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**- LAND DEVELOPMENT -**

**Air Pollutant Emission Notice (APEN) – and – Application for Construction Permit**

New Facility     Transfer of Ownership \*     Change in Production     No Change (APEN Update Only)

All sections of this APEN and application must be completed prior to submittal to the Division for both new and existing facilities. An application with missing information may be determined incomplete and may result in longer engineer processing times.

\* **Note:** If you are transferring the ownership of a permit, you must also submit an Administrative Amendment form and Transfer of Emission Permit Agreement form.

**Permit Number** \_\_\_\_\_ **AIRS Number** \_\_\_\_\_

Company Name: U.S. Department of Energy & Kaiser-Hill Company, L.L.C.  
Billing Address: 10808 Highway 93, Unit B Zip Code: 80403-8200  
Building MV72  
Golden, Colorado  
Person to Contact: Robert C. Nininger Phone Number: (303) 966-4663  
Email Address: robert.nininger@rfets.gov Fax Number: (303) 966-7991

**Please provide description of the activity: (Also, please provide a site map)**

Non-CERCLA Land Configuration, see attached report

Project Name & Location: Non-CERCLA Land Configuration at Rocky Flats Environmental Technology Site  
County: Jefferson Section: 2 Township: 2S Range: 70W  
Total area of land in project: 460 Acres  
Date earthmoving will – Commence: October 1, 2004 Stop: October 2006  
Total area subject to earthmoving: 460 Acres  
Total disturbed area at any one time: 460 Acres  
Area to be paved (roads, parking lots): None Acres  
Date paving will be completed: N/A  
Estimated time to complete entire project (includes buildings) 12-24 months

List any known or suspected contaminants in the soil:

Clean, or below Rocky Flats Cleanup Agreement Action levels

Brief description of how the project development will occur (attach an additional page if necessary):

See attached report

**- LAND DEVELOPMENT -**

**FUGITIVE DUST CONTROL PLAN FOR LAND DEVELOPMENT**

(This must be submitted with the Air Pollutant Emission Notice-and-Application for Emission Permit)

Regulation No. 1 requires that a fugitive dust control plan be submitted by applicants whose source / activity results in fugitive dust emissions. The control plan must enable the source to minimize emissions of fugitive dust to a level that is technologically feasible and economically reasonable. If the control plan is not adequate in minimizing emissions a revised control plan may be required. The control plan (if acceptable to the Division) will be used for enforcement purposes on the sources.

Please check the dust control measures which you propose for your activity. The Division will enforce the control measures checked. Use separate sheets if more space is needed. Also note items with an asterisk (\*). This indicates those measures which will probably be required.

**I. Control of Unpaved Roads on Site**

- Watering
  - Frequent (Watering Frequency of 2 or More Times Per Day)
  - As Needed
- Application of Chemical Stabilizer
- Vehicle Speed Control  
Speeds limited to Per Site Postings mph maximum. Speed limit signs must be posted.  
(Generally 30 mph is maximum approvable speed on site.)
- Graveling

**II. Control of Disturbed Surface Areas on Site**

- Watering
  - Frequent (Watering Frequency of 2 or More Times Per Day)
  - As Needed
- Application of Chemical Stabilizer
- Vehicle Speed Control  
Speeds Limited To Per Site Postings MPH Maximum. Speed Limit Signs Must Be Posted.
- Revegetation Revegetation Must Occur Within One Year Of Soil Disturbance
  - Seeding with mulch
  - Seeding without mulch
- Furrows at right angle to prevailing wind  
Depth of furrows \_\_\_\_\_ Inches (must be greater than 6")
- Compaction Of Disturbed Soil On A Daily Basis To Within 90 % Of Maximum Compaction  
(As determined by a Proctor Test).
  - Foundation areas only; or
  - All disturbed soil.
- Wind Breaks  
Type: \_\_\_\_\_ (Example: Snow Fence, Silt Fence, etc.)
- Synthetic Or Natural Cover For Steep Slopes.  
Type: Erosion Blankets (Netting, Mulching, etc.), As Necessary

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### LAND DEVELOPMENT

#### III. Prevention Of Mud And Dirt Carried Out Onto Paved Surfaces.

- Prevention
  - Gravel Entry Ways, As Necessary
  - Washing Vehicle Wheels, As Necessary
  - Other: \_\_\_\_\_
- Cleanup of Paved Areas      Frequency: \_\_\_\_\_ Times Per Day
  - Street Sweeper
  - Hose With Water
  - Other: \_\_\_\_\_

#### Additional Sources of Emissions

List any other sources of emissions or control methods

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Signature of Person Legally Authorized to Supply Data: Robert C. Nininger, Manager, Environmental Media Management, Kaiser-Hill, L.L.C. <i>Robert C. Nininger</i>	Date: <i>8/4/04</i>
Signature of Person Legally Authorized to Supply Data: Robert H. Birk, DOE, RFFO <i>R. H. Birk</i>	Date: <i>8/4/04</i>

#### Check the appropriate box if you want:

- Copy of the Preliminary Analysis conducted by the Division
- To review a draft of the permit prior to issuance

(Checking any of these boxes may result in an increased fee and/or processing time)

Send this form along with \$119.96 to:  
Telephone: (303) 692-3150

**Colorado Department of Public Health and Environment  
Air Pollution Control Division  
APCD-SS-B1  
4300 Cherry Creek Drive South  
Denver, CO 80246-1530**

**Small Business Assistance Program**  
(303) 692-3148

**Small Business Ombudsman**  
(303) 692-2135

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**Kaiser-Hill Environmental Systems and Stewardship  
Rocky Flats Environmental Technology Site**

**Non-CERCLA Projects APEN and Permit Application  
Submittal Report**

**August 4, 2004**

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**Introduction**

This report provides supporting information to the Colorado Department of Public Health and Environment, Air Pollution Control Division (CDPHE, APCD) for submittal of an Air Pollutant Emission Notice (APEN) form and application for a construction permit quantifying particulate emissions from numerous soil disturbance activities supporting Site closure.

This information and the associated APEN and permit application are being transmitted to the CDPHE, APCD to meet the requirements of Colorado Air Quality Control Commission Regulation No. 3. The reportable criteria pollutants are particulates (both particulate matter less than 10 micrometers in diameter [PM10] and total particulate matter [PM]).

**Background**

An agreement was reached with CDPHE, APCD representatives to submit a single APEN and permit application for several non-Comprehensive Environmental Response, Compensation, and Liability Act (non-CERCLA) activities that have the potential to emit fugitive dust. These activities include reconfiguration of the A and B Series ponds, asphalt removal from site roads and parking lots, and Industrial Area (IA) reconfiguration, including soil borrow areas, grading, functional channels, and removal of storm drains and culverts. This submittal includes a list of potential dust control measures to be utilized during soil disturbance activities (see attached permit application).

**A and B Series Ponds Reconfiguration**

The Site maintains nine retention ponds in the North Walnut Creek and South Walnut Creek drainages. North Walnut Creek has four Ponds (A Series ponds) and South Walnut Creek has five ponds (B Series ponds). The responsibility to manage water discharges after termination of site activities and final closure requires modifications to these ponds. The modifications to the drainage systems will allow less active management and maintenance than the current system and should preserve existing wetlands and habitat as available water allows.

Six of the nine dams will be modified by reducing the height of the dams (by notching) and therefore the size of the ponds to create a more passive, flow-through system. Please see the attached map and diagram of the proposed reconfiguration of the dam face. Projected particulate emissions estimates are based on the total amount of material removed from the dams.

**Asphalt Removal**

Asphalt will be removed from major access roads to the central portion of the Site, including the East and West Access Roads and the North Perimeter Road, as well as removal of parking lots. A one-lane road consisting of

remaining road-base will be retained on the West Access Road. Other roads and parking lots will be removed completely and revegetated. Generally, roads will not be graded to remove drainage ditches along the roadway. Limited grading will be conducted as needed to promote overland flow of storm water. Roads and parking lots will be revegetated consistent with the existing Site revegetation plans. Projected particulate emissions estimates are based on the total amount of asphalt removed from the Site.

### **Industrial Area Reconfiguration**

The general concept for IA Land Configuration is to provide a land surface consistent with the end use of the facility as a wildlife refuge. The goals of the IA Land Configuration are to minimize total earthwork scope; provide surface water drainage; utilize soil borrow areas; maintain geotechnical stability; limit erosion, specifically in the drainage ditches; and minimize habitat and wetland impacts. The IA Land Configuration includes the following major activities:

**IA Grading** - When the buildings and facilities are removed from areas within the IA, limited grading will be conducted to promote Site drainage. Generally, the grading at buildings and facilities will match the existing area grades surrounding the building or facility. Some existing drainage ditches and/or swales will be retained to assist in directing storm water flow towards more major drainages. The area will be revegetated consistent with the existing Site revegetation plans. Any areas that have not recently been disturbed and are adequately drained will not be re-graded. IA grading will not return the IA to a pre-development condition. Please refer to the attached map demonstrating drainage and grading plans.

**Soil Borrow Areas** - In order to establish a drainage pattern west of Building 371/374 that feeds North Walnut Creek, an area south and west of Building 371/374 will require excavation. The excavated soils will be used to fill IA building basements or other low areas that exist after building removal. Much of the upper portion of the proposed excavation area contains previously disturbed soils. Establishment of this drainage will complement the stable and more functional end state desired. Disturbed borrow areas will be revegetated accordingly.

**Culverts and Storm Drains** - Many culverts and storm drains within 3 feet of existing grade will be removed, and some below 3 feet of existing grade will be plugged at both ends and remain in place. Earthwork will be conducted where culverts or storm drains are removed to either fill the disturbed area up to existing area grades or to grade the area to establish a functional channel. Disturbed areas will be revegetated in accordance with the existing Site revegetation plans.

**Functional Channels** - Functional channels are defined as newly constructed channels intended to direct storm water from the IA into the North and South Walnut Creek drainages. The channels will generally be trapezoidal in shape unless an existing channel is determined to provide adequate flow capacity. Erosion protection would be provided at the bottom and sides of the channels as needed, and covered with soil.

Projected particulate emissions estimates are based on the total amount of soil to be moved within the IA.

### **APEN Submittal Information**

An APEN form and application for construction permit is provided with this report. Reportable particulate emissions will be generated from the above mentioned activities.

## Emissions

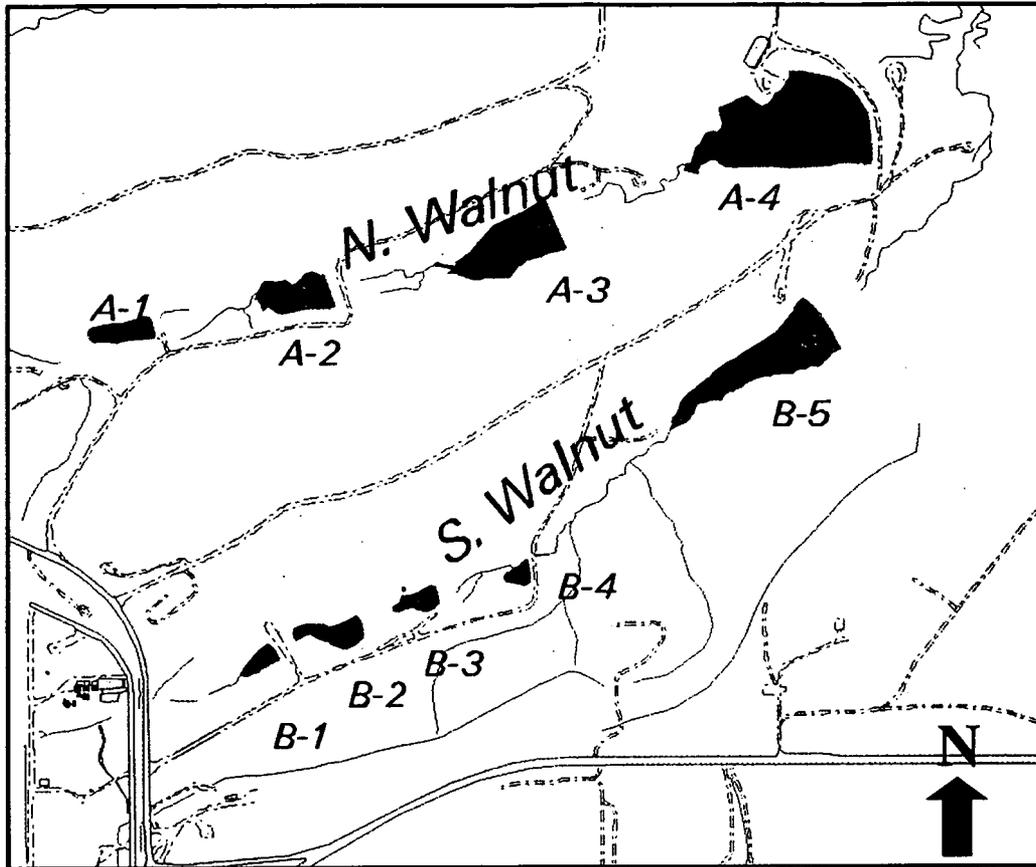
Particulate air pollutant emissions were calculated for various soil disturbance activities utilizing emission factors from the "Compilation of Air Pollutant Emission Factors," EPA, AP-42. The reported emissions listed below are uncontrolled. No credit was taken for control methodologies (watering, dust suppression techniques, etc.).

The following table provides a summary of particulate emissions from the above mentioned non-CERCLA activities:

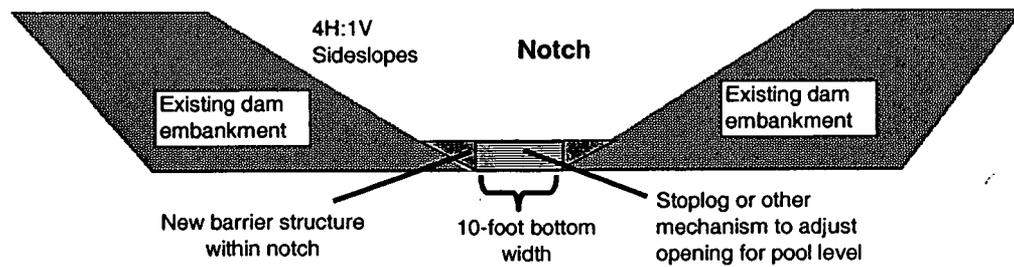
### Emissions Summary Table:

**Table of Non-CERCLA Projects -  
Estimated Particulate Emissions (tons per year)**

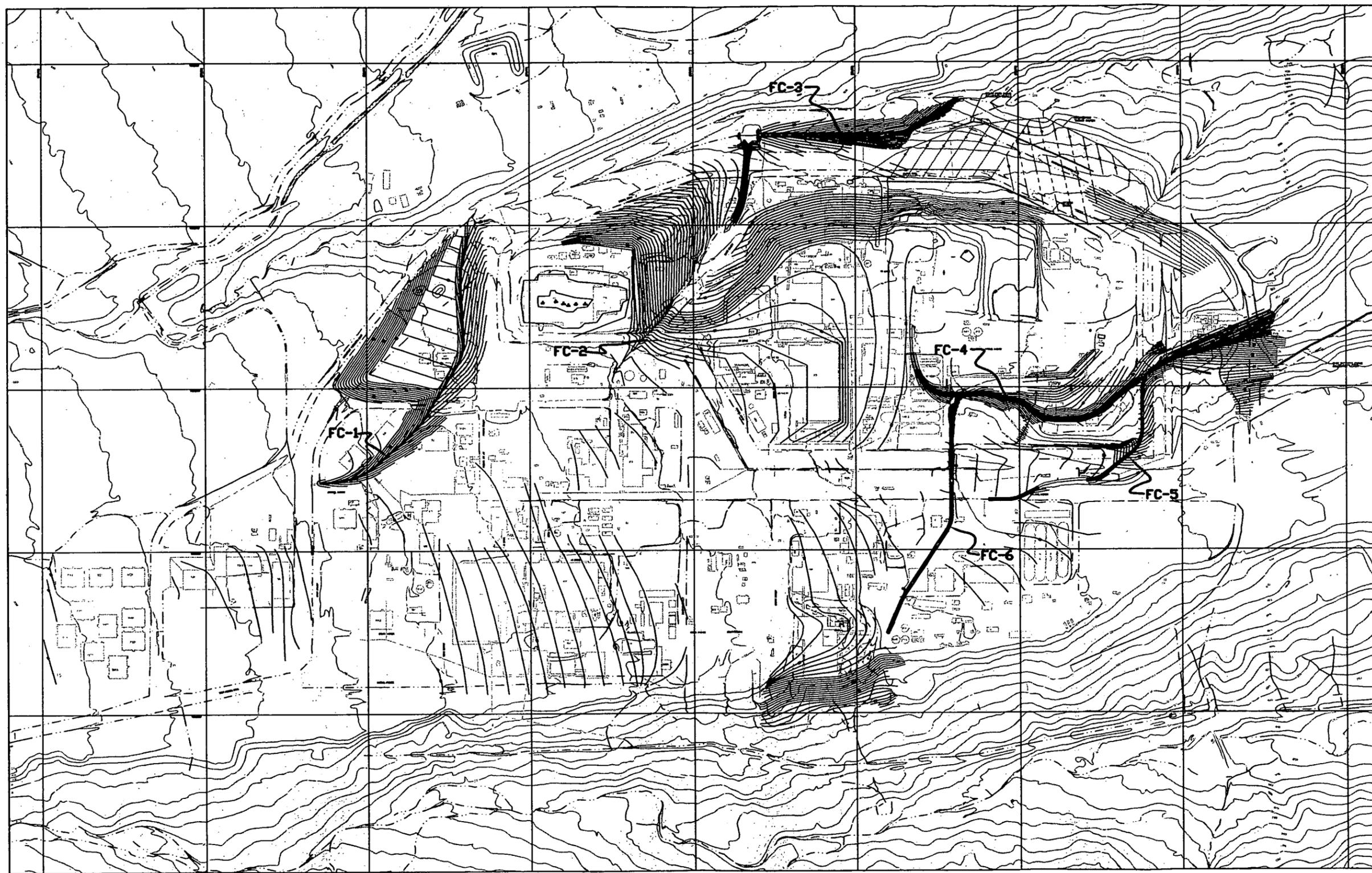
Project		Paved Roads	Unpaved Roads	Backhoe	Handling	Grader	Bulldozer	Scraper	Stockpiles	Total PM	Total PM-10
Asphalt Removal	PM	44.9	-	0.23	0.03	-	-	-	-	45.16	-
	PM-10	8.76	-	0.09	0.02	-	-	-	-	-	8.87
Ponds Reconfiguration	PM	-	11.5	0.1	0.03	1.01	0.83	-	-	13.47	-
	PM-10	-	2.93	0.04	0.01	0.34	0.16	-	-	-	3.48
Industrial Area Reconfiguration	PM	-	26.2	0.83	0.23	11.6	2.7	-	-	41.56	-
	PM-10	-	6.67	0.33	0.11	3.98	0.53	-	-	-	11.62
<b>Total PM</b>		<b>44.9</b>	<b>37.7</b>	<b>1.16</b>	<b>0.29</b>	<b>12.61</b>	<b>3.53</b>	<b>0</b>	<b>0</b>	<b>100.19</b>	<b>-</b>
<b>Total PM-10</b>		<b>8.76</b>	<b>9.6</b>	<b>0.46</b>	<b>0.14</b>	<b>4.32</b>	<b>0.69</b>	<b>0</b>	<b>0</b>	<b>-</b>	<b>23.97</b>



**Typical Front View of Modified Dam**  
(not to scale)



Note: Configuration shown is a "maximum impact" conceptual design developed for this EA.  
Actual design for dam modification may vary, depending on results of engineering analyses to be conducted (that are not within EA scope).



**NOTES:**

1. EXISTING CONTOURS BASED ON 1994 AERIAL TOPOGRAPHICAL SURVEY SUPPLEMENTED WITH FIELD SURVEY MEASUREMENTS OF POND BERMS TAKEN IN JUNE 2002 (SEE DWG. 51754-C201)
2. PROPOSED GRADING FOR SOLAR POND AREA COMPLETED IN DEC. 2002. SOLAR POND COVER CONTOURS BASED ON AS-BUILT FIELD SURVEY MEASUREMENTS TAKEN IN FEBRUARY 2003 (SEE DWG. 1068001est(L.dwg))
3. DO NOT EXCAVATE WITHIN IHSS 154 BOUNDARY.

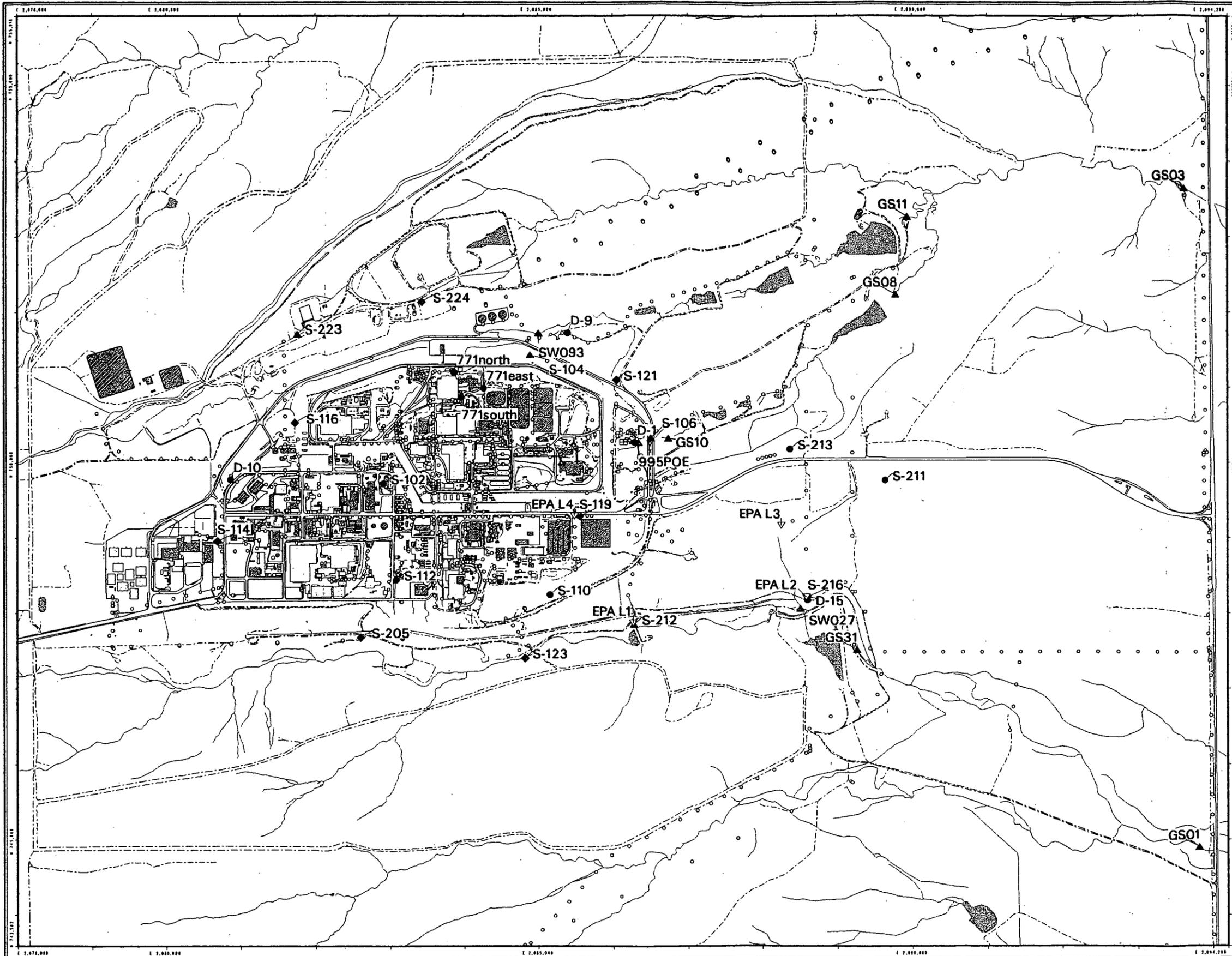
**LEGEND:**

- 0000 EXISTING INDEX CONTOUR
- EXISTING INTERMEDIATE CONTOUR
- PAVED ROAD
- UNPAVED ROAD
- FENCE
- EXISTING CULVERT
- 80 PROPOSED INDEX GRADE
- PROPOSED INTERMEDIATE GRADE
- 100 PROPOSED SPOT ELEVATION
- URBANAGE DITCH/ENGINEERED CHANNEL CENTER LINE
- FO-# ENGINEERED FUNCTIONAL CHANNEL IDENTIFIER



**DRAFT**

11		REVISED PROPOSED GRADE (REV-1A-GRADING-REV1)		DATE: 08/20/04		DRAWN: J. GIBSON	
0		ORIGINAL ES&E CONCEPTUAL DESIGN		DATE: 03/02/04		DESIGNED: J. GIBSON	
KEYWORDS		PROJECT: 51754		SHEET: 11		TOTAL SHEETS: 11	
CLASS		CONCEPTUAL DESIGN		U.S. DEPARTMENT OF ENERGY		Rocky Flats Environmental Technology Site	
LOCATION		SOUTH PLAIN, COLORADO		GOLDEN, COLORADO		CONCEPTUAL 1A GRADING	
DATE		08/20/04		PROJECT NUMBER		51754-C600	
BY		J. GIBSON		DATE		08/20/04	
CHECKED		N/A		DATE		N/A	
APPROVED		N/A		DATE		N/A	
AS NOTED		N/A		DATE		N/A	
AUTOCAD COMPUTER GENERATED NO MANUAL CHANGES ALLOWED							



### Required Environmental Monitoring Locations with Site Power Grid

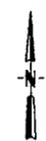
#### EXPLANATION

- 803 Pad Remediation Project (HSS 112 & 155)
- ▲ 803/A Project Sampler
- ◆ Industrial Area Projects
- ▽ EPA Sampler Locations
- CDPHE Air Sampler Location
- Existing Power Pole
- ▲ Surface Water Sampler Location (POC)
- ▲ Surface Water Sampler Location (POE)

#### Standard Map Features

- Buildings and other structures
- ▨ Demolished buildings and other structures
- ▩ Lakes and ponds
- Streams, ditches, or other drainage features
- - - Fences and other barriers
- == Paved roads
- - - Dirt roads

**DATA SOURCE BASE FEATURES:**  
 Buildings, fences, hydrography, roads and other structures from 1994 aerial fly-over data captured by EG&G RSL, Las Vegas. Digitized from the orthophotographs. 1/95



Scale = 1 : 15920  
 1 inch represents approximately 1327 feet



State Plane Coordinate Projection  
 Colorado Central Zone  
 Datum: NAD27

U.S. Department of Energy  
 Rocky Flats Environmental Technology Site

Prepared by: CH2MHILL  
 Prepared for: KAISER HILL COMPANY



June 17, 2004

NT\_Srv\_w\projects\fy2004\04-0414\air\_samp\_powerpoles\_base.mxd

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**Table of Non-CERCLA E. R. Project Estimated Particulate Emissions (tons)**

Project		Paved Roads	Unpaved Rds	Backhoe	Handling	Grader	Bulldozer	Scraper	Stockpiles	Total TSP	Total PM-10	Time-frame
Road Removal	TSP	44.9		0.23	0.03					45.16		Fall 04
	PM-10	8.76		0.09	0.02						8.87	
Ponds	TSP		11.5	0.1	0.03	1.01	0.83			13.47		Spring 05
Reconfig.	PM-10		2.93	0.04	0.01	0.34	0.16				3.48	
I.A.	TSP		26.2	0.83	0.23	11.6	2.7			41.56		Fall 04
Reconfig.	PM-10		6.67	0.33	0.11	3.98	0.53				11.62	
Total TSP		44.9	37.7	1.16	0.29	12.61	3.53	0	0	100.19		
Total PM-10		8.76	9.6	0.46	0.14	4.32	0.69	0	0		23.97	



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Soil Handling w/Frontend Loader or Dump Truck (AP-42, 13.2.4) - loading soil and asphalt.

Emission Factor Equations:  $EF = k \cdot (0.0032) \cdot [(U/5)^{1.3}] / [(M/2)^{1.4}]$ , lb/ton

Inputs/Assumptions: k, particle size multiplier (AP-42, T) 0.74 TSP  
0.35 PM-10  
U, average wind speed (mph) = 9  
M, soil moisture content (%) = 10  
d, density of soil (lb/ft<sup>3</sup>) = 117

V, volume of soil handled (yd<sup>3</sup>) 75,720  
W, weight of soil handled (ton) 1.20E+05  
-->  $W = V \cdot d \cdot (27 \text{ ft}^3 / 1 \text{ yd}^3) \cdot (1 \text{ to } \dots)$

\* Items in regular black font are given or are used consistently site-wide and do not generally change from project to project. Items in bolded red font must be input specifically for each project. (Note: W is calculated.)

Emission Calculations: TSP emission factor (lb/ton) = 5.34E-04  
TSP emissions (ton) = 3.19E-02

PM-10 emission factor (lb/ton) = 2.53E-04  
PM-10 emissions (ton) = 1.51E-02

Excavation w/Backhoe (AP-42, Table 11.9-2) - excavation of soil/asphalt at the site.

Emission Factor Equations:

TSP EF =  $[0.0021 \cdot (d)^{1.1}] / [(M)^{0.3}]$ , lb/yd<sup>3</sup>  
PM-10 EF =  $0.75 \cdot \{ [0.0021 \cdot (d)^{0.7}] / [(M)^{0.3}] \}$ , lb/yd<sup>3</sup>

Inputs/Assumptions:

d, drop height (ft) = 5  
M, moisture content (%) = 10

V, volume of soil excavated (yd) 75720

\* Items in regular black font are given or are used consistently site-wide and do not generally change from project to project. Items in bolded red font must be input specifically for each project.

Emission Calculations:

TSP emission factor (lb/yd<sup>3</sup>) = 6.18E-03  
TSP emissions (ton) = 2.34E-01

PM-10 emission factor (lb/yd<sup>3</sup>) = 2.44E-03  
PM-10 emissions (ton) = 9.22E-02

Total Project Emissions:

Paved Roads -	4.49E+01 tpy TSP	8.76E+00 tpy PM10
Soil Handling -	3.19E-02 tpy TSP	1.51E-02 tpy PM10
Backhoe -	2.34E-01 tpy TSP	9.22E-02 tpy PM10
Total	4.52E+01 tpy TSP	8.87E+00 tpy PM10

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### A & B Ponds Dams Reconfiguration - July

Description: Modify existing dams A-1, A-2, B-1, B-2, B-3, and B-4 by excavating a notch in each dam.  
 The total volume of soil to be excavated is 33,972 yd<sup>3</sup> over a 4 month period. Assume soil is not contaminated.  
 Assume bulldozers will run 6 hours/day for 16 weeks.  
 Total volume of soil to be moved by trucks is 33,972 yd<sup>3</sup>  
 Approximately 255 feet of pond bottom will be graded, or 2550 ft<sup>2</sup>.  
 Soil will be hauled from ponds to IA on unpaved roads, approximately 0.65 mile each way.  
 12 cu yd trucks will be used to haul 33,972 yd<sup>3</sup> soil; 10 wheels, avg weight of 21.4 tons. 2831 trips  
 Soil handling emissions will result from front-end loaders and truck dumping - 67,944 yd<sup>3</sup>

#### Unpaved Roads (AP-42, 13.2.2, 12/03)

Emission Factor Eq:  $EF = k * ((s/12)^a) * ((W/3)^b)$ , in lb/VMT  
 Emissions Equation:  $E = EF * VMT$   
 Inputs/Assumptions:

k, from Table 13.2.2-2 =	4.9	TSP (PM-30)
	1.5	PM-10
	0.23	PM-2.5
s, % silt content =	4.8	Sand and Gravel Processing Average
a, constants from Table 13.2.2-2	0.7	TSP (PM-30)
	0.9	PM-10
	0.9	PM-2.5
b, constants from Table 13.2.2-	0.45	TSP (PM-30)
	0.45	PM-10
	0.45	PM-2.5
W, average weight of vehicle (to	21.4	
w, number of wheels on vehicle	10	
n, number of vehicles =	1	
x, number of trips per vehicle =	2831	
RT, total round trip miles travel	1.3	
Total Material Volume Transpor	33,972	
VMT, vehicle miles traveled =	3.68E+03	
where VMT = n*x*RT	-----	

Emission Calculations:

TSP emission factor, lb/VMT =	6.25E+00
TSP emissions, tons =	1.15E+01
PM-10 emission factor, lb/VMT =	1.59E+00
PM-10 emissions, tons =	2.93E+00
PM-2.5 emission factor, lb/VMT =	2.44E-01
PM-2.5 emissions, tons =	4.49E-01

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Soil Handling with Front-end Loader or Truck (AP-42, 13.2.4 - loading and unloading excavated soil.

EF = k\*(0.0032)\*[(U/5)^1.3]/[(M/2)^1.4], lb/ton

Inputs/Assumptions: k, particle size multiplier (AP-42, T 0.74 TSP  
0.35 PM-10

Inputs/Assumptions: U, average wind speed (mph) = 9  
M, soil moisture content (%) = 10  
d, density of soil (lb/ft^3) = 117

V, volume of soil handled (yd^3) 67,944  
W, weight of soil handled (ton) 1.07E+05  
--> W=V\*d\*(27 ft^3/1 yd^3)\*(1 to -----

\* Items in regular black font are given or are used consistently site-wide and do not generally change from project to project. Items in bolded red font must be input specifically for each project. (Note: W is calculated.)

TSP emission factor (lb/ton) = 5.34E-04  
TSP emissions (ton) = 2.87E-02

Emission Calculations:

PM-10 emission factor (lb/ton) = 2.53E-04  
PM-10 emissions (ton) = 1.36E-02

Grader (AP- 42, Table 11.9-2) for pond bottoms.

Emission Factor Equation: TSP EF = 0.040\*(S)^2.5, lb/VMT  
PM-10 EF = 0.60\*[ 0.051\*(S)^2.0], lb/VMT

Inputs/Assumptions:

S, average vehicle speed (mph) 5  
n, number of graders = 1  
x, operating days per year = 90  
RT, miles traveled per day per g 10  
VMT, vehicle miles traveled per 9.00E+02  
--> VMT = n\*x\*RT -----

\* Items in bolded red font must be input specifically for each project. (Note: VMT is calculated.)

Emission Calculations:

TSP emission factor (lb/VMT) = 2.24E+00  
TSP emissions (ton) = 1.01E+00

PM-10 emission factor (lb/VMT) = 7.65E-01  
PM-10 emissions (ton) = 3.44E-01

Excavation w/Backhoe (AP-42, Table 11.9-2) - excavation of the dams.

TSP EF =  $[0.0021 \cdot (d)^{1.1} / ((M)^{0.3})]$ , lb/yd<sup>3</sup>

Emission Factor Equations: PM-10 EF =  $0.75 \cdot [0.0021 \cdot (d)^{0.7} / ((M)^{0.3})]$ , lb/yd<sup>3</sup>

Inputs/Assumptions: d, drop height (ft) = 5  
M, moisture content (%) = 10  
**V, volume of soil excavated (yd) = 33972**

\* Items in regular black font are given or are used consistently site-wide and do not generally change from project to project. Items in bolded red font must be input specifically for each project.

Emission Calculations: TSP emission factor (lb/yd<sup>3</sup>) = 6.18E-03  
TSP emissions (ton) = 1.05E-01

PM-10 emission factor (lb/yd<sup>3</sup>) = 2.44E-03  
PM-10 emissions (ton) = 4.14E-02

Bulldozer (AP-42, Table 11.9-2) (Pushing Soil)

Emission Factor Equations: TSP EF =  $5.7 \cdot [(s)^{1.2} / ((M)^{1.3})]$ , lb/hr

PM-10 EF =  $0.75 \cdot [1.0 \cdot [(s)^{1.5} / ((M)^{1.4})]$ , lb/hr

Inputs/Assumptions: s, material silt content (%) = 8  
M, moisture content (%) = 10  
**Hours of Operation per Day = 6**  
**Days of Operation per Week = 5**  
**Weeks of Operation per Year = 16**

\* Items in regular black font are given or are used consistently site-wide and do not generally change from project to project. Items in bolded red font must be input specifically for each project.

Emission Calculations: TSP emission factor (lb/hr) = 3.46E+00  
TSP emissions (ton) = 8.31E-01

PM-10 emission factor (lb/hr) = 6.76E-01  
PM-10 emissions (ton) = 1.62E-01

Total Project Emissions:	TSP	PM-10
Unpaved Roads -	1.15E+01 tpy TSP	2.93E+00 tpy PM10
Soil Handling -	2.87E-02 tpy TSP	1.36E-02 tpy PM10
Graders -	1.01E+00 tpy TSP	3.44E-01 tpy PM10
Backhoe -	1.05E-01 tpy TSP	4.14E-02 tpy PM10
Bulldozer -	8.31E-01 tpy TSP	1.62E-01 tpy PM10
<b>Total</b>	<b>1.35E+01 tpy TSP</b>	<b>3.49E+00 tpy PM10</b>

**Industrial Area Land Configuration and Borrow Area Plan Including Creation of Functional Channels.**

Description: Use existing soil from bermed areas on Site as backfill for building basements and grading schemes.  
 The total volume of soil is 268,500 yd<sup>3</sup> over a one year period. Assume soil is not contaminated.  
 Assume bulldozers will run 6 hours/day for 52 weeks.  
 Total volume of soil to be moved by dump trucks is 268,500 yd<sup>3</sup> on unpaved roads/areas.  
 Assume graders will be utilized every work day for one year.  
 Soil will be hauled from clean, on-site areas, on unpaved roads, approximately 0.25 miles.  
 20 yd<sup>3</sup> articulated dump trucks with ave. weight of 35 tons will be used to haul soil on unpaved roads.  
 Soil handling emissions will result from front-end loader and truck dumping - 537,000 yd<sup>3</sup>

**Unpaved Roads (AP-42, 13.2.2, 12/03)**

Emission Factor Eq:  $EF = k * ((s/12)^a * ((W/3)^b))$ , in lb/VMT  
 Emissions Equation:  $E = EF * VMT$   
 Inputs/Assumptions:

k, from Table 13.2.2-2 =	4.9	TSP (PM-30)
	1.5	PM-10
	0.23	PM-2.5
s, % silt content =	4.8	Sand and Gravel Processing Ave.
a, from Table 13.2.2-2	0.7	TSP (PM-30)
	0.9	PM-10
	0.9	PM-2.5
b, from Table 13.2.2-2	0.45	TSP (PM-30)
	0.45	PM-10
	0.45	PM-2.5
W, average weight of vehicle (to	35	
w, number of wheels on vehicle	4	
n, number of vehicles =	1	
x, number of trips per vehicle =	13425	
RT, total round trip miles travel	0.5	
Total Material Volume Transpor	268,500	
VMT, vehicle miles traveled =	6.71E+03	
where VMT = n*x*RT	-----	

Emission Calculations: TSP emission factor, lb/VMT = 7.79E+00  
 TSP emissions, tons = 2.62E+01

PM-10 emission factor, lb/VMT = 1.99E+00  
 PM-10 emissions, tons = 6.67E+00

PM-2.5 emission factor, lb/VMT = 3.05E-01  
 PM-2.5 emissions, tons = 1.02E+00

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**Soil Handling (AP-42, 13.2.4) - unloading clean fill soil from scrapers**

$$EF = k \cdot (0.0032)^k \cdot (U/5)^{1.3} / [(M/2)^{1.4}], \text{ lb/ton}$$

Inputs/Assumptions:  $k$ , particle size multiplier (AP-42, T) = 0.74 TSP  
 0.35 PM-10  
 Inputs/Assumptions:  $U$ , average wind speed (mph) = 9  
 $M$ , soil moisture content (%) = 10  
 $d$ , density of soil (lb/ft<sup>3</sup>) = 117

$V$ , volume of soil handled (yd <sup>3</sup> )	537,000
$W$ , weight of soil handled (ton)	8.48E+05
--> $W = V \cdot d \cdot (27 \text{ ft}^3 / 1 \text{ yd}^3) \cdot (1 \text{ to } \dots)$	-----

\* Items in regular black font are given or are used consistently site-wide and do not generally change from project to project. Items in bolded red font must be input specifically for each project. (Note:  $W$  is calculated.)

TSP emission factor (lb/ton) =	5.34E-04
TSP emissions (ton) =	2.27E-01

Emission Calculations:

PM-10 emission factor (lb/ton) =	2.53E-04
PM-10 emissions (ton) =	1.07E-01

**Grader (AP- 42, Table 11.9-2)**

Emission Factor Equation: TSP EF = 0.040\*(S)<sup>2.5</sup>, lb/VMT

PM-10 EF = 0.60\*[ 0.051\*(S)<sup>2.0</sup>], lb/VMT

Inputs/Assumptions:

$S$ , average vehicle speed (mph)	5
$n$ , number of graders =	2
$x$ , operating days per year =	260
$RT$ , miles traveled per day per g	20
VMT, vehicle miles traveled per	1.04E+04
--> $VMT = n \cdot x \cdot RT$	-----

\* Items in bolded red font must be input specifically for each project. (Note: VMT is calculated.)

Emission Calculations:

TSP emission factor (lb/VMT) =	2.24E+00
TSP emissions (ton) =	1.16E+01

PM-10 emission factor (lb/VMT) =	7.65E-01
PM-10 emissions (ton) =	3.98E+00

Excavation w/Backhoe (AP-42, Table 11.9-2) - excavation of the clean fill soil site.

$$\text{TSP EF} = [0.0021 \cdot (d)^{1.1}] / [(M)^{0.3}], \text{ lb/yd}^3$$

Emission Factor Equations:  $\text{PM-10 EF} = 0.75 \cdot [0.0021 \cdot (d)^{0.7}] / [(M)^{0.3}], \text{ lb/yd}^3$

Inputs/Assumptions: d, drop height (ft) = 5  
M, moisture content (%) = 10  
**V, volume of soil excavated (yd) = 268500**

\* Items in regular black font are given or are used consistently site-wide and do not generally change from project to project. Items in bolded red font must be input specifically for each project.

Emission Calculations: **TSP emission factor (lb/yd<sup>3</sup>) = 6.18E-03**  
**TSP emissions (ton) = 8.30E-01**

**PM-10 emission factor (lb/yd<sup>3</sup>) = 2.44E-03**  
**PM-10 emissions (ton) = 3.27E-01**

Bulldozer (AP-42, Table 11.9-2) (Pushing Soil)

Emission Factor Equations:  $\text{TSP EF} = 5.7 \cdot [(s)^{1.2}] / [(M)^{1.3}], \text{ lb/hr}$

$$\text{PM-10 EF} = 0.75 \cdot [1.0 \cdot (s)^{1.5}] / [(M)^{1.4}], \text{ lb/hr}$$

Inputs/Assumptions: s, material silt content (%) = 8  
M, moisture content (%) = 10  
**Hours of Operation per Day = 6**  
**Days of Operation per Week = 5**  
**Weeks of Operation per Year = 52**

\* Items in regular black font are given or are used consistently site-wide and do not generally change from project to project. Items in bolded red font must be input specifically for each project.

Emission Calculations: **TSP emission factor (lb/hr) = 3.46E+00**  
**TSP emissions (ton) = 2.70E+00**

**PM-10 emission factor (lb/hr) = 6.76E-01**  
**PM-10 emissions (ton) = 5.27E-01**

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Total Project Emissions:	<u>TSP</u>	<u>PM-10</u>
Unpaved Roads -	2.62E+01 tpy TSP	6.67E+00 tpy PM10
Soil Handling -	2.27E-01 tpy TSP	1.07E-01 tpy PM10
Graders -	1.16E+01 tpy TSP	3.98E+00 tpy PM10
Backhoe -	8.30E-01 tpy TSP	3.27E-01 tpy PM10
Bulldozer -	2.70E+00 tpy TSP	5.27E-01 tpy PM10
<b>Total</b>	<u>4.15E+01 tpy TSP</u>	<u>1.16E+01 tpy PM10</u>