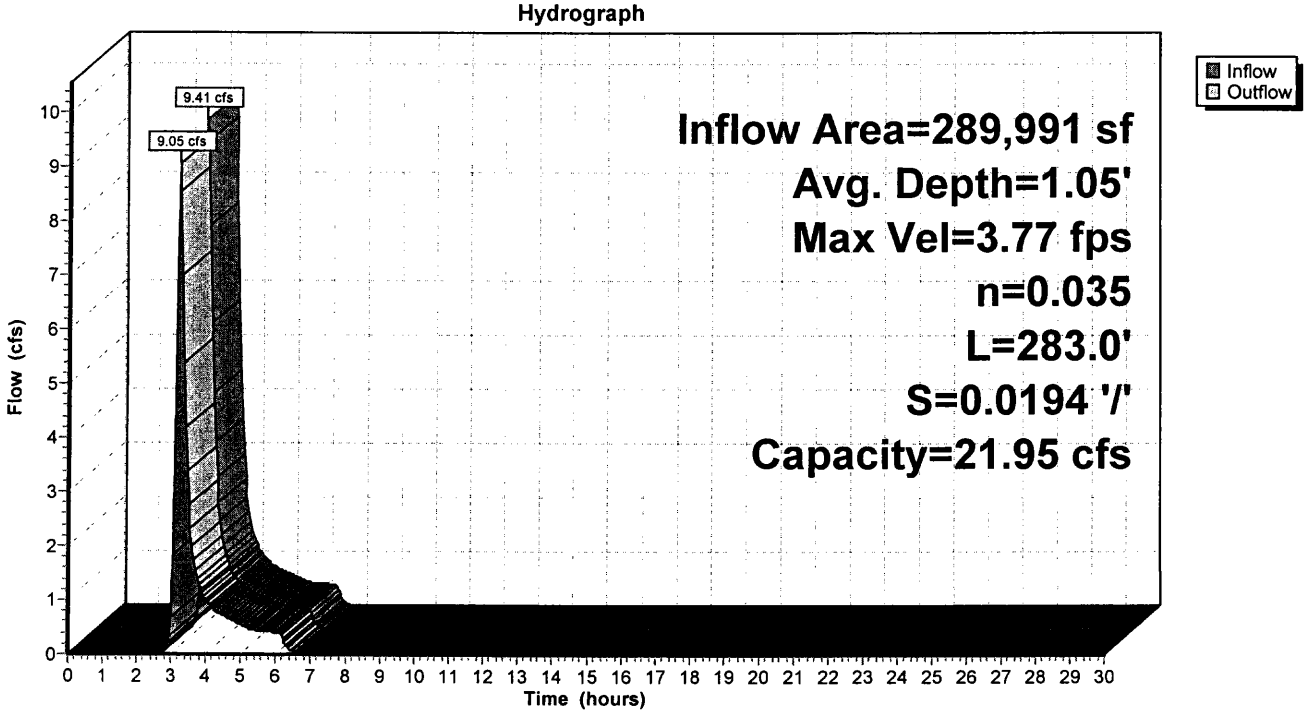
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.77 fps, Min. Travel Time= 1.2 min
Avg. Velocity = 1.54 fps, Avg. Travel Time= 3.1 min

Peak Storage= 694 cf @ 3.19 hrs, Average Depth at Peak Storage= 1.05'
Bank-Full Depth= 1.50', Capacity at Bank-Full= 21.95 cfs

0.50' x 1.50' deep channel, n= 0.035
Side Slope Z-value= 2.5 1.0 '/' Top Width= 5.75'
Length= 283.0' Slope= 0.0194 '/'
Inlet Invert= 5,509.50', Outlet Invert= 5,504.00'



Reach 11R: E-3 Ditch



Summary for Reach 12R: Upper E-1 Ditch

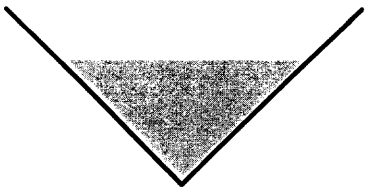
[62] Warning: Exceeded Reach 3R OUTLET depth by 0.78' @ 3.35 hrs

Inflow Area =	154,226 sf,	0.00% Impervious,	Inflow Depth =	0.71"	
Inflow =	3.37 cfs @	3.15 hrs,	Volume=	9,093 cf	
Outflow =	3.02 cfs @	3.32 hrs,	Volume=	9,093 cf,	Atten= 10%, Lag= 10.0 min

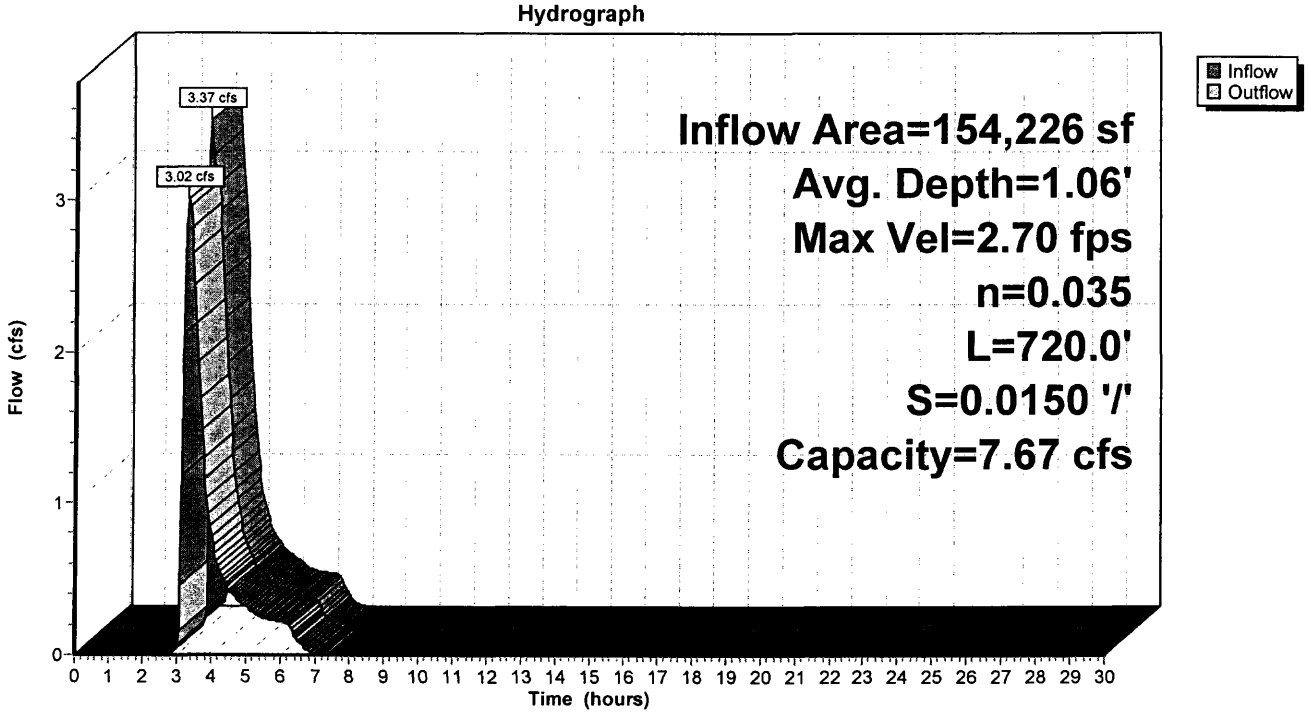
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.70 fps, Min. Travel Time= 4.4 min
Avg. Velocity = 0.94 fps, Avg. Travel Time= 12.7 min

Peak Storage= 806 cf @ 3.23 hrs, Average Depth at Peak Storage= 1.06'
Bank-Full Depth= 1.50', Capacity at Bank-Full= 7.67 cfs

0.00' x 1.50' deep channel, n= 0.035
Side Slope Z-value= 1.0 '/' Top Width= 3.00'
Length= 720.0' Slope= 0.0150 '/'
Inlet Invert= 5,519.50', Outlet Invert= 5,508.70'



Reach 12R: Upper E-1 Ditch



Summary for Pond 6P: Sed Pond

Inflow Area = 759,267 sf, 0.00% Impervious, Inflow Depth = 0.71"
Inflow = 18.07 cfs @ 3.28 hrs, Volume= 44,770 cf
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 100%, Lag= 0.0 min

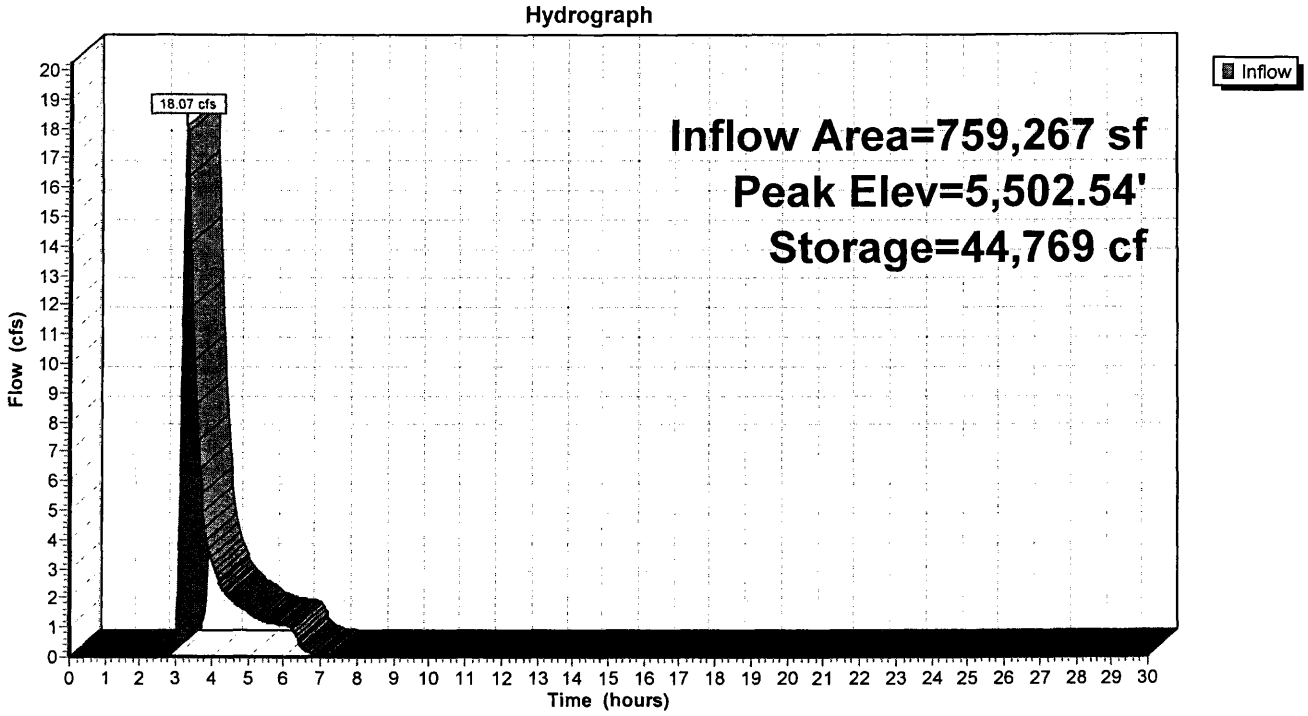
Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 5,502.54' @ 30.00 hrs Surf.Area= 8,833 sf Storage= 44,769 cf

Plug-Flow detention time= (not calculated: initial storage excedes outflow)
Center-of-Mass det. time= (not calculated: no outflow)

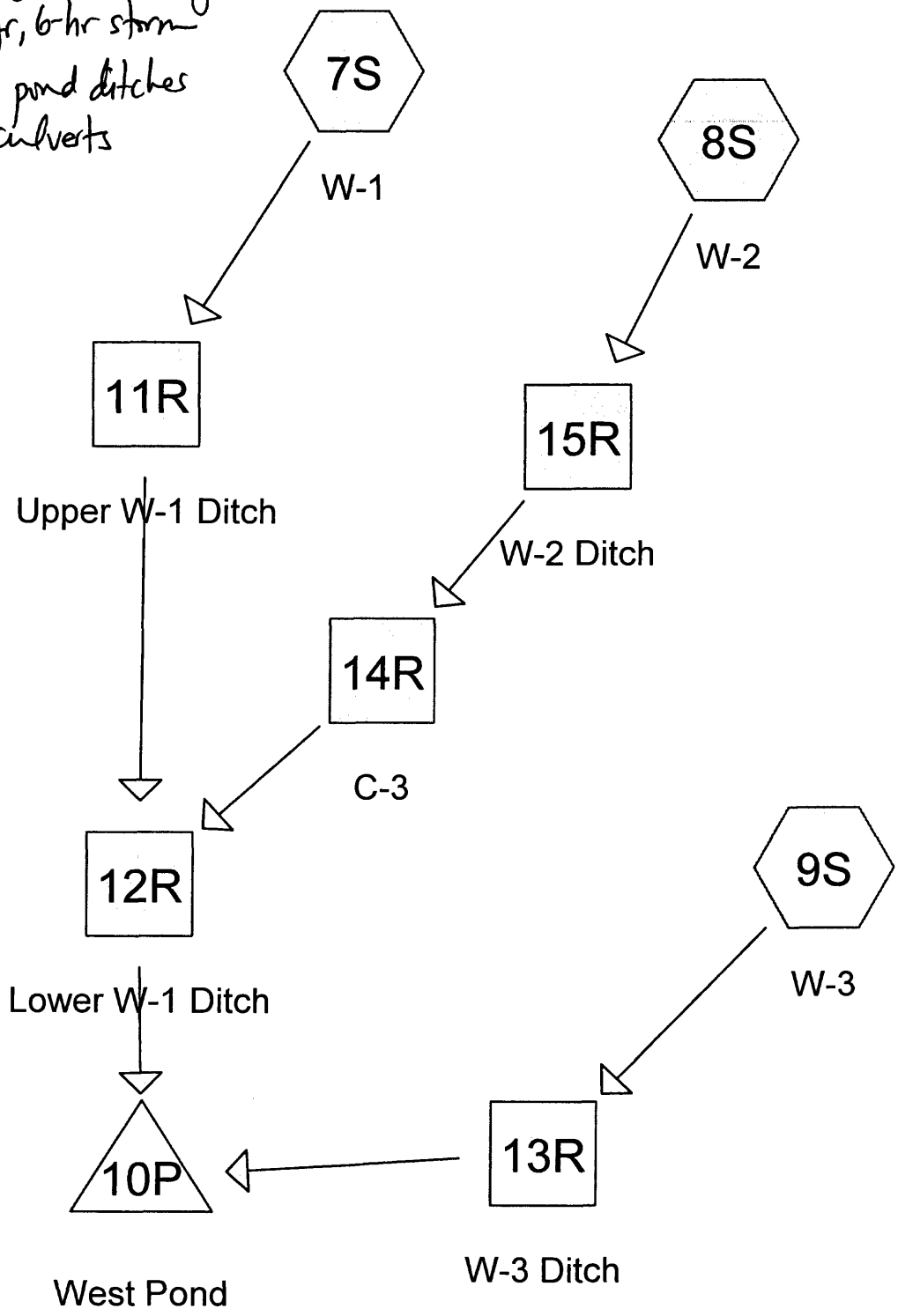
Volume	Invert	Avail.Storage	Storage Description
#1	5,493.80'	56,820 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
5,493.80	2,550	0	0
5,494.80	2,601	2,576	2,576
5,495.80	3,214	2,908	5,483
5,496.80	3,909	3,562	9,045
5,497.80	4,637	4,273	13,318
5,498.80	5,425	5,031	18,349
5,499.80	6,243	5,834	24,183
5,500.80	7,158	6,701	30,883
5,501.80	8,125	7,642	38,525
5,502.80	9,087	8,606	47,131
5,503.80	10,291	9,689	56,820

Pond 6P: Sed Pond



Drainage ditch hydro calcs.
100-yr, 6-hr storm
West pond ditches
& culverts



Subcat Reach Pond Link

Drainage Diagram for 100yr-6hr West Pond
Prepared by EarthFax Engineering, Inc., Printed 1/14/2008
HydroCAD® 8.50 s/n 003900 © 2007 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
305,034	87	(7S,8S,9S)
305,034		**TOTAL AREA**

Time span=0.00-30.00 hrs, dt=0.05 hrs, 601 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 7S: W-1 Runoff Area=105,474 sf 0.00% Impervious Runoff Depth=0.71"
Flow Length=1,297' Slope=0.0250 '/' Tc=19.5 min CN=87 Runoff=2.88 cfs 6,219 cf

Subcatchment 8S: W-2 Runoff Area=128,724 sf 0.00% Impervious Runoff Depth=0.71"
Flow Length=635' Slope=0.0250 '/' Tc=11.0 min CN=87 Runoff=5.32 cfs 7,590 cf

Subcatchment 9S: W-3 Runoff Area=70,836 sf 0.00% Impervious Runoff Depth=0.71"
Flow Length=447' Slope=0.0270 '/' Tc=8.0 min CN=87 Runoff=3.52 cfs 4,177 cf

Reach 11R: Upper W-1 Ditch Avg. Depth=0.71' Max Vel=2.38 fps Inflow=2.88 cfs 6,219 cf
n=0.035 L=963.0' S=0.0145 '/' Capacity=38.02 cfs Outflow=2.37 cfs 6,219 cf

Reach 12R: Lower W-1 Ditch Avg. Depth=1.04' Max Vel=2.36 fps Inflow=5.13 cfs 13,809 cf
n=0.035 L=320.0' S=0.0088 '/' Capacity=29.49 cfs Outflow=5.02 cfs 13,809 cf

Reach 13R: W-3 Ditch Avg. Depth=0.71' Max Vel=2.50 fps Inflow=3.52 cfs 4,177 cf
n=0.035 L=160.0' S=0.0156 '/' Capacity=8.65 cfs Outflow=3.21 cfs 4,177 cf

Reach 14R: C-3 Avg. Depth=0.64' Max Vel=6.47 fps Inflow=4.68 cfs 7,590 cf
D=18.0" n=0.020 L=40.0' S=0.0325 '/' Capacity=12.31 cfs Outflow=4.65 cfs 7,590 cf

Reach 15R: W-2 Ditch Avg. Depth=0.40' Max Vel=2.58 fps Inflow=5.32 cfs 7,590 cf
n=0.035 L=500.0' S=0.0158 '/' Capacity=23.56 cfs Outflow=4.68 cfs 7,590 cf

Pond 10P: West Pond Peak Elev=5,504.70' Storage=17,985 cf Inflow=5.79 cfs 17,985 cf
Outflow=0.00 cfs 0 cf

Total Runoff Area = 305,034 sf Runoff Volume = 17,985 cf Average Runoff Depth = 0.71"
100.00% Pervious = 305,034 sf 0.00% Impervious = 0 sf

Summary for Subcatchment 7S: W-1

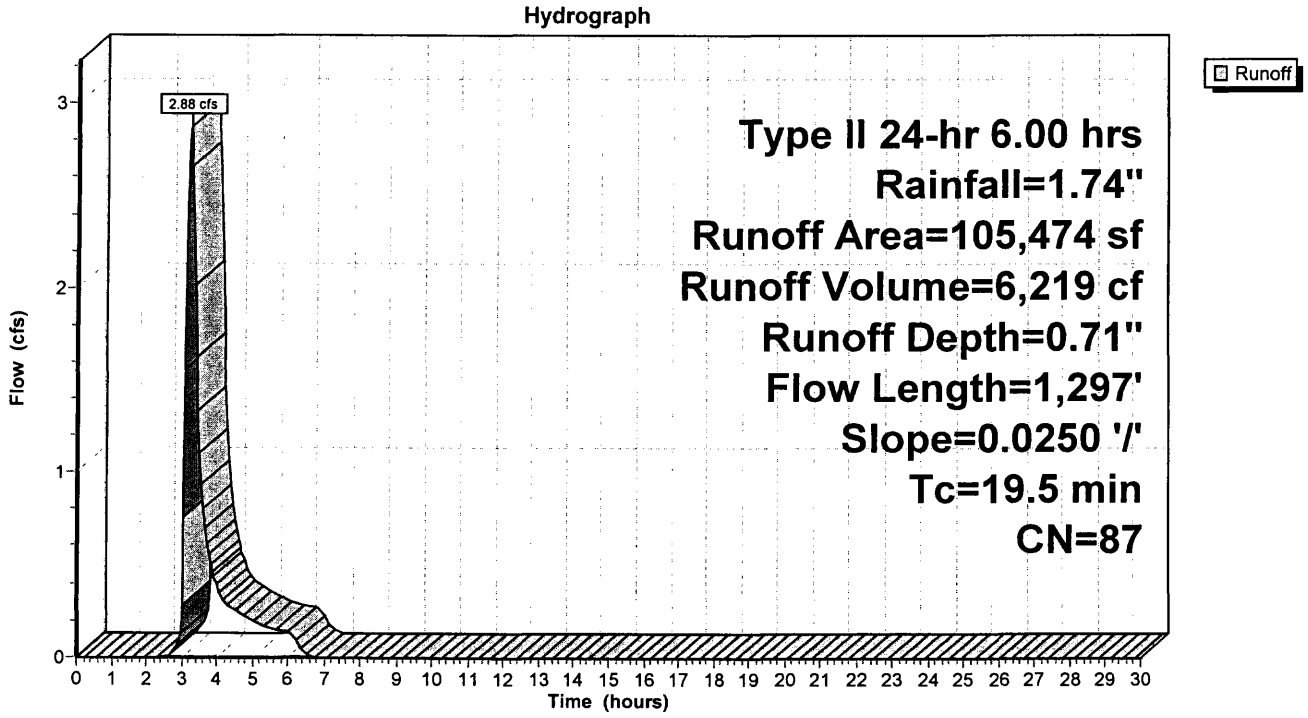
Runoff = 2.88 cfs @ 3.22 hrs, Volume= 6,219 cf, Depth= 0.71"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type II 24-hr 6.00 hrs Rainfall=1.74"

	Area (sf)	CN	Description
*	105,474	87	
	105,474		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.5	1,297	0.0250	1.11		**Lag/CN Method,**

Subcatchment 7S: W-1



Summary for Subcatchment 8S: W-2

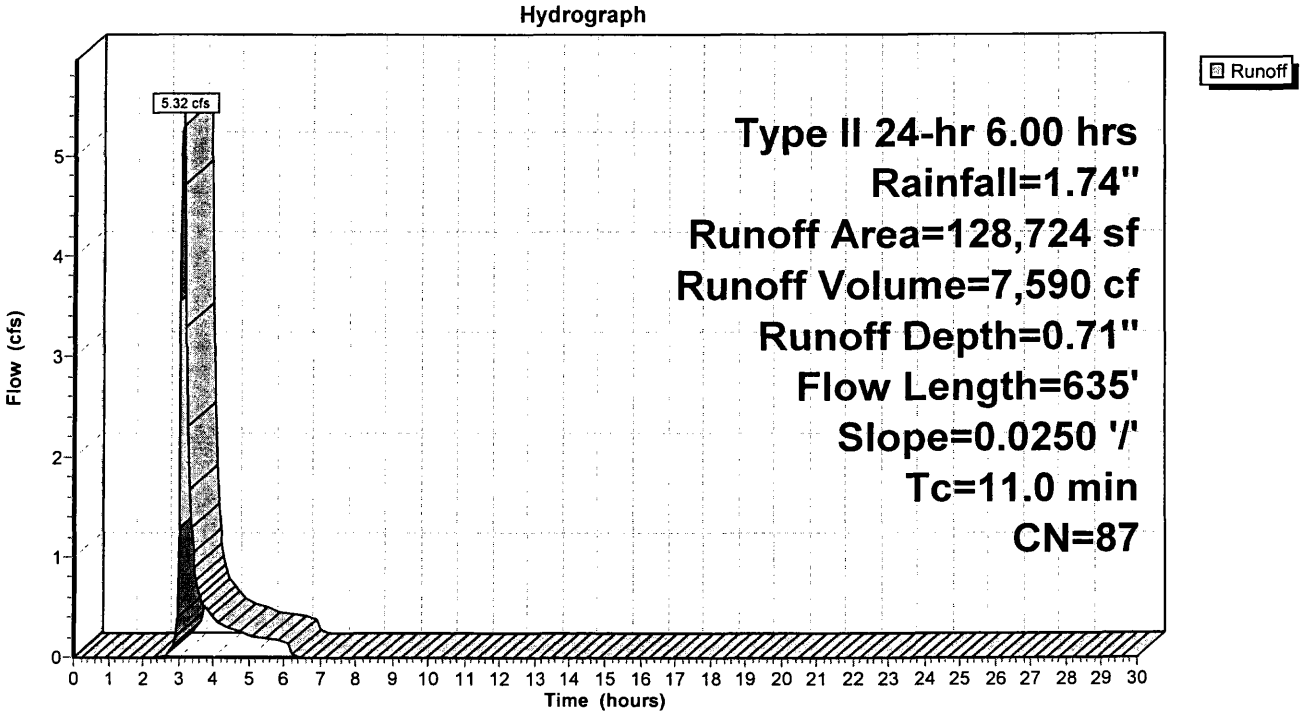
Runoff = 5.32 cfs @ 3.11 hrs, Volume= 7,590 cf, Depth= 0.71"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type II 24-hr 6.00 hrs Rainfall=1.74"

	Area (sf)	CN	Description
*	128,724	87	
	128,724		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.0	635	0.0250	0.96		**Lag/CN Method,**

Subcatchment 8S: W-2



Summary for Subcatchment 9S: W-3

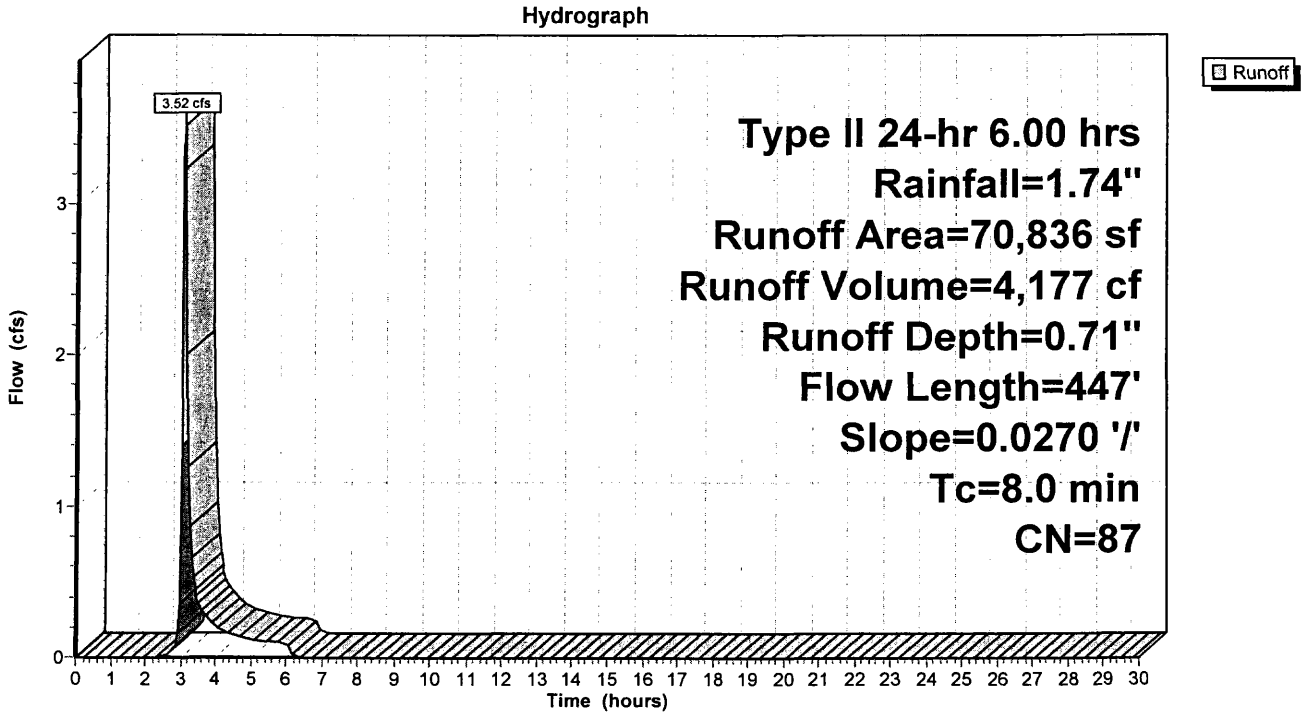
Runoff = 3.52 cfs @ 3.07 hrs, Volume= 4,177 cf, Depth= 0.71"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type II 24-hr 6.00 hrs Rainfall=1.74"

	Area (sf)	CN	Description
*	70,836	87	
	70,836		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.0	447	0.0270	0.93		**Lag/CN Method,**

Subcatchment 9S: W-3



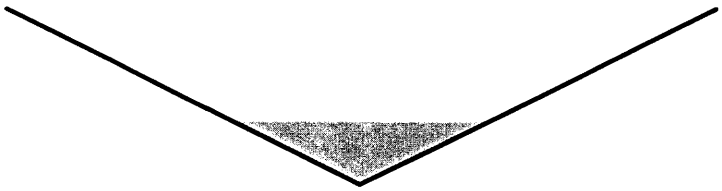
Summary for Reach 11R: Upper W-1 Ditch

Inflow Area = 105,474 sf, 0.00% Impervious, Inflow Depth = 0.71"
Inflow = 2.88 cfs @ 3.22 hrs, Volume= 6,219 cf
Outflow = 2.37 cfs @ 3.43 hrs, Volume= 6,219 cf, Atten= 18%, Lag= 12.2 min

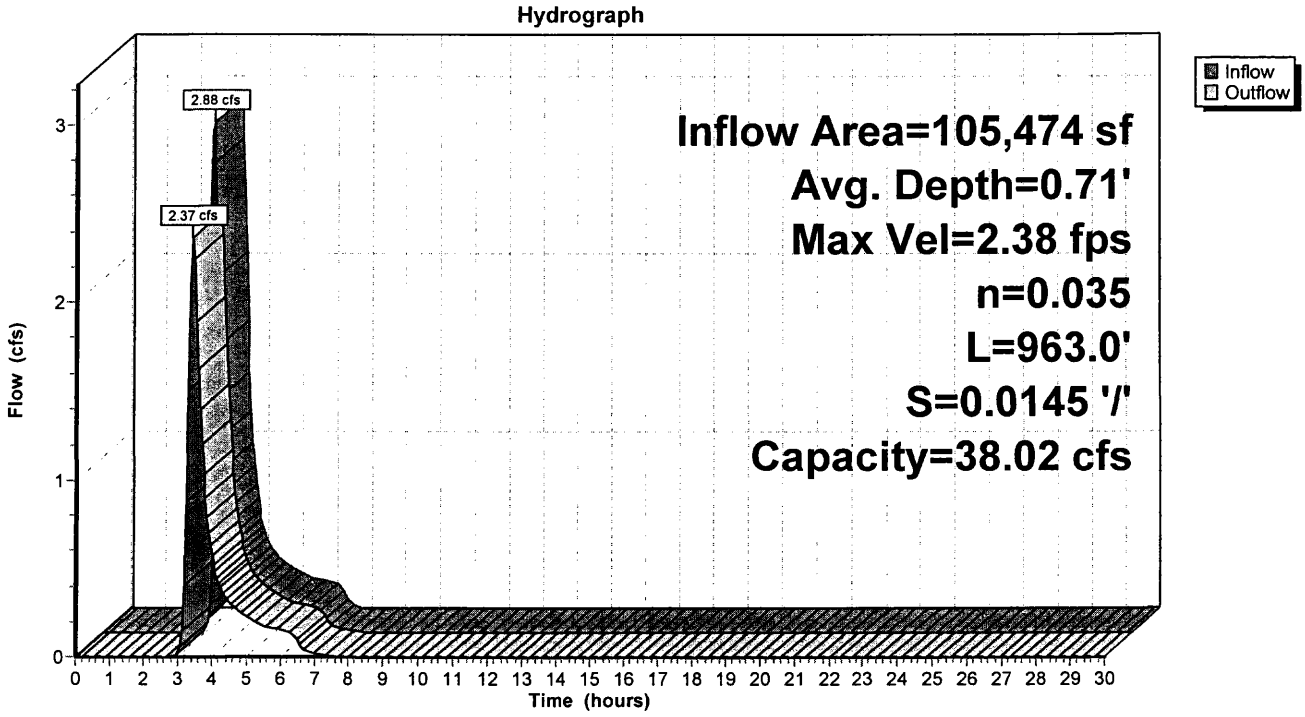
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.38 fps, Min. Travel Time= 6.7 min
Avg. Velocity = 0.77 fps, Avg. Travel Time= 20.8 min

Peak Storage= 971 cf @ 3.31 hrs, Average Depth at Peak Storage= 0.71'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 38.02 cfs

0.00' x 2.00' deep channel, n= 0.035
Side Slope Z-value= 2.0 '/' Top Width= 8.00'
Length= 963.0' Slope= 0.0145 '/'
Inlet Invert= 5,524.80', Outlet Invert= 5,510.80'



Reach 11R: Upper W-1 Ditch



Summary for Reach 12R: Lower W-1 Ditch

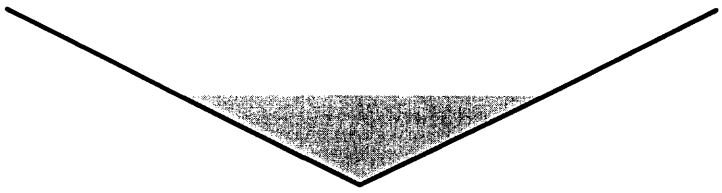
[62] Warning: Exceeded Reach 11R OUTLET depth by 0.34' @ 3.25 hrs
[62] Warning: Exceeded Reach 14R OUTLET depth by 0.60' @ 3.45 hrs

Inflow Area =	234,198 sf,	0.00% Impervious,	Inflow Depth =	0.71"	
Inflow =	5.13 cfs @	3.24 hrs,	Volume=	13,809 cf	
Outflow =	5.02 cfs @	3.32 hrs,	Volume=	13,809 cf,	Atten= 2%, Lag= 4.9 min

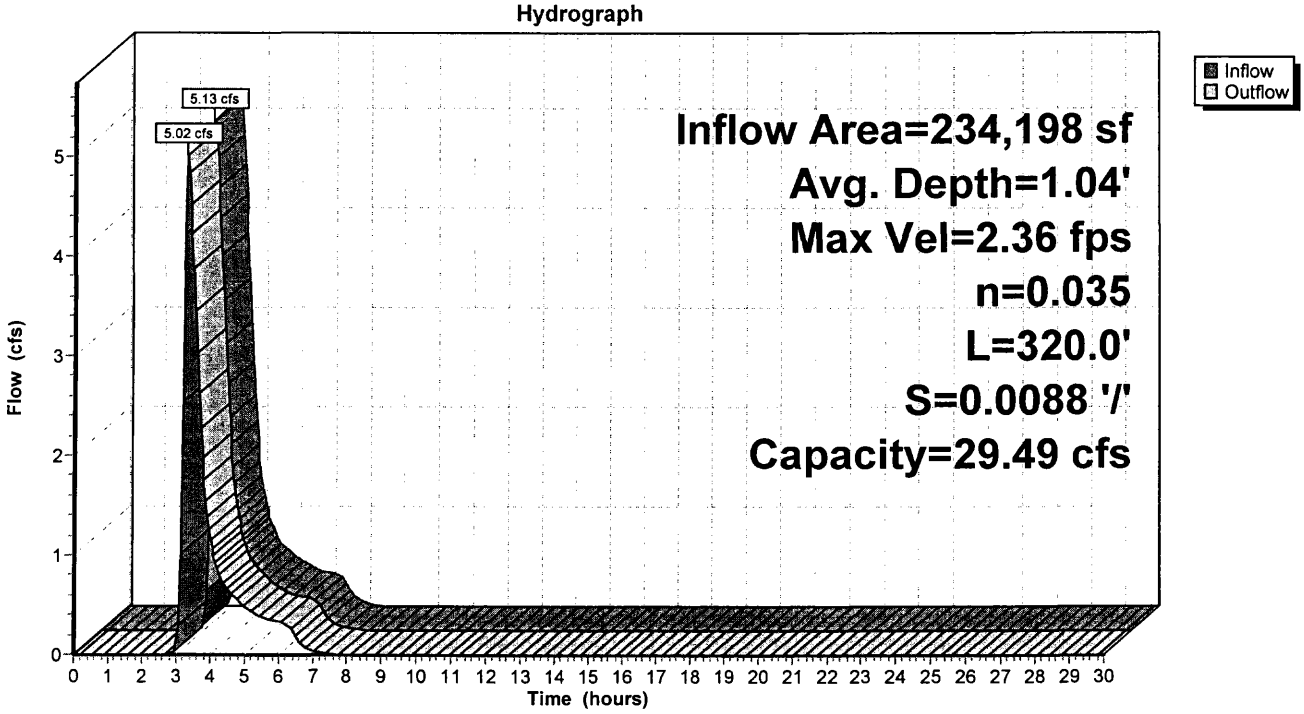
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.36 fps, Min. Travel Time= 2.3 min
Avg. Velocity = 0.71 fps, Avg. Travel Time= 7.5 min

Peak Storage= 685 cf @ 3.27 hrs, Average Depth at Peak Storage= 1.04'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 29.49 cfs

0.00' x 2.00' deep channel, n= 0.035
Side Slope Z-value= 2.0 '/' Top Width= 8.00'
Length= 320.0' Slope= 0.0088 '/'
Inlet Invert= 5,510.80', Outlet Invert= 5,508.00'



Reach 12R: Lower W-1 Ditch



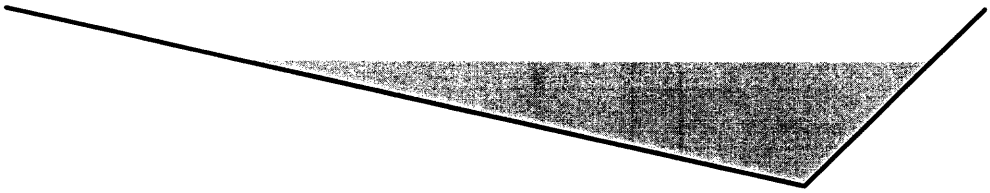
Summary for Reach 13R: W-3 Ditch

Inflow Area =	70,836 sf,	0.00% Impervious,	Inflow Depth =	0.71"	
Inflow =	3.52 cfs @	3.07 hrs,	Volume=	4,177 cf	
Outflow =	3.21 cfs @	3.11 hrs,	Volume=	4,177 cf,	Atten= 9%, Lag= 2.3 min

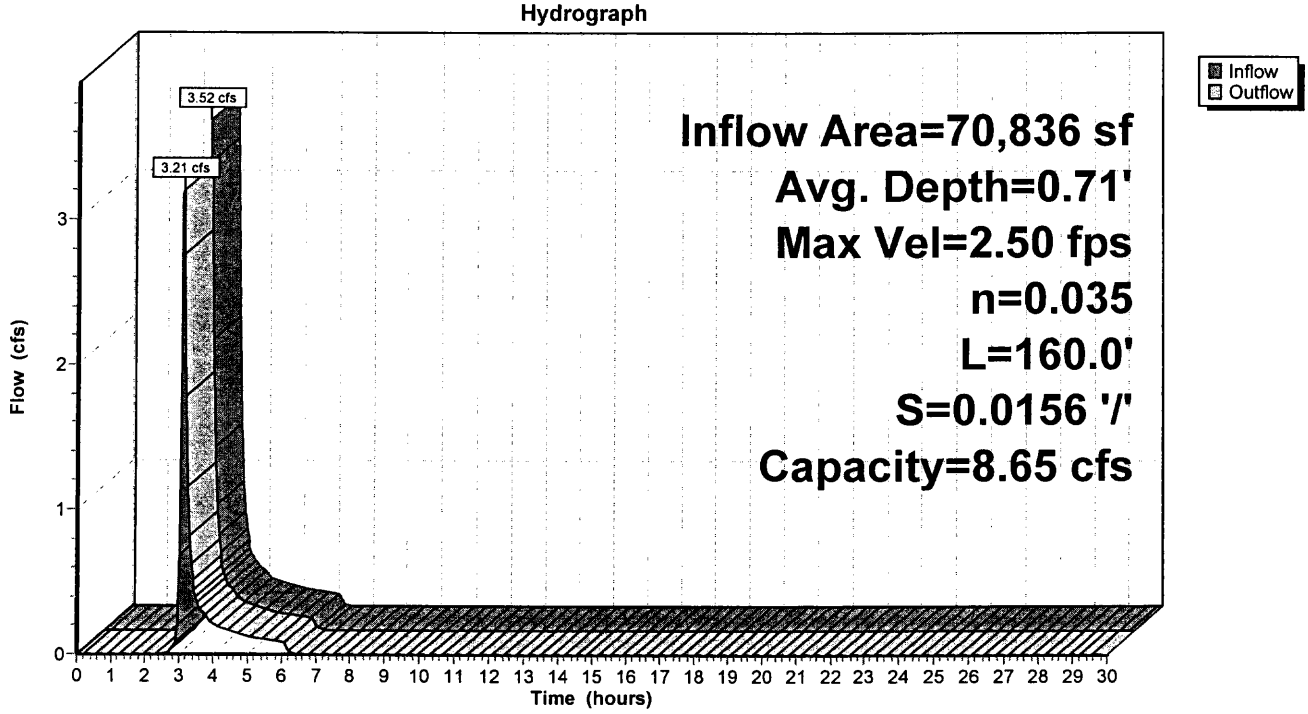
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.50 fps, Min. Travel Time= 1.1 min
Avg. Velocity = 0.98 fps, Avg. Travel Time= 2.7 min

Peak Storage= 221 cf @ 3.10 hrs, Average Depth at Peak Storage= 0.71'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 8.65 cfs

0.00' x 1.00' deep channel, n= 0.035
Side Slope Z-value= 4.5 1.0 '/' Top Width= 5.50'
Length= 160.0' Slope= 0.0156 '/'
Inlet Invert= 5,510.50', Outlet Invert= 5,508.00'



Reach 13R: W-3 Ditch



Summary for Reach 14R: C-3

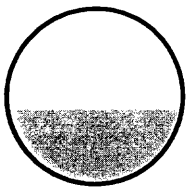
[52] Hint: Inlet/Outlet conditions not evaluated
[62] Warning: Exceeded Reach 15R OUTLET depth by 0.29' @ 3.25 hrs

Inflow Area =	128,724 sf,	0.00% Impervious,	Inflow Depth =	0.71"	
Inflow =	4.68 cfs @	3.21 hrs,	Volume=	7,590 cf	
Outflow =	4.65 cfs @	3.21 hrs,	Volume=	7,590 cf,	Atten= 1%, Lag= 0.2 min

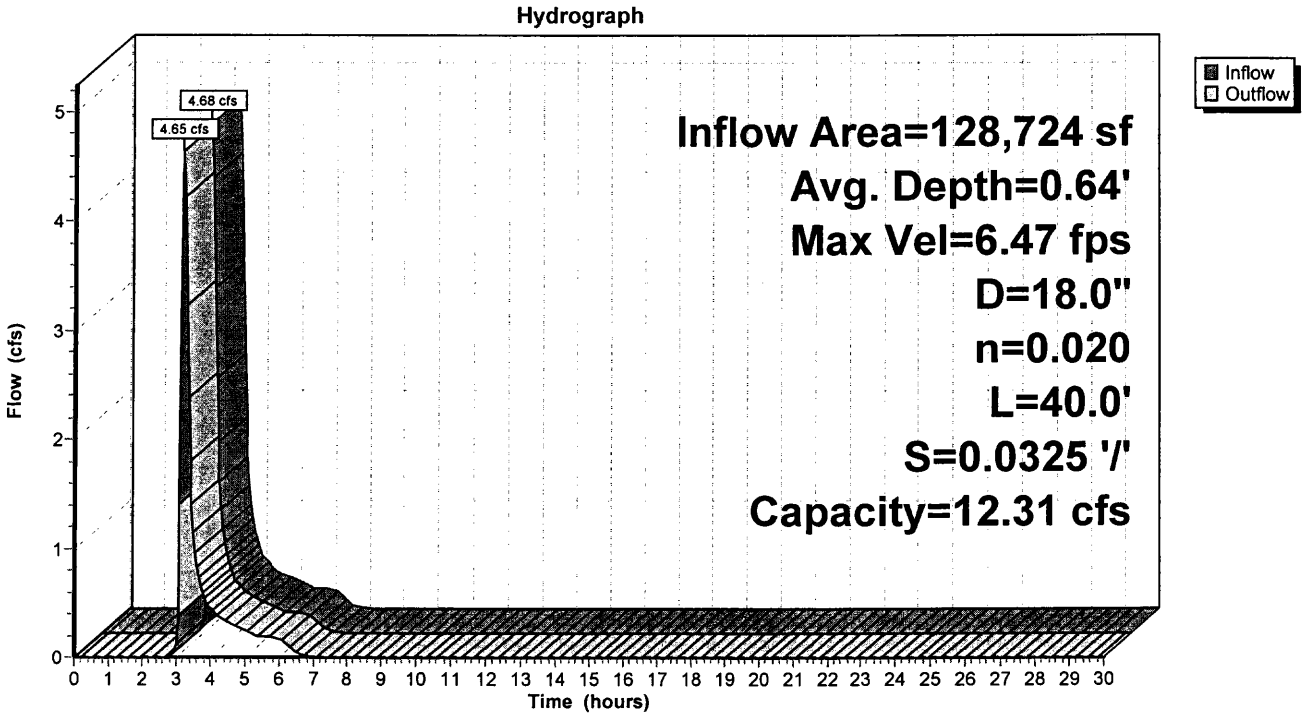
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 6.47 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.96 fps, Avg. Travel Time= 0.3 min

Peak Storage= 29 cf @ 3.21 hrs, Average Depth at Peak Storage= 0.64'
Bank-Full Depth= 1.50', Capacity at Bank-Full= 12.31 cfs

18.0" Diameter Pipe, n= 0.020
Length= 40.0' Slope= 0.0325 '/'
Inlet Invert= 5,512.10', Outlet Invert= 5,510.80'



Reach 14R: C-3



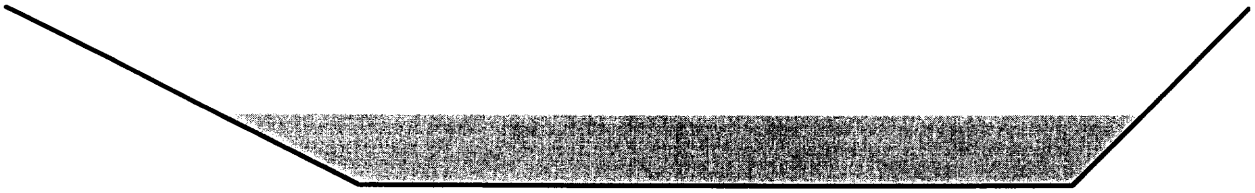
Summary for Reach 15R: W-2 Ditch

Inflow Area =	128,724 sf,	0.00% Impervious,	Inflow Depth =	0.71"	
Inflow =	5.32 cfs @	3.11 hrs,	Volume=	7,590 cf	
Outflow =	4.68 cfs @	3.21 hrs,	Volume=	7,590 cf,	Atten= 12%, Lag= 5.9 min

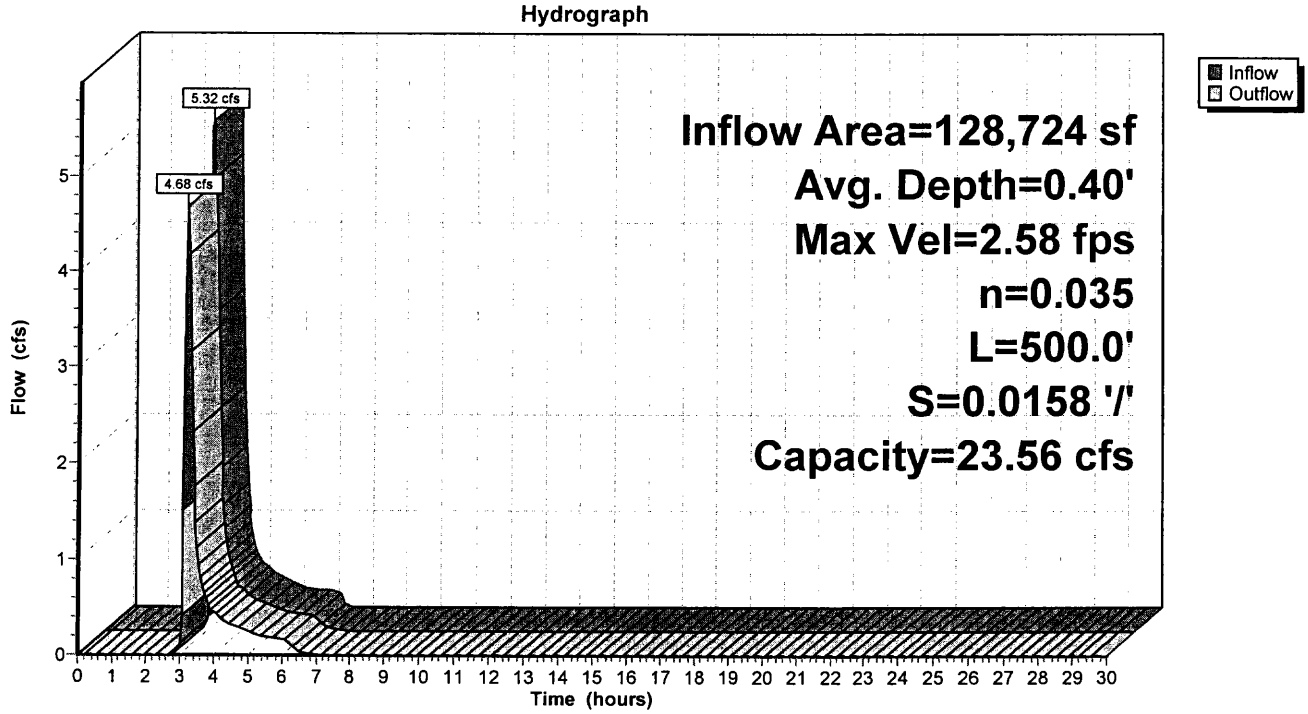
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.58 fps, Min. Travel Time= 3.2 min
Avg. Velocity = 0.62 fps, Avg. Travel Time= 13.3 min

Peak Storage= 918 cf @ 3.16 hrs, Average Depth at Peak Storage= 0.40'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 23.56 cfs

4.00' x 1.00' deep channel, n= 0.035
Side Slope Z-value= 2.0 1.0 '/' Top Width= 7.00'
Length= 500.0' Slope= 0.0158 '/'
Inlet Invert= 5,520.00', Outlet Invert= 5,512.10'



Reach 15R: W-2 Ditch



Summary for Pond 10P: West Pond

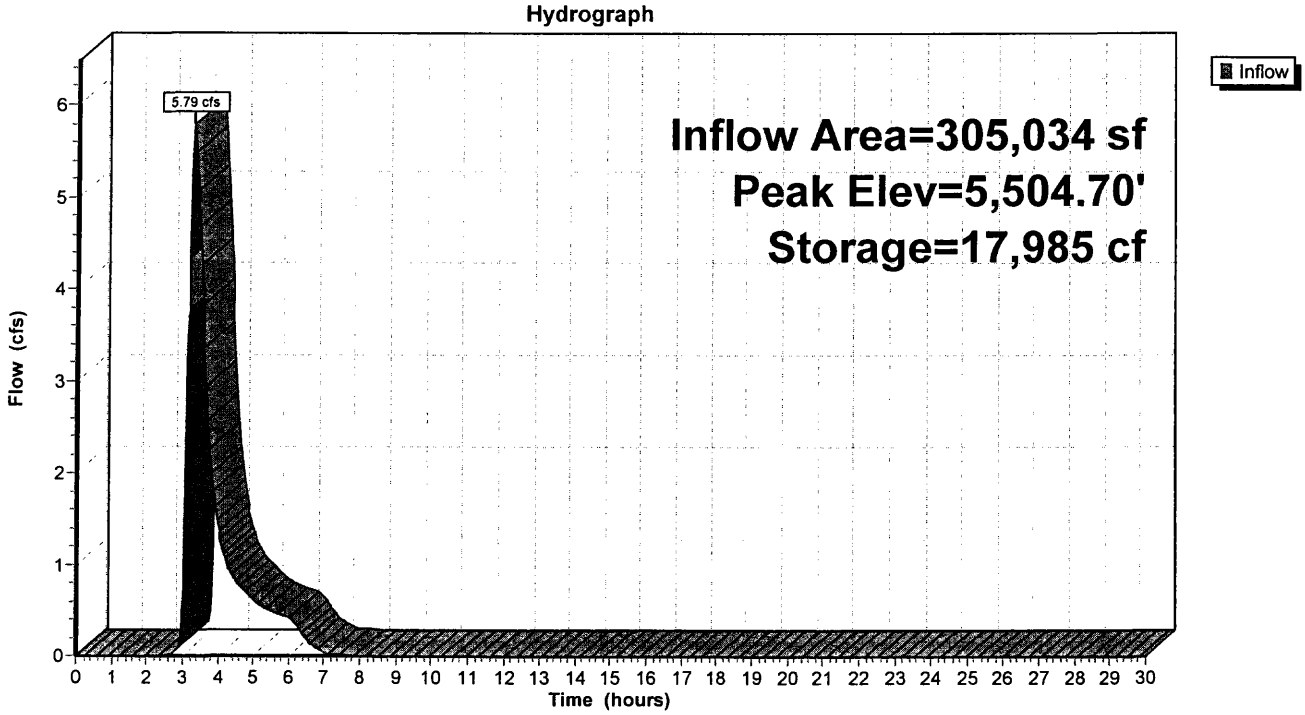
Inflow Area = 305,034 sf, 0.00% Impervious, Inflow Depth = 0.71"
Inflow = 5.79 cfs @ 3.30 hrs, Volume= 17,985 cf
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 100%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 5,504.70' @ 29.95 hrs Surf.Area= 4,455 sf Storage= 17,985 cf

Plug-Flow detention time= (not calculated: initial storage excedes outflow)
Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	5,498.23'	36,065 cf	**17.00'W x 78.00'L x 9.77'H Prismatoid Z=2.0**

Pond 10P: West Pond



Upper E-1 Min Slope
Worksheet for Triangular Channel

Project Description	
Worksheet	Triangular Channel - 1
Flow Element	Triangular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.035	
Slope	0.011000	ft/ft
Left Side Slope	1.00	H : V
Right Side Slope	1.00	H : V
Discharge	3.37	cfs

Results		
Depth	1.17	ft
Flow Area	1.4	ft^2
Wetted Perimeter	3.30	ft
Top Width	2.34	ft
Critical Depth	0.93	ft
Critical Slope	0.036540	ft/ft
Velocity	2.47	ft/s
Velocity Head	0.09	ft
Specific Energy	1.26	ft
Froude Number	0.57	
Flow Type	Subcritical	

Upper E-1 Max Slope
Worksheet for Triangular Channel

Project Description	
Worksheet	Triangular Channel - 1
Flow Element	Triangular Channel
Method	Manning's Formula
Solvc For	Channel Depth

Input Data		
Mannings Coefficient	0.035	
Slope	0.019000	ft/ft
Left Side Slope	1.00	H : V
Right Side Slope	1.00	H : V
Discharge	3.37	cfs

Results		
Depth	1.05	ft
Flow Area	1.1	ft²
Wetted Perimeter	2.98	ft
Top Width	2.11	ft
Critical Depth	0.93	ft
Critical Slope	0.036539	ft/ft
Velocity	3.03	ft/s
Velocity Head	0.14	ft
Specific Energy	1.20	ft
Froude Number	0.74	
Flow Type	Subcritical	

Lower E-1 Min Slope
Worksheet for Triangular Channel

Project Description	
Worksheet	Triangular Channel - 1
Flow Element	Triangular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.035	
Slope	0.013000	ft/ft
Left Side Slope	1.50	H : V
Right Side Slope	1.50	H : V
Discharge	3.44	cfs

Results		
Depth	0.94	ft
Flow Area	1.3	ft²
Wetted Perimeter	3.39	ft
Top Width	2.82	ft
Critical Depth	0.80	ft
Critical Slope	0.030962	ft/ft
Velocity	2.59	ft/s
Velocity Head	0.10	ft
Specific Energy	1.05	ft
Froude Number	0.67	
Flow Type	Subcritical	

Lower E-1 Max Slope
Worksheet for Triangular Channel

Project Description	
Worksheet	Triangular Channel - 1
Flow Element	Triangular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.035	
Slope	0.021000	ft/ft
Left Side Slope	1.50	H : V
Right Side Slope	1.50	H : V
Discharge	3.44	cfs

Results		
Depth	0.86	ft
Flow Area	1.1	ft²
Wetted Perimeter	3.10	ft
Top Width	2.58	ft
Critical Depth	0.80	ft
Critical Slope	0.030962	ft/ft
Velocity	3.10	ft/s
Velocity Head	0.15	ft
Specific Energy	1.01	ft
Froude Number	0.83	
Flow Type	Subcritical	

E-3 Min Slope
Worksheet for Trapezoidal Channel

Project Description	
Worksheet	Trapezoidal Channel - 1
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.035	
Slope	0.015000	ft/ft
Left Side Slope	2.50	H : V
Right Side Slope	1.00	H : V
Bottom Width	0.50	ft
Discharge	9.41	cfs

Results		
Depth	1.12	ft
Flow Area	2.7	ft^2
Wetted Perimeter	5.08	ft
Top Width	4.40	ft
Critical Depth	0.99	ft
Critical Slope	0.026161	ft/ft
Velocity	3.44	ft/s
Velocity Head	0.18	ft
Specific Energy	1.30	ft
Froude Number	0.77	
Flow Type	Subcritical	

E-3 Max Slope
Worksheet for Trapezoidal Channel

Project Description	
Worksheet	Trapezoidal Channel - 1
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.035	
Slope	0.023000	ft/ft
Left Side Slope	2.50	H : V
Right Side Slope	1.00	H : V
Bottom Width	0.50	ft
Discharge	9.41	cfs

Results		
Depth	1.02	ft
Flow Area	2.3	ft²
Wetted Perimeter	4.69	ft
Top Width	4.07	ft
Critical Depth	0.99	ft
Critical Slope	0.026161	ft/ft
Velocity	4.04	ft/s
Velocity Head	0.25	ft
Specific Energy	1.27	ft
Froude Number	0.94	
Flow Type	Subcritical	

E-4 (Constant Slope)
Worksheet for Triangular Channel

Project Description	
Worksheet	Triangular Channel - 1
Flow Element	Triangular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.035	
Slope	0.016000	ft/ft
Left Side Slope	2.00	H : V
Right Side Slope	1.00	H : V
Discharge	2.20	cfs

Results		
Depth	0.77	ft
Flow Area	0.9	ft²
Wetted Perimeter	2.80	ft
Top Width	2.30	ft
Critical Depth	0.67	ft
Critical Slope	0.033408	ft/ft
Velocity	2.49	ft/s
Velocity Head	0.10	ft
Specific Energy	0.86	ft
Froude Number	0.71	
Flow Type	Subcritical	

E-5 Min Slope
Worksheet for Triangular Channel

Project Description	
Worksheet	Triangular Channel - 1
Flow Element	Triangular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.035	
Slope	0.009500	ft/ft
Left Side Slope	4.00	H : V
Right Side Slope	4.00	H : V
Discharge	9.49	cfs

Results		
Depth	0.97	ft
Flow Area	3.8	ft²
Wetted Perimeter	8.02	ft
Top Width	7.78	ft
Critical Depth	0.81	ft
Critical Slope	0.025116	ft/ft
Velocity	2.51	ft/s
Velocity Head	0.10	ft
Specific Energy	1.07	ft
Froude Number	0.63	
Flow Type	Subcritical	

E-5 Max Slope
Worksheet for Triangular Channel

Project Description	
Worksheet	Triangular Channel - 1
Flow Element	Triangular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.035	
Slope	0.033000	ft/ft
Left Side Slope	4.00	H : V
Right Side Slope	4.00	H : V
Discharge	9.49	cfs

Results		
Depth	0.77	ft
Flow Area	2.4	ft²
Wetted Perimeter	6.35	ft
Top Width	6.16	ft
Critical Depth	0.81	ft
Critical Slope	0.025116	ft/ft
Velocity	4.00	ft/s
Velocity Head	0.25	ft
Specific Energy	1.02	ft
Froude Number	1.14	
Flow Type	Supercritical	

Upper W-1 Min Slope
Worksheet for Triangular Channel

Project Description	
Worksheet	Triangular Channel - 1
Flow Element	Triangular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.035	
Slope	0.009100	ft/ft
Left Side Slope	2.00	H : V
Right Side Slope	2.00	H : V
Discharge	2.88	cfs

Results		
Depth	0.83	ft
Flow Area	1.4	ft²
Wetted Perimeter	3.71	ft
Top Width	3.32	ft
Critical Depth	0.66	ft
Critical Slope	0.029917	ft/ft
Velocity	2.09	ft/s
Velocity Head	0.07	ft
Specific Energy	0.90	ft
Froude Number	0.57	
Flow Type	Subcritical	

Upper W-1 Max Slope
Worksheet for Triangular Channel

Project Description	
Worksheet	Triangular Channel - 1
Flow Element	Triangular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.035	
Slope	0.025000	ft/ft
Left Side Slope	2.00	H : V
Right Side Slope	2.00	H : V
Discharge	2.88	cfs

Results		
Depth	0.69	ft
Flow Area	0.9	ft²
Wetted Perimeter	3.07	ft
Top Width	2.75	ft
Critical Depth	0.66	ft
Critical Slope	0.029917	ft/ft
Velocity	3.06	ft/s
Velocity Head	0.15	ft
Specific Energy	0.83	ft
Froude Number	0.92	
Flow Type	Subcritical	

Lower W-1 Min Slope
Worksheet for Triangular Channel

Project Description	
Worksheet	Triangular Channel - 1
Flow Element	Triangular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.035	
Slope	0.006700	ft/ft
Left Side Slope	2.00	H : V
Right Side Slope	2.00	H : V
Discharge	5.13	cfs

Results		
Depth	1.09	ft
Flow Area	2.4	ft²
Wetted Perimeter	4.88	ft
Top Width	4.36	ft
Critical Depth	0.84	ft
Critical Slope	0.027701	ft/ft
Velocity	2.15	ft/s
Velocity Head	0.07	ft
Specific Energy	1.16	ft
Froude Number	0.51	
Flow Type	Subcritical	

Lower W-1 Max Slope
Worksheet for Triangular Channel

Project Description	
Worksheet	Triangular Channel - 1
Flow Element	Triangular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.035	
Slope	0.017000	ft/ft
Left Side Slope	2.00	H : V
Right Side Slope	2.00	H : V
Discharge	5.13	cfs

Results		
Depth	0.92	ft
Flow Area	1.7	ft²
Wetted Perimeter	4.10	ft
Top Width	3.67	ft
Critical Depth	0.84	ft
Critical Slope	0.027701	ft/ft
Velocity	3.05	ft/s
Velocity Head	0.14	ft
Specific Energy	1.06	ft
Froude Number	0.80	
Flow Type	Subcritical	

W-2 Min Slope
Worksheet for Trapezoidal Channel

Project Description	
Worksheet	Trapezoidal Channel - 1
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.035	
Slope	0.008300	ft/ft
Left Side Slope	1.00	H : V
Right Side Slope	2.00	H : V
Bottom Width	2.00	ft
Discharge	5.32	cfs

Results		
Depth	0.72	ft
Flow Area	2.2	ft²
Wetted Perimeter	4.65	ft
Top Width	4.17	ft
Critical Depth	0.53	ft
Critical Slope	0.027144	ft/ft
Velocity	2.38	ft/s
Velocity Head	0.09	ft
Specific Energy	0.81	ft
Froude Number	0.57	
Flow Type	Subcritical	

W-2 Max Slope
Worksheet for Trapezoidal Channel

Project Description	
Worksheet	Trapezoidal Channel - 1
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.035	
Slope	0.033000	ft/ft
Left Side Slope	1.00	H : V
Right Side Slope	2.00	H : V
Bottom Width	2.00	ft
Discharge	5.32	cfs

Results		
Depth	0.50	ft
Flow Area	1.4	ft^2
Wetted Perimeter	3.82	ft
Top Width	3.49	ft
Critical Depth	0.53	ft
Critical Slope	0.027144	ft/ft
Velocity	3.89	ft/s
Velocity Head	0.24	ft
Specific Energy	0.73	ft
Froude Number	1.10	
Flow Type	Supercritical	

W-3 Min Slope
Worksheet for Triangular Channel

Project Description	
Worksheet	Triangular Channel - 1
Flow Element	Triangular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.035	
Slope	0.003300	ft/ft
Left Side Slope	4.50	H : V
Right Side Slope	1.00	H : V
Discharge	3.52	cfs

Results		
Depth	0.96	ft
Flow Area	2.5	ft²
Wetted Perimeter	5.75	ft
Top Width	5.25	ft
Critical Depth	0.63	ft
Critical Slope	0.029568	ft/ft
Velocity	1.40	ft/s
Velocity Head	0.03	ft
Specific Energy	0.99	ft
Froude Number	0.36	
Flow Type	Subcritical	

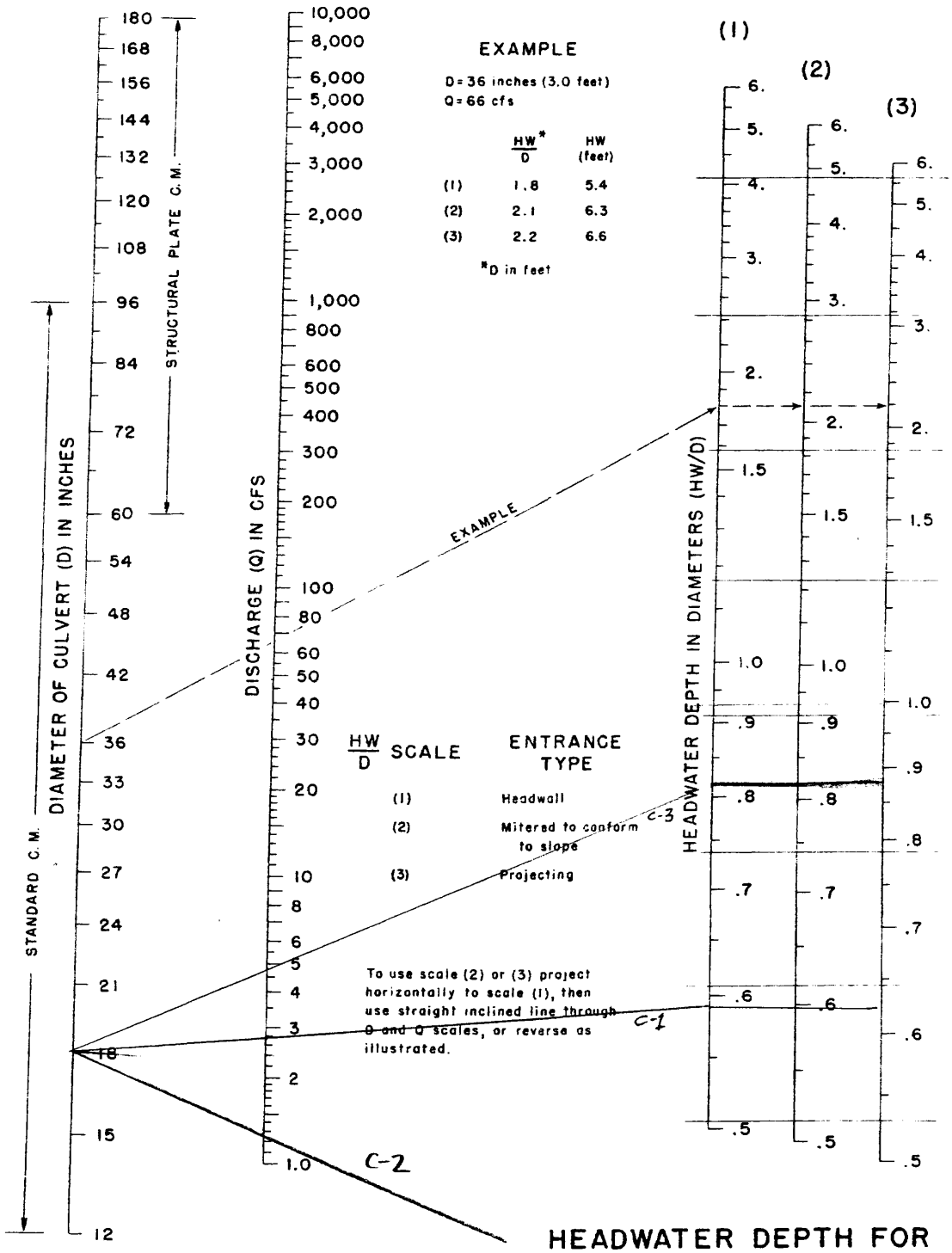
W-3 Max Slope
Worksheet for Triangular Channel

Project Description	
Worksheet	Triangular Channel - 1
Flow Element	Triangular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.035	
Slope	0.025000	ft/ft
Left Side Slope	4.50	H : V
Right Side Slope	1.00	H : V
Discharge	3.52	cfs

Results		
Depth	0.65	ft
Flow Area	1.2	ft²
Wetted Perimeter	3.94	ft
Top Width	3.59	ft
Critical Depth	0.63	ft
Critical Slope	0.029568	ft/ft
Velocity	3.00	ft/s
Velocity Head	0.14	ft
Specific Energy	0.79	ft
Froude Number	0.92	
Flow Type	Subcritical	

CHART 5



HEADWATER DEPTH FOR C. M. PIPE CULVERTS WITH INLET CONTROL

BUREAU OF PUBLIC ROADS JAN. 1963

CHAPTER 8
BONDING AND INSURANCE

8.10 Bonding Definitions and Division Responsibilities

This chapter provides information regarding the bonding for coal mining and reclamation operations at the COVOL Dry Coal Cleaning Facility. The applicant has on file with DOGM a bond made payable to DOGM for performance of all the requirements of the State Program.

8.20 Requirement to File a Bond

The area covered by the bond is outlined on Plate 5-1, which includes all disturbed areas. The disturbed areas and specific acres to be reclaimed are listed in Section 1.1.6. The performance bond period is for the duration of the coal processing and reclamation operations. The bond is in the form of a surety bond and is described in Section 8.60.

8.30 Determination of Bond Amount

The bond amount was determined by using a per-acre reclamation cost provided by DOGM and applied to the acreage of the facility (see Table 8-1). The total bond amount is $165,000. The present bond should be sufficient to assure the completion of the reclamation plan.

8.40 General Terms and Conditions of the Bond

The performance bond is in the amount determined by DOGM as described in Section 8.30 and payable to DOGM. In the event the surety company becomes insolvent, DOGM will be notified by the permittee. The surety company and permittee will notify DOGM of any changes in the bonding terms for COVOL. Duration of the bond is described in Section 8.20.

8.50 Bonding Requirements

The applicant qualifies for a long-term period of liability and therefore will comply with the stipulation that the bond coverage be extended 30 days prior to the expiration of the bond term. A performance bond for a new term will be submitted to DOGM 30 days prior to expiration of coverage.

8.60 Forms of Bonds

The surety bond for the applicant has been executed by Western Surety Company, a corporate surety licensed to do business in Utah. The surety bond will be noncancellable during its term except with the prior consent of DOGM.

8.70 Replacement of Bonds

COVOL does not currently plan to replace the bond for the permit area. However, should a replacement bond be required, the replacement bond will be submitted to and approved by DOGM prior to the cancellation of the original bond.

8.80 Requirements to Release Performance Bonds

The applicant will comply with the requirements described in Section R-645-301-880 of DOGM regulations when applying for the release of performance bonds.

8.90 Terms and Conditions for Liability Insurance

A Certificate of Insurance applicable to the COVOL Dry Coal Cleaning Facility is provided in Appendix 8-1. The policy provides for personal injury and property damage protection consistent with the amounts designated in R645-301-890.100.

The insurance policy will be maintained in full force during the life of the permit including the liability period necessary to complete all reclamation operations. The policy will include a rider stating that DOGM be notified of any changes in the policy including termination or failure to renew.

TABLE 8-1

Reclamation Bond Estimate

TABLE 8-1

Reclamation Bond Estimate

Reclamation Area (acres)	Unit Reclamation Cost ($/ac)[a]	Estimated Reclamation Cost ($)
30	5,500	165,000

[a] Unit cost provided by DOGM

APPENDIX 8-1

Certificate of Insurance

MARSH

CERTIFICATE OF INSURANCE

CERTIFICATE NUMBER
SEA-001044512-02

PRODUCER

Marsh USA Risk & Insurance Services
15 West South Temple, Suite 700
Salt Lake City, UT 84101
Attn: Peggy Boren 801-533-3654

J78001-1--06-07

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER OTHER THAN THOSE PROVIDED IN THE POLICY. THIS CERTIFICATE DOES NOT AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES DESCRIBED HEREIN.

INSURED

Headwaters Energy Services Corp.
10653 South Riverfront Parkway Suite #3
South Jordan, UT 84095

COMPANIES AFFORDING COVERAGE

COMPANY A ACE AMERICAN INSURANCE CO

COMPANY B N/A

COMPANY C ACE AMERICAN INSURANCE CO

COMPANY D N/A

COVERAGES This certificate supersedes and replaces any previously issued certificate for the policy period noted below. 4

THIS IS TO CERTIFY THAT POLICIES OF INSURANCE DESCRIBED HEREIN HAVE BEEN ISSUED TO THE INSURED NAMED HEREIN FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THE CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, CONDITIONS AND EXCLUSIONS OF SUCH POLICIES. AGGREGATE LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

CO LTR	TYPE OF INSURANCE	POLICY NUMBER	POLICY EFFECTIVE DATE (MM/DD/YY)	POLICY EXPIRATION DATE (MM/DD/YY)	LIMITS	
A	GENERAL LIABILITY	XOO G23886819	10/01/07	10/01/08	GENERAL AGGREGATE	$ 4,000,000
	X COMMERCIAL GENERAL LIABILITY				PRODUCTS - COMP/OP AGG	$ 4,000,000
	CLAIMS MADE X OCCUR				PERSONAL & ADV INJURY	$ 2,000,000
	OWNER'S & CONTRACTOR'S PROT				EACH OCCURRENCE	$ 2,000,000
	X SIR $50,000				FIRE DAMAGE (Any one fire)	$ 250,000
					MED EXP (Any one person)	$ 0
	AUTOMOBILE LIABILITY				COMBINED SINGLE LIMIT	$
	ANY AUTO					
	ALL OWNED AUTOS				BODILY INJURY (Per person)	$
	SCHEDULED AUTOS					
	HIRED AUTOS				BODILY INJURY (Per accident)	$
	NON-OWNED AUTOS					
					PROPERTY DAMAGE	$
	GARAGE LIABILITY				AUTO ONLY - EA ACCIDENT	$
	ANY AUTO				OTHER THAN AUTO ONLY:	
					EACH ACCIDENT	$
					AGGREGATE	$
	EXCESS LIABILITY				EACH OCCURRENCE	$
	UMBRELLA FORM				AGGREGATE	$
	OTHER THAN UMBRELLA FORM					$
	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY				WC STATUTORY LIMITS / OTHER	
	THE PROPRIETOR/ PARTNERS/EXECUTIVE OFFICERS ARE: INCL / EXCL				EL EACH ACCIDENT	$
					EL DISEASE-POLICY LIMIT	$
					EL DISEASE-EACH EMPLOYEE	$
C	OTHER Property	PGL N04286510	10/01/07	10/01/08	Property Limit -Inc Equip	110,000,000
E		261 12 18	10/01/07	10/01/08	Deductible	25,000

DESCRIPTION OF OPERATIONS/LOCATIONS/VEHICLES/SPECIAL ITEMS

RE: C/007/0045 Wellington, UT facility

CERTIFICATE HOLDER

Division of Oil Gas & Mining
Attn: Pam Grubaugh-littig
1594 W. North Temple, Suite 1210
Salt Lake City, UT 84114

CANCELLATION

SHOULD ANY OF THE POLICIES DESCRIBED HEREIN BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, THE INSURER AFFORDING COVERAGE WILL ENDEAVOR TO MAIL 30 DAYS WRITTEN NOTICE TO THE CERTIFICATE HOLDER NAMED HEREIN, BUT FAILURE TO MAIL SUCH NOTICE SHALL IMPOSE NO OBLIGATION OR LIABILITY OF ANY KIND UPON THE INSURER AFFORDING COVERAGE, ITS AGENTS OR REPRESENTATIVES, OR THE ISSUER OF THIS CERTIFICATE.

MARSH USA INC.

BY: Peggy Boren Peggy Boren

MM1(3/02) VALID AS OF: 11/05/07

ADDITIONAL INFORMATION

SEA-001044512-02

DATE (MM/DD/YY) 11/05/07

PRODUCER

Marsh USA Risk & Insurance Services
15 West South Temple, Suite 700
Salt Lake City, UT 84101
Attn: Peggy Boren 801-533-3654

J78001-1--06-07

COMPANIES AFFORDING COVERAGE

COMPANY
E NATIONAL UNION FIRE INS. CO. OF PITTSBURGH, PA

COMPANY
F

COMPANY
G

COMPANY
H

INSURED

Headwaters Energy Services Corp.
10653 South Riverfront Parkway Suite #3
South Jordan, UT 84095

TEXT

CERTIFICATE HOLDER

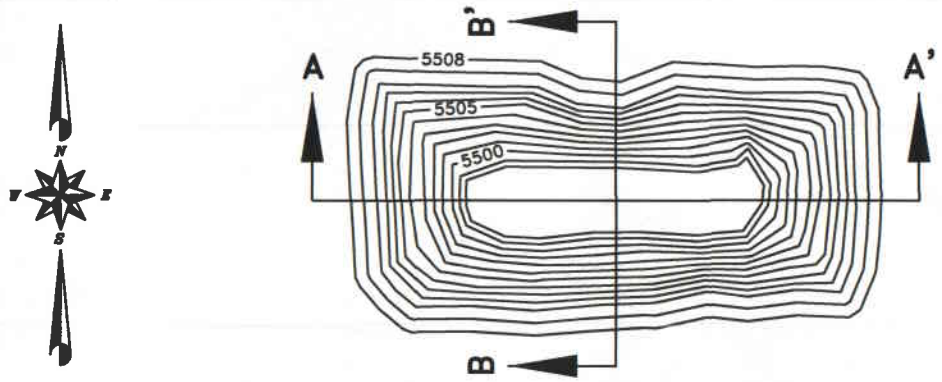
Division of Oil Gas & Mining
Attn: Pam Grubaugh-littig
1594 W. North Temple, Suite 1210
Salt Lake City, UT 84114

MARSH USA INC. BY

Peggy Boren Peggy Boren

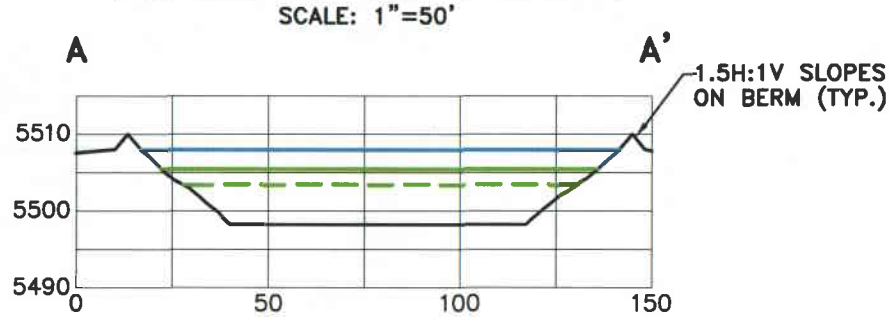
CHAPTER 9
ALLUVIAL VALLEY FLOORS

The COVOL Dry-Coal Cleaning Facility is located in an upland area overlain by a thin veneer of colluvial, slope wash deposits. It is not located within or adjacent to an alluvial valley floor.



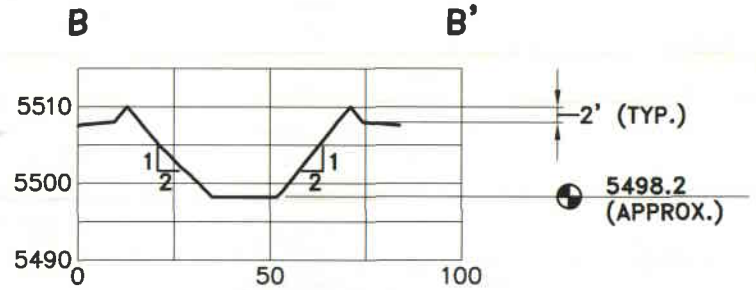
WEST SEDIMENTATION POND

SCALE: 1"=50'



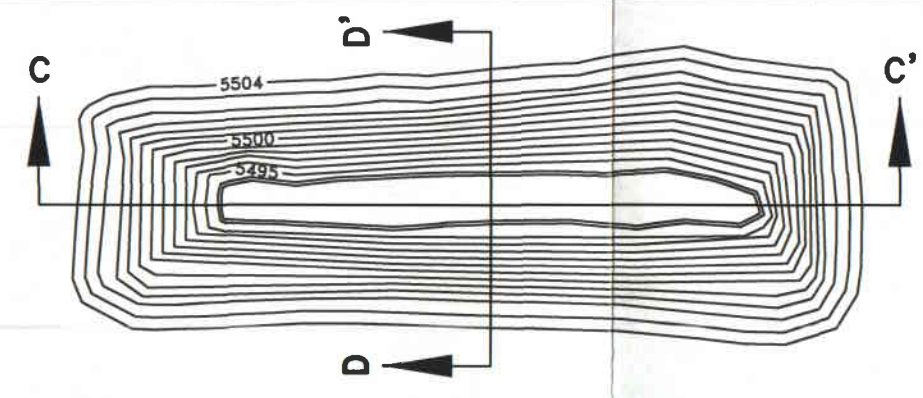
SECTION A–A'

HORZ. SCALE: 1"=50'
VERT. SCALE: 1"=25'



SECTION B–B'

HORZ. SCALE: 1"=50'
VERT. SCALE: 1"=25'

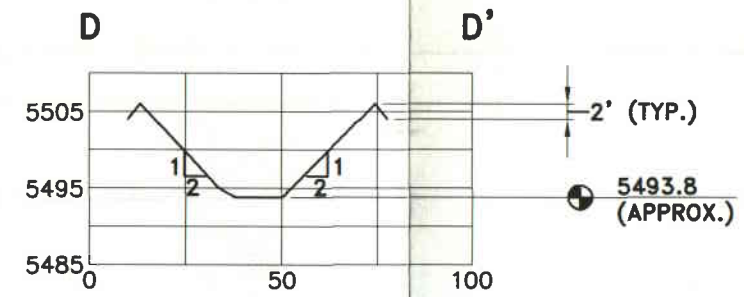


EAST SEDIMENTATION POND

SCALE: 1"=50'

SECTION C–C'

HORZ. SCALE: 1"=50'
VERT. SCALE: 1"=25'



SECTION D–D'

HORZ. SCALE: 1"=50'
VERT. SCALE: 1"=25'

MAX. WATER STORAGE ELEVATION (APPROX. 5508.0')

MAX. SED. STORAGE STAGE (APPROX. 5505.4')

60% SED. CLEANOUT STAGE (APPROX. 5503.4')

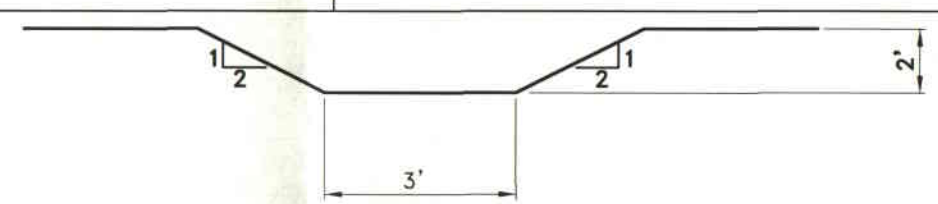
MAX. WATER STORAGE ELEVATION (APPROX. 5503.7')

MAX. SED. STORAGE STAGE (APPROX. 5498.6')

60% SED. CLEANOUT STAGE (APPROX. 5497.3')

NOTE:

SEDIMENTATION POND DIMENSIONS AND GEOMETRY SURVEYED BY EIS ENVIROMENTAL AND ENGINEERING NOVEMBER 2007, THEY WERE PLACED ON THE MAP USING AERIAL PHOTOGRAPHY (GOOGLE EARTH) TAKEN IN 2006. ABSOLUTE ELEVATIONS ARE BASED ON PRE–CONSTRUCTION TOPOGRAPHIC DATA PROVIDED BY MINE AND MILLS ENGINEERING AND ARE THUS CONSIDERED TO BE APPROXIMATE.



TYPICAL SPILLWAY CHANNEL SECTION

SCALE: 1"=3'
HORZ" AND VERT.

REGISTERED PROFESSIONAL ENGINEER No. 168246 RICHARD B. WHITE STATE OF UTAH

EarthFax Engineering, Inc. Engineers/Scientists	SCALE: AS SHOWN	BASE MAP: SURVEY BY EIS ENVIRONMENTAL AND ENGINEERING.	REVISION'S DATE / BY / DATE / BY	DRAWN BY: SWF	CHECKED BY: AM	DATE: 01/2008	COVOL ENGINEERED FUELS 1865 WEST RIDGE ROAD WELLINGTON, UTAH 841654
				APPROVED BY: RBW	DWG DATA: UC1091\02\PERMIT APPLICATION\DRAWINGS\PLATE7-1.DWG		PLATE 7–1 SEDEMENTATION POND MAP

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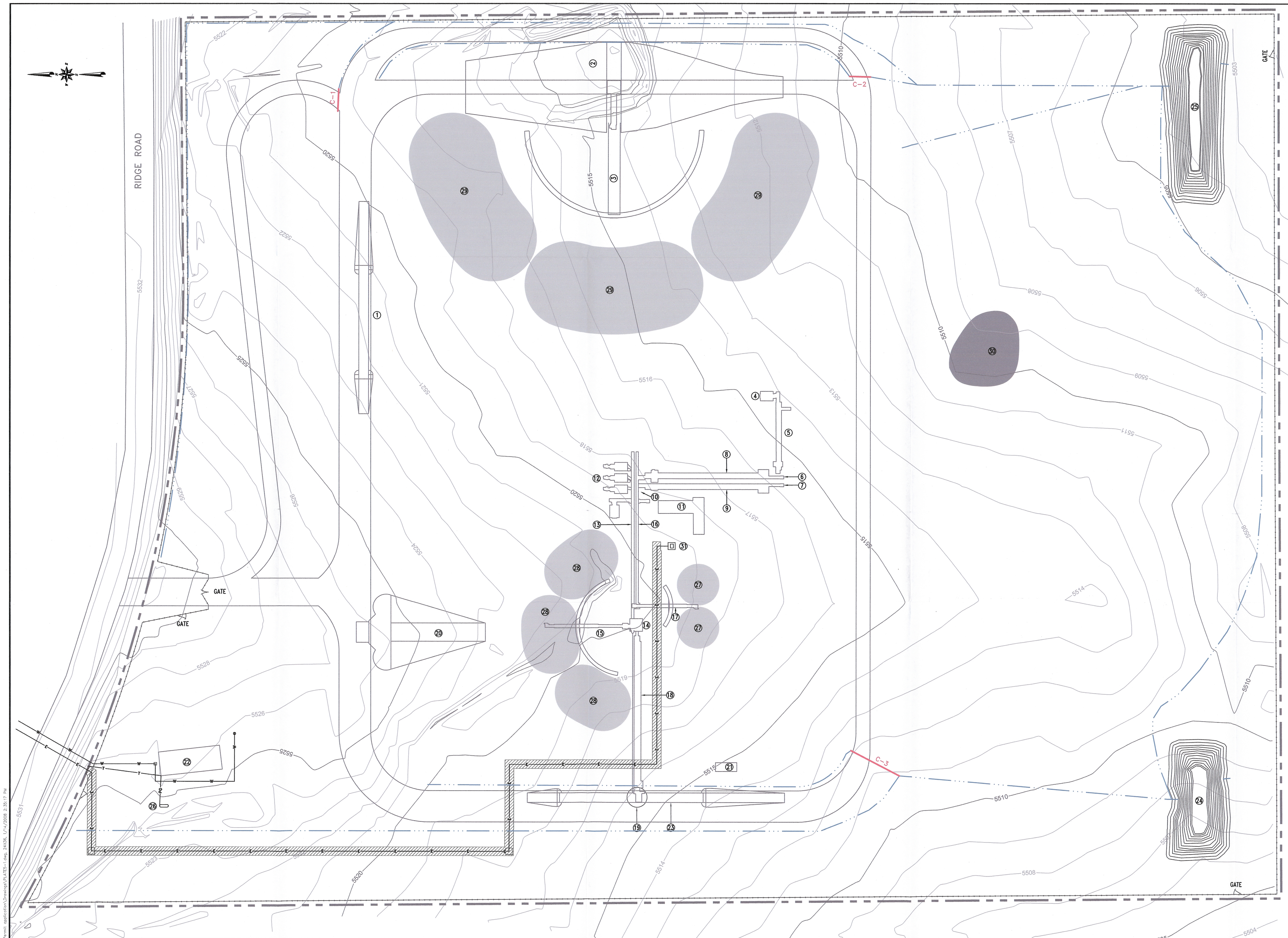

EQUIPMENT LIST

1. TRUCK SCALE TS-01
2. TRUCK DUMP HOPPER WITH BELT FEEDER
3. STOCKPILE RADIAL STACKER RS-1
4. PLANT FEED HOPPER
5. FEED CONVEYOR C-2
6. SCREEN
7. CRUSHER
8. FIRED CONVEYOR C-4
9. COARSE CONVEYOR C-5
10. AIR JIG
11. STORAGE SHED
12. BAG HOUSES
13. PRODUCT CONVEYOR C-7
14. BLENDING HOPPER
15. RADIAL STACKER RS-2
16. CONVEYOR C-6
17. RADIAL STACKER RS-3
18. CONVEYOR C-6
19. PRODUCT SILO
20. ALTERNATE TRUCK LOADOUT HOPPER
21. DIESEL TANK
22. OFFICE TRAILER
23. TRUCK SCALE TS-02
24. WESTERN SEDIMENTATION POND
25. EASTERN SEDIMENTATION POND
26. PROPANE STORAGE TANK
27. BY-PRODUCT STOCKPILE
28. ALTERNATE PRODUCT STOCKPILE
29. PLANT FEED STOCKPILE
30. TOPSOIL STOCKPILE
31. TRANSFORMER

LEGEND

- DISTURBED\PERMIT AREA BOUNDARY
- MUNINCIPAL WATER SUPPLY LINE
- TELEPHONE LINE
- ELECTRIC POWER LINE WITH UTILITY RIGHT OF WAY
- DITCH
- CULVERT

RECEIVED
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DIV. OF OIL, GAS & MINING

NOTES:

1. TOPOGRAPHY SHOWN WAS SURVEYED PRIOR TO CONSTRUCTION OF THE FACILITY.
2. THE GEOMETRY AND DIMENSIONS OF THE SEDIMENT PONDS WERE SURVEYED IN NOVEMBER 2007 BY EIS ENVIROMENTAL AND ENGINEERING CONSULTANTS AND HAVE BEEN LOCATED ON THE MAP USING AERIAL PHOTOGRAPHY (GOOGLE EARTH).
3. THE LOCATIONS OF THE DITCHES WERE MAPPED USING AERIAL PHOTOGRAPY (GOOGLE EARTH, 2006) AND WERE FIELD VERIFIED IN NOVEMBER, 2007.

REGISTERED PROFESSIONAL ENGINEER
No. 168246
RICHARD B. WHITE
STATE OF UTAH

EarthFax Engineering, Inc.
Engineers/Scientists

0' 50'
SCALE: 1"=50'

BASE MAP: ADAPTED FROM AS-BUILT DRAWINGS BY MINE AND MILL ENGINEERING, INC. SALT LAKE CITY, UTAH

REVISIONS	DATE	BY	DATE	BY

DRAWN BY: SWF	CHECKED BY: AM	DATE: 01/2008
APPROVED BY: RBW	DWG DATA: UC1091\02\PERMIT APPLICATION\DWG\MINEANDMILLS\PLATE5-1.DWG	

COVOL ENGINEERED FUELS
1865 WEST RIDGE ROAD
WELLINGTON, UTAH 841654

PLATE 5-1
GENERAL SITE MAP
WELLINGTON DRY COAL CLEANING FACILITY

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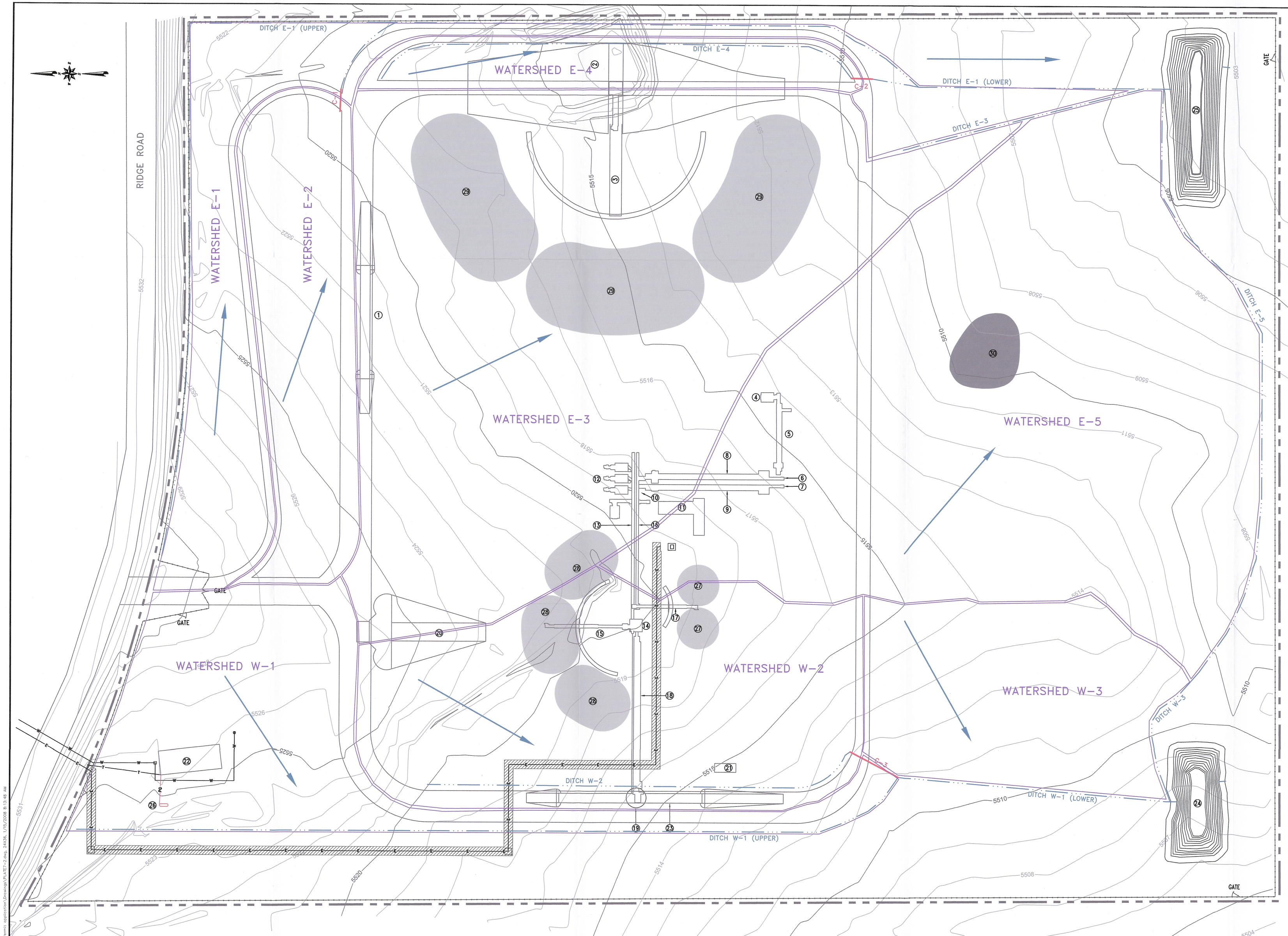

EQUIPMENT LIST

1. TRUCK SCALE TS-01
2. TRUCK DUMP HOPPER WITH BELT FEEDER
3. STOCKPILE RADIAL STACKER RS-1
4. PLANT FEED HOPPER
5. FEED CONVEYOR C-2
6. SCREEN
7. CRUSHER
8. FIRED CONVEYOR C-4
9. COARSE CONVEYOR C-5
10. AIR JIG
11. STORAGE SHED
12. BAG HOUSES
13. PRODUCT CONVEYOR C-7
14. BLENDING HOPPER
15. RADIAL STACKER RS-2
16. CONVEYOR C-6
17. RADIAL STACKER RS-3
18. CONVEYOR C-6
19. PRODUCT SILO
20. ALTERNATE TRUCK LOADOUT HOPPER
21. DIESEL TANK
22. OFFICE TRAILER
23. TRUCK SCALE TS-02
24. WESTERN SEDIMENTATION POND
25. EASTERN SEDIMENTATION POND
26. PROPANE STORAGE TANK
27. BY-PRODUCT STOCKPILE
28. ALTERNATE PRODUCT STOCKPILE
29. PLANT FEED STOCKPILE
30. TOPSOIL STOCKPILE

LEGEND

- DISTURBED\PERMIT AREA BOUNDARY
- MUNINCIPAL WATER SUPPLY LINE
- TELEPHONE LINE
- ELECTRIC POWER LINE WITH UTILITY RIGHT OF WAY
- DITCH
- CULVERT
- DRAINAGE DIRECTION

RECEIVED
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DIV. OF OIL, GAS & MINING

NOTES:

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BASE MAP: ADAPTED FROM AS-BUILT DRAWINGS BY MINE AND MILL ENGINEERING, INC, SALT LAKE CITY, UTAH

REVISIONS	DATE	BY	DATE	BY

DRAWN BY: SWF | CHECKED BY: AM | DATE: 01/2008
APPROVED BY: RBW | DWG DATA: UC1091\02\PERMIT APPLICATION\DWG\MINEANDMILLS\PLATE7-2.DWG

COVOL ENGINEERED FUELS
1865 WEST RIDGE ROAD
WELLINGTON, UTAH 841654

PLATE 7-2
SITE WATERSHED AND DRAINAGE MAP
WELLINGTON DRY COAL CLEANING FACILITY