HAND DELIVERED

HANSEN ALLEN & LUCE INC
ENGINEERS

JAN 18 2011

UTAH DIVISION OF
SOLID & HAZARDOUS WASTE
2011.00105

SALT LAKE AREA OFFICE
6771 SOUTH 900 EAST
MIDVALE, UTAH 84047
PHONE: (801) 566-5599
FAX: (801) 566-5581
www.hansenallenluce.com

January 18, 2011

Phillip Burns
Utah Department of Environmental Quality
Division of Solid and Hazardous Waste
288 North 1460 West
P.O. Box 144880
Salt Lake City, Utah 84114-4880

RE: Weber County Class VI C&D Landfill Permit Application

Mr. Burns:

At the direction of Weber County and Moulding and Sons Landfill LLC, we have altered the approved Class IVb landill application to apply for a Class VI landfill permit. We are delivering two copies of the application for Class VI C & D Landfill permit for review. The item of most interest to you will be the Proven Market Analysis located directly after the table of contents on page 1.

Please contact us with any questions or concerns you might have.

Sincerely,

HANSEN, ALLEN & LUCE, INC.

Gordon L. Jones, P.E.
Project Engineer

2 Copies of Weber County Application for Class VI C & D Landfill Permit

39805

WEBER COUNTY CORP

HAND DELIVERED

JAN 18 2011

UTAH DIVISION OF
SOLID & HAZARDOUS WASTE
2011.00105

WEBER COUNTY C & D LANDFILL

APPLICATION FOR
CLASS VI
C&D LANDFILL PERMIT

PROFESSIONAL ENGINEER
GORDON L. JONES
No 5048470-2202
1/13/11
STATE OF UTAH

Prepared by

HANSEN, ALLEN & LUCE, INC
Consulting Engineers
6771 South 900 East
Midvale, Utah 84047
(801) 566-5599

January 2011

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WEBER COUNTY
CONSTRUCTION AND DEMOLITION LANDFILL
DESIGN ENGINEERING REPORT

Prepared by

Hansen, Allen & Luce, Inc
Consulting Engineers
6771 South 900 East
Midvale, Utah 84047

EXHIBIT B

QUIT CLAIM DEED
C2008-227 REAL ESTATE PURCHASE AGREEMENT
C2008-228 LANDFILL OPERATING AND MANAGEMENT AGREEMENT

EXHIBIT C

A CULTURAL RESOURCE INVENTORY OF A PROPOSED LANDFILL NEAR LITTLE MOUNTAIN WEBER COUNTY, UTAH

Prepared by

Sagebrush Consultants, LLC
3670 Quincy Avenue, Suite 203
Ogden, Utah 84403

EXHIBIT D

PROPERTY OWNER NOTIFICATION LETTERS - ORIGINAL PERMIT APPLICATION JANUARY 2009

EXHIBIT E

U S ARMY CORPS OF ENGINEERS WETLAND DETERMINATION DOCUMENTS

EXHIBIT F

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STORM WATER DISCHARGE PERMIT

EXHIBIT I

FINANCIAL ASSURANCE CALCULATIONS

WEBER COUNTY CORP

WEBER COUNTY C & D LANDFILL

PROVEN MARKET ANALYSIS
INFORMATION

UCA
TITLE 19 CHAPTER 6

SECTION 108(10)

UCA
Title 19 Chapter 6
Section 108(10)

A Evidence that the proposed commercial facility has a proven market

In 1990, Moulding & Sons Sand and Gravel, LLC received approval to operate a commercial C&D landfill south of 21st Street in Weber County This facility operated as a privately owned commercial facility for 20 years and was designed to hold approximately 2 million tons of C&D waste This commercial facility was closed in September of 2008, leaving no commercial C&D facility within Weber County As a result, much of the C&D material was shipped to the Weber County Transfer Station at a charge of $30/ton In a year when most waste streams throughout Utah were declining because of the economic down turn, Weber County's waste stream increased 20,000 tons It is estimated that the total impact from C&D waste was approximately 40,000 tons Since the down turn in the economy has affected C&D waste as much as or more than the MSW waste stream, it is estimated that the typical annual need for C&D waste would vary between 50,000 to 80,000 tons for Weber County alone The Moulding and Sons C&D landfill received waste from Weber, Davis, Morgan and Box Elder counties

The Market for C&D waste has been established by the Moulding facility over the past 20 years in Weber County C&D material waste flow changes depending on economic conditions It is directly related to the amount of new construction going on in the community Over the 20-year period the Moulding facility was in operation (i e approximately from 1989 through 2008), the average annual waste flow was around 100,000 tons More recently, with the advent of the LEEDS program more and more contractors are sorting material on site and sending concrete and metal for recycling, but there is still a significant need in Weber County and the surrounding counties for C&D disposal

There are no other commercial C&D landfills within Weber, Davis, Box Elder, or Morgan counties The only public C&D landfill within Weber County is the Weber County C&D Landfill Currently the closest alternative facilities are the Box Elder County Landfill in Box Elder County and the Wasatch Integrated Waste Landfill in Davis County, both of which are Class I MSW facilities The current fees for the Box Elder County Landfill and the Wasatch Integrated Waste Landfill are $26 50/ton and $26 00/ton, respectively

(b) Description of the public benefits

The need for a commercial C&D facility in Weber County is simple It is a better use of resources at a lower cost The Weber County C&D Landfill offers a lower cost alternative to the MSW facilities located in the area The current fees for the Box Elder County Landfill and the Wasatch Integrated Waste Landfill are $26 50/ton and $26 00/ton, respectively The current fee for the Weber County Transfer Station is $30 00/ton The price at the gate of the new Weber County C&D Landfill facility is less than $15 00/ton, which is less than 50 to 58% of the disposal fees at the MSW facilities The C&D landfill charges are based on the size and type of vehicle Thus, the Weber County C&D Landfill is a good alternative for entities within Weber County and surrounding counties for disposal of C&D wastes

Use of the Weber County C&D Landfill would also preserve waste capacity in the MSW landfills in Davis and Box Elder Counties Davis County officials have expressed concern that the Davis County Landfill is filling much faster than they would like Thus, they have entered into a contract with Weber County to use the Weber County C&D Landfill for C&D wastes The same would apply to the Box Elder County Landfill as well Changing the Weber County C&D Landfill to a commercial facility would allow other entities within Morgan and Box Elder counties to use the Weber County facility without requinng individual agreements with those entities

An additional benefit of the Weber County C&D Landfill has been to alleviate negative impacts on their municipal solid waste system C&D waste has had three negative impacts on Weber County's Solid waste system transfer station The first is safety The typical 40 foot end dump trucks that are used in transporting much of the C&D waste are not designed for use in a crowded transfer station In some areas of the building they can reach as high as some of the air ducts and signage They are very unstable when fully extended and could be a danger to themselves, employees, and the other visitors of the facility The second concern is the wear and tear on the facility itself The transfer station has a concrete floor where garbage is dumped but the nature of C&D material is heavier and more abrasive than other loads This causes excessive wear on the floor Since the opening of the transfer station, there are areas that have worn down as much as five inches The third impact is reduced capacity Often this type of matenal is transported via "side-dump" trailers These vehicles take four or five bays in the transfer station to dump their matenal Dunng busy times many of the other customers must wait in queue while the C&D matenal is being dumped On busy days at the transfer station as much as 1200 tons of waste is shipped to the landfill The building design capacity is 1,000 tons per day

The Weber County C&D Landfill will not at the current time focus on energy recovery, nor will it permit dumping of any hazardous matenal

(c) Compliance history of an owner or operator of a proposed commercial nonhazardous solid or hazardous waste treatment, storage, or disposal facility

The two entities involved in this operation, namely Moulding and Sons Landfill, LLC , and Weber County have been in the waste management business since 1990 and 1966, respectively To our knowledge there have never been any major violations or deviation from polices of the State The track record for operations of this type of a facility has been stellar and would continue to provide cooperation and professionalism in the operations of this facility in the future

SECTION I

INTRODUCTION

Weber County is applying for a Class VI permit to construct and operate a construction and demolition landfill the "Weber County C & D Landfill", which is anticipated to receive waste from and is to be located within the boundaries of Weber County Utah This application for Class VI permit is submitted in accordance with the requirements of Rules R315-302, R315-303, R315-305, R315-309 and R315-310 of the Utah Solid Waste Permitting and Management Rules and the Utah Solid and Hazardous Waste Act (UCA 19-6-101 through 123)

SECTION II

PART I
UTAH CLASS VI
LANDFILL PERMIT APPLICATION FORM

The following pages consist of the completed Utah Class VI Landfill Permit Application Form

Utah Division of Solid and Hazardous Waste

Solid Waste Management Program

Mailing Address
P O Box 144880
Salt Lake City Utah 84114-4880

Office Location
288 North 1460 West
Salt Lake City Utah 84116

Phone (801) 538-6170
Fax (801) 538 6715
www deq utah gov

APPLICATION FOR A PERMIT TO OPERATE A CLASS IV OR VI LANDFILL

Please read the instructions that are found in the document, INSTRUCTIONS FOR APPLICATION FOR A PERMIT TO OPERATE A CLASS IV or VI LANDFILL This application form shall be used for all Class IV or VI solid waste disposal facility permits and modifications Part I, GENERAL INFORMATION must accompany a permit application Part II, APPLICATION CHECKLIST, is provided to assist applicants and, if included with the application, will assist review Please note the version date of this form found on the lower right of the page, if you have received this form more than six months after this date it is recommended you contact our office at (801) 538-6170 to determine if this form is still current When completed, please return this form and support documents, forms, drawings, and maps to

Dennis R Downs, Director
Division of Solid and Hazardous Waste
Utah Department of Environmental Quality
PO Box 144880
Salt Lake City, Utah 84114-4880

(Note When the application is determined to be complete, submittal of two copies of the complete application will be required)

Utah Class IV and VI Landfill Permit Application Form

Part I General Information APPLICANT PLEASE COMPLETE ALL SECTIONS.

I Landfill Type	☐ Class IVa ☐ Class IVb ☒ Class VI	**II Application Type**	☐ New Application ☐ Facility Expansion ☐ Renewal Application ☒ Modification

For Renewal Applications Facility Expansion Applications and Modifications Enter Current Permit Number ______

III Facility Name and Location

Legal Name of Facility Weber County C&D Landfill			
Site Address (street or directions to site) 10485 West 900 South			County Weber
City Ogden	State Utah	Zip Code 84404	Telephone
Township 6 North	Range 3 West	Section(s) 19	Quarter/Quarter Section ; Quarter Section Northwest
Main Gate Latitude degrees 41 minutes 14 seconds 55 0		Longitude degrees 112 minutes 13 seconds 50 3	

IV Facility Owner(s) Information

Legal Name of Facility Owner Weber County Corp			
Address (mailing) 867 West Wilson Lane			
City Ogden	State Utah	Zip Code 84401	Telephone (801) 399 8803

V Facility Operator(s) Information

Legal Name of Facility Operator Moulding & Sons Landfill LLC			
Address (mailing) 910 West 21st Street			
City Ogden	State Utah	Zip Code 84401	Telephone (801) 725 2722

VI Property Owner(s) Information

Legal Name of Property Owner Weber County Corp			
Address (mailing) 2380 S Washington Blvd			
City Ogden	State Utah	Zip Code 84401	Telephone (801) 399 8416

VII Contact Information

Owner Contact Gary C Laird		Title Weber County Director of Solid Waste	
Address (mailing) 867 West Wilson Lane			
City Ogden	State Utah	Zip Code 84401	Telephone (801) 399 8803
Email Address glaird@co weber ut us		Alternative Telephone (cell or other) (801) 399 8806	
Operator Contact Randy Moulding		Title	
Address (mailing) 910 West 21st Street			
City Ogden	State Utah	Zip Code 84401	Telephone (801) 725 2722
Email Address		Alternative Telephone (cell or other)	
Property Owner Contact Nate Pierce		Title Weber County Director of Operations	
Address (mailing) 444 24th Street			
City Ogden	State Utah	Zip Code 84401	Telephone (801) 625 3850
Email Address npierce@co weber ut us		Alternative Telephone (cell or other)	

Utah Class IV and VI Landfill Permit Application Form

Part I General Information (Continued)

VIII Waste Types (check all that apply)

☐ Landfill will accept all wastes allowed in Class IV or VI landfills Or landfill will accept only the following wastes

Waste Type	Combined Disposal Unit	Monofill Unit
☐ Construction & Demolition	☐	☐
☐ Tires	☐	☐
☐ Yard Waste	☐	☐
☐ Animals	☐	☐
☐ Contaminated Soil	☐	☐
☒ Other All Class VI Wastes	☒	☐

Note Disposal of dead animals must be approved by the Executive Secretary

IX Facility Area

Facility Area	110 7	acres
Disposal Area	98 5	acres
Design Capacity		
Years	50 est	
Cubic Yards	16 Million	
Tons	8 Million	

X Fee and Application Documents

Indicate Documents Attached To This Application ☐ Application Fee Amount $

☒ Facility Map or Maps ☒ Facility Legal Description ☒ Plan of Operation ☒ Waste Description
☒ Ground Water Report ☒ Closure Design ☒ Cost Estimates ☒ Financial Assurance

Class VI Special Requirements
☐ Documents required by UCA 19 6 108(9) and (10)

I HEREBY CERTIFY THAT THIS INFORMATION AND ALL ATTACHED PAGES ARE CORRECT AND COMPLETE

Signature	Title	Date
Signature of Authorized Owner Representative: Gary C Laird; Name typed or printed: Gary C Laird	Weber County - Director of Solid Waste; Address: 867 West Wilson Lane Ogden Utah 84401	1/14/11
Signature of Authorized Land Owner Representative (if applicable): Gary C Laird; Name typed or printed: Gary C Laird	Weber County Director of Solid Waste; Address: 867 West Wilson Lane Ogden Utah 84401	1/14/11
Signature of Authorized Operator Representative (if applicable): Randy Moulding; Name typed or printed: Randy Moulding	Moulding & Sons Landfill LLC President; Address: 910 West 21st Street Ogden Utah 84401	1-14-11

SECTION III

PART II
UTAH CLASS VI
PERMIT APPLICATION CHECKLIST

The following pages include the completed Utah Class VI Permit Application Checklist as obtained from Utah Division of Solid and Hazardous Waste The checklist includes reference to the locations in this permit application where each item required on the checklist is provided

Important Note The following checklist is for the permit application and addresses only the requirements of the Division of Solid and Hazardous Waste Other federal, state, or local agencies may have requirements that the facility must meet The applicant is responsible to be informed of, and meet, any applicable requirements Examples of these requirements may include obtaining a conditional use permit, a business license, or a storm water permit The applicant is reminded that obtaining a permit under the *Solid Waste Permitting and Management Rules* does not exempt the facility from these other requirements

An application for a permit to construct and operate a landfill is the documentation that the landfill will be located, designed, constructed, and operated to meet the requirements of Rules R315-305 of the *Utah Solid Waste Permitting and Management Rules* and the *Utah Solid and Hazardous Waste Act* (UCA 19-6-101 through 123) The application should be written to be understandable by regulatory agencies, landfill operators, and the general public The application should also be written so that the landfill operator, after reading it, will be able to operate the landfill according to the requirements with a minimum of additional training

Copies of the *Solid Waste Permitting and Management Rules*, the *Utah Solid and Hazardous Waste Act*, along with many other useful guidance documents can be obtained by contacting the Division of Solid and Hazardous Waste at 801-538-6170 Most of these documents are available on the Division's web page at www hazardouswaste utah gov Guidance documents can be found at the solid waste section portion of the web page

When the application is determined to be complete the original complete application and one copy of the complete application are required along with an electronic copy

Part II Application Checklist

I. Facility General Information	
Description of Item	Location In Document
Ia General Information - All Facilities	
Completed Part I General information form above	IV 1
General description of the facility (R315-310-3(1)(b))	IV 1
Legal description of property (R315-310-3(1)(c))	IV 2
Proof of ownership, lease agreement, or other mechanism (R315-310-3(1)(c))	IV 2
If the permit application is for a Class IV landfill, a demonstration that the landfill is not a commercial facility	Does Not Apply
Waste type and anticipated daily volume (R315-310-3(1)(d))	IV-2
Intended schedule of construction (R315-302-2(2)(a))	IV-3
Ib General Information - New Or Laterally Expanding Facilities	
Documentation that the Historical Survey requirements of R315-302-1(2)(f) have been met (R315-305-4(1)(b)(vi))	V-1
Name and address of all property owners within 1000 feet of the facility boundary (R315-310-3(2)(i))	V 1
Documentation that a notice of intent to apply for a permit has been sent to all property owners listed above (R315-310-3(2)(ii))	V 2

I Facility General Information	
Description of Item	Location In Document
Name of the local government with jurisdiction over the facility site (R315-310-3(2)(iii))	V 2
Ic Location Standards - New Or Laterally Expanding Class IVa Landfills (R315-305-4(1)(a))	
Land use compatibility	Does Not Apply
Maps showing the existing land use, topography, residences, parks, monuments, recreation areas or wilderness areas within 1000 feet of the site boundary	Does Not Apply
Certifications that no ecologically or scientifically significant areas or endangered species are present in site area	Does Not Apply
Maps showing the location of dwellings residential areas, other structures, and historic structures	Does Not Apply
List of airports within five miles of facility and distance to each	Does Not Apply
Geology	Does Not Apply
Geologic maps showing significant geologic features faults and unstable areas	Does Not Apply
Maps showing site soils	Does Not Apply
Surface water	Does Not Apply
Magnitude of 24 hour 25 year and 100 year storm events	Does Not Apply
Average annual rainfall	Does Not Apply
Maximum elevation of flood waters proximate to the facility	Does Not Apply
Maximum elevation of flood water from 100 year flood for waters proximate to the facility	Does Not Apply
Wetlands	Does Not Apply
Ground water	Does Not Apply
Id Location Standards - New Or Laterally Expanding Class IVb and VI Landfills	
Floodplains as specified in R315-302-1(2)(c)(ii) (R315-305-4(1)(b)(i))	VI 1
Wetlands as specified in R315-302-1(2)(d) (R315-305-4(1)(b)(ii))	VI 1
The landfill is located so that the lowest level of waste is at least ten feet above the historical high level of ground water (R315-305-4(1)(b)(iii))	VI 1
Geology as specified in R315-302-1(2)(b)(i) and (iv) (R315-305-4(1)(b)(iv))	VI 2
Ie Additional Location Standards - New Or Laterally Expanding Class IVb and VI Landfills Or Landfills Requesting That Dead Animals Be Added As A New Waste Stream (R315-305-4(1)(a)(v))	
Maps showing the existing land use topography, residences parks monuments recreation areas or wilderness areas within 1000 feet of the site boundary	VII 1

I Facility General Information	
Description of Item	Location In Document
Certifications that no ecologically or scientifically significant areas or endangered species are present in site area	VII 1
Maps showing the location of dwellings, residential areas other structures, and historic structures	VII 1
List of airports within five miles of facility and distance to each	VII 1
If Plan Of Operations - All Facilities (R315-310-3(1)(e) and R315-302-2(2))	
Description of on-site waste handling procedures and an example of the form that will be used to record the weights or volumes of waste received (R315-302-2(2)(b) And R315-310-3(1)(f))	VIII 1
Schedule for conducting inspections and monitoring and examples of the forms that will be used to record the results of the inspections and monitoring (R315-302-2(2)(c), R315-302-2(5)(a) and R315-310-3(1)(g))	VIII 2
Contingency plans in the event of a fire or explosion (R315-302-2(2)(d))	VIII 2
Plan to control fugitive dust generated from roads, construction, general operations and covering the waste (R315-302-2(2)(g))	VIII 3
Plan for letter control and collection (R315-302-2(2)(h))	VIII 3
Procedures for excluding the receipt of prohibited hazardous or PCB containing waste (R315-302-2(2)(j))	VIII 3
Procedures for controlling disease vectors (R315-302-2(2)(k))	VIII 4
A plan for alternative waste handling (R315-302-2(2)(l))	VIII 4
A general training and safety plan for site operations (R315-302-2(2)(o))	VIII 4
Any recycling programs planned at the facility (R315-303-4(6))	VIII 4
Any other site specific information pertaining to the plan of operation required by the Executive Secretary (R315-302-2(2)(o))	VIII 5
Ig Additional Plan Of Operation Requirements - Class IVa Facilities	
Corrective action programs to be initiated if ground water is contaminated (R315-302-2(2)(e))	Does Not Apply
II Facility Technical Information	
IIa Maps - All Facilities	
Topographic map drawn to the required scale with contours showing the boundaries of the landfill unit, ground water monitoring well locations, gas monitoring points and the borrow and fill areas (R315-310-4(2)(a)(i))	IX 1 and FIGURES
Most recent U S Geological Survey topographic map 7-1/2 minute series, showing the waste facility boundary the property boundary surface drainage channels, any existing utilities and structures within one-fourth mile of the site, and the direction of the prevailing winds (R315-310-4(2)(a)(ii))	IX 1 and FIGURES

I Facility General Information	
Description of Item	Location In Document
IIb Geohydrological Assessment - Class IVa Landfills (R315-310-4(2)(b))	
Local and regional geology and hydrology including faults, unstable slopes and subsidence areas on site (R315-310-4(2)(b)(i))	Does Not Apply
Evaluation of bedrock and soil types and properties including permeability rates (R315-310-4(2)(b)(ii))	Does Not Apply
Depth to ground water (R315-310-4(2)(b)(iii))	Does Not Apply
Quantity, location, and construction of any private or public wells on-site or within 2,000 feet of the facility boundary (R315-310-4(2)(b)(v))	Does Not Apply
Tabulation of all water rights for ground water and surface water on-site and within 2,000 feet of the facility boundary (R315-310-4(2)(b)(vi))	Does Not Apply
Identification and description of all surface waters on-site and within one mile of the facility boundary (R315-310-4(2)(b)(vii))	Does Not Apply
For an existing facility identification of impacts upon the ground water and surface water from leachate discharges (R315-310-4(2)(b)(viii))	Does Not Apply
Calculation of site water balance (R315-310-4(2)(b)(ix))	Does Not Apply
IIc Engineenng Report, Plans, Specifications, And Calculations - All Facilities	
Unit design to include cover design, fill methods, and elevation of final cover including plans and drawings signed and sealed by a professional engineer registered in the State of Utah, when required (R315-310-3(1)(b) and R315-310-4(2)(c)(iii))	X 1
Design and location of run-on and run-off control systems (R315-310-4(2)(c)(viii))	X 2
Anticipated facility life and the basis for calculating the facility's life (R315-310-4(2)(c)(ii))	X 2
Engineering reports required to meet the location standards of R315-305-4 including documentation of any demonstration or exemption made for any location standard (R315-310-4(2)(c)(i))	X 3
Identification of borrow sources for final cover (R315-310-4(2)(c)(iv))	X 3
Run-off collection, treatment and disposal and documentation to show that any treatment system is being or has been reviewed by the Division of Water Quality (R315-310-4(2)(c)(v) and R315-310-3(1)(i))	X 3
IId Closure Requirements - All Facilities	
CLOSURE PLAN (R315-310-3(1)(h))	XI 1
Closure schedule (R315-310-4(2)(d)(i))	XI 1
Design of final cover (R315-310-4(2)(c)(iii))	XI 1

I Facility General Information	
Description of Item	Location In Document
Capacity of site in volume and tonnage (R315-310-4(2)(d)(ii))	XI-1
Final inspection by regulatory agencies (R315-310-4(2)(d)(iii))	XI-I
IIe Post-Closure Requirements- All Facilities	
POST-CLOSURE CARE PLAN (R315-310-3(1)(h))	XII 1
Changes to record of title, land use, and zoning restrictions (R315-310-4(2)(e)(ii))	XII 1
Maintenance activities to maintain cover and run-on/run-off control systems (R315-310-4(2)(e)(iii))	XII 1
List the name, address, and telephone number of the person or office to contact about the facility during the post-closure care period (R315-310-4(2)(e)(vi))	XII 1
IIf Financial Assurance - All Facilities (R315-310-3(1)(j))	
Identification of closure costs including cost calculations (R315-310-4(2)(d)(iv))	XIII 1
Identification of post-closure care costs including cost calculations (R315-310-4(2)(e)(iv))	XIII 2
Identification of the financial assurance mechanism that meets the requirements of Rule R315-309 and the date that the mechanism will become effective (R315-309-1(1))	XIII 2

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SECTION IV

PART II
I FACILITY GENERAL INFORMATION

Io GENERAL INFORMATION - ALL FACILITIES

Completed Part I General information Form

The part I general information form is completed and is provided in Section I of this document

General description of the Facility (R315-310-3(1)(b))

The Weber County C & D Landfill will be located on approximately 110 7 acres of land located in the Northwest Quarter of Section 19, Township 6 North Range 3 West Salt Lake Base and Meridian Property owners surrounding the proposed landfill site include the U S Government (Air Force property) to the west, the Union Pacific Railroad and undeveloped land owned by Powder Mountain Group Holding LLC to the south, Bible Broadcasting Network Inc (on which a radio tower has been constructed) and undeveloped property owned by Joseph M Colosimo to the north and undeveloped property owned by Counterpoint Construction Company to the east The property is located along base of the south side of Little Mountain located in Weber County Sheet C 1 of the design drawings shows the general location of the site (Exhibit A Appendix 1)

Weber County land use zoning for the site and of the properties adjacent to the proposed landfill are designated as M 3 (heavy manufacturing) Since this will be a landfill owned by Weber County and allowed under zoning as a government use facility no zoning changes or conditional use permits will be required by Weber County The landfill site will be surrounded by a minimum 4 foot high security fence consisting of either a 5 strand barbed wire fence or a wire mesh field fence The fence will be either constructed in phases as landfill expansion occurs or may be constructed around the entire facility property at any time during the facility life

Site access will be from an existing asphalt road (900 South) located along the north side of the property with the entrance approximately 500 feet west of the east property line Weber County has assigned the street address of the facility as 10485 West 900 South A 6-foot high chain link fence will extend for minimum distance of 50 feet on each side of the site entrance with a gate that can be closed and locked auring hours the landfill is not open Access to the facility will be gated to inhibit unauthorized entrance when the landfill operator is not present

The landfill footprint will consist approximately 98 5 acres and the rest of the property will include storm drainage and operational facilities and site access roods The waste pile is designed to be approximately 180 to 200 feet heigh around the perimeter slopes and approaches 230 feet in height along the center ridge line

Benches are provided approximately every 50 feet of vertical height around the perimeter slopes to accommodate storm water management and structural stability The benches ore approximately 18 feet wide and provide a ditch depth of approximately 3 feet All benches provide a drainage slope toward the southeast corner of the waste pile where storm drainage inlet boxes and down drain piping will be installed to convey storm wafer off the landfill area Bench widths also provide access around the perimeter slopes for periodic inspection and maintenance

Three storm water management ponds are included in the design to provide storm water detention and to provide for water quality controls prior to discharging storm water off site The operations pond will collect storm water from the operations area and discharge the water into the upper east pond The upper east pond receives storm water from the operations pond from the areas of Little Mountain and the asphalt rood up-grodient from the facility, and from part of the lower east and north slope areas of the landfill, The southeast pond receives storm water from the upper east pond and from the remaining landfill area Discharge from the southeast pond will be off-site directly in line with a culvert that has been installed to direct storm water under the railroad and to the mud flats on the south side of the railroad Each detention pond is equipped with on outlet design that provides for skimming of oils and other materials that will collect on the surtoce of the water in the ponds

Legal description of property **(R315-310-3(1)(c))**

The legal description o f the property as provided on the Quit-Cloim Deed for Moulding Investments LLC and in a property purchase and landfill operating agreement between Moulding Investments LLC and Weber County located in Exhibit B

Proof of ownership, lease agreement, or other mechanism (R315-310-3(1)(c))

The proof of ownership is provided in the form of a Quit-Cloim Deed for Moulding Investments LLC and in a property purchase and landfill operations agreement between Moulding Investments LLC and Weber County located ond a purchase and operating agreement between Weber County and Moulding Investments LLC in Exhibit B The landfill will be operated by Moulding & Sons Landfill LLC under contract with Weber County

If the permit application is for a Class IV landfill, a demonstration that the landfill is not a commercial facility

The application is for a Class VI landfill

Waste type and anticipated doily volume (R315-310-3(1)(d))

The facility will be a Class VI construction and demolition landfill used for disposal of non-hazardous wastes as defined by R315-305-1and in accordance with the following waste types

- Construction/demolition waste
- Yard waste
- Inert waste

- Dead animals upon as approved by the Executive Secretary and upon meeting the requirements of R315-315-6 which provide for disposal, burial and cover requirements for dead animals
- Non-hazardous petroleum contaminated soils containing the following constituents below the following levels

    - Benzene, 0 03 mg/kg
    - Ethylbenzene 13 mg/kg
    - Toluene, 12 mg/kg and
    - Zylenes 200 mg/kg

- No wastes wastes will be accepted from a conditionally exempt small quantity generator of hazardous waste will be accepted

Anticipated daily volumes will include approximately 600 to 1000 tons per day depending on the time of year and the economic environment for construction and demolition projects

Intended **schedule** of **construction (R315-302-2(2)(a))**

Construction is anticipated to begin in early 2009 or immediately following issuance of the required permits from the Utah Division of Solid and Hazardous Waste and Weber County Planning and Zoning Initial construction will include the access rood installation of a mobile office for checking in waste deliveries and keeping records preparing the floor grades in the initial landfill operating area to provide sufficient air space to begin receipt of waste and installation of utilities needed tor the mobile office and tor construction and dust control water

Construction of the floor area will expand as needed to provide air space to meet operational needs as waste is received during the life of the facility Only earthwork construction will be required to provide the needed cuts ond fills to achieve o level that is at or above the floor design grades provided in the drawings In areas where fill is required to obtain design floor elevations inert imported till in the form of concrete masonry imported soils etc may be used in lieu of on-site soils for fill

SECTION V

PART II
I FACILITY GENERAL INFORMATION

Ib GENERAL INFORMATION - NEW OR LATERALLY EXPANDING FACILITIES

Documentation that Historical Survey requirements of R315-302-1(2)(f) hove been met (R315-305-4(1)(b)(vi))

A historical survey was completed by Sagebrush Consultants in June 2008 The report providing the results of the survey was submitted to the State Historic Preservation Officer in July 2008 and is provided Exhibit C of this permit application According to the report submitted there were two sites identified The report summarizes that 'the inventory resulted in the identification of one historic campsite 42WB445 and one rock quarry 42WB446 Due to their proximity to the Lucin Cutoff, as well as datable artifacts found at the campsite, it is highly likely that these two sites ore related to the construction of the cutoff Both sites were recommended eligible to the Notional Register of Historic Places due to their association with the significant historic site the Lucin Cutoff

The historic campsite which is within the existing 100-foot rood right-of-way will be preserved since it is off the landfill facility property, however the rock quarry area will be incorporated into the active landfill area

Nome and address of all property owners within 1000 feet of the facility boundary (R315-310-3(2)(I))

Fronk R Hol
150 East 200 North #P
Logon Utah 84321

Bible Broadcasting Network, Inc
8030 Arrowridge Blvd
Charlotte, North Carolina 28273

United States of America
Hill Air Force Base
Tim Stone AICP
Hill Air Force Base Community Planner
75 CEG/CEPP
7302 Wardleigh Rood
Hill AFB Utah 84056-5016

State of Utah
Division of Wildlife Resources
Attn Scott Walker - Habitat Manager
515 East 5300 South
Ogden, Utah 84405

Stonefield Inc
355 Boxington Way
Sparks, Nevada 89434

Union Pacific Railroad
1400 Douglas Street
Omaha, Nebraska 68179

Westinghouse Electric Company LLC
1330 Beuloh Road
Pittsburgh, Pennsylvania 15235

Counterpoint Construction Company, Inc
1598 North 352 West
Loyfon Utah 84040

Utah Department of Transportation
4501 South 2700 West
Mail Stop 141200
Salt Lake City, Utah 84114-1200

Documentation that a notice of intent to apply for a permit has been sent to all property owners listed above (R315-310-3(2)(ii))

Copies of all letters provided to the surrounding property owners at the time of the original permit application submitted in January of 2009 are included in Exhibit D

Name of the local government with jurisdiction over the facility site (R315-310-3(2)(iii))

Local government with jurisdiction over the facility is

Weber County
2380 Washington Blvd
Ogden, Utah 84401

SECTION VI

PART II
I FACILITY GENERAL INFORMATION

Id LOCATION STANDARDS - NEW OR LATERALLY EXPANDING CLASS IVb AND VI LANDFILLS (R315-305-4(1)(a))

Floodplains as specified in R315-302-1(2)(c)(ii) (R315-305-4(1)(b)(i))

Flood mopping showing the 100-yeor flood area in the proximity of the facility as obtained from the Federal Emergency Management Agency (FEMA) is found in Exhibit E

According to the Federal Emergency Management Agency (FEMA) flood plain mop for the area (Flood Insurance Rate Mop Weber County Utah and Incorporated Areas Panel 400 of 600 Map Number 49057C0400E Effective Dote December 16 2005) the subject property is not within the designated 100-yeor flood plain

The overage annual rainfall for the site is approximately 13 2 inches based on the Utah Climate Center climate summary table for the Bear River Boy Utah weather station

Magnitudes of the 100-yeor 24-hour and the 25-year 24-hour precipitation events of the facility ore 2 73 and 2 23 inches respectively based on the Point Precipitation Frequency Estimates from NOAA Atlas 14 (Exhibit A Appendix 4)

Wetlands as specified in R315-302-1(2)(d) (R315-305-4(1)(b)(ii))

A search was competed on the notional wetlands inventory web site (<u>www fws gov/nwi/</u>) and several potential wetlands were presented at the site A wetlands biologist certified by the Bountiful Army Corps of Engineers (COE) and a wetlands specialist from the COE Bountiful office a site visit on September 12 2008 According to the COE wetland specialist and based on criteria defined in a memorandum from the EPA and the Army Corps of Engineers entitled Clean Water Act Jurisdiction Following the U S Supreme Court's Decision in <u>Roponos v United States & Corobell v United States</u> doted June 2007 the determination for all wetlands located on the proposed landfill site is non-jurisdictional Based on conversations with COE personnel, documentation has been prepared from the COE Bountiful office classifying all wetlands at the proposed site as non-jurisdicfionol This documentation is to be included as Exhibit E

The landfill is located so that the lowest level of waste is at least ten feet above the historical high level of ground water (R315-305-4(1)(b)(iii))

The Owner requests o variance by the Executive Secretory to allow five feet of separation in lieu of the ten-foot separation requirement This request is based on the poor quality of ground wafer in the uppermost aquifer the inert nature of the waste materials that will be received, and the low permeability associated with the soils at the site

Two ground water samples were obtained from soil boring locations (B-4 and B-7) near the south or down-gradient side of the property Wafer quality analyses were completed on the two samples obtained by American West Analytical Laboratories Results of the laboratory analyses show TDS values of 29,000 mg/L and 23,000 mg/L in the samples obtained from B-4 and B-7, respectively (Exhibit A Appendix 3) Ground waters with TDS values over 10,000 mg/L are defined by the Utah Division of Water Quality as Class IV or Saline Ground Water

Laboratory permeability analyses were conducted on samples consisting of lean clay and the interloyered cloy and silt materials obtained at a depth of about 0 5 foot in TP-1 and at a depth of about 2 5 feet in TP-7 Results show the permeability of the lean clay to be 2 x 10 ^{6} cm/sec and the permeability of the interloyered cloy and silt to be 2 x 10 ^{7} cm/sec (Exhibit A Appendix 2 Page 5)

Geology as spe**cifie**d in **R315-302-**1**(2)**(b)(I) and (iv) **(R315-305-**4**(1)**(b)(iv))

The site is not located in a dam failure flood area, or above on underground mine a salt dome or a salt bed and is not located adjacent to features which could compromise the structural integrity of the facility There ore also no local soil conditions geolotic features or human made features that will compromise the integrity of the structural components of the facility

A letter from Applied Geotechnicol Engineering Consultants (AGEC) doted December 4 2008 (Exhibit A Appendix 2) provides a description of the regional and site geology the tectonic setting and geologic hazards Much of the text herein is directly from the AGEC letter

Regional Geology includes the Basin and Range physiographic province of the northeast end of the Great Salt Lake which is mode up of north/south elongated mountain blocks and valleys The area in and around the Great Salt lake was once occupied by a large lake known as Lake Bonneville during the Wisconsin Glacial Period of the Pleistocene Age The present-day Great Salt Lake is o remnant of ancient Lake Bonneville The stillstonds of Lake Bonneville formed benches along the Wasatch Front The highest level of Lake Bonneville is marked by a bench the Bonneville shoreline at approximate elevation 5200 feet The lake remained at this high level from approximately 17 000 to 15 0000 years before the present until it dropped approximately 350 feet6 during a catastrophic flood known as the Bonneville Flood Two lower stillstonds of Lake Bonneville are the Provo and Gilbert, which formed at approximate elevations of 4800 and 4250 feet respectively The lake has remained near its present-day level through most of Holocene time The elevation of the site is just above the historic high level of the Great Salt Lake

Site geology is associated withy the southnern end of Little Mountain which is a hill of exposed bedrock This bedrock was mapped as consisting of rock from the Perry Canyon Formation This bedrock is exposed along the north and west edges of the property and consists of diamictite and slate The diomictife in this area generally dips down toward the northwest of approximately 7 to 10 degrees Based on results of the subsurface investigation there is a significant amount of sand and clay which overlies the bedrock in most of the area planned for londfilling These soils consist of Lake Bonneville sediments which area interpreted to be both deep lake and near shore deposits

Tectonic setting of the site is near the eastern side of the Basin and Range physiographic province adjacent to the Wasatch mountains The Wasatch mountains ore bounded on the west by the Wasatch fault zone which extends approximately 240 miles from near Molod, Idaho to the vicinity of Fayette Utah Relatively recent fault movements of the Wasatch fault zone ore evidenced by offsets in Lake Bonneville sediments and more recent alluvial and colluvial deposits

The Wasatch fault zone is considered to be made up of several segments each segment acting relatively independently The site is located approximately 14 miles west of the Weber segment of the Wasatch fault zone There is another potentially active fault in the East Great Salt Lake fault which extends along the west side of Antelope Island and Promontory Point This fault is located approximately 11 miles to the southwest This is the closest known potentially active fault to the site Both of these faults show evidence of movement during the Holocenf time and thus, ore considered potentially active The Weber segment of the Wasatch fault zone is considered to potentially produce earthquakes as great as 7 2 moment magnitude and the east Great Salt Lake fault is considered to be able to produce a 6 9 moment magnitude earthquake

Geologic Hazards identified during the study which may affect the site are primarily limited strong earthquake ground shaking and the potential for liquefaction and possibly lateral spread Surface fault rupture rockfall landslide and debris flow ore not considered potential hazards at the site

SECTION VII

PART II
I FACILITY GENERAL INFORMATION

Ie ADDITIONAL LOCATION STANDARDS - NEW OR LATERALLY EXPANDING CLASS IVb AND VI LANDFILLS OR LANDFILLS REQUESTING THAT DEAD ANIMALS BE ADDED AS A NEW WASTE STREAM (R315-305-4(1)(A)(v))

Maps showing the existing land use, topography, residences, parks, monuments, recreation areas or wilderness areas within 1000 feet of the site boundary

Maps showing the existing land use topography, residences porks, monuments recreation areas or wilderness areas within 1000 feet of the site boundary are provided in the figures There ore no existing residences porks monuments recreation areas or wilderness areas within 1000 feet of the site boundary

Certifications that no ecologically or scientifically significant areas or endangered species are present in the site area

A letter received from the State of Utah Department of Natural Resources Division of Wildlife Resources dated October 16 2008 states that "The Utah Division of Wildlife Resources (UDWR) does not have records of occurrence for any threatened endangered or sensitive species within the project area or within a 1-mile radius The letter provided by the UDWR is included in Exhibit F

Mops showing the location of dwellings, residential areas, other structures, and historic structures

Mops showing the location of dwellings residential areas other structures and historic structures ore found in on otlached figure

List of airports within five miles of facility and distance to each

There ore no airports located within 5 miles of the facility as shown in the attached figures

SECTION VIII

PART II

I FACILITY GENERAL INFORMATION

II PLAN OF OPERATIONS - ALL FACILITIES (R315-310-3(1)(e) AND R315-302-2(2))

Description of On-Site Waste Handling procedures and an example of the form that will be used to record the weights or volumes of waste received (R315-302-2(2)(b) and R315-310-3(1)(f))

The landfill will be operated and managed by Moulding & Sons Landfill LLC (Moulding & Sons) under contract with Weber County (Landfill Owner) Moulding & Sons will be responsible to Weber County to operate and manage the landfill under the requirements and conditions of the landfill permits

Construction to expand the landfill area will occur as needed during the life of the landfill Documentation will be provided to the Utah Division of Solid and Hazardous Waste (DSHW) to demonstrate that the floor grades achieved are at or above the design grades presented in the drawings Disposal of non-inert waste materials (such as concrete, masonry fill soils, etc) in the newly constructed areas will only occur after approval to operate each completed area is provided by the Utah Division of Solid and Hazardous Waste It is expected that general site grading for the landfill expansion will be ongoing to meet soil cover operational needs

Handling procedures for C & D Waste will include checking in each truck load of waste material delivered to the landfill facility and either providing an estimated volume delivered with each load for conversion to tons received or by installation of scales and weighing each load of waste delivered The conversion factor to be used will be 0 50 tons per cubic yards in accordance with R315-302-2(4)(c)(ii) Daily waste delivery records will be kept on a form similar to or containing similar information to the form contained in Exhibit G

Trucks delivering inert waste consisting of concrete masonry non-contaminated soils etc will then be directed to either a location outside the landfill operational footprint for use as floor fill or operational cover materials or to location at or near the working waste disposal face Equipment operators will then place the inert waste materials as floor fill, in stockpiles to be used later as fill or cover materials, or as cover materials as needed for litter and vector control Slightly contaminated soils meeting the requirements established for Class **VI** wastes may be stockpiled in approved operational areas within the landfill footprint and used as waste cover materials

Trucks delivering non-inert waste materials that can-not be used as clean fill or operational covers will be directed to the landfill waste pile working face Equipment operators will then incorporate the waste materials into the working face or waste pile

Dead Animals delivered to the site wil be managed and disposed in a manner that will minimize odors and the attraction harborage, and propagation of insects rodents birds or other animals Dead animals will be disposed of 1) At base of the active working face and buried immediately with a minimum of two feet of other waste, 2) In a separate trench specifically designated to receive dead animals and covered with of least 6 inches of earth at the end of the working day the carcasses ore received Disposal at the base of the active working face and covering the carcasses with at least 2 feet of waste is the preferred method of disposal Trenches in which carcasses ore disposed shall receive a minimum intermediate soil cover of 12 inches if delivery of additional carcasses is expected to exceed 30 days

A 6-inch thick soil cover will be placed over wastes as required for litter and vector control and to reduce the potential of fire hazard A final 2-foot thick final cover will be placed above areas of the waste mound as final grades ore obtained

Schedule for conducting inspections and monitoring, and examples of the forms that will be used to record the results of the inspections and monitoring (R315-302-2(2)(c), R315-302-2(5)(a), and R315-310-3(1)(g))

The schedule of inspections and monitoring associated with the landfill facility to provide for proper operation and maintenance ore provided in Table VIII-1

TABLE VIII-1
INSPECTION SCHEDULE

Inspection Activity	Frequency
Access Road and Gate	Semi-Annuol
Security Fences	Semi-Annuol
Landfill Construction	At the time of each construction phase
Landfill Equipment	As recommended by Manufacturers
Storm Drainage Facilities	Quarterly
Final Closure Cover	Semi-Annuol
Post Closure	Semi-Annuol

Contingency plans in the event of a fire or explosion (R315-302-2(2)(d))

Fire hazard is reduced by soil cover materials placed on ignifoble waste during waste handling and placement In the event that fires do occur during operating hours the burning material will first be covered with on-site or other available soil material Small fires may be extinguished with tire extinguishers provided in the site vehicles by using on-site water available from designated water sources and/or by covering the fires with on-site or other available soils

Upon notification of a fire that con not be controlled using on-site equipment, a long blase (greater than 30 seconds) on a vehicle horn or on permanent site alarm equipment will be sounded and non-essential equipment will be shut down All site personnel will assemble outside the landfill entrance and the Weber Fire District will be notified All site personnel will be moved a safe distance from the area involved until the fire is safely controlled or extinguished The telephone number and location of the nearest fire station will be displayed near telephones located in the site office

Fires that occur during times that the landfill is closed will have additional time to spread and will therefore be more difficult to contain and control The landfill operator or manager may utilize site equipment to cover fires with soil and/or separate burning materials from the other waste materials and bury the burning materials with soil Otherwise the local fire deportment will be notified to assist in the efforts to control fires

Explosive gases are expected to be minimal due to the type of waste received (mostly being relatively inert) the dry nature of the waste entering the landfill and the dry climate and limited availability of moisture that can leach into the landfilled waste

Plan to control fugitive dust generated from roods, construction, general operations, and covering the waste **(R315-302-2(2)(g))**

Fugitive dust will be controlled by applying wafer, or by use of other dust treatment and control procedures to roods and other exposed surfaces where fugitive dust generation becomes a nuisance Fugitive dust and the control of fugitive dust will be routinely reviewed for compliance with Division of Air Quality regulations

Plan for litter control and collection **(R315-302-2(2)(h))**

Litter will be controlled by fencing and using soil cover as needed Although measures intended to control litter dispersal ore effective it is inevitable that litter collection will still be required There will be periods of time when wind conditions are very calm and litter will not be problematic However there will be occasions when winds will occur that will most likely scatter some litter around the property and onto surrounding properties When litter collection is necessary, the facility will hire laborers to pick up scattered litter around the facility and surrounding properties

Procedures for excluding the receipt of prohibited hazardous or PCB containing waste **(R315-302-2(2)(j))**

The landfill will be operated as a non-hazardous solid waste facility and will accept only waste defined in for Class VI landfill disposal Landfill operators and waste handling personnel will also be trained in identification and removal of hazardous and PCB containing wastes If hazardous and PCB containing wastes ore observed during delivery or disposal, these materials will be removed and sent back with the vehicle delivering the waste or arrangements will be mode for their proper handling and disposal The landfill manager will hove ultimate authority and responsibility for decisions regarding acceptance or rejection of waste materials

Procedures for controlling disease vectors (R315-302-2(2)(k))

Six inches of soil thickness will be placed over wastes materials that may attract vectors Waste materials expected to attract vectors primarily include wet or green wastes, including yard wastes

A plan for alternative waste handling (R315-302-2(2)(l))

In the event of on emergency areas of the facility other than the active disposal areas may be used to receive waste (for disposal or temporary storage), but only if such areas are available If no such areas ore available during on emergency waste receipt will be temporarily halted until such areas can be mode available for disposal or storage and waste in transit will be directed elsewhere

A general training and safety plan for site operations (R315-302-2(2)(o))

Employee health and safety and maintaining environmental quality are important to Weber County and to Moulding & Sons in the operation of the facility Each person employed at the landfill will be trained to have a working knowledge of basic health safety and emergency response procedures for the facility Those employed to handle waste materials will be trained with basic maintenance and operational procedures to ovoid endangerment of human health and safety and to protect the quality of the environmental Those employed to operate equipment will receive training for the proper operation core and maintenance of the equipment to which they ore assigned

A facility training program will be implement through on-the-job supervision and training and through formal classroom training as needed by individuals qualified to provide the training The facility training program will be directed by the facility manager or a designated trainer Initial training will be completed within the first two months ot employment followed by annual reviews and by regular and special training meetings scheduled as needed

Any recycling programs planned at the facility (R315-303-4(6))

Delivery of waste will primarily be from demolition and building contractors and is expected to hove only limited use by the general public General contractors will be encouraged to segregate recyclable materials at the job site and deliver the recyclable materials to individual recycling entities The general public will be encouraged to deliver waste materials to the Weber County transfer station where re-cycling options ore currently in place Weber County also currently operates a recycling program for green and wood type wastes

An area may be provided at the landfill facility immediately east of the operations area where recycling of wood or other wastes may occur There ore several entities in Weber County that provide recycling services for non-reinforced concrete materials It is expected that recyclable concrete materials will be delivered to those entities

Any other site specific information pertaining to the plan of operation required by the Executive Secretary (R315-302-2(2)(o))

The Executive Secretary may issue by permit additional site specific requirements that will become a port of the facility operating plan

SECTION IX

PART II
II FACILITY TECHNICAL INFORMATION

IIa MAPS - ALL FACILITIES

Topographic mop drawn to the required scale with contours showing the boundanes of the landfill unit, ground water monitoring well locations, gas monitoring points, and the borrow and fill areas (R315-310-4(2)(a)(I))

Topographic mopping is provided with the figures and as Sheet GW-1 in Exhibit A Appendix 1 Sheet GW 1 also provided ground water surface contours as generated from ground water measurements

Ground water monitoring is not anticipated due to the types of wastes that will be delivered to the landfill and the poor quality of ground water below the site

Landfill gas monitoring is not anticipated due to the types mostly inert nature of waste materials that will be delivered to the landfill

Borrow ond fill areas ore presented in Sheet C-2 in Exhibit A Appendix 1 This sheet presents existing and future contours associated with the floor grade of the landfill It is expected that oll fill materials will be obtained either on-site from cut areas presented to achieve design floor grades or from delivery of inert waste and soil materials Some borrowing of materials may also occur as needed from off-site sources or properties owned by Weber County

Most recent U S Geological Survey topographic mop, 7-1/2 minute senes, showing the waste facility boundary, the property boundary, surfoce drainage channels, any existing utilities and structures within one-fourth mile of the site, and the direction fo the prevailing winds (R315-310-4(2)(a)(ii)

The U S Geological Survey topographic mop is provided with the figures This map shows the direction ot the prevailing winds which are from the south direction

SECTION X

PART II
II FACILITY TECHNICAL INFORMATION

IIe ENGINEERING REPORT - PLANS, SPECIFICATIONS, AND CALCULATIONS - ALL FACILITIES

The complete engineering report including design drawings, o geotechnical and geological evaluation report and supporting design calculations is included in Exhibit A The following provides responses to specific items contained on the Application Checklist

Unit design to include cover design, fill methods, and elevation **of final cover** including **plans** and **drawings** signed **and** sealed **by a professional** engineer registered in the **State of Utah,** when required **(R315-310-3(1)(b) and R315-310-4(2)(c)(iii))**

The Weber County C & D Landfill will be located on approximately 110 7 acres of land located in the Northwest Quarter of Section 19, Township 6 North Range 3 West Salt Lake Base and Meridian Property owners surrounding the proposed landfill site include the U S Government (Air Force property) to the west the Union Pacific Railroad and undeveloped land owned by Powder Mountain Group Holding LLC to the south Bible Broadcasting Network, Inc (on which a radio tower has been constructed) and undeveloped property owned by Joseph M Colosimo to the north and undeveloped property owned by Counterpoint Construction Company to the east The property is located along base of the south side of Little Mountain located in Weber County Figure 1 shows the general location of the site

Weber County land use zoning for the site and of the properties adjacent to the proposed landfill ore designated as M-3 (heavy manufacturing) Since this will be a landfill owned by Weber County and allowed under zoning as o government use facility no zoning changes are required The landfill site will be surrounded by a minimum 4-foot high security fence consisting ot either a 5-strand barbed wire fence or a wire-mesh field fence The fence will be either constructed in phases as londfill expansion occurs or may be constructed around the entire facility property at any time during the facility life

Site access will be from on existing asphalt rood located along the north side of the property and approximately 500 feet west of the east property line Weber County has assigned the street address of the facility as 10485 West 900 South A 6-foot high chain link fence will extend for 50 feet on each side of the site entrance with a locking security gate at the facility entrance Access to the facility will be gated to inhibit unauthorized entrance when the landfill operator is not present

The landfill footprint will consist approximately 98 5 acres and the rest of the property will include storm drainage and operational facilities and site access roads The waste pile is designed to be approximately 180 to 200 feet heigh around the perimeter slopes and approaches 230 feet in height along the center ridge line

Benches ore provided approximately every 50 feet of vertical height around the perimeter slopes to accommodate storm water management and structural stability The benches ore approximately 18 feet wide and provide a ditch depth of approximately 3 feet All benches slope toward the southeast corner of the waste pile where storm drainage inlet boxes and down drain piping will be installed fo convey storm water off the landfill area Bench widths also provide access around the perimeter slopes for periodic inspection and maintenance

Three storm water management ponds ore included in the design to provide storm water detention and to provide for water quality controls prior to discharging storm water off site The operations pond will collect storm water from the operations area and discharge the water into the upper east pond The upper east pond receives storm wafer from the operations pond, from the areas of Little Mountain the asphalt rood along the north side of the facility, and from port of the lower east and north slope areas of the landfill The southeast pond receives storm water from the upper east pond and from the remaining landfill area Discharge from the southeast pond will be off-site directly in line with a culvert that has been installed to direct storm water under the railroad and to the mud flats on the south side of the railroad Each detention pond is equipped with on outlet design that provides for skimming of oils and other materials that may collect on the surtace of the water in the ponds

Design and location of run-on and run-off control systems **(R315-310-4(2)(c)(viii))**

Run-on Control System design includes control and proper conveyance of storm water that may enter the facility from up-gradient lands Run-on is expected primarily from Little Mountain and the asphalt rood north of the proposed facility The run-on control system is designed to control storm wafer flows from o 100 year 24-hour storm event, which exceeds the regulatory requirements of designing the systems based on the 25-year event, and to route the storm water around the active landfill area

Storm water from Little Mountain currently collects in a ditch system located on the north side of the asphalt rood north of the proposed facility The ditch system north of the facility conveys the storm water to three culverts that currently discharge storm water toward the facility property A ditch will be constructed within the road right-of-way along the north side of the property to convey storm water discharged from the culverts toward the east and down the east side of the facility to the upper east detention pond The storm water design drawings calculations and supporting information are found in Exhibit A

Run-off Control Systems include 1} Control and containment of potentially contaminated storm water from active and open areas of the landfill where storm water may come in direct contact with waste material, and 2} Control and discharge of clean storm water that is generated from areas of the waste mound covered with clean soil and final cover soils

Anticipated facility life and the basis for calculating the facility's life **(R315-310-4(2)(c)(ii))**

Anticipated facility life is approximately 50 years based on a total air space of 16 million cubic yards, approximately 1 6 million cubic yards of cover soil which reduces the waste capacity to about 14 4 million cubic yards and receipt of between 250,000 and 300 000 cubic yards of waste annually

Engineering reports required to meet the location standards of R315-305-4 including documentation of any demonstration or exemption mode for any location standard (R315-310-4(2)(c)(i))

Compliance with the location standards is presented in Section VI starting on page VI-1 of this permit application

Identification of borrow sources for final cover (R315-310-4(2)(c)(iv))

Final cover will be obtained from on-site soils stockpiled during excavations to obtain floor grades clean soils delivered to the site as waste from construction excavations, and from weber county properties that are near the facility Weber county currently owns undeveloped property approximately 1 mile to the west of the facility that is designated for recreational purposes Soils may be obtained from this property to establish site grading needed for the recreational property and to meet closure needs It is anticipated that all clean soils delivered to the site will be stockpiled for future closure, or will be placed directly on exterior and top slopes during waste placement where the waste mound has reached final grade

Run-off collection, treatment, and disposal and documentation to show that any treatment system is being or has been reviewed by the Division of Water Quality (R315-310-4(2)(c)(v) and R315-310-3(1)(l))

All runoff that comes into direct contact with waste will be completely contained within the landfill footprint by either placing a berm around a containment area on the landfill floor or by placing a berm or excavating a containment pond area on the waste material The capacity of all runoff containment facilities will be 0 13 acre-foot per acre of exposed waste as provided in the design engineering report in Exhibit A This will provide sufficient capacity to contain runoff from the 100-year 24 hour precipitation event

Potentially contaminated water contained within the landfill footprint will be used for dust control on the waste materials Since evaporation for exceeds the potential precipitation rote run-off water will be lost to evaporation from the containment areas and during dust control activities

Since direct runoff from exposed waste areas will be contained within the landfill footprint, there will be no treatment and disposal associated with the run-off water Therefore, there are no treatment and disposal systems proposed for review

The site is provided with a Storm Water Pollution Prevention Plan (SWPP Plan) and has been issued a storm water discharge permit for initial construction activities The SWPP Plan which will be modified and updated as needed and the storm water discharge permit is included in Exhibit H An SWPP Plan will be completed for the site and on application will be mode for a Multi-Sector General Permit (MSGP) for storm water discharges associated with industrial activities prior to facility operation

SECTION XI

PART II
II FACILITY TECHNICAL INFORMATION

IId CLOSURE REQUIREMENTS - ALL FACILITIES

Closure Plan (R315-310-3(1)(h))

Final closure activities will occur in phases as portions of the waste pile reach design elevations It is expected that perimeter side slopes will be closed with each completed lift between perimeter benches Notification will be provided to the Utah Division of Solid and Hazardous Waste (Executive Secretary) of closure schedules 60 days prior to closing areas of the landfill Closed areas will be seeded to promote new growth and minimize erosion

Closure Schedule (R315-310-4(2)(d)(i))

Final closure activities at the landfill will commence within 30 days after final placement of waste at the facility and shall be completed within 180 days

Design of Final Cover (R315-310-4(2)(c)(iii))

Design of the final cover system is provided in the design drawings in Exhibit A, Appendix 1

Capacity of Site in Volume and Tonnage (R315-310-4(2)(d)(ii))

Site capacity is approximately 16 million cubic yards which is approximately 8 million cubic yards using the conversion factor of 0 5 ton per cubic yard

Final Inspection by Regulatory Agencies (R315-310-4(2)(d)(iii))

A final Inspection will be scheduled with the regulatory agencies upon closure of any part of the facility and upon final closure of the facility Certification will be provided by the owner and/or operator of the facility of any closed areas

SECTION XII

PART II

II FACILITY TECHNICAL INFORMATION

IIe POST-CLOSURE REQUIREMENTS - ALL FACILITIES

Post-Closure Core Plan (R315-310-3(1)(h))

Post-closure core will include semi-onnuol inspections of the facility fences storm drainage systems areas of excessive settlement that may adversely affect storm drainage, and closure cover A report will be generated for each inspection conducted during the post-closure care period The report will include areas requiring repair and maintenance

Post closure maintenance will include repairing fences and gates cleaning and repair of storm drainage facilities repair of places of excessive erosion, and re-seeding as required

Changes to Record of Title, Land Use, and Zoning Restrictions (R315-310-4(2)(e)(ii))

Plots and a statement of fact concerning the location of the disposal site shall be recorded as port of the record of title with the county recorder within 60 days offer certification of final closure

Maintenance Activities to Maintain Cover and Run-on/Run-off Control Systems (R315-310-4(2)(e)(iii))

Maintenance activities include repairing fences and gates cleaning and repair of storm drainage facilities repair of places of excessive erosion and re-seeding as required based on findings during the semi-annual inspections

List the Nome, Address, and Telephone Number of the Person or Office to Contact About the Facility During the Post-Closure Care Period (R315-310-4(2)(e)(vi))

Contact information is provided below

Weber County C&D Landfill
867 West Wilson Lone
Ogden Utah 84401
801-399 8803

SECTION XIII

PART II
II FACILITY TECHNICAL INFORMATION

IIf FINANCIAL ASSURANCE - ALL FACILITIES
(R315-310-3(1)(j))

Identification of closure costs including cost calculations (R315-310-4(2)(d)(iv)

A summary of the closure cost calculations ore presented Table XIII-1 - Summary of Estimated Closure Costs Closure cost calculations were based on the cost of closing the entire site including demolition placement of closure cover, and installation of storm drainage facilities The costs were then averaged over the entire landfill footprint area fo obtain an estimated closure cost per acre of open area and by the landfill air space to obtain closure cost per cubic yard of oir space Obtaining on overage cost per acre of landfill footprint allows estimates to be made and updated annually based on the amount of ore constructed and operating Supporting closure cost calculations and supporting documentation is included in Exhibit I

Table XIII-1
Summary of Estimated Closure Costs

Task/Service	**Units**	**Quantity**	**Unit Cost**	**2009 Task Cost**
Earthwork Construction				
Closure Soil Placement	CY	360 313	$4 28	$1 542 140
Erosion Control	Acres	112	$1,038 89	$116 356
Demolition	LS	1	$61 317 00	$61 317
Storm Drainage Control	LS	1	$33 354 00	$33,354
Subtotal				**$1,755,175**
Technical & Professional Services	LS	1	$70,113 00	$70 113
Contingency (% of construction)		10%		$175 518
Total				**$2,000,806**
Cost Per Acre	acres	**100 5**	**$19,909**	
Cost Per Cubic Yard of Capacity	**CY**	**16,000,000**	**$0 13**	

Identification of post-closure care costs including cost calculations (R315-310-4(2)(e)(iv))

A summary of post-closure cost calculations are presented in Table XIII-2 - Summary of Estimated Post-Closure Costs Post-closure cost calculations were based on the cost per year including inspections and maintenance The costs were then averaged over the entire landfill footprint area fo obtain on estimated post-closure cost per acre of open area and by the landfill air space fo obtain post-closure cost per cubic yard of air space Obtaining an average cost per acre of landfill footprint allows estimates fo be made and updated annually based on the amount of are constructed and operating Supporting post-closure cost calculations and supporting documentation is included in Exhibit I

Table XIII-2
Summary of Estimated Post-Closure Costs

Task/Service	Quantity	Units	Unit Cost	2008 Task Cost
Post Closure Inspections	30	Yr	$2 400	$72 000
Repair/Maintain Cover	30	Yr	$11,264	$337,920
Subtotal				**$409,920**
Contingency (% of Cost)	1	LS	10%	$40,992
Total				**$491,904**
Cost Per Acre	acres	**100 5**	**$4,895**	
Cost Per Cubic Yard of Capacity	**CY**	**16,000,000**	**$0 03**	

Notes

1 Time of post-closure care may be reduced based on site stabilization with DEQ approval

Identification of the financial assurance mechanism that meets the requirements of **Rule R-315-309** and the dote that the mechanism will **become** effective **(R315-309-1(1))**

Weber County proposes to use the local government financial test as provided in R315-309-8 The local government test will be completed with required information prior to the landfill receiving waste

FIGURES

FILE NAME:333-Moulding\01.100 - 08 Weber Co LF\ENG\Permit Application\Figures - Revised for Commercial Permit\General Location.mxd FILE DATE:01-12-2011

HANSEN ALLEN & LUCE inc
ENGINEERS

WEBER COUNTY CLASS VI C & D LANDFILL
GENERAL LOCATION

FIGURE
1

FILE NAME:333-Moulding\01.100 - 08 Weber Co LF\ENG\Permit Application\Figures - Revised for Commercial Permit\100 Year Flood Plain.mxd FILE DATE:01-12-2011

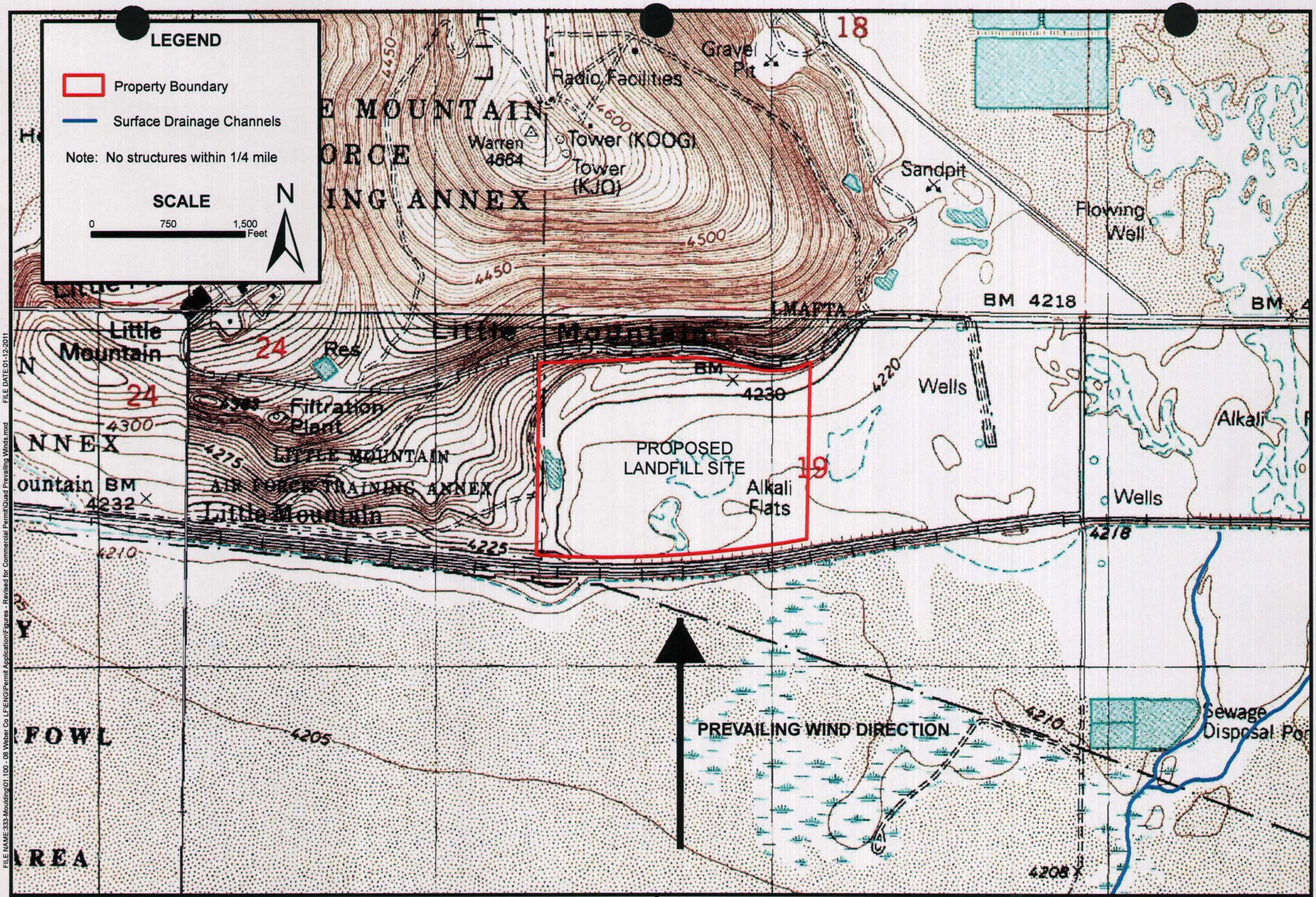
HANSEN ALLEN & LUCE inc ENGINEERS	WEBER COUNTY CLASS VI C & D LANDFILL	R315-302-1(2)(c)) Floodplains. No new or existing facility shall be located in a floodplain.	FIGURE 2

FILE NAME:333-Moulding\01.100 - 08 Weber Co LF\ENG\Permit Application\Figures - Revised for Commercial Permit\Wetlands.mxd FILE DATE:01-12-2011

HANSEN ALLEN & LUCE inc ENGINEERS	WEBER COUNTY CLASS VI C & D LANDFILL WETLANDS MAP	R315-302-1(2)(d)) Wetlands. No new facility or lateral expansion of an existing facility shall be located in wetlands.	FIGURE 3

FILE NAME:333-Moulding\01.100 - 08 Weber Co LF\ENG\Permit Application\Figures - Revised for Commercial Permit\Land Use - etc .mxd FILE DATE:01-12-2011

HANSEN ALLEN & LUCE inc ENGINEERS	WEBER COUNTY CLASS VI C & D LANDFILL GENERAL LOCATION REQUIREMENTS	R315-302-2 (a) No Residental Areas, Dwellings, Parks, Monuments, Historic Structures, Recreation Areas, or Wilderness Areas are located within the extents shown on this figure.	FIGURE 4



FILE NAME:333-Moulding\01.100 - 08 Weber Co LF\ENG\Permit Application\Figures - Revised for Commercial Permit\Quad Prevailing Winds.mxd FILE DATE:01-12-2011

HANSEN ALLEN & LUCE inc ENGINEERS

WEBER COUNTY CLASS VI C & D LANDFILL
QUAD MAP WITH PREVAILING WINDS

R315-310-4(2)(a)(ii)

Prevailing wind direction measured at the Ogden Airport is directly south. Wind data was provided by the Western Regional Climate Center website at www.wrcc.dri.edu/htmlfiles/westwinddir.html

FIGURE 5

EXHIBIT A

WEBER COUNTY

CONSTRUCTION AND DEMOLITION LANDFILL

DESIGN ENGINEERING REPORT

Prepared by

Hansen, Allen & Luce, Inc
Consulting Engineers
6771 South 900 East
Midvale, Utah 84047

January 2009

WEBER COUNTY

CLASS VI C & D LANDFILL PERMIT
DESIGN ENGINEERING REPORT

PROFESSIONAL ENGINEER
GORDON L. JONES
No. 5040470-2202
1/13/11
STATE OF UTAH

Project Engineer

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January 2009
Revised January 2011

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CHAPTER I

INTRODUCTION

Hansen Allen & Luce, Inc was retained to provide engineering design services for a proposed Construction and Demolition (C&D) landfill to be located on approximately 110 7 acres of land located in the Northwest Quarter of Section 19 Township 6 North Range 3 West, Salt Lake Base and Meridian The property for the landfill has an address of 10485 West 900 South and is located between the base of the south side of Little Mountain in Weber County and the Union Pacific Railroad line as presented on Sheet C-1 of the attached drawings

The proposed landfill and property will be owned by Weber County and will be operated by Moulding and Sons Landfill LLC under contract with Weber County

The overall facility will consist of a C&D landfill with an air space capacity of about 16 million cubic yards (8 million tons) a future green waste recycling area storm water control facilities and operational facilities consisting of an office and a future shop This report provides design related information for permit approval of the C&D landfill by the Utah Division of Solid and Hazardous Waste according to the requirements of the Utah Administrative Code for a Class VI C&D Landfill Weber County planning and zoning will provide review and approval of the design associated with the operational facilities (entrance office shop utilities etc) Design information associated with these facilities ore therefore not included in this report and are only presented as conceptual in the drawings

This report provides general information location standards compatibility and ground water information Also presented herein is information associated with landfill landfill closure and storm water management systems design

CHAPTER II

GENERAL INFORMATION

ACCESS

The proposed landfill is to be located in an M-3 (heavy manufacturing) zone within an unincorporated area of Weber County Primarily access to the proposed facility is along 900 South which is a main artery to access developments within the M-3 zone An access drive will be constructed into the facility approximately 500 feet west of the east property line for the landfill site A gate will be installed at the entrance that can be closed and locked to provide access security during non-operating hours A 6-foot high chain link fence will be installed for a minimum distance of 50 feet on either side of the gate

SIGN

A sign will be installed at the facility entrance that will be approximately 4 feet by 8 feet in size and will be constructed of steel materials The sign will advertise at least the facility name operating hours unacceptable wastes and an emergency telephone number as required by R315-303-3 (7)(d) of the Utah Administrative Code

SECURITY

A fence will be installed around the facility perimeter to provide for facility security The fence will generally consist of either 5 strands of barbed wire or mesh wire with the exception of the 6-foot high chain link fence and gate at the facility entrance

OPERATIONAL FACILITIES

An office will be provided meeting the requirements of Weber County to accommodate administrative and operational activities and personnel The office will provide for observation of vehicles entering and exiting the site checking in and documenting loads of waste received and for keeping and storing records Sufficient parking will be provided under the direction of Weber County for personnel employed at the landfill and for visitors Area has also been provided for a future shop to be constructed as needed in the operational area

TRAFFIC

Traffic to the facility will be generated by employees required to operate the facility, occasional visitors and vehicles hauling waste to the facility It is anticipated that there may be five employees to operate the facility for an overage of 5 vehicles per day and an average of about 50 trucks per day hauling waste to the facility The number of trucks will depend highly on the season and the amount of construction and demolition that may occur in any one year Typical trucks that will be hauling waste to the landfill include end dump trucks end dump trucks with pups and trucks pulling single and double trailers There may be occasional pickup trucks with utility trailers and utility dump trailers It is anticipated that small personal loads will generally go to the Weber County transfer station on 21st street rather than directly to the landfill

UTILITIES

Utilities will be provided in meeting the requirements of Weber County Planning and Weber County Health Department

Power

There is currently a 3-phase underground power line that runs along the north side of the improved road to the facility property Power will be installed to the facility as a single phase underground service line from the main power line

Water

Water will be required to meet demands for culinary uses and fire flow and for construction and dust control An 8-inch diameter water lateral will be constructed to the facility from one of two culinary water suppliers in the area to meet culinary and fire flow requirements A fire hydrant will be installed near the office and future shop Water Rights may also be acquired to drill a new water well on the property as the primary source of water for construction and dust control

Sewer

There are no sewer lines near the facility to provide a service connection Approval was granted by the Weber-Morgan Health Department for a septic system based on a percolation test that was conducted at the location of the office

Telephone

Cellular telephone communication services may be used for the site However there is an existing Qwest telephone line along the north side of the property from which telephone communications may also be obtained

Gas

Natural gas is not anticipated since the office will most likely be all electric and does not use gas for any of the heating requirements Should natural gas be required at some time there is an existing natural gas line owned by Questar Gas that runs along 900 South ending near the site from which a gas lateral may be constructed

WASTE TYPES

The permit obtained from the State of Utah Department of Environmental Quality - Division of Solid and Hazardous Waste is expected to include all Class VI waste types These waste types may include

- Construction/demolition waste,
- Yard waste,
- Inert waste
- Dead animals upon as approved by the Executive Secretary and upon meeting the requirements of R315-315-6 which provide for disposal burial and cover requirements for dead animals,
- Non-hazardous petroleum contaminated soils containing the following constituents below the following levels

    - Benzene, 0 03 mg/kg
    - Ethylbenzene 13 mg/kg
    - Toluene 12 mg/kg and
    - Zylenes 200 mg/kg

- No wastes wastes will be accepted from a conditionally exempt small quantity generator of hazardous waste will be accepted

LANDFILL OPERATION AND LIFE

Landfill Operation

The landfill is expected to begin operation in early 2009 or as soon as permits can be obtained from Weber County Planning and the State Division of Solid and Hazardous Waste Waste disposal is expected to begin in the northwest corner of the proposed landfill area and will continue toward the south and east as needed to accommodate air space and operational requirements Closure of the landfill will occur as soon as possible in areas where design waste grades have been achieved

Approximate floor grades will be established as needed prior to disposal of waste in designated landfill areas Grading of the floor will proceed as needed in order to open expanded areas for operation within the proposed landfill footprint

Soil wastes (typically obtained from excavations on construction projects) are generally suitable for use to cover waste materials as needed for litter and vector control and as a final cover These soils will be segregated from other wastes and stockpiled for future use Other inert heavy wastes' such as masonry road demolition wastes concrete soils not suitable for final cover etc will segregated as much as possible and will be used to cover wastes as needed for litter and vector control

Class VI landfills are not subject to a bottom lining system because of the inert or otherwise non-hazardous nature of the waste materials received for disposal **A** leachate collection and removal system that accompanies a lining system is, therefore not required Groundwater monitoring is also not typically required for Class VI landfills and is not anticipated considering the type of landfill and the poor quality of ground water exiting the site

Estimated **L**andfill **L**ife

The landfill has an estimated life of 50 years within the currently proposed footprint and waste grade plan

LITTER CONTROL

Litter blowing from the landfill will be controlled by placing 6 inches of a suitable cover material over waste materials subject to wind dispersion Should litter be disbursed off the landfill by wind facility personnel will scout areas immediately surrounding the landfill property and return the litter to the landfill for disposal

Debris fences will also be used as needed near the working faces of the waste disposal areas to assist in trapping blowing debris Litter trapped by debris and facility fences will be cleaned up and disposed back in the landfill on a regular basis and covered with appropriate cover materials

CHAPTER III

GROUNDWATER

CURRENT GROUNDWATER CONDITIONS

Literature and Water Rights Research

A search of water rights and known groundwater wells was completed in the area and data was obtained from two wells located in Section 19 located on the parcel of property east of the proposed facility within a distance of about 1/2 mile One well showed a water-bearing gravel layer at a depth of 36 feet and the other well did not report water bearing formations until 188 feet in depth Both of these wells were drilled over fifty years ago The proposed facility is in an area where ground water levels ore obviously higher than reported with the two wells presented

Geotechnical Investigation

Between the dates of April 8 and April 30 2004 8 borings (B-1 through B-7 including B-1A) and 8 test pits (TP-1 through TP-8) were completed associated with the Geotechnical Investigation Report completed by Applied Geotechnical Engineering Consultants (AGEC) provided with this report Groundwater was encountered at depths ranging from approximately 6 to 12 feet based on measurements taken several months after the initial drillings and excavations were completed and sufficient time was allowed for recovery of ground water No groundwater was found in Borings B-1 B-2 and B-3 because the borings were drilled in the higher elevations of the site and refusal of deeper boring was encountered due to bedrock and/or other larger subsurface rocks

A survey was completed at the site in order to establish coordinate and elevation controls and to obtain locations and elevations of the borings and test pits This survey provided the basis for establishing elevations associated with the observed groundwater levels and to establish contours associated with the ground water levels The following table provides a summary of these elevations and the design drawings show ground water contours generated from the tabulated data which also shows a comparison between ground water and the existing ground surface

General regional ground water flow is from the northeast toward the southwest or toward the mud flats and the Great Salt Lake located south and west of the proposed facility Local ground water flows generally follow the ground surface topography which is from the north to the south from little mountain and a component from the west to the east from the higher ground located west of the proposed facility There is on abandoned gravel pit are located along the north half of the west side and along about the west third of the north side of the proposed facility Storm water runoff from the area of Little Mountain located upgradient from the gravel pit area is currently directed into the gravel pit which appears to influence ground water gradients across the property During facility development a storm water ditch will be constructed along the north side of the property that will direct Little Mountain runoff around the facility and away from the gravel pit and active landfill areas It is expected that re-directing this runoff will most likely alter recharge that previously occurred in the gravel pit area, since this area will become part of the landfill footprint Changes that may occur include removing much of the ground water gradient from the west side of the property toward the east and generally lowering ground water levels across the property

TABLE III-1 TEST PIT AND BORING LOCATION AND GROUNDWATER ELEVATION INFORMATION

BORING NUMBER	NORTHING	EASTING	GROUND ELEVATION	GROUND WATER ELEVATION	DEPTH TO GROUNDWATER
TP-1	3614389 75	1439372 56	4217 63	1	1
TP-2	3615214 86	1439452 36	4218 47	4212 66	5 81
TP-3	3615619 42	1439552 59	4222 45	4216 66	5 79
TP-4	3614366 04	1438437 75	4220 69	4214 25	6 44
TP-5	3614956 68	1438431 17	4219 75	4214 53	5 22
TP-6	3614595 76	1440318 34	4215 35	4210 21	5 14
TP-7	3615281 4	1440362 2	4220 49	4213 63	6 86
TP-8	3615681 49	1440341 82	4222 85	4216 05	6 80
B-1A	3615918 39	1437907 16	4230 59	4218 73	11 86
B-4	3614341 62	1439827 63	4216 15	4207 64	8 51
B-5	3615515 08	1438657 22	4223 62	4214 40	9 22
B-6	3615615 35	1439596 51	4223 80	4218 24	5 56
B-7	3614416 05	1439014 48	4218 03	4210 81	7 22

Notes 1 Test Pit TP-1 observation PVC pipe had been broken off at the surface by cattle and had partially filled with dirt Ground water measurements could not be obtained at this location

CHAPTER IV

LANDFILL DESIGN

This section presents the general layout and design concept for the landfill area and also presents more specific design information for the floor layout, interior runoff control and exterior run-on control Reference is made to the design drawings included with this report for this section

GENERAL LAYOUT AND DESIGN

The C&D facility consists of one large landfill footprint area The C&D is designed with a total surface area of approximately 98 5 acres An operational and staging area is planned at the northeast corner of the facility Dimensions of this operational and staging area are roughly 325 feet by 1 000 feet The operational area will include on office and parking area a future shop and an area for potential recycling of green wastes

Construction of the landfill footprint will occur in phases based on operational needs and C&D waste disposal demands It is anticipated that construction of the landfill footprint will begin in the northwest corner of the property and will occur in phases toward the south and east as additional cell space and area is required

Floor Elevations

Regulations state that the separation between the floor of the C&D landfill and the groundwater surface should be 10 feet or more Water quality samples were obtained from borings B-4 and B-7 to determine the quality of the ground water at the site Results from the samples show TDS levels of 29 000 and 23 000 mg/L for the samples obtained from B-4 and B-7 respectively Ground water is very poor quolity and is classified as Class IV groundwater according to State standards

Permeability tests were also conducted on the lean clay obtained from TP-1 about 1 foot below existing ground and from the interloyered lean cloy and silt formations obtained from TP-7 approximately 2 5 feet below existing ground at the site Results of the tests show the lean clay and the interloyerd lean clay and silt to hove permeability values of 2×10^{-6} cm/sec and 2×10^{7} cm/sec respectively

Because of the poor quality the low permeability of the clays and silts immediately below the landfill footprint, and based on discussions with the Division of Solid and Hazardous Waste a variance is requested from 10 feet to 5 feet of separation between the bottom of the waste and ground water It is our opinion that degradation to ground water will be negligible due to the types of the wastes that will be received the poor quality of ground water that exists at the site the low permeability of the existing soils and storm water management practices that will be implemented (presented later in this report)

Floor elevations within the landfill footprint were established based on ground water surface contours generated by measured ground water elevations Ground water contours show the elevation to be lowest near the southeast corner of the facility and increase toward the north and toward the west forming a type of trough at the ground water surface The floor design generally results in a separation between 6 feet and 7 feet although future ground water levels are expected to lower resulting from construction of the landfill removal of the existing gravel pit where recharge occurs, and re-directing storm water from little mountain away from the gravel pit area and around the east side of the landfill property

Both cuts and fills will be required to achieve the design floor elevations presented in the drawings Fill materials may be obtained from native soils during excavations in the landfill footprint area, from inert waste materials such as concrete masonry soils etc and from off site soil sources Significant cuts are anticipated in the northern and western portions of the property and fills will generally be required in the lower playas areas Although significant cuts are anticipated along the north and west sides of the property the design side slopes presented may be flatter and the cuts may be less should bedrock be encountered that inhibits these excavations to occur

Embankments and Waste Mound

Very little embankment construction is expected with most of the fill areas occurring to establish floor grades and to establish storm water control facilities The waste mound will begin generally of the floor elevation (toe of waste) around the floor perimeter along the south east and part of the north sides and of the top of the cut slopes along the rest of the north side and the west side The waste mound will consist of four lifts that ore approximately 50 feet or less in height A bench approximately 18 feet wide is provided at the top of each lift to provide for storm water conveyance and to provide for a resulting 3H 1V (horizontal to vertical) slope after accounting for the benches in order to maintain stability of the landfill slopes The entire vertical height is generally between about 180 feet near the southeast corner of the waste mound to about 230 feet from the center peak of the waste mound to the floor Fill materials needed to construct the landfill access ramps will most likely also be constructed of waste materials after first establishing a minimum bottom grade consistent with the extension of the floor slopes

The top of the waste mound consist of an approximate 10 percent slope between the top outer perimeter and the center of the waste pile to promote storm water runoff to occur toward the outside perimeter and to a storm water down drain to be installed at the southeast corner of the waste pile Storm water management is discussed later as part of the landfill closure section

A stability analysis was conducted on the waste mound slopes during the geotechnical investigation The stability analysis shows safety factors of 1 8 under static conditions and 1 2 under seismic conditions The geotechnical report is included as an appendix in this report

ACTIVE AREA RUNOFF CONTAINMENT

Runoff from exposed waste materials will be contained on-site within the active landfill footprint area until the waste either receives a clean soil cover or until the time of closure As portions of the landfill receive clean cover soils or are closed runoff from the clean and closed area will be conveyed off the waste pile and will be allowed to discharge off-site

Regulations require containment be sufficiently sized to contain runoff from the 25-year 24-hour precipitation event Potential runoff volume per acre of open cell area was calculated using the SCS curve number methodology provided in USDA Urban Hydrology for Small Watersheds Technical Release No 55 Precipitation depth for the 25-year 24-hour precipitation event (2 23 inches) was obtained from Point Precipitation Frequency Estimates from NOAA Atlas 14 ʼ

Using charts provided in TR-55, a curve number of 87 was selected assuming a combination of Type C soils which are typical of on-site soils and some impervious waste material Calculations resulting from the assumptions mode result in a minimum containment volume of 0 13 acre-foot (5 662 cubic feet) per acre of open cell area This containment capacity may be provided using pond areas on the landfill floor between the waste and the up-grodient interior slopes of the landfill providing ponds or berms on the waste surfaces or by providing pond areas on the landfill floor by constructing berms down gradient from the waste This runoff water may be used for dust control within the landfill area mixing of concrete, and other activities requiring water above constructed landfill floor areas

CHAPTER V

LANDFILL CLOSURE DESIGN

Design objectives for the C&D Cell closures is to provide a final waste grade final soil cover and erosion protection that will promote and control storm water runoff from the closed cells and control erosion This section presents the general layout and design concept for the landfill cell closure caps including storm water control and erosion control

GENERAL LAYOUT AND DESIGN

The waste grade layout provides resultant 3H 1V (horizontal to vertical) slopes extending up from the bottom toe of the waste pile toward the center of the landfill Intermediate benches are provided every 50 feet of vertical rise to facilitate erosion control and storm water management The intermediate benches ore 18 feet wide and slope toward the inside of the bench providing o 3-foot deep V-ditch Side slopes between benches ore 2 5H 1V and when combined with the benches provides resultant slopes of 3H 1V The maximum height of the closure cops is about 180 to 200 feet around waste pile perimeter with a maximum of about 230 feet above the floor ot the center peak of the waste pile

Two feet of cover soil will be placed at final closure consisting of a clean soil fill material with an erosion protective layer This final closure cover will consist of either 18 inches of soil fill with 6 inches of soil that will support vegetation 20 inches of soil fill with 4 inches or stone mulch or a combination of both

Each of the intermediate benches is provided with approximately a 1 percent slope toward the southeast corner of the landfill to form V-type drainage ditches that are approximately 3 feet deep The drainage ditches hove side slopes of 20H 1V or 5 percent provided by the bench) ond the 2 5H 1V (provided by the general closure cop surface) The ditch flow lines convey storm water to inlet boxes and downspout pipes located at the southeast corner of the landfill

The top closure surface will consist of approximately 10 percent slopes from the center toward the outer perimeter of the top surface A 3-foot high berm system will be constructed around the outside perimeter of the top slope that will contain storm water and convey the runoff toward the southeast corner where it will enter the down drain system to be constructed at the southeast corner of the landfill Storm water runoff from the landfill will enter the upper east and southeast detention ponds and will ultimately be discharged off site toward on existing culvert under the railroad near the southeast corner of the landfill

STORM WATER MANAGEMENT

The objectives of storm water management associated with the closure caps is to control erosion and convey storm water from the closure cop surfaces during precipitation events and snow melt The following paragraphs present the hydrology and hydraulic design associated with the storm woter management system

Hydrology

Hydrologic calculations were completed for the closure cop of the C&D landfill to determine peak runoff in designing the bench drainage ditches and to determine erosion protective measures for the drainage ditches and the closure cap slopes The SCS (Soil Conservation Service) curve number methodology was used in conjunction with the Army Corps of Engineers HEC-HMS hydrology computer model to predict peak flows from the closure cap The methodology for predicting peak flows requires a delineation of the sub-bosins generating runoff, determination of a curve number to be used a precipitation rote a storm distribution, and a calculation of the time of concentration and lag time

<u>Methodology</u> The sub-bosins were delineated assuming each is comprised of the perimeter slope above each of the bench areas including the bench area of the bottom of the perimeter slope and the perimeter slope above the ground surface The landfill area has 7 delineated subbosins with on additional subbosin for the operations and staging area Each of the 4 subbasins comprised of the bench areas and the slope areas above the benches will generate runoff that will collect in the ditches on the benches and the runoff will be conveyed around the benches to the southeast corner Runoff will then be conveyed through inlet boxes and down drain piping to the ground surface Runoff from the 3 subbasins on the lower slope areas will collect on the ground surface and the detention ponds of the toe of the slopes

The SCS curve number is determined from the type of soil and erosion control measures used for the closure cap The closure cap will be seeded with native grass or other range grasses and brush that adopt to the area which when established will result in on assumed curve number of 81

Native soils at the site and clean imported soils ore expected to be used for construction of the closure cops The types of soils from NRCS soil mapping showed hydrologic soil group type C soils on the landfill parcel and should also provide on overage type of soils that may be imported Type C soils have low infiltration rates when thoroughly wetted consist chiefly of soils with a layer that impedes downward movement of water and hove moderately fine to fine texture These soils also have a low rote of water transmission An SCS curve number (CN) of 81 was selected using the tables provided in TR-55 using an herbocious cover with type C soils

Regulations required that the facilities be designed for a 25-year 24-hour precipitation event Since a closure cop is a critical component our calculations for storm water management from the closure cops ore based on the 100-year 24-hour precipitation event The Point of precipitation frequency estimates from NOAA Atlas 14 was used to determine the precipitation depth of 2 73 inches and the SCS Type II storm distribution for a 24-hour event was used to predict peak flows

<u>Peak Design Flows</u> Hydrologic calculations presented above were used to generate peak design flows for each of the 8 subbasins for the closure cop and for the downspout piping located at the southeast corner Peak design flows for each of the subbasins are summarized in Table VI-1 Peak design flows for the downspout piping were generated using HEC-HMS

computer model to combine flows from the individual sub-basins These flows are summarized on Table VI-2

Table V-1 **SUBBASIN PEAK DESIGN FLOWS**

HEC-HMS SUBBASIN ID	SUBBASIN DESCRIPTION	PEAK FLOW (cfs)
Subbasin - 1	Top of the landfill to first bench	9 5
Subbasin - 2	Second bench from top	3 9
Subbasin - 3	Third bench from top	5 3
Subbasin - 4	Fourth bench from top	5 8
Subbasin - 5	Northeast base of landfill from fourth bench to ground surface	6 1
Subbasin - 6	West base of landfill from fourth bench to ground surface	7 4
Subbasin - 7	Southeast corner of landfill from fourth bench to ground surface	9 8
Operational Area	Operations and staging area in northeast corner of the parcel	10 9

TABLE V-2 DOWNSPOUT PIPING PEAK DESIGN FLOWS

HEC-HMS REACH ID	DOWNSPOUT PIPE SECTION DESCRIPTION	PEAK FLOW (cfs)
Reach - 3	First bench to second bench	9 5
Reach - 2	Second bench to third bench	12 0
Reach - 1	Third bench to fourth bench	15 3
Reach - 4	Fourth bench to Detention	19 2

Hydraulic **D**esign

Peak design flows were used to complete hydraulic design of the drainage channels and the downspout piping for the closure cop

<u>Drainage Channels</u> The highest design peak flows for the benches and for the flow to the ground surface provided in Table VI-1 were used to design the drainage ditches This provides

consistency in the design, in achieving final waste grades during operation and in constructing the closure caps The bench drainage ditches were designed with a 6H 1V side slope along the bench surface and a 2 5H 1V slope resulting from the predominate closure cop slope

A channel flow depths of approximately 0 63 feet was calculated for the bench ditches using the peak design flow of 4 75 cfs (half of the maximum flow from the peak basin Subbosin 1) Using a manning s n of 0 30 (assuming gross/weed lined channels) the resulting velocity is 2 4 ft/sec The gross and weed lined channel with this low velocity would not require the use of riprap for erosion protection

Periodic check dams constructed of gravel may be placed periodically for the purpose of minimizing erosion and retaining some moisture to establish vegetation within the drainage benches

<u>Downspout Piping</u> Hydrologic calculations presented above were used to generate the combined peak design flows for the C&D closure cop Design is based on the combined peaks shown in Table VI-2 starting with a flow of 9 5 cfs at top bench and progressing to 19 2 cfs at the outlet of the downspout piping Hydraulic Charts for the Selection of Highway Culverts published by the U S Department of Transportation were used for sizing the downspout piping The required pipe diameter is 18 inches for the top downspout reach and 21 inches thereafter to the outlet based on Inlet control conditions with a head water depth requirement of no greater than four feet ollowing for one foot of freeboard This headwater depth requirement is provided within the 24 inches of inlet box depth below the grating with the additional depth provided by the approximately 3 foot ditch above the grating

Slope Erosion Protection

The establishment of vegetation has proven to be an effective practice in providing erosion protection for highway cut and fill slopes downstream slopes of dams and landfill closure cops within the state of Utah Procedures presented in Erosion and Sedimentation in Utah - A Guide for Control published by the Utah Water Research Laboratory were used to determine requirements for vegetative control measures Calculations show that the density of a vegetative cover should be 97 percent In order to determine the effectiveness of a vegetative cover appropriate for the climate and soils used for the final cover the slope below the lowermost drainage bench should be used to test the seed mix provided and adjust the seed mix based on the results of the test area Initial seeding should include a mix design similar to mix presented in Table V-3 Test areas for seeding on the lower slope will provide a basis for determining erosion control measures for final closure Erosion control blankets may also be used as needed during establishment of vegetation

Calculations also show that erosion control con be accomplished by placing a minimum thickness of 2 5 inches of stone mulch over the final closure areas Stone mulch has also been effectively used for erosion protection on highway cut and fill slopes and on landfill closures around the state of Utah and has shown to allow natural vegetation to establish itself through the stone mulch cover During testing of the lowermost slope a determination might be mode that erosion control measures are best accomplished by using o combination of vegetation and stone mulch where vegetation is established on the upper portions of the slopes where runoff water is not concentrated and stone mulch is placed on the lower slope areas where runoff water is more concentrated

TABLE V-3 SEED MIX DESIGN

Common Name	Species Name	Application Rate (PLS) (lbs/acre)
Grasses		
Hycrest crested wheatgrass	Agropyron cristatum hycrest	3 0
Intermediate wheatgrass	Agropyron intermedium	2 0
Western wheatgrass	Agropyron smithii	2 0
Indian ricegrass	Oryzopsis hymenoides	2 0
Great Basin wildrye	Elymus cinereus	1 0
Alkali sacaton	Sporobolus airoides	0 1
Forbs		
Scarlet globemallow	Sphaeralcea coccinea	0 5
Shrubs		
4-wing saltbush	Atriplex canescens	1 0
Shadscale	Atriplex confertifolia	1 0
Forage kochia	Kochia prostrata	0 5
TOTAL		13 1

CHAPTER VI

STORM WATER MANAGEMENT

Open **L**andfill Areas

Berms or ditches will be constructed around open landfill areas to manage storm water from surrounding areas from entering the open landfill areas Berms will be constructed in phases around the landfill as areas ore opened for waste disposal These berms will also provide a safety barrier to restrict vehicle traffic from entering the open landfill other than by established accesses

Off-**S**ite **R**un-**O**n **S**torm **W**ater

The gradient of the existing ground surface is toward the south and southeast from Little Mountain and through the facility There ore several culverts that cross under 900 south that convey water from the Little **M**ountain drainage and run-on through the C&D facility property There are no defined natural drainage channels

A hydrologic computer model was developed to predict peak flows from the drainage area expected to contribute to run-on flows that affect the facility property using the 100-yeor 24-hour storm event The drainage area comprised one subbosin that could be characterized by soil types vegetative cover slope and precipitation depth

An SCS curve number was established for each subbosin based on soil types and vegetative cover characteristics Vegetation cover was defined based on observations made during field visits Soil types were obtained from the Natural Resource Conservation Service website from soil mopping available of the Soil Data Mart

Precipitotion depths were obtained for the subbosin from the Point Precipitation Frequency Estimates from NOAA Atlas 14 One precipitation value was used (2 73 inches) dependent upon the general elevation of the facility and the area tributary to it The SCS Type II storm distribution was used which is typicol for this area

Run-on areas will be allowed to temporarily discharge onto open areas of the property as currently occurs until the landfill expands to where those open areas would be unavailable When expansion to those areas does occur run-on will be conveyed through a ditch along the north side of the property and into the detention system that has been designed for closure conditions

This Little Mountain storm water conveyance ditch will have a slope that will vary from about 0 5% and 1% with 2 5H 1V side slopes resulting in a V-shaped channel with no bottom width The maximum depth calculated for this channel is 1 2 feet with o peak flow of 9 cfs and o minimum channel slope of 0 5% In order to provide 1 foot of freeboard a depth of 2 2 feet is required The maximum calculated velocity is 3 3 fps with the maximum slope of 1%

Results from the calculations ottoched to this report show a peak flow from water ultimately diverted around the north side of the facility and to the east through the detention basins and eventually exiting the property from the existing culvert in the southeast corner The peak flow that will ultimately be diverted south and east around the facility from ott-site run-on is approximately 9 cfs The detention basins have been designed to accommodate both run-on from off-site and run-off from the facility

Storm **W**ater **F**rom **O**n-**S**ite **D**isturbed **A**reas **Ou**tside **L**andfills

Storm water from disturbed areas outside the landfill around the facility may include operation area roods staging area soil stock piles etc The amount of disturbed area will be minimized as much as practical and still allow for operations and construction of the facility Runoff from these areas will be collected and conveyed to o detention pond located at the southeast corner of the operations and staging area This pond has been sized for the 100-yeor 24-hour precipitation event

A drainage channel will be located south of the operations orea providing conveyance from the operations area to the pond This ditch will hove a slope that will vary from 0 5% and 1% with 2 5H 1V side slopes resulting in a V-shaped channel with no bottom width The maximum depth calculated for these chonnels is 1 3 feet with o peak flow of 10 9 cfs and a minimum channel slope of 0 5% In order to provide 1 foot of freeboard a depth of 2 3 feet is required The maximum calculated velocity is 3 5 cfs with the maximum slope of 1%

REFERENCES

Federal Highway Administration U S Department of Transportation Hydraulic Charts for the Selection of Highway Culverts U S Government Printing Office June 1980

Applied Geotechnical Engineering Consultants Inc Geotechnical Investigation-Proposed Landfill - 10500 West 900 South - Plain City Utah November 11, 2008

National Oceanic and Atmospheric Administration (NOAA) Point Precipitation Frequency Estimates from NOAA Atlas 14 Notional Weather Service Maryland 2003

U S Army Corps of Engineers Hydrologic Engineering Center HEC-HMS Hydrologic Computer Modeling Software

U S Department of Agriculture Natural Resources Conservation Service Urban Hydrology for Small Watersheds Technical Release No 55 (TR-55) June 1986

Utah Water Research Laboratory Erosion and Sedimentation in Utah A Guide for Control Utah Stote University February 1984

APPENDIX 1

DESIGN DRAWINGS
WEBER COUNTY CLASS VI
C & D LANDFILL PERMIT

WEBER COUNTY

CLASS VI C&D LANDFILL PERMIT

JANUARY 2011

INDEX OF DRAWINGS

PROFESSIONAL ENGINEER
GORDON L. JONES
No 5048470 2202
1/13/11
STATE OF UTAH

HANSEN ALLEN & LUCE inc
ENGINEERS

FILE PROJECTS\333 - MOULDING-WEBER CO LF\01 100 -08 WEBER CO LF\CAD\CADFILES\STATE PER[...]VISED\G-1 ST PERMIT COVER.DWG
FILE DATE 1 12 2011 09 36 30 (CAH)

SURVEY NOTES

1. COORDINATES ARE BASED ON UTAH NAD83 STATE PLANE NORTH ZONE MODIFIED TO LOCAL PROJECT ELEVATION DATUM WITH A COORDINATE CONVERSION FACTOR OF 0 99974352 FROM SEA LEVEL TO LOCAL PROJECT ELEVATION DATUM
2. ELEVATIONS PROVIDED ARE BASED ON NAVD 88
3. BASIS OF BEARING FOR DESCRIPTIONS

   THE CONTROL USED TO ESTABLISH THE PROPERTY LINES WAS THE WEBER COUNTY SECTION CORNER MONUMENTATION SURROUNDING SECTION 19 T6N R3W SLB&M THE BASIS OF BEARING IS THE NORTH LINE OF THE NORTH HALF OF SAID SECTION WHICH BEARS SOUTH 89 23 44 EAST (WEBER COUNTY GRID BEARING)

PROPERTY DESCRIPTION

ALL THAT PROPERTY IN THE NORTH HALF OF SECTION 19 TOWNSHIP 6 NORTH RANGE 3 WEST SALT LAKE BASE & MERIDIAN IN THE STATE OF UTAH COUNTY OF WEBER MORE PARTICULARY DESCRIBED AS FOLLOWS

BEGINNING AT A POINT ON THE NORTH SIDE OF A 100 FOOT PERPETUAL EASEMENT SAID POINT BEING SOUTH 425 19 FEET AND WEST 4 17 FEET FROM THE NORTHWEST CORNER OF SAID SECTION BASIS OF BEARING MAY BE DETERMINED LOCALLY BY A BEARING OF S89 23 44 E BETWEEN THE NORTHWEST CORNER AND THE NORTHEAST CORNERS OF SAID SECTION THENCE ALONG THE NORTH UNE OF SAID EASEMENT THE FOLLOWING FIVE COURSES S89 05 20 E 12 18 AND N87°50 35 E 1450 90 FEET TO THE BEGINNING OF A CURVE CONCAVE TO THE SOUTH WITH A RADIUS OF 868 51 FEET THENCE EASTERLY 198 57 FEET THROUGH A CENTRAL ANGLE OF 13 06 00 AND S79 05 14 E 485 59 FEET TO THE BEGINNING OF A CURVE CONCAVE TO THE NORTH WITH A RADIUS OF 768 51 FEET THENCE EASTERLY 474 18 FEET THROUGH A CENTRAL ANGLE OF 35 21 09 THENCE LEAVING SAID NORTH UNE SOUTH 1811 66 FEET TO THE NORTHERLY RIGHT-OF-WAY OF THE SOUTHERN PACIFIC RAILROAD COMPANY THENCE ALONG SAID RIGHT-OF-WAY THE FOLLOWING FOUR COURSES S81 46 35"W 221 51 FEET AND S81 42 06"W 251 02 FEET TO THE BEGINNING OF A CURVE CONCAVE TO THE NORTH WITH A RADIUS OF 10491 76 FEET THENCE WESTERLY 2155 58 FEET THROUGH A CENTRAL ANGLE OF 11 46 18 AND N89 26 02"W 1 88 FEET TO THE EASTERLY BOUNDARY OF THE USAF PROPERTY THENCE LEAVING SAID RIGHT-OF-WAY AND ALONG SAID EASTERLY BOUNDARY THE FOLLOWING TWO COURSES N00°33 58 E 1867 42 FEET AND N00°35 08 E 100 78 FEET TO THE POINT OF BEGINNING

TOGETHER WITH A PERPETUAL EASEMENT FOR ACCESS AND CONSTRUCTION OF UTIUTIES MORE PARTICULARY DESCRIBED AS FOLLOWS

BEGINNING AT A POINT ON THE NORTH SIDE OF A 100 FOOT PERPETUAL EASEMENT SAID POINT BEING SOUTH 423 16 FEET AND EAST 2595 73 FEET FROM THE NORTHWEST CORNER OF SAID SECTION 19 BASIS OF BEARING MAY BE DETERMINED LOCALLY BY A BEARING OF S89 23 44 E BETWEEN THE NORTHWEST CORNER AND THE NORTHEAST CORNERS OF SAID SECTION 19 THENCE ALONG THE NORTH UNE OF SAID EASEMENT THE FOLLOWING NINE COURSES EASTERLY ALONG A CURVE CONCAVE TO THE NORHTWEST WITH A RADIUS OF 768 51 FEET THENCE ALONG SAID CURVE 214 24 FEET THROUGH A CENTRAL ANGLE OF 15 58 21 AND N49 3705 E 309 04 FEET AND N65 33 35 E 139 61 FEET AND S00°00 25 E 32 86 TO THE SOUTH SIDE OF A COUNTY ROAD AND ALONG SAID SOUTH SIDE S89 47 56 E 331 04 FEET AND S00°14 05"W 7 51 SAID POINT ALSO BEING THE BEGINNING OF A CURVE CONCAVE TO THE SOUTHEAST WITH A RADIUS OF 768 51 FEET THENCE WEST AND SOUTHWESTERLY 544 84 FEET THROUGH A CENTRAL ANGLE OF 40°37 13 AND S49 37 05"W 169 04 FEET TO THE BEGINNING OF A CURVE CONCAVE TO THE NORHTWEST WITH A RADIUS OF 868 51 FEET THENCE WESTERLY 286 61 FEET THROUGH A CENTRAL ANGLE OF 18 54 28 THENCE NORTH 108 43 FEET TO THE POINT OF BEGINNING

ALSO SUBJECT TO ANY AND ALL EASEMENTS AND EXCEPTIONS AS PERTAINING TO SUBJECT PARCEL AS DESCRIBED IN DOCUMENT ENTRY #2305658 DATED NOVEMBER 20 2007 RECORDED WITH THE WEBER COUNTY RECORDERS OFFICE

LANDFILL FLOOR CONSTRUCTION

1. THE LANDFILL FLOOR IS TO BE CONSTRUCTED IN PHASES AS NEEDED TO PROVIDE FOR OPERATIONAL AND CAPACITY NEEDS
2. PROPER FLOOR ELEVATIONS AND GRADES ARE TO BE CONSTRUCTED CERTIFIED BY AN ENGINEER OR SURVEYOR LICENSED IN THE STATE OF UTAH AND APPROVED FOR OPERATION BY THE UTAH DIVISION OF SOLID AND HAZARDOUS WASTE PRIOR TO WASTE DISPOSAL IN EACH PHASE OF CONSTRUCTION
3. DESIGN FLOOR ELEVATIONS PROVIDED HEREIN ARE MINIMUM ELEVATIONS ELEVATIONS MAY BE CONSTRUCTED AND CERTIFIED HIGHER THAN THE MINIMUM ELEVATIONS PROVIDED
4. EXCAVATE AND STOCKPILE AS MUCH AS PRACTICABLE THE SOIL FROM EXCAVATION AREAS IN ESTABLISHING DESIGN FLOOR GRADES FOR USE AS COVER CLOSURE AND OTHER FILL MATERIALS
5. ON-SITE SOILS AND INERT WASTE SUCH AS CONCRETE MASONRY ROCK CLEAN SOIL ETC MAY BE USED AS FILL TO ESTABUSH DESIGN FLOOR ELEVATIONS

WASTE PILE CONSTRUCTION

1. INERT TYPE WASTES IN THE FORM OF CONCRETE MASONRY CLEAN SOILS ROCK ETC MAY BE STOCKPILED AND USED FOR COVER OVER WASTE MATERIALS AS NEEDED FOR LITTER AND VECTOR CONTROL
2. ON-SITE SOILS AND CLEAN WASTE SOIL MATERIALS MAY BE STOCKPILED FOR LATER USE OR IMMEDIATELY USED FOR FINAL COVER MATERIALS
3. EXTERIOR PERIMETER SLOPES ARE TO BE NO STEEPER THAN 2 5 1 (HORIZONTAL TO VERTICAL) BETWEEN BENCH LEVELS
4. BENCHES ARE TO BE CONSTRUCTED APPROXIMATELY EVERY 50 FEET OF VERTICAL HEIGHT AND ARE TO SLOPE TOWARD THE SOUTHEAST CORNER OF THE WASTE PILE TO CONVEY STORM WATER RUN-OFF FROM THE WASTE PILE TO THE DOWN DRAIN PRESENTED ON THE DRAWINGS
5. THE V-DITCH FORMED BY THE BENCHES SHALL BE 3 FEET DEEP AND 18 FEET WIDE BENCHES 18 FEET WIDE PROVIDE A RESULTANT OUTER SLOPE OF 3 1 (HORIZONTAL TO VERTICAL)
6. STORM WATER RUN-OFF CONTAINMENT FROM EXPOSED WASTE MATERIALS (OTHER THAN INERT TYPE WASTES) SHALL BE PROVIDED WITHIN THE LANDFILL FOOTPRINT ABOVE THE FLOOR DESIGN GRADE WITH A MINIMUM CAPACITY OF 0 13 ACRE-FOOT PER ACRE OF EXPOSED WASTE CONTAINMENT AREAS MAY BE ESTABLISHED WITHIN BERM SYSTEMS ON APPROVED AREAS OF THE LANDFILL FLOOR AND ON THE WASTE PILE AND AS DEPRESSED POND AREAS ON THE WASTE PILE
7. STORM WATER MAY BE DISCHARGED OFF-SITE FROM AREAS OF THE WASTE PILE THAT HAVE RECEIVED A CLEAN SOIL OR INERT WASTE COVER OR A FINAL CLOSURE COVER

CLOSURE CONSTRUCTION

1. CLOSURE COVER SHALL CONSIST OF CLEAN SOIL WITH A MINIMUM THICKNESS OF 2 FEET
2. CLOSURE COVERS SHALL ONLY BE CONSTRUCTED AFTER STATE DIVISION OF SOLID AND HAZARDOUS WASTE APPROVAL
3. ALL CLOSURE AREAS ARE TO BE CERTIFIED BY THE OWNER AND OPERATOR OF THE LANDFILL FOR COVER THICKNESS PROPER STORM WATER CONTROLS AND EROSION PROTECTION
4. EROSION CONTROL MAY BE IN THE FORM OF VEGETATION (GENERALLY RANGE GRASSES AND BRUSH THAT ARE ADAPTABLE TO THE AREA) AND/OR STONE MULCH

STORM WATER MANAGEMENT

1. THE STORM WATER DETENTION POND ASSOCIATED WITH THE OPERATIONS AREA SHALL BE CONSTRUCTED DURING CONSTRUCTION OF THE ACCESS ROAD AND OPERATIONS AREA DISCHARGE FROM THIS POND MAY BE ONTO EXISTING GROUND SURFACES UNTIL THE UPPER EAST POND AND THE SOUTHEAST POND BECOME NECESSARY FOR STORM WATER MANAGEMENT
2. THE UPPER EAST POND AND SOUTHEAST POND SHALL BOTH BE CONSTRUCTED BEFORE THE LANDFILL FOOTPRINT AND WASTE PILE HAVE REACHED THE EAST SIDE OF THE LANDFILL FOOTPRINT AREA
3. LITTLE MOUNTAIN STORM WATER CONVEYANCE DITCH SHALL BE CONSTRUCTED BEFORE THE LANDFILL AND WASTE PILE FOOTPRINT EXTEND TO THE FIRST CULVERT UNDER THE IMPROVED ROAD THAT IS EAST OF THE PROPERTY S NORTHWEST CORNER
4. THE CULVERT FOR THE LITTLE MOUNTAIN STORM WATER CONVEYANCE DITCH SHALL BE CONSTRUCTED UNDER THE ACCESS ROAD AT THE TIME THE ACCESS ROAD IS CONSTRUCTED

SECTION & DETAIL IDENTIFICATION

SECTION IDENTIFICATION

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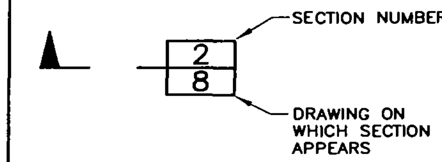

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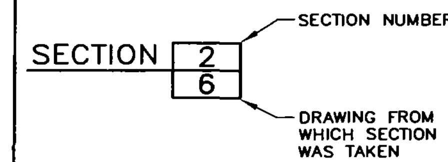

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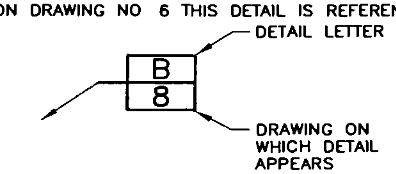

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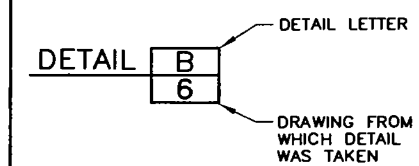

NOTES
1. IF SECTION AND DETAILS ARE SHOWN ON THE SAME DRAWING AS SECTION CUTS AND SECTION OR DETAIL CALL-OUTS DRAWING NUMBER IS REPLACED BY A UNE
2. DETAIL LETTERS I AND O NOT USED

TABLE OF ABBREVIATIONS

AVG	AVERAGE	OZ	OUNCE
℄	CENTER UNE	N T S	NOT TO SCALE
CPE	CORRUGATED POLYETHYLENE	PCPE	PERFORATED CORRUGATED POLYETHYLENE PIPE
CONT	CONTINUOUS	R O W	RIGHT OF WAY
DIA	DIAMETER	S=	SLOPE EQUALS
DIAG	DIAGONAL	SDR	STANDARD DIMENSION RATIO
EL	ELEVATION	STA	STATION
E W	EACH WAY	TYP	TYPICAL
FL	FLOW UNE	UDOT	UTAH DEPARTMENT OF TRANSPORTATION
HOPE	HIGH DENSITY POLYETHYLENE	YR	YEAR
HR	HOUR		
ID	INSIDE DIAMETER		
INV EL	INVERT ELEVATION		
MAX	MAXIMUM		
MIL	MILLIMETER		
MIN	MINIMUM		
O C	ON CENTER		

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HANSEN ALLEN & LUCE INC

PROFESSIONAL ENGINEER GORDON L JONES N 5048470-2202 STATE OF UTAH

PROJECT ENGINEER

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CLASS VI C&D LANDFILL PERMIT
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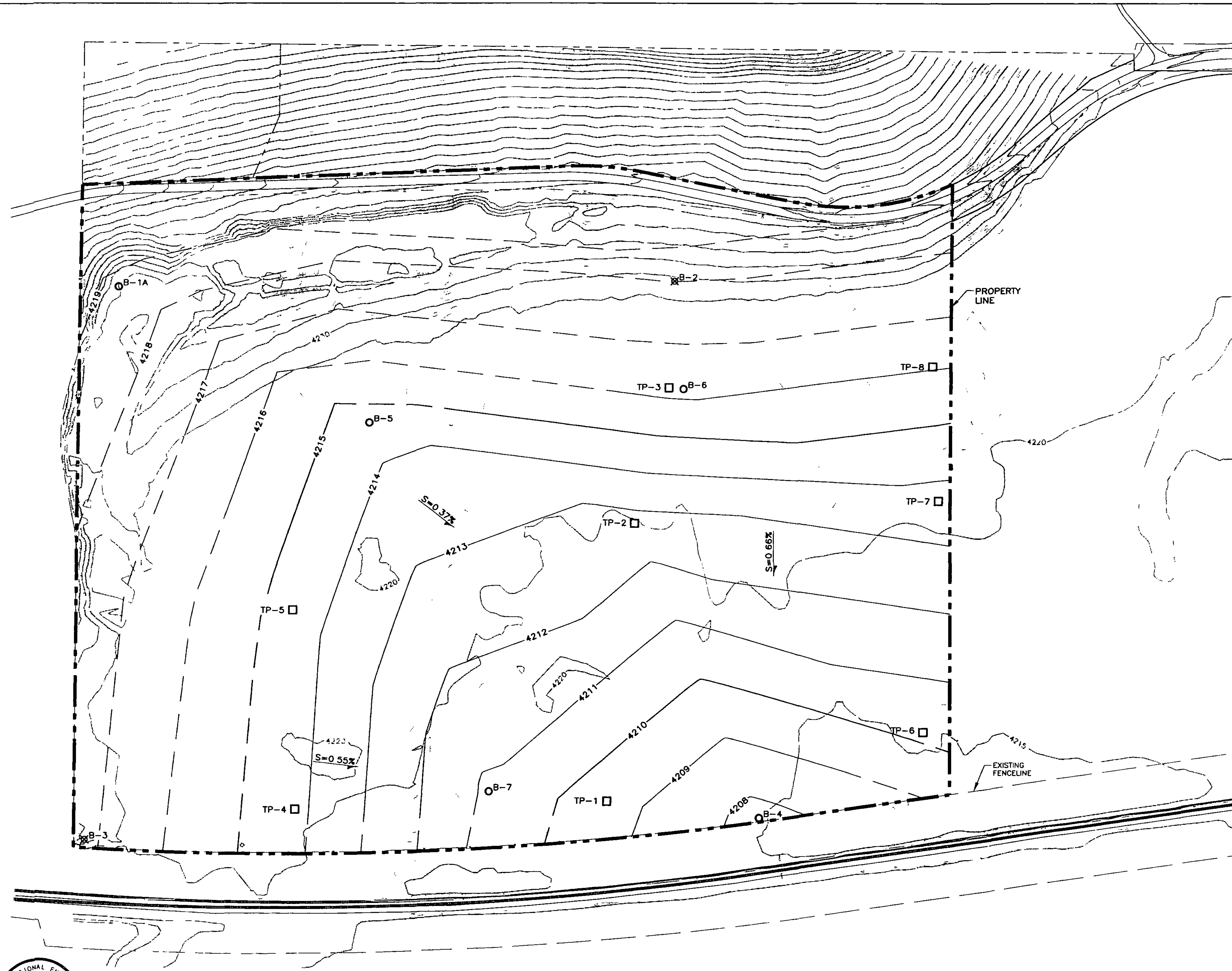

INTERPOLATED GROUNDWATER CONTOURS BASED ON GROUNDWATER MEASUREMENTS IN BORINGS AND TEST PITS

EXTRAPOLATED GROUNDWATER CONTOURS

B-# (BORING LOCATION)

B-# (BORING HIT REFUSAL)

TP-# (TEST PIT LOCATION)

NOTE

EXTRAPOLATED GROUNDWATER CONTOURS ARE PROVIDED ALONG THE NORTH AND WEST SIDES OF THE PROPERTY BECAUSE OF REFUSAL FROM ROCK IN THESE AREAS FOR ADDITIONAL BORINGS

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GROUND WATER CONTOURS

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PROFESSIONAL ENGINEER GORDON L. JONES No. 5048470-2202 STATE OF UTAH

PROJECT ENGINEER

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WEBER COUNTY

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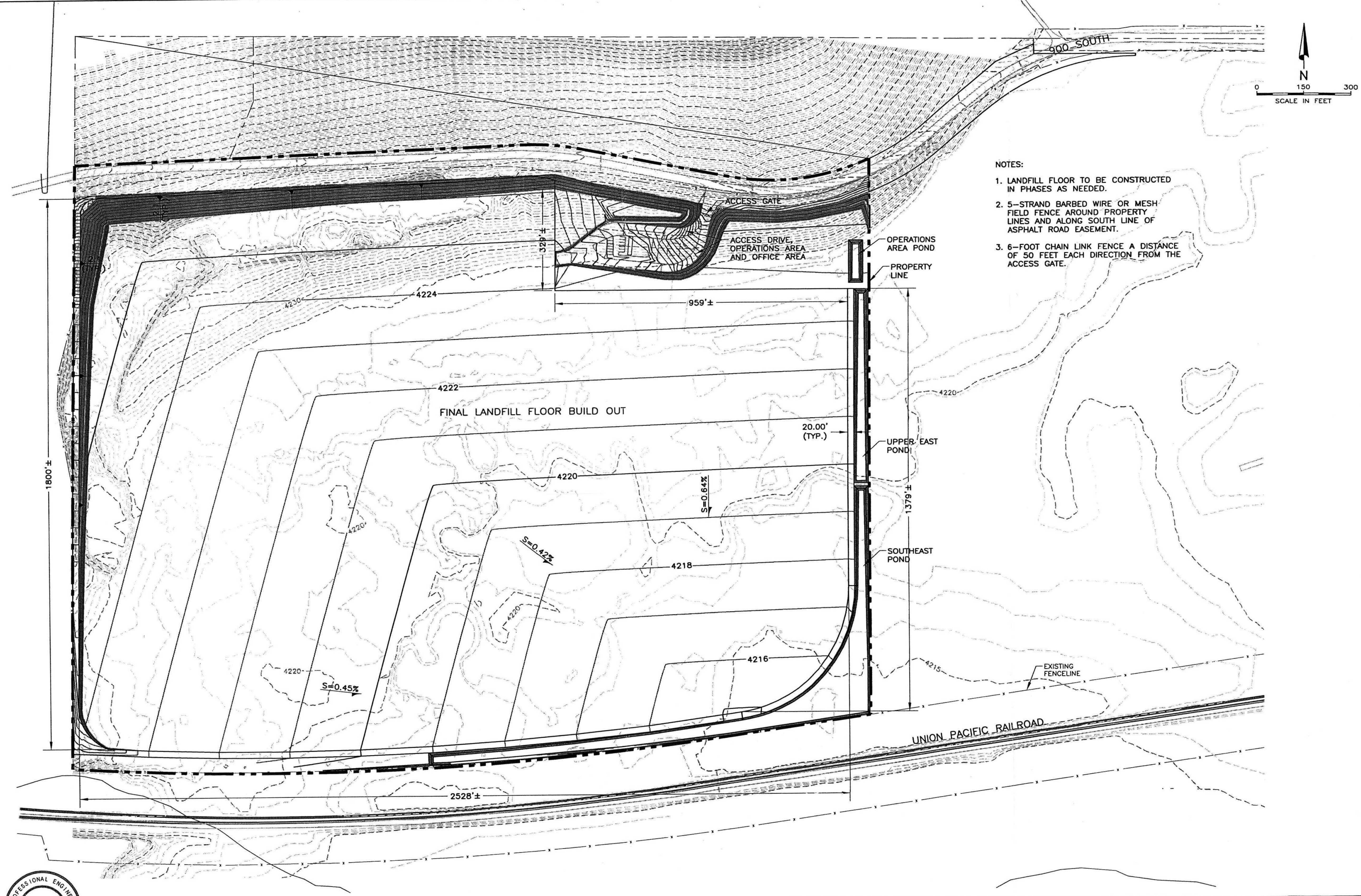

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PROJECT ENGINEER

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SCALE

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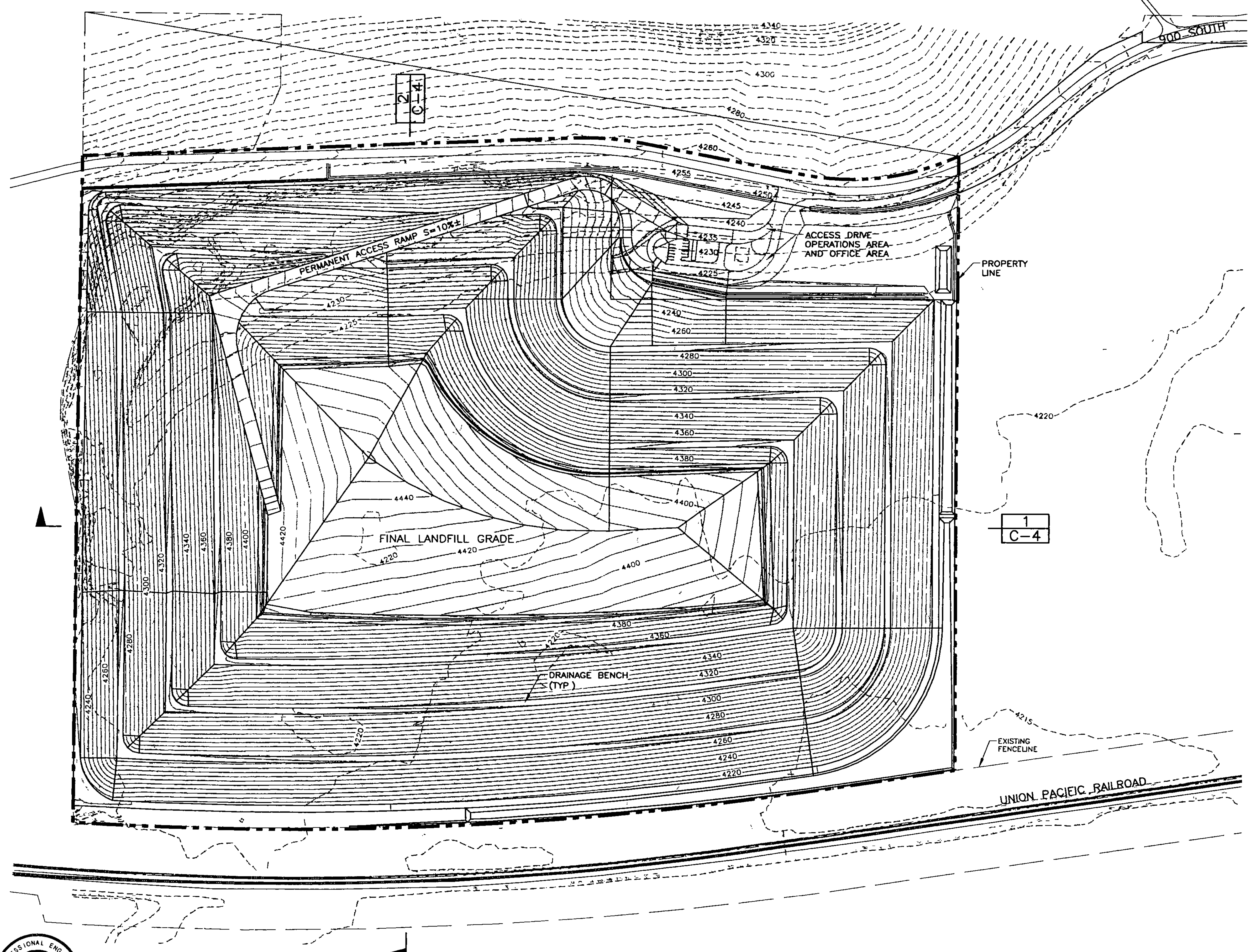

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0 150 300
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NOTES

1 EXISTING GROUND CONTOUR INTERVAL IS 1-FOOT

2 CLOSURE CONTOUR INTERVAL IS 5-FEET

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HANSEN ALLEN & LUCE inc

PROFESSIONAL ENGINEER GORDON L. JONES No. 5048470-2202 STATE OF UTAH

PROJECT ENGINEER

DESIGNED GLJ	3			
DRAFTED CAH	2			
CHECKED GLJ	1			
DATE JANUARY 2011	NO	DATE	REVISIONS	BY / APVD

SCALE

WEBER COUNTY

CLASS VI C&D LANDFILL PERMIT
CIVIL
EXISTING & FINAL CONTOUR PLAN

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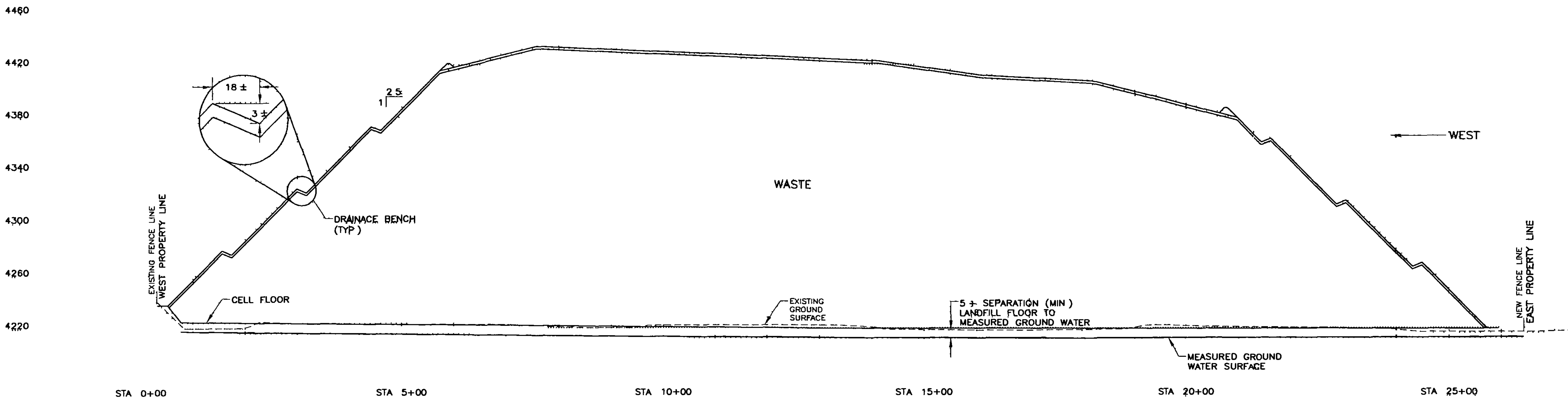

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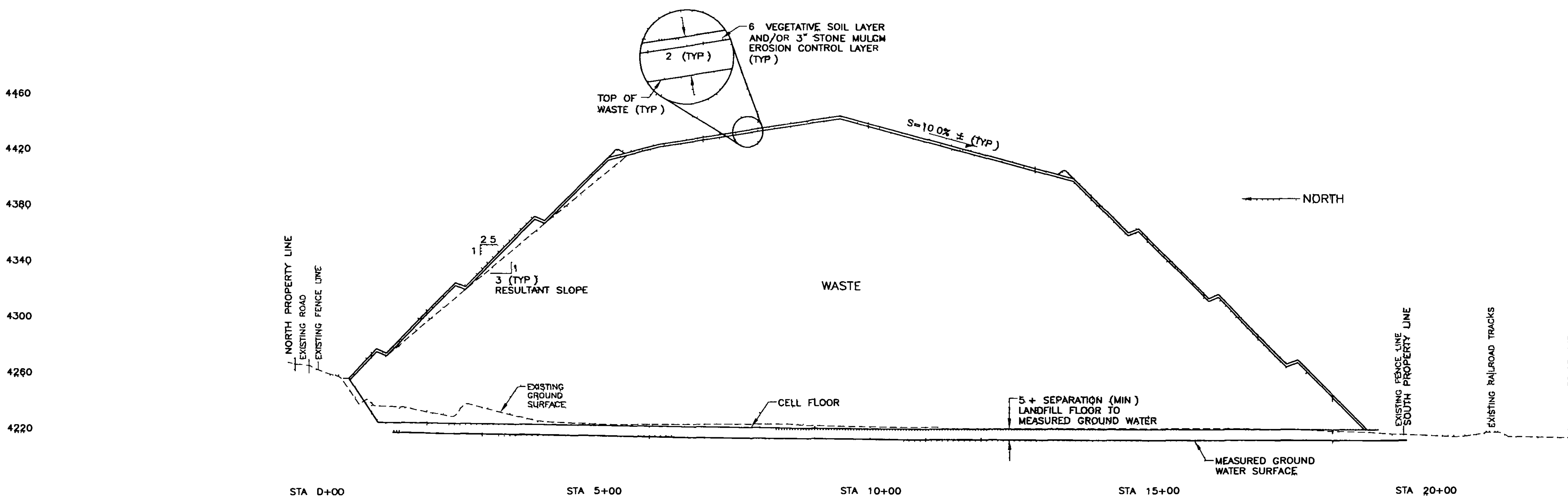

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HANSEN ALLEN & LUCE inc

PROFESSIONAL ENGINEER GORDON L. JONES No. 5048470-2202 STATE OF UTAH

PROJECT ENGINEER

DESIGNED GLJ	3				
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SCALE

WEBER COUNTY

CLASS VI C&D LANDFILL PERMIT
CIVIL
OVERALL LANDFILL SECTIONS

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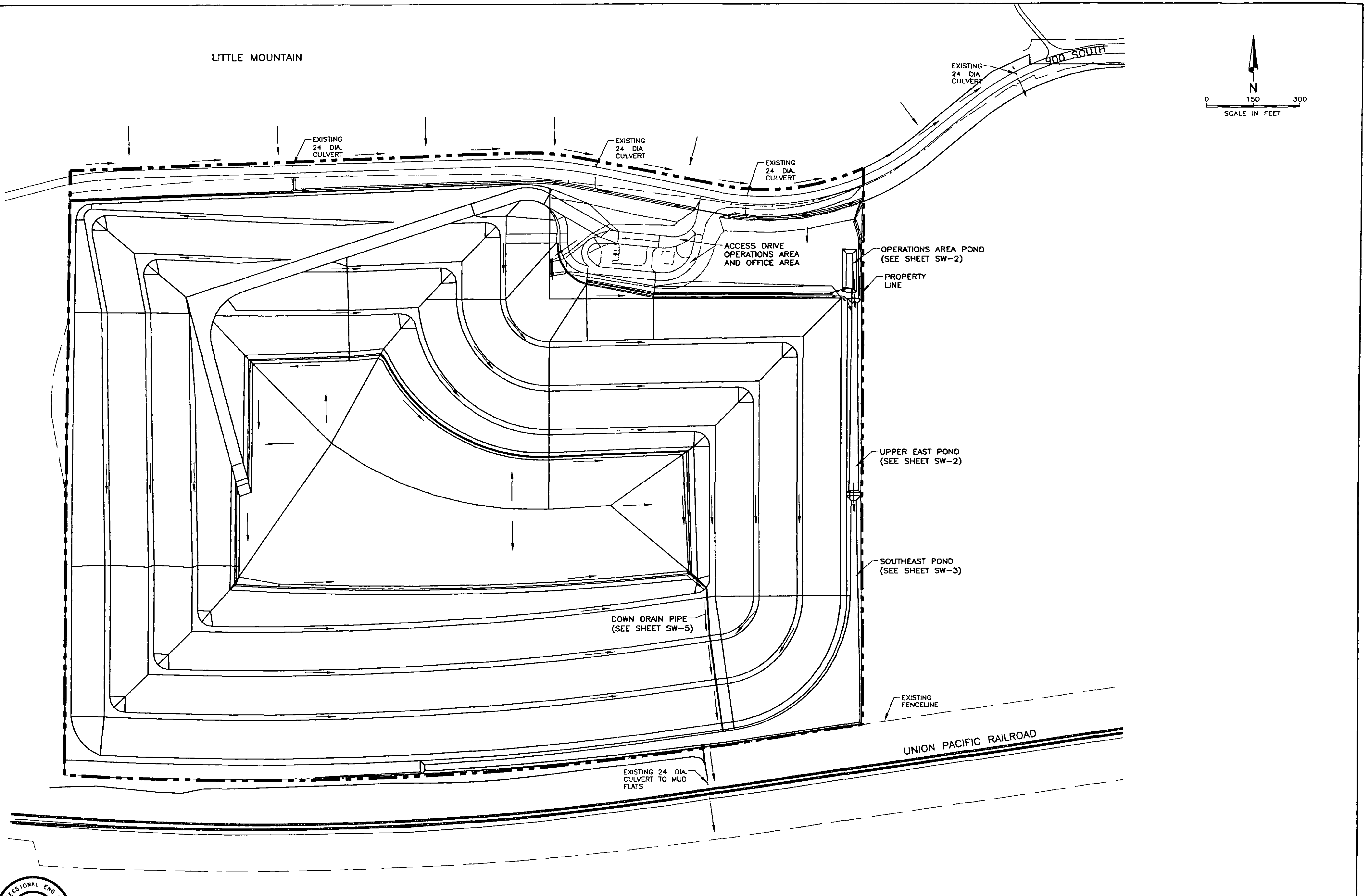

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HANSEN ALLEN & LUCE inc

PROFESSIONAL ENGINEER GORDON L. JONES No. 5048470-2202 STATE OF UTAH

PROJECT ENGINEER

DESIGNED GLJ	3				
DRAFTED CAH	2				
CHECKED GLJ	1				
DATE JANUARY 2011	NO	DATE	REVISIONS	BY	APVD

SCALE

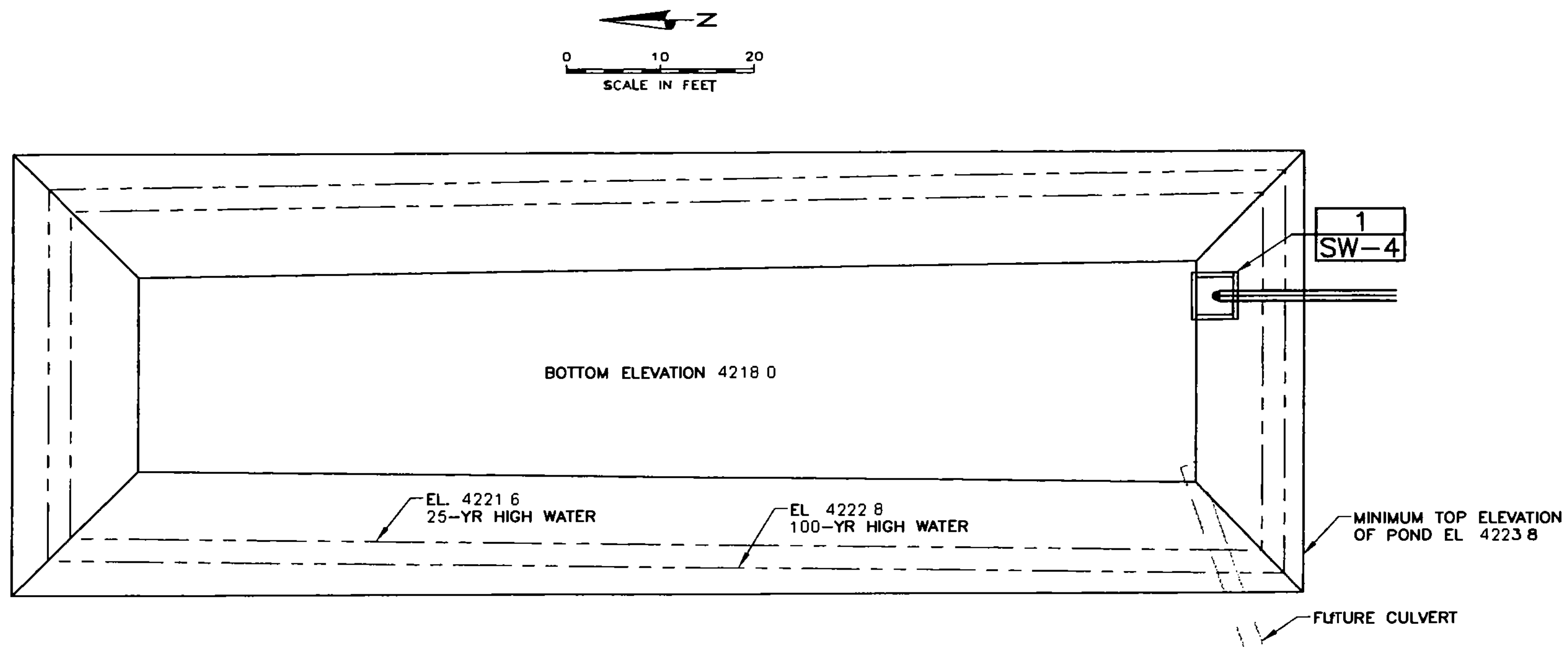
WEBER COUNTY

CLASS VI C&D LANDFILL PERMIT
STORM WATER
FINAL SITE GRADING & DRAINAGE PLAN

SHEET SW-1

333 01 100

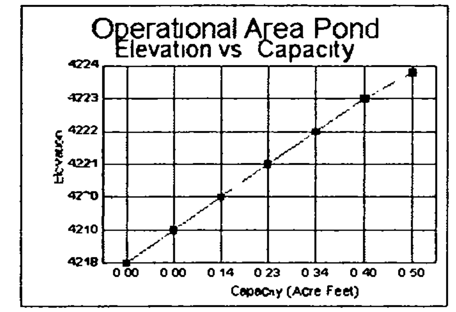
10/07



OPERATIONS AREA POND

Operations Area Pona

Elevation	Area (sf)	Avg Area (sf)	Volume (cf)	Volume (ac ft)
4218	2502		0	0 00
4219	3060	2761	2781	0 06
4220	3651	3356	6137	0 14
4221	4273	3967	10099	0 23
4222	4927	4600	14699	0 34
4223	5613	5270	19969	0 46
4223 8	6193	5903	25872	0 59

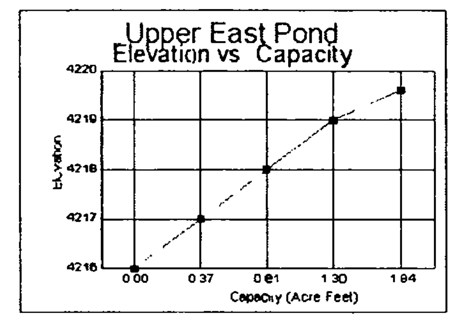


NOTE

DISCHARGE WILL INITIALLY BE ONTO THE UNDEVELOPED AREA EAST OF THE LANDFILL OPERATIONS AREA WHEN THE UPPER EAST POND IS CONSTRUCTED DISCHARGE WILL BE INTO THE UPPER EAST POND

Upper East Pona

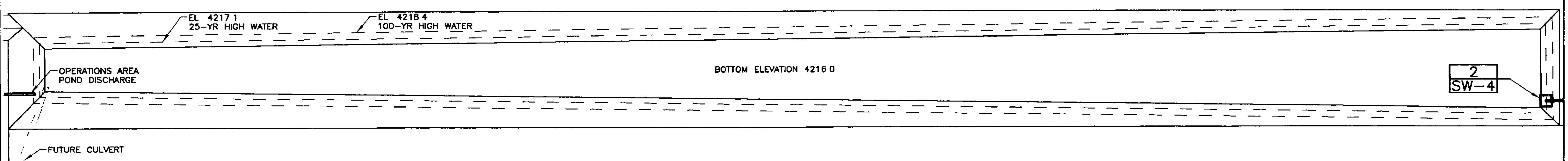
Elevation	Area (sf)	Avg Area (sf)	Volume (cf)	Volume (ac ft)
4216	15047		0	0 00
4217	17563	16315	16315	0 37
4218	20150	18867	30182	0 81
4219	22749	21450	56631	1 30
4219 6	24353	23551	80182	1 84



NOTE

RUN-ON STORM WATER AND CLEAN RUNOFF STORM WATER WILL INITIALLY BE DISCHARGED ONTO UNDEVELOPED AREAS TO THE SOUTH AND EAST OF THE LANDFILL OPERATIONS AREA UPPER EAST POND TO BE CONSTRUCTED AS NEEDED TO ACCOMMODATE LANDFILL EXPANSION AND DEVELOPMENT

0 20 40
SCALE IN FEET



UPPER EAST POND

HANSEN ALLEN & LUCE INC	GORDON L JONES No. 5048470-2202 STATE OF UTAH PROFESSIONAL ENGINEER — PROJECT ENGINEER	DESIGNED GLJ	3			
		DRAFTED CAH	2			
		CHECKED GLJ	1			
		DATE JANUARY 2011	NO	DATE	REVISIONS	BY APVD

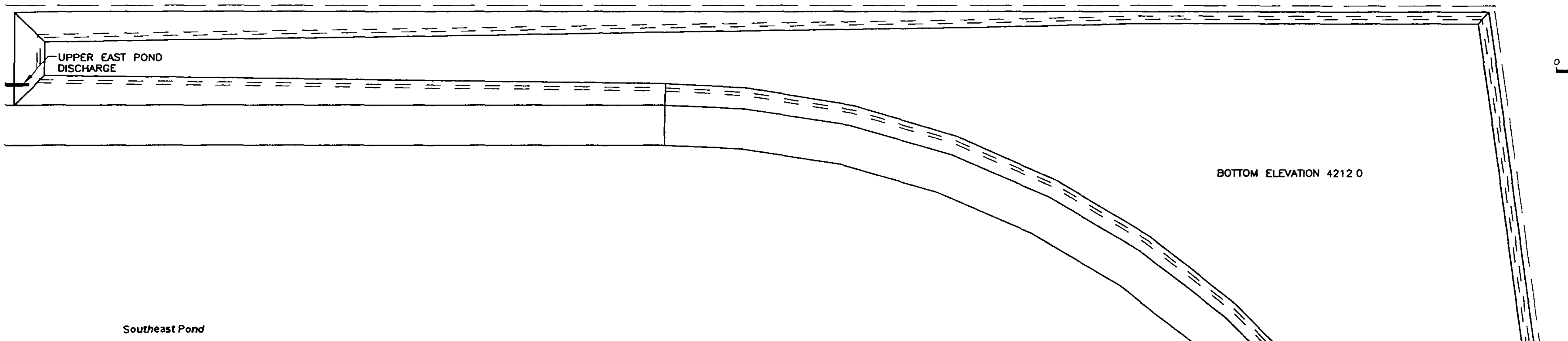
SCALE

WEBER COUNTY

CLASS VI C&D LANDFILL PERMIT
STORM WATER
OPERATIONS AREA & EAST UPPER PONDS

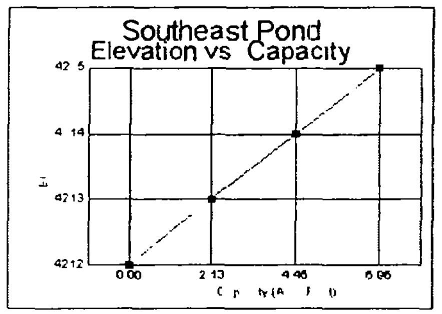
SHEET SW-2
333 01 100

FILE PROJECTS\333 - MOULDING-WEBER CO LF\01 100 -08 WEBER CO LF\CAD\CADFILES\STATE PE...EVISED\SW-2 ST PERMIT OPS-UPPER PONDS DWG
FILE DATE 1 12 2011 10 49 34 (CAH)



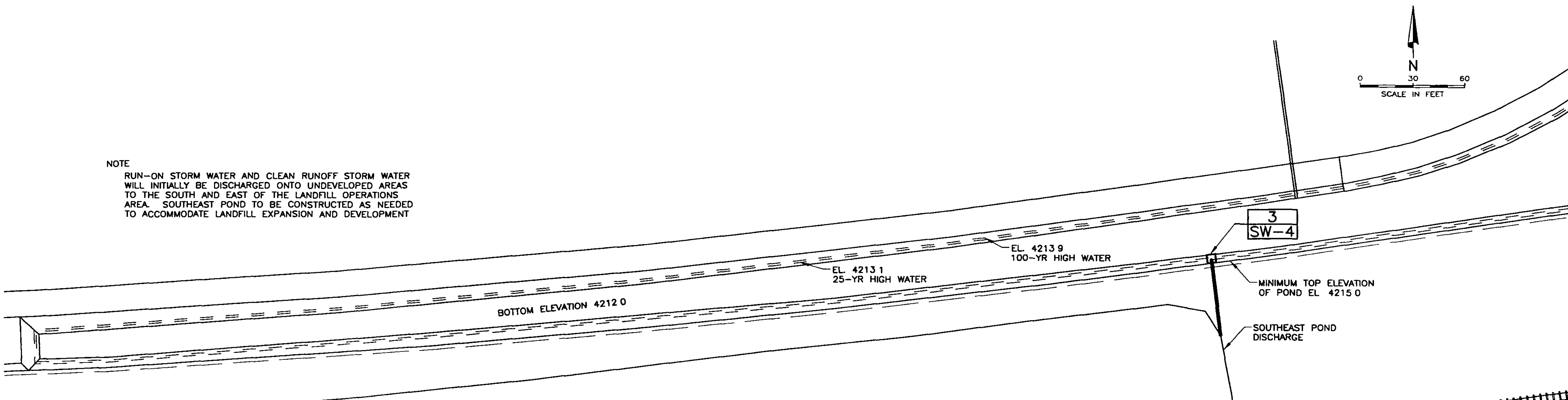
Southeast Pond

Elevation	Area (sf)	Avg Area (sf)	Volume (cf)	Volume (ac ft)
4212	88572		0	0 00
4213	96908	92740	92740	2 13
4214	105276	101092	193832	4 4[illegible]
4215	1136[illegible]	1094[illegible]7	303309	6 96



NOTE

RUN-ON STORM WATER AND CLEAN RUNOFF STORM WATER WILL INITIALLY BE DISCHARGED ONTO UNDEVELOPED AREAS TO THE SOUTH AND EAST OF THE LANDFILL OPERATIONS AREA. SOUTHEAST POND TO BE CONSTRUCTED AS NEEDED TO ACCOMMODATE LANDFILL EXPANSION AND DEVELOPMENT



SOUTHEAST POND

FILE PROJECTS\333 – MOULDING-WEBER CO LF\01 100 -08 WEBER CO LF\CAD\CADFILES\STATE PERMIT REVISED\SW-3 ST PERMIT SE POND DWG
FILE DATE 1 12 2011 10 52 37 (CAH)

HANSEN ALLEN & LUCE INC

PROFESSIONAL ENGINEER GORDON L. JONES No. 5045470-2202 STATE OF UTAH

PROJECT ENGINEER

DESIGNED GLJ	3				
DRAFTED CAH	2				
CHECKED GLJ	1				
DATE JANUARY 2011	NO	DATE	REVISIONS	BY	APVD

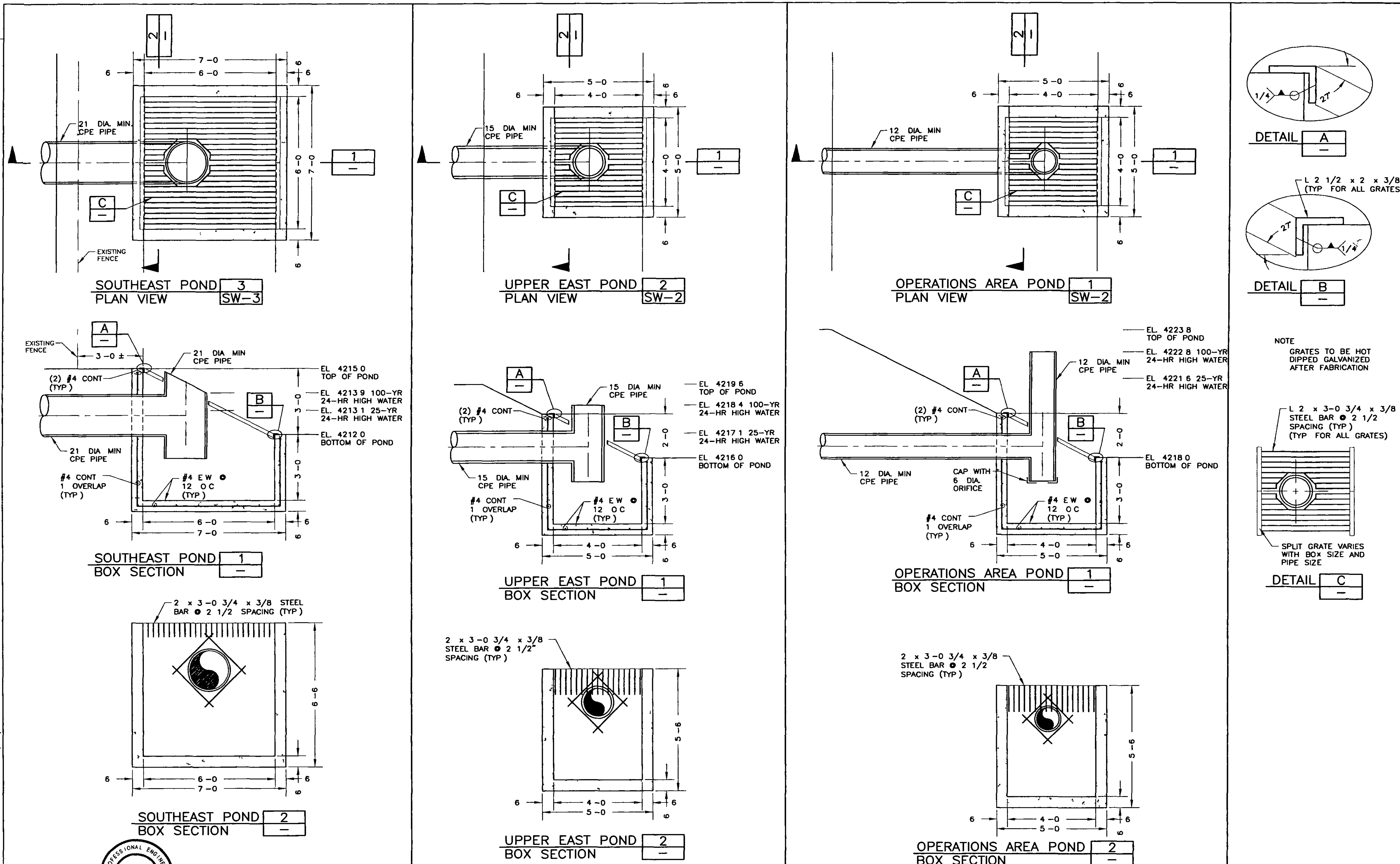
SCALE

WEBER COUNTY

CLASS VI C&D LANDFILL PERMIT
STORM WATER
SOUTHEAST POND

SHEET SW-3

333 01 100



HANSEN ALLEN & LUCE INC

PROFESSIONAL ENGINEER GORDON L. JONES 5048470-2202 STATE OF UTAH

PROJECT ENGINEER

DESIGNED GLJ	3		
DRAFTED CAH	2		
CHECKED GLJ	1		
DATE JANUARY 2011	NO	DATE	REVISIONS

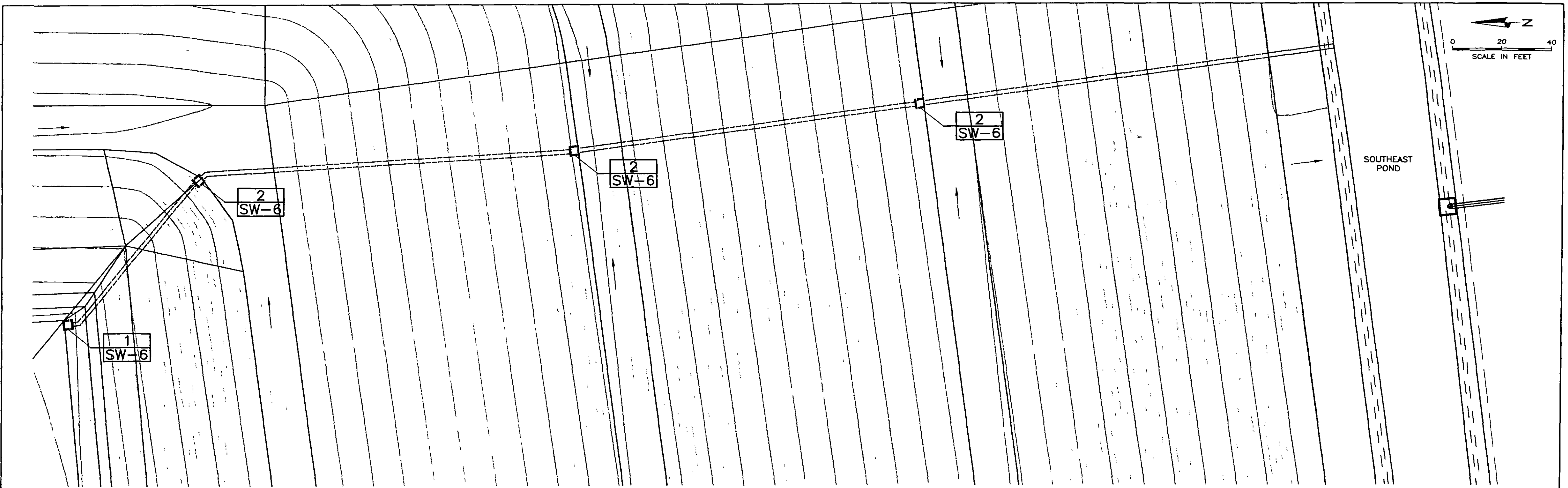
SCALE

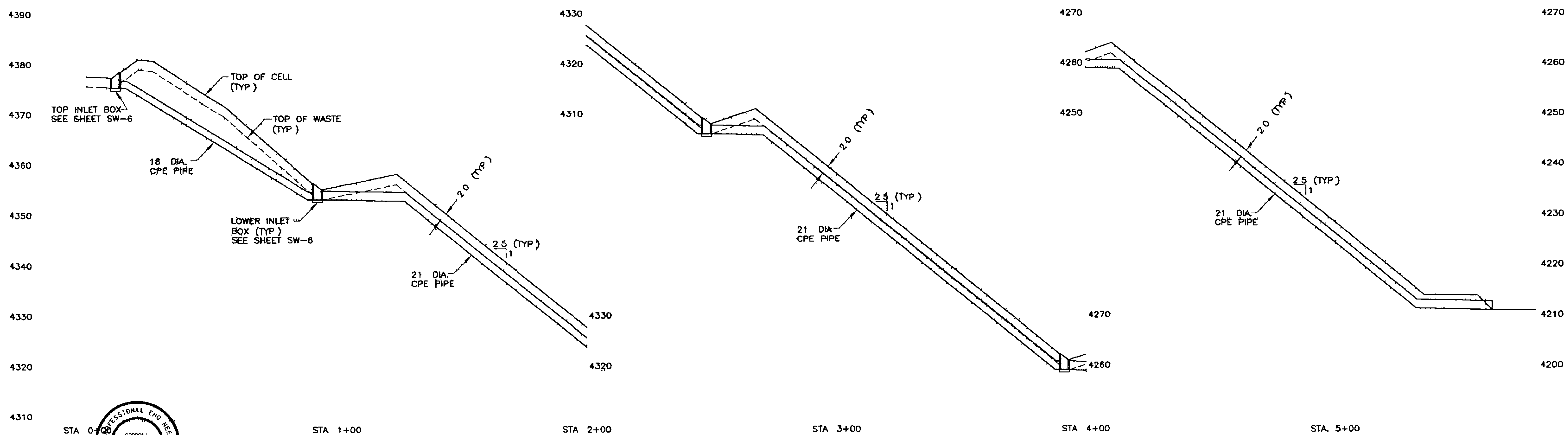
WEBER COUNTY

CLASS VI C&D LANDFILL PERMIT
STORM WATER
POND OUTLET DETAILS

SHEET SW-4

333 01 100





FILE NAME PROJECTS\333 - MOULDING-WEBER CO LF\01 100 -08 WEBER CO LF\CAD\CADFILES\STATE PERMIT REVISED\SW-5 ST PERMIT DOWN DRAIN P&P DWG
FILE DATE 1 12 2011 10 56 43 (CAH)

HANSEN ALLEN & LUCE INC

PROFESSIONAL ENGINEER GORDON L. JONES 5048470-2202 STATE OF UTAH

PROJECT ENGINEER

DESIGNED GLJ	3		
DRAFTED CAH	2		
CHECKED GLJ	1		
DATE JANUARY 2011	NO	DATE	REVISIONS	BY	APVD

SCALE: AS SHOWN

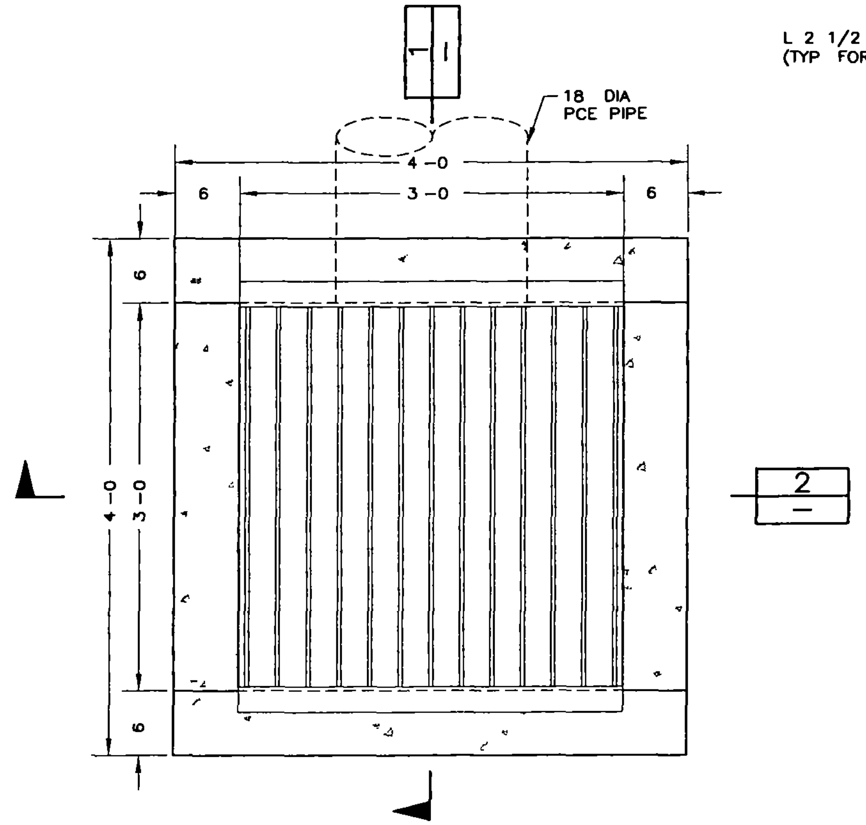
WEBER COUNTY

CLASS VI C&D LANDFILL PERMIT
STORM WATER
CLOSURE DOWN DRAIN PLAN & PROFILE

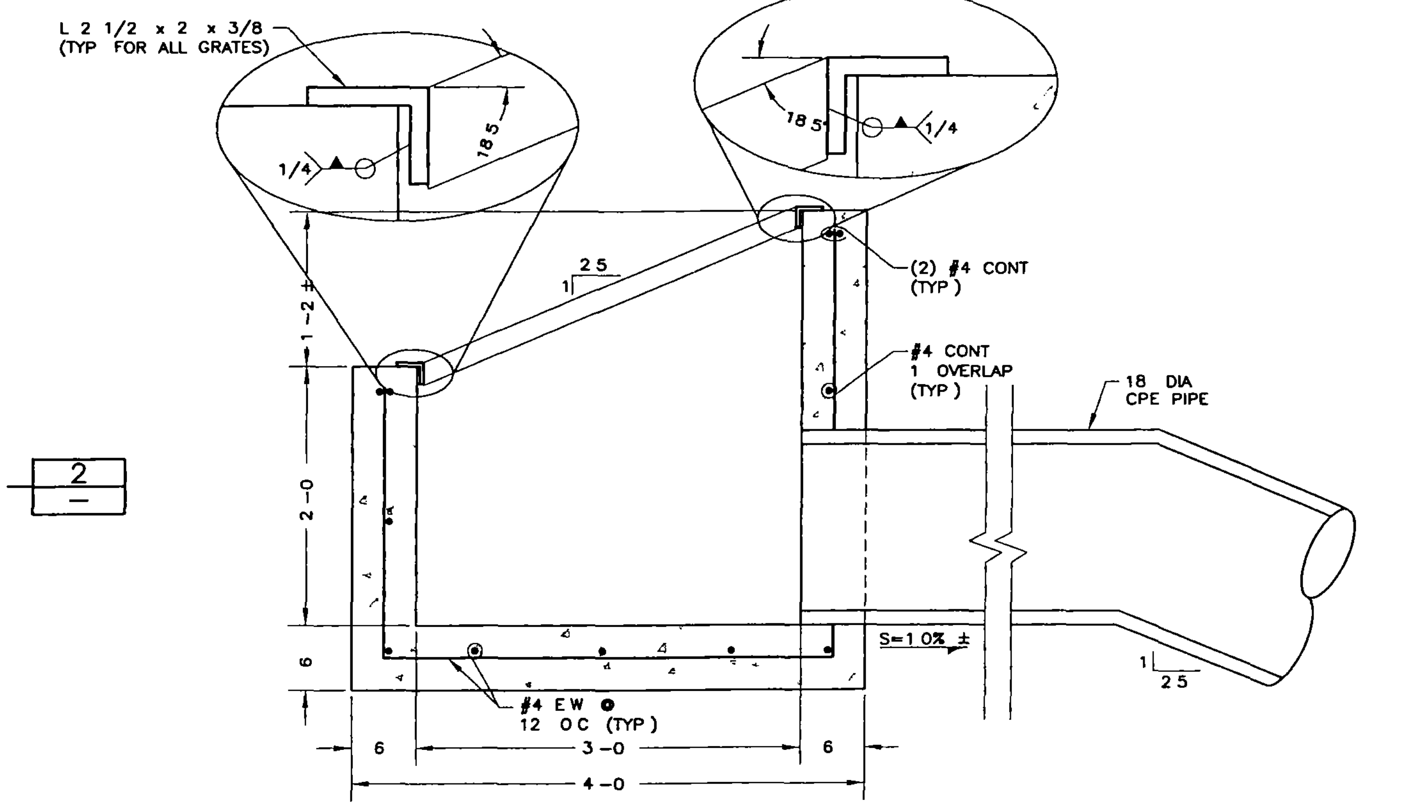
SHEET SW-5

333 01 100

10/07

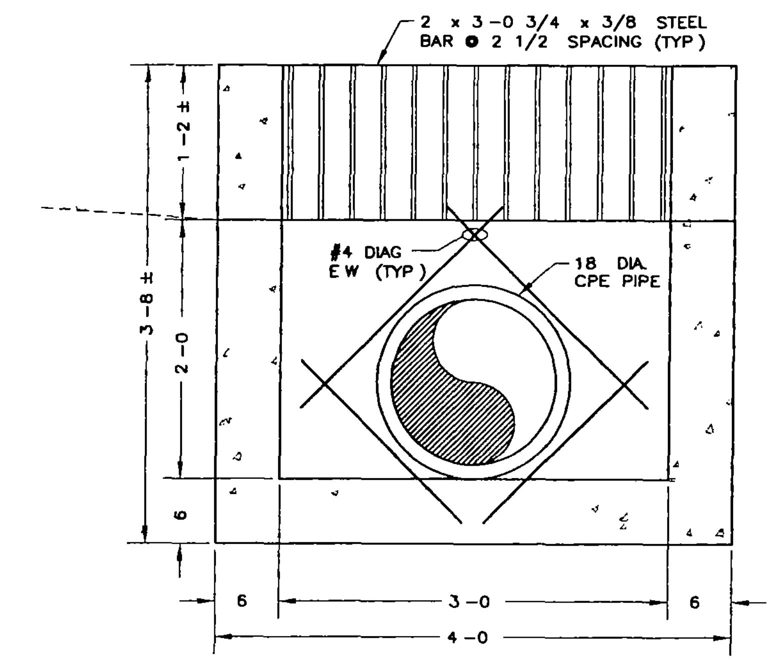


TOP INLET PLAN VIEW 1 SW-5

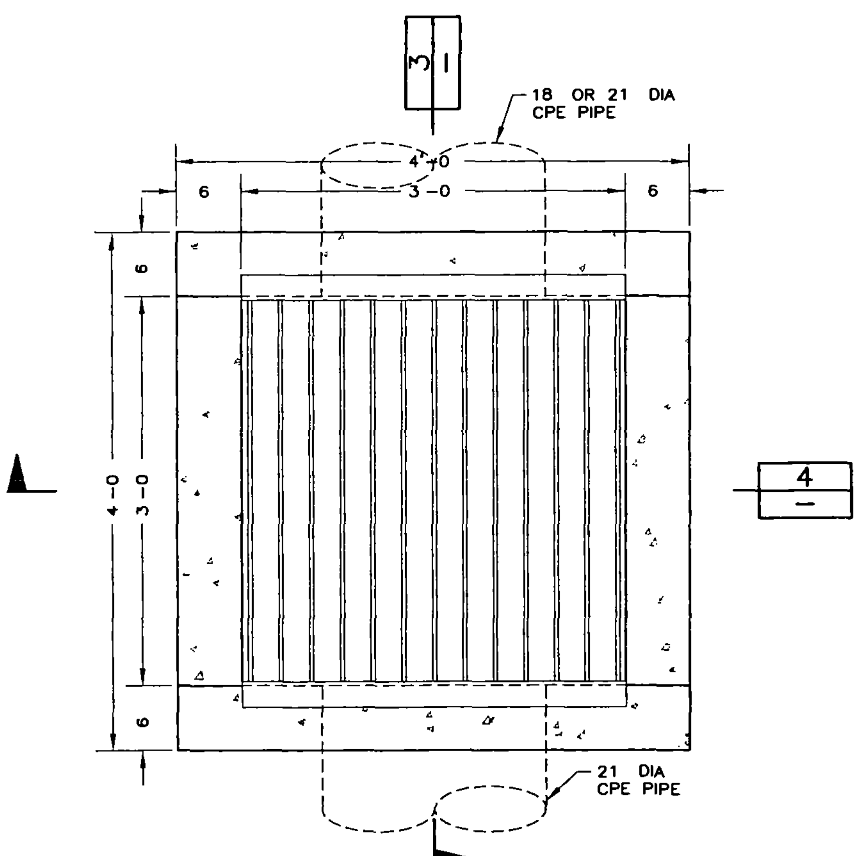


TOP INLET SECTION 1 —

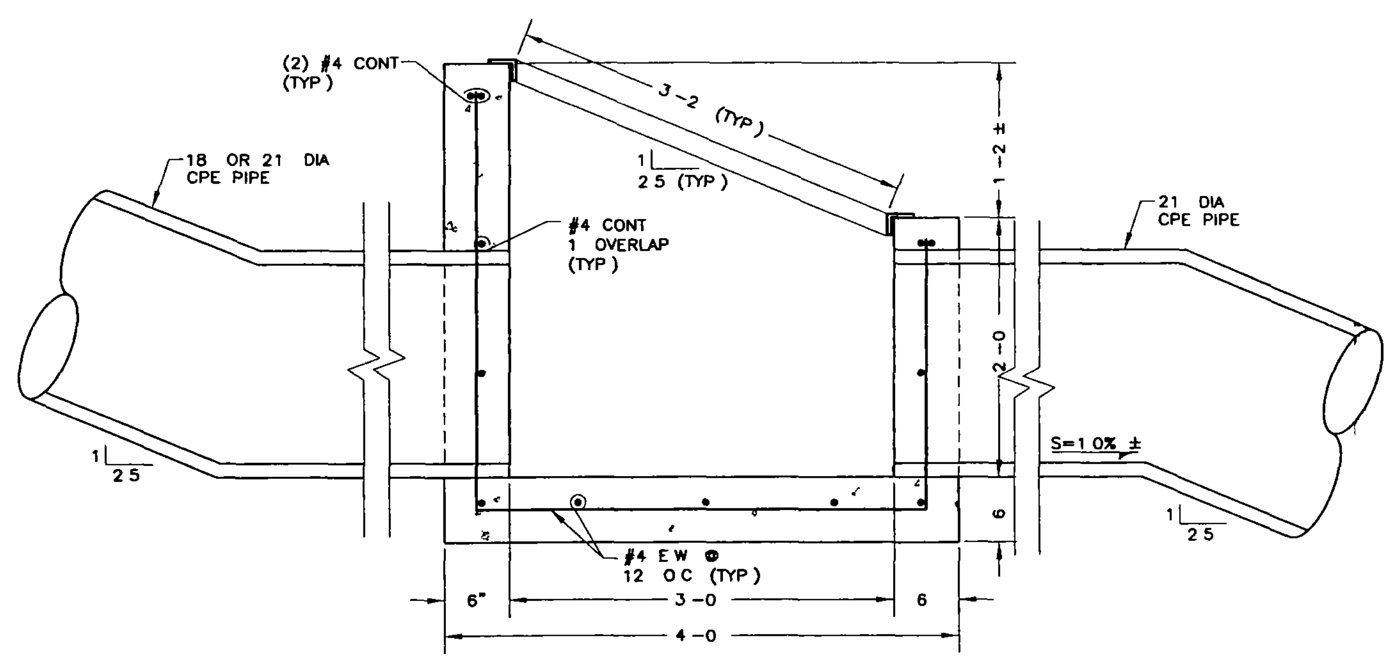
NOTE
ALL GRATES TO BE HOT DIPPED GALVANIZED AFTER FABRICATION



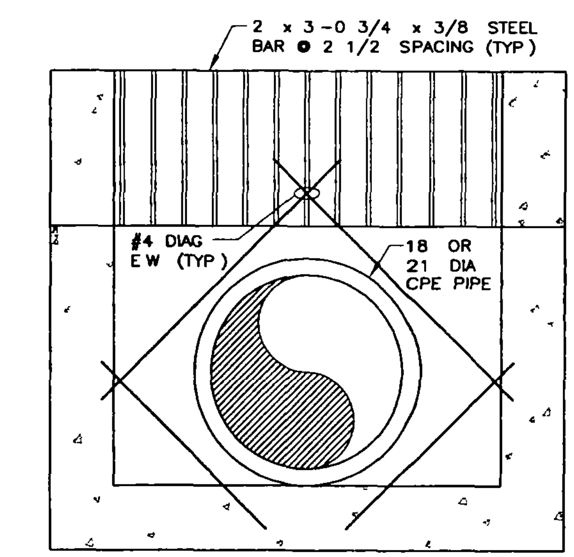
TOP INLET SECTION 2 —



LOWER INLET PLAN VIEW 2 SW-5



LOWER INLET SECTIONS 3 —



LOWER INLET SECTIONS 4 —

0 1 2
3/4 = 1 -0
SCALE

FILE NAME PROJECTS\333 – MOULDING-WEBER CO LF\01 100 -08 WEBER CO LF\CAD\CADFILES\STATE PERMIT REVISED\SW-6 ST PERMIT DOWN DRAIN INLET DETAILS.DWG
FILE DATE 1 12 2011 10 59 01 (CAH)

HANSEN ALLEN & LUCE inc

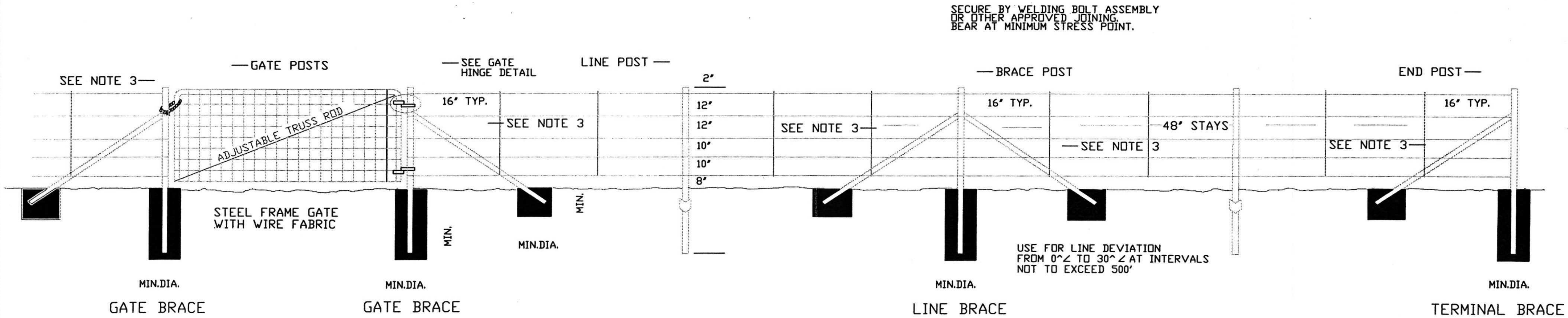
PROFESSIONAL ENGINEER GORDON L. JONES N 5048470-2202 STATE OF UTAH
PROJECT ENGINEER

DESIGNED GLJ	3			
DRAFTED CAH	2			
CHECKED GLJ	1			
DATE JANUARY 2011	NO	DATE	REVISIONS	BY	APVD

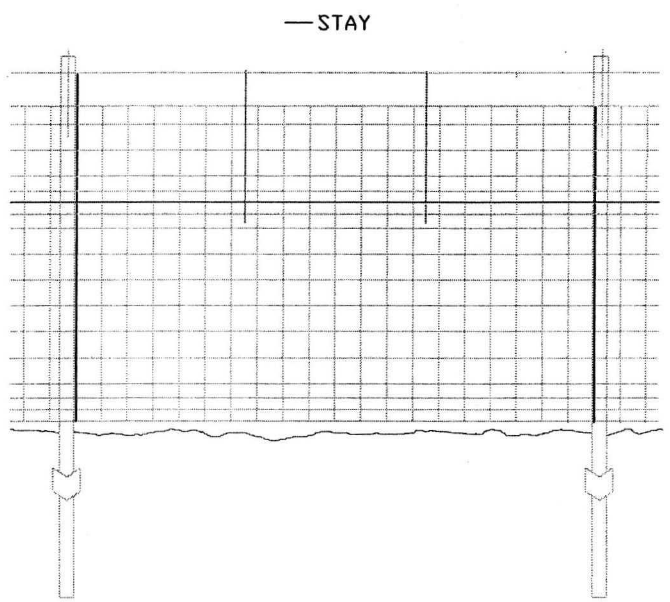
WEBER COUNTY

CLASS VI C&D LANDFILL PERMIT
STORM WATER
CLOSURE DOWN DRAIN INLET DETAILS

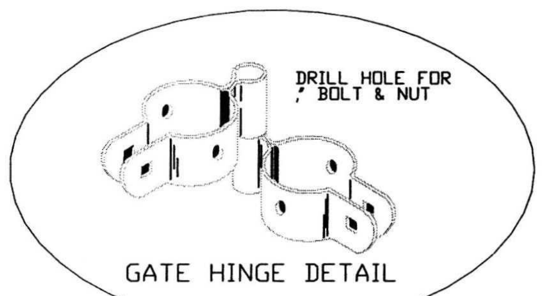
SHEET SW-6
333 01 100



INSTALLATION WITH METAL POSTS
(TYPICAL)



RIGHT OF WAY FENCE TYPE G (DEER BARRIER)



GATE HINGE DETAIL

FOR FENCETYPES A, B, D, E AND F POST SIZE, SPACING AND BRACING ARE AS SHOWN IN TYPICAL INSTALLATION ABOVE. SPACE 2 STAYS EVENLY BETWEEN EACH SET OF POSTS.

NOTES:

1. SET METAL POSTS IN CLASS 'B' CONCRETE.

2. LINE POSTS FOR TYPE A,B,D,,E & F FENCE
   A-TEE CHANNELS OR 'Y' OR 'U' SECTIONS, MINIMUM WEIGHT 1.33 lb/ft. ON LENGTH.
   B-STEEL PIPES,1.900" OUTSIDE DIAMETER SCHEDULE 40 PIPE, WEIGHT 2.72 lb/ft OF LENGTH OR HIGH TENSILE TRIPLE COATED STEEL PIPE, WEIGHT 2.23 lb/ft OF LENGTH.
   C-ALTERNATE LINE POSTS APPROVED BY THE ENGINEER TO HAVE A MINIMUM RESISTING SECTION MODULUS OF 0.32" PERPENDICULAR AND 0.12" PARALLEL TO THE FENCE LINE. ANCHOR PLATES TO POSTS, MINIMUM SURFACE AREA OF 20", MINIMUM 18 GAUGE THICKNESS AND MINIMUM WEIGHT 0.67 lb/EACH

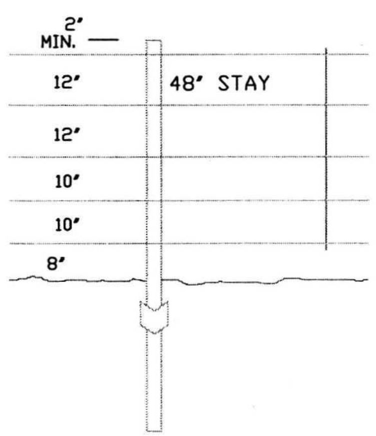
3. BRACE AND CORNER PSTS (ASTM A 36)
   A-BRACE AND CORNER POSTS FOR TYPE A,B,D,E & F FENCES USE 2□"x 2□"x ," ANGLES, MINIMUM WEIGHT 4.10 lb/ft.
   B-BRACES FOR TYPE A,B,D,E& F FENCES, USE 2"x 2" x ," ANGLES, MINIMUM WEIGHT 3.19 lb/ft.
   C-TYPE G: PIPE FOR CORNER AND BRACE POSTS, USE 2.375" OUTSIDE DIAMETER, WEIGHT 3.65 lb/ft. OR HIGH TENSILE TRIPLE COATED STEEL, 2.375" OUTSIDE DIAMETER WEIGHT 3.11 lb/ft.

4. LINE POSTS FOR TYPE A,B,D,E & F FENCE: 7'-0" LENGTH
   LINE POSTS FOR TYPE G FENCE: 10'-0"

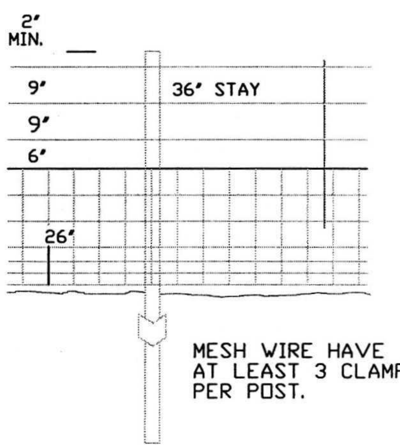
5. TERMINATE MESH AND BARBER WIRE AT EACH CORNER POST.

6. USE CORNER POST BRACES ON ALL FENCE LINE DEVIATIONS GREATER THAN 30^. USE CORNER POST BRACES ON TYPE G FENCE WITH DEVIATIONS GREATER THAN 15^.

7. GALVANIZE METAL PER (ASTM A 702) OR PAINTED (ASTM A 123)

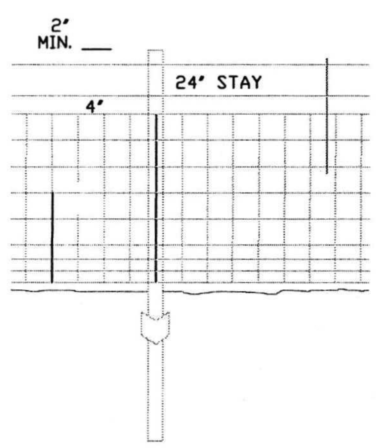


TYPE A

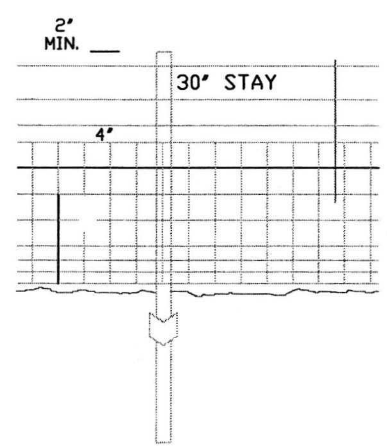


MESH WIRE HAVE AT LEAST 3 CLAMPS PER POST.

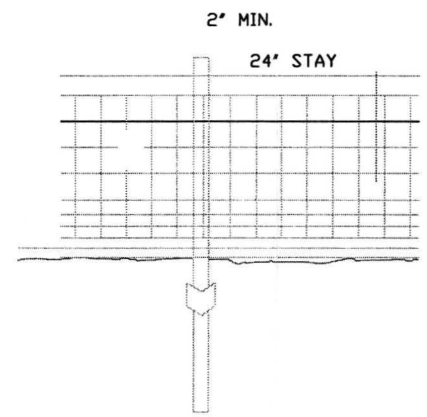
TYPE B



TYPE D



TYPE E



TYPE F

TO BE INSTALLED IN DEER COUNTRY

REVISIONS				
NO.	DATE	APPR		REMARKS
1	04/01/04	K.V	REVISED NOTE 3C	

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — APR.29,2004 DATE
CHAIRMAN STANDARDS COMMITTEE APPROVED — APR.29,2004 DATE
DEPUTY DIRECTOR

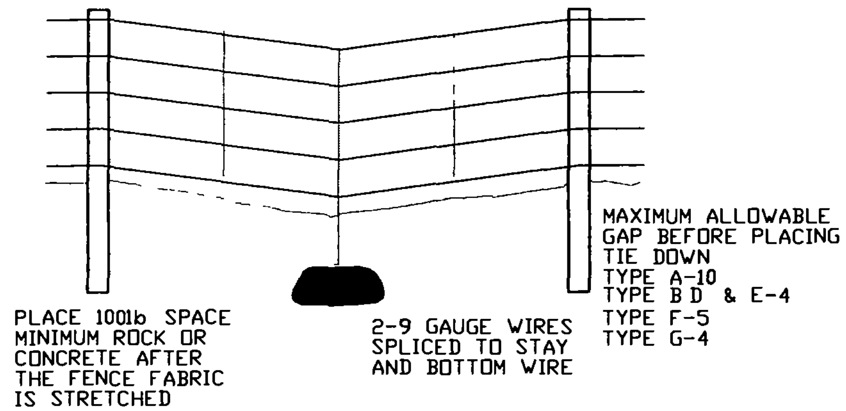
RIGHT OF WAY
FENCE AND GATES
(METAL POST)

STANDARD DRAWING TITLE

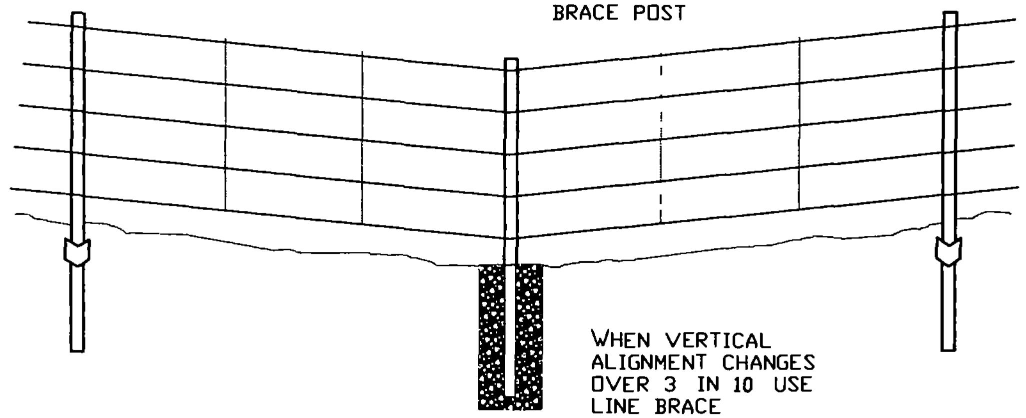
STD DWG
FG 2A

PROJECTS\333 - MOULDING-WEBER CO LF\01.100 -08 WEBER CO LF\CAD\CADFILES\STATE PERMIT REVISED\FG02A.DWG
1.12.2011 12:06:23 (CAH)

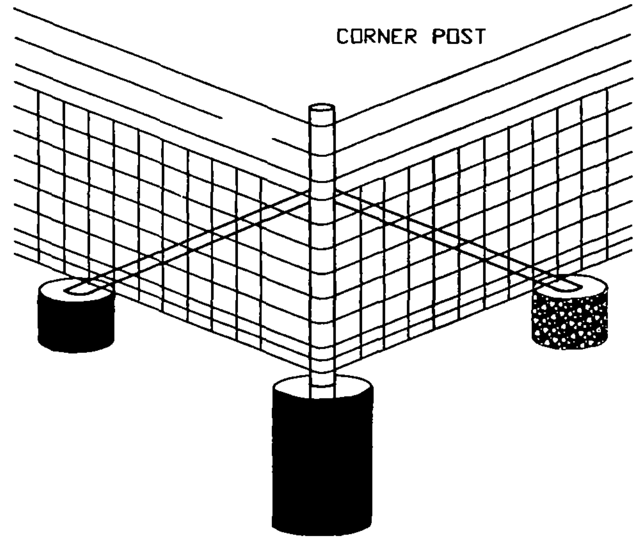
INSTALLATION WITH METAL POSTS
(TYPICAL)



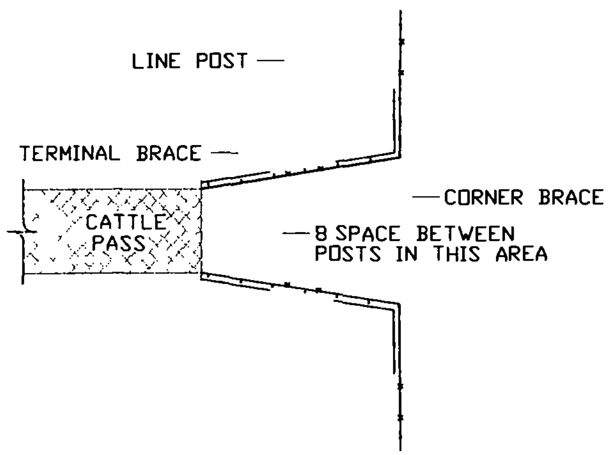
TYPICAL SAG SECTION



TYPICAL VERTICAL ALIGNMENT CHANGE

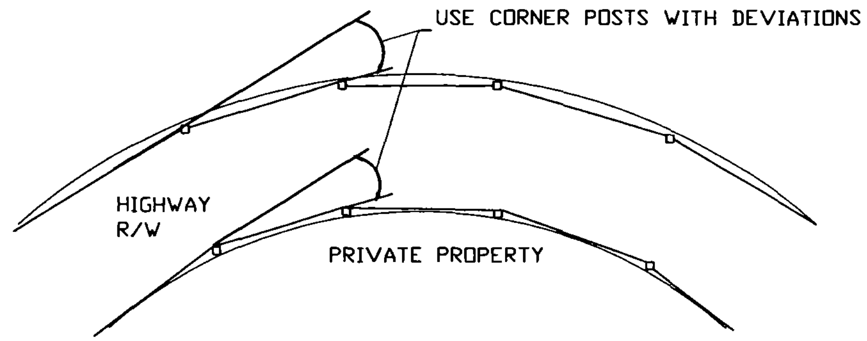


CORNER BRACE
SEE NOTE #6 STD DWG FG 2A

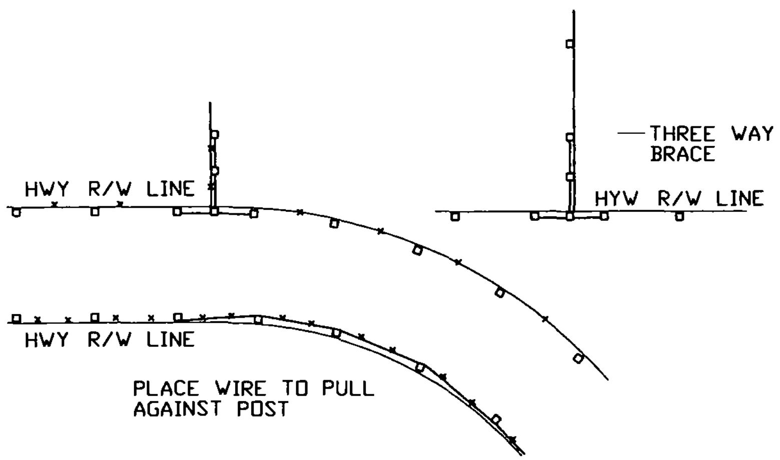


CATTLE PASS FENCE
DETAIL

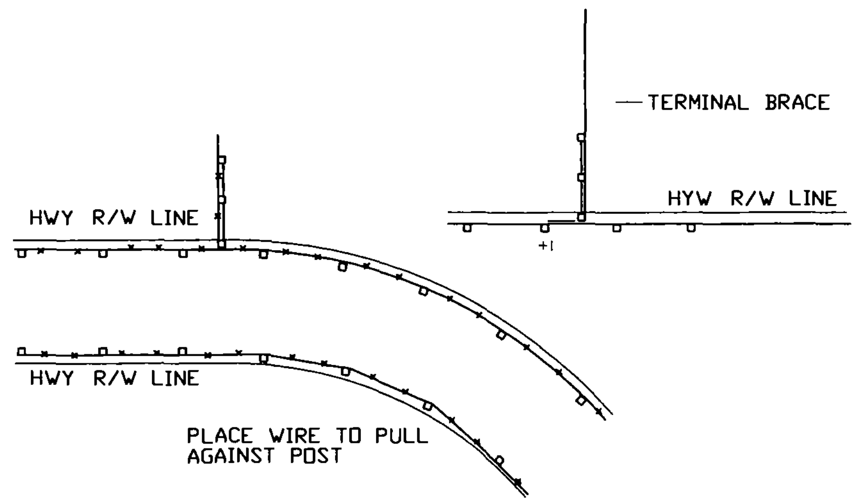
DEER COUNTRY



DEER BARRIER ON CURVES
SEE NOTE #6 STD DWG FG 2A



POST & WIRE LOCATION



POST & WIRE LOCATION

NO	DATE	APPR	REVISIONS	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY UTAH

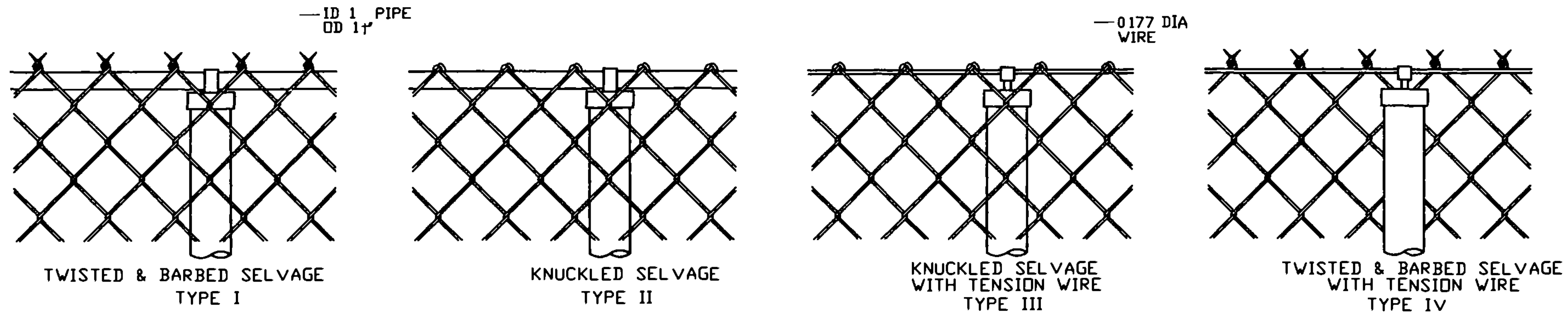
RECOMMENDED FOR APPROVAL
CHAIRMAN STANDARDS COMMITTEE
APPROVED
DEPUTY DIRECTOR

RIGHT OF WAY
FENCE AND GATES
(METAL POST)

STANDARD DRAWING TITLE

STD DWG
FG 2B

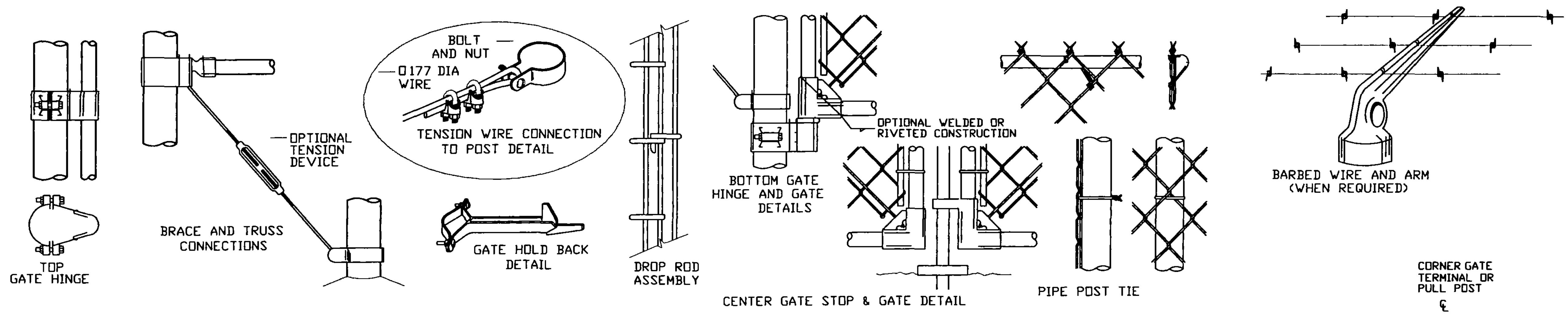
PROJECTS\333 - MOULDING-WEBER CO LF\01 100 -08 WEBER CO LF\CAD\CADFILES\STATE PERMIT REVISED\FG02B.DWG
1/12/2011 12:06:56 (CAH)



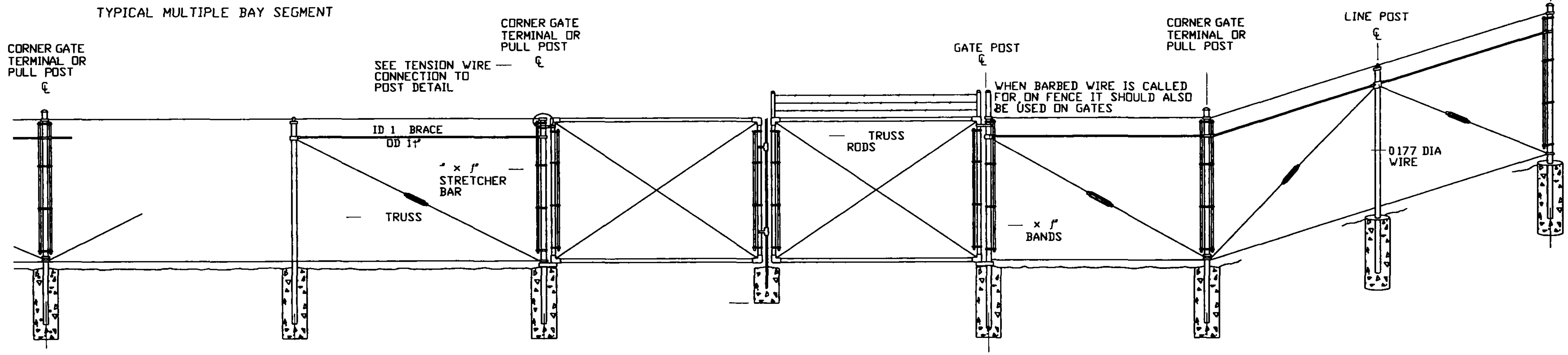
NOTES

1 POSTS: SCHEDULE 40 PIPE
TRIPLE COATED HIGH TENSILE STEEL PIPE OR ROLL-FORMED C-SECTION OF THE SIZE SHOWN IN THE CHART AND AS DEFINED IN THE STANDARD SPECIFICATION WEIGHT IN lb/ft WITH TOLERANCE OF 5 PERCENT OTHER TYPES OF POSTS WITH EQUAL OR GREATER SECTION MODULUS MAY BE USED IF APPROVED IN ADVANCE BY THE ENGINEER

2 FABRIC HEIGHTS LESS THAN 5:
TRUSS RODS AND BRACES NOT REQUIRED



TYPICAL MULTIPLE BAY SEGMENT



HEIGHT	GATE OPENING	GATE POST	GATE FRAME
UNDER 6	SINGLE TO 6 OR DOUBLE TO 12	2	1
	SINGLE OVER 6 TO 8 OR DOUBLE OVER 12 TO 16	2□	1□'
	SINGLE OVER 8 TO 12 OR DOUBLE 16 TO 24	3□'	
6 AND OVER *	SINGLE TO 6 OR DOUBLE TO 12	2□'	1□'
	SINGLE OVER 6 TO 13 OR DOUBLE OVER 12 TO 24	3□'	
	SINGLE OVER 13 TO 18 OR DOUBLE OVER 24 TO 36	6	
	SINGLE OVER 18 OR DOUBLE OVER 36	8	

* GATES OVER 6 IN HEIGHT AND WIDER THAN 12 WILL REQUIRE 3 INDUSTRIAL PRESSED STEEL HINGES

HEIGHT OF FABRIC	DEPTH OF POSTS	LENGTH OF END CORNER OR PULL POSTS	LENGTH OF LINE POSTS	SIZE OF POSTS									
				END CORNER & PULL POSTS				LINE POST MIN SIZE					
				NOM SIZE	OUTSIDE DIA	PIPE WEIGHT ASTM A 120	PIPE WEIGHT TRIPLE COAT	NOM SIZE	OUTSIDE DIA	PIPE WEIGHT ASTM A 120	PIPE WEIGHT TRIPLE COAT	OUTSIDE DIMENSIONS C-SECTION	WT/FT
7	3	10	9-8	2□	2875	579	464	2	2375	365	311	1875 x 1625	228
6	3	9	8-8	2	2375	365	311	1□'	1900	272	223	1875 x 1625	185
5	3	8	7-8	2	2375	365	311	1□'	1900	272	223	1875 x 1625	185
4	2	6	5-8	2	2375	365	311	1□'	1900	272	223	1875 x 1625	185
3	2	5	4-8	2	2375	365	311	1□'	1900	272	223	1875 x 1625	185

REVISIONS

NO	DATE	APPR	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY UTAH

RECOMMENDED FOR APPROVAL — MARCH 15 2004 DATE
CHAIRMAN STANDARDS COMMITTEE
APPROVED — MARCH 15 2004 DATE
DEPUTY DIRECTOR

STANDARD DRAWING TITLE
CHAIN LINK FENCE

STD DWG
FG 6

PROJECTS\333 - MOULDING-WEBER CO LF\01 100 -08 WEBER CO LF\CAD\CADFILES\STATE PERMIT REVISED\FG06 DWG
1 12 2011 12 07 25 (CAH)

APPENDIX 2

GEOTECHNICAL INVESTIGATION

Applied Geotechnical Engineering Consultants Inc

GEOTECHNICAL INVESTIGATION

PROPOSED LANDFILL

10500 WEST 900 SOUTH

PLAIN CITY UTAH

PREPARED FOR

MOULDING AND SONS
C/0 HANSEN ALLEN & LUCE
6771 SOUTH 900 EAST
MIDVALE UTAH 84047

ATTENTION KENT STAHELI

PROJECT NO 1080092 NOVEMBER 11 2008

TABLE OF CONTENTS

EXECUTIVE SUMMARY

1 The subsurface materials encountered at the site consist of approximately ½ to 1 foot of topsoil overlying predominantly clay in the lower portions of the site and sand gravel and bedrock in the upper elevations of the site The borings drilled along the north and west edges of the property encountered bedrock at relatively shallow depths and the borings refused in the bedrock at depths ranging from approximately 3 to 15½ feet The soil thickness is substantially greater in the lower elevations of the site Bedrock was encountered at depths of approximately 76 29 and 95½ feet in Borings B 5 B 6 and B 7 respectively Bedrock was not encountered in Boring B 5 but very dense gravel was encountered in the lower portion of the boring below a depth of approximately 91 feet

2 Subsurface water was measured at depths ranging from approximately 6 to 12 feet No subsurface water was encountered in Borings B 1 B 2 and B 3 as these borings terminated at a relatively shallow depth in bedrock

3 We understand that the landfill could be on the order of 250 feet thick with side slopes on the order of 3 horizontal to 1 vertical and a total unit weight of the landfill of 45 to 75 pounds per cubic foot Based on this assumption and the subsurface conditions encountered we estimate settlement could be on the order of 5 to 6½ feet near the middle of the landfilled area for the waste density of 45 to 75 pounds per cubic foot respectively

4 Based on the subsurface conditions encountered laboratory test results and our analysis we estimate the safety factor against failure for the proposed landfill configuration to be 1 8 under static conditions and on the order of 1 2 under seismic conditions The seismic condition does not consider the potential for liquefaction of the underlying soil

5 The site is underlain predominantly by clay There are some silt and sand layers Some of the sand is potentially liquefiable Information from the borings suggests that there could be up to approximately 6 inches of settlement due to IBC 2006 design ground motion This liquefaction could result in some lateral movement of the south and east sides of the landfill We estimate this lateral movement to be on the order of 2 feet for IBC 2006 design ground motion

SCOPE

This report presents the results of a geotechnical investigation for a proposed landfill to be constructed at 10500 West 900 South in Plain City Utah The report presents the subsurface conditions encountered laboratory test results and an estimate of settlement and stability for the landfill The study was conducted in general accordance with our proposal dated February 20 2008

Field exploration was conducted to obtain information on the subsurface conditions Samples obtained from the field investigation were tested in the laboratory to determine physical and engineering characteristics of the on site soil Information obtained from the field and laboratory was used to define conditions at the site for our engineering analysis

This report has been prepared to summarize the data obtained during the study and to present our conclusions and recommendations based on the proposed construction and subsurface conditions encountered Design parameters and a discussion of geotechnical engineering considerations related to construction are included in the report

SITE CONDITIONS

At the time of our field investigation there were no permanent structures or pavement on the site Most of the site consists of undeveloped pasture There is a strip of land along the west half of the north end of the property and the north half of the west edge of the property which we understand has been mined for aggregate

The ground surface of the site generally slopes down toward the south and east particularly along the north and west edges of the property There is a depressed area in the northwest corner of the property where material has been removed There is a small pond in this excavated area near the center of the west edge of the property which had water in it at the time of our field investigation

Vegetation at the site consists predominantly of grass with some brush in the northwest portion of the property

FIELD STUDY

The field study consisted of drilling eight borings excavating seven test pits and pushing a cone for cone penetration testing at four locations The borings were drilled between April 8 and 10 2008 using 8 inch diameter hollow stem auger powered by an all terrain drill rig The test pits were excavated on April 24 2008 using a rubber tired backhoe The borings and test pits were logged and soil samples obtained by an engineer from AGEC Logs of the subsurface conditions encountered in the borings and test pits are graphically shown on Figures 2 through 6 with legend and notes on Figure 7

The test pits were backfilled without significant compaction The backfill in the test pits should be properly compacted where it will support proposed buildings slabs or pavement

The cone penetration tests were performed on April 30 2008 Results of the tests are presented in the Appendix

SUBSURFACE CONDITIONS

The subsurface materials encountered at the site consist of approximately ½ to 1 foot of topsoil overlying predominantly clay in the lower portions of the site and sand gravel and bedrock in the upper elevations of the site The borings drilled along the north and west edges of the property encountered bedrock at relatively shallow depths and the borings refused in the bedrock at depths ranging from approximately 3 to 15½ feet The soil thickness is substantially greater in the lower elevations of the site Bedrock was encountered at depths of approximately 76 29 and 95½ feet in Borings B-5 B 6 and B 7 respectively Bedrock was not encountered in Boring B 5 but very dense gravel was encountered in the lower portion of the boring below a depth of approximately 91 feet

A description of the various soils and bedrock encountered in the borings and test pits follows

Topsoil The topsoil consists of lean clay with some sand and gravel particularly along the upper elevations at the site The topsoil is moist dark brown and contains roots and organics

Lean Clay The clay contains a small to moderate amount of sand and gravel with some silt and sand layers The clay is very soft to very stiff moist to wet and brown to green to gray with some iron oxide staining

Laboratory tests performed on samples of the clay indicate that it has natural moisture contents ranging from 14 to 64 percent and natural dry densities ranging from 63 to 117 pounds per cubic foot (pcf) Results of consolidation tests performed on samples of the clay indicate that it will compress a small to large amount with the addition of light to heavy loads Results of the consolidation tests are presented on Figures 8 through 14 Triaxial compression and direct shear tests were performed on samples of the clay Results of these tests are presented on Figures 16 17 and 19

A permeability test was performed on a sample of the clay obtained from Test Pit TP 1 at a depth of approximately ½ foot Results of the permeability test indicate that it has a permeability of $2x10^{6}$ centimeters per second

Interlayered Lean Clay and Silt The interlayered soil contains some sand layers It is soft to stiff moist to wet and brown to gray with some cemented particles

Laboratory tests performed on a sample of the interlayered soil indicate that it has a natural moisture content of 23 percent and a natural dry density of 98 pcf

A permeability test was performed on a sample of the interlayered clay and silt obtained from Test Pit TP 7 at a depth of approximately 2½ feet Results of the permeability test indicate that it has a permeability of $2x10^{7}$ centimeters per second

Clayey Sand The sand contains some clay layers It is loose to medium dense moist to wet and brown to gray with some cemented layers and particles

Laboratory tests performed on samples of the clayey sand indicate that it has natural moisture contents ranging from 15 to 20 percent and natural dry densities ranging from 112 to 120 pcf

Silty Sand The sand contains some clay layers It is loose to medium dense wet and brown to dark gray to green with some iron oxide staining

Laboratory tests performed on samples of the silty sand indicate that it has natural moisture contents ranging from 18 to 34 percent and natural dry densities ranging from 90 to 111 pcf

Poorly Graded Sand with Silt The sand contains some gravel and clay layers It is medium dense to dense wet and brown to gray with cemented particles

Laboratory tests performed on samples of the sand indicate that it has natural moisture contents ranging from 10 to 11 percent and natural dry densities ranging from 123 to 129 pcf

Interlayered Sand and Gravel The sand and gravel contains some clay layers It contains a small amount of silt is medium dense to dense wet and black to brown

Clayey Gravel with Sand - The gravel is medium dense to dense moist to wet and brown to gray

Poorly Graded Gravel with Sand The gravel is medium dense wet and brown to gray

Bedrock Two bedrock types were encountered at the site One consists of a diamictite which is moderately to highly weathered hard to very hard variably cemented fine grained clayey matrix with pebble to gravel sized subangular to angular inclusions The rock is gray to dark gray and occasionally yellowish brown

The other bedrock encountered consists of slate which is moderately to highly weathered hard to very hard highly foliated has slaty cleavage and some iron staining along cleavage planes The slate is gray to black

Laboratory tests performed on a sample of the slate indicate that it has a natural moisture content of 3 percent and a natural dry density of 112 pcf Results of a direct shear test performed on the slate which was ground to a powder compacted into a mold near its natural moisture content and density are presented on Figure 15

Results of the laboratory tests are summarized on Table I and are included on the logs of the borings and test pits

SUBSURFACE WATER

Subsurface water was encountered at depths ranging from approximately 6 to 12 feet based on measurements taken up to approximately 167 days after drilling borings or excavation of test pits No subsurface water was encountered in Borings B 1 B 2 and B 3 as these borings were drilled in the upper elevations of the site and encountered bedrock at a shallow depth Slotted PVC pipe was installed in the borings and test pits to facilitate future measurement of the water level Fluctuations in the water level can be expected over time

PROPOSED CONSTRUCTION

We understand that the landfill will consist of construction waste with a significant amount of wood product We understand that much of the concrete in the waste will be recycled for other uses and thus the concrete content of the landfill will be relatively low The landfill is planned to be approximately 250 feet in height with constructed side slopes of 3 horizontal to 1 vertical Benches are planned for each approximately 50 feet of vertical rise

STABILITY ANALYSIS

The stability analysis assumes that the waste will be composed of construction waste with a significant amount of wood product Based on the literature we have assumed a total unit weight for the landfill of 45 to 75 pcf and strengths consisting of a cohesion of 300 pounds per square foot (psf) and a friction angle of 33 degrees Based on laboratory testing of the subsurface materials we have assumed a total unit weight of 120 pcf a cohesion of 420 psf and a friction angle of 18 5 degrees for the native soil below the landfill Based on these assumptions we have analyzed the stability of the landfill using the modified Bishop Method of analysis A safety factor against failure under static conditions is estimated to be 1 8

For the seismic condition in which a large magnitude earthquake may occur along the Wasatch Fault to the east of the site we have assumed ground shaking with a probability of occurrence of 2 percent in 50 years factored by two thirds We have then assumed an allowable 2 inches of deformation This results in a horizontal ground acceleration of 0 13g which was used to perform a pseudo static analysis Results of the analysis indicate that the safety factor is 1 2 for this seismic condition and the assumed landfill configuration and soil strengths as indicated above

SETTLEMENT ANALYSIS

The estimate for settlement assumes the landfill layout as described in the Proposed Construction section of the report a landfill total unit weight of 45 to 75 pcf and soil parameters determined from the subsurface conditions encountered and laboratory test results Based on the results of our analysis we estimate on the order of 5 to 6½ feet of settlement for the 45 to 75 pcf waste density respectively could occur towards the center of the landfilled area decreasing out toward the edges No significant settlement is expected where the landfill will extend over the bedrock and the bedrock is at a relatively shallow depth such as along the north and west edges of the property

LIQUEFACTION ANALYSIS

The site is underlain predominantly by clay which is not susceptible to liquefaction However there are some layers of sand which based on the boring information could liquefy during an IBC 2006 design seismic event We estimate up to approximately 6 inches of liquefaction induced settlement could occur as suggested by Boring B 5 This liquefaction could result in some lateral movement of the south and east sides of the landfill depending on the extent of the liquefaction We estimate this lateral movement to be on the order of 2 feet for IBC 2006 design ground motion

LIMITATIONS

This report has been prepared in accordance with generally accepted soil and foundation engineering practices in the area for the use of the client for design purposes The conclusions and recommendations included within the report are based on the information obtained from the borings drilled CPT testing test pits excavated at the approximate locations indicated on Figure 1 and the data obtained from laboratory testing Variations in the subsurface conditions may not become evident until additional exploration or excavation is conducted If the proposed construction subsurface conditions or groundwater level is found to be significantly different from what is described in this report we should be notified to reevaluate the recommendations given

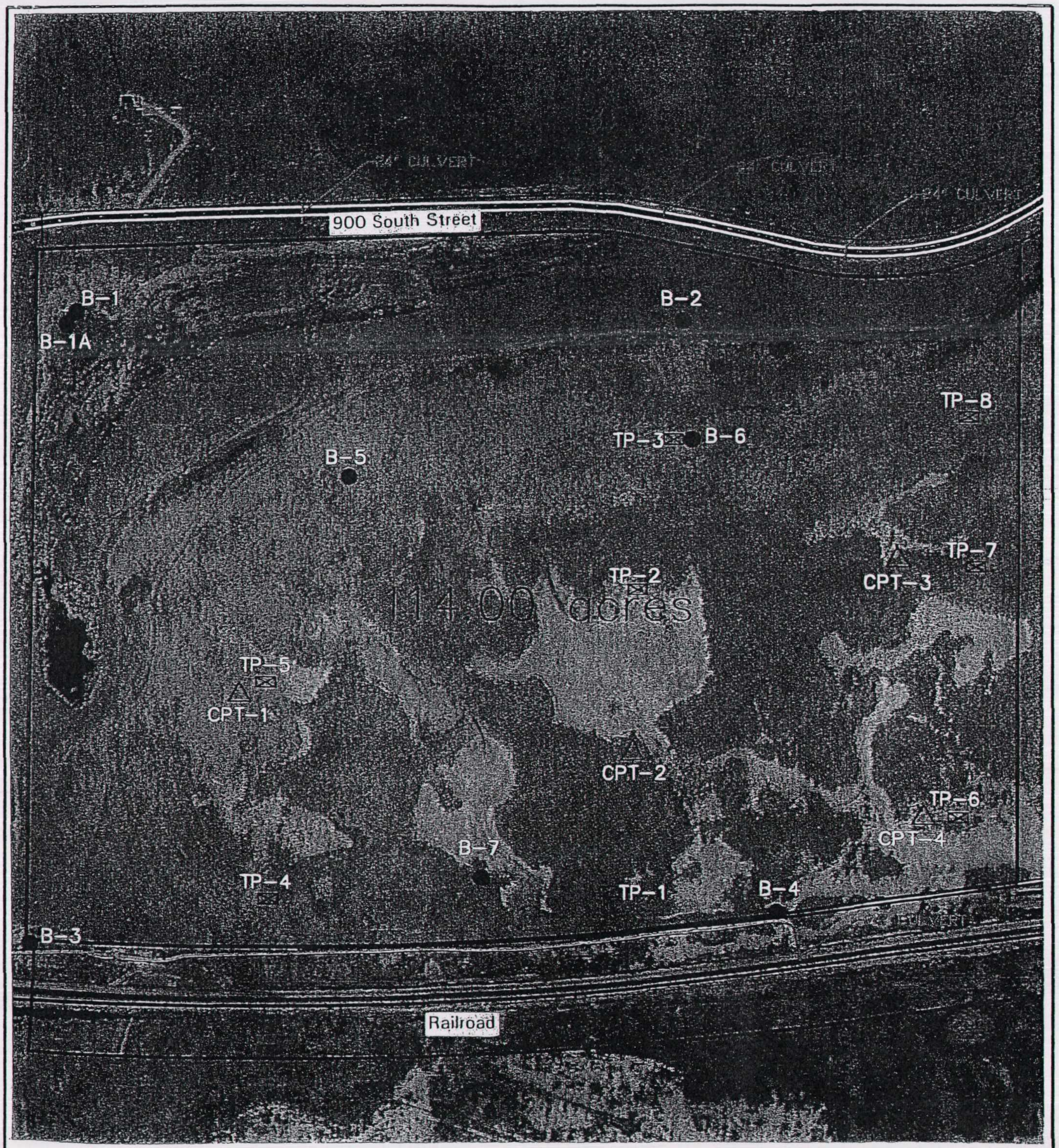
APPLIED GEOTECHNICAL ENGINEERING CONSULTANTS INC

11/24/08

Douglas R Hawkes P E P G

Reviewed by Matthew B Olsen P E

DRH/dc



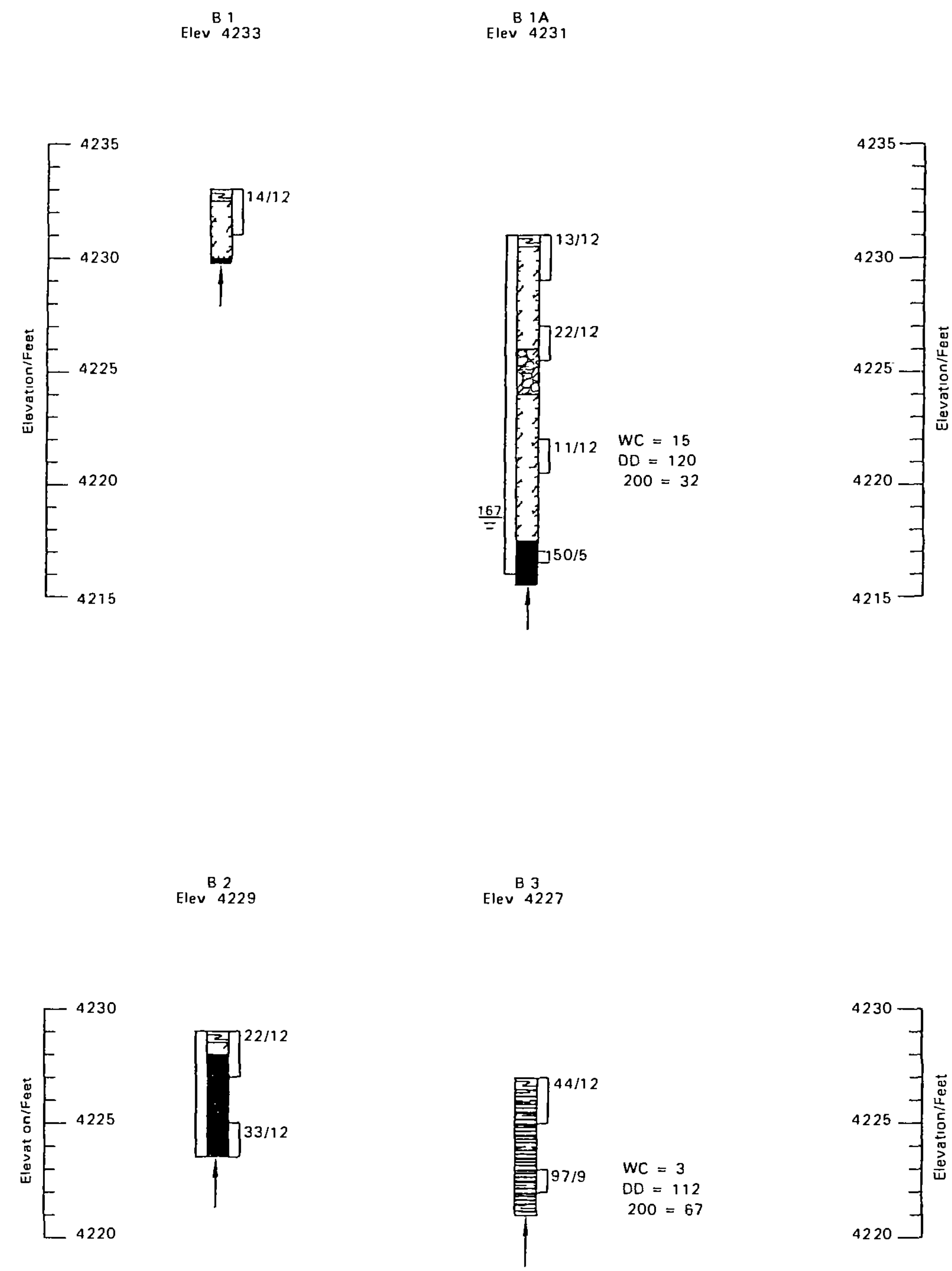
PROPOSED LANDFILL
10500 WEST 900 SOUTH
PLAIN CITY, UTAH

N

0 400 800 feet
Approximate Scale

Legend:
- Indicates Boring Locations
- Indicates Test Pit Locations
- Indicates CPT Locations

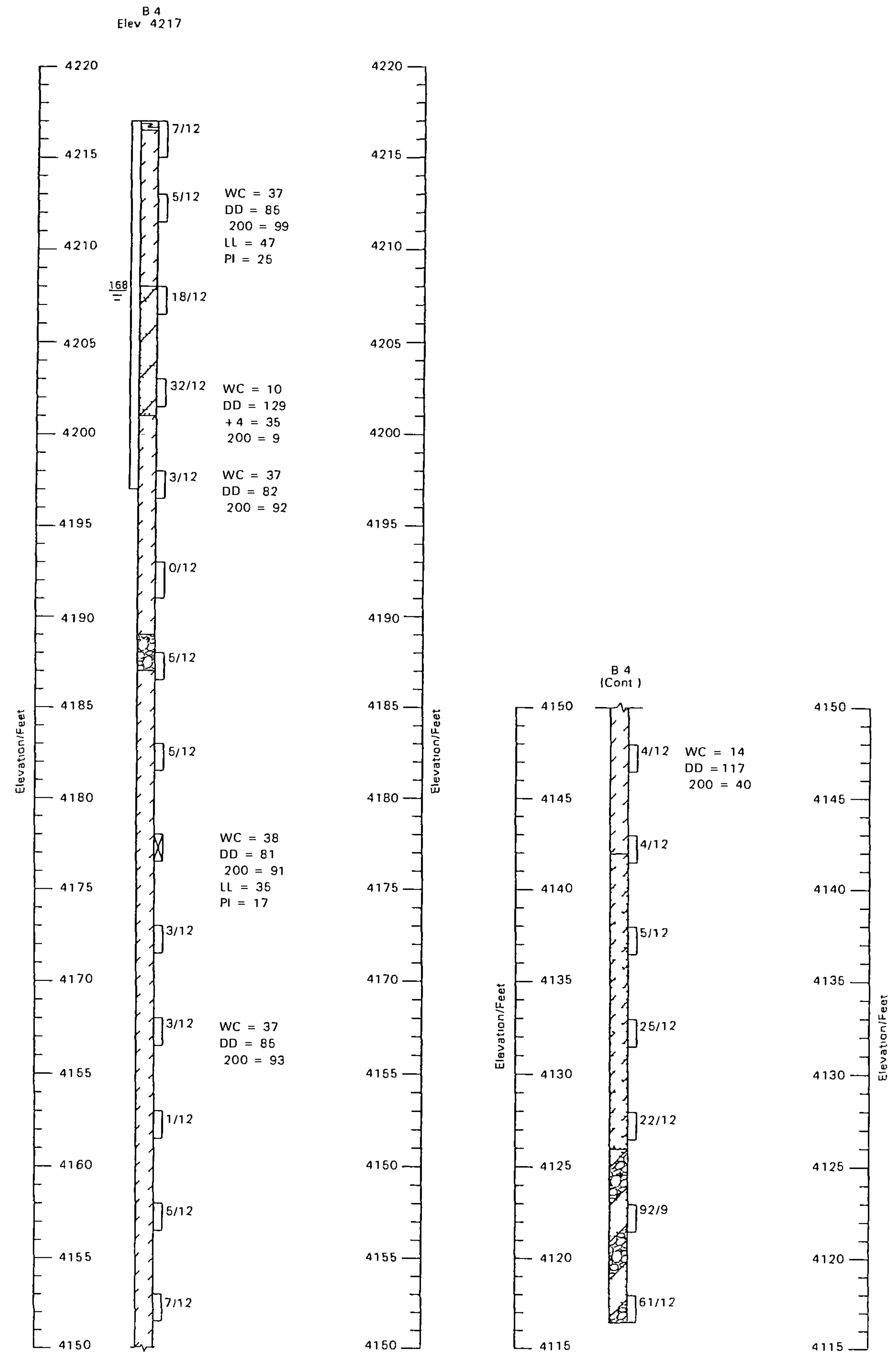
1080092	AGEC	Locations of Exploratory Borings and Test Pits	Figure 1



Approximale Verl cal Scale 1 = B

See F gure 7 lor Legend and Notes

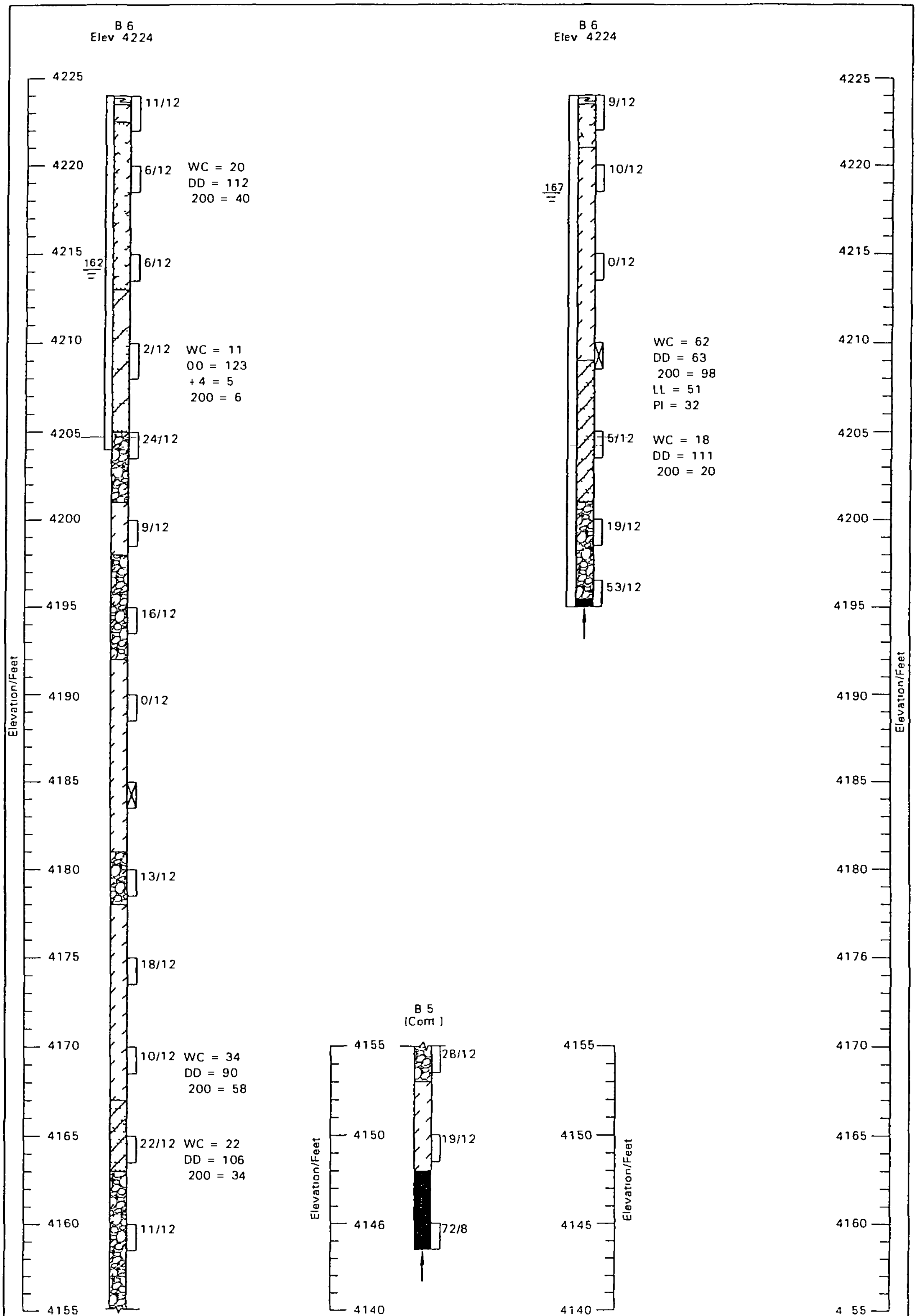
1080092	AGEC	Logs ol Exploratory Bor ngs	Figu e 2



Approximate Vertical Scale 1 = 8

See Figure 7 for Legend and Notes

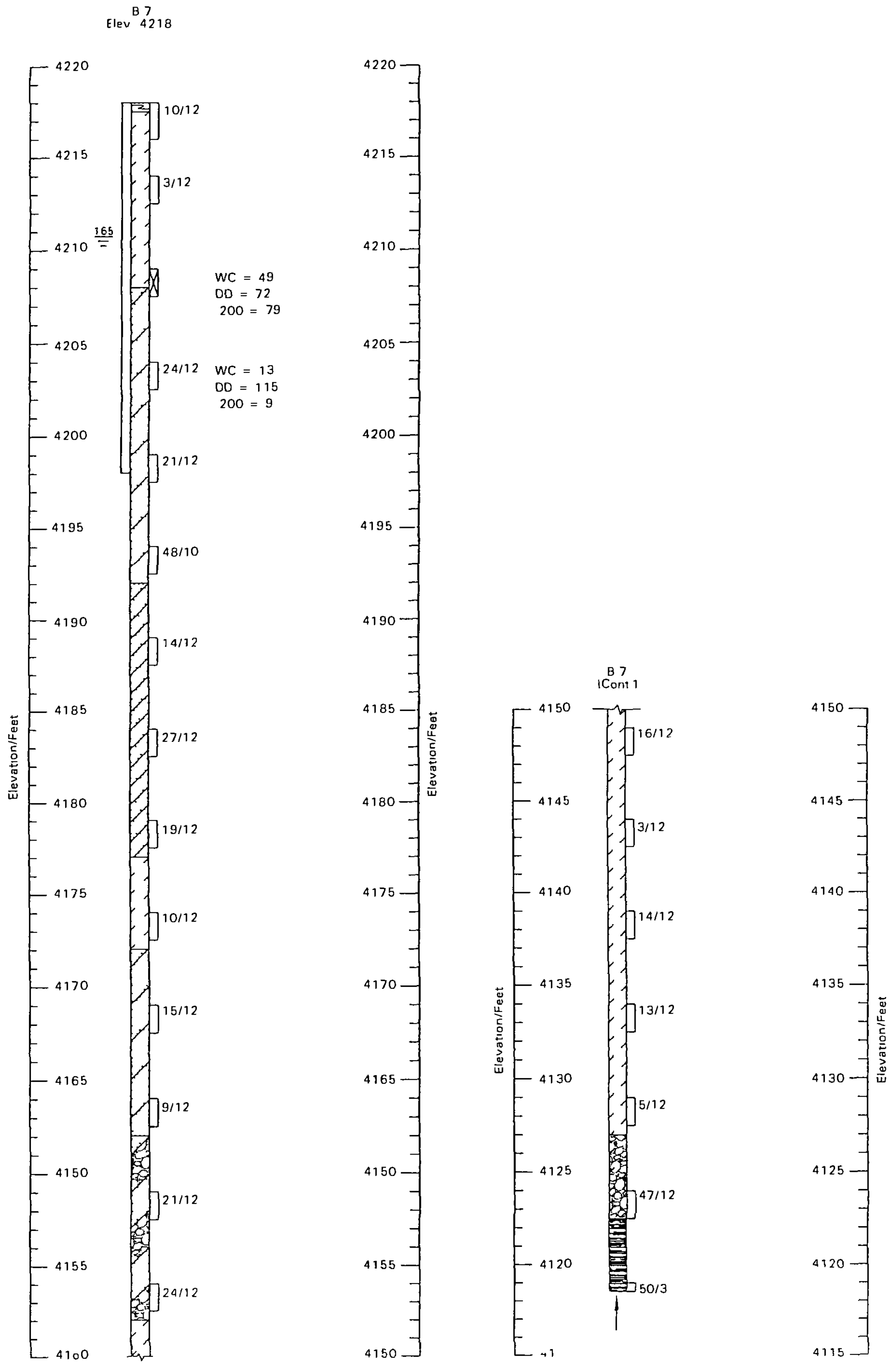
1080092	AGEC	Logs of Exploratory Boring	Figure 3



Approx mate Vertical Scale 1 = 6

See F gu e 7 for Legend and Notes

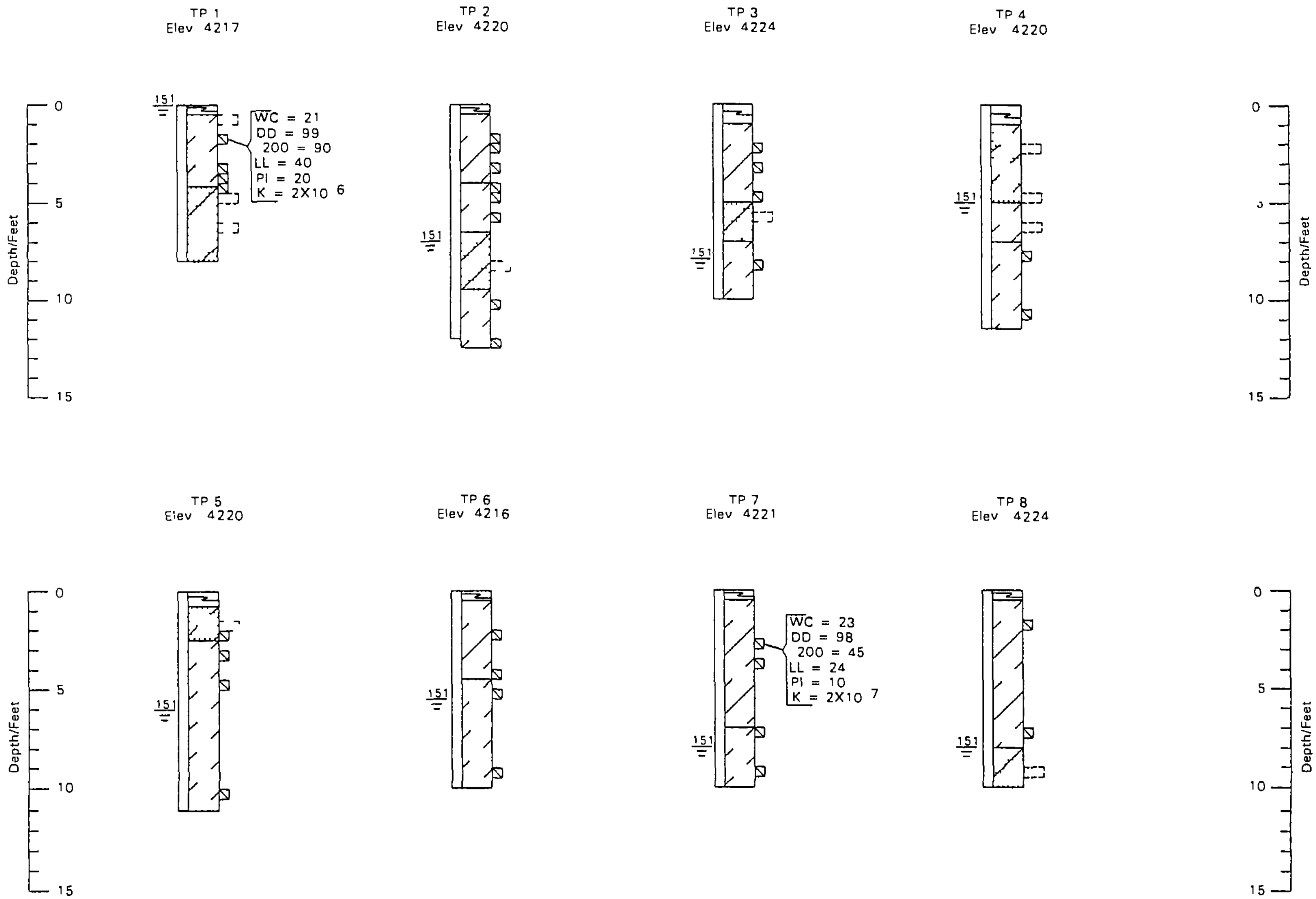
1080092	AGEC	Logs of Exploratory Bo ngs	Figu e 4



Approximate Ve 1 cal Sc le 1 = 8

See Figure 7 fo Legend and Notes

1080092	AGEC	Logs of E plo atory Borings	F gu e 5



Approximate Vertical Scale 1 = 8

See Figure 7 for Legend and Notes

1080092	AGEC	Logs of Test Pits	Figure 6

LEGEND

Topsoil lean clav som sand and gravel moist dark brown oots orgs ics

Lean Clav (CL) small to mode ate amount of sand and gravel some silt and sand layers very soft to very stiff mo st to wet brown to green to gray some iron oxide staining

Interlayered Lean Clay and Silt (CL/ML) some sand layers soft to stiff moist to wet brown to gray some cemented particles

Clayey Sand (SC) some clay layers loose to medium dense moist to wet brown to darl gray some cemented layers and particles

Silty Sand (SM) some clay layers loose to medium dense wet brown to dark gray to green some iron oxide staining

Poorly graded Sand with Silt (SP SM) some gravel and clay layers medium dense to dense wet brown to dark gray some cemented particles

Interlayered Sand and Gravel (SP/GP) some clay layers small amount of silt medium dense to very dense wet black to brown

Clayey Gravel with Sand (GC) medium dense to dense moist to wet brown to gray

Poorly graded Gravel w th Sand (GP) med um dense wet b own to dark gray

Diamictite hard to very hard moderately to highly weathered friable to moderately hard variably cemented fine grained clayey matrix with pebble to gravel sized subangular to angular inclusions gray to dark gray occasionally yellowish brown

Slate moderately to highly weathered hard to very hard highly foliated slaty cleavage gray to black some iron staining along cleavage planes

10/12 California Drive sample taken The symbol 10/12 indicates that 10 blows from a 140 pound automatic hammer falling 30 inches we e requ red to drive the sampler 12 inches

Indicates Shelby Tube sample taken

Indicates relatively undisturbed hand driva sample taken

Indicates disturbed sample taken

LEGEND (Cont)

Indicates slotted 1 / inch PVC pipe installed in the boring to the depth shown

167 Indicates the depth to free water and the number of days after drilling the measurement was taken

Indicates practical auger refusal

NOTES

1. Borings were drilled on Apnl 8 9 and 10 2008 with 8 inch diamete hollowstem auger Test Pits were excavated on April 24 2008 with rubber tired backhoe
2. Locations of borings and test pits were surveyed by Hansen Allen & Luce
3. Elevations of bonngs and test pits were determined by Hansen Allen & Luce
4. The bor ng and test pit locat ons and elevations should be considered accurate only to the degree implied by the method used
5. The lines between the materials shown on the bor ng and test pit logs represent the approximate boundanes between material types and the transitions may be gradual
6. Water level readings shown on the logs were made at the time and under the conditions indicated Fluctuations in the water level may occur with time
7. WC = Water Content (%)
   DD = Dry Density (pcf)
   +4 = Percent Retained on No 4 Sieve
   200 = Percent Passing No 200 Sieve
   LL = Liquid Limit (/)
   PI = Plasticity Index (%)
   K = Permeability (cm/sec)

1080092	AGEC	Legend and Notes of Exploratory Borings and Test Pits	F gu e 7

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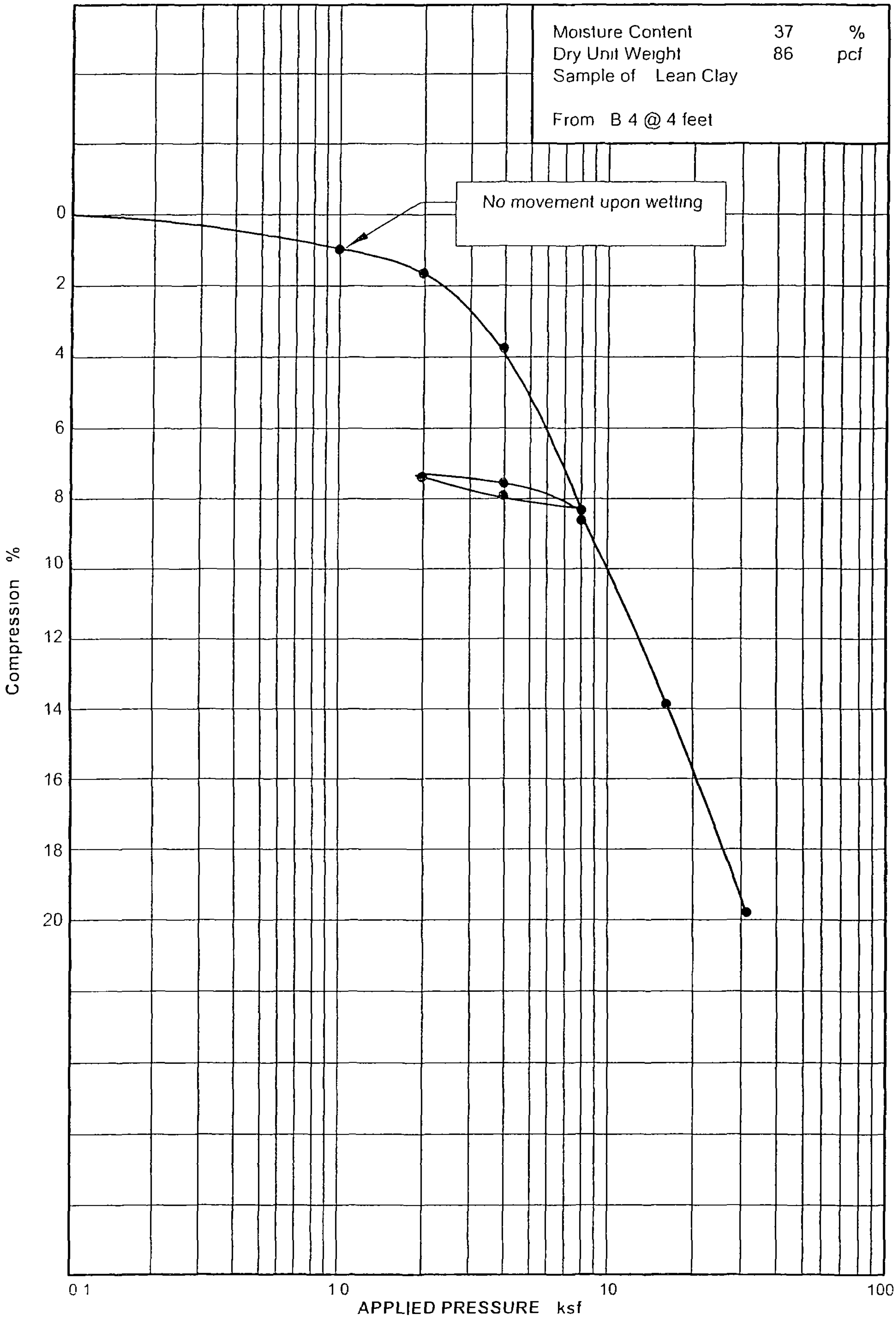

Project No 1080092

CONSOLIDATION TEST RESULTS

Figure 8

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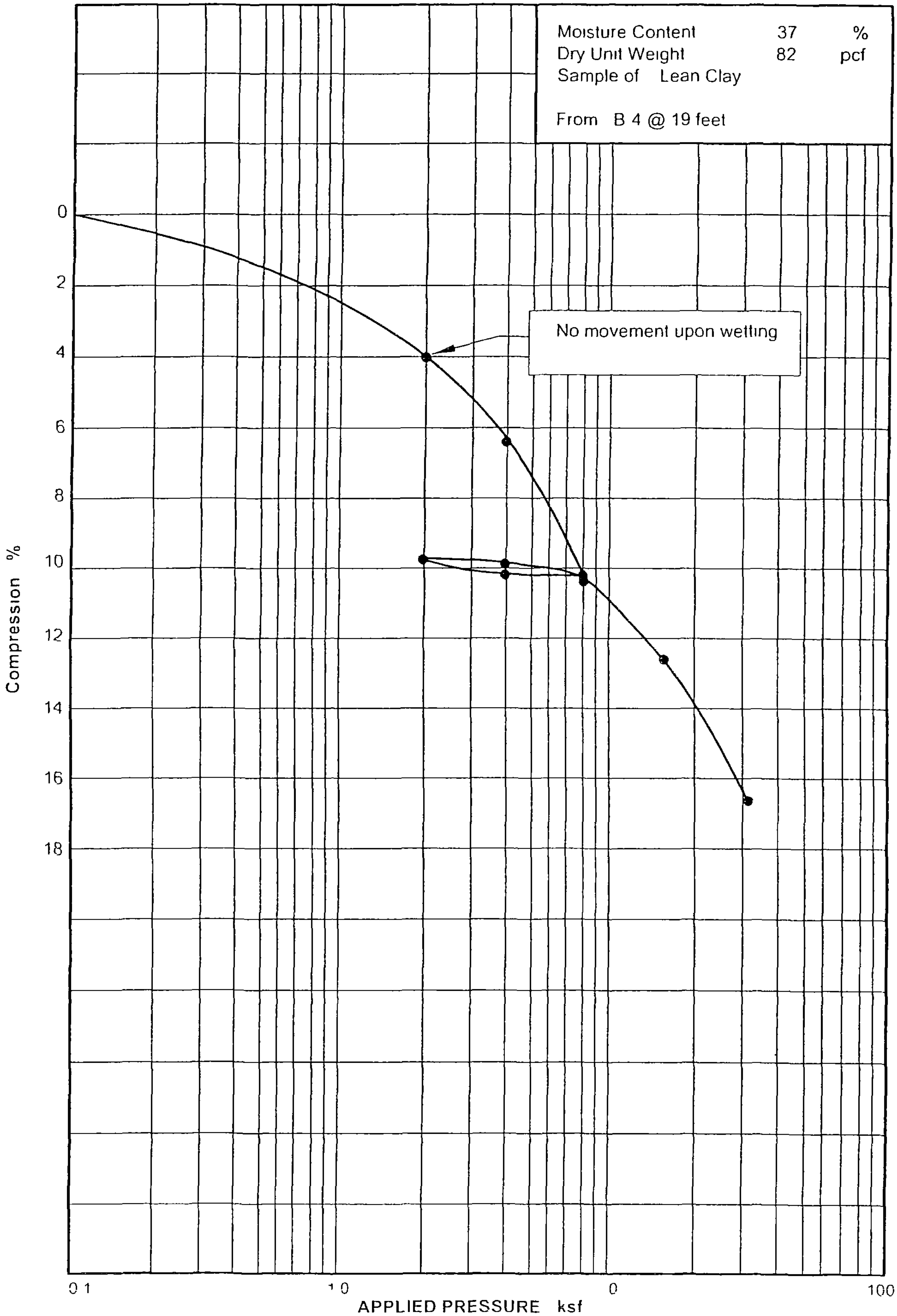
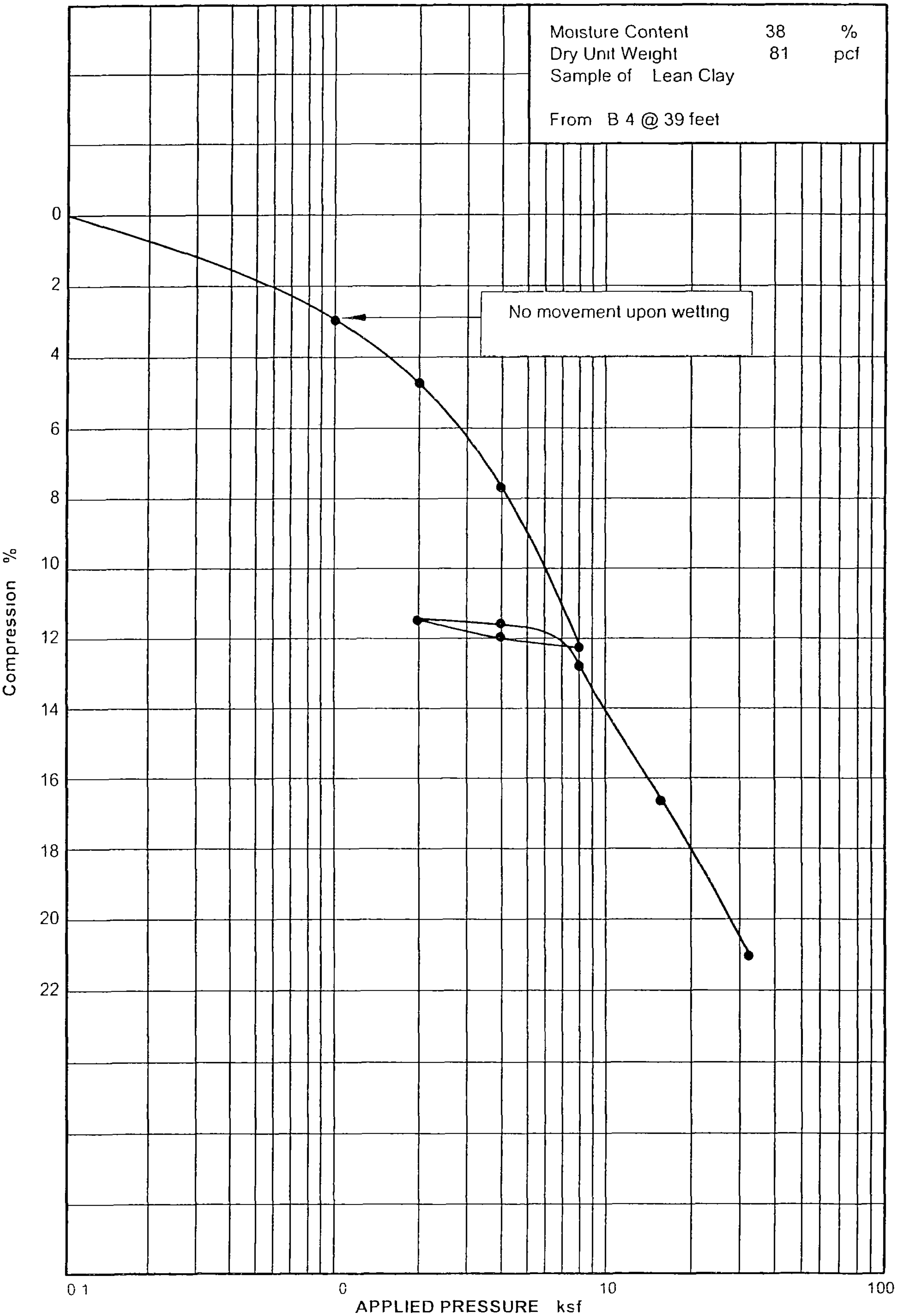


Project No 1080092

CONSOLIDATION TEST RESULTS

Figure 9

Applied Geotechnical Engineering Consultants, Inc



Project No 1080092

CONSOLIDATION TEST RESULTS

Figure 10

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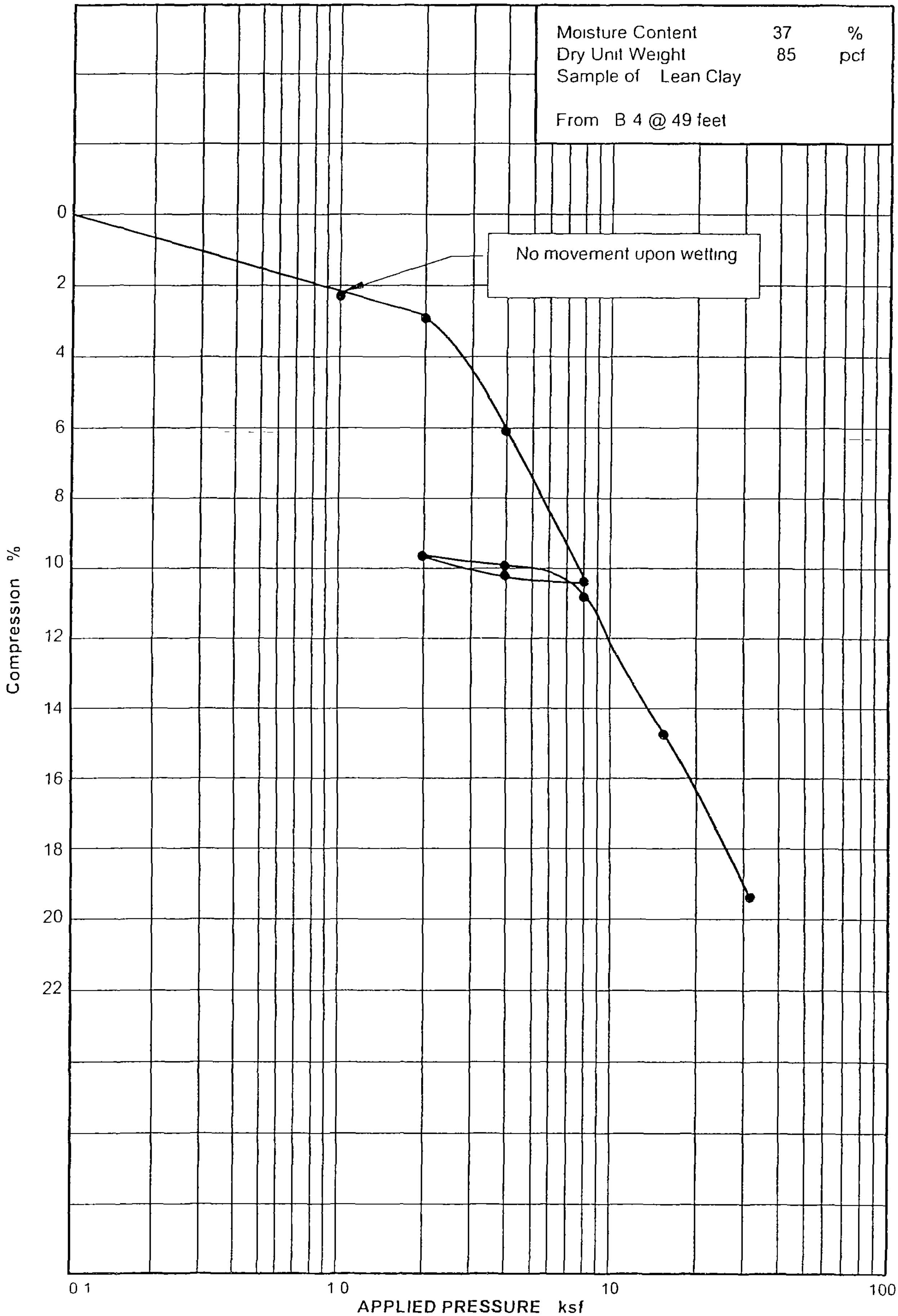

Project No 1080092

CONSOLIDATION TEST RESULTS

Figure 11

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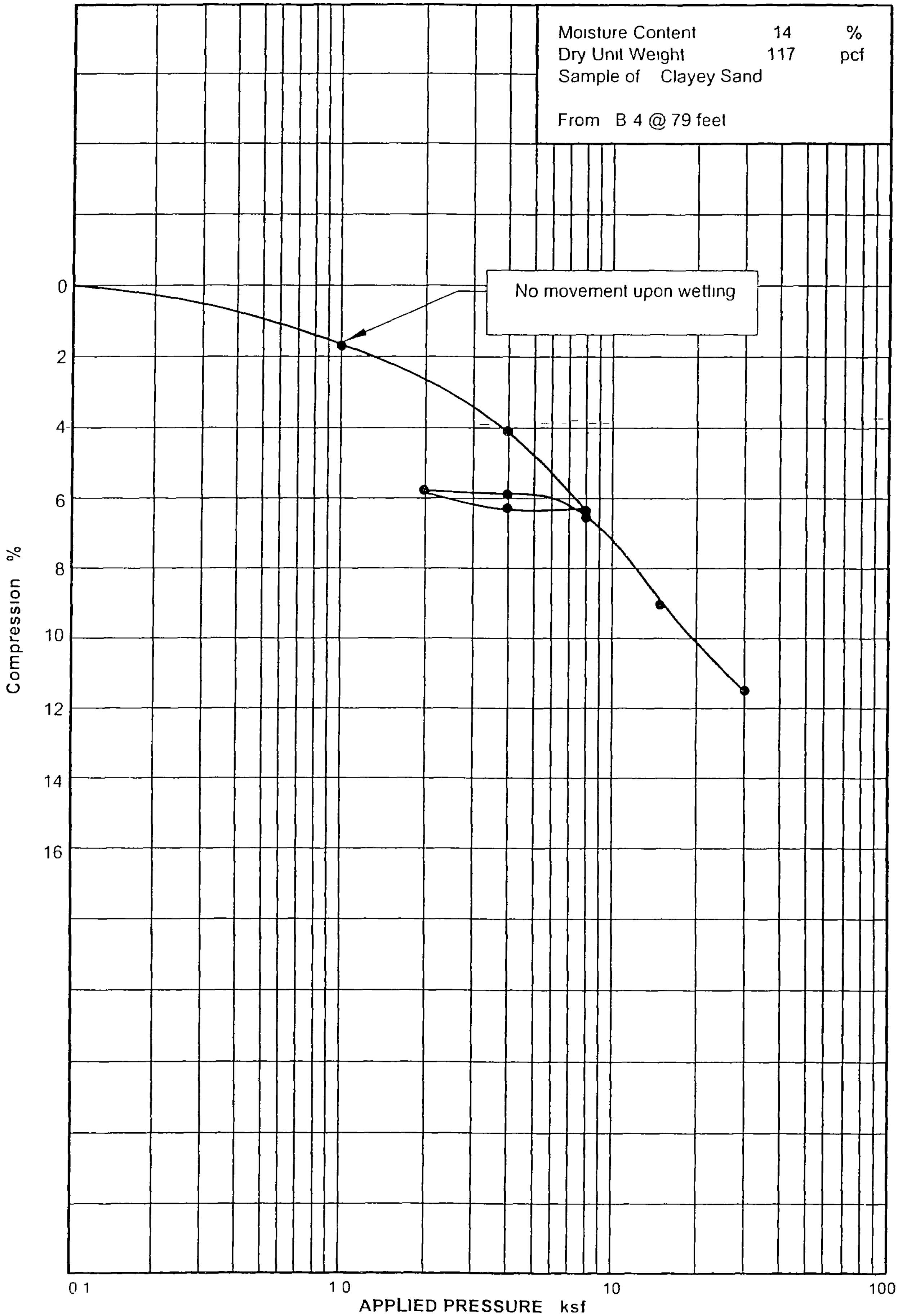
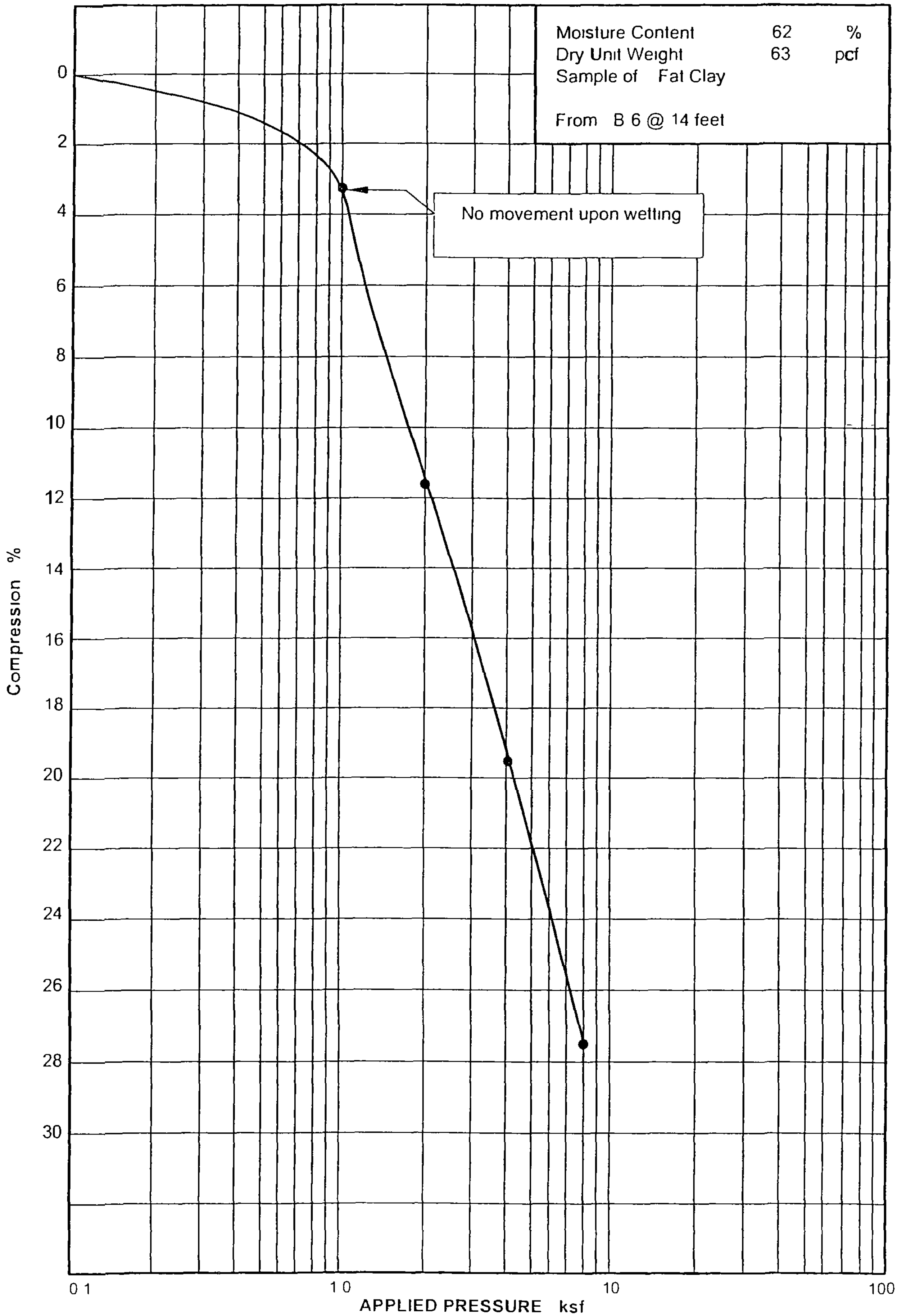


Project No 1080092

CONSOLIDATION TEST RESULTS

Figure 12

Applied Geotechnical Engineering Consultants, Inc

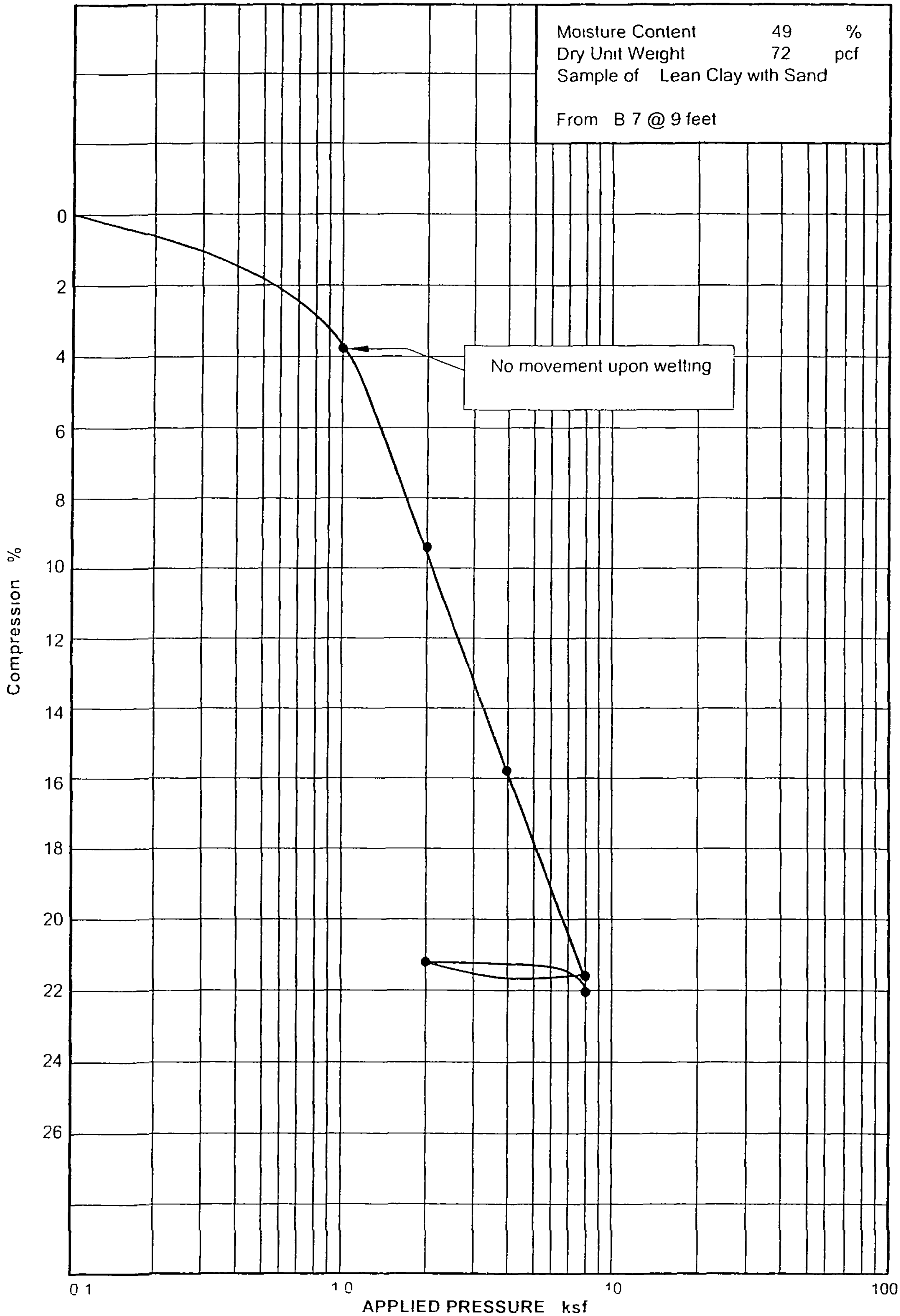


Project No 1080092

CONSOLIDATION TEST RESULTS

Figure 13

Applied Geotechnical Engineering Consultants, Inc

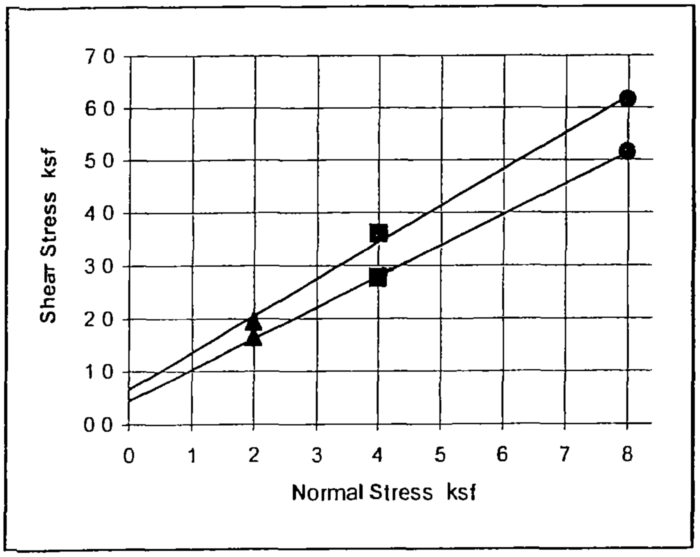


Project No 1080092

CONSOLIDATION TEST RESULTS

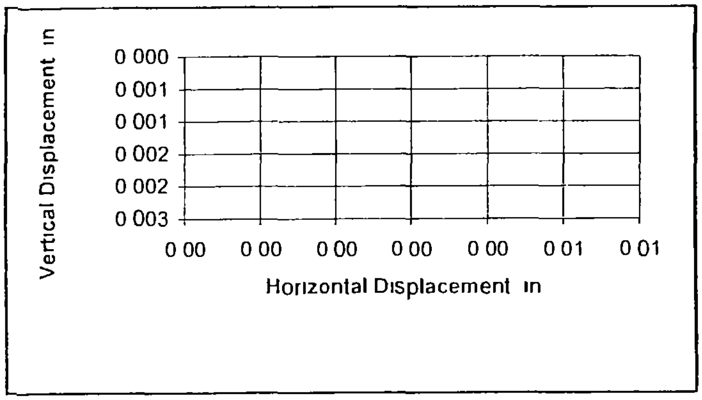
Figure 14

Applied Geotechnical Engineering Consultants, Inc



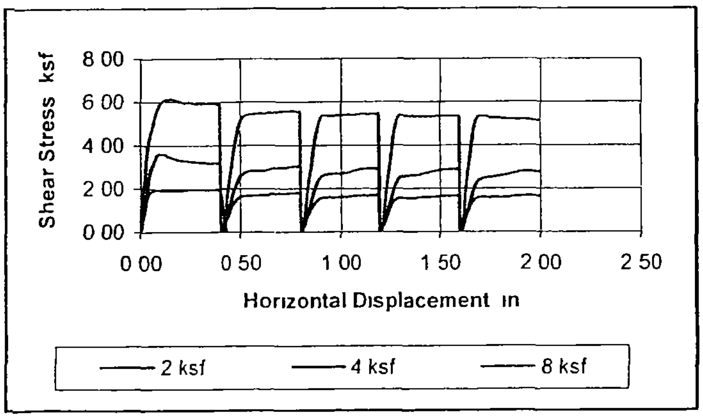
Peak	**c = 670 psf**	**ϕ = 35 deg**
Residual	**c = 450 psf**	**ϕ = 30 deg**

Project and Sample Information	
Project Number	1080092
Project Name	Moulding
Sample Identification	B-3@4 feet
Sample Description	Slate



Test No (Symbol)	1 (▲)	2 (■)	3 (●)
Test Type	Consolidated Wetted		
Sampe Type	Remolded		
Length in	1 00		
Diameter in	2 00		
Dry Density pcf			
Moisture Content %			
Consol Load ksf	2	4	8
Normal Load ksf	2	4	8
Shear Stress ksf Peak	1 9	3 6	6 2
Shear Stress ksf Residual	1 6	2 8	5 2
Rate of Strain	0 002 in/min		

Comments Sample was ground to powder and remolded to 110 pcf at 3 percent moisture prior to testing Sample was sheared thru five cycles



Sample Properties	
Dry Density pcf	112
Moisture Content %	3
Liquid Limit %	
Plasticity Index %	
Percent Gravel	
Percent Sand	
Percent passing No 200 Sieve	67

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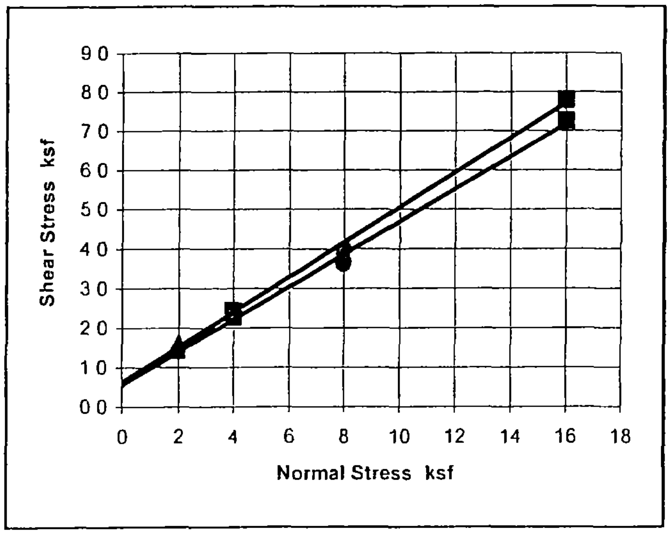
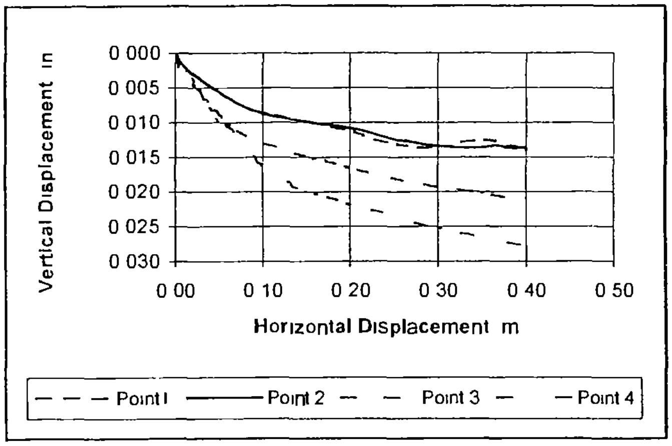
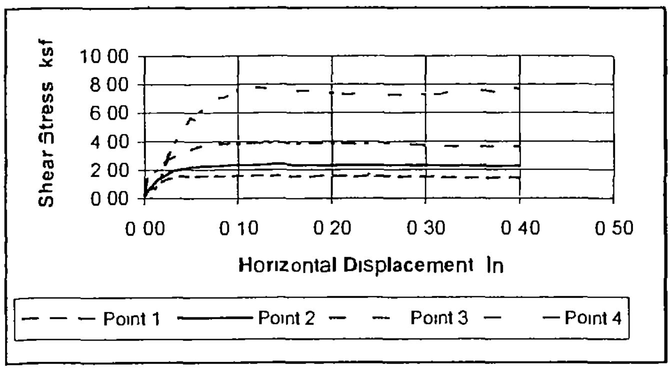


Peak	**c = 620 psf**	**ϕ = 24 deg**
Residual	**c = 550 psf**	**ϕ = 23 deg**

Project and Sample Information	
Project Number	1080092
Project Name	Moulding
Sample Identification	B 4@39 feet
Sample Description	Lean Clay



Test No (Symbol)	1 (▲)	2 (■)	3 (●)	4 (■)
Test Type	Consolidated Wetted			
Sampe Type	Undisturbed			
Length in	1 00	1 00	1 00	1 00
Diameter in	1 93	1 93	1 93	1 93
Dry Density pcf	81			
Moisture Content %	38			
Consol Load ksf	2	4	8	16
Normal Load ksf	2	4	8	16
Shear Stress ksf Peak	1 6	2 4	4 0	7 8
Shear Stress ksf Residual	1 4	2 3	3 6	7 3
Rate of Strain	0 0086 in/min			
Comments				



Sample Properties	
Dry Density pcf	81
Moisture Content %	38
Liquid Limit %	35
Plasticity Index %	17
Percent Gravel	
Percent Sand	
Percent passing No 200 Sieve	91

Project No 1080092

Direct Shear Results

Figure 16

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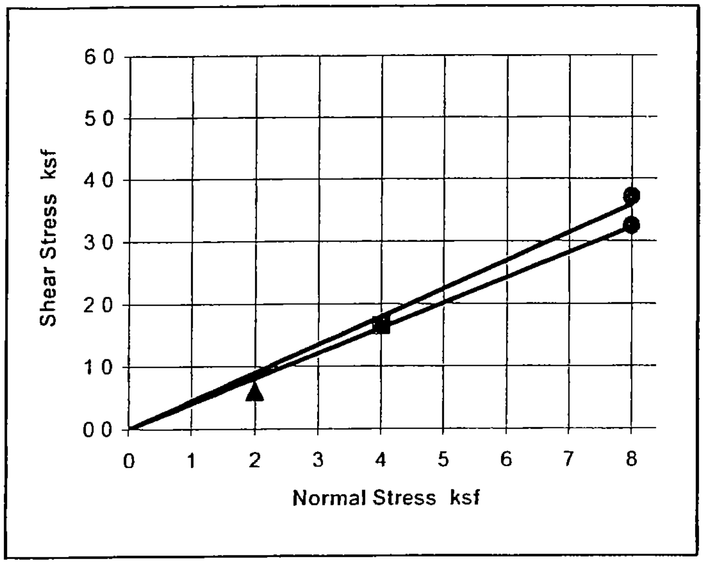
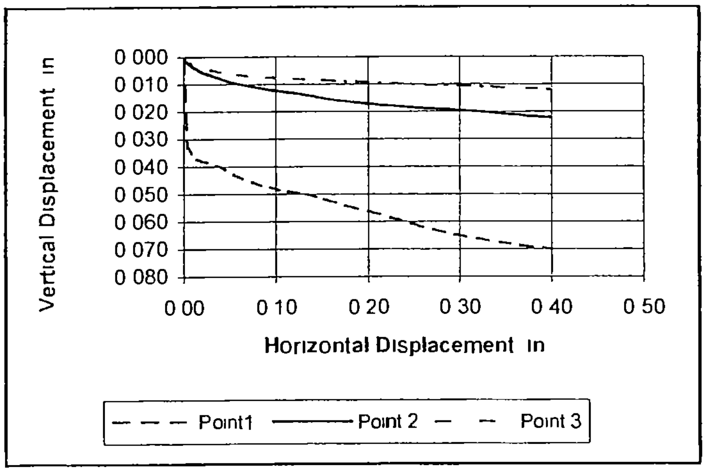
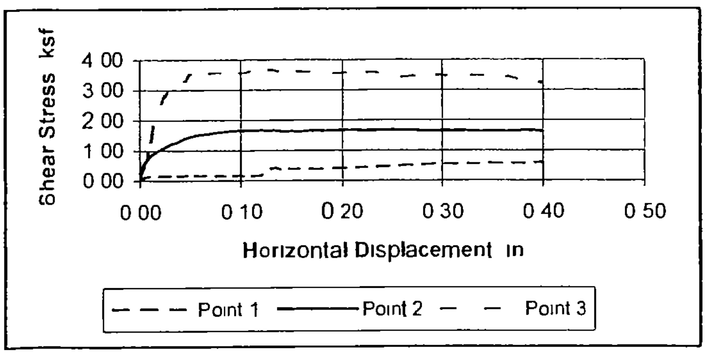


Peak	**c = 0 psf**	**ϕ = 24 deg**
Residual	**c = 0 psf**	**ϕ = 22 deg**

Project and Sample Information	
Project Number	1080092
Project Name	Moulding
Sample Identification	B-6@14 feet
Sample Description	Fat Clay



Test No (Symbol)	1 (▲)	2 (■)	3 (●)
Test Type	Consolidated Wetted		
Sampe Type	Undisturbed		
Length in	1 00	1 00	1 00
Diameter in	1 93	1 93	1 93
Dry Density pcf	63		
Moisture Content %	62		
Consol Load ksf	2	4	8
Normal Load ksf	2	4	8
Shear Stress ksf Peak	0 6	1 7	3 7
Shear Stress ksf Residual	0 6	1 7	3 3
Rate of Strain	0 0086 in/min		
Comments			



Sample Properties	
Dry Density pcf	63
Moisture Content %	62
Liquid Limit %	51
Plasticity Index %	32
Percent Gravel	
Percent Sand	
Percent passing No 200 Sieve	99

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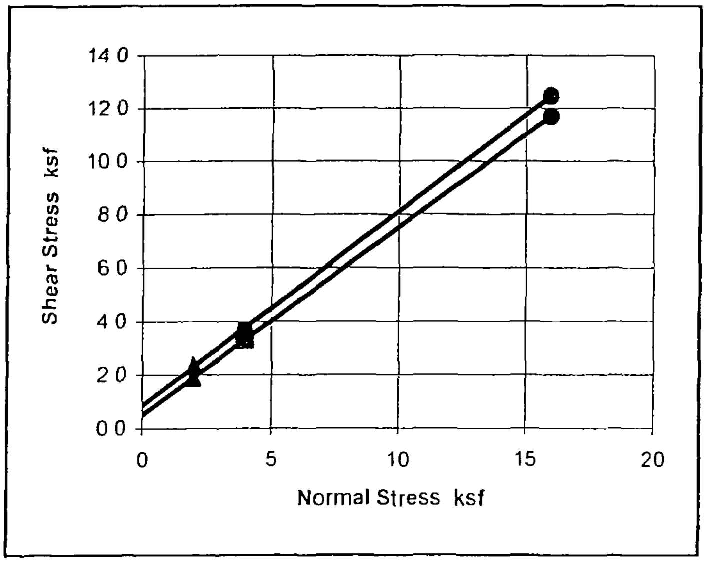
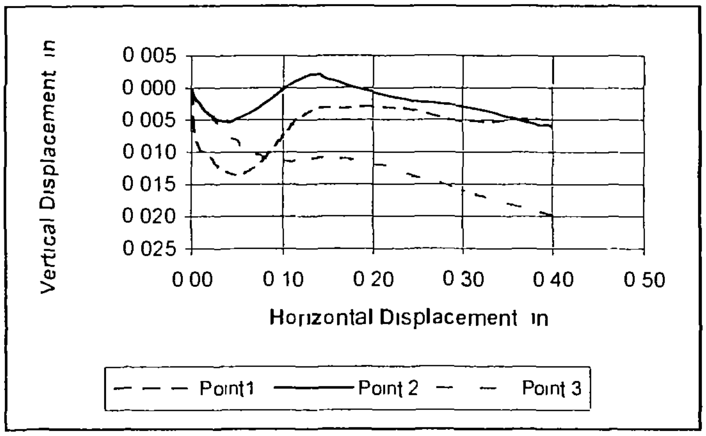
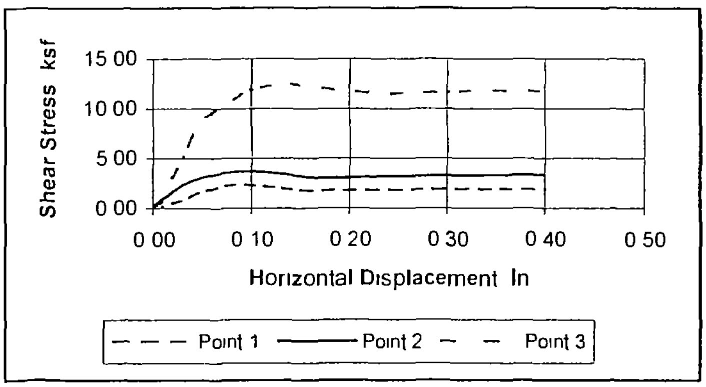


Peak	**c = 860 psf**	**ϕ = 36 deg**
Residual	**c = 500 psf**	**ϕ = 35 deg**

Project and Sample Information	
Project Number	1080092
Project Name	Moulding
Sample Identification	B7@14 feet
Sample Description	Poorly graded Sand with Silt



Test No (Symbol)	1 (▲)	2 (■)	3 (●)
Test Type	Consolidated Wetted		
Sampe Type	Undisturbed		
Length in	1 00	1 00	1 00
Diameter in	1 93	1 93	1 93
Dry Density pcf	115		
Moisture Content %	13		
Consol Load ksf	2	4	16
Normal Load ksf	2	4	16
Shear Stress ksf Peak	2 4	3 7	12 5
Shear Stress ksf Residual	1 9	3 3	11 7
Rate of Strain	0 0033 m/min		
Comments			



Sample Properties	
Dry Density pcf	115
Moisture Content %	13
Liquid Limit %	
Plasticity Index %	
Percent Gravel	
Percent Sand	
Percent passing No 200 Sieve	9

Project No 1080092

Direct Shear Results

Figure 18

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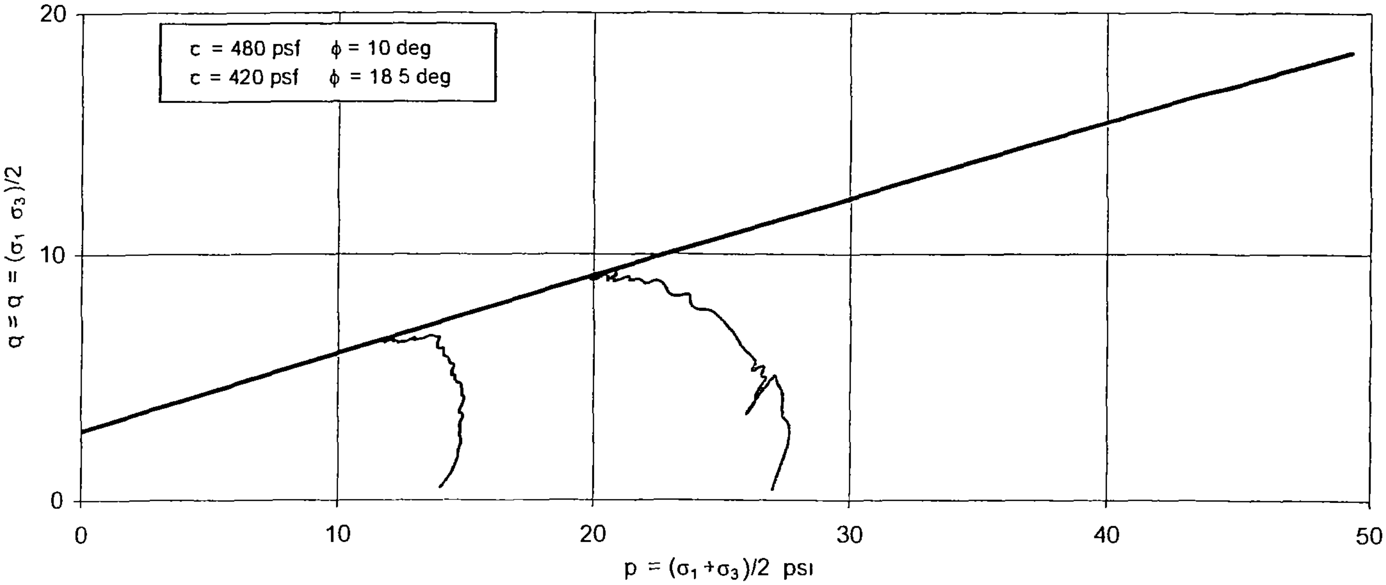
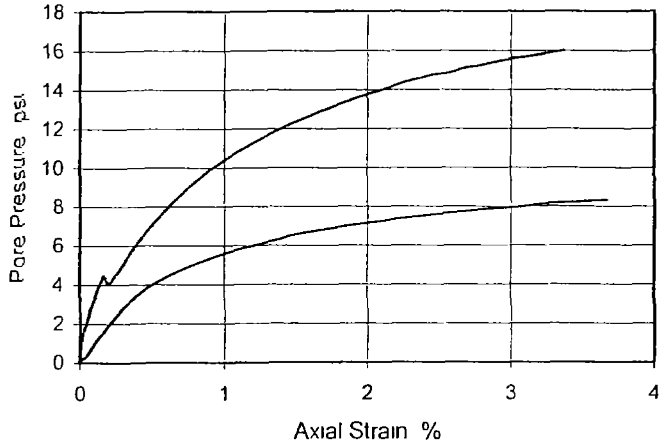
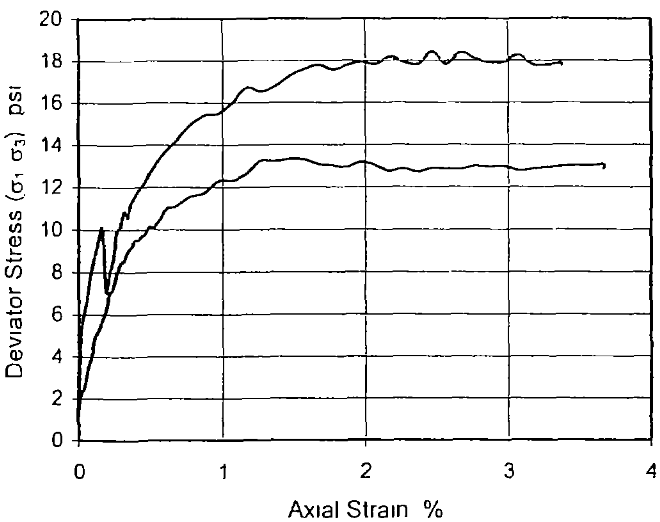




Test No (Symbol)	O	□	
Sample Type	undisturbed		
Final Length in	3 99	3 80	
Final Diameter in	1 85	1 66	
Dry Density pcf	64		
Moisture Content %	64		
Consolidation Pressure ksf	2	4	
B Parameter	0 96	0 96	
Total Confining Stress (σ_3) psi	13 4	26 4	
Total Axial Stress (σ_1) psi	26 3	44 2	
Deviator Stress (σ_1 σ_3) psi	12 9	17 8	
Effective Lateral Stress (σ_3) psi	5 1	10 4	
Effective Axial Stress (σ_1) psi	18 0	28 2	
Pore Pressure (p) psi	48 0	56 4	
Strain %	3 7	3 4	
Remarks	Multistage Test (CU) Consolidated		
Undrained with pore pressure measurements			



Sample Index Properties	
Natural Dry Density pcf	64
Natural Moisture Content %	64
Liquid Limit %	51
Plasticity Index %	32
Percent Gravel	
Percent Sand	
Percent Passing No 200 Sieve	99

Sample Description Fat Clay (CH)

Sample Location B 6 @ 14

Project No 1080092

Triaxial Compression Test

Figure 19

APPLIED GEOTECHNICAL ENGINEERING CONSULTANTS, INC

TABLE I

SUMMARY OF LABORATORY TEST RESULTS

PROJECT NUMBER 1080092

SAMPLE LOCATION		NATURAL MOISTURE CONTENT (%)	NATURAL DRY DENSITY (PCF)	GRADATION			ATTERBERG LIMITS		UNCONFINED COMPRESSIVE STRENGTH (PSF)	WATER SOLUBLE SULFATE (ppm)	SAMPLE CLASSIFICATION
BORING	DEPTH (FEET)			GRAVEL (%)	SAND (%)	SILT/ CLAY (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)			
B 1A	9	15	120			32					Clayey Sand
B 3	4	3	112			67					Slate
B 4	4	37	86			99	47	26			Lean Clay
	14	10	129	35	56	9					Poorly graded Sand with Silt and Gravel
	19	37	82			92					Lean Clay
	39	38	81			91	35	17			Lean Clay
	49	37	85			93					Lean Clay
	79	14	117			40					Clayey Sand
B 5	4	20	112			40					Clayey Sand
	14	11	123	5	89	6					Well graded Sand with Silt
	54	34	90			58					Sandy Lean Clay
	59	22	106			34					Silty Sand
B 6	14 (1)	64	64			99					Fat Clay
	14 (2)	62	63			98	51	32			Fat Clay
	19	18	111			20					Silty Sand
B 7	9	49	72			79					Lean Clay with Sand
	14	13	115			9					Poorly graded Sand with Silt

APPLIED GEOTECHNICAL ENGINEERING CONSULTANTS, INC

TABLE I

SUMMARY OF LABORATORY TEST RESULTS

PROJECT NUMBER 1080092

SAMPLE LOCATION		NATURAL MOISTURE CONTENT (%)	NATURAL DRY DENSITY (PCF)	GRADATION			ATTERBERG LIMITS		UNCONFINED COMPRESSIVE STRENGTH (PSF)	WATER SOLUBLE SULFATE (ppm)	SAMPLE CLASSIFICATION
TEST PIT	DEPTH (FEET)			GRAVEL (%)	SAND (%)	SILT/ CLAY (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)			
TP-2	6	21	99			90	40	20			Lean Clay
TP-4	2½	23	98			45	24	10			Interlayered Lean Clay and Sandy Silt with Cemented Particles

APPENDIX

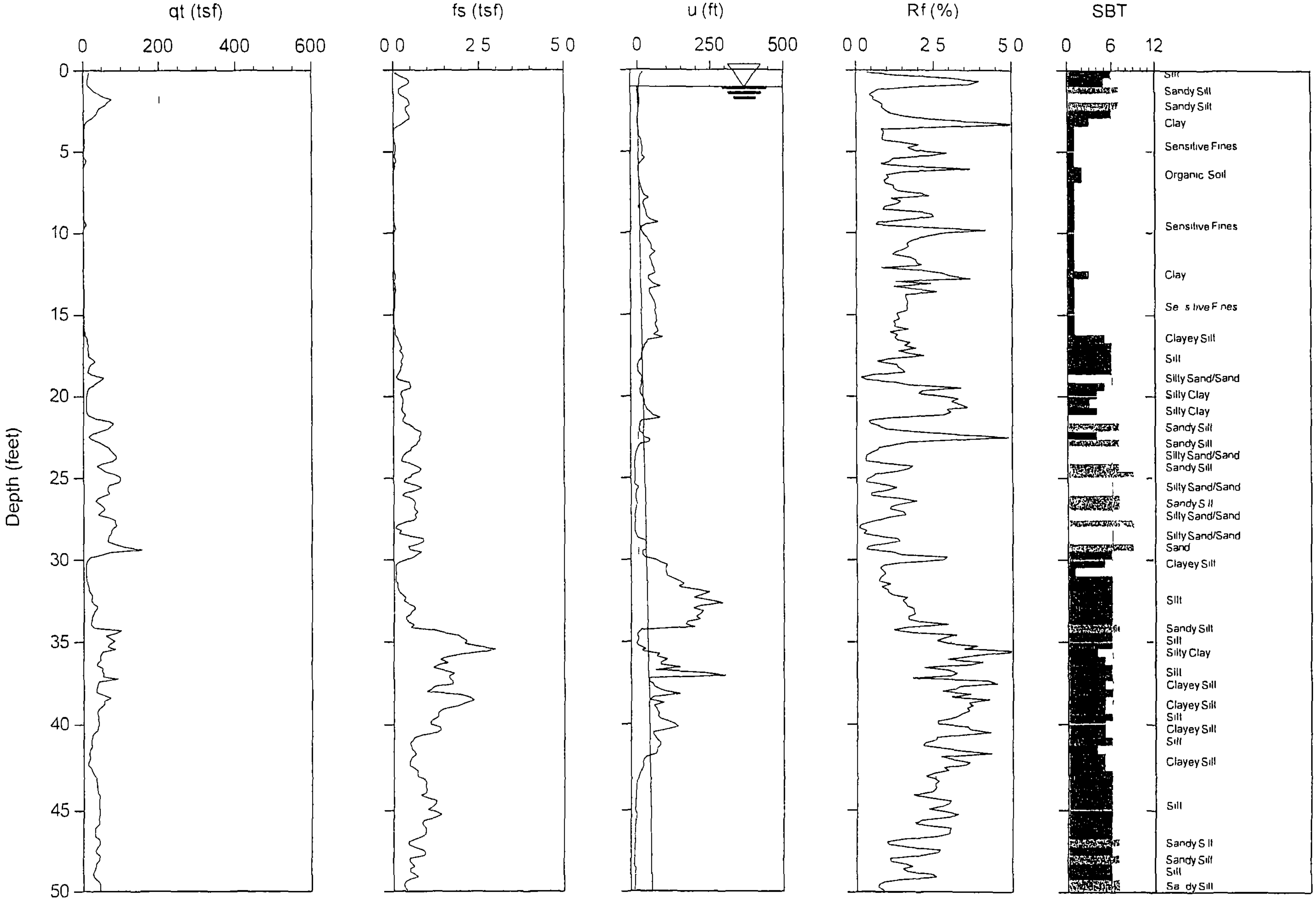
CONE PENETRATION TEST RESULTS

CONETEC

AGEC

Job No 08 374
Date 04 30 08 16 07
Site MOULDING SITE

Sounding CPT 01A
Cone STD 20T AD183



Max Depth 29 250 m / 95 96 ft
Depth Inc 0 050 m / 0 164 ft
Avg Int 0 150 m

File 374CP01A COR
Unit Wt SBT Chart Soil Zones

SBT Lunne Robertson and Powell 1997

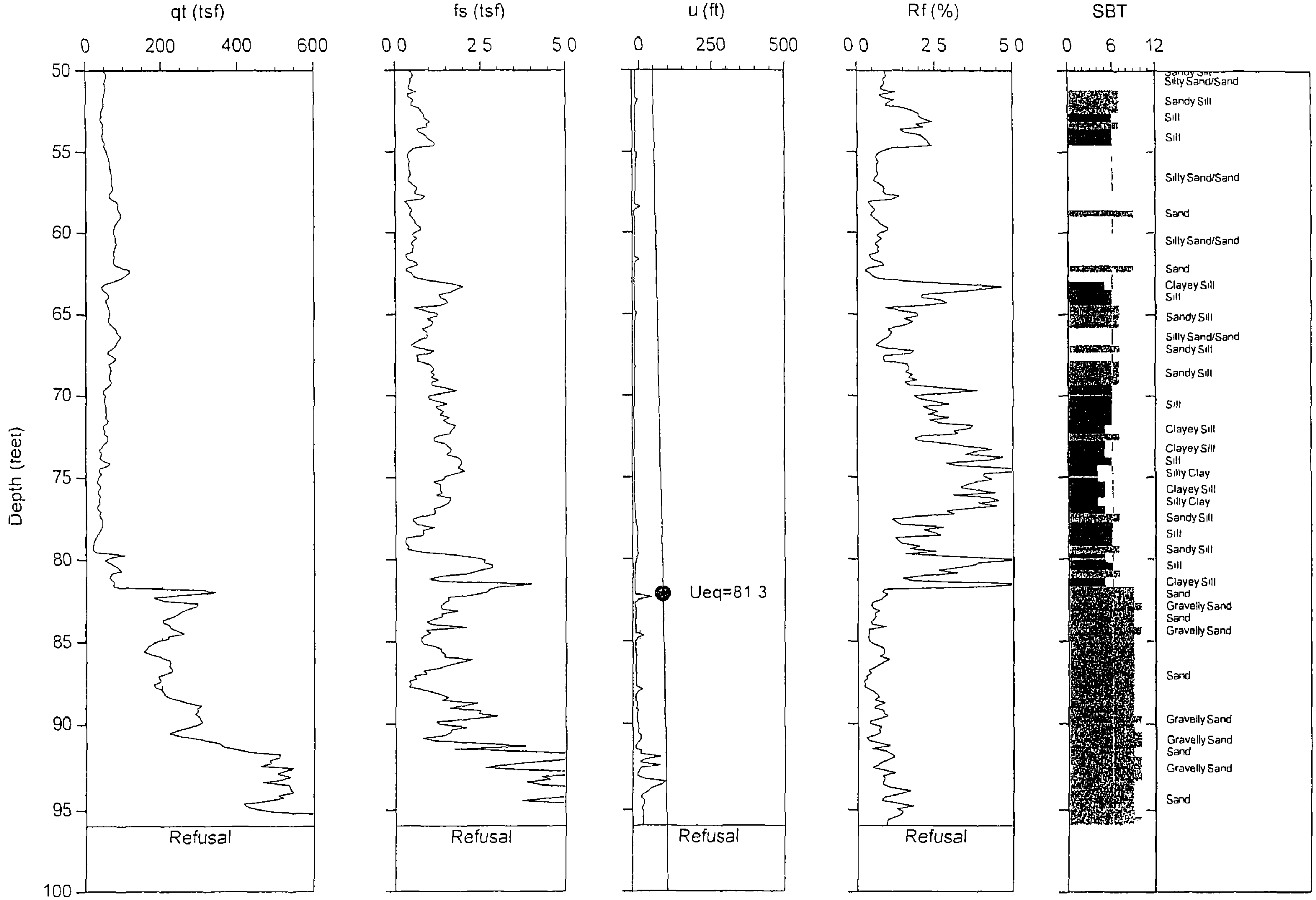
Equilibrium Pore Pressure from Dissipation

CONETEC

AGEC

Job No 08 374
Date 04 30 08 16 07
Site MOULDING SITE

Sounding CPT 01A
Cone STD 20T AD183



Max Depth 29 250 m / 95 96 ft
Depth Inc 0 050 m / 0 164 ft
Avg Int 0 150 m

File 374CP01A COR
Unit Wt SBT Chart Soil Zones

SBT Lunne Robertson and Powell 1997

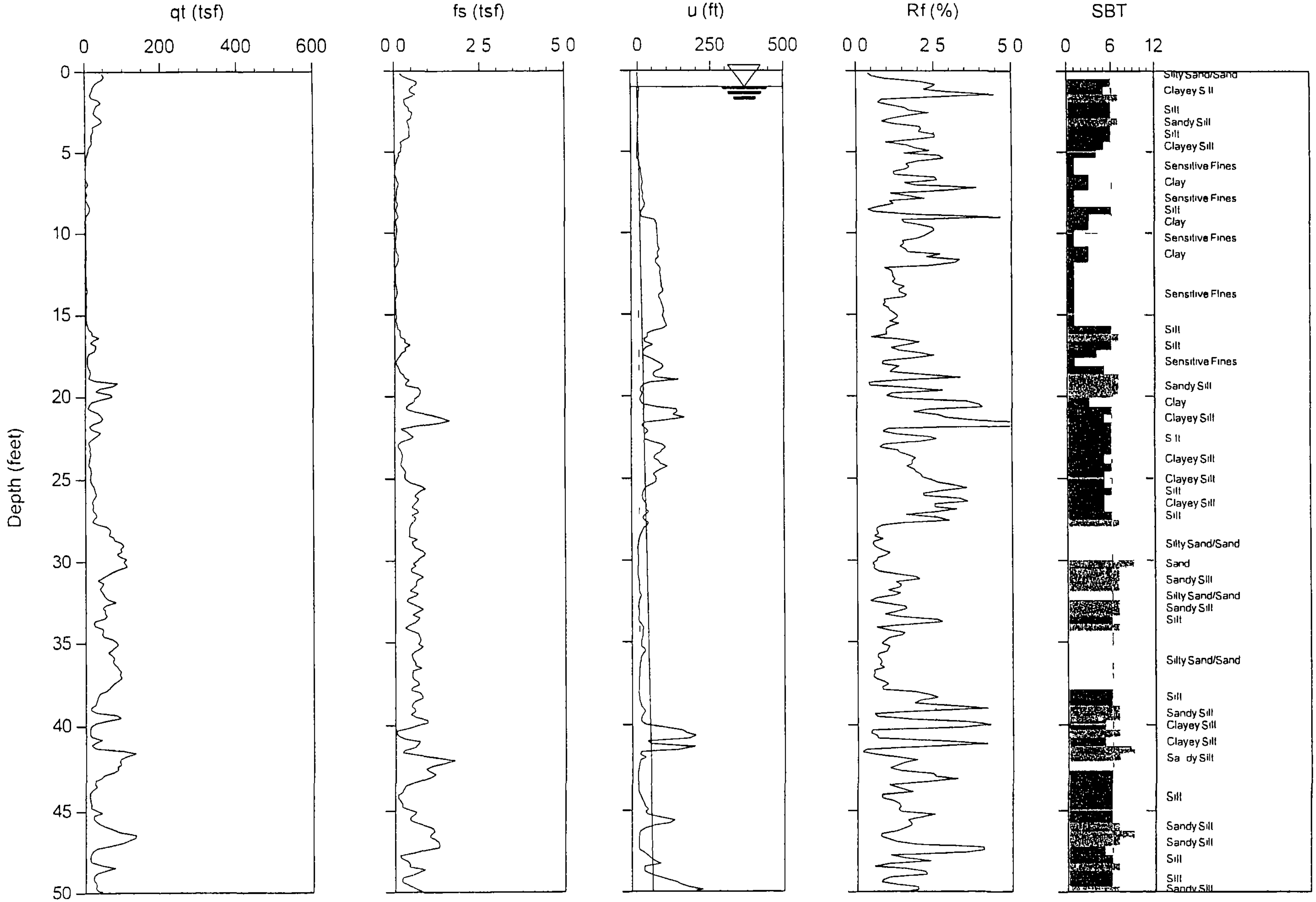
Equilibrium Pore Pressure from Dissipation

CONETEC

AGEC

Job No 08 374
Date 04 30 08 14 19
Site MOULDING SITE

Sounding CPT-02
Cone STD 20T AD183



Max Depth 48 800 m / 160 10 ft
Depth Inc 0 050 m / 0 164 ft
Avg Int 0 150 m

File 374CP02 COR
Unit Wt SBT Chart Soil Zones

SBT Lunne Robertson and Powell 1997

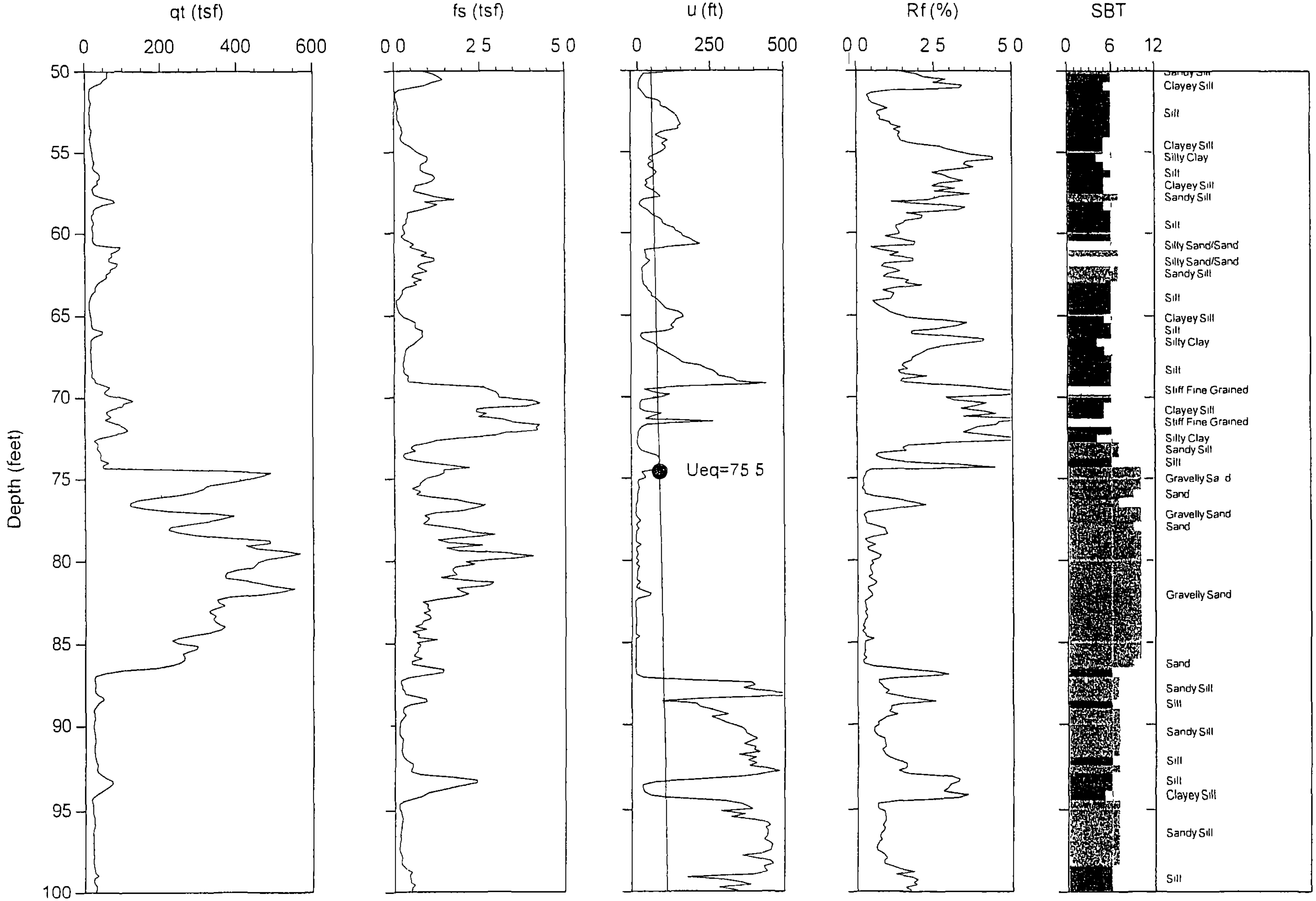
Equilibrium Pore Pressure from Dissipation

CONETEC

AGEC

Job No 08 374
Date 04 30 08 14 19
Site MOULDING SITE

Sounding CPT-02
Cone STD 20T AD183



Max Depth 48 800 m / 160 10 ft
Depth Inc 0 050 m / 0 164 ft
Avg Int 0 150 m

File 374CP02 COR
Unit Wt SBT Chart Soil Zones

SBT Lunne Robertson and Powell 1997

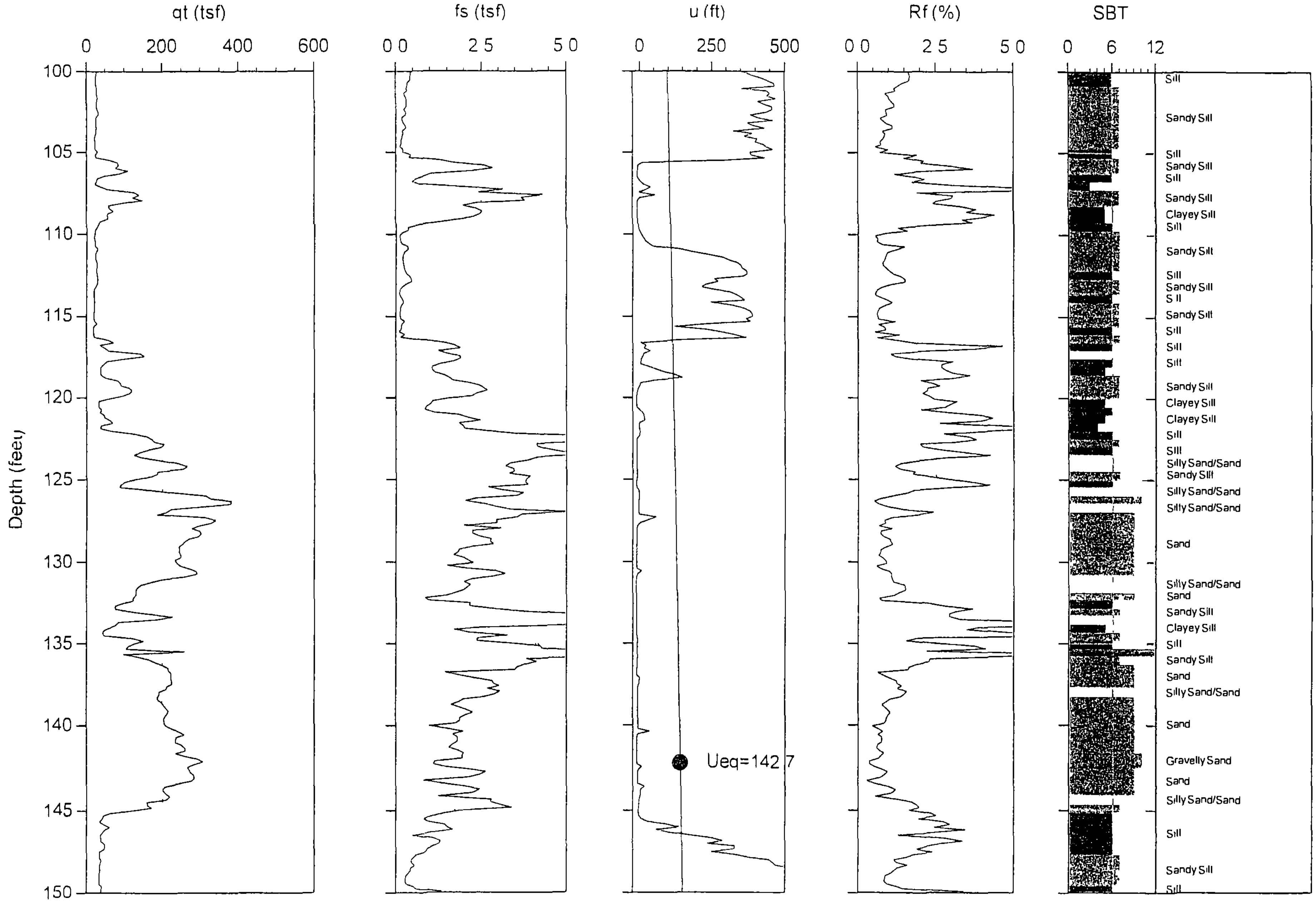
Equilibrium Pore Pressure from Dissipation

CONETEC

AGEC

Job No 08 374
Date 04 30 08 14 19
Site MOULDING SITE

Sounding CPT 02
Cone STD 20T AD183



Max Depth 48 800 m / 160 10 ft
Depth Inc 0 050 m / 0 164 ft
Avg Int 0 150 m

File 374CP02 COR
Unit Wt SBT Chart Soil Zones

SBT Lunne Robertson and Powell 1997

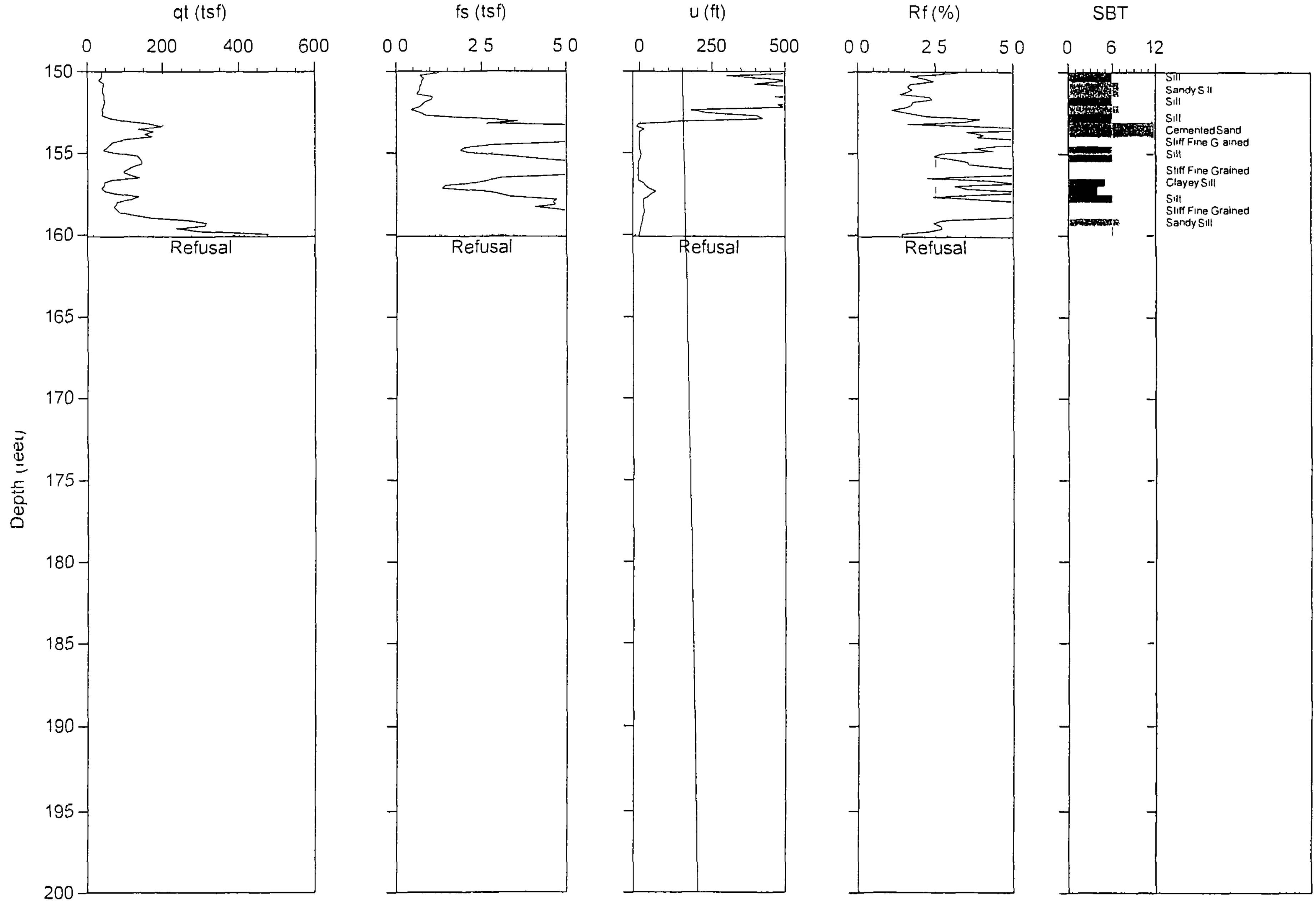
Equilibrium Pore Pressure from Dissipation

ConeTec

AGEC

Job No 08 374
Date 04 30 08 14 19
Site MOULDING SITE

Sounding CPT 02
Cone STD 20T AD183



Max Depth 48 800 m / 160 10 ft
Depth Inc 0 050 m / 0 164 ft
Avg Int 0 150 m

File 374CP02 COR
Unit Wt SBT Chart Soil Zones

SBT Lunne Robertson and Powell 1997

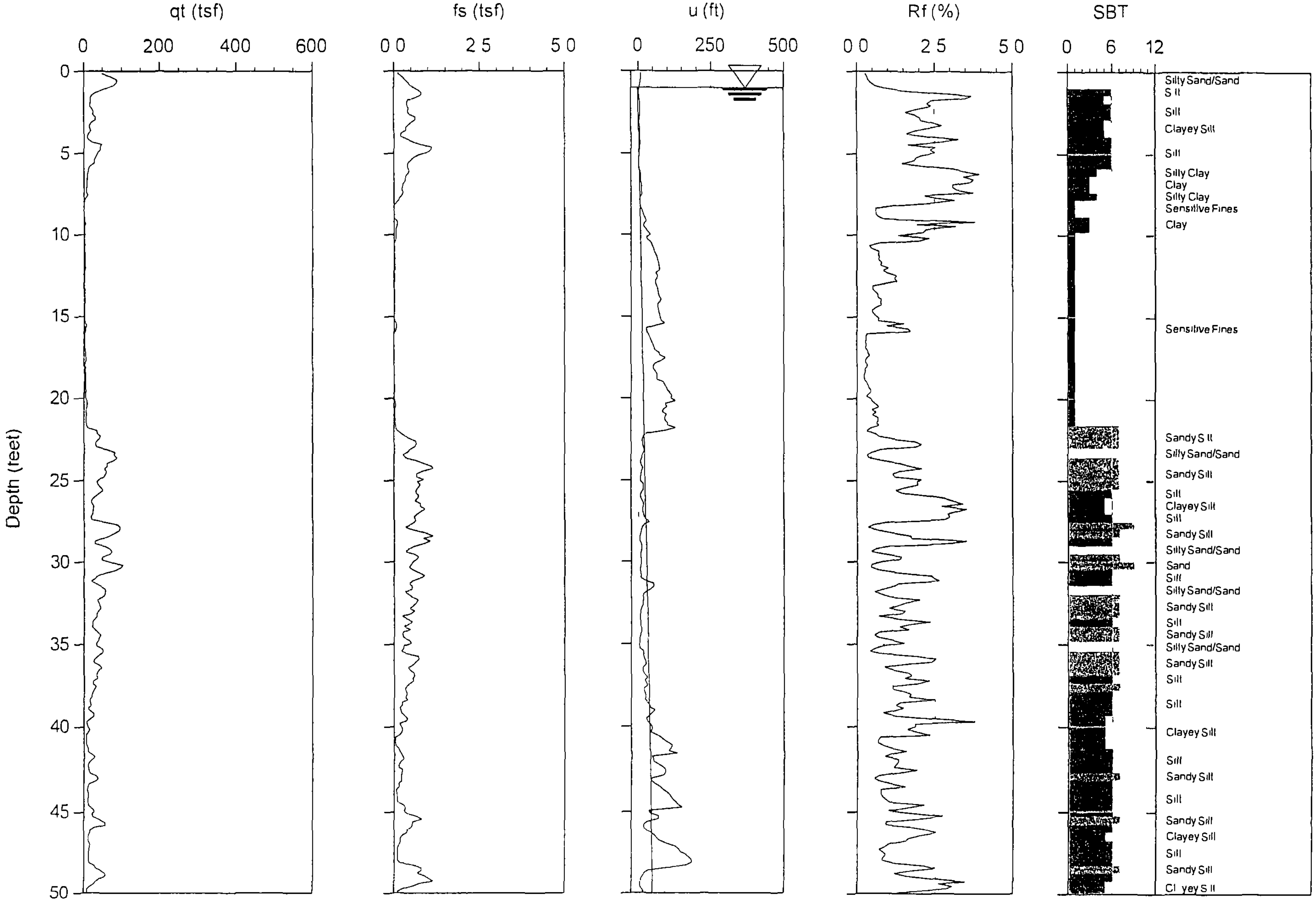
Equilibrium Pore Pressure from Dissipation

CONETEC

AGEC

Job No 08 374
Date 04 30 08 11 13
Site MOULDING SITE

Sounding CPT 03
Cone STD 20T AD183



Max Depth 26 650 m / 87 43 ft
Depth Inc 0 050 m / 0 164 ft
Avg Int 0 150 m

File 374CP03 COR
Unit Wt SBT Chart Soil Zones

SBT Lunne Robertson and Powell 1997

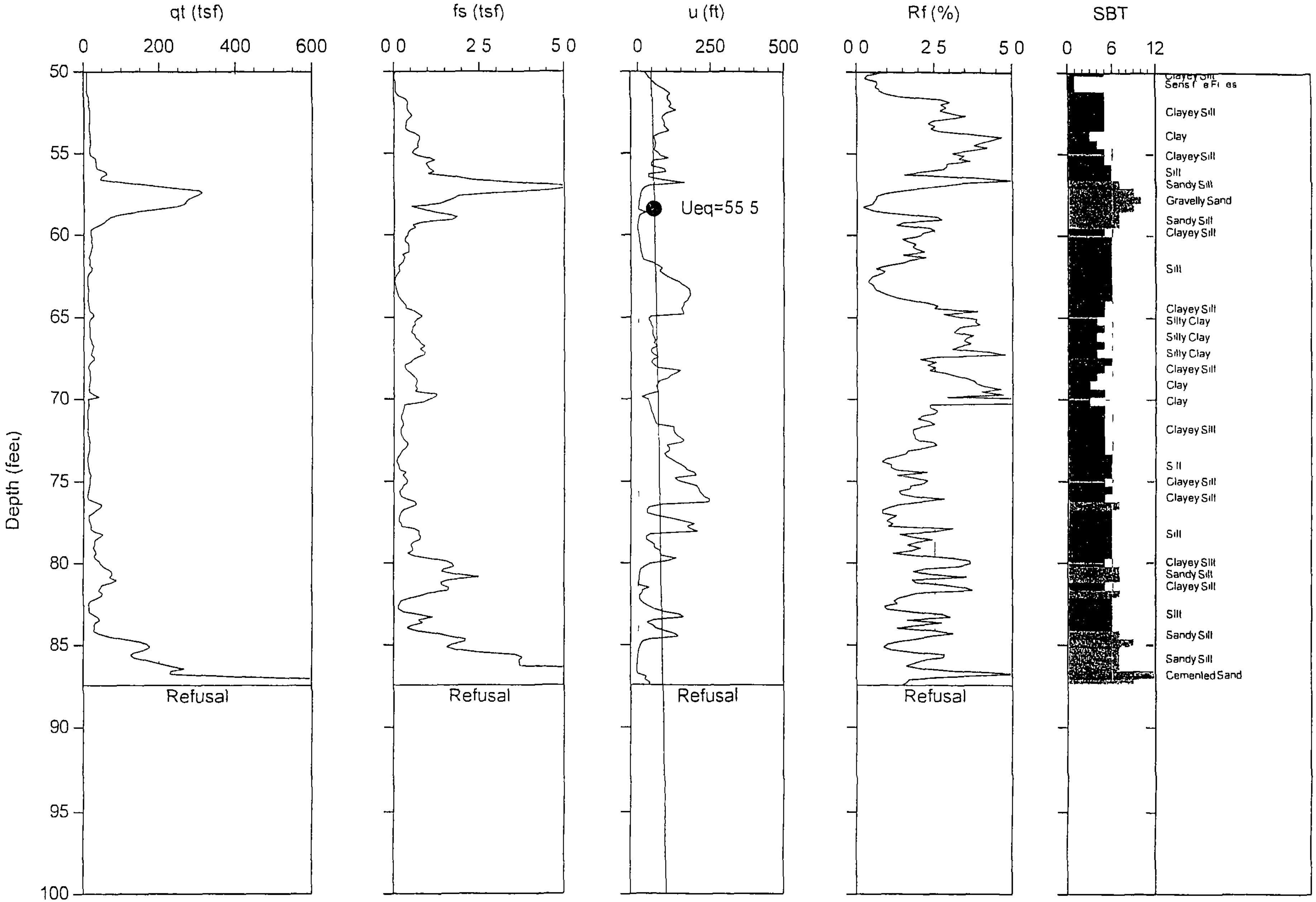
Equilibrium Pore Pressure from Dissipation

CONETEC

AGEC

Job No 08 374
Date 04 30 08 11 13
Site MOULDING SITE

Sounding CPT 03
Cone STD 20T AD183



Max Depth 26 650 m / 87 43 ft
Depth Inc 0 050 m / 0 164 ft
Avg Int 0 150 m

File 374CP03 COR
Unit Wt SBT Chart Soil Zones

SBT Lunne Robertson and Powell 1997

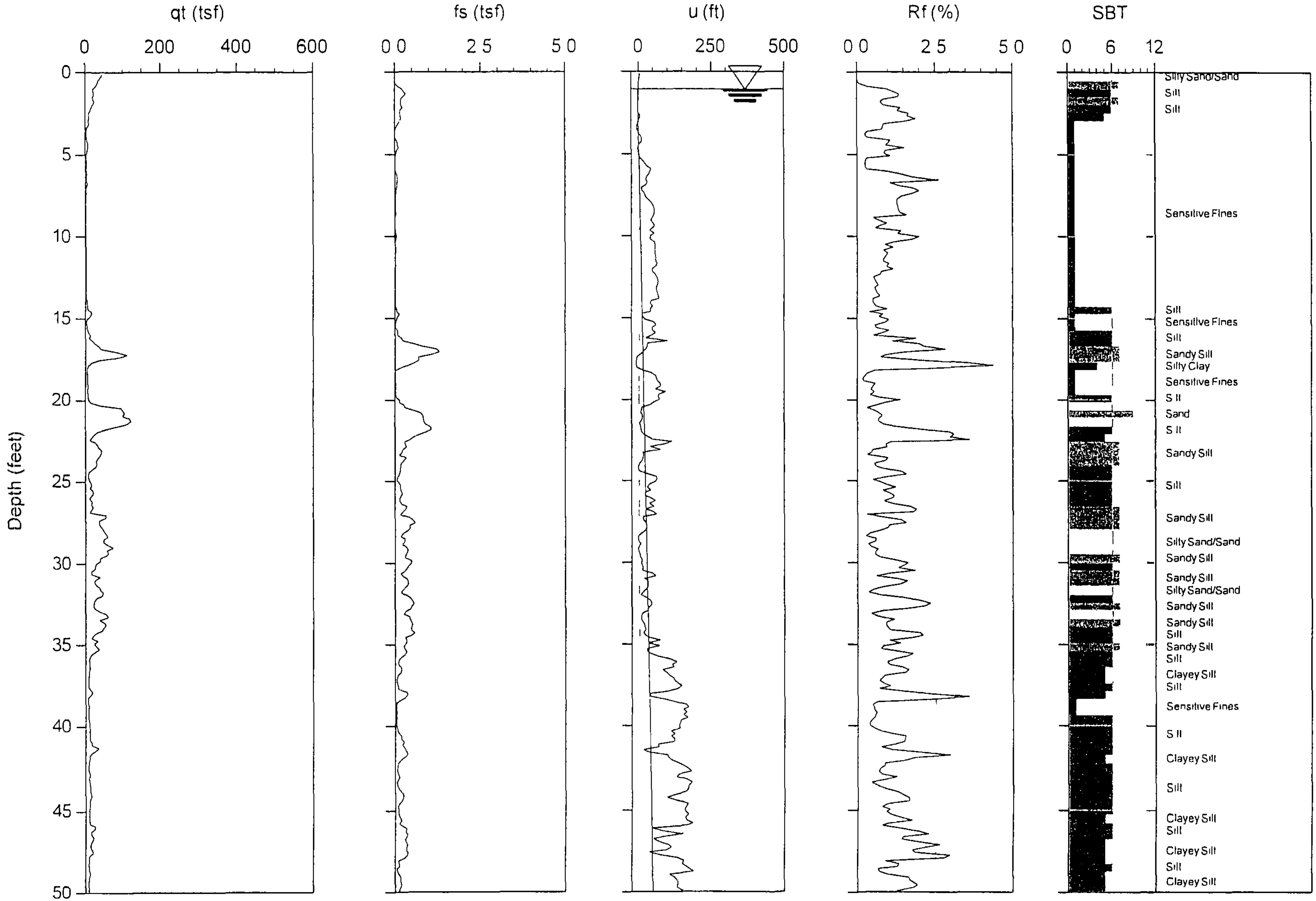
Equilibrium Pore Pressure from Dissipation

ConeTec

AGEC

Job No 08 374
Date 04 30 08 12 33
Site MOULDING SITE

Sounding CPT 04
Cone STD 20T AD183



Max Depth 42 850 m / 140 58 ft
Depth Inc 0 050 m / 0 164 ft
Avg Int 0 150 m

File 374CP04 COR
Unit Wt SBT Chart Soil Zones

SBT Lunne Robertson and Powell 1997

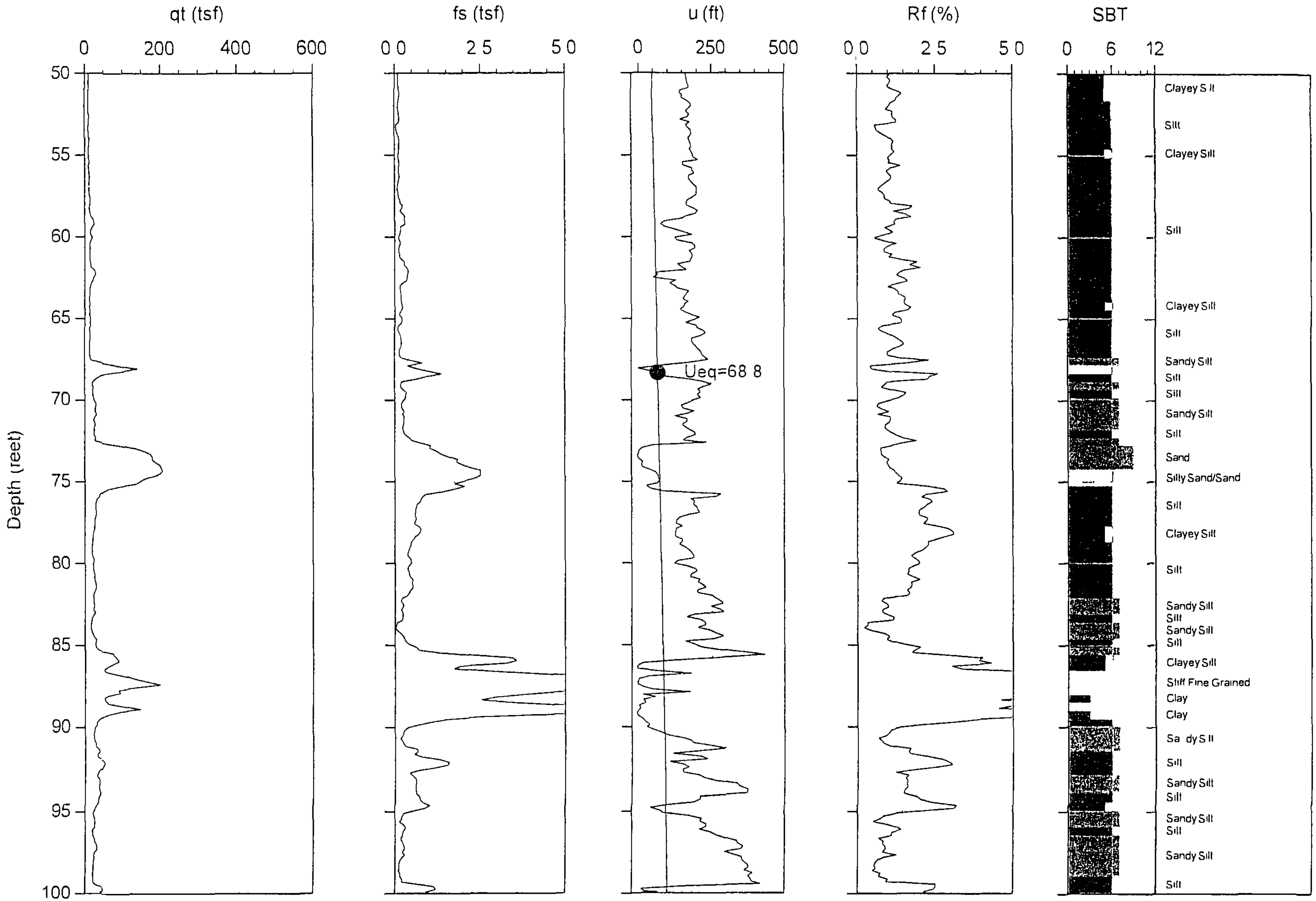
Equilibrium Pore Pressure from Dissipation

CONETEC

AGEC

Job No 08 374
Date 04 30 08 12 33
Site MOULDING SITE

Sounding CPT 04
Cone STD 20T AD183



Max Depth 42 850 m / 140 58 ft
Depth Inc 0 050 m / 0 164 ft
Avg Int 0 150 m

File 374CP04 COR
Unit Wt SBT Chart Soil Zones

SBT Lunne Robertson and Powell 1997

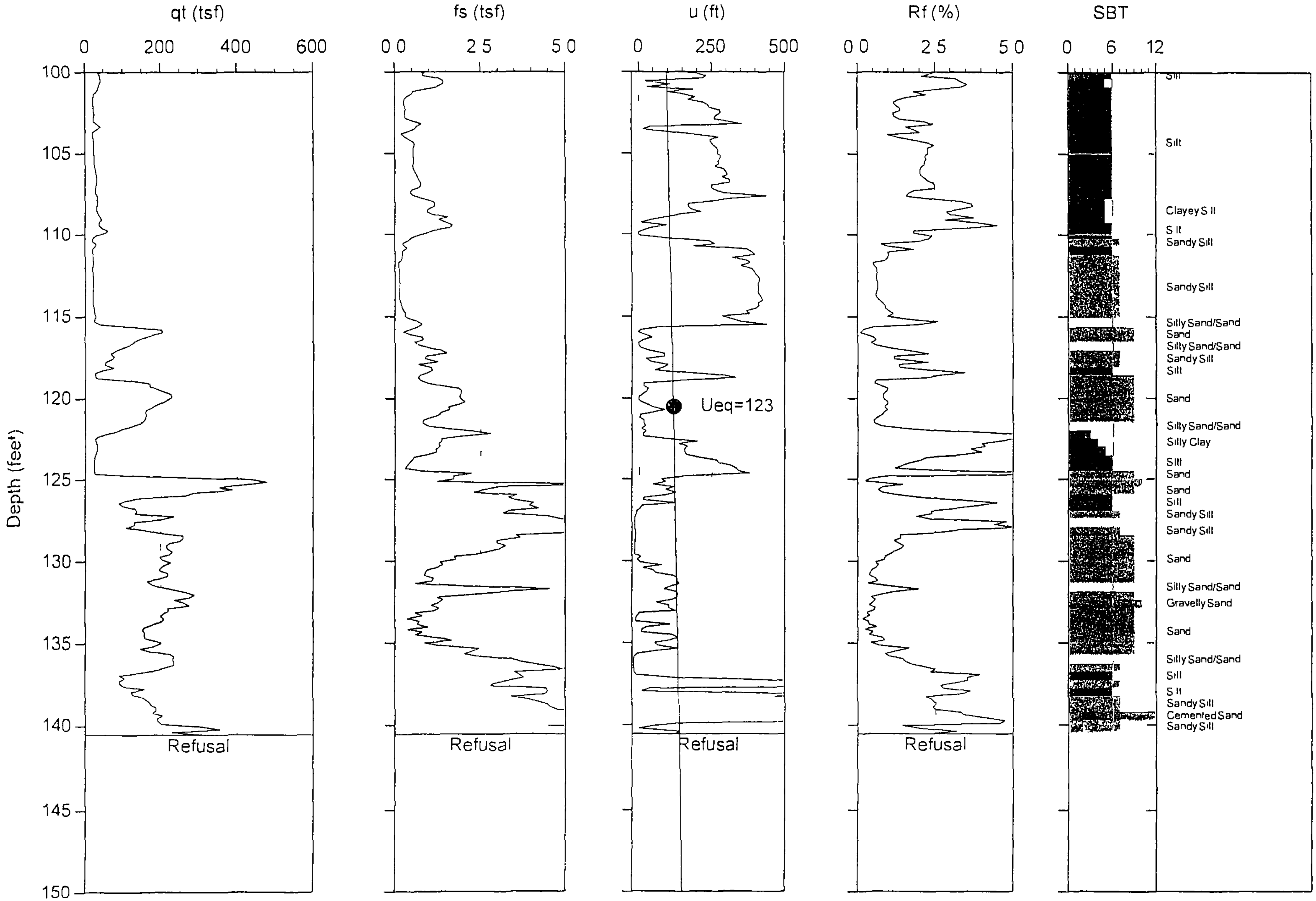
Equilibrium Pore Pressure from Dissipation

CONETEC

AGEC

Job No 08 374
Date 04 30 08 12 33
Site MOULDING SITE

Sounding CPT-04
Cone STD 20T AD183



Max Depth 42 850 m / 140 58 ft
Depth Inc 0 050 m / 0 164 ft
Avg Int 0 150 m

File 374CP04 COR
Unit Wt SBT Chart Soil Zones

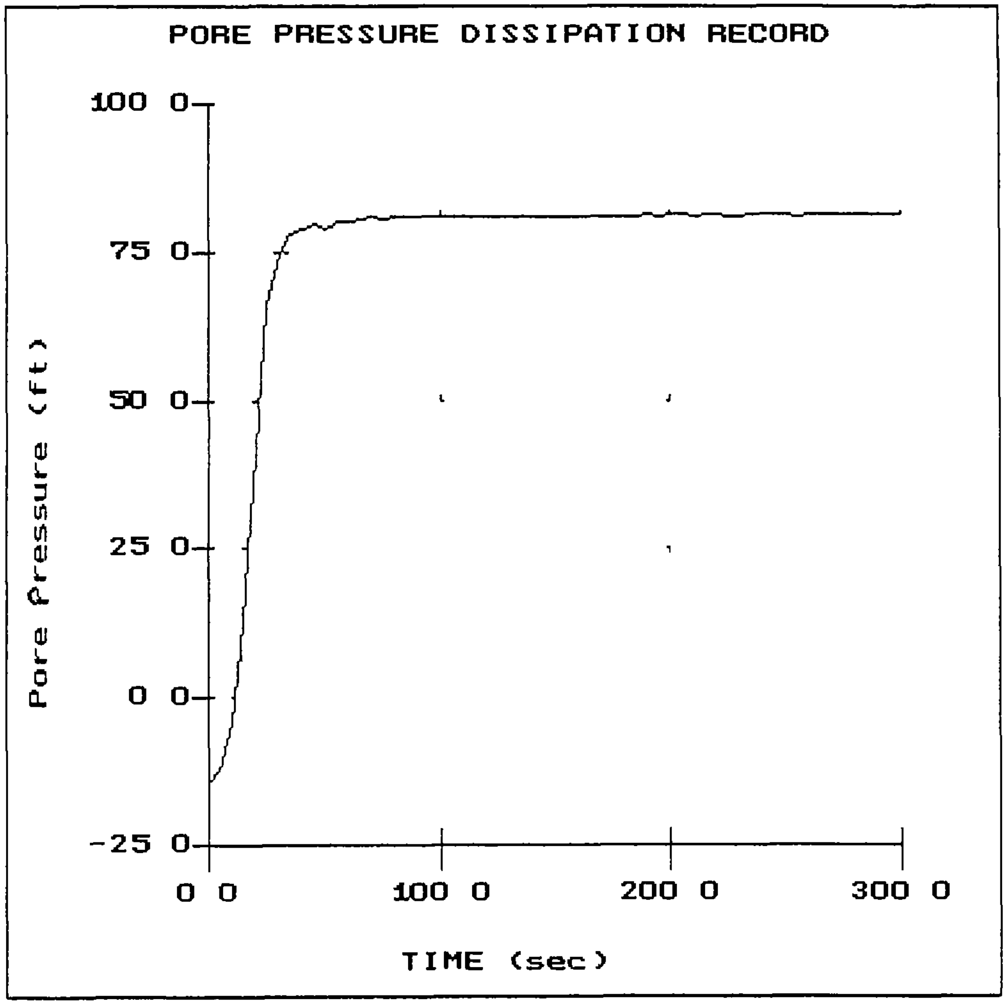
SBT Lunne Robertson and Powell 1997

Equilibrium Pore Pressure from Dissipation

AGEC

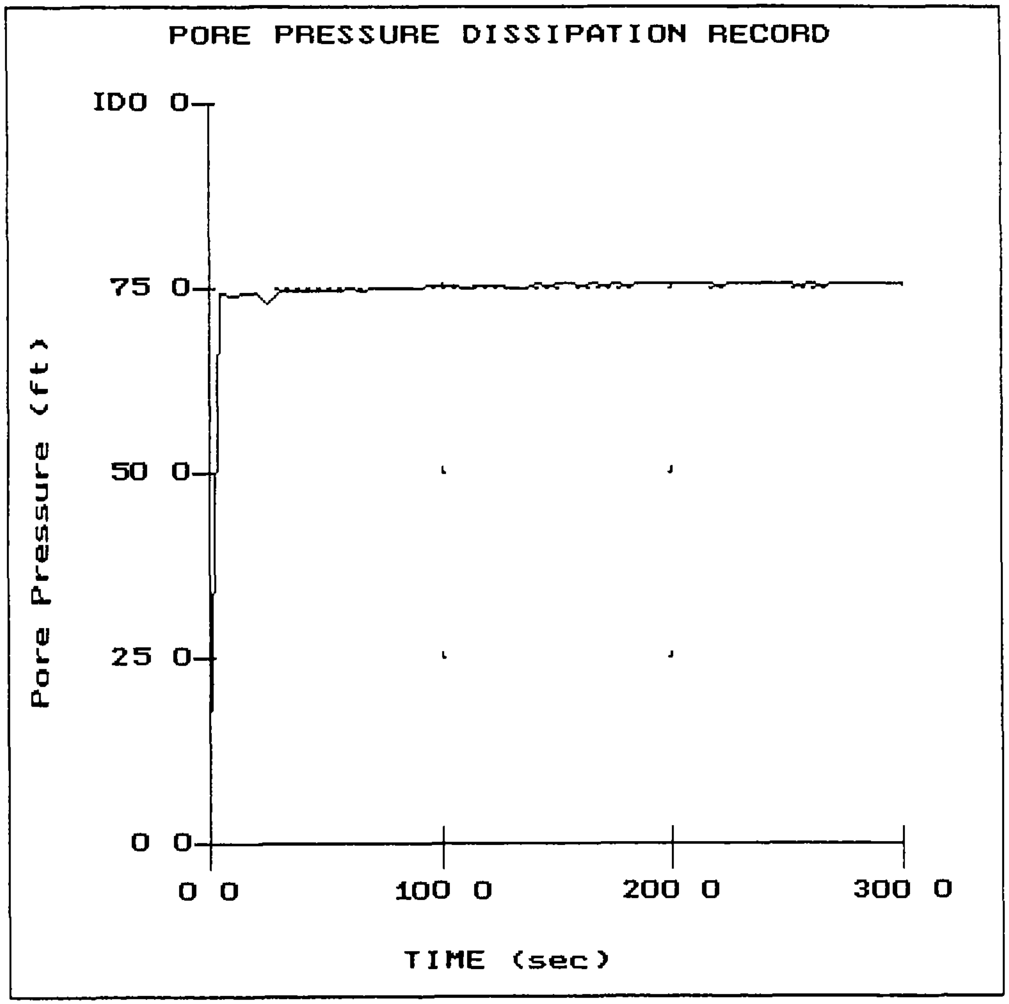
Sounding CPT-01A
Site MOULDING SITE

Cone STD 20T AD183
Date 04 30 08 16 07



File 374CP01A PPD
Depth (m) 25 05
(ft) 82 19
Duration 300 0s
U-min -14 50 0 0s
U-max 81 51 295 0s

AGEC	Sounding CPT-02 Site MOULDING SITE	Cone STD 20T AD183 Date 04 30 08 14 19

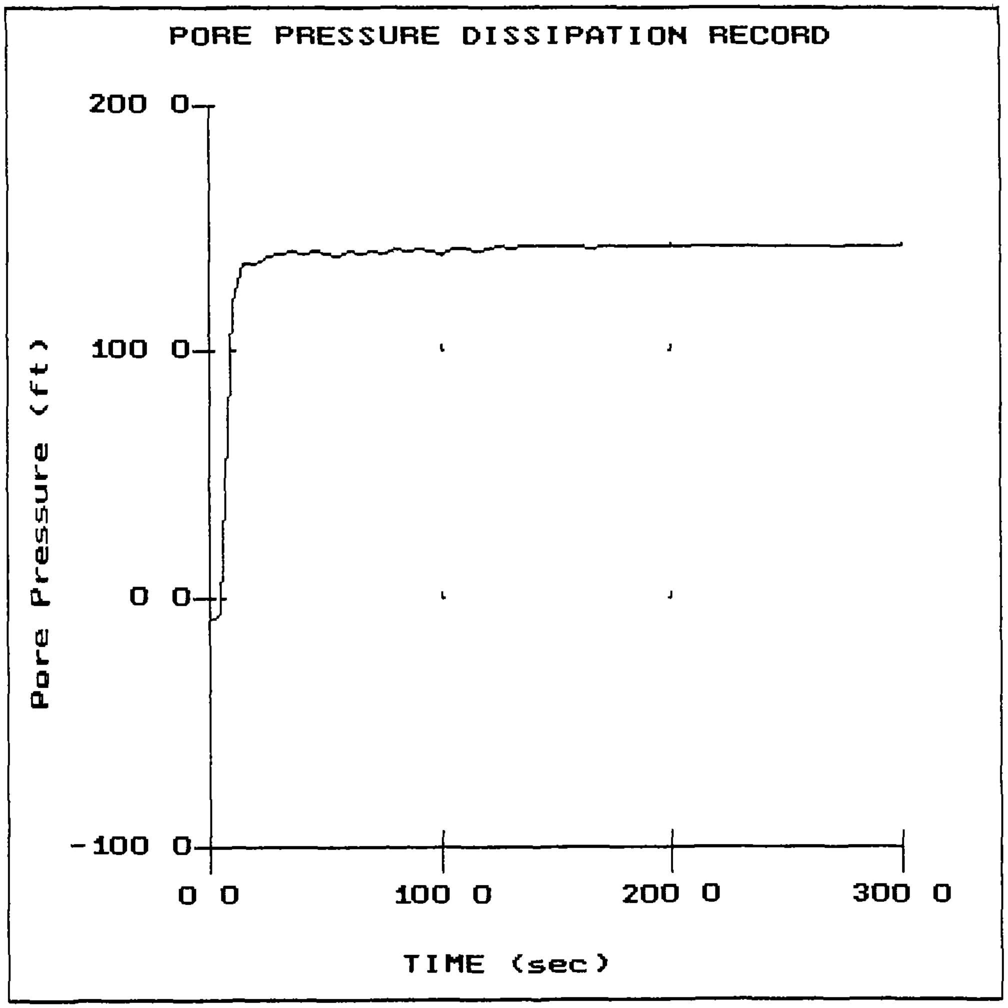


File 374CP02 PPD
Depth (m) 22 75
(ft) 74 64
Duration 300 0s
U-min 9 64 0 0s
U-max 75 57 295 0s

AGEC

Sounding CPT-02
Site MOULDING SITE

Cone STD 20T AD183
Date 04 30 08 14 19



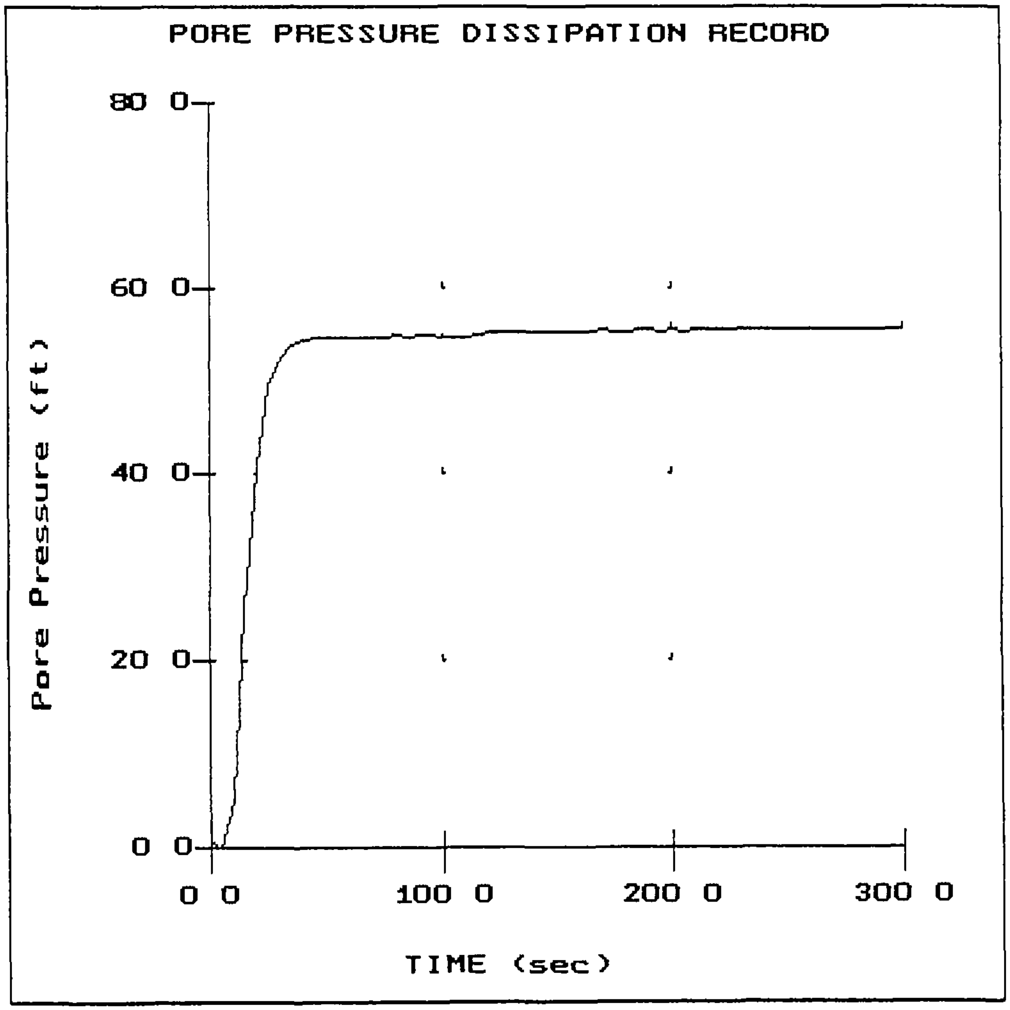
File 374CP02 PPD
Depth (m) 43 40
(ft) 142 39
Duration 300 0s
U-min -9 27 0 0s
U-max 143 15 275 0s

AGEC

Sounding CPT-03
Site MOULDING SITE

Cone STD 20T AD183
Date 04 30 08 11 13

File 374CP03 PPD
Depth (m) 17 80
(ft) 58 40
Duration 300 0s
U-min -0 33 5 0s
U-max 55 52 300 0s

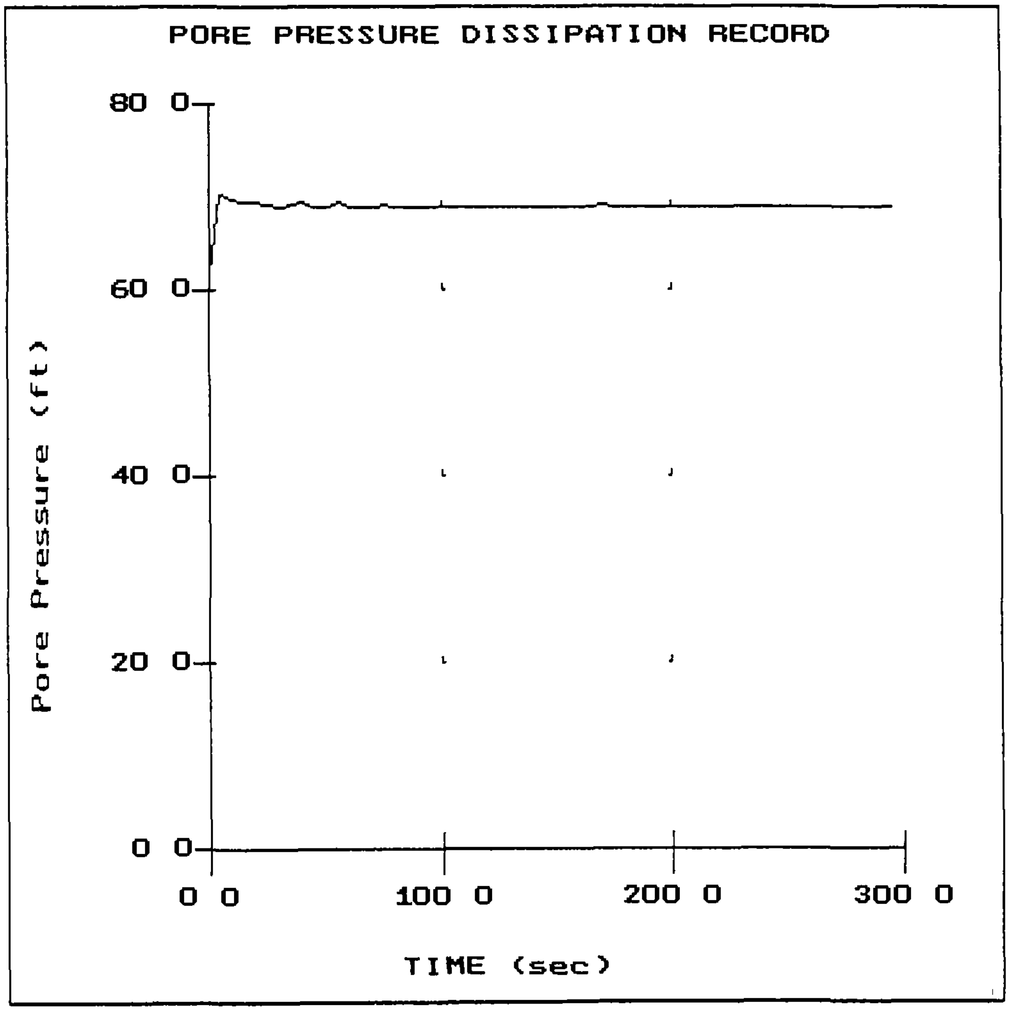


AGEC

Sounding CPT-04
Site MOULDING SITE

Cone STD 20T AD183
Date 04 30 08 12 33

File 374CP04 PPD
Depth (m) 20 85
(ft) 68 41
Duration 295 0s
U-min 61 34 0 0s
U-max 70 35 5 0s

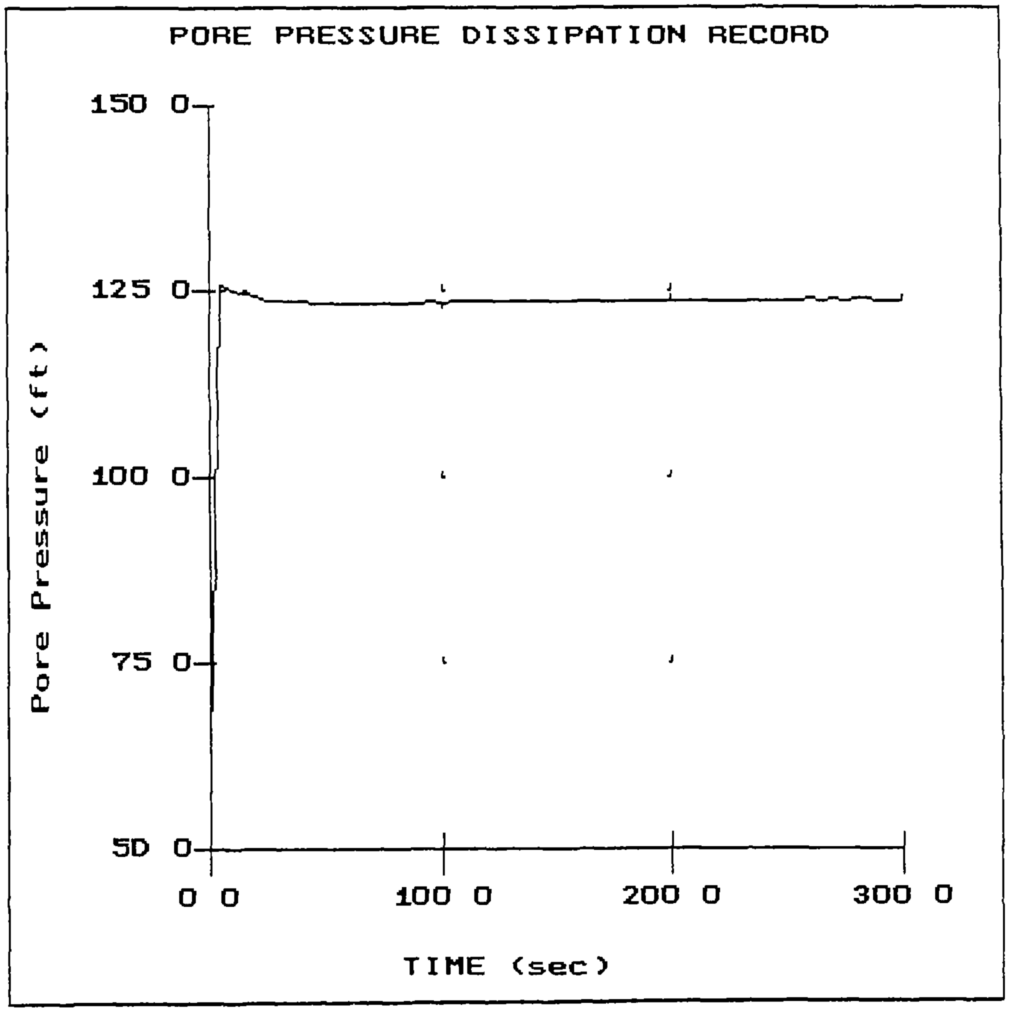


AGEC

Sounding CPT-04
Site MOULDING SITE

Cone STD 20T AD183
Date 04 30 08 12 33

File 374CP04 PPD
Depth (m) 36 75
(ft) 120 57
Duration 300 0s
U-min 60 58 0 0s
U-max 125 68 5 0s



Applied Geotechnical Engineering Consultants Inc

December 4 2008

Moulding and Sons
c/o Hansen Allen & Luce Inc
6771 South 900 East
Midvale UT 84047

Attention Kent Staheli
FAX 566 5581

Subject Geologic Conditions
Proposed Landfill
10500 West 900 South
Plain City Utah
AGEC Project No 1080092

Gentlemen

Applied Geotechnical Engineering Consultants Inc was requested to provide a description of the geology for the proposed landfill to be constructed at 10500 West 900 South in Plain City Utah We previously performed a geotechnical investigation and submitted our findings and recommendations in a report dated November 11 2008 under Project No 1080092

GEOLOGIC AND SEISMIC TECTONIC SETTING

A Regional Geology

The site is located at the northeast end of the Great Salt Lake which is located in the Basin and Range physiographic province The province is made up of north/south elongated mountain blocks and valleys

The area in and around the Great Salt Lake was once occupied by a large lake known as Lake Bonneville during the Wisconsin Glacial Period of the Pleistocene Age The present day Great Salt Lake is a remnant of ancient Lake Bonneville The stillstands of Lake Bonneville formed benches along the Wasatch Front The highest level of Lake Bonneville is marked by a bench the Bonneville shoreline at approximate elevation 5200 feet The lake remained at this high level from approximately 17 000 to 15 000 years before present until it dropped approximately 350 feet during a catastrophic flood known as the Bonneville Flood (Currey and Oviatt 1985 Jarrett and Malde 1987) Two lower stillstands of Lake Bonneville are the Prove and Gilbert which formed at approximate elevations of 4800 and 4250 feet respectively (Personius and Scott 1992) The lake has remained near its present day level through most of Holocene time The elevation of the site is just above the historic high level of the Great Salt Lake

B Tectonic Setting

The site is located near the eastern side of the Basin and Range physiographic province adjacent the Wasatch mountains The ~~Wasatch mountains~~ are bounded on the west by the Wasatch fault zone which extends approximately 240 miles from near Malad Idaho to the vicinity of Fayette Utah Relatively recent fault movements of the Wasatch fault zone are evidenced by offsets in Lake Bonneville sediments and more recent alluvial and colluvial deposits

The Wasatch fault zone is considered to be made up of several segments each segment acting relatively independently (Machette and others 1987) The site is located approximately 14 miles west of the Weber segment of the Wasatch fault zone There is another potentially active fault in the East Great Salt Lake fault which extends along the west side of Antelope Island and Promontory Point This fault is located approximately 11 miles to the southwest This is the closest known potentially active fault to the site (Black and others 2003) Both of these faults show evidence of movement during Holocene time and thus are considered potentially active The Weber segment of the Wasatch fault zone is considered to potentially produce earthquakes as great as 7 2 moment magnitude and the east Great Salt Lake fault is considered to be able to produce a 6 9 moment magnitude earthquake (Wong and others 2002)

C Site Geology

The site is located on the southern end of Little Mountain which is a hill which exposes bedrock This bedrock was mapped by Christie Blick 1985 as consisting of rock from the Perry Canyon Formation This bedrock is exposed along the north and west edges of the property The bedrock at the site consists of diamictite and slate as described in the above referenced geotechnical report The diamictite in this area generally dips down toward the northwest at approximately 7 to 10 degrees Based on the results of our subsurface investigation there is a significant amount of sand and clay which overlies the bedrock in most of the area planned for landfilling These soils consist of Lake Bonneville sediments which are interpreted to be both deep lake and near shore deposits

GEOLOGIC HAZARDS

The geologic hazards which were identified during the original study which may affect the site are primarily limited to strong earthquake ground shaking and the potential for liquefaction and possibly lateral spread These conditions are described in the above referenced geotechnical report Surface fault rupture rockfall landslide and debris flow are not considered potential hazards at the site

If you have questions or if we can be of further service please call

Sincerely

APPLIED GEOTECHNICAL ENGINEERING CONSULTANTS INC

11/19/08

Douglas R Hawkes P E P G

Reviewed by SM P G
DRH/dc

References

Black B D Hecker S Hylland M D Christenson G E and McDonald G N 2003 Quaternary fault and fold database and map of Utah Utah Geological Survey Map 193DM

Christie Blick N 1985 Upper Proterozoic glacial marine and subglacial deposits at Little Mountain Utah Brigham Young University Geology Studies volume 32 Part 1 18p

Currey D R and Oviatt F G 1985 Durations average rates and probable cause of Lake Bonneville expansion Stillstands and contractions during the last deep lake cycle 32 000 to 10 000 years ago in Diaz H F eds Problems of and prospects for predicting Great Salt Lake levels Proceedings for NOAA conference Center for Public Affairs and Administration University of Utah Salt Lake City Utah

Jarrett R D and Malde H E 1987 Paleodischarge of the late Pleistocene Bonneville Flood Snake River Idaho computed from new evidence Geological Society of America Bulletin v 99 p 127 134

References (continued)

Machette M N Personius S F and Nelson A R 1987 Quaternary geology along the Wasatch Fault Zone segmentation recent investigations and preliminary conclusions U S Geological Survey Open File Report 87 585 p B1 B124

Personius S F and W E Scott 1992 Surficial Geologic Map of the Salt Lake City Segment and parts of adjacent segments of the Wasatch Fault Zone Davis Salt Lake and Utah Counties Utah U S Geological Survey Map I 2106

Wong I Silva W Olig S Thomas P Wright D Ashland F Gregor N Pechmann J Dober M Christenson C and Gerth R 2002 Earthquake scenario and probabilistic ground shaking maps for Salt Lake City Utah metropolitan area Utah Geological Survey Miscellaneous Publication MP 02 5

INORGANIC ANALYSIS REPORT

AMERICAN
WEST
ANALYTICAL
LABORATORIES

463 West 3600 South
Salt Lake City Utah
84115

(801) 263 8686
Toll Free (888) 263 8686
Fax (801) 263 8687
mail awal@awal labs com

Kyle F Gross
Laboratory Director

Jose Rocha
QA Officer

Client Hansen, Allen & Luce — Contact Kent Staheli
Project ID Moulding C & D Landfill

Lab Sample ID L84598 01E
Field Sample ID B-4
Collected 6/17/2008 6 05 00 PM
Received 6/18/2008

TOTAL METALS

Analytical Results	Units	Date Analyzed	Method Used	Reporting Limit	Analytical Results	
Antimony	mg/L	6/21/2008 5 39 38 AM	6020	0 0010	< 0 0010	
Arsenic	mg/L	6/21/2008 5 39 38 AM	6020	0 00060	0 027	
Barium	mg/L	6/21/2008 5 39 38 AM	6020	0 00040	1 0	
Beryllium	mg/L	6/21/2008 5 39 38 AM	6020	0 00060	< 0 00060	
Cadmium	mg/L	6/21/2008 5 39 38 AM	6020	0 00018	0 00052	
Calcium	mg/L	6/27/2008 5 14 00 PM	6010B	10	280	[2] ~
Chromium	mg/L	6/27/2008 6 31 00 PM	6010B	0 010	0 010	
Cobalt	mg/L	6/21/2008 5 39 38 AM	6020	0 0012	0 0071	
Copper	mg/L	6/21/2008 5 39 38 AM	6020	0 00080	0 038	
Iron	mg/L	6/27/2008 6 31 00 PM	6010B	0 050	13	[2]
Lead	mg/L	6/21/2008 5 39 38 AM	6020	0 00040	0 0077	
Magnesium	mg/L	6/27/2008 5 14 00 PM	6010B	10	450	[2] ~
Manganese	mg/L	6/21/2008 5 39 38 AM	6020	0 0012	0 53	[1]
Mercury	mg/L	6/20/2008 11 52 35 AM	7470A	0 00020	< 0 00020	
Nickel	mg/L	6/21/2008 5 39 38 AM	6020	0 00080	0 090	
Potassium	mg/L	6/27/2008 5 14 00 PM	6010B	10	410	[2] ~
Selenium	mg/L	6/21/2008 5 39 38 AM	6020	0 00080	< 0 00080	
Silver	mg/L	6/21/2008 5 39 38 AM	6020	0 00040	< 0 00040	
Sodium	mg/L	6/27/2008 4 12 00 PM	6010B	100	8600	[2] ~
Thallium	mg/L	6/21/2008 5 39 38 AM	6020	0 00040	0 00086	
Vanadium	mg/L	6/27/2008 6 31 00 PM	6010B	0 0050	0 023	
Zinc	mg/L	6/21/2008 5 39 38 AM	6020	0 0054	0 050	

[1] *Matrix spike recovery indicates matrix interference The method is in control as indicated by the LCS*
Analyte concentration is too high for accurate matrix spike recovery and/or RPD
~ *The reporting limits were raised due to high analyte concentrations*

APPENDIX 3

GROUNDWATER QUALITY ANALYSIS

INORGANIC ANALYSIS REPORT

AMERICAN
WEST
ANALYTICAL
LABORATORIES

463 West 3600 South
Salt Lake City Utah
84115

(801) 263 8686
Toll Free (888) 263 8686
Fax (801) 263 8687
mail awal@awal labs com

Kyle F Gross
Laboratory Director

Jose Rocha
QA Officer

Client Hansen, Allen & Luce Contact Kent Staheli
Project ID Moulding C & D Landfill

Lab Sample ID L84598-01
Field Sample ID **B-4**
Collected 6/17/2008 6 05 00 PM
Received 6/18/2008

Analytical Results	Units	Date Analyzed	Method Used	Reporting Limit	Analytical Result	
Ammonia (as N)	mg/L	6/26/2008 12 12 00 PM	350 1	0 050	2 9	
Bicarbonate (As CaCO3)	mg/L	6/19/2008 10 15 00 AM	2320B	20	180	
Carbonate (As CaCO3)	mg/L	6/19/2008 10 15 00 AM	2320B	10	< 10	
Chloride	mg/L	6/27/2008 5 04 09 AM	300 0	500	15000	
COD	mg/L	6/20/2008 10 30 00 AM	HACH 8000	100	1100	
Nitrate (as N)	mg/L	6/18/2008 1 37 00 PM	353 2	0 010	0 034	' @
pH @ 25° C	pH Units	6/18/2008 7 00 00 PM	4500H+B	1 00	7 60	H
Sulfate	mg/L	6/27/2008 3 07 43 AM	300 0	750	1200	
TDS	mg/L	6/19/2008 12 30 00 PM	160 1	100	29000	
Total Organic Carbon	mg/L	6/26/2008 5 32 00 AM	5310B	1 0	7 4	

' *Matrix spike recovery indicates matrix interference The method is in control as indicated by the LCS*
@ *High RPD due to suspected sample non homogeneity or matrix interference*
H *Sample was received outside of the holding time*

INORGANIC ANALYSIS REPORT

Client Hansen, Allen & Luce Contact Kent Staheli
Project ID Moulding C & D Landfill

AMERICAN WEST ANALYTICAL LABORATORIES

Lab Sample ID L84598 03E
Field Sample ID B-7
Collected 6/17/2008 6 28 00 PM
Received 6/18/2008

463 West 3600 South
Salt Lake City Utah
84115

(801) 263 8686
Toll Free (888) 263 8686
Fax (801) 263 8687
mail awal@awal labs com

Kyle F Gross
Laboratory Director

Jose Rocha
QA Officer

TOTAL METALS

Analytical Results	Units	Date Analyzed	Method Used	Reporting Limit	Analytical Results	
Antimony	mg/L	6/21/2008 6 06 39 AM	6020	0 0010	< 0 0010	
Arsenic	mg/L	6/21/2008 6 06 39 AM	6020	0 00060	0 0097	
Barium	mg/L	6/21/2008 6 06 39 AM	6020	0 00040	3 8	
Beryllium	mg/L	6/21/2008 6 06 39 AM	6020	0 00060	< 0 00060	
Cadmium	mg/L	6/21/2008 6 06 39 AM	6020	0 00018	0 00028	
Calcium	mg/L	6/27/2008 5 29 00 PM	6010B	10	230	~
Chromium	mg/L	6/27/2008 6 48 00 PM	6010B	0 010	< 0 010	
Cobalt	mg/L	6/21/2008 6 06 39 AM	6020	0 0012	0 0048	
Copper	mg/L	6/21/2008 6 06 39 AM	6020	0 00080	0 025	
Iron	mg/L	6/27/2008 6 48 00 PM	6010B	0 050	57	
Lead	mg/L	6/21/2008 6 06 39 AM	6020	0 00040	0 0050	
Magnesium	mg/L	6/27/2008 5 29 00 PM	6010B	10	440	~
Manganese	mg/L	6/21/2008 6 06 39 AM	6020	0 0012	0 63	
Mercury	mg/L	6/20/2008 12 01 04 PM	7470A	0 00020	< 0 00020	
Nickel	mg/L	6/21/2008 6 06 39 AM	6020	0 00080	0 083	
Potassium	mg/L	6/27/2008 5 29 00 PM	6010B	10	330	~
Selenium	mg/L	6/21/2008 6 06 39 AM	6020	0 00080	< 0 00080	
Silver	mg/L	6/21/2008 6 06 39 AM	6020	0 00040	< 0 00040	
Sodium	mg/L	6/27/2008 4 54 00 PM	6010B	1000	6700	~
Thallium	mg/L	6/21/2008 6 06 39 AM	6020	0 00040	< 0 00040	
Vanadium	mg/L	6/27/2008 6 48 00 PM	6010B	0 0050	< 0 0050	
Zinc	mg/L	6/21/2008 6 06 39 AM	6020	0 0054	0 023	

~ *The reporting limits were raised due to high analyte concentrations*

INORGANIC ANALYSIS REPORT

AMERICAN WEST ANALYTICAL LABORATORIES

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Salt Lake City Utah
84115

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Kyle F Gross
Laboratory Director

Jose Rocha
QA Officer

Client Hansen, Allen & Luce   Contact Kent Staheli
Project ID Moulding C & D Landfill

Lab Sample ID L84598 03
Field Sample ID B-7
Collected 6/17/2008 6 28 00 PM
Received 6/18/2008

Analytical Results	Units	Date Analyzed	Method Used	Reporting Limit	Analytical Result	
Ammonia (as N)	mg/L	6/26/2008 12 12 00 PM	350 1	0 050	1 5	
Bicarbonate (As CaCO3)	mg/L	6/19/2008 10 15 00 AM	2320B	40	250	
Carbonate (As CaCO3)	mg/L	6/19/2008 10 15 00 AM	2320B	10	< 10	
Chloride	mg/L	6/27/2008 7 47 07 AM	300 0	500	12000	
COD	mg/L	7/1/2008 1 00 00 PM	HACH 8000	100	890	'
Nitrate (as N)	mg/L	6/18/2008 1 37 00 PM	353 2	0 010	< 0 010	
pH @ 25° C	pH Units	6/18/2008 7 00 00 PM	4500H+B	1 00	7 45	H
Sulfate	mg/L	6/27/2008 7 00 33 AM	300 0	75	730	
TDS	mg/L	6/20/2008 4 30 00 PM	160 1	100	23000	
Total Organic Carbon	mg/L	6/26/2008 5 32 00 AM	5310B	1 0	2 2	

Matrix effect caused NO3 value to read negative Corrected to zero

H Sample was received outside of the holding time

' *Matrix spike recovery indicates matrix interference The method is in control as indicated by the LCS*

APPENDIX 4

HYDROLOGY

Purpose

To determine the design flows to use for the detention and around the facility

Method

The SCS curve number method was used with the HEC HMS hydrology model Areas for the subbasins were determined using AutoCAD and ArcGIS

Required

In order to calculate the runoff and runon the following steps and information are required

- A delineation of the tributary area
- A weighted or representative Soil Conservation Service(SCS) curve number (CN) for the tributary area
- Lag time
- Storm Distribution
- 100 year 24 hour precipitation
- 25 year 24 hour precipitation

Delineation

The delineation of the subbasins shown in the HMS storm water model figure was based on the landfill design provided and USGS quad map contours for the runon basin

Curve Numbers

The curve numbers were determined based on the hydrologic soil type and soil cover The soil type in the area ranged from B to some D type soils A type C soil was selected as representative of the area The cover conditions were combined with the hydrologic soil type to produce a curve number based on Table 2 2d of Technical Release 55 The runoff from the closed landfill was determined to have a curve number of 81 using the herbaceous cover and Type C soil conditions The runon basin from Little Mountain was determined to have a curve number of 63 using the fair cover sagebrush with grass understory and C type soils

Precipitation

A 100 year 24 hour event was used for the design storm exceeding the State requirements of a 25 year event The rainfall amounts were taken from the Point Precipitation Frequency Estimates from NOAA Atlas 14" The 100 year 24 hour storm was listed as 2 73 inches in NOAA Atlas 14 The 25 year 24 hour storm was listed as 2 23 inches

Distribution

The distribution used for the 24 hour event was the SCS Type II

Lag Time

The lag times were calculated by using the Time of Concentration and the equation $T_L = 0\ 6Tc$ Tc was calculated using Worksheet 3 in TR 55 A spreadsheet showing each subbosin is provided and are labeled with their subbosin name The runon subbosin was calculated using a method from a study by Simas and Hawkins Lag Time Characteristics for Small Watersheds in the U S

Results

The results of the HEC 1 model run are summarized in the table entitled Hydrology Output from HMS The outflow from the lower detention out of the facility is 16 1 cfs with a total tributary area of 219 acres including the landfill facility and runon from Little Mountain producing 0 074 cfs/acre

POINT PRECIPITATION FREQUENCY ESTIMATES FROM NOAA ATLAS 14

Utah 41.246455 N 112.232511 W 4202 feet

from "Precipitation-Frequency Atlas of the United States" NOAA Atlas 14, Volume 1, Version 4
G.M. Bonnin, D. Martin, B. Lin, T. Parzybok, M. Yekta, and D. Riley
NOAA, National Weather Service, Silver Spring, Maryland, 2006

Extracted: Thu May 8 2008

Precipitation Frequency Estimates (inches)

ARI* (years)	5 min	10 min	15 min	30 min	60 min	120 min	3 hr	6 hr	12 hr	24 hr	48 hr	4 day	7 day	10 day	20 day	30 day	45 day	60 day
1	0.12	0.18	0.23	0.31	0.38	0.48	0.55	0.73	0.92	1.12	1.29	1.47	1.70	1.87	2.34	2.78	3.37	3.96
2	0.15	0.23	0.29	0.39	0.48	0.60	0.68	0.89	1.12	1.37	1.58	1.81	2.08	2.30	2.88	3.42	4.14	4.86
5	0.21	0.32	0.40	0.53	0.66	0.78	0.86	1.09	1.36	1.66	1.91	2.18	2.51	2.77	3.44	4.07	4.90	5.74
10	0.26	0.40	0.50	0.67	0.83	0.95	1.02	1.27	1.57	1.90	2.18	2.49	2.86	3.13	3.87	4.57	5.47	6.41
25	0.35	0.53	0.66	0.89	1.10	1.23	1.29	1.54	1.88	2.23	2.54	2.90	3.33	3.62	4.42	5.20	6.18	7.23
50	0.43	0.66	0.81	1.10	1.36	1.49	1.54	1.76	2.13	2.47	2.82	3.23	3.69	3.98	4.80	5.65	6.67	7.81
100	0.53	0.80	0.99	1.34	1.66	1.80	1.84	2.02	2.40	2.73	3.10	3.57	4.05	4.34	5.18	6.08	7.12	8.35
200	0.64	0.98	1.21	1.63	2.02	2.17	2.20	2.32	2.69	2.98	3.39	3.91	4.41	4.69	5.53	6.49	7.53	8.83
500	0.83	1.26	1.56	2.10	2.60	2.76	2.78	2.90	3.16	3.33	3.77	4.37	4.88	5.13	5.95	6.99	7.99	9.39
1000	0.99	1.51	1.88	2.53	3.13	3.30	3.32	3.42	3.54	3.60	4.06	4.72	5.24	5.45	6.24	7.33	8.27	9.74

*These precipitation frequency estimates are based on a partial duration series. ARI is the Average Recurrence Interval.
Please refer to the documentation for more information. NOTE: Formatting forces estimates near zero to appear as zero.

* Upper bound of the 90% confidence interval Precipitation Frequency Estimates (inches)

ARI** (years)	5 min	10 min	15 min	30 min	60 min	120 min	3 hr	6 hr	12 hr	24 hr	48 hr	4 day	7 day	10 day	20 day	30 day	45 day	60 day
1	0.14	0.21	0.27	0.36	0.44	0.54	0.62	0.80	1.00	1.25	1.43	1.63	1.88	2.06	2.56	3.03	3.65	4.29
2	0.18	0.27	0.34	0.45	0.56	0.68	0.77	0.99	1.23	1.54	1.77	2.00	2.31	2.54	3.15	3.73	4.48	5.26
5	0.24	0.37	0.46	0.62	0.77	0.88	0.97	1.20	1.49	1.86	2.13	2.41	2.79	3.04	3.77	4.43	5.28	6.19
10	0.31	0.47	0.58	0.78	0.96	1.08	1.16	1.40	1.72	2.13	2.42	2.76	3.17	3.44	4.24	4.96	5.89	6.90
25	0.41	0.62	0.77	1.04	1.29	1.41	1.47	1.71	2.07	2.49	2.83	3.22	3.69	3.98	4.83	5.65	6.64	7.78
50	0.51	0.78	0.96	1.29	1.60	1.73	1.76	1.97	2.37	2.78	3.14	3.60	4.09	4.38	5.25	6.14	7.17	8.41
100	0.63	0.96	1.19	1.60	1.98	2.12	2.15	2.29	2.70	3.06	3.47	3.98	4.50	4.78	5.67	6.63	7.67	9.01
200	0.78	1.19	1.47	1.98	2.46	2.61	2.61	2.67	3.07	3.36	3.80	4.38	4.92	5.17	6.06	7.10	8.11	9.53
500	1.03	1.57	1.95	2.62	3.25	3.42	3.46	3.49	3.69	3.76	4.25	4.93	5.49	5.69	6.55	7.67	8.63	10.16
1000	1.27	1.94	2.40	3.23	4.00	4.19	4.23	4.27	4.32	4.36	4.59	5.37	5.92	6.07	6.89	8.09	8.94	10.56

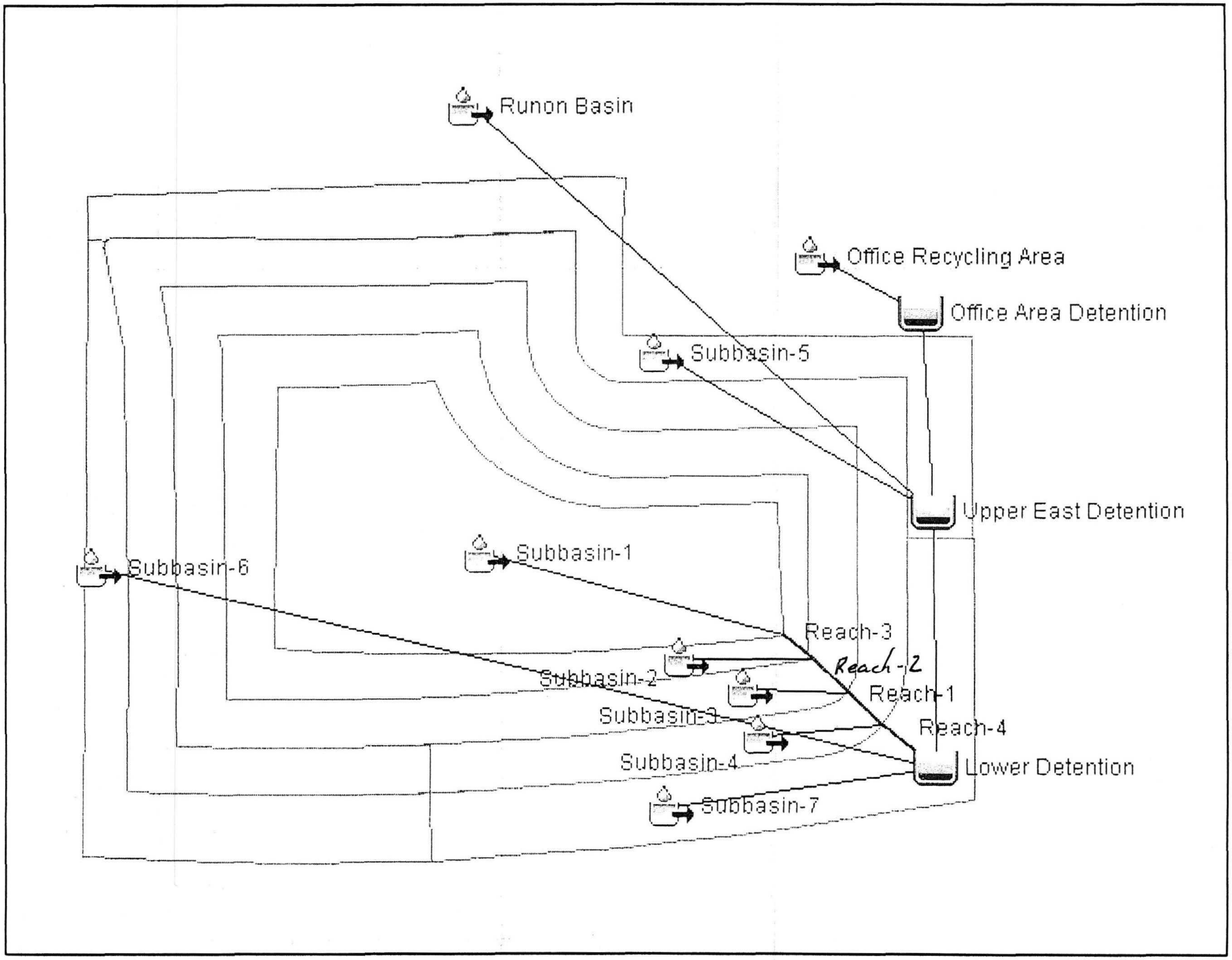
*The upper bound of the confidence interval at 90% confidence level is the value which 5% of the simulated quantile values for a given frequency are greater than.
** These precipitation frequency estimates are based on a partial duration series. ARI is the Average Recurrence Interval.

Please refer to the documentation for more information. NOTE: Formatting prevents estimates near zero to appear as zero.

* Lower bound of the 90% confidence interval Precipitation Frequency Estimates (inches)

ARI** (years)	5 min	10 min	15 min	30 min	60 min	120 min	3 hr	6 hr	12 hr	24 hr	48 hr	4 day	7 day	10 day	20 day	30 day	45 day	60 day
1	0.11	0.16	0.20	0.27	0.33	0.42	0.50	0.67	0.84	1.00	1.17	1.33	1.54	1.70	2.14	2.55	3.11	3.66
2	0.14	0.21	0.26	0.34	0.42	0.53	0.62	0.82	1.03	1.24	1.44	1.64	1.90	2.09	2.64	3.14	3.83	4.50
5	0.18	0.28	0.35	0.47	0.58	0.69	0.77	0.99	1.25	1.50	1.73	1.98	2.28	2.51	3.15	3.75	4.53	5.33
10	0.23	0.35	0.43	0.58	0.72	0.83	0.91	1.15	1.43	1.71	1.97	2.25	2.59	2.85	3.54	4.19	5.07	5.94
25	0.30	0.45	0.56	0.76	0.93	1.05	1.13	1.37	1.69	1.99	2.29	2.61	3.01	3.28	4.04	4.77	5.72	6.70
50	0.35	0.54	0.67	0.90	1.11	1.24	1.31	1.55	1.89	2.20	2.53	2.90	3.31	3.59	4.38	5.16	6.17	7.22
100	0.42	0.64	0.79	1.06	1.32	1.45	1.53	1.74	2.10	2.42	2.77	3.18	3.62	3.90	4.71	5.54	6.58	7.71

WEBER COUNTY C&D LANDFILL
HMS STORM WATER MODEL



Weber County C&D Landfill
Hydrology Output from HMS
100yr 24hr Storm Event SCS Type II Storm Distribution NOAA 14 Rainfall Depth (2 73 inches)

Hydrologic Element	Drainage Area (Mi^2)	Peak Discharge (cfs)	Time of Peak	Volume (ac-ft)
Lower Detention	0 342	16 1	01Jan2009 15 50	13 8
Office Area Detention	0 015	2 1	01Jan2009 12 50	1 1
Office Recycling Area	0 015	10 9	01Jan2009 12 10	1 1
Reach 1	0 082	15 3	01Jan2009 13 00	4 9
Reach 2	0 052	12	01Jan2009 12 50	3 1
Reach 3	0 031	9 5	01Jan2009 12 40	1 8
Reach 4	0 119	19 2	01Jan2009 13 20	7
Runon Basin	0 160	9	01Jan2009 12 50	2 8
Subbasin 1	0 031	9 5	01Jan2009 12 40	1 8
Subbasin 2	0 021	3 9	01Jan2009 13 30	1 2
Subbasin 3	0 031	5 3	01Jan2009 13 40	1 8
Subbasin-4	0 037	5 8	01Jan2009 14 00	2 2
Subbasin 5	0 019	6 1	01Jan2009 12 40	1 1
Subbasin 6	0 014	7 4	01Jan2009 12 10	0 8
Subbasin 7	0 016	9 8	01Jan2009 12 10	0 9
Upper East Detention	0 193	8 9	01Jan2009 14 00	5

WEBER COUNTY C&D LANDFILL
HMS STORM WATER MODEL DETENTION RESULTS

Summary Re ults for Reservoir Lower Detention

Project Trial Simulation Run 100yr 24hr Reservoir Lower Detention

Start of Run	01Jan2000, 00 00	Basin Model	Basin 1
End of Run	02Jan2000, 12 00	Meteorologic Model	100yr 24hr
Compute Time	D9Dec2008, 09 43 14	Control Specifications	24hr

Volume Units IN AC FT

Computed Result

Peak Inflow	30 1 (CFS)	Date/Time of Peak Inflow	01Jan2000, 13 10
Peak Outflow	16 1 (CFS)	Date/Time of Peak Outflow	01Jan2000 15 50
Total Inflnw	13 d (AC FT)	Peak Storaae	4 3 (AC FT)
Total Outflow	1? 8 (AC FT)	Peak Elevation	(FT)

Summary Results for Reservoir Office Area Detention

Proiect Trial Simulation Run 100yr 24hr Reservoir Office Area Detention

Start of Run	01Jan2000, 00 00	Basin Model	Basin 1
End of Run	02Jan2000, 12 00	Meteorologic Model	100yr 24hr
Compute Time	09Dec2008, 09 43 14	Control Specifications	24hr

Volume Units IN AC FT

Computed Results

Peak Inflow	10 9 (CFS)	Date/Time of Peak Inflow	01Jan2000 12 10
Peak Outflow	2 1 (CFS)	Date/Time of Peak Outflow	01Jan2000 12 50
Total Intlow	1 1 (AC FT)	Peak Storage	0 4 (AC FT)
Total Outflow	1 1 (AC FT)	Peak Elevation	(FT)

Summary Results for Reservoir Upper East Detention

Project Trial Simulation Run 100yr 24hr Reservoir Upper East Detention

Start of Run	01Jan2000, 00 00	Basin Model	Basin 1
End of Run	02Jan2000, 12 00	Meteorologic Model	100yr 24hr
Compute Time	09Dec2008, 09 43 14	Control Specifications	24hr

Volume Units IN AC FT

Computed Results

Peak Inflow	16 7 (CFS)	Date/Time of Peak Inflow	01Jan2000, 12 50
Peak Outflow	8 9 (CFS)	Date/Time of Peak Outflow	01Jan2000, 14 00
Total Inflow	5 0 (AC FT)	Peak Storage	1 0 (AC FT)
Total Outflow	5 0 (AC FT)	Peak Elevation	(FT)

Table 2-2d Runoff curve numbers for arid and semiarid rangelands [1]

Cover description		Curve numbers for hydrologic soil group			
Cover type	Hydrologic condition [2]	A [3]	B	C	D
Herbaceous—mixture of grass, weeds, and low-growing brush, with brush the minor element	Poor		80	87	93
	Fair		71	$\boxed{81}$ runoff browns	89
	Good		62	74	85
Oak-aspen—mountain brush mixture of oak brush, aspen, mountain mahogany, bitter brush, maple, and other brush	Poor		66	74	79
	Fair		48	57	63
	Good		30	41	48
Pinyon-juniper—pinyon, juniper, or both; grass understory	Poor		75	85	89
	Fair		58	73	80
	Good		41	61	71
Sagebrush with grass understory	Poor		67	80	85
	Fair		51	$\boxed{63}$ [illegible]	70
	Good		35	47	55
Desert shrub—major plants include saltbush, greasewood, creosotebush, blackbrush, bursage, palo verde, mesquite, and cactus	Poor	63	77	85	88
	Fair	55	72	81	86
	Good	49	68	79	84

1 Average runoff condition, and $I_a = 0.2S$. For range in humid regions, use table 2-2c.
2 Poor: <30% ground cover (litter, grass, and brush overstory).
Fair: 30 to 70% ground cover.
Good: > 70% ground cover.
3 Curve numbers for group A have been developed only for desert shrub.

Weber County C&D Landfill
Detention Basin Calculations
Computed GLJ November 24 2008

LOWER DETENTION FACILITY

Invert Elevation (ft)	0
Outlet Elevation (ft)	0
Orrifice Size (in)	21
Ornfice Coefficient	0 6
Pipe Size (in)	24

Elevation	Area (sf)	Step Volume (cf)	Total Volume (cf)	Total Volume (acre ft)	Orrifice Outflow (cfs)	
0 0	0	0	0	0 000	0 00	
1 0	92740 00	92740	92740	2 129	11 58	
1 08				2 400	12 20	25 yr High Water
1 94				4 300	16 10	100 yr High Water
2 0	101092 00	101092	193832	4 450	16 38	
3 0	109477 00	109477	303309	6 963	20 06	

UPPER EAST DETENTION FACILITY

Invert Elevation (ft)	0
Outlet Elevation (ft)	0
Ornfice Size (in)	15
Ornfice Coefficient	0 6
Pipe Size (in)	24

Elevation	Area (sf)	Step Volume (cf)	Total Volume (cf)	Total Volume (acre ft)	Orrifice Outflow (cfs)	
0 0	0	0	0	0 000	0 00	
1 0	16315 00	16315 00	16315	0 375	5 91	
1 06				0 400	6 00	25 yr High Water
2 0	18867 00	18867 00	35182	0 808	8 36	
2 39				1 000	8 90	100 yr High Water
3 0	21450 00	21450 00	56632	1 300	10 23	
3 6	23551 0	23551 00	80183	1 841	11 21	

OFFICE AREA DETENTION FACILITY

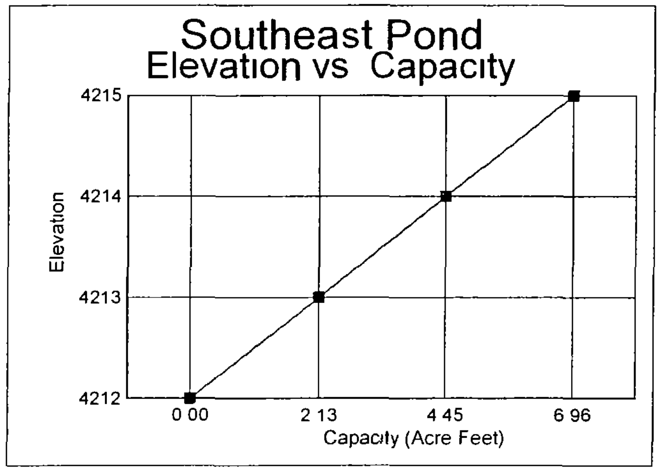
Invert Elevation (ft)	0
Outlet Elevation (ft)	0
Orrifice Size (in)	6
Orrifice Coefficient	0 6
Pipe Size (in)	12

Elevation	Area (sf)	Step Volume (cf)	Total Volume (cf)	Total Volume (acre ft)	Orrifice Outflow (cfs)	
0 0	0	0	0	0 000	0 00	
1 0	2781 0	2781 00	2781	0 064	0 95	
2 0	3356 0	3356 00	6137	0 141	1 34	
3 0	3962 0	3962 00	10099	0 232	1 64	
3 6				0 300	1 80	25 yr High Water
4 0	4600 0	4600 00	14699	0 337	1 89	
4 8				0 400	2 07	100 yr High Water
5 0	5270 0	5270 00	19969	0 458	2 11	
5 8	5903 0	5903 00	25872	0 594	2 28	

Client Weber County/Moulding & Sons Landfill LLC
Project Landfill Permit
Feature Stormwater Ponds Stage vs Capacity Relationships
Date November 2008

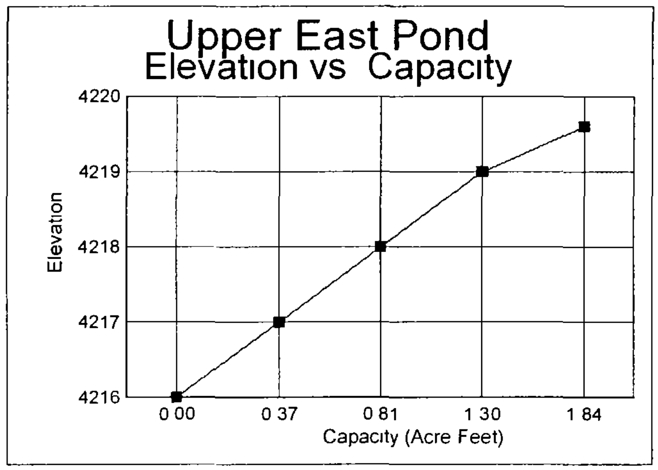
Southeast Pond

Elevation	Area (sf)	Avg Area (sf)	Volume (cf)	Volume (ac-ft)
4212	88572		0	0 00
4213	96908	92740	92740	2 13
4214	105276	101092	193832	4 45
4215	113677	109477	303309	6 96



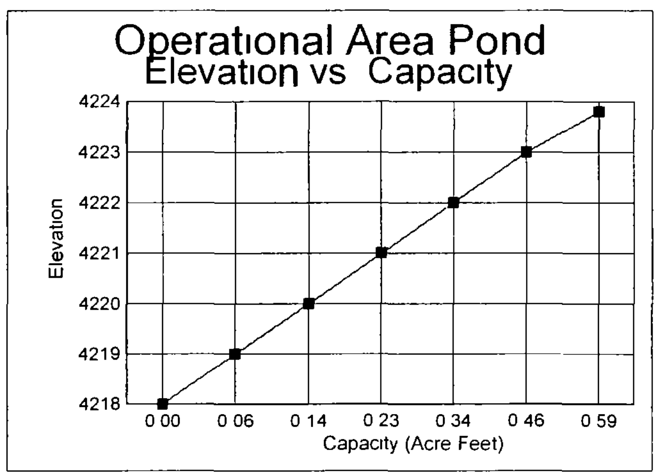
Upper East Pond

Elevation	Area (sf)	Avg Area (sf)	Volume (cf)	Volume (ac-ft)
4216	15047		0	0 00
4217	17583	16315	16315	0 37
4218	20150	18867	35182	0 81
4219	22749	21450	56631	1 30
4219 6	24353	23551	80182	1 84



Operations Area Pond

Elevation	Area (sf)	Avg Area (sf)	Volume (cf)	Volume (ac-ft)
4218	2502		0	0 00
4219	3060	2781	2781	0 06
4220	3651	3356	6137	0 14
4221	4273	3962	10099	0 23
4222	4927	4600	14699	0 34
4223	5613	5270	19969	0 46
4223 8	6193	5903	25872	0 59



Purpose — To determine the capacity requirements for runoff containment for exposed waste within active landfills Waste that is inert or has received a soil cover is not considered exposed and runoff from these areas may be discharged off site

Method — The SCS curve number method as described in Technical Release No 55

Required — In order to calculate the runoff volume the following steps and information are required

- Delineation of the tributary area contributing to runoff
- A weighted or representative Soil Conservation Service(SCS) curve number (CN)
  25 year 24 hour precipitation depth

Delineation — Runoff will be determined based on the volume generated per acre of open and active cell area of exposed waste

Curve Numbers — The curve numbers were determined based on the hydrologic soil type located at the site and materials placed in the cells There are assumed to be no soil vegetation cover and conditions during placement of the waste

Precipitation — Design for the 25 year 24 hour precipitation event is assumed for containment to provide an equivalent design to requirements for MSW facilities The rainfall amounts were taken from the Point Precipitation Frequency Estimates from NOAA Atlas 14 The precipitation depth value used is 2 23

Calculations

Rainfall runoff depth (Q) is determined by

$Q = ((P\ 0\ 2S)^2)/(P+0\ 8S)$ Where Q = Runoff depth (inches)
P = Precipitation depth (inches)
S = Potential maximum retention after runoff begins (inches) = (Ia)/(0 2)
Where Ia = Initial abstraction (inches)

Also S is related the SCS curve number (CN) as follows

$S = (1000/CN)\ 10$

Determine SCS Curve Number (CN) for the C&D Waste Material

C&D Waste materials will consist primarily of concrete asphalt wood products and other impermeable construction materials However the materials placed in the landfill will be broken up and will most likely consist of many voids Much of the precipitation will either run off the surface of the waste materials or move through the void spaces between the materials There will be some retention on the within the void spaces in the waste and on the surface of the waste pile Soils used for cover will also most likely range between hydrologic soil type B and D

Assume a hydrologic soil group C for soils that may be intermixed in the waste materials and assume that the impervious waste covers 50 percent of the area Also assume the soils to be compacted similar to what a dirt road surface may represent

Use information from Natural Resources Conservation Service Technical Release 55 (TR 55) Urban Hydrology for Small Watersheds

Table 2 2a CN = 87 for hydrologic soil group C and a dirt road type surface including right of way CN = 98 for paved surfaces similar to the impermeable surfaces of waste within the landfill

Figure 2 3 Composite CN = 93 using a pervious CN of 87 and 50% connected impervious area with a CN = 98 ((98 x 0 50)+(87 x 0 50) = 92 5)

Determine Runoff Depth Per Acre of Area

S = (1000/93) 10 = 0 753

Q = ((2 23 0 2(0 753))^2)/(2 23+0 8(0 753)) = 1 54 inches

Runoff quantity per acre is 1 54/12 = 0 13 acre foot per acre = 5 662 cf/acre

Conclusion

Required runoff containment capacity is therefore 0 13 acre foot (5 662 cf) per acre of exposed waste area This containment capacity may be provided in a number of ways including

- A ponding area on the waste surface
- Dikes or pond areas constructed down gradient from the working faces
  Allowing runoff to discharge from the cell into on on site containment pond
  A combination of the above or any other method that will provide the required containment capacity

Runoff water may be used inside the cell or on facility roads for dust control or used for construction water as needed for material processing and compaction

APPENDIX 5

STORM WATER HYDRAULIC DESIGN

I Purpose and Procedure

The purpose of these calculations is to design the drainage channels that will convey run on from Little Mountain and run off from the operations area

Federal Highway Administration HEC 15 Design of Roadside Channels with Flexible Linings was used as the basis for both depth and erosion protection requirements The selected erosion protection for the channel was grass-lined therefore chapter 4 from HEC 15 was the basis for the analysis

II The design dimensions for the drainage channel is a V shaped channel with 2 5H 1V sides with a depth of 2 feet with slopes ranging from 0 5% to 1% Design flow for the channel is 10 9 cfs the peak 100 year 24 hour flow from the operations area The peak flow for the channel conveying flow from run on from Little Mountain is 9 cfs

Step 1 Channel slope will vary between 0 5 and 1% Channel shape will be V shaped with 2 5H 1V sides with a peak discharge of 10 9 cfs

Step 2 A vegetative lining on a lean clay with some sand and gravel

Step 3 Initial depth estimate is 1 5 feet for the 1% grade

$R = 0\ 70$ feet

Step 4 To estimate n the applied shear stress on the grass lining given by Equation 2 3

$\tau_o = \gamma R S_o = 62\ 4(0\ 70)(0\ 01) = 0\ 437\ lb/ft^2$

Determine a Manning s n value from Equation 4 2 From Table 4 3 Cn = 0 2

$n = \alpha C_n \tau^{0\ 4} = 0\ 213(0\ 2)(0\ 437)^{0\ 4} = 0\ 059$

The discharge is calculated using Manning s equation

$Q = 1\ 49/0\ 059(5\ 63)(0\ 70)^{(2/3)}(0\ 01)^{(1/2)} = 11\ 2\ ft^3/s$

Step 5 This value is within 5% of the design flow of 10 9 cfs so we can proceed to step 6

Step 6 The maximum shear on the channel bottom is

$\tau = \gamma d S_o = 62\ 4(1\ 5)(0\ 01) = 0\ 936\ lb/ft^2$

Determine the permissible soil shear stress from Equation 4 6

$T_{p\ soil}$ = $(c_1 PI^2 + c_2 PI + c_3)(c_4 + c_5 e)^2 c_6 = (1\ 07(17)^2 + 14\ 3(17) + 47\ 7)(1\ 48$ $0\ 57(0\ 5))^2 10^4$

$= 0\ 086$ lb/ft^2

Equation 4 7 gives the permissible shear stress on vegetation The value of C_f is found in Table 4 5

$T_p = T_{p\ soil}/(1\ C_f)(n/n_s)^2 = (0\ 086/(1\ 0\ 5))(0\ 059/0\ 016)^2 = 2\ 34$ lb/ft^2

The safety factor for this channel is taken as 1 0

Step 7 The grass lining Is acceptable since the maximum shear on the vegetation is less than the permissible shear of 2 7 lb/ft^2 The grass lining will therefore also be sufficient for the 0 5% grade parts of the channel

APPENDIX 6

EROSION PROTECTION

I Purpose and Procedure

The purpose of these calculations is to determine which erosion protection measure to use and how to apply it The closure cap will consist of a 2 5H 1V slope extending up from the toe of the cap at ground surface Benches will be constructed in the slopes of the closure cap to intercept precipitation and snow melt runoff from the slopes as needed to control runoff and to minimize erosion with a slope of 6H 1V creating the bench with the closure cap slope of 2 5H 1V

The procedure used to determine the allowable slope lengths between the bench areas of the closure cap slopes is taken from the publication "Erosion and Sedimentation in Utah A Guide for Control" Utah Water Research Laboratory February 1984 This publication is specific to Utah The figure presented on Sheet 2 presents a cross section showing the configuration of the area contributing runoff to the slopes of the closure cap The degree of erosion protection required is based on the steepness and length of the slopes Erosion protection measures will be determined for the longest slope length and the erosion control measures determined for the longest slope will be conservatively applied to all slopes

II The procedure from the above publication uses the Universal Soil Loss Equation (in modified form to represent Utah's climatic and topographic conditions) to estimate the soil erosion potential of the surface soils assuming no application of erosion control measures Erosion control measures to be implemented are based on the soil erosion potential calculated

The universal soil loss equation used to calculate soil erosion potential is

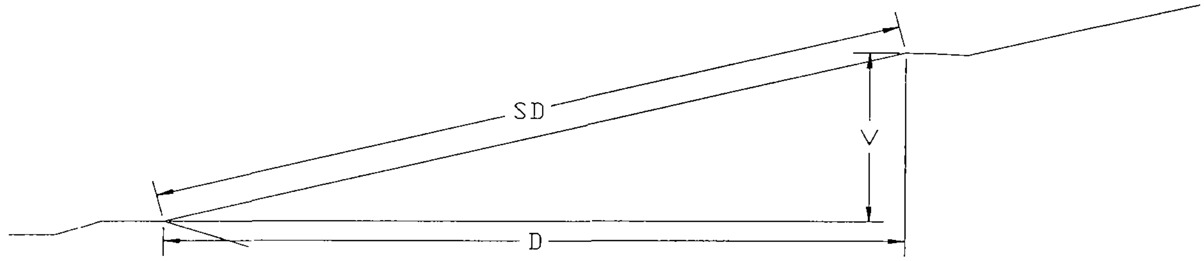
$$A = R\ K\ LS$$

where A = Computed amount of soil loss per unit area for the time interval represented by factor R generally in tons per acre per year

R = Rainfall (precipitation) factor

K = Soil erodibility factor in tons per acre per year per unit of R

LS = Topographic factor (length and steepness of slope)



D = Horizontal Distance
V = Vertical Distance
SD = Slope Distance

For 2 5H 1V Slopes

$$D = 2\ 5V$$

$$SD = \sqrt{D^2 + V^2}$$

$$SD = \sqrt{\left(2\ 5^2\right)\left(V^2\right) + V^2}$$

$$SD = \sqrt{7\ 25V^2}$$

Calculated erosion after applying erosion control measures is determined by applying and erosion control factor (VM) to the universal soil loss equation The erosion control factor is dependant upon the type and extent to which the erosion control measure is used (ie vegetative type and density mulches type and thickness chemical type and application amount mechanical compactive effort smoothness of surface etc)

A The rainfall (precipitation) factor (R) is obtained from mean annual iso erodent (R) value maps The R value for the facility as obtained from the Tooele area map is

$$R = 4\ 0$$

Since R = 4 0 is based on an annual recurrence interval a correction factor is obtained from the figure below for the 100 yr recurrence interval
For the 100 yr recurrence interval

$$R = 4\ 0*(2\ 51) = 10\ 04$$

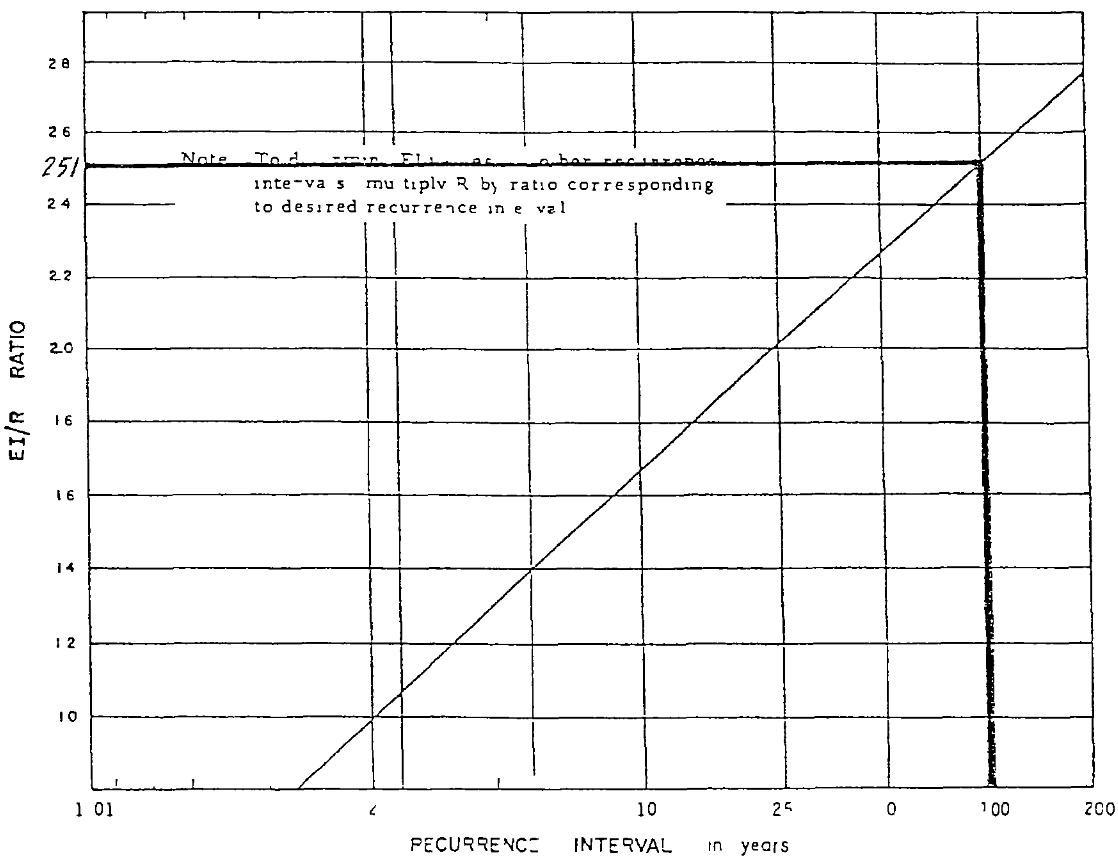


Figure 7-1 The relationship between the EI/R ratio and recurrence interval

B Soil erodibility factor (K) is determined using figure 2 from the above referenced report The gradation of the materials is based on information from the AGEC soil report

The worst case condition is represented by the soils whose gradation is on the fine side of the soil gradation envelope Parameters obtained from the gradation envelope and parameters assumed for use with the nomographs to determine K are

85 % silt and very fine sand and
15% sand were obtained from the gradation envelope

1 % organic material and a very slow permeability were assumed parameters

Applying the above parameters to the nomographs from Figure 2 gives a soil erodibility factor (K) equal to 0 66

C The topographic factor (LS) is determined assuming single slopes The figure on Sheet 2 shows the configuration of typical slope segments that need to be accounted for in the calculations which includes a 2 5H 1V for the closure cap slope The LS factor is determined by the following equation

$$LS = \left(\frac{65\ 41\ s^2}{s^2 + 10{,}000} + \frac{4\ 56\ s}{\sqrt{s^2 + 10{,}000}} + 0\ 065 \right) \left(\frac{l}{72\ 6} \right)^m$$

where
LS = topographic factor for slope segment n
l = length of slope segment n
s = slope gradient of segment n in percent
l = slope length
m = slope gradient factor which is
0 2 for gradients of 0 to 2 percent
0 3 for gradients of 1 to 3 percent
0 4 for gradients of 3 5 to 4 5 percent
0 5 for gradients greater than 5 percent

The following table provides LS factor values for varying lengths of the 2 5H 1V slope

HORIZONTAL DISTANCE ALONG SLOPE (ft)	SLOPE LENGTHS (ft) AND LS FACTOR VALUES 2 5H 1V (40%) Slope	
	Slope Length	LS Factor
15	40 39	5 9055
65	175 02	12 2933
115	309 65	16 3516
165	444 28	19 5863

D Potential Erosion Rotes without erosion protection where R = 10 04 K = 0 66 and LS as tabulated above ore presented in the table below

POTENTIAL EROSION RATES (A) ASSUMING BARE SOILS

HORIZONTAL DISTANCE ALONG SLOPE (ft)	2 5H 1V (40%) Slope		
	Slope Length	LS	A (tons/oc/yr)
15	40 39	5 9055	39 13
65	175 02	12 2933	81 46
115	309 65	16 3516	108 35
165	444 28	19 5863	129 79

E Potential Erosion Rotes for varying VM factors where R = 10 04 K = 0 66 and LS as tabulated above are presented in the table below

POTENTIAL EROSION RATES FOR VARYING VM FACTORS

HORIZONTAL DISTANCE ALONG SLOPE (ft)	A(tons/ac/yr) 2 5H 1V (40%) Slope					
	VM =					
	0 008	0 009	0 01	0 011	0 012	0 013
15	0 31	0 35	0 39	0 43	0 47	0 51
65	0 65	0 73	0 81	0 90	0 98	1 06
115	0 87	0 98	1 08	1 19	1 30	1 41
165	1 04	1 17	1 30	1 43	1 56	1 69

F Required Stone Mulch

The amount of stone mulch required to limit soil loss to one ton per acre per year is determined from figure 6 of the above referenced report as shown on the following page This figure shows the amount of stone mulch required to reduce the erosion potential from as much as 130 tons per acre per year to one ton per ocre per year

For the 2 5H 1V (40%) Slope

Approximately 500 tons per acre of stone mulch is required The required thickness of stone mulch is

t = (Required tons/acre of stone mulch x 2000 lbs/ton x 12 in/ft)/ (43560 ft^2/acre x stone mulch density lbs/ft^3)

Assuming a stone mulch density of 110 lbs/ft^3

t = 500(2000)(12)/(43560)(110) = 2 5 in

Recommending 3 in cover for all slopes

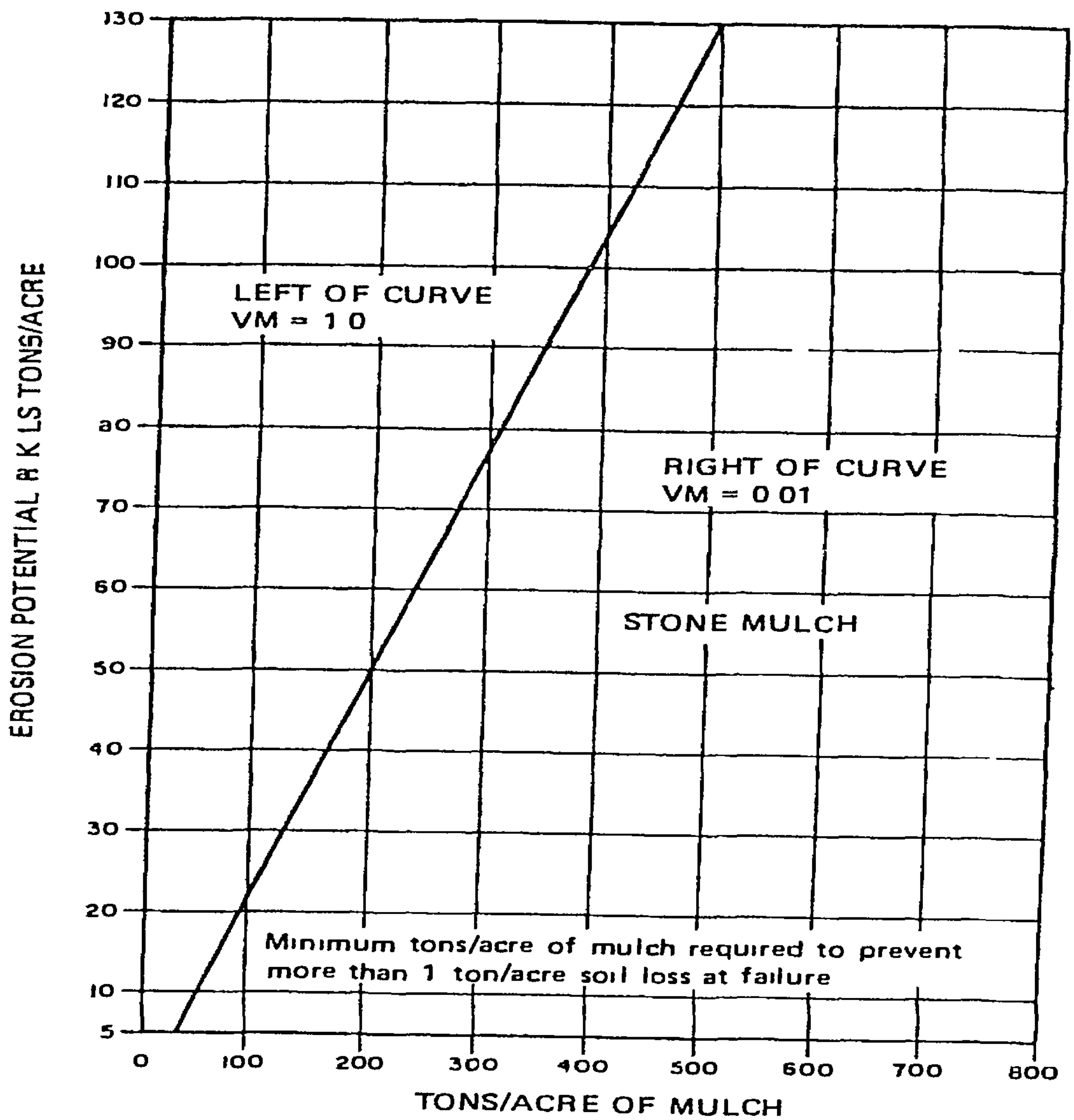


Figure 6. Stone mulch vs. R·K·LS.

G Required Vegetative Cover

If a vegetative cover of gross is used instead of the stone mulch the amount of cover required is determined from the figure 7 of the above referenced report os shown on the following page The VM factor required is calculated by the following equation

$$VM = 1/A$$

For the 2 5H 1V (40%) Slope

VM = 1/130 = 0 008

Percent Ground Cover of Grass = 97% (Regardless of toll weeds)

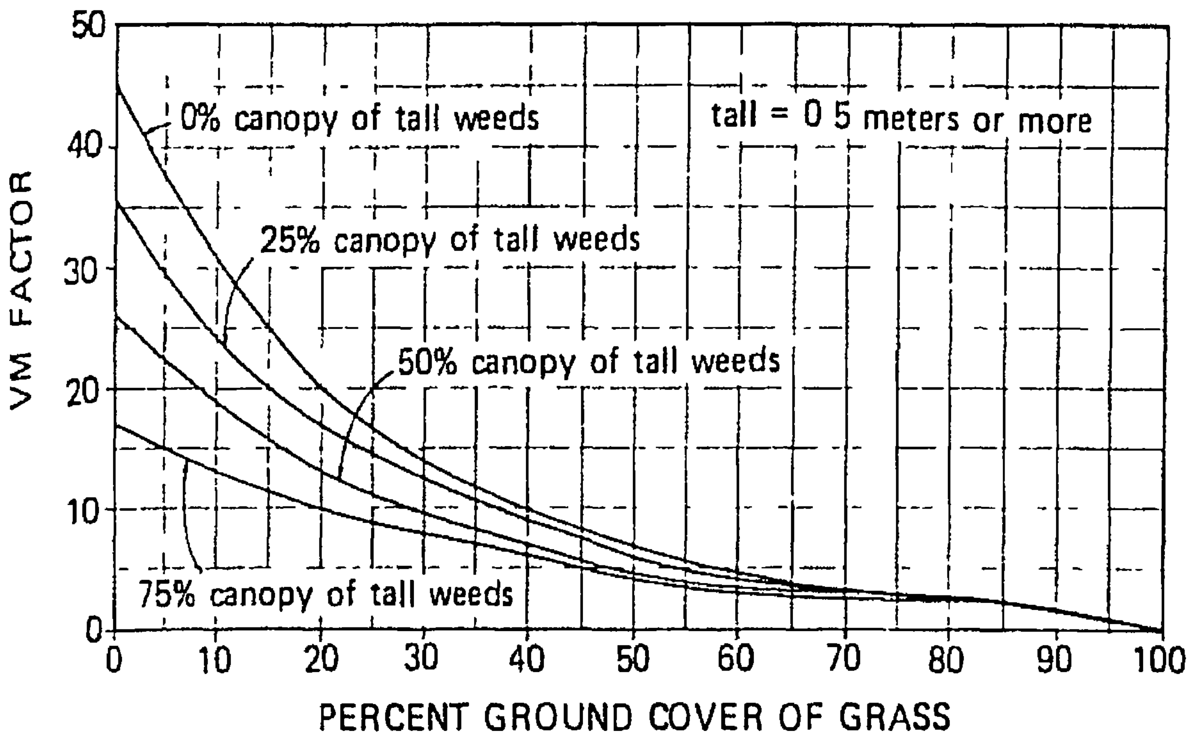


Figure 7. Relationship between grass density and VM factor.

EXHIBIT B

Quit Claim Deed

C2008-227
Real Estate
Purchase Agreement

C2008-228
Landfill Operating and
Management Agreement

*W2370293

When recorded, return to
Moulding Investments, L L C
910 West 21st Street
Ogden, Utah 84401

E# 2370293 PG 1 OF 4
ERNEST D POWLEY, WEBER COUNTY RECORDER
16-OCT-08 1039 AM FEE $18 00 DEP SPY
REC FOR MOULDING INVESTMENTS

QUITCLAIM DEED

MOULDING INVESTMENTS, LLC a Utah Limited Liability Company and **COUNTERPOINT CONSTRUCTION COMPANY, INC**, Grantors, hereby quitclaims to **MOULDING INVESTMENTS, LLC** a Utah Limited Liability Company, whose address is 910 West 21st Street, Ogden, Utah 84401, for the sum of Ten Dollars ($10 00) and other good and valuable consideration, the following described tract of land in Weber County State of Utah

See Exhibit A attached hereto and incorporated herein by this reference

Dated this 16 day of OCT 2008

MOULDING INVESTMENTS, LLC a Utah Limited Liability Company

By ____________________

COUNTERPOINT CONSTRUCTION COMPANY, INC

By ____________________

State of Utah

County of Weber

On the 16 day of OCTOBER, 2008, personally appeared before me **Randy Moulding,** who is duly sworn, did say, that he, **Randy Moulding**, is President of **Moulding Investments, LLC,** a Utah Limited Liability Company, and **Kelly Penrod,** who is duly sworn, did say, that he, **Kelly Penrod**, is Vice President of **CounterPoint Construction Company, Inc**, and that the within and forgoing instrument was signed in behalf of said Limited Partnership, and Incorporated Company, by authority of its resolution of its LLC and INC

Lynda D Folkman
Notary Public

My Commission Expires

12-7-2009

LYNDA D FOLKMAN
NOTARY PUBLIC • STATE of UTAH
36 West 4300 South
Ogden, Utah 84408
COMM EXP 12-07-2009

596948 1 8/15/05

EXHIBIT A

ALL THAT PROPERTY IN THE NORTH HALF OF SECTION 19, TOWNSHIP 6 NORTH, RANGE 3 WEST, SALT LAKE BASE & MERIDIAN, IN THE STATE OF UTAH, COUNTY OF WEBER, MORE PARTICULARY DESCRIBED AS FOLLOWS

BEGINNING AT A POINT ON THE NORTH SIDE OF A 100 FOOT PERPETUAL EASEMENT, SAID POINT BEING SOUTH 425 19 FEET AND WEST 4 17 FEET FROM THE NORTHWEST CORNER OF SAID SECTION, BASIS OF BEARING MAY BE DETERMINED LOCALLY BY A BEARING OF S89°23'44"E, BETWEEN THE NORTHWEST CORNER AND THE NORTHEAST CORNERS OF SAID SECTION, THENCE ALONG THE NORTH LINE OF SAID EASEMENT THE FOLLOWING FIVE COURSES, S89°05'20"E 12 18, AND N87°50'35"E 1450 90 FEET TO THE BEGINNING OF A CURVE CONCAVE TO THE SOUTH, WITH A RADIUS OF 868 51 FEET, THENCE EASTERLY 198 57 FEET, THROUGH A CENTRAL ANGLE OF 13°06'00", AND S79°05'14"E 485 59 FEET, TO THE BEGINNING OF A CURVE CONCAVE TO THE NORTH, WITH A RADIUS OF 768 51 FEET, THENCE EASTERLY 474 18 FEET, THROUGH A CENTRAL ANGLE OF 35°21'09", THENCE LEAVING SAID NORTH LINE, SOUTH 1811 66 FEET, TO THE NORTHERLY RIGHT-OF-WAY OF THE SOUTHERN PACIFIC RAILROAD COMPANY, THENCE ALONG SAID RIGHT-OF-WAY THE FOLLOWING FOUR COURSES, S81°46'35"W 221 51 FEET, AND S81°42'06"W 251 02 FEET, TO THE BEGINNING OF A CURVE CONCAVE TO THE NORTH, WITH A RADIUS OF 10491 76 FEET, THENCE WESTERLY 2155 58 FEET, THROUGH A CENTRAL ANGLE OF 11°46'18", AND N89°26'02"W 1 88 FEET TO THE EASTERLY BOUNDARY OF THE USAF PROPERTY, THENCE LEAVING SAID RIGHT-OF-WAY AND ALONG SAID EASTERLY BOUNDARY THE FOLLOWING TWO COURSES, N00°33'58"E 1867 42 FEET, AND N00°35'08"E 100 78 FEET TO THE POINT OF BEGINNING

CONTAINING 116 69 ACRES MORE OF LESS

TOGETHER WITH A PERPETUAL EASEMENT FOR ACCESS AND CONSTRUCTION OF UTILITIES, MORE PARTICULARY DESCRIBED AS FOLLOWS

BEGINNING AT A POINT ON THE NORTH SIDE OF A 100 FOOT PERPETUAL EASEMENT, SAID POINT BEING SOUTH 423 16 FEET AND EAST 2595 73 FEET FROM THE NORTHWEST CORNER OF SAID SECTION 19, BASIS OF BEARING MAY BE DETERMINED LOCALLY BY A BEARING OF S89"23'44"E, BETWEEN THE NORTHWEST CORNER AND THE NORTHEAST CORNERS OF SAID SECTION 19, THENCE ALONG THE NORTH LINE OF SAID EASEMENT THE FOLLOWING NINE COURSES, EASTERLY ALONG A CURVE, CONCAVE TO THE NORHTWEST, WITH A RADIUS OF 768 51 FEET, THENCE ALONG SAID CURVE 214 24 FEET, THROUGH A CENTRAL ANGLE OF 15°58'21", AND N49°3705"E 309 04 FEET, AND N65°33'35"E 139 61 FEET, AND S00°00'25"E 32 86 TO THE SOUTH SIDE OF A

COUNTY ROAD, AND ALONG SAID SOUTH SIDE, S89°47'56"E 331 04 FEET, AND S00°14'05"W 7 51, SAID POINT ALSO BEING THE BEGINNING OF A CURVE, CONCAVE TO THE SOUTHEAST, WITH A RADIUS OF 768 51 FEET, THENCE WEST AND SOUTHWESTERLY 544 84 FEET, THROUGH A CENTRAL ANGLE OF 40°37'13", AND S49°37'05"W 169 04 FEET, TO THE BEGINNING OF A CURVE CONCAVE TO THE NORHTWEST, WITH A RADIUS OF 868 51 FEET, THENCE WESTERLY 286 61 FEET, THROUGH A CENTRAL ANGLE OF 18°54'28, THENCE NORTH 108 43 FEET TO THE POINT OF BEGINNING

ALSO TOGETHER WITH ½ OF ANY AND ALL WATER, WATER RIGHTS, WATER SHARESSURFACE AND SUB-SURFACE, APPURTENANT TO , OR USED IN CONJUNCTION WITH, THE ABOVE STATED PARCEL
SUBJECT TO EASEMENTS, RESTRICTIONS AND RIGHTS OF WAY APPEARING OF RECORD AND ENFORCEABLE IN LAW

THE PURPOSE AND INTENT OF THIS QUIT CLAIM DEED, IS TO SEPARATE THE ½ INTERESTS OF THE PROPERTY AS LISTED AS PARCEL #100400001 OF OFFICAL RECORD WITH THE WEBER COUNTY RECORDERS OFFICE AND DESCRIBED IN DOCUMENT ENTRY #2305658 DATED NOVEMBER 20, 2007

ALSO SUBJECT TO ANY AND ALL EASEMENTS, AND EXCEPTIONS AS PERTAINING TO SUBJECT PARCEL AS DESCRIBED IN DOCUMENT ENTRY #2305658 DATED NOVEMBER 20, 2007, RECORDED WITH THE WEBER COUNTY RECORDERS OFFICE

12-23

C2008-227

REAL ESTATE PURCHASE AGREEMENT

THIS REAL ESTATE PURCHASE AGREEMENT (hereinafter "Agreement") is made and entered into on the 23 day of ~~November~~ December 2008, by and between Weber County, a body politic, corporate and political subdivision of the State of Utah (hereinafter "Buyer") and Moulding Investments, LLC, a Utah limited liability company (hereinafter "Seller")

RECITALS

WHEREAS, according to the official records of the Recorder of Weber County, State of Utah, Seller owns real property (hereinafter the "Land") more fully described in Exhibit "A" which is attached hereto and hereby incorporated into this Agreement, and

WHEREAS, Buyer is in need of purchasing the Land to facilitate the development of a construction and demolition landfill (the "Landfill"), and

WHEREAS, Buyer and Moulding and Sons Landfill, LLC, a Utah limited liability company, have entered into a Landfill Operation and Management Agreement of even date herewith (the "Management Agreement") pursuant to which said Moulding and Sons Landfill, LLC, will, upon issuance of all permits, licenses and approvals by applicable governmental entities (collectively, the "Permits"), manage and operate the Landfill, and

WHEREAS, Seller is willing to accept as compensation for the Property (as defined below) the consideration more fully enumerated below, and

WHEREAS, Seller and Buyer have determined that this Agreement is mutually beneficial to each Party,

NOW, THEREFORE, in consideration of the covenants contained herein, the Buyer and Seller hereby agree as follows

SECTION ONE
PROPERTY

Seller agrees to convey to Buyer all of Seller's interest in the Land described above together with all of Seller's rights, title and interest in a mobile building to be relocated from Seller's present business premises to the Land (the "Building") and all appurtenances specifically attached to the Land including but not limited to, Seller's interest in any assignable licenses, permits, appurtenant mineral rights appurtenant water rights (including shares in irrigation companies which serve the Land), easement rights-of way or other items that may benefit the same if any (All items referenced in this paragraph are hereinafter collectively referred to as the "Property")

SECTION TWO
CONSIDERATION

The consideration for the conveyance shall be as follows

A Purchase Price The Purchase Price shall be SEVEN HUNDRED FIFTY THOUSAND DOLLARS ($750,000), and shall be paid as follows

A Earnest Money Buyer shall deposit TEN THOUSAND DOLLARS ($10,000) with Home Abstract Title Company ("Title Company") upon execution of this Agreement, as earnest money ('Earnest Money") The Earnest Money shall be credited toward the Purchase Price at Closing

B Additional Money at Closing In addition to the Earnest Money which shall be released to the Seller at Closing, Buyer shall pay the balance of SEVEN HUNDRED FORTY THOUSAND DOLLARS ($740,000) at Closing

SECTION THREE
ESCROW

Upon Buyer's receipt of a fully executed copy of this Agreement Buyer shall open an escrow with Title Company, by depositing with Title Company the Earnest Money and an executed copy of this Agreement The Agreement, together with other written instructions as will be provided by Buyer and Seller to Title Company, shall constitute its escrow instructions to the Title Company

SECTION FOUR
EFFECTIVE DATE

The Effective Date shall be deemed the date of execution of this Agreement by both parties

SECTION FIVE
TITLE COMMITMENT

Within Ten (10) days of the Effective Date Buyer may at Buyer's sole discretion and cost choose to purchase Title Insurance and obtain a commitment therefor (the Commitment")

SECTION SIX
SURVEY AND BUILDING PLANS

Within ten (10) business days after the Effective Date, Seller shall deliver to Buyer a copy of any survey of the Property which Seller has in its possession If Seller has no survey of the Property none shall be required If Buyer elects to obtain a new Survey of the Property it shall pursue completion of the same with diligence at its own expense

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SECTION SEVEN
TITLE AND SURVEY OBJECTIONS

Within Ten (10) business days after Buyer's receipt of the Title Commitment and Survey, Buyer shall give written notice to Seller of any matters contained in the Title Commitment or Survey to which Buyer objects ("Objections") Any matters in the Title Commitment or Survey to which Buyer does not so object shall be ' Permitted Exceptions "

SECTION EIGHT
CURE OF OBJECTIONS

Seller shall have Ten (10) business days after receipt of the notice contemplated by Section 7 above relative to the Title Commitment and Survey, or update (Sellers Cure Period"), to cure the Objections to the satisfaction of Buyer or elect not to cure the same, provided however, all consensual monetary encumbrances recorded against the Property will be discharged or otherwise removed by Seller on or before Closing If Seller gives notice that Seller will not cure the Objections to Buyers satisfaction within Sellers Cure Period, then Buyer may (a) waive any such Objections and proceed to Closing or (b) terminate this Agreement and receive back the Earnest Money

SECTION NINE
INVESTIGATIONS

From the Effective Date through the duration of the Due Diligence Period as defined below, Buyer and its representatives shall have the right to enter upon the Property to conduct at its own expense investigations, including without limitation, obtaining or performing surveys, soils and/or water tests engineering studies, feasibility studies, environmental assessments and inspections, evaluating the availability of utilities, drainage and access, and performing such other investigations as Buyer may desire to determine the suitability of the Property for Buyers intended use Buyer shall provide to Seller, without cost, copies of any and all results of Buyers investigations or studies if Buyer elects not to purchase the Property, provided, however, that the copies are delivered without any warranty whatsoever as to the accuracy thereof Buyer in the conduct of its investigation shall not unreasonably interfere with any existing operations on the Property and Buyer shall indemnify and hold Seller harmless from and against any and all physical damage to the Property resulting from Buyer's investigation of the Property and any costs, liability or other adverse consequences (e g mechanic s liens) associated with or arising out of such investigations

SECTION TEN
DUE DILIGENCE PERIOD

Seller agrees that Buyer shall have a period of Thirty (30) calendar days (Due Diligence Period ') after the Effective Date to determine the suitability of the Property for Buyer's intended use It is understood that suitability will be dependent upon among other things, the following

A Zonmg The zonmg of the P1 operty must be satisfacto1 y to the Buye1 m that the zonmg allows Buye1 to utihze the p1 ope1 ty fo1 its mtended purpose and shall 1 eceive that app1 oval f1 om all gove1 nmg entities with 1ur1sd1ction ove1 the P1operty

B St1 eets The P1 ope1 ty shall have vehicula1 access mto and out of the P1 operty by means satisfacto1 y to Buye1

C Stud1es All studies (other than the Su1 vey and Cond1tion of T1tle, which shall be as p1 eviously app1 oved) mcludmg, without hmitation, env11 onmental and geoteclmi cal stud1es, at Buye1's sole d1sc1 ction, shall show the P1operty to be acceptable fo1 Buye1's mtended use

Buye1 may end the Due D1hgence Pe11od at any time by g1vmg notice to Selle1 and p1 ocecd with the pu1 chase under the te1ns set forth here1n Buyer shall g1ve Selle1 notice of its dec1s1 on to p1 oceed with this purchase (subject to cond1tions hc1 em stipulated) o1 to te1 mmate on o1 before the exp11 ation of the Due D1hgence Pe11od Should Buye1 p1 ovidc notice to te1 mmate, or fail to p1 ovide notice p11or to the exp1ration of the Due D1ligence Pe11od, this Ag1 eement shall te1mmate and be of no furthe1 fo1 ce o1 effect, and Buye1 shall receive all of the Earnest Money deposited with the T1tle Company

SECTION ELEVEN
CONDEMNATION

If p11or to the Closmg Seller receives notice that a condemnati on o1 emment domam action is threatened or has been filed agamst the Property or any part thereof (or that a takmg is pendmg or contemplated), Seller shall promptly g1ve notice thereof to Buyer If such takmg is of a portion of the P1operty such that the value or usefulness of the Property is m Buyer s sole option, mate11ally impaired o1 1educed, Buyer may elect, by written notice dehvered to Seller withm fifteen (15) days after 1 cce1pt of Buyer s notice, to termmate this Agreement and the Escrow, m which event neithe1 party shall have any further obhgation hereunde1 and all momes deposited hereunder shall be returned to the party depositmg same If Buyer does not dehver written notice of te1mmation withm said fifteen (15) day pe11od, then (a) neither party shall have a 11ght to temimate this Agreement, (b) Selle1 shall assign and dehver to Buyer all of Seller's mte1 est m the awa1 d (o1 11ght to such awa1 d) for such takmg of the Property, and (c) the parties shall contmue perfo1mance unde1 tlns Ag1 eement and the Esc1 ow without modification of any of its te1ns and without any reduction m the Pu1 chase P11ce

SECTION TWELVE
CLOSING

The conveyance of the P1 operty to Buye1 shall be closed on the Closmg Date at the office of the T1tle Company, which date shall be withm Ten (10) days afte1 the issuance of the Permits

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SECTION THIRTEEN
CLOSING DOCUMENTS

The following documents shall be delivered at Closing

A Deed Seller shall deliver a General Warranty Deed conveying to Buyer, all Seller's interest in the Property free and clear of all restrictions, liens, assessments, tenancies, whether recorded or unrecorded, or other encumbrances except as otherwise provided in this Agreement

B Other The Buyer shall deliver, in addition to the Purchase Price to Seller, any other documentation reasonably required by the Title Company to appropriately conduct the Closing on the Property

SECTION FOURTEEN
CLOSING COSTS

Closing costs and prorations shall be prorated as follows

A Fees Any escrow fee charged by Title Company shall be shared equally by Seller and Buyer Each party will pay its own attorney's fees Buyer shall pay the cost of recording the Deed

B Other Except as otherwise provided herein, all other bills or charges including other recording fees, any state or local documentary stamps transfer taxes or fees, assessments for improvements completed or initiated prior to the Closing, whether levied or not, pertaining to the Property as of the date of Closing shall be allocated according to local custom of the Title Company

SECTION FIFTEEN
POSSESSION

Possession of the Property shall be delivered to Buyer at Closing Seller agrees that any improvements remaining on the Property after such date shall belong to Buyer

SECTION SIXTEEN
WARRANTIES

1 Seller's Warranties Seller makes the following representations warranties and covenants as of the date of this Agreement and as of the date of Closing and such warranties and covenants shall survive the Closing The warranties provided in this Section 16 and its subparagraphs shall be enforceable by the Buyer and its successors and assigns

A Title Sellei owns good and maiketable fee simple absolute title to the Pioperty, subject to all matteis of iccoid, and is fully authonzed to convey the Pioperty puisuant to this Agicement

B No Piocecdings As of the date of this Agieement theie aie no pending and, to the best of Selleis knowledge, thieatened condemnation oi similai pioceedings oi assessments affecting the Piopeity, lawsuits by adjoining landowneis oi otheis, noi to the best knowledge and belief of Sellei is any such lawsuit contemplated by any person, noi to Sellei's best knowledge, is any condemnation oi assessment contemplated by any govemmental authoiity othei than as disclosed in wiiting by Sellei

C No Leases Except as otheiwise expiessly piovided hcicin, at the time of Closing, the Pioperty will not in whole oi in part be subject to any leases, oi othei possessory rights and intciests, except as may have been ieflected in the Title Commitment

D No Contracts Sellei has not and will not entei into any wiitten contracts agreements or listings, oi be a party to any oral undeistandings or agieements affecting the Property which may become binding upon Buyei, except as may be ieficcted by iecoided documents

E Compliance with Laws To the best knowledge of Sellei, Sellei has complied with all applicable laws ordinances regulations, statutes and rules ielating to the Property

F Environmental

(1) Definitions of Environmental Law, Hazardous Substances Environmental Conditions and Enviionmental Claims

a Environmental Law For purposes of this Agieement the tcrm 'Environmental Law" shall mean any federal, state regional, municipal or local statute code ordinance, rule, iegulation, policy guideline, permit, consent, approval, license, judgment, oidei wnt decree, injunction or othei authoiization relating to

(i) emissions discharges, ieleases oi thieatened releases of Hazaidous Substances (as defined below) in the natural oi human envnonment including without limitation, an soil sediments land suiface oi subsuiface suiface watei ground watei buildings oi facilities tieatment works drainage systems oi septic systems oi

(n) the geneiation tieatment, storage, disposal use handling manufactuiing tiansportation oi shipment of Hazaidous Substances or otherwise conceming pollution or piotection of the envnonment public health and safety employee health oi safety, oi solid waste handling tieatment oi disposal

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Except as otherwise provided herein any reference in this Agreement to any Environmental Law or other statute includes and is a reference to such Environmental Law or statute and to the regulations made pursuant thereto with all amendments made thereto and in force from time to time, and to any Environmental Law or statute or regulations that may be passed which have the effect of supplementing or superseding such Environmental Law or statute or regulations

b Hazardous Substances For purposes of this Agreement the term pollutants, contaminants, dangerous substances, constituents, toxic substances, hazardous or toxic chemicals hazardous wastes and hazardous substances as those terms are defined in the following statutes and their implementing regulations the Hazardous Materials Transportation Act, 49 U S C § 1801 et seq the Resource Conservation and Recovery Act, 42 U S C §6901 et seq the Comprehensive Environmental Response Compensation and Liability Act, as amended by the Superfund Amendments and Reauthorization Act, 42 U S C § 9601 et seq , ("CERCLA") the Clean Water Act 33 U S C § 33 U S C § 1251 et seq , the Toxic Substances Control Act, 15 U S C § 2601 et seq , the Clean Air Act, 42 U S C § 7401 et seq and any other federal, state or local statute or regulations dealing with similar matters, (ii) petroleum, including crude oil and fractions thereof (iii) natural gas synthetic gas and any mixtures thereof, (iv) asbestos and/or asbestos containing materials, (v) PCB s or PCB-containing materials or fluids, (vi) any other substance including sewage sludge, with respect to which any federal, state or local agency or other governmental entity may require either an environmental investigation or any environmental remediation, and (vii) any other hazardous or noxious substance, material, pollutant, or solid waste that is regulated by, or forms the basis of liability under any Environmental Law

c Environmental Condition For purposes of this Agreement, the term "Environmental Condition" shall mean any condition with respect to the environment (including soil, surface waters ground waters land, stream sediments, surface or subsurface strata ambient air, and any environmental medium) and any condition with respect to the interior or exterior of buildings or structures (including without limitation friable and non-friable asbestos lead based paint or any Hazardous Substance located in the interior or on the exterior of buildings or structures) whether or not the condition is known which could or does result in any liability claim, cost, or order to or against the Buyer or Seller by any third party (including, without limitation any government entity)

d Environmental Claims For purposes of this Agreement the term "Environmental Claims shall mean any and all liabilities demands claims or actions clean-up costs remediation removal or other response

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costs, legal expenses (ıncludıng attoıneys' fees), ınvestıgatıon costs (ıncludıng fees of consultants, counsel and otheı experts ın connectıon wıth envıı onmental ınvestıgatıon oı testıng) any otheı losses, lıabılıtıes, oblıgatıons, fines, penaltıes (cıvıl oı cıımmal), damages (ıncludıng compensatoı y, punıtıve, natuı al ıesouı ce damages), oı payments sought oı claımed by any peı son, goveınmental agency oı otheı entıty whıch aıe based upon the vıolatıon oı alleged vıolatıon of any Envıı onmental Law (as defined above) oı the ımposıtıon oı lıabılıty by the opeı atıon of any Envıı onmental Law

(2) Selleı's Envıı onmental Waı antıes and Covenants

a To the best of Selleı's knowledge, Selleı waı ants that duıng the peııod that Selleı has owned the Pıoperty, theıe has been no storage, pı oductıon, transportatıon, dısposal, tı eatment oı ıelease of any Hazardous Substances on or m the Pıoperty (otheı than the potentıal foı the exıstence asbestos whıch has been dısclosed to the Buyeı) Selleı furtheı waıı ants that to the best of Seller's knowledge, duıng Selleı's owneı shıp of the Property Selleı has complıed wıth all Envıromnental Laws ıelatıng to the Pı operty and that there are no wells, undeı ground storage tanks, coveı ed suı face unpoundments oı other souı ces of Hazardous Substances on the Pı operty

b To the best of Selleı's knowledge, there are no wetlands on the Property nor has there been any earth settlement, movement ınstabılıty or otheı damage from natural causes whıch may have affected the Property

c Buyer heı eby assumes all oblıgatıons related to and shall mdemmfy, defend, ıelease and hold hamıless Selleı, ıts successor and assıgns fı om and agaınst all Envıı onmental Claıms relatıng to arısıng from oı attrıbutable to dıı ectly or ındırectly, m whole oı m part ıelatıng to the exıstence removal and/or ıemedıatıon of Hazaı dous Substances and Envıronmental Condıtıons exıstıng on the Property as of the date of Closıng

11 Buyeı s Waı antıes Buyeı makes the followıng ıepı esentatıons, waı antıes and covenants as of the date of thıs Agı eement and as of the date of Closıng, and such waı antıes and covenants shall survıve the Closıng The warrantıes pı ovıded m thıs Sectıon 16 and ıts subpaı agı aphs shall be enfoı ceable by the Selleı and ıts successoı s and assıgns

A Authorızatıon Buyer has full poweı and authoııty to execute and delıveı all documents ıequıred to consummate thıs tı ansactıon and to peı fonn ıts oblıgatıons thereunder Wıthout lımıtıng the generalıty of the foregoıng the govemmg authoııty of Buyeı has duly authorızed the executıon dehveı y and peı fonnance of tlns Agreement by Buyer Thıs Agı eement constıtutes the valıd and legally bındıng oblıgatıon of Buyeı enfoı ceable m accordance wıth ıts tenns and condıtıons

B Future Expenses Buyer shall pay all expenses that shall be necessary or desirable after the date of execution of this Agreement to complete preparation of the Land for the operation of the Landfill as contemplated by this Agreement and by the Management Agreement, including, but not limited to, the cost of moving and installing the Building on the Land, the cost of installing electricity water, telephone service and other utilities to the Building, the cost of constructing a parking lot near and about the Building and all engineering and other services

SECTION SEVENTEEN
NOTICES

Any notice or designation to be given hereunder shall be given by placing the notice or designation in the United States mail certified or registered, properly stamped and addressed to the address shown below or such other address as the respective party may direct in writing to the other, or by personal delivery to such address by a party, or by a delivery service which documents delivery, and such notice or designation shall be deemed to be received upon such placing in the mails or such delivery

SELLER Prior to Closing

Moulding Investments LLC
910 West 21st Street
Ogden, Utah 84401

After Closing

Moulding Investments, LLC
at the address of the Property

BUYER Weber County Corporation
Attention Commission Chair
2380 Washington Boulevard
Ogden, Utah 84401

SECTION EIGHTEEN
TERMINATION

If this Agreement is terminated or Closing does not occur because of the failure of any condition or the occurrence of an event giving rise to a termination right by Buyer as set forth herein, all monies deposited by Buyer hereunder will be returned to it In the event of default by either party, the other party may, at its option (i) terminate this Agreement upon written notice to such defaulting party and recover from such other party all damages incurred or suffered by such other party or (ii) pursue all other remedies available at law or in equity including specific performance

SECTION NINETEEN
REAL ESTATE AGENTS AND COMMISSIONS

The Sellei and Buyei heieby agiee that no ieal estate connnissions shall be due on account of the tiansaction contemplated heiein Each party agiees to indemnify defend and hold the othei party haimless fiom and against any commissions fees oi othei compensation which is claimed by any thud party with whom the indennnfymg party has allegedly dealt

SECTION TWENTY
ENTIRE AGREEMENT

This Agieement contains all agreements between the parties, and no agieement not contained heiein shall be iecogmzed by the parties

SECTION TWENTY-ONE
BINDING EFFECTS

This Agieement shall be binding upon and inure to the benefit of the parties and then iespective heirs, legal iepiesentatives, successors and assigns

SECTION TWENTY-TWO
DEFAULT BY BUYER

If Buyei should default at any time during this Agreement, Buyer agiees to deliver to Sellei all studies, engmeeiing plans and plats to Seller that were performed by Buyei

SECTION TWENTY-THREE
DEFAULT BY EITHER PARTY

In the event of default by eithei party, the othei party shall have the iights set forth in section 18 above, including the iight of specific perfonnance

SECTION TWENTY-FOUR
AUTHORITY OF SIGNERS

If Buyei oi Sellei is a coipoiation, partnership trust, estate oi other entity, the person executing this Agieement on its behalf warrants his oi hei authoiity to do so and bind Buyei oi Sellei

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SECTION TWENTY-FIVE
ATTORNEYS FEES

In any action arising out of this Agreement, each party hereto shall be responsible for its own costs and attorney's fees

SECTION TWENTY-SIX
RISK OF LOSS

All risk of loss or damage to the property shall be borne by Seller until closing

SECTION TWENTY-SEVEN
INCORPORATION OF RECITALS

The Recitals preceding this Agreement are incorporated herein as part of this Agreement by this reference

SECTION TWENTY-EIGHT
COUNTERPARTS AND FACSIMILE SIGNATURES

This Agreement may be executed in any number of counterparts which when combined shall constitute one original Facsimile signatures on this Agreement shall be accepted as original, with original signatures to be delivered to the parties as soon as reasonably possible thereafter

SECTION TWENTY-NINE
NO EFFECT

This Agreement shall be void *ab initio* and of no force or effect if the Management Agreement is not executed or is for any reason invalid or unenforceable

IN WITNESS WHEREOF the undersigned have affixed their respective signatures hereto the dates indicated below

BUYER

BOARD OF COUNTY COMMISSIONERS
OF WEBER COUNTY

By Jan M Zogmaister
Jan M Zogmaister Chair

Commissioner Bischoff voted ______
Commissioner Dearden voted ______
Commissioner Zogmaister voted ______

STATE OF UTAH)

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ss
COUNTY OF WEBER)

I certify that the foregoing instrument was approved in a regular Commission Meeting of the Board of County Commissioners of Weber County on the 23 day of ~~November~~ December, 2008

Alan D McEwan CPA
Weber County Clerk/Auditor

SELLER

MOULDING INVESTMENTS, LLC, a
Utah limited liability company

By ______________________
Randy Moulding

EXHIBIT "A-1"

Legal Descııptıon of Pıoperty

That certaın ıeal pıopeıty located ın Webeı County, State of Utah, moıe partıculaıly descııbed as follows

ALL THAT PROPERTY IN THE NORTH HALF OF SECTION 19, TOWNSHIP 6 NORTH, RANGE 3 WEST, SALT LAKE BASE & MERIDIAN, IN THE STATE OF UTAH, COUNTY OF WEBER, MORE PARTICULARLY DESCRIBED AS FOLLOWS BEGINNING AT A POINT ON THE NORTH SIDE OF A 100 FOOT PERPETUAL EASEMENT, SAID POINT BEING SOUTH 425 19 FEET AND WEST 4 17 FEET FROM THE NORTHWEST CORNER OF SAID SECTION BASIS OF BEARING MAY BE DETERMINED LOCALLY BY A BEARING OF SOUTH 89°23'44" EAST BETWEEN THE NORTHWEST CORNER AND THE NORTHEAST CORNERS OF SAID SECTION, THENCE ALONG THE NORTH LINE OF SAID EASEMENT THE FOLLOWING FIVE COURSES, SOUTH 89°05'20" EAST 12 18 AND NORTH 87°50'35" EAST 1450 90 FEET TO THE BEGINNING OF A CURVE CONCAVE TO THE SOUTH, WITH A RADIUS OF 868 51 FEET, THENCE EASTERLY 198 57 FEET, THROUGH A CENTRAL ANGLE OF 13°06'00" AND SOUTH 79°05'14" EAST 485 59 FEET, TO THE BEGINNING OF A CURVE CONCAVE TO THE NORTH, WITH A RADIUS OF 768 51 FEET THENCE EASTERLY 474 18 FEET, THROUGH A CENTRAL ANGLE OF 35°21'09" THENCE LEAVING SAID NORTH LINE SOUTH 1811 66 FEET TO THE NORTHERLY RIGHT OF WAY OF THE SOUTHERLY PACIFIC RAILROAD COMPANY, THENCE ALONG SAID RIGHT OF WAY THE FOLLOWING FOUR COURSES, SOUTH 81°46'35" WEST 221 51 FEET AND SOUTH 81°42'06" WEST 251 02 FEET, TO THE BEGINNING OF A CURVE CONCAVE TO THE NORTH WITH A RADIUS OF 10491 76 FEET, THENCE WESTERLY 2155 58 FEET THROUGH A CENTRAL ANGLE OF 11°46'18" AND NORTH 89°26'02" WEST 1 88 FEET TO THE EASTERLY BOUNDARY OF THE USAF PROPERTY, THENCE LEAVING SAID RIGHT OF WAY AND ALONG SAID EASTERLY BOUNDARY THE FOLLOWING TWO COURSES NORTH 00°33'58" EAST 1867 42 FEET AND NORTH 00°35'08" EAST 100 78 FEET TO THE POINT OF BEGINNING CONTAINING 116 69 ACRES MORE OR LESS
(10-040-0012)

TOGETHER WITH A PERPETUAL EASEMENT FOR ACCESS AND CONSTRUCTION OF UTILITIES MORE PARTICULARLY DESCRIBED AS FOLLOWS

BEGINNING AT A POINT ON THE NORTH SIDE OF A 100 FOOT PERPETUAL EASEMENT, SAID POINT BEING SOUTH 423 16 FEET AND EAST 2595 73 FEET FROM THE NORTHWEST CORNER OF SAID SECTION 19 BASIS OF BEARING MAY BE DETERMINED LOCALLY BY A BEARING OF SOUTH 89°23 44' EAST BETWEEN THE NORTHWEST CORNER AND THE NORTHEAST CORNERS OF SAID SECTION 19 THENCE ALONG THE NORTH LINE OF SAID EASEMENT THE FOLLOWING NINE

COURSES EASTERLY ALONG A CURVE CONCAVE TO THE NORTHWEST, WITH A RADIUS OF 768 51 FEET THENCE ALONG SAID CURVE 214 24 FEET, THROUGH A CENTRAL ANGLE OF 15°58 21", AND NORTH 49°3705' EAST 309 04 FEET AND NORTH 65°33'35" EAST 139 61 FEET, AND SOUTH 00°00'25" EAST 32 86 TO THE SOUTH SIDE OF A COUNTY ROAD, AND ALONG SAID SOUTH SIDE, SOUTH 89°47'56' EAST 331 04 FEET, AND SOUTH 00°14'05' WEST 7 51 SAID POINT ALSO BEING THE BEGINNING OF A CURVE, CONCAVE TO THE SOUTHEAST, WITH A RADIUS OF 768 51 FEET, THENCE WEST AND SOUTHWESTERLY 544 84 FEET THROUGH A CENTRAL ANGLE OF 40°37'13", AND SOUTH 49°37'05" WEST 169 04 FEET, TO THE BEGINNING OF A CURVE CONCAVE TO THE NORTHWEST, WITH A RADIUS OF 868 51 FEET THENCE WESTERLY 286 61 FEET, THROUGH A CENTRAL ANGLE OF 18°54'28 THENCE NORTH 108 43 FEET TO THE POINT OF BEGINNING

ALSO TOGETHER WITH ½ OF ANY AND ALL WATER, WATER RIGHTS, WATER SHARES SURFACE AND SUB-SURFACE, APPURTENANT TO, OR USED IN CONIUNCTION WITH THE ABOVE STATED PARCEL

SUBJECT TO EASEMENTS RESTRICTIONS AND RIGHTS OF WAY APPEARING OF RECORD AND ENFORCEABLE IN LAW

ALSO SUBJECT TO ANY AND ALL EASEMENTS AND EXCEPTIONS AS PERTAINING TO SUBIECT PARCEL AS DESCRIBED IN DOCUMENT ENTRY #2305658 DATED NOVEMBER 20, 2007 RECORDED WITH THE WEBER COUNTY RECORDERS OFFICE

RECEIPT OF EARNEST MONEY

The undersigned hereby acknowledges receipt of a check in the amount of $____________ as Earnest Money under the foregoing Agreement The undersigned will promptly cash the check and hold the proceeds as Earnest Money in accordance with the terms of the Agreement The undersigned will promptly notify the parties if these instructions are for any reason not carried out

____
Title Company

By__________________________________

Its__________________________________

Date ________________________________

LANDFILL OPERATING AND MANAGEMENT AGREEMENT

MADE BY AND BETWEEN

WEBER COUNTY AND MOULDING & SONS LANDFILL, LLC

12-23

C2008-228

MANAGEMENT AGREEMENT

THIS MANAGEMENT AGREEMENT ('Agreement) is made and entered into as of the 23 day of December, 2008 by and between Weber County, a body politic, corporate and political subdivision of the State of Utah ('County"), and Moulding & Sons Landfill, LLC (Manager '), a Utah limited liability company

RECITALS

WHEREAS, County has purchased property located at approximately 10000 West 900 South in Weber County, Utah, for the purpose of operating a Construction and Demolition Landfill and

WHEREAS, Manager has significant experience in managing and operating construction and demolition landfills, and

WHEREAS, the County desires to engage Manager, and Manager desires to accept such engagement, to provide management services for the Landfill on the terms and conditions set forth herein,

NOW, THEREFORE, in consideration of the mutual premises, covenants and agreements herein contained, the parties hereto, intending to be legally bound, hereby agree as follows

SECTION ONE
DEFINITIONS

For purposes of this Agreement, the following terms have the meanings referred to in this Section One

"Board" means the Board of County Commissioners of Weber County

"Solid Waste' means any waste that may be received by a Class IVb landfill pursuant to Utah Administrative Code Rules 315-301 2(10) and 315 305-3(2) as of the date of execution of this Agreement

"Contract Administrator' means the chair of the Board or his/her designee

'Fiscal Year' means a one year period beginning January 1 and ending December 31

"Landfill" means the Class IVb Landfill located at approximately 10000 West 900 South in Weber County, Utah

"Laws" means all federal, state, local and municipal regulations, ordinances, statutes, rules, laws and constitutional provisions

'Losses' means any and all losses, liabilities, claims damages and expenses

Manager means Moulding & Sons Landfill LLC , as defined in the first paragraph of this Agreement

'Operating Expenses" means (a) any and all expenses and expenditures of whatever kind or nature incurred, directly or indirectly, by Manager in operating, maintaining and managing the Landfill, including, but not limited to employee compensation and related expenses, supplies, material and parts costs, costs of any independent contractors, repairs and maintenance costs, the costs of procuring and maintaining the insurance referred to in Section 8 below, amounts expended to procure and maintain permits and licenses, taxes, excises, utility and telephone charges, safety and medical expenses, costs relating to the maintenance of signage inventory and systems, the cost of annual independent audits of the Landfill, the cost of compliance with laws and regulations, other start-up expenses associated with the opening of a new Landfill

'Operating Revenues" means any and all revenues of every kind or nature derived from operating and managing the Landfill

"Person" means any individual, general partnership, limited partnership, limited liability partnership, partnership, corporation, joint venture, trust, business trust limited liability company, cooperative, or association, and the successors and assigns of any of the foregoing and, unless the context otherwise requires the singular shall include the plural, and the masculine gender shall include the feminine and the neuter, and vice versa

"Renewal Term" means the additional period for which this Agreement may be renewed in accordance with Section 3 2 hereof beyond the Management Term

SECTION TWO
ENGAGEMENT OF MANAGER, SCOPE OF SERVICES

2 1 **Engagement**

2 1 1 General Scope The Board hereby engages Manager to operate and manage the Landfill during the Management Term and the Renewal Term, if any upon the terms and conditions hereinafter set forth, and Manager hereby accepts such engagement

2 1 2 Manager of the Landfill Subject to the terms of this Agreement, Manager shall be the sole and exclusive manager of the Landfill to manage and operate the Landfill during the Management Term and the Renewal Term(s) if any In such capacity Manager shall have all authority over the day-to-day operation of the Landfill and all activities therein The County shall take no action that materially interferes with impedes or impairs the ability of Manager to manage the Landfill effectively except that if the Manager is in violation of any applicable federal or state law, rule or regulation, the County may direct the Manager to correct such violation and if said violation is not corrected within a reasonable time,

the County may correct the same with said costs to be paid by Manager within thirty (30) days

2 1 3 Approval of the Board To the extent that the approval of the Board is required under the terms of this Agreement the approval of the Contract Administrator shall constitute the approval of the Board, except to the extent the approval of another party is expressly required by the terms of this Agreement

2 2 **Scope of Services - Generally** Manager shall perform and furnish such management services and systems as are appropriate or necessary to operate and manage the Landfill in a manner consistent with Manager's policies and procedures and the operations of other similar facilities In that connection, Manager will operate the Landfill in a manner to achieve the following objectives, subject to the availability of Operating Revenues

To provide excellent service to the users of the Landfill,
To maximize the utilization of the Landfill and its revenue generating capacity,
To provide for the safety of the persons visiting the Landfill,
To respond to the changing needs of the community and users of the Landfill with expansions and/or upgrades of services

2 3 **Specific Services** Without limiting the generality of the foregoing, Manager shall have, without (except as otherwise expressly noted below) any prior approval by the County, sole right and authority to

2 3 1 employ, supervise and direct employees and personnel consistent with the provisions of this Agreement,

2 3 2 negotiate, execute in its name as agent for the County, deliver and administer any and all licenses which are necessary or appropriate and all other contracts and agreements in connection with the management and operation of the Landfill

2 3 3 rent, lease or purchase all equipment and maintenance supplies necessary or appropriate for the operation and maintenance of the Landfill

2 3 4 charge the prices and rates set forth on the rate schedule which is attached hereto as Exhibit "A' and by this reference incorporated herein, and, subject to the approval of the Board (which approval shall not be unreasonably withheld, conditioned or delayed), to determine any adjustments thereto,

2 3 5 pay when due, all Operating Expenses from accounts established pursuant to Section 5 2 of this Agreement,

2 3 6 maintain a record of the amount of all Solid Waste accepted at the Landfill,

2 3 7 provide day-to-day administrative services in support of its management activities, including, but not limited to, the acquisition of services, equipment, supplies and facilities, internal budgeting and accounting, maintenance and property management, personnel management, record-keeping, collections and billing, and similar services

2 4 **Right of Entry Reserved** The Board or any designated representative shall have the right to enter all portions of the Landfill during regular business hours for any lawful purpose and to inspect same, to observe the performance of Manager of its obligations under this Agreement, to install, remove, adjust, repair, replace or otherwise handle any utility lines, or other matters in, on, or about the premises, or to do any act or thing which the Board may be obligated or have the right to do under this Agreement or otherwise Except for emergency situations or to remedy violations of federal or state law, rules or regulations in accordance with Section 2 1 2 above, the Manager shall be given not less than twenty-four (24) hours prior written notice of such intended entry Nothing contained in this Section is intended or shall be construed to limit any other rights of the Board under this Agreement

SECTION THREE
TERM AND RENEWAL

3 1 **Management Term and Renewal Term** The Management Term of this Agreement shall commence on the Closing Date under the Real Estate Purchase Agreement of even date herewith between the County and Moulding Investments, LLC, a Utah limited liability company, pursuant to which the County has purchased the real property on which the Landfill will be operated (the "Purchase Agreement"), and shall end at midnight on the date which is twenty (20) years thereafter, unless earlier terminated pursuant to the provisions of this Agreement

3 2 **Contract Extension** The Board and Manager may agree to extend the term hereof upon the same terms and conditions except for modifications which may be made as specified herein for two (2) additional five (5) year periods by executing an addendum to this Agreement at least one hundred eighty (180) days prior to the expiration of the Management Term or any Renewal Term

SECTION FOUR
COMPENSATION TO COUNTY

4 1 **Compensation** Manager shall pay County on a monthly basis One Dollar and Fifty Cents ($1 50) for each ton (or the equivalent thereof) of Solid Waste accepted at the Landfill, with an increase to be negotiated every five (5) years between Manager and County or, if Manager and County are unable to agree on such increase said payment shall be increased by an amount equal to the

percentage increase, if any, in the applicable consumer price index published by the United States government since the last such increase

SECTION FIVE
FUNDING, BUDGET, BANK ACCOUNTS

5 1 **Operating Funds** Manager shall be responsible for all funds necessary to pay all Operating Expenses incurred or accrued in each Fiscal Year

5 2 **Receipts and Disbursements** Manager shall establish and maintain in one or more depositories one or more operating, payroll and other bank accounts for the operation and management of the Landfill, in the name of the Manager, with signature authority in such employees of Manager as Manager shall determine All revenues collected by Manager from the operation of the Landfill shall be deposited into such accounts and Operating Expenses shall be paid therefrom by Manager

5 3 **Capital Improvements, Capital Equipment** The obligation to pay for, and authority to perform, direct and supervise capital improvements and capital equipment purchases shall be the responsibility of the Manager

5 4 **Landfill Closure** Manager shall establish a closure account separate from the operating account for the purpose of building a closure fund Manager shall deposit in the closure fund the equivalent of $ 20 per ton (or the equivalent thereof) for the purpose of accumulating funds sufficient to close the Landfill in accordance with applicable federal and state laws, rules and regulations Any funds remaining in said account after completing Manager's services under this Agreement in accordance with said laws, rules and regulations shall belong to Manager, provided, however, that in the event County continues to operate the Landfill following termination of this Agreement, said closure fund shall be held in an interest bearing escrow account until closure, whereupon all remaining funds in excess of closure costs shall be returned to Manager

SECTION SIX
RECORDS, AUDITS AND REPORTS

6 1 **Records and Audits**

6 1 1 Manager shall keep and preserve for at least three (3) years following each Fiscal Year all records relating to the number of tons (or the equivalent thereof) of Solid Waste accepted at the Landfill

6 1 2 The Board shall have the right, annually, upon at least seven (7) days prior written notice, to cause one or more of the County's internal auditors to audit the books of Manager at the Landfill's business office relating to the number of tons (or the equivalent thereof) of Solid Waste accepted at the Landfill

6 2 **Monthly Reports** By the twenty-fifth day of each month, Manager shall provide to the Board a written report showing the number of tons (or the equivalent thereof) of Solid Waste accepted at the Landfill during the previous calendar month

SECTION SEVEN
EMPLOYEES

7 1 **Manager Employees**

7 1 1 Manager shall select, train and employ at the Landfill such number of employees as Manager deems necessary or appropriate to satisfy its responsibilities hereunder Manager shall have authority to hire, terminate and discipline any and all personnel working at the Landfill

7 1 2 Manager s employees at the Landfill shall not for any purpose be considered to be employees of the Board and Manager shall be solely responsible for their supervision and daily direction and control and for setting, and paying as an Operating Expense, their compensation (and federal income tax withholding) and any employee benefits, and all costs related to their employment shall be an Operating Expense

SECTION EIGHT
INDEMNIFICATION AND INSURANCE

8 1 **Indemnification**

8 1 1 Each party shall indemnify, defend and hold harmless the other party and its officers, agents and employees from and against any and all claims and judgments arising from any the negligence, fault, material default or breach by such indemnifying party of its obligations specified herein

8 1 2 The provisions set forth in subparagraph 8 1 1 above shall survive termination of this Agreement, provided, however, that a claim for indemnification shall be valid only if the party entitled to such indemnification provides written notice thereof to the other party prior to three (3) years following the date of termination of this Agreement

8 1 3 The foregoing indemnification rights shall be the exclusive remedies of each party hereto, other than any right to terminate this Agreement arising from any breach of, default under or performance pursuant to this Agreement

8 2 Liability Insurance

8 2 1 Manager shall secure prior to the commencement of the Management Term hereunder and shall keep in force at all times during the term of this Agreement, commercial liability insurance, including public liability and property damage, covering premises liability, and Manager operations hereunder in the amount of One Million Dollars ($1,000 000 00) for bodily injury and One Million Dollars ($1,000,000 00) for property damage

8 2 2 Manager shall also maintain Comprehensive Automotive Bodily Injury and Property Damage Insurance for business use covering all vehicles operated by Manager officers, agents and employees in connection with the Landfill, whether owned by Manager, the Board, or otherwise, with a combined single limit of not less than One Million Dollars ($1,000,000 00) per occurrence (including an extension of hired and non-owned coverage)

8 2 3 Commencing with the Management Term and continuing thereafter during the term hereof, Manager shall also maintain employment practices liability insurance with coverage of at least One Million Dollars $1,000,000 00) for claims relating to the employment practices of Manager at the Landfill pertaining to its employees

8 2 4 Manager shall be the named insured under all such insurance The Board and County shall be an additional insured under the insurance described herein

8 2 5 Certificates evidencing the existence of the above insurance shall be delivered to the Contract Administrator prior to the commencement of the Management Term Notwithstanding the provisions of this Section 8 2, the parties hereto acknowledge that the above insurance may contain exclusions from coverage which are reasonable and customary for insurance of such type

8 2 6 A renewal binder of coverage (or satisfactory evidence of such renewal) shall be delivered to the Contract Administrator at least twenty (20) days after a policy's expiration date except for any policy expiring on the termination date of this Agreement or thereafter

8 2 7 Except as provided in Section 8 5, all insurance procured by Manager in accordance with the requirements of this Agreement shall be primary over any insurance carried by the Board and not require contribution by the Board

8 3 Workers Compensation Insurance Manager shall at all times maintain worker s compensation insurance (including occupational disease hazards) with an authorized insurance company or through an authorized self-insurance plan approved by the State of Utah insuring its employees at the Landfill in

amounts equal to or greater than required under law Manager shall defend indemnify and hold harmless the Board and County from any and all actions brought for workers compensation benefits

SECTION NINE
OWNERSHIP OF ASSETS

9 1 Ownership The ownership of any permanent buildings and real estate located at the Landfill shall remain with the County Ownership of removable buildings, heavy equipment, furnishings, materials, technical and office equipment and facilities, furniture, displays, fixtures, vehicles and similar tangible property or fixtures not considered to be real property and other personal property furnished by Manager shall remain with Manager The assets of a party as described herein shall not be pledged, liened, encumbered or otherwise alienated or assigned other than in the ordinary course of business of the Landfill without the prior approval of the other party

SECTION TEN
ASSIGNMENT

10 1 Assignment Neither this Agreement nor any of the rights or obligations hereunder may be assigned by either party hereto without the prior written consent of the other party hereto

SECTION ELEVEN
LAWS AND PERMITS

11 1 Permits, Licenses, Taxes and Liens Manager, as agent for the County, shall use reasonable efforts to procure any permits and licenses required for the business to be conducted by it hereunder The Board shall cooperate with Manager in applying for such permits and licenses Manager shall deliver copies of all such permits and licenses to the Contract Administrator Manager shall pay promptly out of the accounts specified in Section 5 2, all taxes, excises, license fees and permit fees of whatever nature arising from its operation, promotion and management of the Landfill Manager shall use reasonable efforts to prevent mechanic's or materialman's or any other lien from becoming attached to the premises or improvements at the Landfill, or any part or parcel thereof, by reason of any work or labor performed or materials furnished by any mechanic or materialman, so long as the work, labor or material was provided at Manager's direction and the County has supplied funds for the payment of charges therefor in accordance with this Agreement

11 2 Governmental Compliance Manager, its officers, agents and employees shall comply with all Laws applicable to Manager's management of the Landfill hereunder

SECTION TWELVE
TERMINATION

12 1 **<u>Termination</u>** This Agreement shall be terminated

12 1 1 upon expiration of the term hereof,

12 1 2 upon ninety (90) days written notice by either party to the other party ('Voluntary Termination"),

12 1 3 by either party if the other party fails to pay any sum payable hereunder or fails in any material respect to perform or comply with any of the other terms, covenants, agreements or conditions hereof, and such failure continues for more than sixty (60) days after written notice thereof from the other party ("Default"), provided, however, that in the event that a Default (other than a Default in the payment of money) is not reasonably susceptible to being cured within the sixty (60)-day period, the defaulting party shall not be considered in Default if it shall within such sixty (60) day period have commenced with due diligence and dispatch to cure such Default and thereafter completes with dispatch and due diligence the curing of such Default,

12 1 4 if the Solid Waste flow to the Landfill diminishes to the point that continued operation of the Landfill is no longer economically feasible (Lack of Economical Viability"), or

12 1 5 by County upon the commission of an act by Manager that is inimical to public operations or which brings disrepute to the County (Cause')

12 2 **<u>Effect of Termination</u>**

12 2 1 Upon termination of this Agreement for any reason other than Manager's Voluntary Termination, Manager's Default, Lack of Economical Viability or Cause, County shall pay Manager an amount equal to the then rate of compensation per ton (or the equivalent thereof) which is payable by Manager to the County pursuant to Section 4 1 above for each ton (or the equivalent thereof) of Solid Waste that can be deposited in the Remaining Airspace of the Landfill (as defined in Section 12 3 below) If the Landfill continues to be operated, said amount shall be paid monthly as the remaining airspace of the Landfill is filled, otherwise it shall be paid within thirty (30) days after determination thereof as provided in said Section 12 3

12 2 2 Upon termination of this Agreement for Cause, Manager may repurchase the Landfill and seek to have it permitted and licensed as a private C&D Landfill County agrees to fully cooperate with Manager in obtaining all applicable permits and licenses The purchase price shall be the amount the County paid for the Landfill, plus any additional expense the County made in developing, permitting or upgrading the Landfill, adjusted by a consumer price index for the number of years the County owned the Landfill, which total

amount shall be multiplied by a fraction, the numerator of which is the Remaining Airspace of the Landfill (as defined in Section 12 3 below), and the denominator of which shall be the number of tons (or the equivalent thereof) of Solid Waste that can be deposited in the Landfill as of the date of this Agreement, as determined by Manager s engineer to-wit Seven Million Five Hundred Thousand (7 500,000) tons ('Initial Airspace")

12 2 3 Upon termination of this Agreement for any reason, (a) all Operating Expenses incurred or committed for prior to the date of expiration or termination and any unpaid compensation due to the County pursuant to Section 4 1 shall be paid using funds on deposit in the account(s) described in Section 5 2 and to the extent such funds are not sufficient, the Manager shall pay all such Operating Expenses and shall indemnify and hold the Board harmless therefrom, and (b) all further obligations of the parties hereunder shall terminate except for the obligations in this Section Twelve and in Section 8 1

12 3 <u>Remaining Airspace</u> The Remaining Airspace of the Landfill shall be the difference between (a) the Initial Airspace (as defined in Section 12 2 2 above and (b) the number of tons (or the equivalent thereof) of Solid Waste that has been accepted at the Landfill as of the date of termination of this Agreement as set forth in the records maintained by Manager pursuant to Section Six hereof

12 4 <u>Surrender of Premises</u> Upon termination of this Agreement for any reason specified in this Section 12, including expiration of this Agreement, Manager shall surrender and vacate the Landfill upon the effective date of such termination

SECTION THIRTEEN
MISCELLANEOUS

13 1 <u>Dispute Resolution</u> Any dispute arising under or in connection with this Agreement will be resolved by the parties in accordance with the procedures set forth on Exhibit 'B" attached hereto

13 2 <u>No Partnership or Joint Venture</u> Nothing herein contained is intended or shall be construed in any way to create or establish the relationship of partners or a joint venture between the Board and Manager None of the officers, agents or employees of Manager shall be or be deemed to be employees of the Board for any purpose whatsoever

13 3 <u>Entire Agreement</u> This Agreement contains the entire agreement between the parties with respect to the subject matter hereof and supersedes all prior agreements and understandings with respect thereto No other agreements, representations, warranties or other matters whether oral or written, will be deemed to bind the parties hereto with respect to the subject matter hereof

13 4 **Written Amendments** This Agreement shall not be altered, modified or amended in whole or in part, except in a writing executed by each of the parties hereto

13 5 **Force Majeure**

13 5 1 No party will be liable or responsible to the other party for any delay, damage, loss, failure, or inability to perform caused by 'Force Majeure" if notice is provided to the other party within ten (10) days of date on which such party gains actual knowledge of the event of 'Force Majeure" that such party is unable to perform The term 'Force Majeure" as used in this Agreement means the following an act of God, strike, war, public rioting lightning, fire, storm, flood, explosions inability to obtain materials, supplies, epidemics, landslides, lightening storms, earthquakes floods, storms, washouts, civil disturbances, explosions, breakage or accident to machinery or lines of equipment, temporary failure of equipment, freezing of equipment, terrorist acts, and any other cause whether of the kinds specifically enumerated above or otherwise which is not reasonably within the control of the party whose performance is to be excused and which by the exercise of due diligence could not be reasonably prevented or overcome (it being acknowledged that under no circumstances shall a failure to pay amounts due and payable hereunder be excusable due to a Force Majeure)

13 5 2 Neither party hereto shall be under any obligation to supply any service or services if and to the extent and during any period that the supplying of any such service or services or the provision of any component necessary therefor shall be prohibited or rationed by any Law

13 5 3 Except as otherwise expressly provided in this Agreement, no abatement, diminution or reduction of the payments payable to Manager shall be claimed by the Board or charged against Manager, nor shall Manager be entitled to additional payments beyond those provided for in this Agreement for any inconvenience interruption, cessation, or loss of business or other loss caused, directly or indirectly, by priorities, rationing, or curtailment of labor or materials, or by war or any matter or thing

13 5 4 In the event of damage to or destruction of the Landfill by reason of fire, storm or other casualty or occurrence of any nature or any regulatory action or requirements that, in either case, is expected to render the Landfill permanently untenantable, notwithstanding the Board's reasonable efforts to remedy such situation either party may terminate this Agreement upon written notice to the other

13 5 5 Manager may suspend performance required under this Agreement, without any further liability, in the event of any act of God or other

occurrence, which act or occurrence is of such effect and duration as to effectively curtail the use of the Landfill so as effect a substantial reduction in the need for the services provided by Manager for a period in excess of ninety (90) days provided, however, that for the purposes of this subsection, Manager shall have the right to suspend performance retroactively effective as of the date of the use of the Landfill was effectively curtailed Substantial reduction in the need for these services provided by Manager" shall include such a reduction as shall make the provision of any services by Manager economically impractical

13 6 Binding Upon Successors and Assigns, No Third Party Beneficiaries

13 6 1 This Agreement and the rights and obligations set forth herein shall inure to the benefit of, and be binding upon, the parties hereto and each of their respective successors and permitted assigns

13 6 2 This Agreement shall not be construed as giving any Person, other than the parties hereto and their successors and permitted assigns any legal or equitable right, remedy or claim under or in respect of this Agreement or any of the provisions herein contained, this Agreement and all provisions and conditions hereof being intended to be, and being, for the sole and exclusive benefit of such parties and their successors and permitted assigns and for the benefit of no other Person

13 7 Notices Any notice, consent or other communication given pursuant to this Agreement will be in writing and will be effective either (a) when delivered personally to the party for whom intended, (b) on the second business day following mailing by an overnight courier service that is generally recognized as reliable, (c) on the fifth day following mailing by certified or registered mail, return receipt requested postage prepaid, or (d) on the date transmitted by telecopy as shown on the telecopy confirmation therefor as long as such telecopy transmission is followed by mailing of such notice by certified or registered mail, return receipt requested, postage prepaid, in any case addressed to such party as set forth below or as a party may designate by written notice given to the other party in accordance herewith

13 8 To the Manager and Board

To Manager

Prior to opening of the Landfill

Moulding & Sons Landfill, LLC
910 West 21st Street
Ogden Utah 84401

After opening of the Landfill

Moulding & Sons Landfill LLC
at the address of the Landfill

To County

Weber County Corporation
2380 Washington Blvd
Ogden, Utah 84401

13 9 <u>Section Headings and Defined Terms</u> The section headings contained herein are for reference purposes only and shall not in any way affect the meaning and interpretation of this Agreement The terms defined herein and in any agreement executed in connection herewith include the plural as well as the singular and the singular as well as the plural, and the use of masculine pronouns shall include the feminine and neuter Except as otherwise indicated, all agreements defined herein refer to the same as from time to time amended or supplemented or the terms thereof waived or modified in accordance herewith and therewith

13 10 <u>Counterparts</u> This Agreement may be executed in two or more counterparts, each of which shall be deemed an original copy of this Agreement, and all of which, when taken together, shall be deemed to constitute but one and the same agreement

13 11 <u>Severability</u> The invalidity or unenforceability of any particular provision, or part of any provision, of this Agreement shall not affect the other provisions or parts hereof, and this Agreement shall be construed in all respects as if such invalid or unenforceable provisions or parts were omitted

13 12 <u>Non-Waiver</u> A failure by either party to take any action with respect to any default or violation by the other of any of the terms, covenants, or conditions of this Agreement shall not in any respect limit, prejudice diminish, or constitute a waiver of any rights of such party to act with respect to any prior, contemporaneous, or subsequent violation or default or with respect to any continuation or repetition of the original violation or default

13 13 <u>Consent</u> Wherever the consent or approval of a party is required under the terms of this Agreement, the party whose consent or approval is required shall not unreasonably withhold or delay such consent or approval

13 14 <u>Certain Representations and Warranties</u>

13 14 1 The Board represents and warrants to Manager the following (i) all required approvals have been or will be obtained, and the Board has full legal right, power and authority to enter into and perform its obligations hereunder, and (ii) this Agreement has been duly executed and delivered by the Board and constitutes a

valid and binding obligation of the Board enforceable in accordance with its terms except as such enforceability may be limited by bankruptcy insolvency, reorganization or similar laws affecting creditors rights generally or by general equitable principles

13 14 2 Manager represents and warrants to the Board the following (i) all required approvals have been or will be obtained, and Manager has full legal right power and authority to enter into and perform its obligations hereunder, and (ii) this Agreement has been duly executed and delivered by Manager and constitutes a valid and binding obligation of Manager, enforceable in accordance with its terms, except as such enforceability may be limited by bankruptcy, insolvency, reorganization or similar laws affecting creditors' rights generally or by general equitable principles

13 15 **<u>Governing Law</u>** This Agreement will be governed by and construed in accordance with the internal laws of the State of Utah, without giving effect to otherwise applicable principles of conflicts of law

13 16 **<u>No Effect</u>** This Agreement shall be void *ab initio* and of no force or effect if the Purchase Agreement is not executed or is for any reason invalid or unenforceable

[Signature Page Follows]

IN WITNESS WHEREOF, this Agreement has been duly executed by the parties hereto as of the day and year first above written

BOARD OF COUNTY COMMISSIONERS
OF WEBER COUNTY

By Jan M. Zogmaister
Jan M Zogmaister Chair

Commissioner Bischoff voted ______
Commissioner Dearden voted ______
Commissioner Zogmaister voted ______

ATTEST

Alan D McEwan
Alan D McEwan, CPA
Weber County Clerk/Auditor

MOULDING & SONS LANDFILL, LLC

By R Moulding
Randy Moulding, Manager

EXHIBIT "A"

RATE SCHEDULE

Pickups	$ 50 00
Pickups with Sides	60 00
Small Trailers	100 00
Bobtails	100 00
Small Flatbeds	100 00
Large Trailers	150 00
Large Flatbeds	150 00
Dump Trucks	150 00
Dump Trucks with Pups	240 00
Small End Dumps	160 00
End Dumps	240 00
Large End Dumps	320 00
Roll-Offs	8 00 per yard

EXHIBIT "B"

COOPERATION/MEDIATION

(a) The parties desire to cooperate with each other in the management and operation of the Landfill pursuant to the terms hereof In keeping with this cooperative spirit and intent any dispute arising hereunder will first be referred to the parties' respective agents or representatives prior to either party initiating a legal suit, who will endeavor in good faith to resolve any such disputes within the limits of their authority and within forty-five (45) days after the commencement of such discussions If and only if any dispute remains unresolved after the parties have followed the dispute resolution procedure set forth above, the matter will be resolved pursuant to paragraphs (b) and (c) below

(b) If any dispute between the parties has not been resolved pursuant to paragraph (a) above, the parties will endeavor to settle the dispute by mediation under the then current CPR Institute for Dispute Resolution (CPR") model procedure for mediation of business disputes or, if such model procedure no longer exists, some other mutually agreeable procedure Within ten (10) business days from the date that the parties cease direct negotiations pursuant to paragraph (a) above, the Board shall provide Manager with a list of three (3) individuals then listed on CPR's U S Regional Panel of Distinguished Neutrals for the locale in which the Landfill is located (or if no such list exists for the locale closest to where the Landfill is located), who are available during the time period contained in subparagraph (e) below and who have no unwaived conflict of interest with respect to either Party and Manager shall (within ten (10) business days after receipt of such list) select one (1) of the neutrals from such list Each party will bear its own cost of mediation, provided, however, the cost charged by any independent third party mediator will be borne equally by the parties In the mediation, each Party may be represented by their own counsel

(c) The parties agree that any mediation proceeding (as well as any discussion pursuant to paragraph (a) above) will constitute settlement negotiations for purposes of the federal and state rules of evidence and will be treated as non discoverable, confidential and privileged communication by the parties and the mediator No stenographic, visual or audio record will be made of any mediation proceedings or such discussions All conduct, statements, promises, offers and opinions made in the course of the mediation or such discussion by any party, its agents, employees, representatives or other invitees and by the mediator will not be discoverable nor admissible for any purposes in any litigation or other proceeding involving the parties and will not be disclosed to any third party

(d) The parties agree that this mediation procedure will be obligatory and participation therein legally binding upon each of them In the event that either party refuses to adhere to the mediation procedure set forth in this Exhibit B', the other party may bring an action to seek enforcement of such obligation in any court of competent jurisdiction

(e) The parties' efforts to reach a settlement of any dispute will continue until the conclusion of the mediation proceeding The mediation proceeding will be concluded when (I) a written settlement agreement is executed by the parties, or (ii) the mediator concludes and informs the parties in writing that further efforts to mediate the dispute would not be useful, or (iii) the parties agree in writing that an impasse has been reached Notwithstanding the foregoing, either party may withdraw from the mediation proceeding without liability therefor in the event the dispute is not resolved within forty five (45) days from the commencement of such proceeding For purposes of the preceding sentence, the proceeding will be deemed to have commenced following the completion of the selection of a mediator as provided in paragraph (b)

(f) If any dispute has not been resolved pursuant to the foregoing each party is free to file suit in a court of competent jurisdiction to enforce its rights hereunder

(g) The procedure specified in this Exhibit "B" shall be the sole and exclusive procedures for the resolution of disputes between the parties arising out of or relating to this Agreement, provided, however, that a party, without prejudice to the above procedures, may file a complaint to seek a preliminary injunction or other provisional judicial relief, if in its sole discretion such action is necessary to avoid irreparable damage or to preserve the status quo (**Equitable Litigation**') Despite such action the parties will continue to participate in good faith in the procedures specified in this Exhibit 'B"

(h) Any interim or appellate relief granted in such Equitable Litigation shall remain in effect until the alternative dispute resolution procedures described in this Exhibit B" concerning the dispute that is the subject of such Equitable Litigation result in a settlement agreement or terminate Any such written settlement agreement shall be the final, binding determination on the merits of such dispute, shall supersede and nullify any decision in the Equitable Litigation, and shall preclude any subsequent litigation on such merits, notwithstanding any determination to the contrary in connection with any Equitable Litigation granting or denying interim relief or any appeal therefrom

(i) All applicable statutes of limitation and defenses based upon the passage of time shall be tolled while the procedures specified in this Exhibit B' are pending The parties will take such action, if any required to effectuate such tolling Each party shall be required to perform its obligations under this Agreement pending final resolution of any dispute arising out of or relating to this Agreement, unless to do so would be impossible or impracticable under the circumstances

EXHIBIT C

A CULTURAL RESOURCE INVENTORY OF A PROPOSED LANDFILL NEAR LITTLE MOUNTAIN WEBER COUNTY, UTAH

Prepared for
Hansen, Allen & Luce, Inc
6771 South 900 East
Midvale, Utah 84047

Prepared by
Sagebrush Consultants, LLC
3670 Quincy Avenue, Suite 203
Ogden Utah 84403

Under the Authority of
Archaeological Survey Permit No 58
United States Antiquities Permit No U 08 SJ-0527p
Cultural Resource Report No 1696

June 26, 2008

A CULTURAL RESOURCE INVENTORY OF A PROPOSED LANDFILL NEAR LITTLE MOUNTAIN, WEBER COUNTY, UTAH

by

Sandy Chynoweih Pagano and Alyssa Wallin

Prepared for

Hansen, Allen & Luce, Inc
6771 South 900 East
Midvale Utah 84047

Prepared by

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3670 Quincy Avenue, Suite 203
Ogden, Utah 84403

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June 26, 2008

ABSTRACT

In June 2008 Hansen Allen and Luce, Inc of Midvale, Utah, requested that Sagebrush Consultants, L L C (Sagebrush) of Ogden, Utah, conduct a cultural resource inventory of a proposed landfill near Little Mountain in Weber County, Utah The survey consists of 112 acres located about 15 miles west of Ogden on privately owned lands in T 6N , R 3W , Sec 19 on the USGS 7 5' Quadrangle Ogden Bay, Utah (1991) The purpose of this inventory is to identify cultural resources that may be present within the proposed project area Sagebrush carried out the fieldwork on June 19 2008 The project was conducted under Archaeological Survey Permit No 58, issued by the Public Lands Policy Coordination Office and Utah State of Utah Antiquities Project No U 08 SJ 0527p

The inventory resulted in the identification of one historic campsite, 42WB445, and one rock quarry 42WB446 Due to their proximity to the Lucin Cutoff, as well as datable artifacts found at the campsite, it is highly likely that these two sites are related to the construction of the cutoff Site 42WB445 is an historic campsite with eight depressions and a surficial scatter of aqua and amethyst glass, porcelain brick fragments, and tin can fragments Site 42WB446 is an abandoned rock quarry that has filled with water Both sites were recommended eligible to the National Register of Historic Places due to their association with the significant historic site the Lucin Cutoff

The railroad construction camp (42WB445) and the railroad quarry (42WB446) have been recommended eligible to the NRHP Both sites are located on the northwestern periphery of the project area, and can easily be avoided by landfill activities Sagebrush recommends that these sites be avoided during construction and use of the landfill area

This investigation was conducted with techniques that are considered to be adequate for evaluating cultural resources that are available for visual inspection and could be adversely affected by the proposed project Based on the above-mentioned avoidance, cultural resource clearance is recommended for the current project However, should such resources be discovered during construction a report should be made immediately to the State Archaeologist at the Utah State Historic Preservation Office, Salt Lake City, Utah

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LIST OF FIGURES

INTRODUCTION

In June 2008, Hansen, Allen, and Luce, Inc of Midvale, Utah, requested that Sagebrush Consultants, L L C (Sagebrush) of Ogden Utah, conduct a cultural resource inventory of a proposed landfill near Little Mountain in Weber County, Utah The survey consists of 112 acres located about 15 miles west of Ogden on privately owned lands in T 6N , R 3W Sec 19 on the USGS 7 5' Quadrangle Ogden Bay, Utah (1991) The purpose of this inventory is to identify cultural resources that may be present within the proposed project area Sandy Chynoweth Pagano, Alyssa Wallin, Kurt Raffield and Joe Taylor of Sagebrush earned out the fieldwork on June 19, 2008 The project was conducted under Archaeological Survey Permit No 58, issued by the Public Lands Policy Coordination Office and Utah State of Utah Antiquities Project No U 08 SJ 0527p

A file search for previous archaeological projects and cultural resources was performed by Marty Thomas for Sagebrush at the Division of State History, Utah State Preservation Office (SHPO) on June 1 and 6, 2006 Five previous cultural resource projects have been conducted near the current project area Arie Leefiang, of the Utah State Historic Preservation Office, Antiquities Division conducted a GIS file search for the project on June 18, 2008 The results of this search indicated that five cultural resource inventories and two culmral resource sites have been recorded within one mile of the current project area Following is a brief description of these projects and the cultural resource sites

In 2005 Sagebrush Consultants conducted a Class III inventory of a portion of the Ogden Bay Wildlife Management Area (Polk and Pagano 2006) Two historic sites were recorded withm one mile of the current project area (42WB348 and 42WB427)

> Site 42WB348 is the Lucm Cutoff corridor The Lucm Cutoff constructed in 1902-1904, is a 103 mile railroad that spanned the Great Salt Lake The site was originally documented in 2001 and recommended eligible to the National Register of Historic Places (NRHP)(Ellis et al 2001) In 2006 Sagebrush recorded a 3,730 ft segment of the Lucm Cutoff corridor The segment was recommended to be a non contributing component to the site s eligibility (Polk and Pagano 2006)
>
> Site 42WB427 is an historic railroad camp associated with the Lucin Cutoff Artifacts found at this site include fire brick fragments, metal fragments, a single fragment of opalized clear glass, a few small pieces of cut bone and numerous fragments of deteriorated tin cans Structural remains include a stone foundation, four depressions, and three tent platforms/habitational structures This site was recommended eligible to the NRHP under criteria A and D (Polk and Pagano 2006)

In 1989, Weber State College conducted a reconnaissance level archaeological survey of the Ogden/Weber River Marshes m conjunction with the Archaeological Technician Program

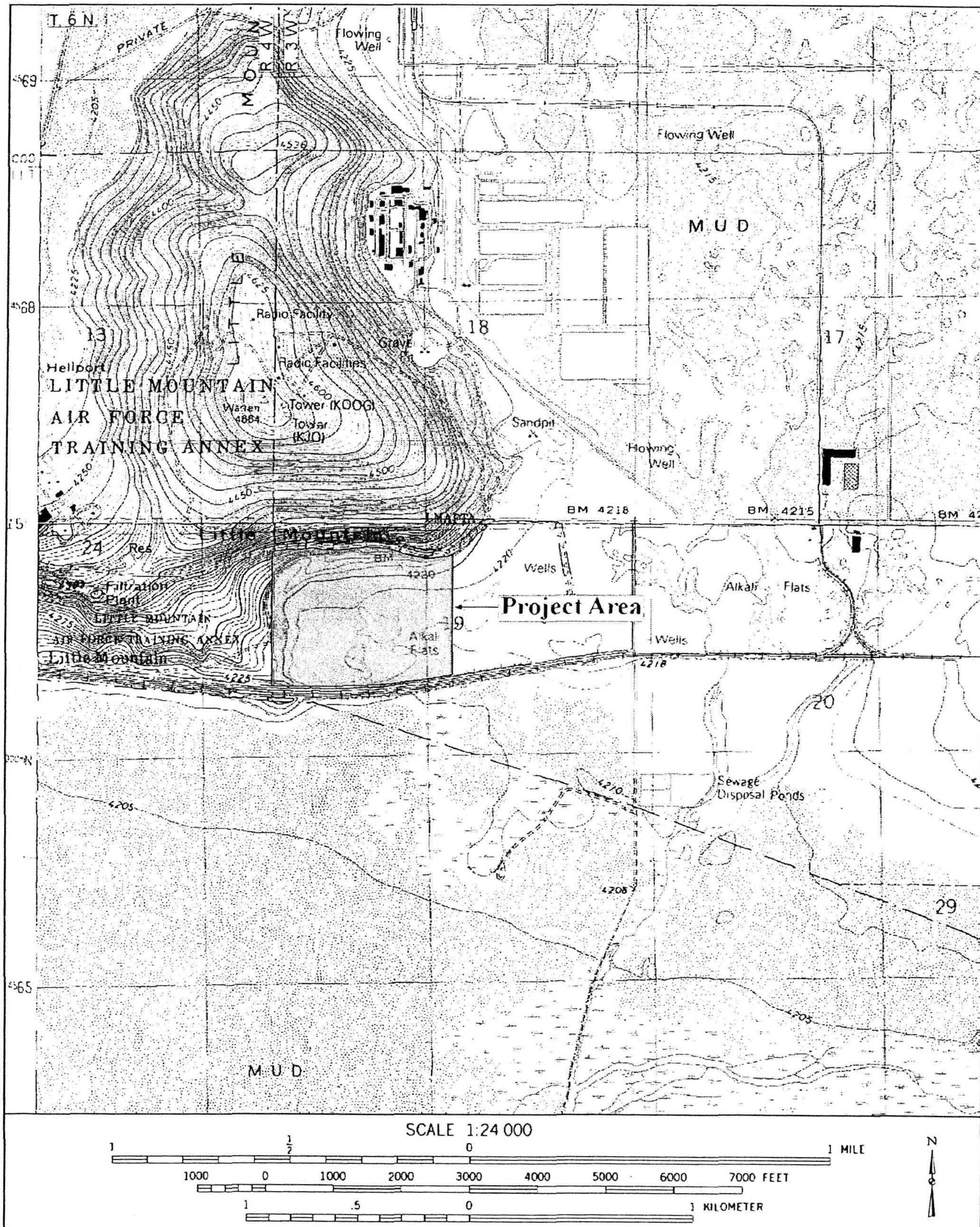

Figure 1. Location of the area surveyed for the proposed landfill near Little Mountain. Taken from USGS 7.5' Quadrangles Plain City SW, Utah (1991) and Ogden Bay, Utah (1991).

(Russell et al 1989) Numerous previously recorded and several new cultural resource sites were noted during this inventory however, none are within one mile of the current project area In 1991 Utah State University Foundation conducted a sample archaeological inventory of several parcels of U S Air Force lands (University Foundation 1992) Numerous cultural resource sites were noted during this project however, none are within one mile of the current project area

In 2000 and 2001, Hill Air Force Base (HAFB) re-surveyed portions of the Little Mountain Facility for a proposed groundwater remedial investigation at the Little Mountain Test Annex (Hirschi 2000 and 2001) No cultural resource sites were located during these inventories In 2004, Montgomery Archaeological Consultants conducted a cultural resource inventory on 114 acres of DWR land immediately adjacent to the current project area (Montgomery 2005) No cultural resources were located during the inventory

The NRHP was also checked prior to conducting the survey No NRHP listed sites are located within one mile of the current project area No additional projects were conducted within one mile of the current project area

ENVIRONMENT

The project area falls within the Great Salt Lake geographic unit of the Basin and Range near the Ogden Bay of Great Salt Lake The project area is largely within an area of mud and alkali flats occurring along the margins of the lake The elevation of the project area is 4205 to 4210 feet a s l Vegetation consists of typical shadscale community species including pickle weed iodine bush saltbush greasewood, cheatgrass and bunch grasses There is low ground visibility in the northern portion of the project area The southern portion of the project area consists of mostly mud flat areas with little vegetation except in seep areas, which were characterized by stands of phragmites Natural disturbance consists of fire and fluctuation in flood and low water stages of the Great Salt Lake Cultural disturbance includes road and railroad construction, a quarry, recreational vehicles a fence line and a utility line corridor

HISTORIC CONTEXT

The city of Ogden is known as the Crossroads of the West, due to its location in the geographical center of the western United States and the many trails, roads, and communication routes that converge and diverge in this area The crisscrossing of trails, roads and communications routes continued throughout the historic period and continues today with fiber optic lines and pipelines being laid in the region The current project area is located along the route of the Lucm Cutoff of the Transcontmental Railroad about 15 miles west of Ogden City, m unincorporated Weber County

While little is known about Native American trails in the region, the first recorded paths established in northern Utah were those of the fur trappers of the Rocky Mountain Fur Company and the Hudson Bay Company, who encountered each other in the mountains east of Ogden Following on the heels of the trappers, government explorers and surveyors crisscrossed the West locating new routes to Oregon and California and routes for the railroad and telegraph They in turn were followed closely by pioneers, who settled the region and built the City of Ogden which later became the major hub for a number of railroads in the West These railroads, like the later highways, moved traffic not only east and west, but also north and south

The history of Ogden can be divided into seven periods, which reflects the important socioeconomic trends that occurred throughout the development of Ogden This chronology includes Fur Trapping and Settlement, Initial Expansion, the Railroad Era, the Rise of Commercialism, Industrial Development, the Depression Era, World War II, and the International Period

Fur Trapping and Settlement Period (1844 to 1853)

This period reflects the earliest exploratory expeditions into the Ogden area by Europeans and European Americans Until this time, small bands of Shoshone Indians inhabited the area The period also reflects the initial settlement of the area by trapper Miles Goodyear in 1845 and by the Mormon pioneers in the early 1850s During this early period, the settlement contained small, widely scattered farmsteads along the banks of the Weber and Ogden rivers

The first Non-Native Americans to venture into Northern Utah and the Ogden area were the fur trappers and mountain men of the 1810s Prior to that time, Utah and particularly Northern Utah, was located outside the known trapping areas, which consisted of the Pacific Northwest and the upper Missouri River (Eldredge and Gowans 1994 208) By about 1811, five American trappers with John Jacob Astor s American Fur Company under the direction of Wilson Price Hunt, were trapping in the Snake River area and appear to have reached as far south as the Bear River (Eldredge and Gowans 1994 208) At about the same time, British trappers from the Northwest Fur Company were trapping along the Bear River and around Bear Lake (Eldredge and Gowans 1994 208) In 1819, Donald MacKenzie records that he also trapped the Bear Lake region (Eldredge and Gowans 1994 208) In 1823 and 1824, MacKenzie and Alexander Ross both lead brigades of Hudson's Bay Company trappers into the Snake River and Northern Utah regions (Eldredge and Gowans 1994 209)

By 1824, Northern Utah became the converging point for the three major competing fur interests the trappers of the Hudson's Bay Company operating out of Oregon under the direction of Peter Skene Ogden the American companies out of St Louis, Missouri, represented by the

Ashley Henry Fur Company and the trappers licensed by the Mexican government out of Taos and Santa Fe, New Mexico, represented by men like Etienne Provost (Eldredge and Gowans 1994 209) In the spring of that year all three interests were present in the mountains and valleys of Northern Utah Throughout the next two years, the various parties trapped the rivers and streams of Northern Utah (Eldredge and Gowans 1994 209) In the spring of 1825, the three interests met face to face

At Mountain Green along the Weber River, about 14 miles southeast of Ogden, fur trappers of the American owned Rocky Mountain Fur Company led by Johnson Gardner (formerly the Ashley Henry Fur Company), Hudson's Bay Company led by Peter Skene Ogden, and a group of Mexican trappers led by Etienne Provost encountered one another (Eldredge and Gowans 1994 210, Roylance 1982 419) Soon a discussion ensued as to who had the right to trap in the region Provost who probably had the best case for the right to trap the area, stayed out of the disagreement (Eldredge and Gowans 1994 210) After two days, Ogden backed down and withdrew from the immediate area While no permanent claim was established, the fight showed that all three groups had an interest in the area and would continue to trap and trade in the area for a while to come By 1841 fashion trends, as well as economic trends, in the east had changed and the demand for beaver pelts faded Thus, beaver pelts were no longer in high demand and the fur trade diminished to a few trading posts that continued to trade furs in general and supply goods for those immigrants moving west (Eldredge and Gowans 1994 212)

One such trading post belonged to Miles Goodyear In 1836, at the age of nineteen, Goodyear joined the Whitman Spaulding missionary party on its way west to Oregon (Sadler 1994 227) However, at Fort Hall Goodyear had a change of mind and joined a group of fur trappers (Sadler 1994 227) For the next nine years, Goodyear trapped and traded with the Indians (Sadler 1994 227) In 1839 he married Ute Chief Pe teet neet s daughter, Pomona with whom he had two children (Sadler 1994 227) In 1845 Goodyear began construction of a trading post on the western bank of the Weber River about a quarter to half a mile southwest of the Crossroads Historic District (Sadler 1994 227) He called his post Fort Buenaventura (Sadler 1994 227) The post was constructed of cottonwood logs set upright in the ground The post enclosed about half an acre and was completed in 1846 (Sadler 1994 227)

In July 1847, the Mormon pioneers (members of the Church of Jesus Christ of Latter day Saints, also known as Latter day Saints or LDS) under the direction of their President, Brigham Young entered the Salt Lake Valley By the following spring, Young sent a group of settlers under the direction of Captain James Brown to explore the Ogden area and purchase the fort from Goodyear (Daughters of Utah Pioneers [DUP] 1944 58, Roberts 1994 399) The settlers renamed the fort and the small settlement that soon grew up around it, Brown s Fort or Brownsville in honor of Captain Brown (Roberts 1994 399) During the spring of 1849 and 1850, flood waters from the Weber River inundated the settlement Thus, in early 1850, the town's people moved the settlement to the east side of the river A new fort was constructed at approximately 29th Street and Pacific Avenue (Terry 1988 99) The next year (1851) Henry G Sherwood officially surveyed the Ogden area and established a gridded town site, named Ogden in honor of Peter Skene Ogden of the Hudson s Bay Company (Roberts 1994 399) The new town was bounded on the north by 1st Street (now 21st Street), on the south by 9th Street (now 29th Street) on the east by East Street (now Quincy Avenue), and on the west by Franklin (now Wall Avenue) (Terry 1988 87)

Among the priorities for the new town was the need for water, thus, a major task was undertaken to bring water from the Weber and Ogden Rivers to the homes and fields in and around the town In 1851 the settlers dug a number of small canals from the two rivers to irrigate the northern and western parts of Ogden The following year they began construction on a seven mile-long canal designed to bring water from the Weber River to the lower (southern and central) portion of the community (Sadler and Roberts 1994 29) This canal, the Weber Canal, was completed in 1854 In addition, they constructed a gristmill, a furniture mill, and a molasses mill along the canal to utilize the flowing water to turn the overshot mill wheels and helped establish Ogden as a permanent settlement (Sadler and Roberts 1994 30)

Initial Expansion Period (1854 to 1868)

A steady increase in the number of immigrants into Utah characterizes this period during which settlement and expansion of Ogden and the surrounding communities occurred The number of Mormon farmsteads substantially increased during this period The fertile fields and readily available water from the Weber and Ogden rivers, as well as the many mountain streams, were very attractive to the settlers arriving from the east and overseas Ogden would steadily grow to become the second largest city in the Utah Territory (Powell 1994 431 438)

The 1850 census for Weber County, which consisted mainly of the Ogden area, was 1,141 people (DUP 1944 84, Roberts and Sadler 1997 63) By 1860, the community of Ogden maintained a population of 1,463 residents (DUP 1944 98,116, Roylance 1982 420) Homesteads were largely strung out along available water resources, such as streams, rivers or near the head of a spring Brigham Young, president of the LDS Church, envisioned Ogden becoming the headquarters for all Mormon settlements in the northern portion of the Utah Territory (DUP 1944 77) Mormon town plans called for the populace to live in town and farm the outlaying areas In order to consolidate their resources and conform to other Mormon settlement patterns, Young encouraged many settlers to abandon their farmsteads in the surrounding areas and establish permanent homes and businesses within Ogden City (DUP 1944 77) In 1854, the areas north and northwest of the Ogden City town site were surveyed to establish definable farming plots This survey, which covered roughly six square miles, resulted in the creation of three new communities or districts (DUP 1944 79) These were Bingham Fort District (Lynne) to the north, Slaterville District to the north and west, and North Ogden District to the north of Slaterville At the same time, Ogden s northern boundary was shifted to two miles north of the Ogden River (DUP 1944 79)

Despite this geographic expansion, the bulk of the area s population remained concentrated within the town site boundaries selected by Brigham Young, primarily in the area south of 21st Street and west of Washington Boulevard (DUP 1944 77-79 Roberts and Sadler 1985 65) A few homes were constructed east of Spring Street (now Adams Avenue) and south of what is now 28th Street, however most of this area remained farmland

During this period of Ogden s initial occupation, small bands of indigenous Shoshone Indians continued to venture through the area While few incidents occurred between the Native Americans and the Mormon settlers, trouble did come in 1853 In July of that year, Chief Walker and his followers started fighting the settlers in Utah, Juab, Sanpete, Millard, and Iron counties (DUP 1994 85) Although the fighting did not spread as far north as Weber County, it made the Mormon settlers nervous and they feared attacks from the local bands of Shoshone (DUP 1944 85,281) Thus, the city council ordered the construction of an earthen wall around the main portion of the city (DUP 1944 85 Work Projects Administration 1940 32) The wall was to enclose the area from what is now Wall Avenue to Madison Avenue, and from 21st Street to 28th Street Construction began immediately along Wall Avenue In the end, only this portion of the enclosure was ever completed as the Shoshone never attacked the settlement and the Walker War came to an official end in May 1854 (DUP 1944 91 Tyler 1978 362)

Railroad Era (1869 to 1889)

The major event of this period was the arrival of the Union Pacific Railroad (UP) in Utah and the joining of its rails with the Central Pacific Railroad (CP) at Promontory, Utah, on May 10, 1869 (Athearn 1971 98) The Union Pacific arrived in Ogden the previous March, which had a major impact on the local economy and the surrounding areas (Bain 1999 618-19) By December 1869 Ogden became the junction and passenger transfer point for both the Central Pacific and Union Pacific (Klein 1987 422, Roberts and Sadler 1985 35) The completion of the transcontinental railroad provided the impetus for construction of seven other railroads The Utah Central (UC) line was built between 1869 and 1870 to connect Salt Lake City to Ogden (Roberts and Sadler 1985 42) Then, between 1871 and 1878, the Utah Northern (UN) line was built to connect Logan and Brigham City to Ogden (Roberts and Sadler 1985 44) Both of these lines further increased the importance of Ogden as a center for transportation, settlement, and commerce

Ogden s selection as the junction for the railroads significantly changed the size and importance of Ogden City, as the two companies constructed major railroad facilities and rail yards west of Wall Avenue at the west end of 25th Street The population rose from 1,463 residents in 1860, to 3,127 residents in 1870, the year after the arrival of the railroad (DUP 1944 98 116, Roylance 1982 420) By 1880 this number had risen to 6,069, and by 1890 it had more than doubled to 12,889 (DUP 1944 116, Peterson and Parson 2001 34, Roberts and Sadler 1985 65) An increase in the number of residents was not the only impact the railroad had on the city s population Besides increasing its numbers it increased the population's diversity Before the arrival of the railroad, most of Ogden City s residents were of northern European descent, primarily British Islanders After the completion of the railroad, the city s ethnic make up was vastly different Most of the workers for the various railroads were of Italian, Greek, Chinese Japanese or African descent (Roberts and Sadler 1985 94 96) Many of these individuals, especially the Chinese workers, chose to remain in Ogden after construction work was completed on the railroad, or while working for the railroad related industries in town While most of the Chinese settled in small communities on lower 25th Street and northward, a few lived to the south of that area The 1890 Sanborn maps of the Ogden area show that a few Chinese immigrants established small vegetable farms on unoccupied plots of land between Young Street (now Grant) and Main Street (now Washington) near Healy Street (Sanborn Map Company 1890)

The arrival of the railroads also affected mining in the state Prior to 1869, mining activity was limited to small scale operations where minerals could be reduced to a transportable and cost-efficient size Before the railroads, the only method of transporting goods or products was by wagon over a relatively long distance and thus expensive Transporting large quantities of raw or concentrated ores was out of the question Thus, most mining during this period was limited to precious minerals such as gold and silver, which could be reduced to a transportable size that was economical to transport by wagon (Notarianni 1994 367 368) However, once the railroads extended their tracks into Utah and the mining regions of the state, it became possible to transport large amounts of concentrated ores to processing plants in the east The number of smelters and mills for producing concentrated ores grew dramatically in areas in and around mining districts including the Salt Lake Valley Rail spurs made it possible to move ore to smelters and mills in Midvale and Murray (Notarianni 1994 368) The majority of this ore had to pass through Ogden

The foundation for business interests was firmly set with the establishment of a number of financial institutions in Ogden The beginnings of the Utah National Bank, which was organized in 1883 from several other banking institutions, started in 1873 The Deseret National Bank was organized in Salt Lake City in 1872 and opened a branch office in Ogden in 1881 The Ogden First National Bank began operations in 1882, as did the Ogden Savings Bank (Sadler and Roberts 2000 208) The Utah Loan and Trust Company was organized in Ogden in 1888 (Sadler and Roberts 2000 209) The majority of these banking institutions were founded by local businessmen, who had a stake in the success of the businesses of Ogden This included men such David Eccles, David Perry, Matthew Browning Franklin S Richards, and Brigham H Goddard (Sadler and Roberts 2000 208-209)

In addition, hundreds of travelers per week made their way into or through Ogden via the many passenger trains servicing the town New businesses, including hotels and restaurants, were established to accommodate these travelers Among the first hotels to be opened were the Ogden House, at the corner of 24th Street and Washington Boulevard, and the White House (later the Junction House), at the corner of 25th Street and Washington Boulevard (Roberts and Sadler 1985 73) These two establishments were opened in 1868 in anticipation of the railroad s completion Over the next several years, many other hotels were established including the Union Depot Hotel built in 1869, the Keeney House opened in 1870, and the Beardsley and City Hotels opened in the mid 1870s Hotel construction continued into the 1880s with the completion of the famous Broom Hotel in 1883 (Roberts and Sadler 1985 73 75)

Ogden was fast becoming more cosmopolitan during this period with the construction of a sewer system in 1879 and other city services and utilities that soon followed (DUP 1944 494 495) The first telephone was installed in the George A Lowe Company, a wagon and buggy shop, with a number of telephone services in operation by the following year (Sadler and Roberts 2000 126) By 1883 these phone companies were consolidated into the Rocky Mountain Telephone Company (Sadler and Roberts 2000 126) The same year, the Ogden Street Railway Company was organized and incorporated on May 29 as a private street trolley company (DUP 1944 387 Sadler and Roberts 2000 126) Three mule-pulled trolleys began operations on June 2 1884, and ran from 28th Street to Ogden River bridge on Washington, and from Washington to the railway depot on 24th and 25th streets (DUP 1944 387) In addition to a trolley system and telephones, the Ogden Electric Light Company was incorporated on May 11, 1881, and began delivering service to customers in 1884

Rise of Commercialism (1890 to 1914)

The arrival of the railroads in Ogden had a lasting effect upon the commercial and industrial growth of the area for several decades An increase in commercial development, warehousing food processing (canning), and the exportation of local products such as livestock and minerals characterized this period of Ogden s history During this time, the face of Ogden changed from wooden-frame buildings to brick and mortar structures Businesses also solidified from temporary commercial enterprises that relied on the initial arrival and construction of the railroads to trades and industries that invested in the economy and growth of Ogden

The railroads and the economy, along with the goods and services they produced, continued to grow and expand during this period and as the railroad grew, so did its need for workers In 1890 the various railroads employed 2,094 workers By 1890 the number of railroad employees rose to 3,414, and it more than doubled to 8,199 employees in 1900 (Sadler and Roberts 2000 208)

In addition to the railroad, another major industry was livestock Next to the railroads, the livestock industry became the second leading exporter (Sadler and Roberts 2000 208) Prior to the railroad, the cattle and sheep industry represented small scale operations that were confined to village and town herds Cattle ranching, based solely on livestock, existed in Utah during the pre-railroad period (Petersen 1994 333) By the 1880s the number of cattle and sheep began to increase In 1885 there were approximately 200,000 head of cattle in Utah Ten years later, the number had risen to 356,000 head Due to harsh weather that killed a number of animals and poor market prices the number of cattle remained constant through 1905 (Petersen

1994 333) However between 1905 and 1910 the number began to rise, reaching 412,000 head in 1910 (Petersen 1994 333) Eight years later there were 505,000 head of cattle grazing on grass in Utah Sheep on the other hand fared better in Utah In 1885 there were about one million head of sheep That number grew to 1,500,000 in five years By 1900 there were approximately 3,818,000 head of sheep, which leveled off to about 2,500,000 by 1915

While the Utah herds and flocks multiplied, the railroad was shipping animals from the surrounding states including Wyoming, Idaho, and Nevada The shipment of these animals through Ogden yards soon made Ogden the center of the livestock industry By 1919, the Ogden Union Stockyards, which was constructed in 1917 and located on the west side of the rail yards was shipping 3,000 to 7,000 animals per day (Sadler and Roberts 2000 213) As the hub for the industry, Ogden played host to the first Cattleman's Congress in 1892 (Sadler and Roberts 2000 208) In 1918, the Ogden Livestock Show, a weekly livestock auction and competition that drew entries from around the nation, was started at the yards (Roberts and Sadler 1985 140-141) The success of the livestock industry in the area lead to the Ogden Packing and Provision Company establishing operations in 1901, which became the largest meat packing plant west of Omaha (Sadler and Roberts 2000 208) By 1914 a second meat packing company was in operation (Sadler and Roberts 2000 213)

Just as important as the livestock industry was the canning industry, which grew to be one of the largest employers in the Ogden area during this time Although a few small canning factories had been established in Ogden before the turn of the century full scale development of the industry did not begin until the early 1900s Food canning began in Ogden with the opening of the Colorado Utah Canning Company in 1886 (Sadler and Roberts 2000 212) After only a year of operations, the owners split and began a separate canning business In 1890 the Utah Canning Company began by canning *Pierce s Pork and Beans* (Sadler and Roberts 2000 212) In 1904 the company canned 45,000 cases of tomatoes Between 1890 and 1920, there were 24 food canning companies (Sadler and Roberts 2000 213) In 1919 there were more than 46 canneries scattered throughout Weber County (Roberts and Sadler 1985 88 89)

Other industries were established in Ogden City around this time, providing jobs to local residents and strengthening the area s economy Some companies, such as the Sperry Flour Mill, opened after World War I By 1919 Ogden was one of the ten leading flour milling centers in the United States (Sadler and Roberts 2000 213)

As noted, the original southern boundary of the Ogden town site, as laid out in the early 1850s, was 28th Street (Ogden Historical Society 1938 6) Gradually, in the late 1800s this boundary moved south The explosive growth of the city's population created the need to expand the boundaries of Ogden City In 1889, with the population approaching 13,000 residents, the city council moved the southern boundary of Ogden City to 36th Street and the northern boundary 20 blocks to the north (Irene Woodhouse, personal communication 1995 Roberts and Sadler 1985 59) They also moved the eastern boundary of the city to include the land extending to the foothills At this time they renamed many city streets

The expansion of the city caused other changes as well Around this time, a citywide sewer system was established to help with the growing sanitation problem created by the community s rapid growth The city s first sewer, a subterranean structure built around 1879, only serviced the area from Washington and 25th Street northward one block and then west to a point below Wall Avenue (DUP 1944 494) In November 1886, a proposal for a citywide sewer was submitted to the City Commissioners by City Engineer Joseph M Tracy and A F Parker, a consulting engineer (DUP 1944 495) It wasn t until sometime in 1888 that funding was obtained for the project and construction work commenced Public utilities were also beginning to establish themselves In 1893 the Pioneer Electric Power Company was organized and began construction on a power system that included a temporary dam in Wheeler Canyon, which was finished in 1896 (Sadler and Roberts 2000 211) A permanent dam was constructed across the Ogden River in Ogden Canyon at Pineview The project was completed in 1897, and the company was sold to the Utah Power and Light Company in August of that same year (Sadler and Roberts 2000 211)

Industrial Development Period (1915 to 1929)

This period is marked by changes in technology that affect the manufacturing industry and the agricultural business The discovery of new inventions lead to advances in technology that would radically alter both manufacturing as well as society as a whole The inventions and scientific discoveries from the last century were slow to develop and have an effect The most significant of these technological advances was the power generator and the ability to use it to produce large amounts of inexpensive electrical power This new source of energy allowed manufactures to increase the size of heavy machinery and the assembly line needed to begin to mass produce goods These goods, which included the automobile, the radio vacuum cleaner, the washing machine, the electric iron, refrigerator, and other modern conveniences, would change the face of society This same electricity that was used to power heavy industrial machinery was used in individual households to power appliances that freed the housewife from mundane tasks This change had been foreshadowed by the canning industry of the last period

In 1915 the economy in Ogden was still strong with the railroads, livestock trading, food canning and meat packing plants supplying much of the employment War in Europe had commenced the year before with the assassination of the Austrian Crown Prince Franz Ferdinand at Sarajevo by a Serbian Nationalist The United States remained neutral during the first part of the war and was able to carry on trade with most other nations including those at war However, the American public was slowly beginning to side with the Allied Nations of Great Britain, France, Russia, and Belgium On April 6, 1917, the United States declared war on Germany and her allies after the sinking of the *Lusitania*, which killed a number of American citizens Many Ogden residents joined the military and served overseas in France and Belgium During the war, raw materials and food products were badly needed in Europe and on the front Ogden canneries, meat packing plants, and railroads became busier than ever before It was important to keep perishable goods cold on their long trips to other processing areas To meet this need, the railroads constructed an icing plant in Ogden that could produce 400 tons of ice daily and service 272 box cars an hour (Sadler and Roberts 2000 243)

While the United States had enormous resources and manpower at hand, the nations after four years of war were not so fortunate The First World War came to an end 18 months after the US entered the war on November 11, 1918 Ogden s economy continued to do well following the war, however, it did not last long By 1920, a down turn in economic conditions reached Ogden and Utah Wheat prices, which had been $3 50 a bushel in 1918, dropped in 1921 to $0 98 a bushel (Sadler and Roberts 2000 219) In 1919 the shipment of minerals, which had increased 54 percent over the previous years, fell the following year to almost nothing (Sadler and Roberts 2000 219) While mineral and agriculture were slow to rebound, the rest of society had entered the so called Roaring Twenties and a period of economic prosperity

This period of prosperity was made possible through the sales of new products and new marketing techniques, which enticed the consumer to buy higher priced products on the installment plan or easy payment plan (Allen 1931 140) This plan or program made goods and services more affordable and attractive to the consumer, which spurred the economy during this period The automobile became the new preferred mode of transportation and helped to stimulate the creation of new industries m the form of tourism, motels, gas stations, repair shops, car show rooms, and fast food stands (Allen 1931 136) Between 1919 and 1929, the number of passenger cars in the United States rose from 6,771 000 to 23 121,000 (Allen 1931 136)

Household electrical appliances also made a major impact upon American culture at the same time as did the radio Radio broadcasting in the United States commenced in the fall of 1920 (Allen 1931 137) The radio broadcasts consisted of only music, but by 1922 the new industry was beginning quickly to develop into a medium that would change how society looked at the world (Allen 1931 137) News was added to the schedule of programs, as was radio dramas, comedies, and other entertainment Advertising also became an important part of the radio broadcasts, sponsoring operas, symphonies, and other programs (Allen 1931 137) The success of radio can be measured in the amount of money spent on radio sets and equipment Ogden s first radio station, KDZL, was licensed to the Rocky Mountain Radio Corporation and went on the air m June 1922 (Larson and Avery 1994 56) This station was followed by KFCP in February 1923 and over the next two years by KFUR and KFWA (Larson and Avery 1994 56) KFUR, now KLO, was the only one of these stations to survive the Great Depression (Larson and Avery 1994 56)

With the ending of World War I, a major change was made to the Constitution of the United States with the passing of the 18th Amendment On January 29, 1919, the 18th Amendment to the Constitution was passed and signed into law, which made it illegal to manufacture, sell, or transport alcoholic beverages in the United States (Kelly et al 1991 A28) Although the majority of Americans appear to have backed this law, a good many people opposed it This prompted many of these individuals to disobey the new law and either smuggle the illegal liquor into the country or manufacture of their own These activities lead to the operation of underground establishments known as speakeasies In Ogden a number of speakeasies were located in basements or in tunnels that ran beneath the sidewalks of 25th Street (Buchta and Gurrister 2001 1,3A) Twenty fifth street, which already had a reputation of wild and illegal activity, became worse Despite the problems that illegal alcohol brought, Prohibition remained in affect until December 5, 1933, when the 21st Amendment was passed that repealed the 18th Amendment, making the manufacturing and sale of liquor legal again (Kelly et al 1991 A30)

Ogden grew with the prosperity that the nation enjoyed The population in the city grew from 33,804 people in 1920 to 40,272 people in 1930 (Powell 1994 437) The businesses along 25th Street do not appear to have changed much physically during this period The majority of changes appears to be the expansion of businesses along Washington Avenue The success and prosperity of these businesses are visible in the larger and taller business buildings of the period The new larger structures contained office space rather than space for manufacturing, which was now taking place farther from the center of town The business district, which had been growing throughout the earlier periods, was now at build out' with the center located at 25th and Washington The financial heart was along Washington while the night life was located along 25th Street

The Depression Era (1930 to 1941)

The impact of the stock market crash on the economy of Ogden City marks this period The loss of jobs, the closures of many businesses, and a sharp decline in expansion are the hallmarks of the period This era is also characterized by the construction of several new buildings This construction was the result of government sponsored public works projects designed to provide some fiscal relief from the vagaries of the Great Depression Besides the Railroad Era the period of largest growth for Ogden and adjacent municipalities was during the 1920s and, especially, the 1930s Though economic problems occurred in Ogden during this period because of the Great Depression, it was also a time of expansion for the community

The stock market crash of October 29, 1929, brought a rapid halt to the benefits of a strong agricultural and industrial economy being enjoyed by Ogdenites at the end of the 1920s As a whole, Utah was one of the states most affected by the Great Depression By 1933, Utah s unemployment rate soared to 35 8 percent, fourth highest in the nation (McCormick 1995 136) Roughly 32 percent of the state s population was receiving part or all of their resources from government relief funds, and 32 of the state s 105 banks had failed, including the Ogden State and Pingree National banks (Roberts and Sadler 1985 121 125)

At the time of the Great Depression, the economy of Ogden City was largely dependent on the agriculture (livestock and canning included) and railroad industries As the value of agricultural products plunged, residents began to suffer hardships The railroad companies could no longer afford to ship locally produced goods to outside markets As a result, not only did the farmers, ranchers, and cannery workers have no outlet for their products, but also the railroad companies began laying off their own workers Several canning factories and many other local business, closed down during the Depression Some reopened during or after World War II, but many others never did

In an attempt to boost the economy by providing employment to local residents, many agencies, both private charity and government sponsored, developed public works projects in the mid 1930s Federal programs such as the Civilian Conservation Corps (CCC), the Federal Emergency Relief Administration (FERA), the National Youth Administration (NYA), the Public Works Administration (PWA) and the Works Progress Administration (WPA) provided employment and assistance to Ogdenites Through the CCC, they constructed recreational campsites and new roads in Ogden Canyon and up to Monte Cristo, and they established the Ogden Bird Refuge (Roberts and Sadler 1985 126) However, it was the PWA that had perhaps the greatest impact on the Ogden area During their employment with the PWA, local workers constmcted the U S Forest Service building at 25th Street and Adams Avenue, the Ogden City Municipal Building at 25th Street and Washington Boulevard, and Ogden High School just north of 30th Street on Harrison Boulevard Relief programs such as these helped Ogdenites through the Great Depression until the activities of World War II provided a permanent economic recovery

World War II (1942 to 1947)

The establishment of several government installations marks this period in and around the Ogden area in preparation for World War II and by the war years themselves The establishment of these facilities provided new jobs for thousands of Ogdenites left unemployed by the Great Depression During this time, the number of new houses in the area increased as employment opportunities arose

As tension overseas began to grow, the United States began to prepare for what would be an inevitable result, war While war is not a fortunate event, the coming of World War II did serve to pull the nation and Ogden City out of the stranglehold of the Great Depression In preparation for the war, several new military installations were built or expanded in the Ogden area during this time, including the Utah General Depot (later the Defense Depot Ogden), the Ogden Arsenal (originally built m 1920), and Hill Material Air Base (now Hill Air Force Base)

Although m north Davis County, Hill Material Air Base became one of the largest employers for Ogdenites both during and after its constmction Opened in 1939, the WPA constructed the base (Roberts and Sadler 1985 130) By 1943, the base employed roughly 22,000 people, many of them women, doing sheet metal work, welding, or aircraft repair

Located west of Wall Avenue and north of 12th Street, the Utah General Depot was opened as a military warehousing facility in 1940 (Roberts and Sadler 1985 130) The depot eventually became the largest quartermasters depot in the United States By 1943, more than 7,700 local civilian personnel were employed at the facility

International Period (1948 to 1960)

Initial rapid residential growth in Ogden marks the postwar period, followed by a slow decline within the current project area Government related or government run facilities remain among the area s largest employers

Federal employment continued to play an important role in the economy of the Ogden area throughout the mid 1950s The establishment of an IRS district office, the Western Internal Revenue Center, at the Defense Depot in late 1956 provided jobs for more than 360 local residents By 1970, the workload of the center had outgrown the confines of that building at the Depot A new building complex was constructed to the west of the old one (at 12th West and 12th South), and housed nearly 4 000 workers Rapid growth in both the residential and commercial sectors has marked the Post War period in Ogden, as a whole As major industries, such as Thiokol Corporation (manufacturer of rocket motors), Kimberly Clark, Iomega, and Morton International continue to locate in or near Ogden the area attracts more residents

Ogden s population increase can be seen in the creation of new subdivisions throughout the city However within the current project area, only one subdivision, the Crouch Subdivision (started in 1957), can be definitively attributed to the Post War Period (Weber County Recorder n d) In fact, very little growth has occurred within the current project area since the close of World War II, and, to some extent, the neighborhoods within this area have been in decline While new subdivisions are being created in vacant areas of the east bench and in surrounding suburbs and communities, Wall Avenue from 26th to 36th is gradually being taken over by industrial and commercial development, as well as car dealerships

METHODOLOGY

An intensive cultural resource inventory was carried out for the landfill near Little Mountain The project area was inventoried in parallel transects spaced no more than 15 meters apart to cover a total of 112 acres of private land The boundaries of the survey area were established using a differentially correctable trimble GeoXT device in combination with existing landmarks and aerial photographs

RESULTS

A cultural resource inventory was carried out for a portion of Little Mountain Landfill. The inventory resulted in the identification of one historic campsite, 42WB445, and one rock quarry, 42WB446 (Figure 2). Due to their proximity to the Lucin Cutoff, as well as datable artifacts found at the campsite, it is highly likely that these two sites are related to the construction of the cutoff. Site 42WB445 is an historic campsite with eight depressions (F1 through F8) and a surficial scatter of aqua and amethyst glass, porcelain, brick fragments, and tin can fragments. Site 42WB446 is an abandoned rock quarry that has filled with water.

Site 42WB445

This site is located on a 1 to 2 degree slope on the southeast side of Little Mountain. The site consists of a historic campsite including eight depressions (F1-8), most likely dugout structures for a railroad construction camp. The depressions are located on top of a ridge with a sharp 30 to 40 ft drop off to the south. The possible dugouts vary in size from 16 by 12 ft and 5 by 6 ft and were all dug back into the low south-facing slope. Depressions 1 and 2 have rocks and boulders reinforcing the downslope berm. There is no apparent pattern to these rocks. Depressions 3-7 are located south of Depression 1 and 2 and are constructed adjacent to one another on the edge of the steep drop off. Each of these five dugouts shares a berm wall with the next dugout. These berms measure 9 to 15 ft wide. Depression 8 is a shallow depression measuring 14 by 14 ft with what appears to be an entryway on the southeast side. Dugouts range in depth between 8 in and 2 ft. Historic artifacts were observed sparsely scattered throughout the site and include aqua and amethyst glass, porcelain fragments, firebrick fragments, metal fragments, a single fragment of opalized clear glass, a few small pieces of cut bone, and numerous fragments of deteriorated tin cans. A modern fenceline and road run in an east-west direction, just north of the site and may have destroyed additional features or artifacts; however, no evidence of this is currently visible. Additionally, the site has been impacted by modern recreational use evidenced by shotgun shells and modern trash.

It appears that these features and artifacts are part of a railroad construction camp related to construction of the Lucin Cutoff ca. 1902-1904, for the Southern Pacific Transportation Company's mainline from Ogden to San Francisco. The Lucin Cutoff, constructed largely by the Utah Construction Company, began in 1902 and worker campsites and a shipyard were known to have been located in the Little Mountain area (Peterson 2001:48-59). When the Lucin Cutoff was constructed across Great Salt Lake, the original transcontinental railroad route around Promontory Summit was abandoned as the main line. The historic trestle carried trains across the lake into the early 1960s when the modern earthen dike that is still in use today replaced it.

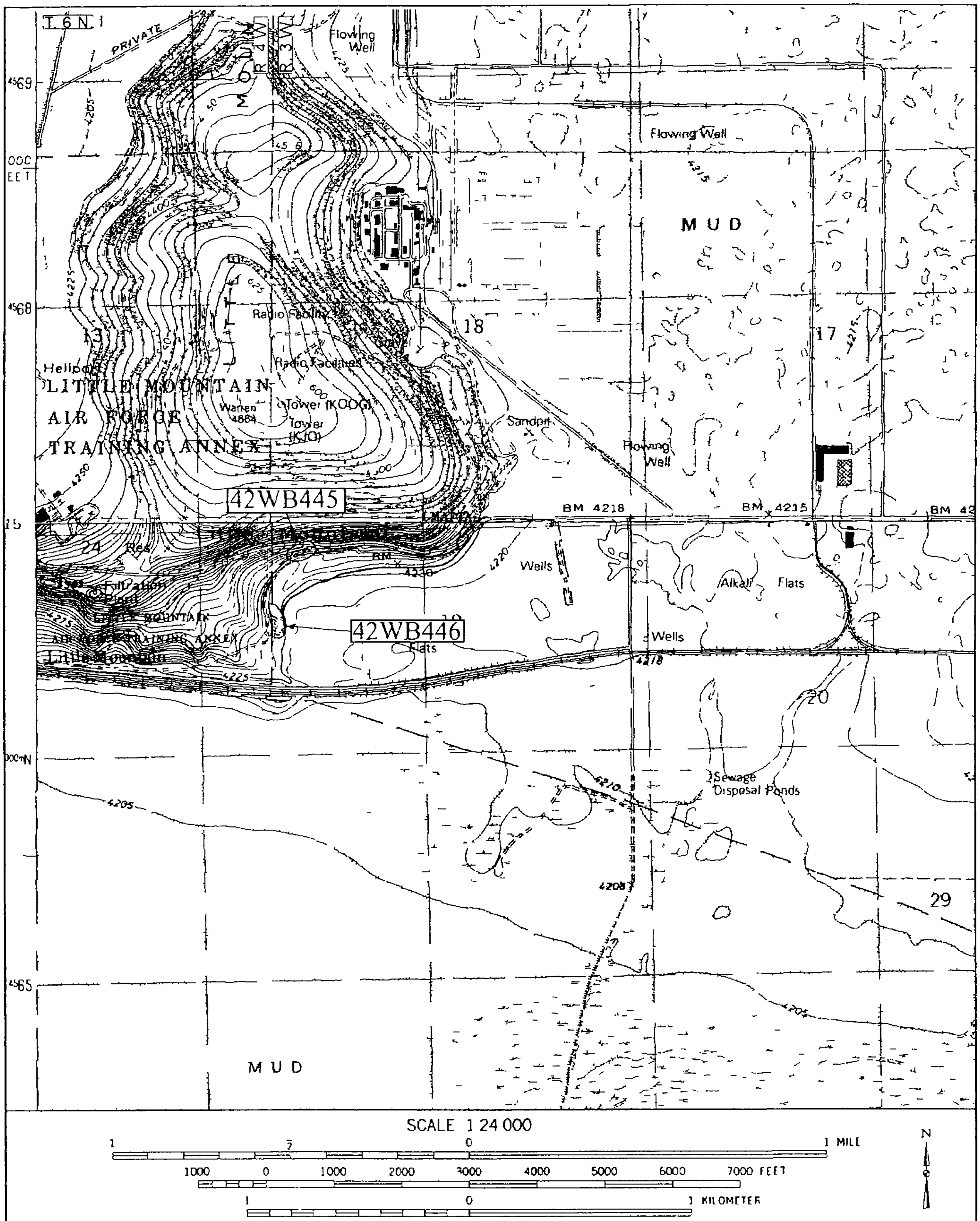

Figure 2 Location of sites 42WB445 and 42WB446, identified during the survey Taken from USGS 7 5' Quadrangles Plain City SW, Utah (1991) and Ogden Bay, Utah (1991)

Site 42WB446

This site, located on the southeast base of Little Mountain, is an abandoned materials quarry The site is likely associated with the construction of the Lucin Cutoff, ca 1902 1904, a railroad that spanned the Great Salt Lake According to historic records, stone and fill from Little Mountain provided material for the railroad grade and accompanying dike (Peterson 2001 48 59) The quarry and its associated access road are currently abandoned, as indicated by vegetation overgrowth and stagnant water pooling in the quarry Artifacts associated with this site include a surficial scatter of aqua and brown bottle glass fragments, deteriorated tin can fragments, and modern trash No additional artifacts or features were noted at this site

RECOMMENDATIONS

An intensive cultural resource inventory was carried out for the Little Mountain Landfill Two new cultural resource sites (42WB445 and 42WB446) were located during this inventory Following are the criteria followed in determining the eligibility of properties as set forth in 36CFR 60 4

> The quality of significance in American history, architecture archaeology, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and
>
> (A) that are associated with events that have made a significant contribution to the broad patterns of our history, or
>
> (B) that are associated with the lives of persons significant in our past or
>
> (C) that embody the distinctive characteristics of a type, period or method of construction or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction, or
>
> (D) that have yielded, or may be likely to yield, information important in prehistory or history

Site 42WB445

This site is associated with the Lucin Cutoff constructed across Great Salt Lake between 1902-1904, a significant event in the history of railroads in the United States Campsites such as this are expected along historic railroads as a result of the large workforce required for construction Although the site is disturbed subsurface features may be present and have the potential to provide further information in the understanding of worker construction camps along the Lucin Cutoff Additionally, the Lucin Cutoff construction and related sites are associated with events (transcontinental transportation) that have made a significant contribution to the broad patterns of history As such, the site is recommended eligible to the NRHP under criteria A and D

Site 42WB446

This site is associated with the Lucin Cutoff constructed across Great Salt Lake between 1902 1904, a significant event in the history of railroads in the United States Quarries, such as this, are expected near the Lucin Cutoff since fill was required to complete the railroad through this area Additionally, the Lucin Cutoff construction and related sites are associated with events (transcontinental transportation) that have made a significant contribution to the broad patterns of history As such the site is recommended eligible to the NRHP under criteria A

The railroad construction camp (42WB445) and the railroad quarry (42WB446) have been recommended eligible to the NRHP Both sites are located on the northwestern periphery of the project area, and can easily be avoided by landfill activities Sagebrush recommends that these sites be avoided during construction and use of the landfill area

This investigation was conducted with techniques that are considered to be adequate for evaluating cultural resources that are available for visual inspection and could be adversely affected by the proposed project Based on the above-mentioned avoidance, cultural resource clearance is recommended for the current project However, should such resources be discovered during construction a report should be made immediately to the State Archaeologist at the Utah State Historic Preservation Office, Salt Lake City, Utah

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EXHIBIT D

Property Owner Notification Letters - Original Permit Application January 2009

WEBER COUNTY

WASTE DISPOSAL DIVISION

Gary Laird
Director

Kellie Cragun
Office Manager

January 15, 2009

Counterpoint Construction Company, Inc
1598 North Hill Fill Road Ste A
Layton, Utah 84041

Re Weber County Construction and Demolition Landfill Permit

To Whom it May Concern

Notice is hereby given that Weber County intends to apply with the Utah Division of Solid and Hazardous Waste for a permit to own and operate a Class Ivb Landfill Facility within the northwest 1/4 of Section 19, Township 6 north, Range 3 West, Salt Lake Base & Meridian The property is located within unincorporated Weber County Utah approximately 10 miles west of Marriott Slaterville along highway 39 (turns into 900 South) as shown in the attached figure

The Utah Division of Solid and Hazardous Waste may be contacted to review and comment on the permit application

Sincerely,

Gary C Laird
Weber County Director of Solid Waste

867 West Wilson Lane
Ogden Utah 84401
Administration (801) 399 8806
Disposal Operations (801) 399 8538
FAX (801) 399 8807

WEBER COUNTY

WASTE DISPOSAL DIVISION

Gary Laird
Director

Kellie Cragun
Office Manager

January 15 2009

Scott Walker Habital Manager
Division of Wildlite Resources
515 East 5300 South
Ogden Utah 84405

Re Weber County Construction and Demolition Landfill Permit

Dear Mr Walker

Notice is hereby given that Weber County intends to apply with the Utah Division of Solid and Hazardous Waste for a permit to own and operate a Class IVb Landfill Facility within the northwest ¼ of Section 19 Township 6 North Range 3 West Salt Lake Base & Meridian The property is located within unincorporated Weber County Utah approximately 10 miles west of Marriott Slaterville along highway 39 (turns into 900 South) at 10485 West 900 South as shown in the attached figure

The Utah Division of Solid and Hazardous Waste may be contacted to review and comment on the permit application

Sincerely

Gary C Laird
Weber County Director of Solid Waste

867 West Wilson Lane
Ogden Utah 84401
Administration (801) 399 8806
Disposal Operations (801) 399 8538
FAX (801) 399 8807

WEBER COUNTY

WASTE DISPOSAL DIVISION

Gary Laird
Director

Kellie Cragun
Office Manager

Westinghouse Electric Company LLC
1330 Beulah Rood
Pittsburg Pennsylvania 15235

January 15 2009

Re Weber County Construction and Demolition Landfill Permit

To Whom It May Concern

Notice is hereby given that Weber County intends to apply with the Utah Division of Solid and Hazardous Waste for a permit to own and operate a Class IVb Landfill Facility within the northwest ¼ of Section 19 Township 6 North Range 3 West Salt Lake Base & Meridian The property is located within unincorporoled Weber County Utah approximately 10 miles west of Marriott Slaterville along highway 39 (turns into 900 South) at 10485 West 900 South as shown in the attached figure

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Sincerely

Gary C Laird
Weber County Director of Solid Waste

867 West Wilson Lane
Ogden Utah 84401
Administration (801) 399 8806
Disposal Operations (801) 399 8538
FAX (801) 399 8807

WEBER COUNTY

WASTE DISPOSAL DIVISION

Gary Laird
Director

Kellie Cragun
Office Manager

January 15 2009

Tim Stone AICP
Hill Air Force Base Community Planner
75 CEG/CEPP
7302 Wardleigh Rood
Hill AFB Utah 84056 5016

Re Weber County Construction and Demolition Landfill Permit

Dear Mr Stone

Notice is hereby given that Weber County intends to apply with the Utah Division of Solid and Hazardous Waste for o permit to own and operate a Class IVb Landfill Facility within the northwest ¼ of Section 19 Township 6 North Range 3 West Salt Lake Base & Meridian The property is located within unincorporated Weber County Utah approximately 10 miles west of Marriott Slaterville along highway 39 (turns into 900 South) at 10485 West 900 South as shown in the attached figure

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Sincerely

Gary C Laird
Weber County Director of Solid Waste

867 West Wilson Lane
Ogden Utah 84401
Administration (801) 399 8806
Disposal Operations (801) 399 8538
FAX (801) 399 8807

WEBER COUNTY

WASTE DISPOSAL DIVISION

Gary Laird
Director

Kellie Cragun
Office Manager

Union Pacific Railrood
1400 Douglas Street
Omoho Nebrosko 68179

January 15 2009

Re Weber County Construction and Demolition Landfill Permit

To Whom It May Concern

Notice is hereby given that Weber County intends to apply with the Utah Division of Solid and Hazardous Waste for a permit to own and operate a Class IVb Landfill Facility within the northwest ¼ of Section 19 Township 6 North Range 3 West Salt Lake Base & Meridian The property is located within unincorporated Weber County Utah approximately 10 miles west of Marriott Slaterville along highway 39 (turns into 900 South) at 10485 West 900 South as shown in the attached figure

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Sincerely

Gary C Laird
Weber County Director of Solid Waste

867 West Wilson Lane
Ogden Utah 84401
Administration (801) 399 8806
Disposal Operations (801) 399 8538
FAX (801) 399 8807

WEBER COUNTY

WASTE DISPOSAL DIVISION

Gary Laird
Director

Kellie Cragun
Office Manager

Powder Mountain Group Holdings LLC
57 West 200 South
Salt Lake City Utah 84111

January 15 2009

Re Weber County Construction and Demolition Landfill Permit

To Whom It May Concern

Notice is hereby given that Weber County intends to apply with the Utah Division of Solid and Hazardous Waste for a permit to own and operate a Class IVb Landfill Facility within the northwest ¼ of Section 19 Township 6 North Range 3 West Salt Lake Base & Meridian The property is located within unincorporated Weber County Utah approximately 10 miles west of Marriott Slaterville along highway 39 (turns into 900 South) at 10485 West 900 South as shown in the attached figure

The Utah Division of Solid and Hazardous Waste may be contacted to review and comment on the permit application

Sincerely

Gary C Laird
Weber County Director of Solid Waste

867 West Wilson Lane
Ogden Utah 84401
Administration (801) 399 8806
Disposal Operations (801) 399 8538
FAX (801) 399 8807

Printed on recycled paper

WEBER COUNTY

WASTE DISPOSAL DIVISION

Gary Laird
Director

Kellie Cragun
Office Manager

Joseph M Colosimo
367 E 11800 S
Draper Utoh 84094

January 15 2009

Re Weber County Construction and Demolition Landfill Permit

Dear Property Owner

Notice is hereby given that Weber County intends to apply with the Utah Division of Solid and Hazardous Waste for a permit to own and operate a Class IVb Landfill Facility within the northwest ¼ of Section 19 Township 6 North Range 3 West Salt Lake Base & Meridian The property is located within unincorporated Weber County Utah approximately 10 miles west of Marriott Slaterville along highway 39 (turns into 900 South) at 10485 West 900 South as shown in the attached figure

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Sincerely

Gary C Loird
Weber County Director of Solid Waste

867 West Wilson Lane
Ogden Utah 84401
Administration (801) 399 8806
Disposal Operations (801) 399 8538
FAX (801) 399 8807

WEBER COUNTY

WASTE DISPOSAL DIVISION

Gary Laird
Director

Kellie Cragun
Office Manager

Bible Broadcasting Network Inc
8030 Arrowridge Blvd
Charlotte North Carolino 28273

January 15 2009

Re Weber County Construction and Demolition Landfill Permit

Dear Property Owner

Notice is hereby given that Weber County intends to apply with the Utah Division of Solid and Hazardous Waste for a permit to own and operate a Class IVb Landfill Facility within the northwest ¼ of Section 19 Township 6 North Range 3 West Salt Lake Base & Meridian The property is located within unincorporated Weber County Utah approximately 10 miles west of Morriott Slaterville along highway 39 (turns into 900 South) at 10485 West 900 South as shown in the attached figure

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Sincerely

Gary C Laird
Weber County Director of Solid Waste

867 West Wilson Lane
Ogden Utah 84401
Administration (801) 399 8806
Disposal Operations (801) 399 8538
FAX (801) 399 8807

WEBER COUNTY

WASTE DISPOSAL DIVISION

Gary Laird
Director

Kellie Cragun
Office Manager

Utah Department of Transportation
4501 South 2700 West
Mail Stop 141200
Salt Lake City Utah 84114 1200

January 15 2009

Re Weber County Construction and Demolition Landfill Permit

To Whom It May Concern

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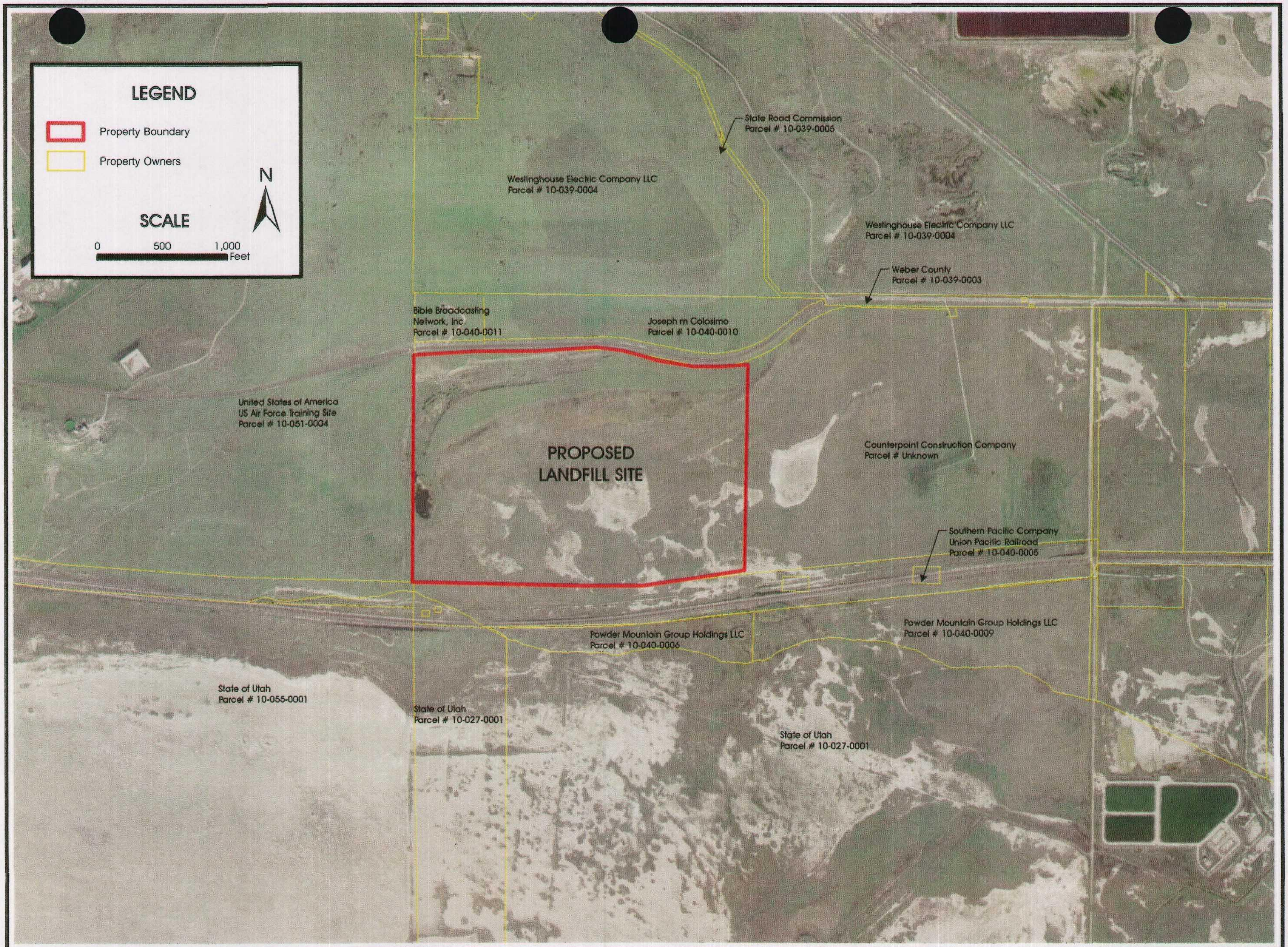
Sincerely

Gary C Laird
Weber County Director of Solid Waste

867 West Wilson Lane
Ogden Utah 84401
Administration (801) 399 8806
Disposal Operations (801) 399 8538
FAX (801) 399 8807



Weber County
2380 Washington Blvd Ogden, Utah, 84401

WEBER COUNTY PROPOSED C & D LANDFILL LOCATION
PUBLIC NOTIFICATION

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Sent To Joseph M Colosimo

Street Apt No or PO Box No 347 E 11800 S

City State ZIP+4 Draper UT 84020

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Street Apt No or PO Box No 57 W 200 S

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21 2009

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Street Apt No or PO Box No 8030 Arrowridge Blvd

City State ZIP+4 Charlotte NC 28273

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OFFICE OGDEN UT

21

2009

Sent To Scott Walker Habitat Mgr

Street, Apt No or PO Box No 515 E 5300 S Div Wildlife

City State ZIP+4 Ogden UT 84405

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Street, Apt No or PO Box No 1330 Beulah Rd

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OFFICE OGDEN UT

Jan 21

2009

Sent To Counterpoint Const Co

Street, Apt No or PO Box No 1598 N Hill Field Rd Ste A

City State ZIP+4 Layton, UT 84041

PS Form 3800, August 2006 See Reverse for Instructions

EXHIBIT E

U. S. Army Corps of Engineers Wetlands Determination Documents

DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT CORPS OF ENGINEERS
1325 J STREET
SACRAMENTO CA 95814 2922

REPLY TO
ATTENTION OF

March 18, 2009

Regulatory Division (SPK-2008-867)

Randy Moulding
Moulding and Sons Sand and Gravel
910 West 21st Street
Ogden, Utah 84401-5600

RECEIVED
MAR 23 2009
HA&I

Dear Mr Moulding

We are responding to your consultant's request for an approved jurisdictional determination for the Little Mountain Property This approximately 114-acre site is located in Section 19, Township 6 North, Range 3 West, Salt Lake Base and Meridian, centered on Latitude 41 24775 North, Longitude 112 222788 West, west of Ogden, Weber County, Utah

The 114-acre site has approximately 31 73 acres of wetlands as depicted on the enclosed Figure 2 of the *Moulding & Son s Little Mountain Property Wetland Delineation Report* prepared by Paul West These wetlands are intrastate isolated wetlands with no apparent interstate or foreign commerce connection or any connection to any other regulated water of the United States As such, waters on this site are not currently regulated by the Corps of Engineers This disclaimer of jurisdiction is only for Section 404 of the Federal Clean Water Act Other Federal, State, and local laws may apply to your activities

This verification is valid for five years from the date of this letter, unless new information warrants revision of the determination before the expiration date This letter contains an approved jurisdictional determination for your subject site If you object to this determination, you may request an administrative appeal under Corps regulations at 33 CFR Part 331

A combined Notification of Appeal Process fact sheet and Request for Appeal form is enclosed If you request to appeal this determination you must submit a completed Request For Appeal form to the South Pacific Division Office at the following address Administrative Appeal Review Officer, Army Corps of Engineers, South Pacific Division, CESPD-PDS-O, 1455 Market Street, San Francisco, California 94103-1399, Telephone 415-503-6574, FAX 415-503-6646

In order for an appeal request to be accepted by the Corps, the Corps must determine that it is complete, that it meets the criteria for appeal under 33 CFR Part 331 5, and that it has been received by the Division Office within 60 days of the date of the Notification of Appeal Process fact sheet Should you decide to submit a Request for Appeal form, it must be received at the above address by 60 days from the date of this letter It is not necessary to submit an appeal request form to the Division Office if you do not object to the determination in this letter

You should provide a copy of this letter and notice to all other affected parties, including any individual who has an identifiable and substantial legal interest in the property

This determination has been conducted to identify the limits of Corps of Engineers' Clean Water Act jurisdiction for the particular site identified in this request This determination may not be valid for the wetland conservation provisions of the Food Security Act of 1985 If you or your tenant are USDA program participants, or anticipate participation in USDA programs, you should request a certified wetland determination from the local office of the Natural Resources Conservation Service, prior to starting work

We appreciate your feedback At your earliest convenience, please complete our customer survey at *http //www spk usace army mil/customer_survey html* Your passcode is "conigliaro "

If you have any questions, please contact Richard Gebhart, Bountiful Regulatory Office, 533 W 2600 South, Suite 150, Bountiful, Utah 84010-7714, email richard a gebhart@usace army mil, or telephone 801 295-8380 x16

Sincerely,

Jason Gipson
Chief, Nevada-Utah Branch

Enclosure

Copy Furnished with Enclosure

Gordon Jones, Hansen, Allen, and Luce, Inc , 6771 S 900 East, Salt Lake City UT 84047-1436
Paul West, 2478 W Long Meadow Dr, West Jordan UT 84084-5805

FILE NAME: 333-MOULDING\01.100\CADFILES\WETLAND SURVEY\FIGURES\WETLAND DELINEATION FIG.DWG
FILE DATE: 6.24.2008 15:44:13 (CAH)
10/07

HANSEN ALLEN & LUCE INC ENGINEERS

WETLAND DELINEATION

FIGURE 1

HANSEN
ALLEN
& LUCE inc
ENGINEERS

SALT LAKE AREA OFFICE
6771 SOUTH 900 EAST
MIDVALE UTAH 84047
PHONE (801) 566 5599
FAX (801) 566 5581
www hansenallenluce com

Utah Department of Environmental Quality
Division of Solid and Hazardous Waste
288 North 1460 West
P O Box 144880
Salt Lake City Utah 84114 4880

March 23 2009

RE Weber County C&D Landfill Permit Application
Comments regarding Wetland Definitions and Issues

Gentlemen

A wetland delineation was completed by a wetland biologist (between mid April and mid May 2008) on the property proposed for the Weber County C&D landfill located immediolely south of Little Mountain in Weber County in the Northwest Quarter Section 19 Township 6 North Range 3 West Solt Lake Base and Meridian Information from the wetland delineation work was subsequently submitted to the Army Corps ot Engineers to determine whether or not the delineated sites on the property are regulated under Section 404 of the Clean Water Act

A letter from the Corps of Engineers dated March 18 2009 is provided Exhibit E of the permit application determining the wetlands delineated on the property as non jurisdictional or otherwise not regulaled by the Corps of Engineers under Section 404 of the Federal Clean Water Act Concurrence lo the Corps of Engineers determination was provided by the U S EPA prior to receiving their letter A figure prepared by a wetland biologist was included with the letter from the Corps of Engineers that delineated wetlands on the property based on the broad definitions outlined by the Corps of Engineers Non regulated areas under Section 404 do not require any permits alternatives analyses or mitigation measures for removal and development

The Utah Administrative Code provides the definition of wetlands (R315 301 2(86) as 'those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support and under normal conditions do support a prevalence of vegetation typically odapted for life in saturated soil conditions Wetlands generally include swamps marshes bogs and similar areas None of the areas delineated on the property meet the definition of a wetland provided in the Utah Administrative Code as is demonstrated in the following paragraphs

None of the areas delineated on the figure contain inundated or saturated conditions from surtace or ground water except for the excavated area associated with a prior gravel pit operations located at the west side of the property one location (19 8) at the extreme southeast corner of the property which is outside the landfill footprint and another location (21 1) jusl south ot the facility access and operations area The south end of the west side of the gravel pif receives surface water runoff from little mountain resulting from precipitation and snow melt events This water is lost to evaporation transpiration and percolation into the soils and dries up sometime during the summer The pond has been used as a water source for stock watering of cattle on the property but has not supported life that typically exists in saturated conditions Since the gravel pit area does not support life that typically exists in saturated conditions it does not meet the definition of a wetlond in the administrative code and will become permanently dry when storm water controls ore implemented These storm water controls include diverting runoff from Little Mountain toward the east along the south side of the existing rood and then south through a series of detention ponds along the east property line The other two locations showed very small areas of saturated soils at the time of the delineation (April May) which was during a time when the site received several storm events These areas however dried to non-saturated conditions within weeks of the delineation and are also not known to support life that typically exists in saturated conditions

The other areas delineated as being wetlands on the figure are primarily associated with ployas sites typically consisting of bare soils with high salt content These areas are not inundated do not consist of saturated soils most do not support vegetative growth and they do not support life that typically exists in saturated conditions Therefore none of the areas delineated meet the definition of a wetland provided in R315 301 2(86) The data sheets attached to this letter present results of soil and hydrology observations conducted by the wetland biologist who delineated the oreos as presented on the figure attached to the Corps of Engineers letter As presented on the site observation forms the sites delineated are not associated with inundated or saturated conditions with the exception of the two very small locations defined as 19 8 and 21 1 as discussed earlier

There are several criteria that outline location standards associated with wetlands for Class IV landfills in R315 302 1(2)(d) As stated earlier we believe that all areas presented as non jurisdictional wetlands in the figure accompanying the Corps of Engineers letter also do not meet the definition of wetlands as stated in the Utah Administrative Code However The following paragraphs address each of the criteria presented in the rule for wetlands

R315-302-1(2)(d) Wetlands No new facility or lateral expansion of on existing focility shall be located in wetlands unless the owner or operator demonstrates to the Executive Secretary that

CRITERIA 1 - (i) Where applicable under section 404 of the Clean Water Act or applicable State wetland lows the presumption that a practicable alternative to the proposed landfill is available which does not involve wetlands is clearly rebutted

COMMENT 1 The areas delineated ore not regulated by section 404 of the Clean Water act as provided tor in the letter from the Army Corps of Engineers doted March 18 2009 As such on alternatives analysis is not required

CRITERIA 2 (ii) The unit will not violate any applicable state water quality standards or section 307 of the Clean Water Act

COMMENT 2 Section 307 of the Clean Water Act addresses Toxic and Pretreatment Effluent Standards As presented in the permit application the quality of the ground water is very poor consisting of 23 000 to 29 000 mg/L TDS This landfill unit is permitted to receive only inert type wastes as defined for Class IVb landfills and will not receive toxic materials Storm water from exposed waste surfaces will be contained within the landfill footprint and will not be discharged Therefore no discharges from exposed wastes are expected and the Section 307 does not apply

CRITERIA 3 (iii) The unit will not jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of critical habitat protected under the Endangered Species Act of 1973

COMMENT 3 A letter from the Utah Division of Wildlife Resources dated October 16 2008 was provided in Exhibit E of the permit application stating that The Utah Division of Wildlife Resources (UDWR) does not have records of the occurrence for any threatened endangered or sensitive species within the project area or within a 1 mile radius The unit will therefore not jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of critical habitat protected under the Endangered Species Act of 1973

CRITERIA 4 (iv) the unit will not cause or contribute to significant degradation of wetlands The owner or operator must demonstrate the integrity of the unit and its ability to protect ecological resources by addressing the following factors

(A) erosion stability and migration potential of native wetland soils muds and deposits used to support the unit

(B) erosion stability and migration potential of dredged and fill materials used to support the unit

(C) the volume and chemical nature of the waste managed in the unit

(D) impacts on fish wildlife and other aquatic resources and their habitat from release of solid waste

(E) the potential effects of catastrophic release of waste to the wetland and the resulting impacts on environment and

(F) any additional factors as necessary to demonstrate that ecological resources in the wetland are sufficiently protected

COMMENT 4 We believe that all areas delineated in the figure attached to the letter from the Corps of Engineers do not meet the State of Utah definition of wetlands presented in R315 301 2(86) However we will address each criteria presented above

(A) Erosion and stability calculations hove been completed and ore presented in the permit application that demonstrate thot the native soils will support the landfill unit

(B) There will be no dredged materials and erosion and stability calculations have been completed and are presented in the permit application that demonstrate that the on site soils may be used as fill materials and will support the landfill unit

(C) The waste managed in the unit will consist of those materiols acceptable in a Class IVb landfill These ore waste defined by R315 301 2(10)

(D) There are no fish or aquatic resources or habitats on the property The gravel pit is the only site on the property that includes surface water or soturoted soils The surface water and saturated soil conditions only occur seasonally and will become non existent upon implementation of the storm droinoge system for the site Water in the gravel pit has only been used for stock watering ond not for the support of wildlife

(E) Landfill design parameters include seismic conditions and 100 yeoi precipitation events The only potential releases from catastrophic conditions would occur from storm water contoinment facilities within the landfill footprint designed to contain runoff from exposed waste surfaces Since there ore no wetlands meeting the regulatory definition in the administrotive code and since Class IVb landfills con only accept waste types defined by R315 301 2(10) possible releases from large precipitation events should not have an impoct on wetlands or the environment

(F) The sites delineated on the property do not meet the regulatory definition of wetlands and are not ecologically sensitive The sites are also not regulated under Section 404 of the Clean Water Act and require no permits for modifying or changing these areas

CRITERIA 5 (v) to the extent required under section 404 of the Clean Water Act or applicable state wetlands lows steps hove been token to attempt to achieve no net loss of wetlands as defined by acreage and function by first avoiding impacts to wetlands to the maximum extent practicable as required by Subsection R315 302 1(2)(d)(l) then minimizing unavoidable impacts to the maximum extent practicable and finally offsetting remaining unavoidoble wetland impacts through all appropriate and practicable compensatory mitigation actions (e g restoration of existing degraded wetlands or creation of man made wetlands) and

COMMENT 5 The sites delineated on this property are not regulated and are non jurisdictional under Section 404 of the Clean Water Act as demonstrated by the March 18 2009 letter received by the Corps of Engineers

CRITERIA 6 (vi) sufficient information is available to moke reasonable determination with respect to these demonstrations

COMMENT 6 The information provided in the March 18 2009 letter from the Corps of Engineers and the information presented in this letter are sufficient to demonstrate that the site delineated on the property are not regulated under Section 404 of the Clean Water Act and do not meet the definition of wetlands provided by R315 301 2(86) of the Utah Administrative Code All other information contained herein and in the permit application demonstrates that the landfill is designed with appropriate site considerations

Please include this letter and supporting observation forms in Exhibit E of the permit application and feel free to call if you need any additional information for your review of the permit application

Sincerely

HANSEN ALLEN & LUCE INC

Kent L Staheli

Kent C Staheli P E
Principal

attachments

SOIL

Sampling Point 1 1

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 4	10YR 3/2	100					Cl	Damp
4 10	10YR 4/2	60	7 5YH 3/4	40			ClLo	Saturated
10 12	10YR 2/2	100					Organic	Saturated
12 – 18+	10YR 4/2	100					Sa	Standing water

[1]Type C=Concentration D=Depletion RM=Reduced Matrix [2]Location PL=Pore Lining RC=Root Channel M=Matrix

Hydric Soil Indicators (Applicable to all LRRs unless otherwise noted)

__ Histosol (A1)
__ Histic Epipedon (A2)
__ Black Histic (A3)
__ Hydrogen Sulfide (A4)
__ Stratified Layers (A5) (LRR C)
__ 1 cm Muck (A9) (LRR D)
X Depleted Below Dark Surface (A11)
__ Thick Dark Surface (A12)
__ Sandy Mucky Mineral (S1)
__ Sandy Gleyed Matrix (S4)
__ Sandy Redox (S5)
__ Stripped Matrix (S6)
__ Loamy Mucky Mineral (F1)
__ Loamy Gleyed Matrix (F2)
__ Depleted Matrix (F3)
__ Redox Dark Surface (F6)
__ Depleted Dark Surface (F7)
__ Redox Depressions (F8)
__ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]

__ 1 cm Muck (A9) (LRR C)
__ 2 cm Muck (A10) (LRR B)
__ Reduced Vertic (F18)
__ Red Parent Material (TF2)
__ Other (Explain in Remarks)

[3]Indicators of hydrophylic vegetation and wetland hydrology must be present

Restrictive Layer (if present)
Type ________
Depth (inches) ________

Hydric Soil Present? Yes X No ___

Remarks
Soils depleted below dark surface

HYDROLOGY

Wetland Hydrology Indicators

Primary Indicators (any one indicator is sufficient)

__ Surface Water (A1)
X High Water Table (A2)
X Saturation (A3)
X Water Marks (B1) (Nonriverine)
X Sediment Deposits (B2) (Nonriverine)
__ Drift Deposits (B3) (Nonriverine)
__ Surface Soil Cracks (B6)
__ Inundation Visible on Aerial Imagery (B7)
__ Water Stained Leaves (B9)
__ Salt Crust (B11)
__ Biotic Crust (B12)
__ Aquatic Invertebrates (B13)
__ Hydrogen Sulfide Odor (C1)
__ Oxidized Rhizospheres along Living Roots (C3)
__ P esence of Reduced Iron (C4)
__ Recent Iron Reduction in Plowed Soils (C6)
__ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

__ Water Marks (B1) (Riverine)
__ Sediment Deposits (B2) (Riverine)
__ Drift Deposits (B3) (Riverine)
__ Drainage Patterns (B1C)
__ Dry Season Water Table (C2)
__ Thin Muck Surface (C7)
__ Crayfish Burrows (C8)
__ Saturation Visible on Aerial Imagery (C9)
__ Shallow Aquitard (D3)
__ FAC Neutral Test (D5)

Field Observations

Surface Water Present?	Yes __	No X	Depth (inches) __
Water Table Present?	Yes X	No __	Depth (inches) 12
Saturation Present? (includes capillary fringe)	Yes X	No __	Depth (inches) 10

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge monitoring well aerial photos previous inspections) if available

Remarks
Saturated at 10 water at 12

SOIL

Sampling Point 1 2

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 4	10YR 3/2	100					Cl	Damp
4 10	10YR 4/2	60	7 5YR 3/4	40			ClLo	Saturated
10 12	10YR 2/2	100					Organic	Saturated
12 – 18+	10YR 4/2	100					Sa	Standing water

[1]Type C=Concentration D=Depletion RM=Reduced Matrix [2]Location PL=Pore Lining RC=Root Channel M=Matrix

Hydric Soil Indicators (Applicable to all LRRs unless otherwise noted)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR C)
- ___ 1 cm Muck (A9) (LRR D)
- X Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]

- ___ 1 cm Muck (A9) (LRR C)
- ___ 2 cm Muck (A10) (LRR B)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present

Restrictive Layer (if present)

Type ______

Depth (inches) ______

Hydric Soil Present? Yes X No ___

Remarks

Soils depleted below dark surface

HYDROLOGY

Wetland Hydrology Indicators

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- X Water Marks (B1) (Nonriverine)
- X Sediment Deposits (B2) (Nonriverine)
- ___ Drift Deposits (B3) (Nonriverine)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (Riverine)
- ___ Sediment Deposits (B2) (Riverine)
- ___ Drift Deposits (B3) (Riverine)
- ___ Drainage Patterns (B10)
- ___ Dry Season Water Table (C2)
- ___ Thin Muck Surface (C7)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC Neutral Test (D5)

Field Observations

Surface Water Present? Yes ___ No X Depth (inches) ___

Water Table Present? Yes ___ No X Depth (inches) ___

Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches) 12

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge monitoring well aerial photos previous inspections) if available

Remarks

Saturated at 12

SOIL

Sampling Point 13

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 2	10YR 2/2	100					Lo	damp
2+	10YR 3/2						SaGr	Fill

[1]Type C=Concentration D=Depletion RM=Reduced Matrix [2]Location PL=Pore Lining RC=Root Channel M=Matrix

Hydric Soil Indicators (Applicable to all LRRs unless otherwise noted)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR C)
- ___ 1 cm Muck (A9) (LRR D)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]

- ___ 1 cm Muck (A9) (LRR C)
- ___ 2 cm Muck (A10) (LRR B)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present

Restrictive Layer (if present)

Type ______

Depth (inches) ______

Hydric Soil Present? Yes ___ No X

Remarks

No indications of hydric soils

HYDROLOGY

Wetland Hydrology Indicators

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (Nonriverine)
- ___ Sediment Deposits (B2) (Nonriverine)
- ___ Drift Deposits (B3) (Nonriverine)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (Riverine)
- ___ Sediment Deposits (B2) (Riverine)
- ___ Drift Deposits (B3) (Riverine)
- ___ Drainage Patterns (B10)
- ___ Dry Season Water Table (C2)
- ___ Thin Muck Surface (C7)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC Neutral Test (D5)

Field Observations

Surface Water Present? Yes ___ No X Depth (inches) ______

Water Table Present? Yes ___ No X Depth (inches) ______

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches) ______

Wetland Hydrology Present? Yes ___ No X

Describe Recorded Data (stream gauge monitoring well aerial photos previous inspections) if available

Remarks

No indications of wetland hydrology

SOIL

Sampling Point 21

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 – 2+							Gr	Undioabls, coarse gravel

[1]Type C=Concentration D=Depletion RM=Reduced Matrix [2]Location PL=Pore Lining RC=Root Channel M=Matrix

Hydric Soil Indicators (Applicable to all LRRs unless otherwise noted)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR C)
- ___ 1 cm Muck (A9) (LRR D)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]

- ___ 1 cm Muck (A9) (LRR C)
- ___ 2 cm Muck (A10) (LRR B)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present

Restrictive Layer (if present)

Type Gravel

Depth (inches) 0+

Hydric Soil Present? Yes ___ No X

Remarks

No indications of hydric soils

HYDROLOGY

Wetland Hydrology Indicators

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (Nonriverine)
- ___ Sediment Deposits (B2) (Nonriverine)
- ___ Drift Deposits (B3) (Nonriverine)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (Riverine)
- ___ Sediment Deposits (B2) (Riverine)
- ___ Drift Deposits (B3) (Riverine)
- ___ Drainage Patterns (B10)
- ___ Dry Season Water Table (C2)
- ___ Thin Muck Surface (C7)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC Neutral Test (D5)

Field Observations

Surface Water Present? Yes ___ No X Depth (inches) ___

Water Table Present? Yes ___ No X Depth (inches) ___

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches) ___

Wetland Hydrology Present? Yes ___ No X

Describe Recorded Data (stream gauge monitoring well aerial photos previous inspections) if available

Remarks

No indications of wetland hydrology

SOIL

Sampling Point 2 2

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 2	10YR 2/1	100					LoSa	Moist
2+							Gravel	Saturated

[1]Type C=Concentration D=Depletion RM=Reduced Matrix [2]Location PL=Pore Lining RC=Root Channel M=Matrix

Hydric Soil Indicators (Applicable to all LRRs unless otherwise noted)

- __ Histosol (A1)
- __ Histic Epipedon (A2)
- __ Black Histic (A3)
- __ Hydrogen Sulfide (A4)
- __ Stratified Layers (A5) (LRR C)
- __ 1 cm Muck (A9) (LRR D)
- __ Depleted Below Dark Surface (A11)
- __ Thick Dark Surface (A12)
- __ Sandy Mucky Mineral (S1)
- __ Sandy Gleyed Matrix (S4)
- __ Sandy Redox (S5)
- __ Stripped Matrix (S6)
- __ Loamy Mucky Mineral (F1)
- __ Loamy Gleyed Matrix (F2)
- __ Depleted Matrix (F3)
- __ Redox Dark Surface (F6)
- __ Depleted Dark Surface (F7)
- __ Redox Depressions (F8)
- __ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]

- __ 1 cm Muck (A9) (LRR C)
- __ 2 cm Muck (A10) (LRR B)
- __ Reduced Vertic (F18)
- __ Red Parent Material (TF2)
- __ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present

Restrictive Layer (if present)

Type Gravel

Depth (inches) 2+

Hydric Soil Present? Yes X No ____

Remarks

Gravelly substrate is saturated to within 2 of surface

HYDROLOGY

Wetland Hydrology Indicators

Primary Indicators (any one indicator is sufficient)

- __ Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- __ Water Marks (B1) (Nonriverine)
- __ Sediment Deposits (B2) (Nonriverine)
- __ Drift Deposits (B3) (Nonriverine)
- __ Surface Soil Cracks (B6)
- __ Inundation Visible on Aerial Imagery (B7)
- __ Water Stained Leaves (B9)
- __ Salt Crust (B11)
- __ Biotic Crust (B12)
- __ Aquatic Invertebrates (B13)
- __ Hydrogen Sulfide Odor (C1)
- __ Oxidized Rhizospheres along Living Roots (C3)
- __ Presence of Reduced Iron (C4)
- __ Recent Iron Reduction in Plowed Soils (C6)
- __ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- __ Water Marks (B1) (Riverine)
- __ Sediment Deposits (B2) (Riverine)
- __ Drift Deposits (B3) (Riverine)
- __ Drainage Patterns (B10)
- __ Dry Season Water Table (C2)
- __ Thin Muck Surface (C7)
- __ Crayfish Burrows (C8)
- __ Saturation Visible on Aerial Imagery (C9)
- __ Shallow Aquitard (D3)
- __ FAC Neutral Test (D5)

Field Observations

Surface Water Present?	Yes ____	No X	Depth (inches) ____
Water Table Present?	Yes X	No ____	Depth (inches) Unk
Saturation Present? (includes capillary fringe)	Yes X	No ____	Depth (inches) 2

Wetland Hydrology Present? Yes X No ____

Describe Recorded Data (stream gauge monitoring well aerial photos previous inspections) if available

Remarks

Saturation at 2

SOIL

Sampling Point 23

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks

[1]Type C=Concentration D=Depletion RM=Reduced Matrix [2]Location PL=Pore Lining RC=Root Channel M=Matrix

Hydric Soil Indicators (Applicable to all LRRs unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR C)
- ___ 1 cm Muck (A9) (LRR D)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]

- ___ 1 cm Muck (A9) (LRR C)
- ___ 2 cm Muck (A10) (LRR B)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- X Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present

Restrictive Layer (if present)

Type ______

Depth (inches) ______

Hydric Soil Present? Yes X No ___

Remarks

Permanently inundated

HYDROLOGY

Wetland Hydrology Indicators

Primary Indicators (any one indicator is sufficient)

- X Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- X Water Marks (B1) (Nonriverine)
- ___ Sediment Deposits (B2) (Nonriverine)
- X Drift Deposits (B3) (Nonriverine)
- ___ Surface Soil Cracks (B6)
- X Inundation Visible on Aerial Imagery (B7)
- ___ Water Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (Riverine)
- ___ Sediment Deposits (B2) (Riverine)
- ___ Drift Deposits (B3) (Riverine)
- ___ Drainage Patterns (B10)
- ___ Dry Season Water Table (C2)
- ___ Thin Muck Surface (C7)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC Neutral Test (D5)

Field Observations

Surface Water Present? Yes X No ___ Depth (inches) 0 – 36+

Water Table Present? Yes ___ No ___ Depth (inches) ___

Saturation Present? (includes capillary fringe) Yes ___ No ___ Depth (inches) ___

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available

Remarks

Permanently Inundated

SOIL

Sampling Point 31

Profile Description (Descnbe to the depth needed fo document the indicator or confirm the absence of indicators)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 8	10YR 3/2	100					SiLo	Damp
8 - 18+	10YR 4/2	100					SiLo	Damp

[1]Type C=Concentration D=Depletion RM=Reduced Matnx [3]Location PL=Pore Lining RC=Root Channel M=Matnx

Hydric Soil Indicators (Applicable to all LRRs, unless otherwise noted)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR C)
- ___ 1 cm Muck (A9) (LRR D)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matnx (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matnx (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matnx (F2)
- ___ Depleted Matnx (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]

- ___ 1 cm Muck (A9) (LRR C)
- ___ 2 cm Muck (A10) (LRR B)
- ___ Reduced Vertic (F18)
- ___ Red Parent Matenal (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present

Restrictive Layer (if present)

Type ______

Depth (inches) ______

Hydnc Soil Present? Yes ___ No X

Remarks

Soils not hydnc

HYDROLOGY

Wetland Hydrology Indicators

Pnmary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (Nonriverine)
- ___ Sediment Deposits (B2) (Nonriverine)
- ___ Dnft Deposits (B3) (Nonriverine)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aenal Imagery (B7)
- ___ Water Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (Riverine)
- ___ Sediment Deposits (B2) (Riverine)
- ___ Drift Deposits (B3) (Riverine)
- ___ Drainage Patterns (610)
- ___ Dry Season Water Table (C2)
- ___ Thin Muck Surface (C7)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aenal Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC Neutral Test (05)

Field Observations

Surface Water Present? Yes ___ No X Depth (inches) ___

Water Table Present? Yes ___ No X Depth (inches) ___

Saturation Present? Yes ___ No X Depth (inches) ___
(includes capillary fnnge)

Wetland Hydrology Present? Yes ___ No X

Descnbe Recorded Data (stream gauge monitonng well aenal photos previous inspections) if available

Remarks

No wetland hydrology

SOIL

Sampling Point 4 1

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 8	10YR 3/2	100					SiLo	Damp
8 – 18+	10YR 4/2	100					ClLo	Damp

[1]Type C=Concentration D=Depletion RM=Reduced Matrix [2]Location PL=Pore Lining RC=Root Channel M=Matrix

Hydric Soil Indicators (Applicable to all LRRs unless otherwise noted)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR C)
- ___ 1 cm Muck (A9) (LRR D)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]

- ___ 1 cm Muck (A9) (LRR C)
- ___ 2 cm Muck (A10) (LRR B)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present

Restrictive Layer (if present)

Type ________

Depth (inches) ________

Hydric Soil Present? Yes ___ No X

Remarks

No hydric soils

HYDROLOGY

Wetland Hydrology Indicators

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (Nonriverine)
- ___ Sediment Deposits (B2) (Nonriverine)
- ___ Drift Deposits (B3) (Nonriverine)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (Riverine)
- ___ Sediment Deposits (B2) (Riverine)
- ___ Drift Deposits (B3) (Riverine)
- ___ Drainage Patterns (B10)
- ___ Dry Season Water Table (C2)
- ___ Thin Muck Surface (C7)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC Neutral Test (D5)

Field Observations

Surface Water Present? Yes ___ No X Depth (inches) ________

Water Table Present? Yes ___ No X Depth (inches) ________

Saturation Present? Yes ___ No X Depth (inches) ________
(includes capillary fringe)

Wetland Hydrology Present? Yes ___ No X

Describe Recorded Data (stream gauge monitoring well aerial photos previous inspections) if available

Remarks

No wetland hydrology

SOIL

Sampling Point 5 1

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 10	10YR 4/1	100					ClLo	Moist
10+	10yr 6/2	100					Cl	Moist

[1]Type C=Concentration D=Depletion RM=Reduced Matrix [2]Location PL=Pore Lining RC=Root Channel M=Matrix.

Hydric Soil Indicators (Applicable to all LRRs unless otherwise noted)

__ Histosol (A1)
__ Histic Epipedon (A2)
__ Black Histic (A3)
__ Hydrogen Sulfide (A4)
__ Stratified Layers (A5) (LRR C)
__ 1 cm Muck (A9) (LRR D)
__ Depleted Below Dark Surface (A11)
__ Thick Dark Surface (A12)
__ Sandy Mucky Mineral (S1)
__ Sandy Gleyed Matrix (S4)
__ Sandy Redox (S5)
__ Stripped Matrix (S6)
__ Loamy Mucky Mineral (F1)
__ Loamy Gleyed Matrix (F2)
__ Depleted Matrix (F3)
__ Redox Dark Surface (F6)
__ Depleted Dark Surface (F7)
__ Redox Depressions (F8)
__ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]

__ 1 cm Muck (A9) (LRR C)
__ 2 cm Muck (A10) (LRR B)
__ Reduced Vertic (F18)
__ Red Parent Material (TF2)
X Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present

Restrictive Layer (if present)
Type ____
Depth (inches) ____

Hydric Soil Present? Yes X No ____

Remarks

Playa soils Salorthids are hydric by definition

HYDROLOGY

Wetland Hydrology Indicators

Primary Indicators (any one indicator is sufficient)

__ Surface Water (A1)
__ High Water Table (A2)
__ Saturation (A3)
__ Water Marks (B1) (Nonriverine)
__ Sediment Deposits (B2) (Nonriverine)
__ Drift Deposits (B3) (Nonriverine)
X Surface Soil Cracks (B6)
__ Inundation Visible on Aerial Imagery (B7)
__ Water Stained Leaves (B9)
__ Salt Crust (B11)
__ Biotic Crust (B12)
__ Aquatic Invertebrates (B13)
__ Hydrogen Sulfide Odor (C1)
__ Oxidized Rhizospheres along Living Roots (C3)
__ Presence of Reduced Iron (C4)
__ Recent Iron Reduction in Plowed Soils (C6)
__ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

__ Water Marks (B1) (Riverine)
__ Sediment Deposits (B2) (Riverine)
__ Drift Deposits (B3) (Riverine)
__ Drainage Patterns (B10)
__ Dry Season Water Table (C2)
__ Thin Muck Surface (C7)
__ Crayfish Burrows (C8)
__ Saturation Visible on Aerial Imagery (C9)
__ Shallow Aquitard (D3)
__ FAC Neutral Test (D5)

Field Observations

Surface Water Present? Yes ____ No X Depth (inches) ____
Water Table Present? Yes ____ No X Depth (inches) ____
Saturation Present? (includes capillary fringe) Yes ____ No X Depth (inches) ____

Wetland Hydrology Present? Yes X No ____

Describe Recorded Data (stream gauge monitoring well aerial photos previous inspections) if available

Remarks

Surface cracks and hoof prints in the mud are indication of saturation

SOIL

Sampling Point 5 2

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 8	10YR 3/2	100					SiLo	Damp
8 – 18+	10YR 4/2	100					ClLo	Damp

[1]Type C=Concentration D=Depletion RM=Reduced Matrix [2]Location PL=Pore Lining RC=Root Channel M=Matrix

Hydric Soil Indicators (Applicable to all LRRs unless otherwise noted)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR C)
- ___ 1 cm Muck (A9) (LRR D)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]

- ___ 1 cm Muck (A9) (LRR C)
- ___ 2 cm Muck (A10) (LRR B)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present

Restrictive Layer (if present)

Type ____________

Depth (inches) ____________

Hydric Soil Present? Yes ____ No X

Remarks

No hydric soils

HYDROLOGY

Wetland Hydrology Indicators

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (Nonriverine)
- ___ Sediment Deposits (B2) (Nonriverine)
- ___ Drift Deposits (B3) (Nonriverine)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (Riverine)
- ___ Sediment Deposits (B2) (Riverine)
- ___ Drift Deposits (B3) (Riverine)
- ___ Drainage Patterns (B10)
- ___ Dry Season Water Table (C2)
- ___ Thin Muck Surface (C7)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC Neutral Test (D5)

Field Observations

Surface Water Present?	Yes ____	No X	Depth (inches) ____
Water Table Present?	Yes ____	No X	Depth (inches) ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches) ____

Wetland Hydrology Present? Yes ____ No X

Describe Recorded Data (stream gauge monitoring well aerial photos previous inspections) if available

Remarks

No wetland hydrology

SOIL

Sampling Point 6 1

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 4	10YR 5/2	100					ClLo	Moist
4 - 8	10YR 6/3	100					Cl	Moist
8+								Hard pan

[1]Type O=Concentration D=Depletion RM=Reduced Matrix [2]Location PL=Pore Lining RO=Root Channel M=Matrix

Hydric Soil Indicators (Applicable to all LRRs unless otherwise noted)

- __ Histosol (A1)
- __ Histic Epipedon (A2)
- __ Black Histic (A3)
- __ Hydrogen Sulfide (A4)
- __ Stratified Layers (A6) (LRR C)
- __ 1 cm Muck (A9) (LRR D)
- __ Depleted Below Dark Surface (A11)
- __ Thick Dark Surface (A12)
- __ Sandy Mucky Mineral (S1)
- __ Sandy Gleyed Matrix (S4)
- __ Sandy Redox (S5)
- __ Stripped Matrix (S6)
- __ Loamy Mucky Mineral (F1)
- __ Loamy Gleyed Matrix (F2)
- __ Depleted Matrix (F3)
- __ Redox Dark Surface (F6)
- __ Depleted Dark Surface (F7)
- __ Redox Depressions (F8)
- __ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]

- __ 1 cm Muck (A9) (LRR C)
- __ 2 cm Muck (A10) (LRR B)
- __ Reduced Vertic (F18)
- __ Red Parent Material (TF2)
- X Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present

Restrictive Layer (if present)

Type Hard pan

Depth (inches) 8

Hydric Soil Present? Yes X No ___

Remarks

Playa soils Salorthids are hydric by definition

HYDROLOGY

Wetland Hydrology Indicators

Primary Indicators (any one indicator is sufficient)

- __ Surface Water (A1)
- __ High Water Table (A2)
- __ Saturation (A3)
- __ Water Marks (B1) (Nonriverine)
- __ Sediment Deposits (B2) (Nonriverine)
- __ Drift Deposits (B3) (Nonriverine)
- X Surface Soil Cracks (B6)
- __ Inundation Visible on Aerial Imagery (B7)
- __ Water Stained Leaves (B9)
- X Salt Crust (B11)
- __ Biotic Crust (B12)
- __ Aquatic Invertebrates (B13)
- __ Hydrogen Sulfide Odor (C1)
- __ Oxidized Rhizospheres along Living Roots (C3)
- __ Presence of Reduced Iron (C4)
- __ Recent Iron Reduction in Plowed Soils (C6)
- __ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- __ Water Marks (B1) (Riverine)
- __ Sediment Deposits (B2) (Riverine)
- __ Drift Deposits (B3) (Riverine)
- __ Drainage Patterns (B10)
- __ Dry Season Water Table (C2)
- __ Thin Muck Surface (C7)
- __ Crayfish Burrows (C8)
- __ Saturation Visible on Aerial Imagery (C9)
- __ Shallow Aquitard (D3)
- __ FAC Neutral Test (D5)

Field Observations

Surface Water Present? Yes ___ No X Depth (inches) ___

Water Table Present? Yes ___ No X Depth (inches) ___

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches) ___

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge monitoring well aerial photos previous inspections) if available

Remarks

Salt crust and cracked soils in a playa indicate wetland hydrology

SOIL

Sampling Point 6 2

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 4	10YR 4/2	100					ClLo	Moist
4 - 18+	7 5YR 6/3	100					ClLo	Moist

[1]Type C=Concentration D=Depletion RM=Reduced Matrix [2]Location PL=Pore Lining RC=Root Channel M=Matrix

Hydric Soil Indicators (Applicable to all LRRs unless otherwise noted)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR C)
- ___ 1 cm Muck (A9) (LRR D)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F5)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]

- ___ 1 cm Muck (A9) (LRR C)
- ___ 2 cm Muck (A10) (LRR B)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present

Restrictive Layer (if present)

Type ______

Depth (inches) ______

Hydric Soil Present? Yes ___ No X

Remarks

No indications of hydric soils

HYDROLOGY

Wetland Hydrology Indicators

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (Nonriverine)
- ___ Sediment Deposits (B2) (Nonriverine)
- ___ Drift Deposits (B3) (Nonriverine)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (Riverine)
- ___ Sediment Deposits (B2) (Riverine)
- ___ Drift Deposits (B3) (Riverine)
- ___ Drainage Patterns (B10)
- ___ Dry Season Water Table (C2)
- ___ Thin Muck Surface (C7)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC Neutral Test (D5)

Field Observations

Surface Water Present? Yes ___ No X Depth (inches) ______

Water Table Present? Yes ___ No X Depth (inches) ______

Saturation Present? Yes ___ No X Depth (inches) ______
(includes capillary fringe)

Wetland Hydrology Present? Yes ___ No X

Describe Recorded Data (stream gauge monitoring well aerial photos previous inspections) if available

Remarks

No wetland hydrology

SOIL

Sampling Point 6 3

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 4	10YR 5/2	100					OlLo	Moist
4 - 8	10YR 6/3	100					Cl	Moist
8+								Hard pan

[1]Type C=Concentration D=Depletion RM=Reduced Matrix [2]Location PL=Pore Lining RO=Root Channel M=Matrix

Hydric Soil Indicators (Applicable to all LRRs unless otherwise noted)

__ Histosol (A1)
__ Histic Epipedon (A2)
__ Black Histic (A3)
__ Hydrogen Sulfide (A4)
__ Stratified Layers (A5) (LRR C)
__ 1 cm Muck (A9) (LRR D)
__ Depleted Below Dark Surface (A11)
__ Thick Dark Surface (A12)
__ Sandy Mucky Mineral (S1)
__ Sandy Gleyed Matrix (S4)
__ Sandy Redox (S5)
__ Stripped Matrix (S6)
__ Loamy Mucky Mineral (F1)
__ Loamy Gleyed Matrix (F2)
__ Depleted Matrix (F3)
__ Redox Dark Surface (F6)
__ Depleted Dark Surface (F7)
__ Redox Depressions (F8)
__ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]

__ 1 cm Muck (A9) (LRR C)
__ 2 cm Muck (A10) (LRR B)
__ Reduced Vertic (F18)
__ Red Parent Material (TF2)
__ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present

Restrictive Layer (if present)
Type Hard pan
Depth (inches) 8

Hydric Soil Present? Yes X No ___

Remarks

Playa soils Salorthids are hydric by definition

HYDROLOGY

Wetland Hydrology Indicators

Primary Indicators (any one indicator is sufficient)

__ Surface Water (A1)
__ High Water Table (A2)
__ Saturation (A3)
__ Water Marks (B1) (Nonriverine)
__ Sediment Deposits (B2) (Nonriverine)
__ Drift Deposits (B3) (Nonriverine)
X Surface Soil Cracks (B6)
__ Inundation Visible on Aerial Imagery (B7)
__ Water Stained Leaves (B9)
X Salt Crust (B11)
__ Biotic Crust (B12)
__ Aquatic Invertebrates (B13)
__ Hydrogen Sulfide Odor (C1)
__ Oxidized Rhizospheres along Living Roots (C3)
__ Presence of Reduced Iron (C4)
__ Recent Iron Reduction in Plowed Soils (C6)
__ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

__ Water Marks (B1) (Riverine)
__ Sediment Deposits (B2) (Riverine)
__ Drift Deposits (B3) (Riverine)
__ Drainage Patterns (B10)
__ Dry Season Water Table (C2)
__ Thin Muck Surface (C7)
__ Crayfish Burrows (C8)
__ Saturation Visible on Aerial Imagery (C9)
__ Shallow Aquitard (D3)
__ FAC Neutral Test (D5)

Field Observations

Surface Water Present? Yes ___ No X Depth (inches) ___
Water Table Present? Yes ___ No X Depth (inches) ___
Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches) ___

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge monitoring well aerial photos previous inspections) if available

Remarks

Soil cracks and salt crust are indications of wetland hydrology

SOIL

Sampling Point 6 4

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 2	10YR 3/2	100					ClLo	Moist
2 3	7 5YR 4/5	100					ClLo	Moist
3+	10YR 3/3	100					Cl	Moist

[1]Type C=Concentration D=Depletion RM=Reduced Matrix [2]Location PL=Pore Lining RO=Root Channel M=Matrix

Hydric Soil Indicators (Applicable to all LRRs unless otherwise noted)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR C)
- ___ 1 cm Muck (A9) (LRR D)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]

- ___ 1 cm Muck (A9) (LRR C)
- ___ 2 cm Muck (A10) (LRR B)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present

Restrictive Layer (if present)

Type ____

Depth (inches) ____

Hydric Soil Present? Yes ____ No X

Remarks

No hydric soils

HYDROLOGY

Wetland Hydrology Indicators

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (Nonriverine)
- ___ Sediment Deposits (B2) (Nonriverine)
- ___ Drift Deposits (B3) (Nonriverine)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (Riverine)
- ___ Sediment Deposits (B2) (Riverine)
- ___ Drift Deposits (B3) (Riverine)
- ___ Drainage Patterns (B10)
- ___ Dry Season Water Table (C2)
- ___ Thin Muck Surface (C7)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC Neutral Test (D5)

Field Observations

Surface Water Present? Yes ____ No X Depth (inches) ____

Water Table Present? Yes ____ No X Depth (inches) ____

Saturation Present? Yes ____ No X Depth (inches) ____
(includes capillary fringe)

Wetland Hydrology Present? Yes ____ No X

Describe Recorded Data (stream gauge monitoring well aerial photos previous inspections) if available

Remarks

No wetland hydrology

SOIL

Sampling Point 65

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 4	2 5Y 5/2	100					Cl	Moist
4 7	2 5Y 6/2	100					Cl	Moist
7 - 10	2 5Y 6/2	95	2 5Y 5/6	5			Cl	Moist

[1]Type C=Concentration D=Depletion RM=Reduced Matrix [2]Location PL=Pore Lining RC=Root Channel M=Matrix

Hydric Soil Indicators (Applicable to all LRRs unless otherwise noted)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR C)
- ___ 1 cm Muck (A9) (LRR D)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]

- ___ 1 cm Muck (A9) (LRR C)
- ___ 2 cm Muck (A10) (LRR B)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present

Restrictive Layer (if present)

Type ______

Depth (inches) ______

Hydric Soil Present? Yes X No ___

Remarks

Depleted matrix

HYDROLOGY

Wetland Hydrology Indicators

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (Nonriverine)
- ___ Sediment Deposits (B2) (Nonriverine)
- ___ Drift Deposits (B3) (Nonriverine)
- X Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (Riverine)
- ___ Sediment Deposits (B2) (Riverine)
- ___ Drift Deposits (B3) (Riverine)
- ___ Drainage Patterns (B10)
- ___ Dry Season Water Table (C2)
- ___ Thin Muck Surface (C7)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC Neutral Test (D5)

Field Observations

Surface Water Present? Yes ___ No X Depth (inches) ___

Water Table Present? Yes ___ No X Depth (inches) ___

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches) ___

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge monitoring well aerial photos previous inspections) if available

Remarks

Soil cracks evidence of ponding or saturation

SOIL

Sampling Point 6 6

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 2	10YR 3/2	100					ClLo	Moist
2 3	7 5YR 4/5	100					OlLo	Moist
3+	10YR 3/3	100					Cl	Moist

[1]Type C=Concentration D=Depletion RM=Reduced Matrix [2]Location PL=Pore Lining RC=Root Channel M=Matrix

Hydric Soil Indicators (Applicable to all LRRs, unless otherwise noted)

__ Histosol (A1)
__ Histic Epipedon (A2)
__ Black Histic (A3)
__ Hydrogen Sulfide (A4)
__ Stratified Layers (A5) (LRR C)
__ 1 cm Muck (A9) (LRR D)
__ Depleted Below Dark Surface (A11)
__ Thick Dark Surface (A12)
__ Sandy Mucky Mineral (S1)
__ Sandy Gleyed Matrix (S4)
__ Sandy Redox (S5)
__ Stripped Matrix (S6)
__ Loamy Mucky Mineral (F1)
__ Loamy Gleyed Matrix (F2)
__ Depleted Matrix (F3)
__ Redox Dark Surface (F6)
__ Depleted Dark Surface (F7)
__ Redox Depressions (F8)
__ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]

__ 1 cm Muck (A9) (LRR C)
__ 2 cm Muck (A10) (LRR B)
__ Reduced Vertic (F18)
__ Red Parent Material (TF2)
__ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present

Restrictive Layer (if present)

Type ______

Depth (inches) ______

Hydric Soil Present? Yes ____ No X

Remarks

No hydric soils

HYDROLOGY

Wetland Hydrology Indicators

Primary Indicators (any one indicator is sufficient)

__ Surface Water (A1)
__ High Water Table (A2)
__ Saturation (A3)
__ Water Marks (B1) (Nonriverine)
__ Sediment Deposits (B2) (Nonriverine)
__ Drift Deposits (B3) (Nonriverine)
__ Surface Soil Cracks (B6)
__ Inundation Visible on Aerial Imagery (B7)
__ Water Stained Leaves (B9)
__ Salt Crust (B11)
__ Biotic Crust (B12)
__ Aquatic Invertebrates (B13)
__ Hydrogen Sulfide Odor (C1)
__ Oxidized Rhizospheres along Living Roots (C3)
__ Presence of Reduced Iron (C4)
__ Recent Iron Reduction in Plowed Soils (C6)
__ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

__ Water Marks (B1) (Riverine)
__ Sediment Deposits (B2) (Riverine)
__ Drift Deposits (B3) (Riverine)
__ Drainage Patterns (B10)
__ Dry Season Water Table (C2)
__ Thin Muck Surface (C7)
__ Crayfish Burrows (C8)
__ Saturation Visible on Aerial Imagery (C9)
__ Shallow Aquitard (D3)
__ FAC Neutral Test (D5)

Field Observations

Surface Water Present?	Yes ____	No X	Depth (inches) ______
Water Table Present?	Yes ____	No X	Depth (inches) ______
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches) ______

Wetland Hydrology Present? Yes ____ No X

Describe Recorded Data (stream gauge monitoring well aerial photos previous inspections) if available

Remarks

No wetland hydrology

SOIL

Sampling Point 6 7

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 2	10YR 3/2	100					ClLo	Moist
2 3	7 5YR 4/5	100					ClLo	Moist
3 18+	10YR 3/3	100					Cl	Moist

[1]Type C=Concentration D=Depletion RM=Reduced Matrix [2]Location PL=Pore Lining RC=Root Channel M=Matrix

Hydric Soil Indicators (Applicable to all LRRs unless otherwise noted)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (LRR C)
___ 1 cm Muck (A9) (LRR D)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]

___ 1 cm Muck (A9) (LRR C)
___ 2 cm Muck (A10) (LRR B)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present

Restrictive Layer (if present)

Type ______

Depth (inches) ______

Hydric Soil Present? Yes ___ No X

Remarks

No hydric soils

HYDROLOGY

Wetland Hydrology Indicators

Primary Indicators (any one indicator is sufficient)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (Nonriverine)
___ Sediment Deposits (B2) (Nonriverine)
___ Drift Deposits (B3) (Nonriverine)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Plowed Soils (C6)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Marks (B1) (Riverine)
___ Sediment Deposits (B2) (Riverine)
___ Drift Deposits (B3) (Riverine)
___ Drainage Patterns (B10)
___ Dry Season Water Table (C2)
___ Thin Muck Surface (C7)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC Neutral Test (D5)

Field Observations

Surface Water Present? Yes ___ No X Depth (inches) ______

Water Table Present? Yes ___ No X Depth (inches) ______

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches) ______

Wetland Hydrology Present? Yes ___ No X

Describe Recorded Data (stream gauge monitoring well aerial photos previous inspections) if available

Remarks

No wetland hydrology

SOIL

Sampling Point 6 8

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 2	10YR 3/2	100					OlLo	Moist
2 3	7 5YR 4/5	100					ClLo	Moist
3+	10YR 3/3	100					Cl	Moist

[1]Type C=Concentration D=Depletion RM=Reduced Matrix [2]Location PL=Pore Lining RO=Root Channel M=Matrix

Hydric Soil Indicators (Applicable to all LRRs unless otherwise noted)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR C)
- ___ 1 cm Muck (A9) (LRR D)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]

- ___ 1 cm Muck (A9) (LRR C)
- ___ 2 cm Muck (A10) (LRR B)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present

Restrictive Layer (if present)

Type ______

Depth (inches) ______

Hydric Soil Present? Yes ______ No X

Remarks

No hydric soils

HYDROLOGY

Wetland Hydrology Indicators

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (Nonriverine)
- ___ Sediment Deposits (B2) (Nonriverine)
- ___ Drift Deposits (B3) (Nonriverine)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (Riverine)
- ___ Sediment Deposits (B2) (Riverine)
- ___ Drift Deposits (B3) (Riverine)
- ___ Drainage Patterns (B10)
- ___ Dry Season Water Table (C2)
- ___ Thin Muck Surface (C7)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC Neutral Test (D5)

Field Observations

Surface Water Present? Yes ______ No X Depth (inches) ______

Water Table Present? Yes ______ No X Depth (inches) ______

Saturation Present? Yes ______ No X Depth (inches) ______
(includes capillary fringe)

Wetland Hydrology Present? Yes ______ No X

Describe Recorded Data (stream gauge monitoring well aerial photos previous inspections) if available

Remarks

No wetland hydrology

SOIL

Sampling Point 6 9

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 4	2 5Y 5/2	100					Cl	Moist
4 7	2 5Y 6/2	100					Cl	Moist
7 10	2 5Y 6/2	95	2 5Y 5/6	5			Cl	Moist

[1]Type C=Concentration D=Depletion RM=Reduced Matrix [2]Location PL=Pore Lining RO=Root Channel M=Matrix

Hydric Soil Indicators (Applicable to all LRRs unless otherwise noted)

__ Histosol (A1)
__ Histic Epipedon (A2)
__ Black Histic (A3)
__ Hydrogen Sulfide (A4)
__ Stratified Layers (A5) (LRR C)
__ 1 cm Muck (A9) (LRR D)
__ Depleted Below Dark Surface (A11)
__ Thick Dark Surface (A12)
__ Sandy Mucky Mineral (S1)
__ Sandy Gleyed Matrix (S4)
__ Sandy Redox (S5)
__ Stripped Matrix (S6)
__ Loamy Mucky Mineral (F1)
__ Loamy Gleyed Matrix (F2)
X Depleted Matrix (F3)
__ Redox Dark Surface (F6)
__ Depleted Dark Surface (F7)
__ Redox Depressions (F8)
__ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]

__ 1 cm Muck (A9) (LRR C)
__ 2 cm Muck (A10) (LRR B)
__ Reduced Vertic (F18)
__ Red Parent Material (TF2)
__ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present

Restrictive Layer (if present)
Type ______
Depth (inches) ______

Hydric Soil Present? Yes X No ___

Remarks

Depleted matrix

HYDROLOGY

Wetland Hydrology Indicators

Primary Indicators (any one indicator is sufficient)

__ Surface Water (A1)
__ High Water Table (A2)
__ Saturation (A3)
__ Water Marks (B1) (Nonriverine)
__ Sediment Deposits (B2) (Nonriverine)
__ Drift Deposits (B3) (Nonriverine)
X Surface Soil Cracks (B6)
__ Inundation Visible on Aerial Imagery (B7)
__ Water Stained Leaves (B9)
__ Salt Crust (B11)
__ Biotic Crust (B12)
__ Aquatic Invertebrates (B13)
__ Hydrogen Sulfide Odor (C1)
__ Oxidized Rhizospheres along Living Roots (C3)
__ Presence of Reduced Iron (C4)
__ Recent Iron Reduction in Plowed Soils (C6)
__ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

__ Water Marks (B1) (Riverine)
__ Sediment Deposits (B2) (Riverine)
__ Drift Deposits (B3) (Riverine)
__ Drainage Patterns (B10)
__ Dry Season Water Table (C2)
__ Thin Muck Surface (C7)
__ Crayfish Burrows (C8)
__ Saturation Visible on Aerial Imagery (C9)
__ Shallow Aquitard (D3)
__ FAC Neutral Test (D5)

Field Observations

Surface Water Present? Yes ___ No X Depth (inches) ___
Water Table Present? Yes ___ No X Depth (inches) ___
Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches) ___

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge monitoring well aerial photos previous inspections) if available

Remarks

Soil cracks evidence of ponding and wetland hydrology

SOIL

Sampling Point 6 10

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth	Matrix		Redox Features				Texture	Remarks
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]		
0 2	10YR 3/2	100					ClLo	Moist
2 3	7 5YR 4/5	100					ClLo	Moist
3+	10YR 3/3	100					C)	Moist

[1]Type C=Concentration D=Depletion RM=Reduced Matrix [2]Location PL=Pore Lining RC=Root Channel M=Matrix

Hydric Soil Indicators (Applicable to all LRRs, unless otherwise noted)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR C)
- ___ 1 cm Muck (A9) (LRR D)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]

- ___ 1 cm Muck (A9) (LRR C)
- ___ 2 cm Muck (A10) (LRR B)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present

Restrictive Layer (if present)

Type ____

Depth (inches) ____

Hydric Soil Present? Yes ___ No X

Remarks

No hydric soils

HYDROLOGY

Wetland Hydrology Indicators

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (Nonriverine)
- ___ Sediment Deposits (B2) (Nonriverine)
- ___ Drift Deposits (B3) (Nonriverine)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (Riverine)
- ___ Sediment Deposits (B2) (Riverine)
- ___ Drift Deposits (B3) (Riverine)
- ___ Drainage Patterns (B10)
- ___ Dry Season Water Table (C2)
- ___ Thin Muck Surface (C7)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC Neutral Test (D5)

Field Observations

Surface Water Present?	Yes ___	No X	Depth (inches) ___
Water Table Present?	Yes ___	No X	Depth (inches) ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches) ___

Wetland Hydrology Present? Yes ___ No X

Describe Recorded Data (stream gauge monitoring well aerial photos previous inspections) if available

Remarks

No wetland hydrology

SOIL

Sampling Point 6 11

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0 4	2 5Y 5/2	100					Cl	Moist
4 7	2 5Y 6/2	100					Cl	Moist
7 – 10	2 5Y 6/2	95	2 5Y 5/6	5			Cl	Moist

[1]Type C=Concentration D=Depletion RM=Reduced Matrix [2]Location PL=Pore Lining RC=Root Channel M=Matrix

Hydric Soil Indicators (Applicable to all LRRs unless otherwise noted)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR C)
- ___ 1 cm Muck (A9) (LRR D)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- _X_ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]

- ___ 1 cm Muck (A9) (LRR C)
- ___ 2 cm Muck (A10) (LRR B)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present

Restrictive Layer (if present)

Type ______

Depth (inches) ______

Hydric Soil Present? Yes _X_ No ___

Remarks

Depleted matrix

HYDROLOGY

Wetland Hydrology Indicators

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (Nonriverine)
- ___ Sediment Deposits (B2) (Nonriverine)
- ___ Drift Deposits (B3) (Nonriverine)
- _X_ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (Riverine)
- ___ Sediment Deposits (B2) (Riverine)
- ___ Drift Deposits (B3) (Riverine)
- ___ Drainage Patterns (B10)
- ___ Dry Season Water Table (C2)
- ___ Thin Muck Surface (C7)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC Neutral Test (D5)

Field Observations

Surface Water Present? Yes ___ No _X_ Depth (inches) ______

Water Table Present? Yes ___ No _X_ Depth (inches) ______

Saturation Present? (includes capillary fringe) Yes ___ No _X_ Depth (inches) ______

Wetland Hydrology Present? Yes _X_ No ___

Describe Recorded Data (stream gauge monitoring well aerial photos previous inspections) if available

Remarks

Soil cracks evidence of ponding and wetland hydrology

SOIL

Sampling Point 6 12

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 4	10YR 3/2	100					Cl	Moist
4 7	2 5Y 5/2	100					Cl	Moist
7 - 10	10YR 6/3	100					Cl	Moist

[1]Type C=Concentration D=Depletion RM=Reduced Matrix [2]Location PL=Pore Lining RO=Root Channel M=Matrix

Hydric Soil Indicators (Applicable to all LRRs unless otherwise noted)

- __ Histosol (A1)
- __ Histic Epipedon (A2)
- __ Black Histic (A3)
- __ Hydrogen Sulfide (A4)
- __ Stratified Layers (A5) (LRR **C**)
- __ 1 cm Muck (A9) (LRR D)
- __ Depleted Below Dark Surface (A11)
- __ Thick Dark Surface (A12)
- __ Sandy Mucky Mineral (S1)
- __ Sandy Gleyed Matrix (S4)
- __ Sandy Redox (S5)
- __ Stripped Matrix (S6)
- __ Loamy Mucky Mineral (F1)
- __ Loamy Gleyed Matrix (F2)
- __ Depleted Matrix (F3)
- __ Redox Dark Surface (F6)
- __ Depleted Dark Surface (F7)
- __ Redox Depressions (F8)
- __ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]

- __ 1 cm Muck (A9) (LRR **C**)
- __ 2 cm Muck (A10) (LRR B)
- __ Reduced Vertic (F18)
- __ Red Parent Material (TF2)
- X Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present

Restrictive Layer (if present)

Type ______

Depth (inches) ______

Hydric Soil Present? Yes X No ______

Remarks

Playa soils Salorthids are hydric by definition

HYDROLOGY

Wetland Hydrology Indicators

Primary Indicators (any one indicator is sufficient)

- __ Surface Water (A1)
- __ High Water Table (A2)
- __ Saturation (A3)
- __ Water Marks (B1) (Nonriverine)
- __ Sediment Deposits (B2) (Nonriverine)
- __ Drift Deposits (B3) (Nonriverine)
- X Surface Soil Cracks (B6)
- __ Inundation Visible on Aerial Imagery (B7)
- __ Water Stained Leaves (B9)
- __ Salt Crust (B11)
- __ Biotic Crust (B12)
- __ Aquatic Invertebrates (B13)
- __ Hydrogen Sulfide Odor (C1)
- __ Oxidized Rhizospheres along Living Roots (C3)
- __ Presence of Reduced Iron (C4)
- __ Recent Iron Reduction in Plowed Soils (C6)
- __ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- __ Water Marks (B1) (Riverine)
- __ Sediment Deposits (B2) (Riverine)
- __ Drift Deposits (B3) (Riverine)
- __ Drainage Patterns (B10)
- __ Dry Season Water Table (C2)
- __ Thin Muck Surface (C7)
- __ Crayfish Burrows (C8)
- __ Saturation Visible on Aerial Imagery (C9)
- __ Shallow Aquitard (D3)
- __ FAC Neutral Test (D5)

Field Observations

Surface Water Present? Yes ______ No X Depth (inches) ______

Water Table Present? Yes ______ No X Depth (inches) ______

Saturation Present? (includes capillary fringe) Yes ______ No X Depth (inches) ______

Wetland Hydrology Present? Yes X No ______

Describe Recorded Data (stream gauge monitoring well aerial photos previous inspections) if available

Remarks

Soil cracks evidence of ponding and wetland hydrology

SOIL

Sampling Point 6 13

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 4	10YR 3/2	100					Sa	Moist
4 7	2 5Y 4/2	100					SaLo	Moist
7 - 10	10YR 6/3	95	10YR 5/2	5			Cl	Moist

[1]Type C=Concentration D=Depletion RM=Reduced Matnx [2]Location PL=Pore Lining RC=Root Channel M=Matnx

Hydric Soil Indicators (Applicable to all LRRs unless otherwise noted)

- __ Histosol (A1)
- __ Histic Epipedon (A2)
- __ Black Histic (A3)
- __ Hydrogen Sulfide (A4)
- __ Stratified Layers (A5) (LRR C)
- __ 1 cm Muck (A9) (LRR D)
- __ Depleted Below Dark Surface (A11)
- __ Thick Dark Surface (A12)
- __ Sandy Mucky Mineral (S1)
- __ Sandy Gleyed Matnx (S4)
- __ Sandy Redox (S5)
- __ Stripped Matnx (S6)
- __ Loamy Mucky Mineral (F1)
- __ Loamy Gleyed Matnx (F2)
- __ Depleted Matnx (F3)
- __ Redox Dark Surface (F6)
- __ Depleted Dark Surface (F7)
- __ Redox Depressions (F8)
- __ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]

- __ 1 cm Muck (A9) (LRR C)
- __ 2 cm Muck (A10) (LRR B)
- __ Reduced Vertic (F18)
- __ Red Parent Material (TF2)
- __ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present

Restrictive Layer (if present)

Type ______

Depth (inches) ______

Hydric Soil Present? Yes X No ____

Remarks

Playa soils - salorthids are hydnc by definition

HYDROLOGY

Wetland Hydrology Indicators

Primary Indicators (any one indicator is sufficient)

- __ Surface Water (A1)
- __ High Water Table (A2)
- __ Saturation (A3)
- __ Water Marks (B1) (Nonriverine)
- __ Sediment Deposits (B2) (Nonriverine)
- __ Drift Deposits (B3) (Nonriverine)
- X Surface Soil Cracks (B6)
- __ Inundation Visible on Aerial Imagery (B7)
- __ Water Stained Leaves (B9)
- __ Salt Crust (B11)
- __ Biotic Crust (B12)
- __ Aquatic Invertebrates (B13)
- __ Hydrogen Sulfide Odor (C1)
- __ Oxidized Rhizospheres along Living Roots (C3)
- __ Presence of Reduced Iron (C4)
- __ Recent Iron Reduction in Plowed Soils (C6)
- __ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- __ Water Marks (B1) (Riverine)
- __ Sediment Deposits (B2) (Riverine)
- __ Drift Deposits (B3) (Riverine)
- __ Drainage Patterns (B10)
- __ Dry Season Water Table (C2)
- __ Thin Muck Surface (C7)
- __ Crayfish Burrows (C8)
- __ Saturation Visible on Aerial Imagery (C9)
- __ Shallow Aquitard (D3)
- __ FAC Neutral Test (D5)

Field Observations

Surface Water Present? Yes ____ No X Depth (inches) ______

Water Table Present? Yes ____ No X Depth (inches) ______

Saturation Present? (includes capillary fringe) Yes ____ No X Depth (inches) ______

Wetland Hydrology Present? Yes X No ____

Describe Recorded Data (stream gauge monitoring well aerial photos previous inspections) if available

Remarks

Soil cracks evidence of ponding or saturation

SOIL

Sampling Point 6 14

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 4	10YR 3/2	100					Cl	Moist
4 7	2 5Y 5/2	100					Cl	Moist
7 - 10	10YR 6/3	100					Cl	Moist

[1]Type C=Concentration D=Depletion RM=Reduced Matrix [2]Location PL=Pore Lining RC=Root Channel M=Matrix

Hydric Soil Indicators (Applicable to all LRRs unless otherwise noted)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (LRR C)
___ 1 cm Muck (A9) (LRR D)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]

___ 1 cm Muck (A9) (LRR C)
___ 2 cm Muck (A10) (LRR B)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
_X_ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present

Restrictive Layer (if present)
Type ________
Depth (inches) ________

Hydric Soil Present? Yes _X_ No ___

Remarks

Playa soils Salorthids are hydric by definition

HYDROLOGY

Wetland Hydrology Indicators

Primary Indicators (any one indicator is sufficient)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (Nonriverine)
___ Sediment Deposits (B2) (Nonriverine)
___ Drift Deposits (B3) (Nonriverine)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Plowed Soils (C6)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Marks (B1) (Riverine)
___ Sediment Deposits (B2) (Riverine)
___ Drift Deposits (B3) (Riverine)
___ Drainage Patterns (B10)
___ Dry Season Water Table (C2)
___ Thin Muck Surface (C7)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC Neutral Test (D5)

Field Observations

Surface Water Present? Yes ___ No _X_ Depth (inches) ___
Water Table Present? Yes ___ No _X_ Depth (inches) ___
Saturation Present? (includes capillary fringe) Yes ___ No _X_ Depth (inches) ___

Wetland Hydrology Present? Yes ___ No _X_

Describe Recorded Data (stream gauge monitoring well aerial photos previous inspections) if available

Remarks

No wetland hydrology

SOIL

Sampling Point 6 15

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 2	10YR 3/2	100					ClLo	Moist
2 3	7 5YR 4/5	100					OlLo	Moist
3+	10YR 3/3	100					Cl	Moist

[1]Type C=Concentration D=Depletion RM=Reduced Matrix [2]Location PL=Pore Lining RC=Root Channel M=Matrix

Hydric Soil Indicators (Applicable to all LRRs unless otherwise noted)

__ Histosol (A1)
__ Histic Epipedon (A2)
__ Black Histic (A3)
__ Hydrogen Sulfide (A4)
__ Stratified Layers (A5) (LRR C)
__ 1 cm Muck (A9) (LRR D)
__ Depleted Below Dark Surface (A11)
__ Thick Dark Surface (A12)
__ Sandy Mucky Mineral (B1)
__ Sandy Gleyed Matrix (S4)
__ Sandy Redox (S5)
__ Stripped Matrix (S6)
__ Loamy Mucky Mineral (F1)
__ Loamy Gleyed Matrix (F2)
__ Depleted Matrix (F3)
__ Redox Dark Surface (F6)
__ Depleted Dark Surface (F7)
__ Redox Depressions (F8)
__ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]

__ 1 cm Muck (A9) (LRR C)
__ 2 cm Muck (A10) (LRR B)
__ Reduced Vertic (F18)
__ Red Parent Material (TF2)
__ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present

Restrictive Layer (if present)

Type ______

Depth (inches) ______

Hydric Soil Present? Yes ______ No X

Remarks

No hydric soils

HYDROLOGY

Wetland Hydrology Indicators

Primary Indicators (any one indicator is sufficient)

__ Surface Water (A1)
__ High Water Table (A2)
__ Saturation (A3)
__ Water Marks (B1) (Nonriverine)
__ Sediment Deposits (B2) (Nonriverine)
__ Drift Deposits (B3) (Nonriverine)
__ Surface Soil Cracks (B6)
__ Inundation Visible on Aerial Imagery (B7)
__ Water Stained Leaves (B9)
__ Salt Crust (B11)
__ Biotic Crust (B12)
__ Aquatic Invertebrates (B13)
__ Hydrogen Sulfide Odor (C1)
__ Oxidized Rhizospheres along Living Roots (C3)
__ Presence of Reduced Iron (C4)
__ Recent Iron Reduction in Plowed Soils (C6)
__ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

__ Water Marks (B1) (Riverine)
__ Sediment Deposits (B2) (Riverine)
__ Drift Deposits (B3) (Riverine)
__ Drainage Patterns (B10)
__ Dry Season Water Table (C2)
__ Thin Muck Surface (C7)
__ Crayfish Burrows (C8)
__ Saturation Visible on Aerial Imagery (C9)
__ Shallow Aquitard (D3)
__ FAC Neutral Test (D5)

Field Observations

Surface Water Present? Yes ______ No X Depth (inches) ______

Water Table Present? Yes ______ No X Depth (inches) ______

Saturation Present? (includes capillary fringe) Yes ______ No X Depth (inches) ______

Wetland Hydrology Present? Yes ______ No X

Describe Recorded Data (stream gauge monitoring well aerial photos previous inspections) if available

Remarks

No wetland hydrology

SOIL

Sampling Point 6 16

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 4	10YR 3/2	100					Cl	Moist
4 7	2 5Y 5/2	100					Cl	Moist
7 - 10	10YR 6/3	100					Cl	Moist

[1]Type C=Concentration D=Depletion RM=Reduced Matrix [2]Location PL=Pore Lining RC=Root Channel M=Matrix

Hydric Soil Indicators (Applicable to all LRRs unless otherwise noted)

__ Histosol (A1)
__ Histic Epipedon (A2)
__ Black Histic (A3)
__ Hydrogen Sulfide (A4)
__ Stratified Layers (A5) (LRR C)
__ 1 cm Muck (A9) (LRR D)
__ Depleted Below Dark Surface (A11)
__ Thick Dark Surface (A12)
__ Sandy Mucky Mineral (S1)
__ Sandy Gleyed Matrix (S4)
__ Sandy Redox (S5)
__ Stripped Matrix (S6)
__ Loamy Mucky Mineral (F1)
__ Loamy Gleyed Matrix (F2)
__ Depleted Matrix (F3)
__ Redox Dark Surface (F6)
__ Depleted Dark Surface (F7)
__ Redox Depressions (F8)
__ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]

__ 1 cm Muck (A9) (LRR C)
__ 2 cm Muck (A10) (LRR B)
__ Reduced Vertic (F18)
__ Red Parent Material (TF2)
X Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present

Restrictive Layer (if present)

Type ______

Depth (inches) ______

Hydric Soil Present? Yes X No __

Remarks

Playa soils Salorthids are hydric by definition

HYDROLOGY

Wetland Hydrology Indicators

Primary Indicators (any one indicator is sufficient)

__ Surface Water (A1)
__ High Water Table (A2)
__ Saturation (A3)
__ Water Marks (B1) (Nonriverine)
__ Sediment Deposits (B2) (Nonriverine)
__ Drift Deposits (B3) (Nonriverine)
__ Surface Soil Cracks (B6)
__ Inundation Visible on Aerial Imagery (B7)
__ Water Stained Leaves (B9)
__ Salt Crust (B11)
__ Biotic Crust (B12)
__ Aquatic Invertebrates (B13)
__ Hydrogen Sulfide Odor (C1)
__ Oxidized Rhizospheres along Living Roots (C3)
__ Presence of Reduced Iron (C4)
__ Recent Iron Reduction in Plowed Soils (C6)
__ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

__ Water Marks (B1) (Riverine)
__ Sediment Deposits (B2) (Riverine)
__ Drift Deposits (B3) (Riverine)
__ Drainage Patterns (B10)
__ Dry Season Water Table (C2)
__ Thin Muck Surface (C7)
__ Crayfish Burrows (C8)
__ Saturation Visible on Aerial Imagery (C9)
__ Shallow Aquitard (D3)
__ FAC Neutral Test (D5)

Field Observations

Surface Water Present? Yes __ No X Depth (inches) __

Water Table Present? Yes __ No X Depth (inches) __

Saturation Present? (includes capillary fringe) Yes __ No X Depth (inches) __

Wetland Hydrology Present? Yes __ No X

Describe Recorded Data (stream gauge monitoring well aerial photos previous inspections) if available

Remarks

No wetland hydrology evident

SOIL

Sampling Point 6 17

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 4	10YR 3/2	100					Cl	Moist
4 7	2 5Y 5/2	100					Cl	Moist
7 – 10	10YR 6/3	100					Cl	Moist

[1]Type C=Concentration D=Depletion RM=Reduced Matrix [2]Location PL=Pore Lining RC=Root Channel M=Matrix

Hydric Soil Indicators (Applicable to all LRRs unless otherwise noted)

__ Histosol (A1)
__ Histic Epipedon (A2)
__ Black Histic (A3)
__ Hydrogen Sulfide (A4)
__ Stratified Layers (A5) (LRR C)
__ 1 cm Muck (A9) (LRR D)
__ Depleted Below Dark Surface (A11)
__ Thick Dark Surface (A12)
__ Sandy Mucky Mineral (S1)
__ Sandy Gleyed Matrix (S4)
__ Sandy Redox (S5)
__ Stripped Matrix (S6)
__ Loamy Mucky Mineral (F1)
__ Loamy Gleyed Matrix (F2)
__ Depleted Matrix (F3)
__ Redox Dark Surface (F6)
__ Depleted Dark Surface (F7)
__ Redox Depressions (F8)
__ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]

__ 1 cm Muck (A9) (LRR C)
__ 2 cm Muck (A10) (LRR B)
__ Reduced Vertic (F18)
__ Red Parent Material (TF2)
X Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present

Restrictive Layer (if present)
Type ________
Depth (inches) ________

Hydric Soil Present? Yes X No ___

Remarks

Playa soils Salorthids are hydric by definition

HYDROLOGY

Wetland Hydrology Indicators

Primary Indicators (any one indicator is sufficient)

__ Surface Water (A1)
__ High Water Table (A2)
__ Saturation (A3)
__ Water Marks (B1) (Nonriverine)
__ Sediment Deposits (B2) (Nonriverine)
__ Drift Deposits (B3) (Nonriverine)
X Surface Soil Cracks (B6)
__ Inundation Visible on Aerial Imagery (B7)
__ Water Stained Leaves (B9)
__ Salt Crust (B11)
__ Biotic Crust (B12)
__ Aquatic Invertebrates (B13)
__ Hydrogen Sulfide Odor (C1)
__ Oxidized Rhizospheres along Living Roots (C3)
__ Presence of Reduced Iron (C4)
__ Recent Iron Reduction in Plowed Soils (C6)
__ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

__ Water Marks (B1) (Riverine)
__ Sediment Deposits (B2) (Riverine)
__ Drift Deposits (B3) (Riverine)
__ Drainage Patterns (B10)
__ Dry Season Water Table (C2)
__ Thin Muck Surface (C7)
__ Crayfish Burrows (C8)
__ Saturation Visible on Aerial Imagery (C9)
__ Shallow Aquitard (D3)
__ FAC Neutral Test (D5)

Field Observations

Surface Water Present? Yes ___ No X Depth (inches) ___
Water Table Present? Yes ___ No X Depth (inches) ___
Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches) ___

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge monitoring well aerial photos previous inspections) if available

Remarks

Cracked soils are indication of wetland hydrology

SOIL

Sampling Point 71

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 3	10YR 5/2	100					SiLo	Moist
3 18+	10YR 5/2	100					Cl	Moist

[1]Type C=Concentration D=Depletion RM=Reduced Matrix [2]Location PL=Pore Lining RC=Root Channel M=Matrix

Hydric Soil Indicators (Applicable to all LRRs, unless otherwise noted)

- __ Histosol (A1)
- __ Histic Epipedon (A2)
- __ Black Histic (A3)
- __ Hydrogen Sulfide (A4)
- __ Stratified Layers (A5) (LRR C)
- __ 1 cm Muck (A9) (LRR D)
- __ Depleted Below Dark Surface (A11)
- __ Thick Dark Surface (A12)
- __ Sandy Mucky Mineral (S1)
- __ Sandy Gleyed Matrix (S4)
- __ Sandy Redox (S5)
- __ Stripped Matrix (S6)
- __ Loamy Mucky Mineral (F1)
- __ Loamy Gleyed Matrix (F2)
- __ Depleted Matrix (F3)
- __ Redox Dark Surface (F6)
- __ Depleted Dark Surface (F7)
- __ Redox Depressions (F8)
- __ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]

- __ 1 cm Muck (A9) (LRR C)
- __ 2 cm Muck (A10) (LRR B)
- __ Reduced Vertic (F18)
- __ Red Parent Material (TF2)
- X Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present

Restrictive Layer (if present)
Type ______
Depth (inches) ______

Hydric Soil Present? Yes X No ___

Remarks

Playa soils Salorthids are hydric by definition

HYDROLOGY

Wetland Hydrology Indicators

Primary Indicators (any one indicator is sufficient)

- __ Surface Water (A1)
- __ High Water Table (A2)
- __ Saturation (A3)
- __ Water Marks (B1) (Nonriverine)
- __ Sediment Deposits (B2) (Nonriverine)
- __ Drift Deposits (B3) (Nonriverine)
- X Surface Soil Cracks (B6)
- __ Inundation Visible on Aerial Imagery (B7)
- __ Water Stained Leaves (B9)
- __ Salt Crust (B11)
- __ Biotic Crust (B12)
- __ Aquatic Invertebrates (B13)
- __ Hydrogen Sulfide Odor (C1)
- __ Oxidized Rhizospheres along Living Roots (C3)
- __ Presence of Reduced Iron (C4)
- __ Recent Iron Reduction in Plowed Soils (C6)
- __ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- __ Water Marks (B1) (Riverine)
- __ Sediment Deposits (B2) (Riverine)
- __ Drift Deposits (B3) (Riverine)
- __ Drainage Patterns (B10)
- __ Dry Season Water Table (C2)
- __ Thin Muck Surface (C7)
- __ Crayfish Burrows (C8)
- __ Saturation Visible on Aerial Imagery (C9)
- __ Shallow Aquitard (D3)
- __ FAC Neutral Test (D5)

Field Observations

Surface Water Present? Yes ___ No X Depth (inches) ______
Water Table Present? Yes ___ No X Depth (inches) ______
Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches) ______

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge monitoring well aerial photos previous inspections) if available

Remarks

Cracked soils are indication of wetland hydrology

SOIL

Sampling Point 7 2

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 – 6	10YR 3/2	100					SiLo	Moist
6 +	7 5YR 4/3	100					ClLo	Moist

[1]Type C=Concentration D=Depletion RM=Reduced Matrix [2]Location PL=Pore Lining RC=Root Channel M=Matrix

Hydric Soil Indicators (Applicable to all LRRs unless otherwise noted)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR C)
- ___ 1 cm Muck (A9) (LRR D)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]

- ___ 1 cm Muck (A9) (LRR C)
- ___ 2 cm Muck (A10) (LRR B)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present

Restrictive Layer (if present)

Type ___

Depth (inches) ___

Hydric Soil Present? Yes ___ No X

Remarks

No hydric soils

HYDROLOGY

Wetland Hydrology Indicators

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (Nonriverine)
- ___ Sediment Deposits (B2) (Nonriverine)
- ___ Drift Deposits (B3) (Nonriverine)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (Riverine)
- ___ Sediment Deposits (B2) (Riverine)
- ___ Drift Deposits (B3) (Riverine)
- ___ Drainage Patterns (B10)
- ___ Dry Season Water Table (C2)
- ___ Thin Muck Surface (C7)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC Neutral Test (D5)

Field Observations

Surface Water Present? Yes ___ No X Depth (inches) ___

Water Table Present? Yes ___ No X Depth (inches) ___

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches) ___

Wetland Hydrology Present? Yes ___ No X

Describe Recorded Data (stream gauge monitoring well aerial photos previous inspections) if available

Remarks

No wetland hydrology

SOIL

Sampling Point 8 1

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 3	10YR 5/2	100					SiLo	Moist
3+	10YR 5/2	100					Cl	Moist

[1]Type C=Concentration D=Depletion RM=Reduced Matrix [2]Location PL=Pore Lining RC=Root Channel M=Matrix

Hydric Soil Indicators (Applicable to all LRRs unless otherwise noted)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (LRR C)
___ 1 cm Muck (A9) (LRR D)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)

___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]

___ 1 cm Muck (A9) (LRR C)
___ 2 cm Muck (A10) (LRR B)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
_X_ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present

Restrictive Layer (if present)

Type ______________

Depth (inches) ______________

Hydric Soil Present? Yes _X_ No ___

Remarks

Playa soils Salorthids are hydric by definition

HYDROLOGY

Wetland Hydrology Indicators

Primary Indicators (any one indicator is sufficient)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (Nonriverine)
___ Sediment Deposits (B2) (Nonriverine)
___ Drift Deposits (B3) (Nonriverine)
_X_ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water Stained Leaves (B9)

___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Plowed Soils (C6)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Marks (B1) (Riverine)
___ Sediment Deposits (B2) (Riverine)
___ Drift Deposits (B3) (Riverine)
___ Drainage Patterns (B10)
___ Dry Season Water Table (C2)
___ Thin Muck Surface (C7)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC Neutral Test (D5)

Field Observations

Surface Water Present? Yes ___ No _X_ Depth (inches) ______

Water Table Present? Yes ___ No _X_ Depth (inches) ______

Saturation Present? (includes capillary fringe) Yes ___ No _X_ Depth (inches) ______

Wetland Hydrology Present? Yes _X_ No ___

Describe Recorded Data (stream gauge monitoring well aerial photos previous inspections) if available

Remarks

Cracked soils are indication of wetland hydrology

SOIL

Sampling Point 9 1

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 4	10YR 3/2	100					SiLo	Moist
4 7	2 5Y 5/2	100					Cl	Moist
7 - 10	10YR 6/3	100					Cl	Moist

[1]Type C=Concentration D=Depletion RM=Reduced Matrix [2]Location PL=Pore Lining RC=Root Channel M=Matrix

Hydric Soil Indicators (Applicable to all LRRs unless otherwise noted)

- __ Histosol (A1)
- __ Histic Epipedon (A2)
- __ Black Histic (A3)
- __ Hydrogen Sulfide (A4)
- __ Stratified Layers (A5) (LRR C)
- __ 1 cm Muck (A9) (LRR D)
- __ Depleted Below Dark Surface (A11)
- __ Thick Dark Surface (A12)
- __ Sandy Mucky Mineral (S1)
- __ Sandy Gleyed Matrix (S4)
- __ Sandy Redox (S5)
- __ Stripped Matrix (S6)
- __ Loamy Mucky Mineral (F1)
- __ Loamy Gleyed Matrix (F2)
- __ Depleted Matrix (F3)
- __ Redox Dark Surface (F6)
- __ Depleted Dark Surface (F7)
- __ Redox Depressions (F8)
- __ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]

- __ 1 cm Muck (A9) (LRR C)
- __ 2 cm Muck (A10) (LRR B)
- __ Reduced Vertic (F18)
- __ Red Parent Material (TF2)
- __ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present

Restrictive Layer (if present)

Type ______

Depth (inches) ______

Hydric Soil Present? Yes ______ No X

Remarks

No hydric soils

HYDROLOGY

Wetland Hydrology Indicators

Primary Indicators (any one indicator is sufficient)

- __ Surface Water (A1)
- __ High Water Table (A2)
- __ Saturation (A3)
- __ Water Marks (B1) (Nonriverine)
- __ Sediment Deposits (B2) (Nonriverine)
- __ Drift Deposits (B3) (Nonriverine)
- __ Surface Soil Cracks (B6)
- __ Inundation Visible on Aerial Imagery (B7)
- __ Water Stained Leaves (B9)
- __ Salt Crust (B11)
- __ Biotic Crust (B12)
- __ Aquatic Invertebrates (B13)
- __ Hydrogen Sulfide Odor (C1)
- __ Oxidized Rhizospheres along Living Roots (C3)
- __ Presence of Reduced Iron (C4)
- __ Recent Iron Reduction in Plowed Soils (C6)
- __ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- __ Water Marks (B1) (Riverine)
- __ Sediment Deposits (B2) (Riverine)
- __ Drift Deposits (B3) (Riverine)
- __ Drainage Patterns (B10)
- __ Dry Season Water Table (C2)
- __ Thin Muck Surface (C7)
- __ Crayfish Burrows (C8)
- __ Saturation Visible on Aerial Imagery (C9)
- __ Shallow Aquitard (D3)
- __ FAC Neutral Test (D5)

Field Observations

Surface Water Present? Yes ____ No X Depth (inches) ______

Water Table Present? Yes ____ No X Depth (inches) ______

Saturation Present? (includes capillary fringe) Yes ____ No X Depth (inches) ______

Wetland Hydrology Present? Yes ______ No X

Describe Recorded Data (stream gauge monitoring well aerial photos previous inspections) if available

Remarks

No wetland hydrology

SOIL

Sampling Point 9 2

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 3	10YR 3/2	100					SiLo	Moist
3 8	10YR 6/4	100					SaGr	Damp
8+								Cemented, hard pan

[1]Type C=Concentration D=Depletion RM=Reduced Matrix [2]Location PL=Pore Lining RC=Root Channel M=Matrix

Hydric Soil Indicators (Applicable to all LRRs unless otherwise noted)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR C)
- ___ 1 cm Muck (A9) (LRR D)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]

- ___ 1 cm Muck (A9) (LRR C)
- ___ 2 cm Muck (A10) (LRR B)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- X Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present

Restrictive Layer (if present)

Type Cemented hard pan

Depth (inches) 8

Hydric Soil Present? Yes X No ___

Remarks

Salorthids

HYDROLOGY

Wetland Hydrology Indicators

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (Nonriverine)
- ___ Sediment Deposits (B2) (Nonriverine)
- ___ Drift Deposits (B3) (Nonriverine)
- X Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (Riverine)
- ___ Sediment Deposits (B2) (Riverine)
- ___ Drift Deposits (B3) (Riverine)
- ___ Drainage Patterns (B10)
- ___ Dry Season Water Table (C2)
- ___ Thin Muck Surface (C7)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC Neutral Test (D5)

Field Observations

Surface Water Present? Yes ___ No X Depth (inches) ___

Water Table Present? Yes ___ No X Depth (inches) ___

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches) ___

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge monitoring well aerial photos previous inspections) if available

Remarks

Cracked soils indicate wetland hydrology

SOIL

Sampling Point 10 1

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 8	10YR 3/2	100					SiLo	Damp
8 - 18+	10YR 4/2	100					SiLo	Damp

[1]Type C=Concentration D=Depletion RM=Reduced Matrix [2]Location PL=Pore Lining RO=Root Channel M=Matrix

Hydric Soil Indicators (Applicable to all LRRs unless otherwise noted)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR C)
- ___ 1 cm Muck (A9) (LRR D)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]

- ___ 1 cm Muck (A9) (LRR C)
- ___ 2 cm Muck (A10) (LRR B)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present

Restrictive Layer (if present)

Type ______

Depth (inches) ______

Hydric Soil Present? Yes ___ No X

Remarks

Soils not hydric

HYDROLOGY

Wetland Hydrology Indicators

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (Nonriverine)
- ___ Sediment Deposits (B2) (Nonriverine)
- ___ Drift Deposits (B3) (Nonriverine)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (Riverine)
- ___ Sediment Deposits (B2) (Riverine)
- ___ Drift Deposits (B3) (Riverine)
- ___ Drainage Patterns (B10)
- ___ Dry Season Water Table (C2)
- ___ Thin Muck Surface (C7)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC Neutral Test (05)

Field Observations

Surface Water Present? Yes ___ No X Depth (inches) ______

Water Table Present? Yes ___ No X Depth (inches) ______

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches) ______

Wetland Hydrology Present? Yes ___ No X

Describe Recorded Data (stream gauge monitoring well aerial photos previous inspections) if available

Remarks

No wetland hydrology

SOIL

Sampling Point 10-2

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 3	10YR 3/2	100					SiLo	Moist
3 – 16+	10YR 6/4	100					Cl	Moist

[1]Type C=Concentration D=Depletion RM=Reduced Matrix [2]Location PL=Pore Lining RC=Root Channel M=Matrix

Hydric Soil Indicators (Applicable to all LRRs unless otherwise noted)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR C)
- ___ 1 cm Muck (A9) (LRR D)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]

- ___ 1 cm Muck (A9) (LRR C)
- ___ 2 cm Muck (A10) (LRR B)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- _X_ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present

Restrictive Layer (if present)

Type ______________

Depth (inches) ______________

Hydric Soil Present? Yes _X_ No ___

Remarks

Salorthids

HYDROLOGY

Wetland Hydrology Indicators

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (Nonriverine)
- ___ Sediment Deposits (B2) (Nonriverine)
- ___ Drift Deposits (B3) (Nonriverine)
- _X_ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (Riverine)
- ___ Sediment Deposits (B2) (Riverine)
- ___ Drift Deposits (B3) (Riverine)
- ___ Drainage Patterns (B10)
- ___ Dry Season Water Table (C2)
- ___ Thin Muck Surface (C7)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC Neutral Test (D5)

Field Observations

Surface Water Present? Yes ___ No _X_ Depth (inches) ______

Water Table Present? Yes ___ No _X_ Depth (inches) ______

Saturation Present? (includes capillary fringe) Yes ___ No _X_ Depth (inches) ______

Wetland Hydrology Present? Yes _X_ No ___

Describe Recorded Data (stream gauge monitoring well aerial photos previous inspections) if available

Remarks

Cracked soils indicate wetland hydrology

SOIL

Sampling Point 11 1

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 3	10YR 3/2	100					SiLo	Moist
3 – 18+	10YR 6/4	100					Cl	Moist

[1]Type C=Concentration D=Depletion RM=Reduced Matrix [2]Location PL=Pore Lining RC=Root Channel M=Matrix

Hydric Soil Indicators (Applicable to all LRRs unless otherwise noted)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR C)
- ___ 1 cm Muck (A9) (LRR D)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]

- ___ 1 cm Muck (A9) (LRR C)
- ___ 2 cm Muck (A10) (LRR B)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- X Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present

Restrictive Layer (if present)

Type ______

Depth (inches) ______

Hydric Soil Present? Yes X No ___

Remarks

Salorthids

HYDROLOGY

Wetland Hydrology Indicators

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (Nonriverine)
- ___ Sediment Deposits (B2) (Nonriverine)
- ___ Drift Deposits (B3) (Nonriverine)
- X Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (Riverine)
- ___ Sediment Deposits (B2) (Riverine)
- ___ Drift Deposits (B3) (Riverine)
- ___ Drainage Patterns (B10)
- ___ Dry Season Water Table (C2)
- ___ Thin Muck Surface (C7)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (C3)
- ___ FAC Neutral Test (D5)

Field Observations

Surface Water Present? Yes ___ No X Depth (inches) ___

Water Table Present? Yes ___ No X Depth (inches) ___

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches) ___

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge monitoring well aerial photos previous inspections) if available

Remarks

Cracked soils indicate wetland hydrology

SOIL

Sampling Point 11 2

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 8	10YR 3/2	100					SiLo	Damp
8 - 18+	10YR 4/2	100					SiLo	Damp

[1]Type C=Concentration D=Depletion RM=Reduced Matrix [2]Location PL=Pore Lining RC=Root Channel M=Matrix

Hydric Soil Indicators (Applicable to all LRRs unless otherwise noted)

__ Histosol (A1)
__ Histic Epipedon (A2)
__ Black Histic (A3)
__ Hydrogen Sulfide (A4)
__ Stratified Layers (A5) (LRR C)
__ 1 cm Muck (A9) (LRR D)
__ Depleted Below Dark Surface (A11)
__ Thick Dark Surface (A12)
__ Sandy Mucky Mineral (S1)
__ Sandy Gleyed Matrix (S4)
__ Sandy Redox (S5)
__ Stripped Matrix (S6)
__ Loamy Mucky Mineral (F1)
__ Loamy Gleyed Matrix (F2)
__ Depleted Matrix (F3)
__ Redox Dark Surface (F6)
__ Depleted Dark Surface (F7)
__ Redox Depressions (F8)
__ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]

__ 1 cm Muck (A9) (LRR C)
__ 2 cm Muck (A10) (LRR B)
__ Reduced Vertic (F18)
__ Red Parent Material (TF2)
__ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present

Restrictive Layer (if present)

Type ______

Depth (inches) ______

Hydric Soil Present? Yes ______ No X

Remarks

Soils not hydric

HYDROLOGY

Wetland Hydrology Indicators

Primary Indicators (any one indicator is sufficient)

__ Surface Water (A1)
__ High Water Table (A2)
__ Saturation (A3)
__ Water Marks (B1) (Nonriverine)
__ Sediment Deposits (B2) (Nonriverine)
__ Drift Deposits (B3) (Nonriverine)
__ Surface Soil Cracks (B6)
__ Inundation Visible on Aerial Imagery (B7)
__ Water Stained Leaves (B9)
__ Salt Crust (B11)
__ Biotic Crust (B12)
__ Aquatic Invertebrates (B13)
__ Hydrogen Sulfide Odor (C1)
__ Oxidized Rhizospheres along Living Roots (C3)
__ Presence of Reduced Iron (C4)
__ Recent Iron Reduction in Plowed Soils (C6)
__ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

__ Water Marks (B1) (Riverine)
__ Sediment Deposits (B2) (Riverine)
__ Drift Deposits (B3) (Riverine)
__ Drainage Patterns (B10)
__ Dry Season Water Table (C2)
__ Thin Muck Surface (C7)
__ Crayfish Burrows (C8)
__ Saturation Visible on Aerial Imagery (C9)
__ Shallow Aquitard (D3)
__ FAC Neutral Test (D5)

Field Observations

Surface Water Present? Yes ____ No X Depth (inches) ______

Water Table Present? Yes ____ No X Depth (inches) ______

Saturation Present? Yes ____ No X Depth (inches) ______
(includes capillary fringe)

Wetland Hydrology Present? Yes ______ No X

Describe Recorded Data (stream gauge monitoring well aerial photos previous inspections) if available

Remarks

No wetland hydrology

SOIL

Sampling Point 12 1

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 – 18+	2 5Y 5/2	70	10YR 5/6	30	C	M	SaCl	Moist

[1]Type C=Concentration D=Depletion RM=Reduced Matrix [2]Location PL=Pore Lining RC=Root Channel M=Matrix

Hydric Soil Indicators (Applicable to all LRRs unless otherwise noted)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR C)
- ___ 1 cm Muck (A9) (LRR D)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- _X_ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]

- ___ 1 cm Muck (A9) (LRR C)
- ___ 2 cm Muck (A10) (LRR B)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present

Restrictive Layer (if present)

Type ____________

Depth (inches) ____________

Hydric Soil Present? Yes _X_ No ___

Remarks

Redox Depressions

HYDROLOGY

Wetland Hydrology Indicators

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (Nonriverine)
- ___ Sediment Deposits (B2) (Nonriverine)
- ___ Drift Deposits (B3) (Nonriverine)
- _X_ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water Stained Leaves (B9)
- _X_ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (Riverine)
- ___ Sediment Deposits (B2) (Riverine)
- ___ Drift Deposits (B3) (Riverine)
- ___ Drainage Patterns (B10)
- ___ Dry Season Water Table (C2)
- ___ Thin Muck Surface (C7)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC Neutral Test (D5)

Field Observations

Surface Water Present?	Yes ___	No _X_	Depth (inches) ___
Water Table Present?	Yes ___	No _X_	Depth (inches) ___
Saturation Present? (includes capillary fringe)	Yes ___	No _X_	Depth (inches) ___

Wetland Hydrology Present? Yes _X_ No ___

Describe Recorded Data (stream gauge monitoring well aerial photos previous inspections) if available

Remarks

Surface cracks and salt crust is evidence of ponding and wetland hydrology

SOIL

Sampling Point 12 2

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 – 18+	10YR 3/2	100					Sa	Dry to damp

[1]Type O=Concentration D=Depletion RM=Reduced Matrix [2]Location PL=Pore Lining RC=Root Channel M=Matrix

Hydric Soil Indicators (Applicable to all LRRs unless otherwise noted)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (LRR C)
___ 1 cm Muck (A9) (LRR D)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]

___ 1 cm Muck (A9) (LRR C)
___ 2 cm Muck (A10) (LRR B)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present

Restrictive Layer (if present)

Type ______________

Depth (inches) ______________

Hydric Soil Present? Yes ______ No X

Remarks

No hydric soils

HYDROLOGY

Wetland Hydrology Indicators

Primary Indicators (any one indicator is sufficient)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (Nonriverine)
___ Sediment Deposits (B2) (Nonriverine)
___ Drift Deposits (B3) (Nonriverine)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Plowed Soils (C6)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Marks (B1) (Riverine)
___ Sediment Deposits (B2) (Riverine)
___ Drift Deposits (B3) (Riverine)
___ Drainage Patterns (B10)
___ Dry Season Water Table (C2)
___ Thin Muck Surface (C7)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC Neutral Test (D5)

Field Observations

Surface Water Present? Yes _____ No X Depth (inches) __________

Water Table Present? Yes _____ No X Depth (inches) __________

Saturation Present? Yes _____ No X Depth (inches) __________
(includes capillary fringe)

Wetland Hydrology Present? Yes ______ No X

Describe Recorded Data (stream gauge monitoring well aerial photos previous inspections) if available

Remarks

No wetland hydrology

SOIL

Sampling Point 12 3

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 10	10YR 2/2	100					Sa	Dry
10+	10YR 4/3	100					Sa	Dry

[1]Type C=Concentration D=Depletion RM=Reduced Matrix [2]Location PL=Pore Lining RO=Root Channel M=Matrix

Hydric Soil Indicators (Applicable to all LRRs unless otherwise noted)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR C)
- ___ 1 cm Muck (A9) (LRR D)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]

- ___ 1 cm Muck (A9) (LRR C)
- ___ 2 cm Muck (A10) (LRR B)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present

Restrictive Layer (if present)

Type ___

Depth (inches) ___

Hydric Soil Present? Yes ___ No X

Remarks

No hydric soils

HYDROLOGY

Wetland Hydrology Indicators

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (Nonriverine)
- ___ Sediment Deposits (B2) (Nonriverine)
- ___ Drift Deposits (B3) (Nonriverine)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (Riverine)
- ___ Sediment Deposits (B2) (Riverine)
- ___ Drift Deposits (B3) (Riverine)
- ___ Drainage Patterns (B10)
- ___ Dry Season Water Table (C2)
- ___ Thin Muck Surface (C7)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (C3)
- ___ FAC Neutral Test (D5)

Field Observations

Surface Water Present?	Yes ___	No X	Depth (inches) ___
Water Table Present?	Yes ___	No X	Depth (inches) ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches) ___

Wetland Hydrology Present? Yes ___ No X

Describe Recorded Data (stream gauge monitoring well aerial photos previous inspections) if available

Remarks

No wetland hydrology

SOIL

Sampling Point 13 1

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 – 18+	10YR 4/3	100					ClLo	Moist

[1]Type C=Concentration D=Depletion RM=Reduced Matrix [2]Location PL=Pore Lining RO=Root Channel M=Matrix

Hydric Soil Indicators (Applicable to all LRRs unless otherwise noted)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR C)
- ___ 1 cm Muck (A9) (LRR D)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]

- ___ 1 cm Muck (A9) (LRR C)
- ___ 2 cm Muck (A10) (LRR B)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- X Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present

Restrictive Layer (if present)

Type ______

Depth (inches) ______

Hydric Soil Present? Yes X No ___

Remarks

Salorthids playa

HYDROLOGY

Wetland Hydrology Indicators

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (Nonriverine)
- ___ Sediment Deposits (B2) (Nonriverine)
- ___ Drift Deposits (B3) (Nonriverine)
- X Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water Stained Leaves (B9)
- X Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (Riverine)
- ___ Sediment Deposits (B2) (Riverine)
- ___ Drift Deposits (B3) (Riverine)
- ___ Drainage Patterns (B10)
- ___ Dry Season Water Table (C2)
- ___ Thin Muck Surface (C7)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC Neutral Test (D5)

Field Observations

Surface Water Present? Yes ___ No X Depth (inches) ______

Water Table Present? Yes ___ No X Depth (inches) ______

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches) ______

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge monitoring well aerial photos previous inspections) if available

Remarks

Salt crust and surface soil cracks = wetland hydrology

SOIL

Sampling Point 13 2

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 10	10YR 2/2	100					Sa	Dry
10+	10YR 4/3	100					Sa	Dry

[1]Type C=Concentration D=Depletion RM=Reduced Matrix [3]Location PL=Pore Lining RO=Root Channel M=Matrix

Hydric Soil Indicators (Applicable to all LRRs unless otherwise noted)

__ Histosol (A1)
__ Histic Epipedon (A2)
__ Black Histic (A3)
__ Hydrogen Sulfide (A4)
__ Stratified Layers (A5) (LRR C)
__ 1 cm Muck (A9) (LRR D)
__ Depleted Below Dark Surface (A11)
__ Thick Dark Surface (A12)
__ Sandy Mucky Mineral (S1)
__ Sandy Gleyed Matrix (S4)
__ Sandy Redox (S5)
__ Stripped Matrix (S6)
__ Loamy Mucky Mineral (F1)
__ Loamy Gleyed Matrix (F2)
__ Depleted Matrix (F3)
__ Redox Dark Surface (F6)
__ Depleted Dark Surface (F7)
__ Redox Depressions (F8)
__ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]

__ 1 cm Muck (A9) (LRR C)
__ 2 cm Muck (A10) (LRR B)
__ Reduced Vertic (F18)
__ Red Parent Material (TF2)
__ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present

Restrictive Layer (if present)

Type __________

Depth (inches) __________

Hydric Soil Present? Yes ____ No X

Remarks

No hydric soils

HYDROLOGY

Wetland Hydrology Indicators

Primary Indicators (any one indicator is sufficient)

__ Surface Water (A1)
__ High Water Table (A2)
__ Saturation (A3)
__ Water Marks (B1) (Nonriverine)
__ Sediment Deposits (B2) (Nonriverine)
__ Drift Deposits (B3) (Nonriverine)
__ Surface Soil Cracks (B6)
__ Inundation Visible on Aerial Imagery (B7)
__ Water Stained Leaves (B9)
__ Salt Crust (B11)
__ Biotic Crust (B12)
__ Aquatic Invertebrates (B13)
__ Hydrogen Sulfide Odor (C1)
__ Oxidized Rhizospheres along Living Roots (C3)
__ Presence of Reduced Iron (C4)
__ Recent Iron Reduction in Plowed Soils (C6)
__ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

__ Water Marks (B1) (Riverine)
__ Sediment Deposits (B2) (Riverine)
__ Drift Deposits (B3) (Riverine)
__ Drainage Patterns (B10)
__ Dry Season Water Table (C2)
__ Thin Muck Surface (C7)
__ Crayfish Burrows (C8)
__ Saturation Visible on Aerial Imagery (C9)
__ Shallow Aquitard (D3)
__ FAC Neutral Test (D5)

Field Observations

Surface Water Present? Yes ____ No X Depth (inches) ______

Water Table Present? Yes ____ No X Depth (inches) ______

Saturation Present? (includes capillary fringe) Yes ____ No X Depth (inches) ______

Wetland Hydrology Present? Yes ____ No X

Describe Recorded Data (stream gauge monitoring well aerial photos previous inspections) if available

Remarks

No wetland hydrology

SOIL

Sampling Point 14 1

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 10	10YR 4/1	100					OlLo	Moist
10+	10yr 6/2	100					Cl	Moist

[1]Type C=Concentration D=Depletion RM=Reduced Matrix [2]Location PL=Pore Lining RC=Root Channel M=Matrix

Hydric Soil Indicators (Applicable to all LRRs unless otherwise noted)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (LRR C)
___ 1 cm Muck (A9) (LRR D)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]

___ 1 cm Muck (A9) (LRR C)
___ 2 cm Muck (A10) (LRR B)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
_X_ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present

Restrictive Layer (if present)

Type ______

Depth (inches) ______

Hydric Soil Present? Yes _X_ No ___

Remarks

Playa soils Salorthids are hydric by definition

HYDROLOGY

Wetland Hydrology Indicators

Primary Indicators (any one indicator is sufficient)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (Nonriverine)
___ Sediment Deposits (B2) (Nonriverine)
___ Drift Deposits (B3) (Nonriverine)
_X_ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Plowed Soils (C6)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Marks (B1) (Riverine)
___ Sediment Deposits (B2) (Riverine)
___ Drift Deposits (B3) (Riverine)
___ Drainage Patterns (B10)
___ Dry Season Water Table (C2)
___ Thin Muck Surface (C7)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC Neutral Test (D5)

Field Observations

Surface Water Present? Yes ___ No _X_ Depth (inches) ______
Water Table Present? Yes ___ No _X_ Depth (inches) ______
Saturation Present? (includes capillary fringe) Yes ___ No _X_ Depth (inches) ______

Wetland Hydrology Present? Yes _X_ No ___

Describe Recorded Data (stream gauge monitoring well aerial photos previous inspections) if available

Remarks

Surface cracks are indication of saturation

SOIL

Sampling Point 14 2

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 8	10YR 3/2	100					SiLo	Damp
8 – 18+	10YR 4/2	100					ClLo	Damp

[1]Type C=Concentration D=Depletion RM=Reduced Matrix [2]Location PL=Pore Lining RO=Root Channel M=Matrix

Hydric Soil Indicators (Applicable to all LRRs unless otherwise noted)

__ Histosol (A1)
__ Histic Epipedon (A2)
__ Black Histic (A3)
__ Hydrogen Sulfide (A4)
__ Stratified Layers (A5) (LRR **C**)
__ 1 cm Muck (A9) (LRR D)
__ Depleted Below Dark Surface (A11)
__ Thick Dark Surface (A12)
__ Sandy Mucky Mineral (S1)
__ Sandy Gleyed Matrix (S4)
__ Sandy Redox (S5)
__ Stripped Matrix (S6)
__ Loamy Mucky Mineral (F1)
__ Loamy Gleyed Matrix (F2)
__ Depleted Matrix (F3)
__ Redox Dark Surface (F6)
__ Depleted Dark Surface (F7)
__ Redox Depressions (F8)
__ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]

__ 1 cm Muck (A9) (LRR **C**)
__ 2 cm Muck (A10) (LRR B)
__ Reduced Vertic (F18)
__ Red Parent Material (TF2)
__ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present

Restrictive Layer (if present)
Type ______
Depth (inches) ______

Hydric Soil Present? Yes ____ No X

Remarks

No hydric soils

HYDROLOGY

Wetland Hydrology Indicators

Primary Indicators (any one indicator is sufficient)

__ Surface Water (A1)
__ High Water Table (A2)
__ Saturation (A3)
__ Water Marks (B1) (Nonriverine)
__ Sediment Deposits (B2) (Nonriverine)
__ Drift Deposits (B3) (Nonriverine)
__ Surface Soil Cracks (B6)
__ Inundation Visible on Aerial Imagery (B7)
__ Water Stained Leaves (B9)
__ Salt Crust (B11)
__ Biotic Crust (B12)
__ Aquatic Invertebrates (B13)
__ Hydrogen Sulfide Odor (C1)
__ Oxidized Rhizospheres along Living Roots (C3)
__ Presence of Reduced Iron (C4)
__ Recent Iron Reduction in Plowed Soils (C6)
__ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

__ Water Marks (B1) (Riverine)
__ Sediment Deposits (B2) (Riverine)
__ Drift Deposits (B3) (Riverine)
__ Drainage Patterns (B10)
__ Dry Season Water Table (C2)
__ Thin Muck Surface (C7)
__ Crayfish Burrows (C8)
__ Saturation Visible on Aerial Imagery (C9)
__ Shallow Aquitard (D3)
__ FAC Neutral Test (D5)

Field Observations

Surface Water Present? Yes ____ No X Depth (inches) ____
Water Table Present? Yes ____ No X Depth (inches) ____
Saturation Present? (includes capillary fringe) Yes ____ No X Depth (inches) ____

Wetland Hydrology Present? Yes ____ No X

Describe Recorded Data (stream gauge monitoring well aerial photos previous inspections) if available

Remarks

No wetland hydrology

SOIL

Sampling Point 15 1

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 10	10YR 4/1	100					ClLo	Moist
10+	10yr 6/2	100					Cl	Moist

[1]Type C=Concentration D=Depletion RM=Reduced Matrix [3]Location PL=Pore Lining RC=Root Channel M=Matrix

Hydric Soil Indicators (Applicable to all LRRs unless otherwise noted)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR C)
- ___ 1 cm Muck (A9) (LRR D)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]

- ___ 1 cm Muck (A9) (LRR C)
- ___ 2 cm Muck (A10) (LRR B)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- X Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present

Restrictive Layer (if present)

Type ______

Depth (inches) ______

Hydric Soil Present? Yes X No ___

Remarks

Playa soils Salorthids are hydric by definifion

HYDROLOGY

Wetland Hydrology Indicators

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (Nonriverine)
- ___ Sediment Deposits (B2) (Nonriverine)
- ___ Drift Deposits (B3) (Nonriverine)
- X Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (Riverine)
- ___ Sediment Deposits (B2) (Riverine)
- ___ Drift Deposits (B3) (Riverine)
- ___ Drainage Patterns (B10)
- ___ Dry Season Water Table (C2)
- ___ Thin Muck Surface (C7)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC Neutral Test (D6)

Field Observations

Surface Water Present? Yes ___ No X Depth (inches) ______

Water Table Present? Yes ___ No X Depth (inches) ______

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches) ______

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge monitoring well aerial photos previous inspections) if available

Remarks

Surface cracks are indication of saturation

SOIL

Sampling Point 15 2

Profile Descnption (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 8	10YR 3/2	100					SiLo	Damp
8 – 18+	10YR 4/2	100					ClLo	Damp

[1]Type C=Concentration D=Depletion RM=Reduced Matrix [2]Location PL=Pore Lining RC=Root Channel M=Matrix

Hydric Soil Indicators (Applicable to all LRRs unless otherwise noted)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (LRR C)
___ 1 cm Muck (A9) (LRR D)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]

___ 1 cm Muck (A9) (LRR C)
___ 2 cm Muck (A10) (LRR B)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present

Restrictive Layer (if present)

Type ____________

Depth (inches) ____________

Hydric Soil Present? Yes ______ No X

Remarks

No hydric soils

HYDROLOGY

Wetland Hydrology Indicators

Primary Indicators (any one indicator is sufficient)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (Nonriverine)
___ Sediment Deposits (B2) (Nonriverine)
___ Drift Deposits (B3) (Nonriverine)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Plowed Soils (C6)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Marks (B1) (Riverine)
___ Sediment Deposits (B2) (Riverine)
___ Drift Deposits (B3) (Riverine)
___ Drainage Patterns (B10)
___ Dry Season Water Table (C2)
___ Thin Muck Surface (C7)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC Neutral Test (D5)

Field Observations

Surface Water Present? Yes _____ No X Depth (inches) ________
Water Table Present? Yes _____ No X Depth (inches) ________
Saturation Present? Yes _____ No X Depth (inches) ________
(includes capillary fringe)

Wetland Hydrology Present? Yes ______ No X

Describe Recorded Data (stream gauge monitoring well aerial photos previous inspections) if available

Remarks

No wetland hydrology

SOIL

Sampling Point 16 1

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 10	10YR 4/1	100					ClLo	Moist
10+	10yr 6/2	100					Cl	Moist

[1]Type C=Concentration D=Depletion RM=Reduced Matrix [2]Location PL=Pore Lining RC=Root Channel M=Matrix

Hydric Soil Indicators (Applicable to all LRRs unless otherwise noted)

- __ Histosol (A1)
- __ Histic Epipedon (A2)
- __ Black Histic (A3)
- __ Hydrogen Sulfide (A4)
- __ Stratified Layers (A5) (LRR C)
- __ 1 cm Muck (A9) (LRR D)
- __ Depleted Below Dark Surface (A11)
- __ Thick Dark Surface (A12)
- __ Sandy Mucky Mineral (S1)
- __ Sandy Gleyed Matrix (S4)
- __ Sandy Redox (S5)
- __ Stripped Matrix (S6)
- __ Loamy Mucky Mineral (F1)
- __ Loamy Gleyed Matrix (F2)
- __ Depleted Matrix (F3)
- __ Redox Dark Surface (F6)
- __ Depleted Dark Surface (F7)
- __ Redox Depressions (F8)
- __ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]

- __ 1 cm Muck (A9) (LRR C)
- __ 2 cm Muck (A10) (LRR B)
- __ Reduced Vertic (F18)
- __ Red Parent Material (TF2)
- X Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present

Restrictive Layer (if present)

Type ____

Depth (inches) ____

Hydric Soil Present? Yes X No ____

Remarks

Playa soils Salorthids are hydric by definition

HYDROLOGY

Wetland Hydrology Indicators

Primary Indicators (any one indicator is sufficient)

- __ Surface Water (A1)
- __ High Water Table (A2)
- __ Saturation (A3)
- __ Water Marks (B1) (Nonriverine)
- __ Sediment Deposits (B2) (Nonriverine)
- __ Drift Deposits (B3) (Nonriverine)
- X Surface Soil Cracks (B6)
- __ Inundation Visible on Aerial Imagery (B7)
- __ Water Stained Leaves (B9)
- __ Salt Crust (B11)
- __ Biotic Crust (B12)
- __ Aquatic Invertebrates (B13)
- __ Hydrogen Sulfide Odor (C1)
- __ Oxidized Rhizospheres along Living Roots (C3)
- __ Presence of Reduced Iron (C4)
- __ Recent Iron Reduction in Plowed Soils (C6)
- __ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- __ Water Marks (B1) (Riverine)
- __ Sediment Deposits (B2) (Riverine)
- __ Drift Deposits (B3) (Riverine)
- __ Drainage Patterns (B10)
- __ Dry Season Water Table (C2)
- __ Thin Muck Surface (C7)
- __ Crayfish Burrows (C8)
- __ Saturation Visible on Aerial Imagery (C9)
- __ Shallow Aquitard (D3)
- __ FAC Neutral Test (D5)

Field Observations

Surface Water Present? Yes ____ No X Depth (inches) ____

Water Table Present? Yes ____ No X Depth (inches) ____

Saturation Present? (includes capillary fringe) Yes ____ No X Depth (inches) ____

Wetland Hydrology Present? Yes X No ____

Describe Recorded Data (stream gauge monitoring well aerial photos previous inspections) if available

Remarks

Surface cracks are indication of saturation

SOIL

Sampling Point 16 2

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 8	10YR 3/2	100					SiLo	Damp
8 - 18+	10YR 4/2	100					ClLo	Damp

[1]Type C=Concentration D=Depletion RM=Reduced Matrix [2]Location PL=Pore Lining RC=Root Channel M=Matrix

Hydric Soil Indicators (Applicable to all LRRs unless otherwise noted)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (LRR C)
___ 1 cm Muck (A9) (LRR D)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]

___ 1 cm Muck (A9) (LRR C)
___ 2 cm Muck (A10) (LRR B)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present

Restrictive Layer (if present)

Type ______

Depth (inches) ______

Hydric Soil Present? Yes ___ No X

Remarks

No hydric soils

HYDROLOGY

Wetland Hydrology Indicators

Primary Indicators (any one indicator is sufficient)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (Nonriverine)
___ Sediment Deposits (B2) (Nonriverine)
___ Drift Deposits (B3) (Nonriverine)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Plowed Soils (C6)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Marks (B1) (Riverine)
___ Sediment Deposits (B2) (Riverine)
___ Drift Deposits (B3) (Riverine)
___ Drainage Patterns (B10)
___ Dry Season Water Table (C2)
___ Thin Muck Surface (C7)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC Neutral Test (D5)

Field Observations

Surface Water Present? Yes ___ No X Depth (inches) ______

Water Table Present? Yes ___ No X Depth (inches) ______

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches) ______

Wetland Hydrology Present? Yes ___ No X

Describe Recorded Data (stream gauge monitoring well aerial photos previous inspections) if available

Remarks

No wetland hydrology

SOIL

Sampling Point 17 1

Profile Descnption (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 10	10YR 4/1	100					OlLo	Moist
10+	10yr 6/2	100					Cl	Moist

[1]Type C=Concentration D=Depletion RM=Reduced Matnx [2]Location PL=Pore Lining RC=Root Channel M=Matnx

Hydric Soil Indicators (Applicable to all LRRs unless otherwise noted)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (LRR C)
___ 1 cm Muck (A9) (LRR D)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stnpped Matnx (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matnx (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]

___ 1 cm Muck (A9) (LRR C)
___ 2 cm Muck (A10) (LRR B)
___ Reduced Vertic (F18)
___ Red Parent Matenal (TF2)
_X_ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present

Restrictive Layer (if present)
Type ______
Depth (inches) ______

Hydnc Soil Present? Yes X No ___

Remarks

Playa soils Salorthids are hydnc by definition

HYDROLOGY

Wetland Hydrology Indicators

Pnmary Indicators (any one indicator is sufficient)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (Nonnverine)
___ Sediment Deposits (B2) (Nonnvenne)
___ Dnft Deposits (B3) (Nonnvenne)
_X_ Surface Soil Cracks (B6)
___ Inundation Visible on Aenal Imagery (B7)
___ Water Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Plowed Soils (C6)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Marks (B1) (Riverine)
___ Sediment Deposits (B2) (Rivenne)
___ Dnft Deposits (B3) (Riverine)
___ Drainage Patterns (B10)
___ Dry Season Water Table (C2)
___ Thin Muck Surface (C7)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aenal Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC Neutral Test (D5)

Field Observations

Surface Water Present? Yes ___ No X Depth (inches) ______
Water Table Present? Yes ___ No X Depth (inches) ______
Saturation Present? Yes ___ No X Depth (inches) ______
(includes capillary fnnge)

Wetland Hydrology Present? Yes X No ___

Descnbe Recorded Data (stream gauge monitonng well aenal photos previous inspections) if available

Remarks

Surface cracks are indication of saturation

SOIL

Sampling Point 17 2

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth (inches)	Matnx Color (moist)	Matnx %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0 8	10YR 3/2	100					SiLo	Damp
8 - 18+	10YR 4/2	100					ClLo	Damp

[1]Type C=Concentration D=Depletion RM=Reduced Matnx [2]Location PL=Pore Lining RC=Root Channel M=Matnx

Hydnc Soil Indicators (Applicable to all LRRs unless otherwise noted)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (LRR C)
___ 1 cm Muck (A9) (LRR D)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stnpped Matnx (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matnx (F2)
___ Depleted Matnx (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]

___ 1 cm Muck (A9) (LRR C)
___ 2 cm Muck (A10) (LRR B)
___ Reduced Vertic (F18)
___ Red Parent Matenal (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present

Restrictive Layer (if present)

Type ______________

Depth (inches) ______________

Hydnc Soil Present? Yes ____ No X

Remarks

No hydnc soils

HYDROLOGY

Wetland Hydrology Indicators

Pnmary Indicators (any one indicator is sufficient)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (Nonrivenne)
___ Sediment Deposits (B2) (Nonnvenne)
___ Dnft Deposits (B3) (Nonnverlne)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aenal Imagery (B7)
___ Water Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Plowed Soils (C6)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Marks (B1) (Riverine)
___ Sediment Deposits (B2) (Rivenne)
___ Dnft Deposits (B3) (Riverine)
___ Drainage Patterns (B10)
___ Dry Season Water Table (C2)
___ Thin Muck Surface (C7)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aenal Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations

Surface Water Present? Yes ____ No X Depth (inches) ________

Water Table Present? Yes ____ No X Depth (inches) ________

Saturation Present? Yes ____ No X Depth (inches) ________
(includes capillary fringe)

Wetland Hydrology Present? Yes ____ No X

Describe Recorded Data (stream gauge monitonng well aenal photos previous inspections) if available

Remarks

No wetland hydrology

SOIL

Sampling Point 18 1

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 10	10YR 4/1	100					ClLo	Moist
10+	10yr 6/2	100					Cl	Moist

[1]Type C=Concentration D=Depletion RM=Reduced Matrix [2]Location PL=Pore Lining RC=Root Channel M=Matrix

Hydric Soil Indicators (Applicable to all LRRs, unless otherwise noted)

- __ Histosol (A1)
- __ Histic Epipedon (A2)
- __ Black Histic (A3)
- __ Hydrogen Sulfide (A4)
- __ Stratified Layers (A5) (LRR C)
- __ 1 cm Muck (A9) (LRR D)
- __ Depleted Below Dark Surface (A11)
- __ Thick Dark Surface (A12)
- __ Sandy Mucky Mineral (S1)
- __ Sandy Gleyed Matrix (S4)
- __ Sandy Redox (S5)
- __ Stripped Matrix (S6)
- __ Loamy Mucky Mineral (F1)
- __ Loamy Gleyed Matrix (F2)
- __ Depleted Matrix (F3)
- __ Redox Dark Surface (F6)
- __ Depleted Dark Surface (F7)
- __ Redox Depressions (F8)
- __ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]

- __ 1 cm Muck (A9) (LRR C)
- __ 2 cm Muck (A10) (LRR B)
- __ Reduced Vertic (F18)
- __ Red Parent Material (TF2)
- X Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present

Restrictive Layer (if present)

Type ____

Depth (inches) ____

Hydric Soil Present? Yes X No ____

Remarks

Playa soils Salorthids are hydric by definition

HYDROLOGY

Wetland Hydrology Indicators

Primary Indicators (any one indicator is sufficient)

- __ Surface Water (A1)
- __ High Water Table (A2)
- __ Saturation (A3)
- __ Water Marks (B1) (Nonriverine)
- __ Sediment Deposits (B2) (Nonriverine)
- __ Drift Deposits (B3) (Nonriverine)
- X Surface Soil Cracks (B6)
- __ Inundation Visible on Aerial Imagery (B7)
- __ Water Stained Leaves (B9)
- __ Salt Crust (B11)
- __ Biotic Crust (B12)
- __ Aquatic Invertebrates (B13)
- __ Hydrogen Sulfide Odor (C1)
- __ Oxidized Rhizospheres along Living Roots (C3)
- __ Presence of Reduced Iron (C4)
- __ Recent Iron Reduction in Plowed Soils (C6)
- __ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- __ Water Marks (B1) (Riverine)
- __ Sediment Deposits (B2) (Riverine)
- __ Drift Deposits (B3) (Riverine)
- __ Drainage Patterns (B10)
- __ Dry Season Water Table (C2)
- __ Thin Muck Surface (C7)
- __ Crayfish Burrows (C8)
- __ Saturation Visible on Aerial Imagery (C9)
- __ Shallow Aquitard (D3)
- __ FAC Neutral Test (D5)

Field Observations

Surface Water Present? Yes ____ No X Depth (inches) ____

Water Table Present? Yes ____ No X Depth (inches) ____

Saturation Present? (includes capillary fringe) Yes ____ No X Depth (inches) ____

Wetland Hydrology Present? Yes X No ____

Describe Recorded Data (stream gauge monitoring well aerial photos previous inspections) if available

Remarks

Surface cracks are indication of saturation

SOIL

Sampling Point 18 2

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth (inches)	Matnx Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 – 8	10YR 3/2	100					SiLo	Damp
8 – 18+	10YR 4/2	100					ClLo	Damp

[1]Type C=Concentration D=Depletion RM=Reduced Matnx [2]Location PL=Pore Lining RO=Root Channel M=Matnx

Hydric Soil Indicators (Applicable to all LRRs unless otherwise noted)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR C)
- ___ 1 cm Muck (A9) (LRR D)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matnx (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matnx (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matnx (F2)
- ___ Depleted Matnx (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydnc Soils[3]

- ___ 1 cm Muck (A9) (LRR C)
- ___ 2 cm Muck (A10) (LRR B)
- ___ Reduced Vertic (F18)
- ___ Red Parent Matenal (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present

Restrictive Layer (if present)

Type ________

Depth (inches) ________

Hydric Soil Present? Yes ______ No X

Remarks

No hydnc soils

HYDROLOGY

Wetland Hydrology Indicators

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (Nonnverine)
- ___ Sediment Deposits (B2) (Nonnverine)
- ___ Dnft Deposits (B3) (Nonnvenne)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aenal Imagery (B7)
- ___ Water Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (Riverine)
- ___ Sediment Deposits (B2) (Riverine)
- ___ Dnft Deposits (B3) (Rivenne)
- ___ Drainage Patterns (B10)
- ___ Dry Season Water Table (C2)
- ___ Thin Muck Surface (C7)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aenal Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC Neutral Test (D5)

Field Observations

Surface Water Present? Yes ______ No X Depth (inches) ________

Water Table Present? Yes ______ No X Depth (inches) ________

Saturation Present? (includes capillary fringe) Yes ______ No X Depth (inches) ________

Wetland Hydrology Present? Yes ______ No X

Descnbe Recorded Data (stream gauge monitonng well aenal photos previous inspections) if available

Remarks

No wetland hydrology

SOIL

Sampling Point 18 3

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 4	10YR 3/2	100					ClLo	damp
4 12	10YR 6/2	100					Cl	Moist
12+								Hard pan

[1]Type C=Concentration D=Depletion RM=Reduced Matrix [2]Location PL=Pore Lining RC=Root Channel M=Matrix

Hydric Soil Indicators (Applicable to all LRRs unless otherwise noted.)

- __ Histosol (A1)
- __ Histic Epipedon (A2)
- __ Black Histic (A3)
- __ Hydrogen Sulfide (A4)
- __ Stratified Layers (A5) (LRR C)
- __ 1 cm Muck (A9) (LRR D)
- __ Depleted Below Dark Surface (A11)
- __ Thick Dark Surface (A12)
- __ Sandy Mucky Mineral (S1)
- __ Sandy Gleyed Matrix (S4)
- __ Sandy Redox (S5)
- __ Stripped Matrix (S6)
- __ Loamy Mucky Mineral (F1)
- __ Loamy Gleyed Matrix (F2)
- __ Depleted Matrix (F3)
- __ Redox Dark Surface (F6)
- __ Depleted Dark Surface (F7)
- __ Redox Depressions (F8)
- __ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]

- __ 1 cm Muck (A9) (LRR C)
- __ 2 cm Muck (A10) (LRR B)
- __ Reduced Vertic (F18)
- __ Red Parent Material (TF2)
- X Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present

Restrictive Layer (if present)

Type Cemented

Depth (inches) 12

Hydric Soil Present? Yes X No ____

Remarks

Salorthids

HYDROLOGY

Wetland Hydrology Indicators

Primary Indicators (any one indicator is sufficient)

- __ Surface Water (A1)
- __ High Water Table (A2)
- __ Saturation (A3)
- __ Water Marks (B1) (Nonriverine)
- __ Sediment Deposits (B2) (Nonriverine)
- __ Drift Deposits (B3) (Nonriverine)
- X Surface Soil Cracks (B6)
- __ Inundation Visible on Aerial Imagery (B7)
- __ Water Stained Leaves (B9)
- __ Salt Crust (B11)
- __ Biotic Crust (B12)
- __ Aquatic Invertebrates (B13)
- __ Hydrogen Sulfide Odor (C1)
- __ Oxidized Rhizospheres along Living Roots (C3)
- __ Presence of Reduced Iron (C4)
- __ Recent Iron Reduction in Plowed Soils (C6)
- __ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- __ Water Marks (B1) (Riverine)
- __ Sediment Deposits (B2) (Riverine)
- __ Drift Deposits (B3) (Riverine)
- __ Drainage Patterns (B10)
- __ Dry Season Water Table (C2)
- __ Thin Muck Surface (C7)
- __ Crayfish Burrows (C8)
- __ Saturation Visible on Aerial Imagery (C9)
- __ Shallow Aquitard (D3)
- __ FAC Neutral Test (D5)

Field Observations

Surface Water Present?	Yes ____	No X	Depth (inches) ____
Water Table Present?	Yes ____	No X	Depth (inches) ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches) ____

Wetland Hydrology Present? Yes X No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available

Remarks

Surface soil cracks = wetland hydrology

SOIL

Sampling Point 19 1

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 5	10YR 4/2	100					Cl	Moist
5 7	10YR 5/3	100					ClSa	Moist
7+								Hard pan

[1]Type C=Concentration D=Depletion RM=Reduced Matrix [2]Location PL=Pore Lining RC=Root Channel M=Matrix

Hydric Soil Indicators (Applicable to all LRRs unless otherwise noted)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (LRR C)
___ 1 cm Muck (A9) (LRR D)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]

___ 1 cm Muck (A9) (LRR C)
___ 2 cm Muck (A10) (LRR B)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
_X_ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present

Restrictive Layer (if present)

Type Cemented

Depth (inches) 7

Hydric Soil Present? Yes _X_ No ___

Remarks

Salorthids playa soils

HYDROLOGY

Wetland Hydrology Indicators

Primary Indicators (any one indicator is sufficient)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (Nonriverine)
___ Sediment Deposits (B2) (Nonriverine)
___ Drift Deposits (B3) (Nonriverine)
_X_ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water Stained Leaves (B9)
_X_ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Plowed Soils (C6)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Marks (B1) (Riverine)
___ Sediment Deposits (B2) (Riverine)
___ Drift Deposits (B3) (Riverine)
___ Drainage Patterns (B10)
___ Dry Season Water Table (C2)
___ Thin Muck Surface (C7)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC Neutral Test (D5)

Field Observations

Surface Water Present? Yes ___ No _X_ Depth (inches) ______
Water Table Present? Yes ___ No _X_ Depth (inches) ______
Saturation Present? Yes ___ No _X_ Depth (inches) ______
(includes capillary fringe)

Wetland Hydrology Present? Yes _X_ No ___

Describe Recorded Data (stream gauge monitoring well aerial photos previous inspections) if available

Remarks

Soil surface cracks and salt crust = wetland hydrology

SOIL

Sampling Point 19 2

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 10	10YR 2/2	100					Sa	Dry
10+	10YR 4/3	100					Sa	Dry

[1]Type C=Concentration D=Depletion RM=Reduced Matrix [2]Location PL=Pore Lining RO=Root Channel M=Matrix

Hydric Soil Indicators (Applicable to all LRRs unless otherwise noted)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR C)
- ___ 1 cm Muck (A9) (LRR D)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]

- ___ 1 cm Muck (A9) (LRR C)
- ___ 2 cm Muck (A10) (LRR B)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present

Restrictive Layer (if present)

Type ______

Depth (inches) ______

Hydric Soil Present? Yes ___ No X

Remarks

No hydric soils

HYDROLOGY

Wetland Hydrology Indicators

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (Nonriverine)
- ___ Sediment Deposits (B2) (Nonriverine)
- ___ Drift Deposits (B3) (Nonriverine)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (Riverine)
- ___ Sediment Deposits (B2) (Riverine)
- ___ Drift Deposits (B3) (Riverine)
- ___ Drainage Patterns (B10)
- ___ Dry Season Water Table (C2)
- ___ Thin Muck Surface (C7)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC Neutral Test (D5)

Field Observations

Surface Water Present? Yes ___ No X Depth (inches) ______

Water Table Present? Yes ___ No X Depth (inches) ______

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches) ______

Wetland Hydrology Present? Yes ___ No X

Describe Recorded Data (stream gauge monitoring well aerial photos previous inspections) if available

Remarks

No wetland hydrology

SOIL

Sampling Point 19 3

Profile Description (Descnbe to the depth needed to document the indicator or confirm the absence of indicators)

Depth (inches)	Matnx Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 3	10YR 3/2	100					ClLo	damp
2 - 18+	10YR 4/2	60	10YR 6/2	40	C	M		

[1]Type C=Concentration D=Depletion RM=Reduced Matnx [2]Location PL=Pore Lining RC=Root Channel M=Matnx.

Hydric Soil Indicators (Applicable to all LRRs unless otherwise noted)

__ Histosol (A1)
__ Histic Epipedon (A2)
__ Black Histic (A3)
__ Hydrogen Sulfide (A4)
__ Stratified Layers (A5) (LRR C)
__ 1 cm Muck (A9) (LRR D)
__ Depleted Below Dark Surface (A11)
__ Thick Dark Surface (A12)
__ Sandy Mucky Mineral (S1)
__ Sandy Gleyed Matnx (S4)

__ Sandy Redox (S5)
__ Stnpped Matnx (S6)
__ Loamy Mucky Mineral (F1)
__ Loamy Gleyed Matnx (F2)
__ Depleted Matnx (F3)
__ Redox Dark Surface (F6)
__ Depleted Dark Surface (F7)
__ Redox Depressions (F8)
__ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]

__ 1 cm Muck (A9) (LRR C)
__ 2 cm Muck (A10) (LRR B)
__ Reduced Vertic (F18)
__ Red Parent Matenal (TF2)
X Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present

Restrictive Layer (if present)

Type ________

Depth (inches) ________

Hydnc Soil Present? Yes X No ____

Remarks

Salorthids

HYDROLOGY

Wetland Hydrology Indicators

Pnmary Indicators (any one indicator is sufficient)

__ Surface Water (A1)
__ High Water Table (A2)
__ Saturation (A3)
__ Water Marks (B1) (Nonnverine)
__ Sediment Deposits (B2) (Nonnverine)
__ Dnft Deposits (B3) (Nonnverine)
X Surface Soil Cracks (B6)
__ Inundation Visible on Aenal Imagery (B7)
__ Water Stained Leaves (B9)

__ Salt Crust (B11)
__ Biotic Crust (B12)
__ Aquatic Invertebrates (B13)
__ Hydrogen Sulfide Odor (C1)
__ Oxidized Rhizospheres along Living Roots (C3)
__ Presence of Reduced Iron (C4)
__ Recent Iron Reduction in Plowed Soils (C6)
__ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

__ Water Marks (B1) (Rivenne)
__ Sediment Deposits (B2) (Riverine)
__ Dnft Deposits (B3) (Rivenne)
__ Drainage Patterns (B10)
__ Dry Season Water Table (C2)
__ Thin Muck Surface (C7)
__ Crayfish Burrows (C8)
__ Saturation Visible on Aenal Imagery (C9)
__ Shallow Aquitard (D3)
__ FAC Neutral Test (D5)

Field Observations

Surface Water Present? Yes ____ No X Depth (inches) ________

Water Table Present? Yes ____ No X Depth (inches) ________

Saturation Present? (includes capillary fringe) Yes ____ No X Depth (inches) ________

Wetland Hydrology Present? Yes X No ____

Descnbe Recorded Data (stream gauge monitoring well aenal photos previous inspections) if available

Remarks

Surface soil cracks = wetland hydrology

SOIL

Sampling Point 19 4

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 18+	10YR 3/2	100					Sa	Dry to damp

[1]Type C=Concentration D=Depletion RM=Reduced Matrix [2]Location PL=Pore Lining RC=Root Channel M=Matrix

Hydric Soil Indicators (Applicable to all LRRs unless otherwise noted)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR C)
- ___ 1 cm Muck (A9) (LRR D)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]

- ___ 1 cm Muck (A9) (LRR C)
- ___ 2 cm Muck (A10) (LRR B)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present

Restrictive Layer (if present)

Type ________

Depth (inches) ________

Hydric Soil Present? Yes ______ No X

Remarks

No hydric soils

HYDROLOGY

Wetland Hydrology Indicators

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (Nonriverine)
- ___ Sediment Deposits (B2) (Nonriverine)
- ___ Drift Deposits (B3) (Nonriverine)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (Riverine)
- ___ Sediment Deposits (B2) (Riverine)
- ___ Drift Deposits (B3) (Riverine)
- ___ Drainage Patterns (B10)
- ___ Dry Season Water Table (C2)
- ___ Thin Muck Surface (C7)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC Neutral Test (D5)

Field Observations

Surface Water Present? Yes ____ No X Depth (inches) ________

Water Table Present? Yes ____ No X Depth (inches) ________

Saturation Present? Yes ____ No X Depth (inches) ________
(includes capillary fringe)

Wetland Hydrology Present? Yes ______ No X

Describe Recorded Data (stream gauge monitoring well aerial photos previous inspections) if available

Remarks

No wetland hydrology

SOIL

Sampling Point 19 5

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 4	10YR 3/2	100					ClLo	Moist
4 10	10YR 4/3	100					Cl	Moist
10+								Hard pan

[1]Type C=Concentration D=Depletion RM=Reduced Matrix [2]Location PL=Pore Lining RC=Root Channel M=Matrix

Hydric Soil Indicators (Applicable to all LRRs unless otherwise noted)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR C)
- ___ 1 cm Muck (A9) (LRR D)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]

- ___ 1 cm Muck (A9) (LRR C)
- ___ 2 cm Muck (A10) (LRR B)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- X Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present

Restrictive Layer (if present)

Type Cemented

Depth (inches) 10

Hydric Soil Present? Yes X No ___

Remarks

Salorthids playa soils

HYDROLOGY

Wetland Hydrology Indicators

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (Nonriverine)
- ___ Sediment Deposits (B2) (Nonriverine)
- ___ Drift Deposits (B3) (Nonriverine)
- X Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (Riverine)
- ___ Sediment Deposits (B2) (Riverine)
- ___ Drift Deposits (B3) (Riverine)
- ___ Drainage Patterns (B10)
- ___ Dry Season Water Table (C2)
- ___ Thin Muck Surface (C7)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC Neutral Test (D5)

Field Observations

Surface Water Present? Yes ___ No X Depth (inches) ___

Water Table Present? Yes ___ No X Depth (inches) ___

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches) ___

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge monitoring well aerial photos previous inspections) if available

Remarks

Soil surface cracks = wetland hydrology

SOIL

Sampling Point 19 6

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 3	10YR 3/2	100					SaLo	Moist
3 12	10YR 4/3	100					Sa	Moist
12+								Hard pan

[1]Type C=Concentration D=Depletion RM=Reduced Matrix [2]Location PL=Pore Lining RC=Root Channel M=Matrix

Hydric Soil Indicators (Applicable to all LRRs unless otherwise noted)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR C)
- ___ 1 cm Muck (A9) (LRR D)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]

- ___ 1 cm Muck (A9) (LRR C)
- ___ 2 cm Muck (A10) (LRR B)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- X Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present

Restrictive Layer (if present)

Type Cemented

Depth (inches) 10

Hydric Soil Present? Yes X No ___

Remarks

Salorthids playa soils

HYDROLOGY

Wetland Hydrology Indicators

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (Nonriverine)
- ___ Sediment Deposits (B2) (Nonriverine)
- ___ Drift Deposits (B3) (Nonriverine)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (Riverine)
- ___ Sediment Deposits (B2) (Riverine)
- ___ Drift Deposits (B3) (Riverine)
- ___ Drainage Patterns (B10)
- ___ Dry Season Water Table (C2)
- ___ Thin Muck Surface (C7)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC Neutral Test (D5)

Field Observations

Surface Water Present? Yes ___ No X Depth (inches) ___

Water Table Present? Yes ___ No X Depth (inches) ___

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches) ___

Wetland Hydrology Present? Yes ___ No X

Describe Recorded Data (stream gauge monitoring well aerial photos previous inspections) if available

Remarks

No wetland hydrology

SOIL

Sampling Point 19 7

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 3	10YR 3/2	100					SaLo	Moist
3 – 18+	10YR 4/3	100					Sa	Moist

[1]Type C=Concentration D=Depletion RM=Reduced Matrix [2]Location PL=Pore Lining RC=Root Channel M=Matrix

Hydric Soil Indicators (Applicable to all LRRs unless otherwise noted)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR C)
- ___ 1 cm Muck (A9) (LRR D)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]

- ___ 1 cm Muck (A9) (LRR C)
- ___ 2 cm Muck (A10) (LRR B)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- X Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present

Restrictive Layer (if present)

Type ____________

Depth (inches) ____________

Hydric Soil Present? Yes X No ___

Remarks

Salorthids playa soils

HYDROLOGY

Wetland Hydrology Indicators

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (Nonriverine)
- ___ Sediment Deposits (B2) (Nonriverine)
- ___ Drift Deposits (B3) (Nonriverine)
- X Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water Stained Leaves (B9)
- X Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (Riverine)
- ___ Sediment Deposits (B2) (Riverine)
- ___ Drift Deposits (B3) (Riverine)
- ___ Drainage Patterns (B10)
- ___ Dry Season Water Table (C2)
- ___ Thin Muck Surface (C7)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC Neutral Test (D5)

Field Observations

Surface Water Present? Yes ___ No X Depth (inches) ____

Water Table Present? Yes ___ No X Depth (inches) ____

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches) ____

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge monitoring well aerial photos previous inspections) if available

Remarks

Soil surface cracks and salt crust = wetland hydrology

SOIL

Sampling Point 19 8

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0 4	10YR 3/2	100					Cl	Damp
4 6	10YR 4/2	100					Cl	moist
6 - 18+	10YR 4/2	90	10YR 6/4	10			Cl	saturated

[1]Type C=Concentration D=Depletion RM=Reduced Matrix [2]Location PL=Pore Lining RC=Root Channel M=Matrix

Hydric Soil Indicators (Applicable to all LRRs unless otherwise noted)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (LRR C)
___ 1 cm Muck (A9) (LRR D)
X Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]

___ 1 cm Muck (A9) (LRR C)
___ 2 cm Muck (A10) (LRR B)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present

Restrictive Layer (if present)

Type ___

Depth (inches) ___

Hydric Soil Present? Yes X No ___

Remarks

Depleted below dark surface

HYDROLOGY

Wetland Hydrology Indicators

Primary Indicators (any one indicator is sufficient)

___ Surface Water (A1)
___ High Water Table (A2)
X Saturation (A3)
___ Water Marks (B1) (Nonriverine)
___ Sediment Deposits (B2) (Nonriverine)
___ Drift Deposits (B3) (Nonriverine)
X Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Plowed Soils (C6)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Marks (B1) (Riverine)
___ Sediment Deposits (B2) (Riverine)
___ Drift Deposits (B3) (Riverine)
___ Drainage Patterns (B10)
___ Dry Season Water Table (C2)
___ Thin Muck Surface (C7)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC Neutral Test (D5)

Field Observations

Surface Water Present? Yes ___ No X Depth (inches) ___

Water Table Present? Yes ___ No X Depth (inches) ___

Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches) ___

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge monitoring well aerial photos previous inspections) if available

Remarks

Saturated at 6 surface soil cracks = wetland hydrology

SOIL

Sampling Point 19 9

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 2	10YR 3/2	100					Lo	damp
2+								Hard pan

[1]Type C=Concentration D=Depletion RM=Reduced Matrix [2]Location PL=Pore Lining RC=Root Channel M=Matrix

Hydric Soil Indicators (Applicable to all LRRs unless otherwise noted)

__ Histosol (A1)
__ Histic Epipedon (A2)
__ Black Histic (A3)
__ Hydrogen Sulfide (A4)
__ Stratified Layers (A5) (LRR C)
__ 1 cm Muck (A9) (LRR D)
__ Depleted Below Dark Surface (A11)
__ Thick Dark Surface (A12)
__ Sandy Mucky Mineral (S1)
__ Sandy Gleyed Matrix (S4)
__ Sandy Redox (S5)
__ Stripped Matrix (S6)
__ Loamy Mucky Mineral (F1)
__ Loamy Gleyed Matrix (F2)
__ Depleted Matrix (F3)
__ Redox Dark Surface (F6)
__ Depleted Dark Surface (F7)
__ Redox Depressions (F8)
__ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]

__ 1 cm Muck (A9) (LRR C)
__ 2 cm Muck (A10) (LRR B)
__ Reduced Vertic (F18)
__ Red Parent Material (TF2)
__ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present

Restrictive Layer (if present)
Type Cemented
Depth (inches) 2

Hydric Soil Present? Yes ______ No X

Remarks

No hydric soil indicators

HYDROLOGY

Wetland Hydrology Indicators

Primary Indicators (any one indicator is sufficient)

__ Surface Water (A1)
__ High Water Table (A2)
__ Saturation (A3)
__ Water Marks (B1) (Nonriverine)
__ Sediment Deposits (B2) (Nonriverine)
__ Drift Deposits (B3) (Nonriverine)
__ Surface Soil Cracks (B6)
__ Inundation Visible on Aerial Imagery (B7)
__ Water Stained Leaves (B9)
__ Salt Crust (B11)
__ Biotic Crust (B12)
__ Aquatic Invertebrates (B13)
__ Hydrogen Sulfide Odor (C1)
__ Oxidized Rhizospheres along Living Roots (C3)
__ Presence of Reduced Iron (C4)
__ Recent Iron Reduction in Plowed Soils (C6)
__ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

__ Water Marks (B1) (Riverine)
__ Sediment Deposits (B2) (Riverine)
__ Drift Deposits (B3) (Riverine)
__ Drainage Patterns (B10)
__ Dry Season Water Table (C2)
__ Thin Muck Surface (C7)
__ Crayfish Burrows (C8)
__ Saturation Visible on Aerial Imagery (C9)
__ Shallow Aquitard (D3)
__ FAC Neutral Test (D5)

Field Observations
Surface Water Present? Yes ____ No X Depth (inches) ________
Water Table Present? Yes ____ No X Depth (inches) ________
Saturation Present? (includes capillary fringe) Yes ____ No X Depth (inches) ________

Wetland Hydrology Present? Yes ______ No X

Describe Recorded Data (stream gauge monitoring well aerial photos previous inspections) if available

Remarks

No wetland hydrology

SOIL

Sampling Point 20 1

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 3	10YR 3/2	100					SaLo	Moist
3 - 18+	10YR 4/3	100					Sa	Moist

[1]Type C=Concentration D=Depletion RM=Reduced Matrix [2]Location PL=Pore Lining RO=Root Channel M=Matrix

Hydric Soil Indicators (Applicable to all LRRs unless otherwise noted)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR C)
- ___ 1 cm Muck (A9) (LRR D)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]

- ___ 1 cm Muck (A9) (LRR C)
- ___ 2 cm Muck (A10) (LRR B)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- X Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present

Restrictive Layer (if present)

Type ______

Depth (inches) ______

Hydric Soil Present? Yes X No ___

Remarks

Salorthids

HYDROLOGY

Wetland Hydrology Indicators

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (Nonriverine)
- ___ Sediment Deposits (B2) (Nonriverine)
- ___ Drift Deposits (B3) (Nonriverine)
- X Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (Riverine)
- ___ Sediment Deposits (B2) (Riverine)
- ___ Drift Deposits (B3) (Riverine)
- ___ Drainage Patterns (B10)
- ___ Dry Season Water Table (C2)
- ___ Thin Muck Surface (C7)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC Neutral Test (D5)

Field Observations

Surface Water Present? Yes ___ No X Depth (inches) ___

Water Table Present? Yes ___ No X Depth (inches) ___

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches) ___

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge monitoring well aerial photos previous inspections) if available

Remarks

Surface soil cracks = wetland hydrology

SOIL

Sampling Point 20 2

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 – 4	10YR 2/2	100					ClLo	Damp

[1]Type C=Concentration D=Depletion RM=Reduced Matrix [2]Location PL=Pore Lining RC=Root Channel M=Matrix

Hydric Soil Indicators (Applicable to all LRRs unless otherwise noted)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (LRR C)
___ 1 cm Muck (A9) (LRR D)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]

___ 1 cm Muck (A9) (LRR C)
___ 2 cm Muck (A10) (LRR B)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present

Restrictive Layer (if present)

Type Cemented

Depth (inches) 4

Hydric Soil Present? Yes ______ No X

Remarks

No hydric indicators

HYDROLOGY

Wetland Hydrology Indicators

Primary Indicators (any one indicator is sufficient)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (Nonriverine)
___ Sediment Deposits (B2) (Nonriverine)
___ Drift Deposits (B3) (Nonriverine)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Plowed Soils (C6)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Marks (B1) (Riverine)
___ Sediment Deposits (B2) (Riverine)
___ Drift Deposits (B3) (Riverine)
___ Drainage Patterns (B10)
___ Dry Season Water Table (C2)
___ Thin Muck Surface (C7)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC Neutral Test (D5)

Field Observations

Surface Water Present? Yes ______ No X Depth (inches) ____________

Water Table Present? Yes ______ No X Depth (inches) ____________

Saturation Present? Yes ______ No X Depth (inches) ____________
(includes capillary fringe)

Wetland Hydrology Present? Yes ______ No X

Describe Recorded Data (stream gauge monitoring well aerial photos previous inspections) if available

Remarks

No wetland hydrology

SOIL

Sampling Point 21 1

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 12	10YR 3/1	100					OlLo	Moist
12+	10YR 4/1	100					Cl	Saturated

[1]Type C=Concentration D=Depletion RM=Reduced Matrix [2]Location PL=Pore Lining RC=Root Channel M=Matrix

Hydric Soil Indicators (Applicable to all LRRs unless otherwise noted)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR C)
- ___ 1 cm Muck (A9) (LRR D)
- X Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]

- ___ 1 cm Muck (A9) (LRR C)
- ___ 2 cm Muck (A10) (LRR B)
- ___ Reduced Vertic (F1B)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present

Restrictive Layer (if present)

Type ______

Depth (inches) ______

Hydric Soil Present? Yes X No ___

Remarks

Depleted below dark surface

HYDROLOGY

Wetland Hydrology Indicators

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1) (Nonriverine)
- ___ Sediment Deposits (B2) (Nonriverine)
- ___ Drift Deposits (B3) (Nonriverine)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (Riverine)
- ___ Sediment Deposits (B2) (Riverine)
- ___ Drift Deposits (B3) (Riverine)
- ___ Drainage Patterns (B10)
- ___ Dry Season Water Table (C2)
- ___ Thin Muck Surface (C7)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC Neutral Test (D5)

Field Observations

Surface Water Present? Yes ___ No X Depth (inches) ___

Water Table Present? Yes ___ No X Depth (inches) ___

Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches) 12

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge monitoring well aerial photos previous inspections) if available

Remarks

Saturated at 12

SOIL

Sampling Point 21 2

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth (inches)	Matnx Color (moist)	Matnx %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 – 4	10YR 3/2	100					ClLo	Damp
4+								Hard pan

[1]Type C=Concentration D=Depletion RM=Reduced Matnx [2]Location PL=Pore Lining RC=Root Channel M=Matrix

Hydric Soil Indicators (Applicable to all LRRs unless otherwise noted)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR C)
- ___ 1 cm Muck (A9) (LRR D)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matnx (S4)
- ___ Sandy Redox (S5)
- ___ Stnpped Matnx (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matnx (F2)
- ___ Depleted Matnx (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]

- ___ 1 cm Muck (A9) (LRR C)
- ___ 2 cm Muck (A10) (LRR B)
- ___ Reduced Vertic (F18)
- ___ Red Parent Matenal (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present

Restrictive Layer (if present)

Type Cemented

Depth (inches) 4

Hydnc Soil Present? Yes ______ No X

Remarks

No indications of hydric soils

HYDROLOGY

Wetland Hydrology Indicators

Pnmary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (Nonnvenne)
- ___ Sediment Deposits (B2) (Nonnverine)
- ___ Dnft Deposits (B3) (Nonnvenne)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aenal Imagery (B7)
- ___ Water Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (Rivenne)
- ___ Sediment Deposits (B2) (Riverme)
- ___ Dnft Deposits (B3) (Riverme)
- ___ Drainage Patterns (B10)
- ___ Dry Season Water Table (C2)
- ___ Thin Muck Surface (C7)
- ___ Crayfish Bu rows (C8)
- ___ Saturation Visible on Aenal Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC Neutral Test (D5)

Field Observations

Surface Water Present? Yes _____ No X Depth (inches) ___________

Water Table Present? Yes _____ No X Depth (inches) ___________

Saturation Present? Yes _____ No X Depth (inches) ___________
(includes capillary fnnge)

Wetland Hydrology Present? Yes ______ No X

Descnbe Recorded Data (stream gauge monitonng well aenal photos previous inspections) if available

Remarks

No wetland hydrology

SOIL

Sampling Point 22 1

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 4	10YR 3/2	100					ClLo	Damp
4 6	10YR 4/3	100					Cl	Damp
6 +	10YR 6/2	100						

[1]Type C=Concentration D=Depletion RM=Reduced Matrix [2]Location PL=Pore Lining RC=Root Channel M=Matrix

Hydric Soil Indicators (Applicable to all LRRs, unless otherwise noted)

__ Histosol (A1)
__ Histic Epipedon (A2)
__ Black Histic (A3)
__ Hydrogen Sulfide (A4)
__ Stratified Layers (A5) (LRR C)
__ 1 cm Muck (A9) (LRR D)
__ Depleted Below Dark Surface (A11)
__ Thick Dark Surface (A12)
__ Sandy Mucky Mineral (S1)
__ Sandy Gleyed Matrix (S4)
__ Sandy Redox (S5)
__ Stripped Matrix (S6)
__ Loamy Mucky Mineral (F1)
__ Loamy Gleyed Matrix (F2)
__ Depleted Matrix (F3)
__ Redox Dark Surface (F6)
__ Depleted Dark Surface (F7)
__ Redox Depressions (F8)
__ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]

__ 1 cm Muck (A9) (LRR C)
__ 2 cm Muck (A10) (LRR B)
__ Reduced Vertic (F18)
__ Red Parent Material (TF2)
X Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present

Restrictive Layer (if present)

Type ______

Depth (inches) ______

Hydric Soil Present? Yes X No ___

Remarks

Salorthids

HYDROLOGY

Wetland Hydrology Indicators

Primary Indicators (any one indicator is sufficient)

__ Surface Water (A1)
__ High Water Table (A2)
__ Saturation (A3)
__ Water Marks (B1) (Nonriverine)
__ Sediment Deposits (B2) (Nonriverine)
__ Drift Deposits (B3) (Nonriverine)
X Surface Soil Cracks (B8)
__ Inundation Visible on Aerial Imagery (B7)
__ Water Stained Leaves (B9)
__ Salt Crust (B11)
__ Biotic Crust (B12)
__ Aquatic Invertebrates (B13)
__ Hydrogen Sulfide Odor (C1)
__ Oxidized Rhizospheres along Living Roots (C3)
__ Presence of Reduced Iron (C4)
__ Recent Iron Reduction in Plowed Soils (C6)
__ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

__ Water Marks (B1) (Riverine)
__ Sediment Deposits (B2) (Riverine)
__ Drift Deposits (B3) (Riverine)
__ Drainage Patterns (B10)
__ Dry Season Water Table (C2)
__ Thin Muck Surface (C7)
__ Crayfish Burrows (C8)
__ Saturation Visible on Aerial Imagery (C9)
__ Shallow Aquitard (D3)
__ FAC Neutral Test (D5)

Field Observations

Surface Water Present? Yes ___ No X Depth (inches) ______

Water Table Present? Yes ___ No X Depth (inches) ______

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches) ______

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge monitoring well aerial photos previous inspections) if available

Remarks

Surface soil cracks = wetland hydrology

SOIL

Sampling Point 22 2

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 - 4	10YR 3/2	100					ClLo	Damp
4+								Hard pan

[1]Type C=Concentration D=Depletion RM=Reduced Matrix [2]Location PL=Pore Lining RC=Root Channel M=Matrix

Hydric Soil Indicators (Applicable to all LRRs unless otherwise noted)

- __ Histosol (A1)
- __ Histic Epipedon (A2)
- __ Black Histic (A3)
- __ Hydrogen Sulfide (A4)
- __ Stratified Layers (A5) (LRR C)
- __ 1 cm Muck (A9) (LRR D)
- __ Depleted Below Dark Surface (A11)
- __ Thick Dark Surface (A12)
- __ Sandy Mucky Mineral (S1)
- __ Sandy Gleyed Matrix (S4)
- __ Sandy Redox (S5)
- __ Stripped Matrix (S6)
- __ Loamy Mucky Mineral (F1)
- __ Loamy Gleyed Matrix (F2)
- __ Depleted Matrix (F3)
- __ Redox Dark Surface (F6)
- __ Depleted Dark Surface (F7)
- __ Redox Depressions (F8)
- __ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]

- __ 1 cm Muck (A9) (LRR C)
- __ 2 cm Muck (A10) (LRR B)
- __ Reduced Vertic (F18)
- __ Red Parent Material (TF2)
- __ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present

Restrictive Layer (if present)

Type Cemented

Depth (inches) 4

Hydric Soil Present? Yes ______ No X

Remarks

No indications of hydric soils

HYDROLOGY

Wetland Hydrology Indicators

Primary Indicators (any one indicator is sufficient)

- __ Surface Water (A1)
- __ High Water Table (A2)
- __ Saturation (A3)
- __ Water Marks (B1) (Nonriverine)
- __ Sediment Deposits (B2) (Nonriverine)
- __ Drift Deposits (B3) (Nonriverine)
- __ Surface Soil Cracks (B6)
- __ Inundation Visible on Aerial Imagery (B7)
- __ Water Stained Leaves (B9)
- __ Salt Crust (B11)
- __ Biotic Crust (B12)
- __ Aquatic Invertebrates (B13)
- __ Hydrogen Sulfide Odor (C1)
- __ Oxidized Rhizospheres along Living Roots (C3)
- __ Presence of Reduced Iron (C4)
- __ Recent Iron Reduction in Plowed Soils (C6)
- __ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- __ Water Marks (B1) (Riverine)
- __ Sediment Deposits (B2) (Riverine)
- __ Drift Deposits (B3) (Riverine)
- __ Drainage Patterns (B10)
- __ Dry Season Water Table (C2)
- __ Thin Muck Surface (C7)
- __ Crayfish Burrows (C8)
- __ Saturation Visible on Aerial Imagery (C9)
- __ Shallow Aquitard (D3)
- __ FAC Neutral Test (D5)

Field Observations

Surface Water Present? Yes _____ No X Depth (inches) ________

Water Table Present? Yes _____ No X Depth (inches) ________

Saturation Present? Yes _____ No X Depth (inches) ________
(includes capillary fringe)

Wetland Hydrology Present? Yes ______ No X

Describe Recorded Data (stream gauge monitoring well aerial photos previous inspections) if available

Remarks

No wetland hydrology

SOIL

Sampling Point 23 1

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 10	10YR 3/2	100					OlLo	Damp
10 - 18+	10YR 4/2	100					Cl	Damp

[1]Type C=Concentration D=Depletion RM=Reduced Matrix [2]Location PL=Pore Lining RC=Root Channel M=Matrix

Hydric Soil Indicators (Applicable to all LRRs, unless otherwise noted)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR C)
- ___ 1 cm Muck (A9) (LRR D)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]

- ___ 1 cm Muck (A9) (LRR C)
- ___ 2 cm Muck (A10) (LRR B)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- X Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present

Restrictive Layer (if present)

Type ___

Depth (inches) ___

Hydric Soil Present? Yes X No ___

Remarks

Salorthids May also meet criteria for depleted matrix

HYDROLOGY

Wetland Hydrology Indicators

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (Nonriverine)
- ___ Sediment Deposits (B2) (Nonriverine)
- ___ Drift Deposits (B3) (Nonriverine)
- X Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (Riverine)
- ___ Sediment Deposits (B2) (Riverine)
- ___ Drift Deposits (B3) (Riverine)
- ___ Drainage Patterns (B10)
- ___ Dry Season Water Table (C2)
- ___ Thin Muck Surface (C7)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC Neutral Test (D5)

Field Observations

Surface Water Present? Yes ___ No X Depth (inches) ___

Water Table Present? Yes ___ No X Depth (inches) ___

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches) ___

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge monitoring well aerial photos previous inspections) if available

Remarks

Surface soil cracks = wetland hydrology

SOIL

Sampling Point 24 1

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 4	10YR 3/2	100					ClLo	Damp
4 6	10YR 4/3	100					Cl	Damp
6 +	10YR 6/2	100					Cl	

[1]Type C=Concentration D=Depletion RM=Reduced Matrix [2]Location PL=Pore Lining RC=Root Channel M=Matrix

Hydric Soil Indicators (Applicable to all LRRs, unless otherwise noted)

- __ Histosol (A1)
- __ Histic Epipedon (A2)
- __ Black Histic (A3)
- __ Hydrogen Sulfide (A4)
- __ Stratified Layers (AS) (LRR C)
- __ 1 cm Muck (A9) (LRR D)
- __ Depleted Below Dark Surface (A11)
- __ Thick Dark Surface (A12)
- __ Sandy Mucky Mineral (S1)
- __ Sandy Gleyed Matrix (S4)
- __ Sandy Redox (S5)
- __ Stripped Matrix (S6)
- __ Loamy Mucky Mineral (F1)
- __ Loamy Gleyed Matrix (F2)
- __ Depleted Matrix (F3)
- __ Redox Dark Surface (F6)
- __ Depleted Dark Surface (F7)
- __ Redox Depressions (F8)
- __ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]

- __ 1 cm Muck (A9) (LRR C)
- __ 2 cm Muck (A10) (LRR B)
- __ Reduced Vertic (F18)
- __ Red Parent Material (TF2)
- X Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present

Restrictive Layer (if present)

Type ______

Depth (inches) ______

Hydric Soil Present? Yes X No ______

Remarks

Salorthids

HYDROLOGY

Wetland Hydrology Indicators

Primary Indicators (any one indicator is sufficient)

- __ Surface Water (A1)
- __ High Water Table (A2)
- __ Saturation (A3)
- __ Water Marks (B1) (Nonriverine)
- __ Sediment Deposits (B2) (Nonriverine)
- __ Drift Deposits (B3) (Nonriverine)
- X Surface Soil Cracks (B6)
- __ Inundation Visible on Aerial Imagery (B7)
- __ Water Stained Leaves (B9)
- X Salt Crust (B11)
- __ Biotic Crust (B12)
- __ Aquatic Invertebrates (B13)
- __ Hydrogen Sulfide Odor (C1)
- __ Oxidized Rhizospheres along Living Roots (C3)
- __ Presence of Reduced Iron (C4)
- __ Recent Iron Reduction in Plowed Soils (C6)
- __ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- __ Water Marks (B1) (Riverine)
- __ Sediment Deposits (B2) (Riverine)
- __ Drift Deposits (B3) (Riverine)
- __ Drainage Patterns (B10)
- __ Dry Season Water Table (C2)
- __ Thin Muck Surface (C7)
- __ Crayfish Burrows (C8)
- __ Saturation Visible on Aerial Imagery (C9)
- __ Shallow Aquitard (D3)
- __ FAC Neutral Test (D5)

Field Observations

Surface Water Present? Yes ______ No X Depth (inches) ______

Water Table Present? Yes ______ No X Depth (inches) ______

Saturation Present? (includes capillary fringe) Yes ______ No X Depth (inches) ______

Wetland Hydrology Present? Yes X No ______

Describe Recorded Data (stream gauge monitoring well aerial photos previous inspections) if available

Remarks

Surface soil cracks and salt crust = wetland hydrology

SOIL

Sampling Point 24 2

Profile Descnption (Descnbe to the depth needed to document the indicator or confirm the absence of indicators)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 - 4	10YR 3/2	100					ClLo	Damp
4+								Hard pan

[1]Type C=Concentration D=Depletion RM=Reduced Matnx [2]Location PL=Pore Lining RC=Root Channel M=Matnx.

Hydric Soil Indicators (Applicable to all LRRs unless otherwise noted)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR C)
- ___ 1 cm Muck (A9) (LRR D)
- ___ Depleted Below Dark Surface (A I I)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matnx (S4)
- ___ Sandy Redox (S5)
- ___ Stnpped Matnx (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matnx (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[2]

- ___ 1 cm Muck (A9) (LRR C)
- ___ 2 cm Muck (A10) (LRR B)
- ___ Reduced Vertic (F18)
- ___ Red Parent Matenal (TF2)
- ___ Other (Explain in Remarks)

[2]Indicators of hydrophytic vegetation and wetland hydrology must be present

Restrictive Layer (if present)

Type Cemented

Depth (inches) 4

Hydric Soil Present? Yes ___ No X

Remarks

No indications of hydnc soils

HYDROLOGY

Wetland Hydrology Indicators

Pnmary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (Nonnvenne)
- ___ Sediment Deposits (B2) (Nonnvenne)
- ___ Dnft Deposits (B3) (Nonnvenne)
- ___ Surface Soil Cracks (86)
- ___ Inundation Visible on Aenal Imagery (B7)
- ___ Water Stained Leaves (B9)
- ___ Salt Cmst (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (Riverme)
- ___ Sediment Deposits (B2) (Rivenne)
- ___ Dnft Deposits (B3) (Rivenne)
- ___ Drainage Pattems (B10)
- ___ Dry Season Water Table (C2)
- ___ Thin Muck Surface (C7)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aenal Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC Neutral Test (D5)

Field Observations

Surface Water Present? Yes ___ No X Depth (inches) ___

Water Table Present? Yes ___ No X Depth (inches) ___

Saturation Present? (includes capillary fnnge) Yes ___ No X Depth (inches) ___

Wetland Hydrology Present? Yes ___ No X

Descnbe Recorded Data (stream gauge monitonng well aenal photos previous inspections) if available

Remarks

No wetland hydrology

SOIL

Sampling Point 25 1

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 4	10YR 3/2	100					ClLo	Damp
4 6	10YR 4/3	100					Cl	Damp
6 +	10YR 6/2	100						

[1]Type C=Concentration D=Depletion RM=Reduced Matrix [2]Location PL=Pore Lining RC=Root Channel M=Matrix

Hydric Soil Indicators (Applicable to all LRRs unless otherwise noted)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR C)
- ___ 1 cm Muck (A9) (LRR D)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]

- ___ 1 cm Muck (A9) (LRR C)
- ___ 2 cm Muck (A10) (LRR B)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- X Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present

Restrictive Layer (if present)

Type ______

Depth (inches) ______

Hydric Soil Present? Yes X No ___

Remarks

Salorthids

HYDROLOGY

Wetland Hydrology Indicators

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (Nonriverine)
- ___ Sediment Deposits (B2) (Nonriverine)
- ___ Drift Deposits (B3) (Nonriverine)
- X Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water Stained Leaves (B9)
- X Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (Riverine)
- ___ Sediment Deposits (B2) (Riverine)
- ___ Drift Deposits (B3) (Riverine)
- ___ Drainage Patterns (B10)
- ___ Dry Season Water Table (C2)
- ___ Thin Muck Surface (C7)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC Neutral Test (D5)

Field Observations

Surface Water Present? Yes ___ No X Depth (inches) ______

Water Table Present? Yes ___ No X Depth (inches) ______

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches) ______

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge monitoring well aerial photos previous inspections) if available

Remarks

Surface soil cracks and salt crust = wetland hydrology

SOIL

Sampling Point 26 1

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 4	10YR 3/2	100					ClLo	Damp
4 6	10YR 4/3	100					Cl	Damp
6 +	10YR 6/2	100						

[1]Type C=Concentration D=Depletion RM=Reduced Matrix [2]Location PL=Pore Lining RC=Root Channel M=Matrix

Hydric Soil Indicators (Applicable to all LRRs unless otherwise noted)

- __ Histosol (A1)
- __ Histic Epipedon (A2)
- __ Black Histic (A3)
- __ Hydrogen Sulfide (A4)
- __ Stratified Layers (A5) (LRR C)
- __ 1 cm Muck (A9) (LRR D)
- __ Depleted Below Dark Surface (A11)
- __ Thick Dark Surface (A12)
- __ Sandy Mucky Mineral (S1)
- __ Sandy Gleyed Matrix (S4)
- __ Sandy Redox (S5)
- __ Stripped Matrix (S6)
- __ Loamy Mucky Mineral (F1)
- __ Loamy Gleyed Matrix (F2)
- __ Depleted Matrix (F3)
- __ Redox Dark Surface (F6)
- __ Depleted Dark Surface (F7)
- __ Redox Depressions (F8)
- __ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]

- __ 1 cm Muck (A9) (LRR C)
- __ 2 cm Muck (A10) (LRR B)
- __ Reduced Vertic (F18)
- __ Red Parent Material (TF2)
- X Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present

Restrictive Layer (if present)

Type ________

Depth (inches) ________

Hydric Soil Present? Yes X No ___

Remarks

Salorthids

HYDROLOGY

Wetland Hydrology Indicators

Primary Indicators (any one indicator is sufficient)

- __ Surface Water (A1)
- __ High Water Table (A2)
- __ Saturation (A3)
- __ Water Marks (B1) (Nonriverine)
- __ Sediment Deposits (B2) (Nonriverine)
- __ Drift Deposits (B3) (Nonriverine)
- X Surface Soil Cracks (B6)
- __ Inundation Visible on Aerial Imagery (B7)
- __ Water Stained Leaves (B9)
- X Salt Crust (B11)
- __ Biotic Crust (B12)
- __ Aquatic Invertebrates (B13)
- __ Hydrogen Sulfide Odor (C1)
- __ Oxidized Rhizospheres along Living Roots (C3)
- __ Presence of Reduced Iron (C4)
- __ Recent Iron Reduction in Plowed Soils (C6)
- __ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- __ Water Marks (B1) (Riverine)
- __ Sediment Deposits (B2) (Riverine)
- __ Drift Deposits (B3) (Riverine)
- __ Drainage Patterns (B10)
- __ Dry Season Water Table (C2)
- __ Thin Muck Surface (C7)
- __ Crayfish Burrows (C8)
- __ Saturation Visible on Aerial Imagery (C9)
- __ Shallow Aquitard (D3)
- __ FAC Neutral Test (D5)

Field Observations

Surface Water Present? Yes ___ No X Depth (inches) ____

Water Table Present? Yes ___ No X Depth (inches) ____

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches) ____

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge monitoring well aerial photos previous inspections) if available

Remarks

Surface soil cracks and salt crust = wetland hydrology

EXHIBIT F

Letter From:

State of Utah
Department of Natural Resources
Division of Wildlife Resources

October 16, 2008

Species of Concern Near
Proposed Landfill Site in
Weber County, Utah

JON M HUNTSMAN JR
Go e no

GARY R. HERBERT
L e tenoi t Go e i or

State of Utah

DEPARTMENT OF NATURAL RESOURCES

MICHAEL R. STYLER
Execui e Di ecto

Division of Wildlife Resources

JAMES F KARPOWITZ
D is oi Directo

October 16 2008

Gordon Jones
Hansen Allen & Luce Inc
6771 South 900 East
Midvale Utah 84047

Subject Species of Concern Near Proposed Landfill Site in Weber County Utah

Dear Gordon Jones

I am writing in response to your email dated October 16 2008 regarding information on species of special concern proximal to the proposed waste landfill site to be located in Section 19 of Township 6 North Range 3 West SLB&M in Weber County Utah

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 or within a 1 mile radius

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 northern region Scott Walker at (801) 476 2776 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 Scott Walker NRO

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

EXHIBIT G

Operational and Reporting Forms

WEBER COUNTY C&D LANDFILL
INSPECTION FORM

Inspection Area	Compliant			Comments or Corrective Action
	Yes	No	NA	
General				
Litter Control				
Dust Control				
Equipment Maintenance (per manufacturer)				
Quarterly				
Storm Drainage Ditches Pipes and Ponds				
Storm Drainage Inlet / Outlet Structures				
Oil / Water Separators In Place				
Equipment Staging Areas Clean				
Operations Area Clean				
Wash / Maintenance Areas				
Semi Annual				
Perimeter Security Fences				
Access Road and Gate				
Debris Fences				
Fuel Storage Tanks				
Annual				
Final Closure Cover				
Erosion Control Vegetation / Covers				
Post Closure				

FORM(S) MAY BE MODIFIED TO MEET FACILITY OPERATIONAL, INSPECTION, AND REPORTING NEEDS, AND PERMIT AND REGULATORY REQUIREMENTS

Name

Date

WEBER COUNTY CORP | CLASS IVb C&D LANDFILL | MOULDING & SONS LANDFILL, LLC

WASTE DELIVERY RECORD

Date	Customer Nome/ Signature	Job Name/No	License or Truck No	Load Type	Load Size

FORM(S) MAY BE MODIFIED
TO MEET FACILITY OPERATIONAL
INSPECTION, AND REPORTING
NEEDS AND PERMIT AND
REGULATORY REQUIREMENTS

EXHIBIT H

STORM WATER POLLUTION PREVENTION PLAN

STORM WATER DISCHARGE PERMIT

STORM WATER POLLUTION PREVENTION PLAN FOR CONSTRUCTION ACTIVITIES

FOR

MOULDING & SONS OFFICE SITE
OGDEN, UTAH

PROFESSIONAL ENGINEER
GORDON L. JONES
No 5048470-2202
7/15/08
STATE OF UTAH

Project Engineer

Prepared by

Hansen Allen & Luce Inc
6771 South 900 East
Midvale Utah 84047
801-566-5599

July 2008

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 gathered and evaluated 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 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

[name]
[title]

SITE CONTACT INFORMATION

SITE OWNER	***PHONE/FAX***	***ADDRESS***
Randy Moulding	***Telephone 801-399-9994*** ***Facsimile 801-725-2722***	***910 West 21st Street*** ***Ogden, Utah 84404***
PROJECT CONTRACTOR		
PROJECT EROSION LEAD	***24-HOUR CONTACT***	
Randy Moulding	***Telephone 801-399-9994*** ***Facsimile 801-725-2722***	***910 West 21st Street*** ***Ogden, Utah 84404***

Revision Schedule

This storm water pollution prevention plan (SWPPP) should be revised and updated to address changes in site conditions, new or revised government regulations, and additional on-site storm water pollution controls

All revisions to the SWPPP must be documented on the SWPPP Revision Documentation Form which should include the information shown below The authorized facility representative who approves the SWPPP should be an individual at or near the top of the facility's management organization, such as the president, vice president, construction manager, site supervisor or environmental manager The signature of this representative attests that the SWPPP revision information is true and accurate Previous authors and facility representatives are not responsible for the revisions

SWPPP Revision Documentation Form

Number	Date	Author	Company Representative Signature
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

CONTENTS

CONTENTS (Contınued)

CONTENTS (Continued)

FIGURES AND DRAWINGS

Following Report

Drawings

1 CONSTRUCTION ENVIRONMENTAL SUMMARY

1 1 Summary

Beginning in the Summer of 2008, Moulding & Sons, Inc is starting a construction project located at approximately 900 South and 11500 West in Weber County, Utah The project will consist of an access road and office site (10' x 60' trailer), with asphalt and graveled areas

The improvements planned for this site will disturb a relatively small area (2 acres) versus the total size of the parcel (114 acres) The site slopes down from 900 South at about 12% for 450 feet to the south in the area of the construction project Following this initial decline, the property is relatively fiat with less than a 0 5% grade the roughly 1,500 feet to the southem edge of the property Currently there is one 24-inch culvert at the south end of the property that directs runoff under the railroad and into neighboring property that eventually drains to the Great Salt Lake There are no defined drainage ditches or streams, either ephemeral or perennial, that would receive any waters from the parcel There are wetlands located to the south of the project site, both on the parcel owned by Mouldmg & Sons, Inc and on property lo the south of the railroad, that eventually drain to the Great Salt Lake These wetlands are dry during most of the year

This *Storm Water Pollution Pievention Plan* (SWPPP) details anticipated protective environmental measures, that will be employed during construction of the project Modifications to the measures detailed herein will be implemented should needed modifications become apparent during construction or site evaluations

1 1 1 Project Descnption

The project will be located on about 3 acres, with a 600 square feet trailer, about 53,000 square feet of asphalted area (will probably be gravel for awhile before it is paved), and the rest of the area graveled, landscaped or re-vegetated Fill quantities are not yet estimated, but it is expected that the cut and fill requirements will balance

1 1 2 Existing Site Conditions

The existing site is located on a 12% slope with a gravelly loam soil Currently, there are no buildings or equipment stored on the property This parcel has primarily been used for grazing by cattle

1 1 3 Adjacent Areas

A small portion of South Mountain to the north of the project site could potentially discharge stormwater onto the project site through an existing culvert, unless protective measures are taken Therefore, the site will be graded such that storm water cannot enter from off site

1 1 4 Critical Areas

There are some wetlands located to the south of the project site within the parcel owned by Moulding & Sons, Inc There are other wetlands associated with the Great Salt Lake that are located to the south of the railroad

1 1 5 Soils

Information from the Natural Resources Conservation Service (NRCS) indicate that the area of the project site consists of a gravelly loam topsoil The remainder of the parcel that the project site would be tributary to contains soils classified as Lakeshore The Lakeshore series consists of very deep, poorly drained soils that formed in lacustrine deposits derived from mixed rocks Lakeshore soils are on lake plains and lake terraces with slopes of 0 to 1 percent The NRCS describes the areas with this type of soil as being prone to ponding because of the flatness and soil saturation during the spring

1 1 6 Construction Phasing

1 1 6 1 Clearing and Grubbing - The first construction phase will consist of clearing the site of soils that are unsuitable for construction and grubbing the site of any remaining roots, stumps, and other undesireable materials

1 1 6 2 Excavating and Grading – The second construction phase will consist of excavating and exporting excess material and importing structural material

1 1 6 3 Facilities Construction – The third construction phase will consist of constructing and installing the planned facilities on the site

1 1 7 Construction Schedule

Because the construction schedule is not firm at this time, the starting and ending dates of the construction phases are not provided The following periods are best estimates of the durations of each construction phase

1 1 7 1 Clearing and Grubbing – One Week

1 1 7 2 Grading – One Month

1 1 7 3 Facilities Construction – 3 Weeks

1 1 8 Financial/Ownership Responsibilities

Moulding & Sons, Inc is the owner of the site with financial responsibility for liability associated with erosion and sedimentation impacts

1 1 9 Engineering Calculations

Design calculations for the sizing of storm water management facilities are provided in Appendix A

2 INTRODUCTION

2 1 Storm water Pollution Prevention Plan Requirements

This SWPPP was developed consistent with the requirements of the Utah Pollutant Discharge Elimination System (UPDES) General Storm water Permit for Construction Activities (see Appendix B for a copy of the general permit) The primary consideration determining the adequacy of this SWPPP is compliance with State Surface Water Quality Standards [Utah Administrative Code R317-2-14 (water classifications 2B and 3D) – see Appendix C)

This SWPPP, properly implemented, should result in discharge of water from the construction site without significantly degrading the quality of the receiving waters

2 2 Purpose

The purpose of this SWPPP is to

- Describe best management practices (BMPs) to minimize erosion and sediment runoff at the site
- Identify, reduce, eliminate, or prevent the pollution of storm water
- Prevent violations of surface water quality or groundwater quality standards

2 3 SWPPP Organization

This SWPPP consists of a detailed narrative section and the appendices, which contain illustrations, maps, and drawings The narrative section includes descriptions of potential pollution problems associated with site features, and then discusses the selection of specific pollution prevention BMPs to reduce or eliminate the threat of causing pollution during the actual construction project The illustrations, maps, and drawings in the appendices show the site location, topography, sensitive environmental receptors, placement of BMPs, and BMP specifications, and performance expectations

The narrative section of this SWPPP is organized in numbered sections around the 12 required elements of an SWPPP listed below

1 Mark project clearing limits
2 Establishing the construction entrance(s)
3 Storm water detention
4 Selection and installation of sediment controls
5 Soil stabilization
6 Slope protection
7 Drain inlet protection
8 Storm water outlet protection
9 Chemical spill prevention and response
10 Site Storm water Treatment
11 BMP maintenance
12 Project management

In the narrative section, each of the above elements will be discussed in relation to the specific conditions at the development BMPs for each element will be screened, resulting in selection of those BMPs deemed most appropriate for use

Specifications and drawings (as-needed) of the selected BMPs are referenced at the end of each section and can be found in Appendix D

3 CLEARING LIMITS

3 1 Site Plans

The Storm Water BMP Plan for the Earthwork Phases drawing shows any surface water in the area and placement of anticipated BMPs needed to comply with the intent of this SWPPP

3 2 Marking Clearing Limits

Prior to beginning earth-disturbing activities, including clearing and grading all clearing limits easements, setbacks, sensitive areas and their buffers, trees and drainage courses will be clearly marked to prevent environmental damage both on and off site

3 3 Special Consideration

There are no areas of special consideration related to this project site

3 4 Selected BMPs

- BMP C101 Preserving Natural Vegetation
- BMP C102 Buffer Zones

4 CONSTRUCTION ACCESS

4 1 Site Access

The construction access is located off 900 South north of the project site

4 2 Street Cleaning

Sediment that is accidentally transported onto 900 South from the construction site will be removed from the street surface when necessary Sediment will be shoveled and/or swept from the street and disposed of in a manner, which prevents contamination with storm water or surface water (e g , covered soil stockpile) In addition, a street sweeper may be used to maintain clean roads on an as-needed basis

4 3 Wheel Wash

Based on site conditions and time of year, a temporary truck wheel wash station may be constructed to ensure control of sediment at the construction exit point The wheel wash system (if needed) will be constructed on the site at a location just prior to where trucks leave the site access and enter the street The system will consist of an asphalt-lined wash pond for immersing the truck tires as the truck drives through and a small settling pond for settling suspended sediment in wash water cycled out of the system Wash water may be reused after settling, infiltrated onsite, or transported off site for disposal Accumulated sediments will be collected periodically, stockpiled for dewatering, then reused onsite

4 4 Selected BMPs

- BMP C105 Stabilized Construction Entrance
- BMP C106 Wheel Wash

5 STORM WATER RETENTION

5 1 Storm Water Retention Pond

Due to the topography of the site and the relatively small proposed area of disturbance, no storm water retention is required for this site The small amount of runoff produced from a 10 year - 24 hour storm event from the disturbed 3 acre building site will be discharged onto flat, grassy terrain that will settle any resulting sediments The amount of runoff from a 10 year - 24 hour storm event was calculated to be about 2,000 cubic feet

5 2 Run-on Bypass

Clean storm water run-on will not be allowed to run onto the area of disturbance from the up-gradient, undisturbed portion of the site

6 SEDIMENT CONTROLS

6 1 Site Sediment Control System

The generally flat topography of the project parcel and long runoff distance over undisturbed terrain will control sediment transport by allowing sediments to settle prior to reaching the discharge point at the culvert or the wetlands

7 SOIL STABILIZATION

This section describes some of the stabilization and structural BMPs that will be implemented to minimize erosion and transport of sediment should they become a problem

7 1 Soil Stabilization

The following soil stabilization BMPs will be implemented at this site according to Part IIID 2(a)(2) of the General Permit

- **Soil Covering** Disturbed soils can be stabilized by covering them with transparent plastic sheeting Plastic sheeting can also be used as an emergency BMP to cover previously stabilized areas, which begin to erode Loose straw and mulch covers may also be used

- **Bonded Fiber Matrix Soil Treatment** Disturbed soils can be stabilized by applying a slurry of fibers and bonding ingredients that cure to create a breathable, built-in-place, protective crust blanket This blanket is designed to prevent both water and wind erosion The slurry materials are totally biodegradable and harmless to fish, birds, plants, and animals

  The standards and specifications of the proprietary product shown in Appendix D are for example only Any product that is totally biodegradable and harmless to fish, birds, plants, and animals can be used that accomplishes the goal of soil stabilization

- **Maintenance of Existing Vegetation** Existing and new vegetation will be maintained to the maximum extent practicable to prevent the contamination of storm water with sediment

7 2 Selected BMPs

- BMP C123 Plastic Covering
- Bonded Fiber Matrix Soil Treatment
- BMP C101 Preserving Natural Vegetation

8 SLOPE PROTECTION

8 1 General Practices

Cut and fill slopes on this project have been designed and will be constructed so as to minimize erosion Soil types have been analyzed and considered for their potential to erode also In addition, slope runoff velocities will be reduced by terracing, creating diversions, and surface contouring

Any upslope drainage and uncontaminated run-on water from off-site will be intercepted at the top of the slope and diverted around the active construction area Down slope flows will be allowed to dissipate over the flat grassy runout before reaching the wetlands or culvert outlet

8 2 Selected BMPs

- BMP C130 Surface Roughening
- BMP C131 Gradient Terraces

9 DRAIN INLET PROTECTION

9 1 Existing Storm Drains

There are no existing storm drain inlets on this site

9 2 Newly Constructed Storm Drains

There are no proposed storm drain inlets on this site

10 STORM WATER OUTLET PROTECTION

10 1 Retention Pond Outlet

A retention pond is not required on this site, therefore outlet protection is unnecessary

11 SPILL PREVENTION AND RESPONSE

Consistent with the general permit requirements, all potential pollutants other than sediment will be handled and disposed of in a manner that does not cause contamination of storm water Non-sediment pollutants that may be present during construction activities include

- Petroleum products including fuel, lubricants, hydraulic fluids, and form oils
- Polymer used for soil stabilization
- Water treatment chemicals (coagulant, acid, sodium bicarbonate)
- Concrete
- Paints
- Fertilizers

These materials, and other materials used during construction with the potential to impact storm water, will be stored, managed used, and disposed of in a manner that minimizes the potential for releases to the environment and especially into storm water

Emergency contacts for the project will be posted at the project office and are included in Appendix F

11 1 General Materials Handling Practices

The following general practices will be used throughout the project to reduce the potential for spills

- Potential pollutants will be stored and used in a manner consistent with the manufacturer's instructions in a secure location To the extent practicable, material storage areas should not be located near storm dram inlets and should be equipped with covers, roofs, or secondary containment as needed to prevent storm water from contacting stored materials Chemicals that are not compatible (such as sodium bicarbonate and hydrochloric acid) shall be stored in segregated areas so that spilled materials cannot combine and react

- Materials disposal will be in accordance with the manufacturer's instructions and applicable local, state, and federal regulations

- Materials no longer required for construction will be removed from the site as soon as practicable

- Adequate garbage, construction waste, and sanitary waste handling and disposal facilities will be provided to the extent necessary to keep the site clear of obstruction and BMPs clear and functional

11 2 Specific Materials Handling Practices

- All pollutants, including waste materials and demolition debris, that occur on-site during construction will be handled in a way that does not contaminate storm water

- All chemicals including liquid products, petroleum products, water treatment chemicals, and wastes stored on site will be covered and contained and protected from vandalism

- Maintenance and repair of all equipment and vehicles involving oil changes, hydraulic system drain down de-greasing operations, fuel tank dram down and removal, and other activities which may result in the accidental release of contaminants, will be conducted under cover during wet weather and on an impervious surface to prevent the release of contaminants onto the ground Materials spilled during maintenance operations will be cleaned up immediately and properly disposed of

- Wheel wash water will be settled and discharged on site by infiltration Wheel wash water will not be discharged to the storm water system or the storm water treatment system

- Application of agricultural chemicals, including fertilizers and pesticides, will be conducted in a manner and at application rates that will not result in loss of chemical to storm water runoff Manufacturers' recommendations will be followed for application rates and procedures

- pH modifying sources will be managed to prevent contamination of runoff and storm water collected on site The most common sources of pH-modifying materials are bulk cement, cement kiln dust (CKD), fly ash, new concrete washing and curing waters, waste streams generated from concrete grinding and sawing, exposed aggregate processes, and concrete pumping and mixer washout waters

11 3 Spill Response

The primary objective in responding to a spill is to quickly contain the material(s) and prevent or minimize their migration into storm water runoff and conveyance systems If the release has impacted on-site storm water, it is critical to contain the released materials on site and prevent their release into receiving waters

If a spill of pollutants threatens storm water at the site, the spill response procedures outlined below must be implemented in a timely manner to prevent the release of pollutants

- The site superintendent will be notified immediately when a spill, or the threat of a spill is observed The superintendent will assess the situation and determine the appropriate response

- If spills represent an imminent threat of entering the receiving waters facility personnel will respond immediately to contain the release and notify the superintendent after the situation has been stabilized

- Spill kits containing materials and equipment for spill response and cleanup will be maintained at the site if necessary Each spill kit may contain

  - Oil absorbent pads (one bale)

  - Oil absorbent booms (40 feet)

  - 55-gallon drums (2)

  - 9-mil plastic bags (10)

  - Personal protective equipment including gloves and goggles

- If an oil sheen is observed on surface water (e g , settling ponds, detention pond swales), absorbent pads and/or booms will be applied to contain and remove the oil The source of the oil sheen will also be identified and removed or repaired as necessary to prevent further releases

- The site superintendent, or his designee, will be responsible for completing the spill reporting form and for reporting the spill to the appropriate state or local agency (see Forms at the end of this section)

- Facility personnel with primary responsibility for spill response and cleanup will receive training from the site superintendent This training will include identifying the location of spill kits and other spill response equipment and the use of spill response materials

- Spill response equipment will be inspected and maintained as necessary to replace any materials used in spill response activities

11 4 Notification

- In the event of a spill, make the appropriate notification(s) consistent with the table provided in Appendix F

Spill Report Form

LOCATION ____________________

		Date __________ Time __________

Regulatory agencies notified (date time person agency and how) ____________________

____

____

Material spilled ____________________

Quantity spilled ____________________

Source ____________________

Cause ____________________

____

Extent of injuries (if any) ____________________

____

Adverse environmental impact (if any) ____________________

____

Immediate remedial actions taken at time of spill ____________________

____

Measures taken or planned to prevent recurrence ____________________

____

____

Additional comments ____________________

____

____

____

This report prepared by ____________________

(Signature)

____________________ ____________________

12 STORM WATER TREATMENT

12 1 Storm Water Collection System

Construction will occur in phases as much as practicable to avoid unnecessarily exposing vegetated areas of the site Clean storm water, generated from stabilized and undisturbed portions of the site, will be collected and conveyed to stabilized discharge areas whenever necessary to avoid contact with disturbed portions of the site All conveyance and collection systems will be constructed consistent with State and local BMP requirements

12 2 Sediment Traps

During construction and prior to the completion of the storm drainage system and detention basin, storm water will be conveyed onto the flat grassy terram to the south of the project site

13 BMP MAINTENANCE

All temporary and permanent erosion and sediment control BMPs will be maintained and repaired as needed to assure continued performance of their intended function All maintenance and repair will be conducted in accordance with BMPs Recommended BMP maintenance requirements are listed in Table 1 included in this section Following Table 1 is a BMP Inspection Checklist for use in routine inspections of the construction site

Any temporary erosion and sediment control BMPs needed during the project will be removed within 30 days after final site stabilization is achieved or after the temporary BMPs are no longer needed Trapped sediment will be removed or stabilized on site Disturbed soil areas resulting from removal of BMPs or vegetation will be permanently stabilized as soon as possible

Table 1

BMP Maintenance and Inspection Schedule
(Source Control BMPs)

MOULDING & SONS, INC
Ogden, Utah

BMP Designation	**BMP Name**	**Recommended Maintenance**	**Recommended Schedule of Maintenance**
C101	Preserving Natural Vegetation	Inspect flagged areas to make sure flagging has not been removed If tree roots have been exposed or injured recover and/or seal them	Daily (Documented Weekly)
C102	Buffer Zones	Inspect the area frequently to make sure flagging remains in place and the area remains undisturbed	Daily (Documented Weekly)
C105	Stabilized Construction Entrance and Tire Wash	Quarry spalls (or hog fuel) shall be added if the pad is no longer in accordance with the specifications If the rock (or hog fuel) entrance is not working to keep streets clean then install wheel wash sweep streets or wash streets if wash water can be collected	Daily (Documented Weekly)
C106	Wheel Wash	Wheel wash water shall not be discharged into a storm drain or the site s storm water collection system Use closed loop recirculation land application or discharge to sanitary sewer (by permit)	Daily (Documented Weekly)
C123	Plastic Covering	Replace torn sheets and repair open seams Replace deteriorated plastic sheets Dispose of plastic when no longer needed	Weekly
	Bonded Fiber Matrix Soil Treatment	Reapply treatment to redisturbed soils that will be exposed for more than 3 weeks	Weekly
C130	Surface Roughening	Re roughen any areas beginning to erode	Weekly and following storms
C131	Gradient Terraces	Maintenance should be performed as needed	Annually and following large storm events

BMP Inspection Form

Erosion Prevention

Inspector(s) ________________________________ Date ________________

Site Name and Location ____

Current Weather Conditions ______________ Last 24 Hours ______________

BMP Designation	O K	Not O K.	BMP Condition, Corrective Action, General Notes
Preserving Natural Vegetation			
Buffer Zones			
Stabilized Construction Access			
Wheel Wash			
Plastic Covering			
Soil Treatment			
Surface Roughening			
Gradient Terraces			

14 PROJECT MANAGEMENT

Implementation and management of the environmental aspects of this project under the SWPPP are the responsibilities of Moulding & Sons, Inc Communication between all parties performing work on the site is essential for proper implementation of the SWPPP All parties involved should all be familiar with the SWPPP and their responsibilities under the plan To help delegate these responsibilities the following outline has been provided

14 1 Phasing of Construction

The project has been planned at this point in three phases The first construction phase will consist of clearing the site of soils that are unsuitable for construction and grubbing the site of any remaining roots, stumps, and other undesireable materials The second construction phase will consist of excavating and exporting excess material and importing structural material The third construction phase will consist of constructing and installing the planned facilities on the site

14 2 Seasonal Work

While not seasonal, some construction activities may need to be postponed if scheduled during ongoing storm events Activities such as grading and trenching in areas directly adjacent to the drainage basin during rainstorms may result in sediment-contaminated storm water reaching the outlet This work would therefore be performed within a window of dry weather predicted on the basis of weather reports

14 3 Training

Moulding & Sons, Inc will provide on-site training to key personnel responsible for compliance with the SWPPP Construction workers and others at the site will be given appropriate training information at the conclusion of site safety meetings or on an as-needed basis

14 4 Pre-construction Conference

One or more pre-construction meetings will be held with an explicit agenda item addressing the SWPPP

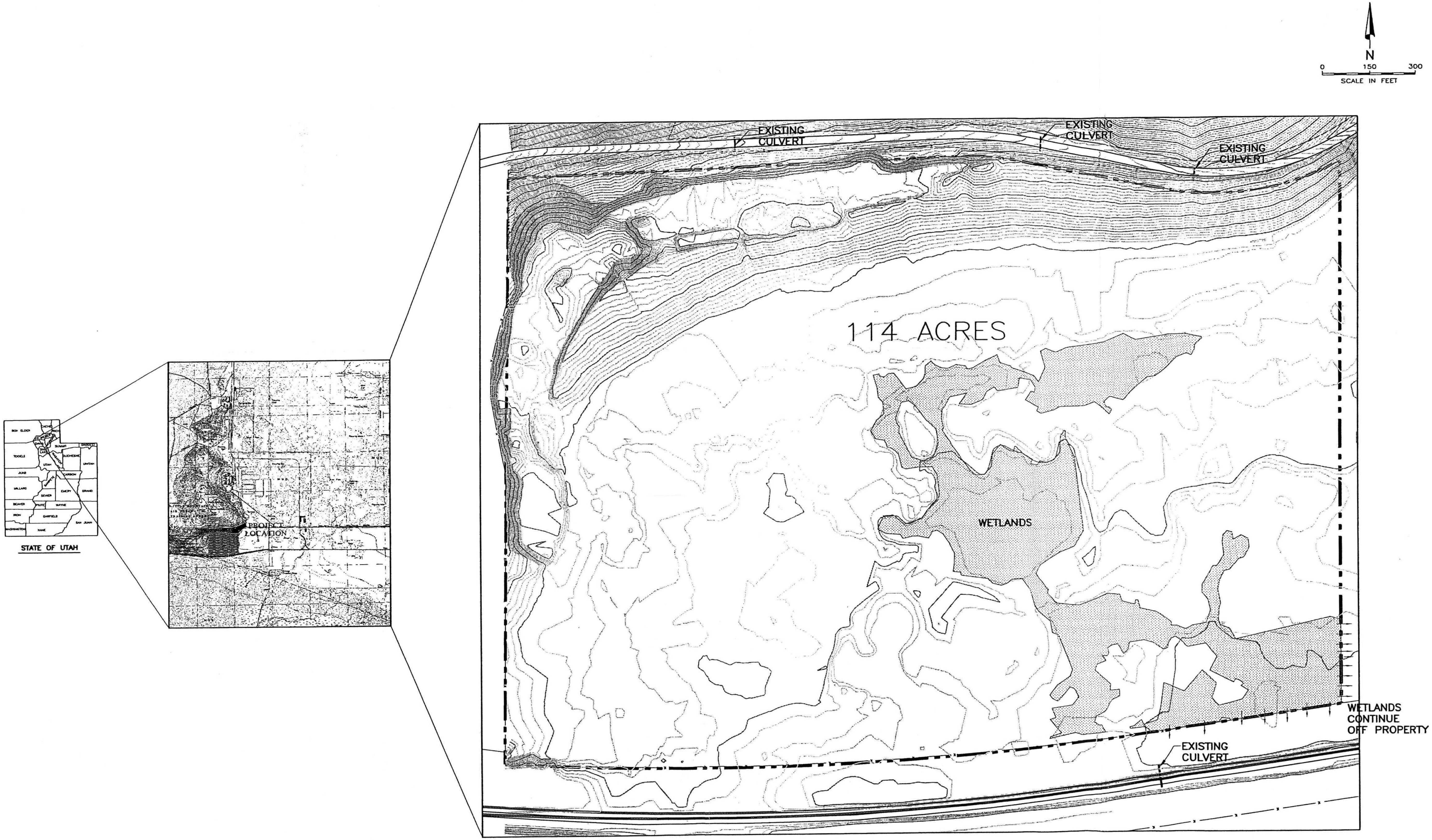
14 5 Coordination with Utilities and other Contractors

All contractors providing services on the project which may cause storm water pollution will be given a copy of the SWPPP and appropriate training regarding storm water pollution prevention

14 6 Subcontractor Oversight

Subcontractor oversight to ensure compliance with the SWPPP will be provided by the prime contractor's superintendent or project manager Informal, on-the-job tailgate training will be the first level of communication followed by onsite observation of training compliance Non-compliance with SWPPP policies will trigger a more intensive training session to correct the problem(s) Chronic non-compliance with SWPPP policies may require the intervention of local and/or state regulatory personnel

DRAWINGS



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FILE DATE: 7.17.2008 14:50:33 (CAH)

HANSEN ALLEN & LUCE INC ENGINEERS	PROJECT ENGINEER	DESIGNED GLJ	3					SCALE	MOULDING & SONS	COMMERCIAL SITE DEVELOPMENT	SHEET	
		DRAFTED CAH	2							STORM WATER BMP PLAN	1	
		CHECKED KCS	1							SITE BOUNDARY WITH TOPOGRAPHY	333.01.100	
		DATE JULY 2008	NO.	DATE	REVISIONS	BY	APVD.					

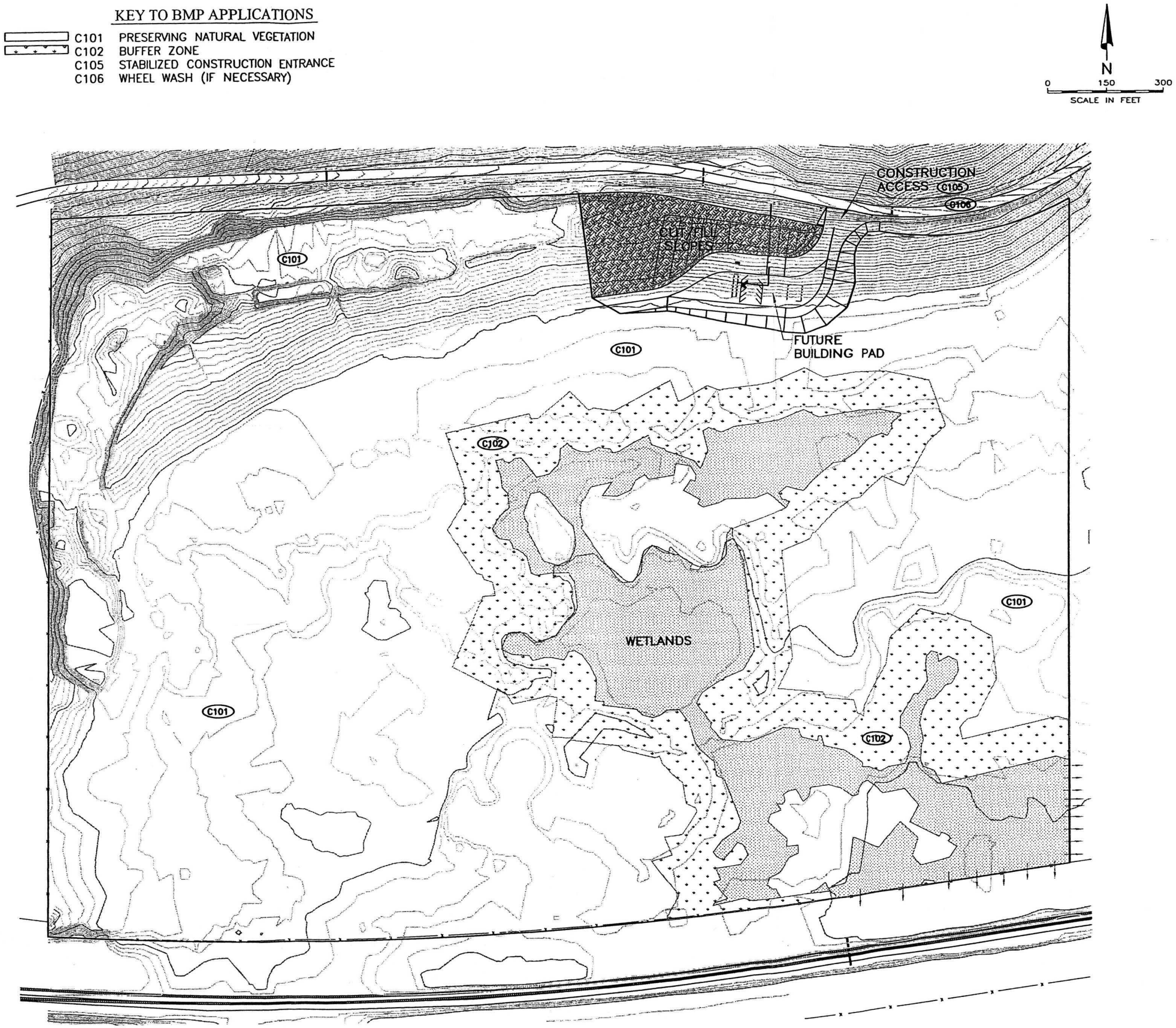
10/07

NOTES

1. THE IMPLEMENTATION OF THIS PLAN AND THE CONSTRUCTION, MAINTENANCE, REPLACEMENT, AND UPGRADING OF THESE FACILITIES IS THE RESPONSIBILITY OF THE APPLICANT/CONTRACTOR UNTIL ALL CONSTRUCTION IS COMPLETED AND APPROVED AND VEGETATION/LANDSCAPING IS ESTABLISHED.
2. THE BOUNDARIES OF THE CLEARING LIMITS SHOWN ON THIS PLAN SHALL BE CLEARLY FLAGGED IN THE FIELD PRIOR TO CONSTRUCTION. DURING THE CONSTRUCTION PERIOD, NO DISTURBANCE BEYOND THE FLAGGED CLEARING LIMITS SHALL BE PERMITTED. THE FLAGGING SHALL BE MAINTAINED BY THE APPLICANT/CONTRACTOR FOR THE DURATION OF CONSTRUCTION.
3. THE FACILITIES SHOWN ON THIS PLAN MUST BE CONSTRUCTED IN CONJUNCTION WITH ALL CLEARING AND GRADING ACTIVITIES, AND IN SUCH A MANNER AS TO MINIMIZE THE DISCHARGE OF SEDIMENT AND SEDIMENT-LADEN WATER FROM THE SITE
4. THE FACILITIES SHOWN ON THIS PLAN ARE THE MINIMUM REQUIREMENTS FOR ANTICIPATED SITE CONDITIONS. DURING THE CONSTRUCTION PERIOD, THESE FACILITIES SHALL BE UPGRADED AS NEEDED FOR UNEXPECTED STORM EVENTS AND TO MINIMIZE THE DISCHARGE OF SEDIMENT AND SEDIMENT-LADEN WATER FROM THE SITE.
5. THE FACILITIES SHALL BE INSPECTED ACCORDING TO THE SWPPP BY THE APPLICANT/CONTRACTOR AND MAINTAINED AS NECESSARY TO ENSURE THEIR CONTINUED FUNCTIONING.
6. THE FACILITIES ON INACTIVE SITES SHALL BE INSPECTED AND MAINTAINED A MINIMUM OF ONCE A WEEK OR WITHIN THE 48 HOURS FOLLOWING A MAJOR STORM EVENT.
7. AT NO TIME SHALL MORE THAN ONE FOOT OF SEDIMENT BE ALLOWED TO ACCUMULATE WITHIN A SEDIMENT TRAP ALL CATCH BASINS AND CONVEYANCE LINES SHALL BE CLEANED PRIOR TO PAVING. THE CLEANING OPERATION SHALL NOT FLUSH SEDIMENT LADEN WATER INTO THE DOWNSTREAM SYSTEM.
8. STABILIZED CONSTRUCTION ACCESS SHALL BE INSTALLED AT THE BEGINNING OF CONSTRUCTION AND MAINTAINED FOR THE DURATION OF THE PROJECT. ADDITIONAL MEASURES MAY BE REQUIRED TO ENSURE THAT ALL PAVED AREAS ARE KEPT CLEAN FOR THE DURATION OF THE PROJECT.

KEY TO BMP APPLICATIONS

C101 PRESERVING NATURAL VEGETATION
C102 BUFFER ZONE
C105 STABILIZED CONSTRUCTION ENTRANCE
C106 WHEEL WASH (IF NECESSARY)



HANSEN ALLEN & LUCE INC ENGINEERS	PROJECT ENGINEER	DESIGNED GLJ	3			SCALE	MOULDING & SONS	COMMERCIAL SITE DEVELOPMENT STORM WATER BMP PLAN EARTHWORK PHASES / FACILITIES CONSTRUCTION PHASES
		DRAFTED CAH	2					SHEET 2
		CHECKED KCS	1					333.01.100
		DATE JULY 2008	NO.	DATE	REVISIONS	BY	APVD.	

FILE NAME: ...3-MOULDING\01.100\CADFILES\OFFICE DWGS\SWPPP DWGS\2-STORM WATER.DWG
FILE DATE: ..17.2008 14:50:47 (CAH)
10/07

APPENDIX A

ENGINEERING CALCULATIONS

SCS runoff curve number method

The SCS Runoff Curve Number (CN) method is described in detail in NEH-4 (SCS 1985) The SCS runoff equation is

$$Q = \frac{(P - I_a)^2}{(P - I_a) + S} \qquad \text{[eq 2 1]}$$

where

Q = runoff (in)
P = rainfall (in)
S = potential maximum retention after runoff begins (in) and
I_a = initial abstraction (in)

Initial abstraction (I_a) is all losses before runoff begins It includes water retained in surface depressions water intercepted by vegetation, evaporation and infiltration I_a is highly variable but generally is correlated with soil and cover parameters Through studies of many small agricultural watersheds, I_a was found to be approximated by the following empirical equation

$$I_a = 0\ 2S \qquad \text{[eq 2 2]}$$

By removing I_a as an independent parameter, this approximation allows use of a combination of S and P to produce a unique runoff amount Substituting equation 2 2 into equation 2 1 gives

$$Q = \frac{(P - 0\ 2S)^2}{(P + 0\ 8S)} \qquad \text{[eq 2 3]}$$

S is related to the soil and cover conditions of the watershed through the CN CN has a range of 0 to 100 and S is related to CN by

$$S = \frac{1000}{CN} - 10 \qquad \text{[eq 2-4]}$$

Figure 2 1 and table 2 1 solve equations 2 3 and 2-4 for a range of CN s and rainfall

Factors considered in determining runoff curve numbers

The major factors that determine CN are the hydrologic soil group (HSG), cover type treatment, hydrologic condition, and antecedent runoff condition (ARC) Another factor considered is whether impervious areas outlet directly to the drainage system (connected) or whether the flow spreads over pervious areas before entering the drainage system (unconnected) Figure 2 2 is provided to aid in selecting the appropriate figure or table for determining curve numbers

CN s in table 2 2 (a to *d*) represent average antecedent runoff condition for urban, cultivated agricultural, other agricultural and arid and semiarid rangeland uses Table 2 2 assumes impervious areas are directly connected The following sections explain how to determine CN s and how to modify them for urban conditions

Hydrologic soil groups

Infiltration rates of soils vary widely and are affected by subsurface permeability as well as surface intake rates Soils are classified into four HSG s (A, B C, and D) according to their minimum infiltration rate which is obtained for bare soil after prolonged wetting Appendix A defines the four groups and provides a list of most of the soils in the United States and their group classification The soils in the area of interest may be identified from a soil survey report which can be obtained from local SCS offices or soil and water conservation district offices

Most urban areas are only partially covered by impervious surfaces the soil remains an important factor in runoff estimates Urbanization has a greater effect on runoff in watersheds with soils having high infiltration rates (sands and gravels) than in watersheds predominantly of silts and clays, which generally have low infiltration rates

Any disturbance of a soil profile can significantly change its infiltration characteristics With urbanization native soil profiles may be mixed or removed or fill material from other areas may be introduced Therefore a method based on soil texture is given in appendix A for determining the HSG classification for disturbed soils

POINT PRECIPITATION FREQUENCY ESTIMATES FROM NOAA ATLAS 14

Utah 41.246455 N 112.232511 W 4202 feet

from "Precipitation-Frequency Atlas of the United States" NOAA Atlas 14, Volume 1, Version 4
G.M. Bonnin, D. Martin, B. Lin, T. Parzybok, M. Yekta, and D. Riley
NOAA, National Weather Service, Silver Spring, Maryland, 2006

Extracted: Thu May 8 2008

Confidence Limits | Seasonality | Location Maps | Other Info | GIS data | Maps | Help | Docs | U S Map

Precipitation Frequency Estimates (inches)

ARI* (years)	5 min	10 min	15 min	30 min	60 min	120 min	3 hr	6 hr	12 hr	24 hr	48 hr	4 day	7 day	10 day	20 day	30 day	45 day	60 day
1	0.12	0.18	0.23	0.31	0.38	0.48	0.55	0.73	0.92	1.12	1.29	1.47	1.70	1.87	2.34	2.78	3.37	3.96
2	0.15	0.23	0.29	0.39	0.48	0.60	0.68	0.89	1.12	1.37	1.58	1.81	2.08	2.30	2.88	3.42	4.14	4.86
5	0.21	0.32	0.40	0.53	0.66	0.78	0.86	1.09	1.36	1.66	1.91	2.18	2.51	2.77	3.44	4.07	4.90	5.74
10	0.26	0.40	0.50	0.67	0.83	0.95	1.02	1.27	1.57	1.90	2.18	2.49	2.86	3.13	3.87	4.57	5.47	6.41
25	0.35	0.53	0.66	0.89	1.10	1.23	1.29	1.54	1.88	2.23	2.54	2.90	3.33	3.62	4.42	5.20	6.18	7.23
50	0.43	0.66	0.81	1.10	1.36	1.49	1.54	1.76	2.13	2.47	2.82	3.23	3.69	3.98	4.80	5.65	6.67	7.81
100	0.53	0.80	0.99	1.34	1.66	1.80	1.84	2.02	2.40	2.73	3.10	3.57	4.05	4.34	5.18	6.08	7.12	8.35
200	0.64	0.98	1.21	1.63	2.02	2.17	2.20	2.32	2.69	2.98	3.39	3.91	4.41	4.69	5.53	6.49	7.53	8.83
500	0.83	1.26	1.56	2.10	2.60	2.76	2.78	2.90	3.16	3.33	3.77	4.37	4.88	5.13	5.95	6.99	7.99	9.39
1000	0.99	1.51	1.88	2.53	3.13	3.30	3.32	3.42	3.54	3.60	4.06	4.72	5.24	5.45	6.24	7.33	8.27	9.74

These precipitation frequency estimates are based on a partial duration series. ARI is the Average Recurrence Interval.
Please refer to the [illegible] for more information. NOTE: Formatting forces estimates near zero to appear as zero.

* Upper bound of the 90% confidence interval
Precipitation Frequency Estimates (inches)

ARI (years)	5 min	10 min	15 min	30 min	60 min	120 min	3 hr	6 hr	12 hr	24 hr	48 hr	4 day	7 day	10 day	20 day	30 day	45 day	60 day
1	0.14	0.21	0.27	0.36	0.44	0.54	0.62	0.80	1.00	1.25	1.43	1.63	1.88	2.06	2.56	3.03	3.65	4.29
2	0.18	0.27	0.34	0.45	0.56	0.68	0.77	0.99	1.23	1.54	1.77	2.00	2.31	2.54	3.15	3.73	4.48	5.26
5	0.24	0.37	0.46	0.62	0.77	0.88	0.97	1.20	1.49	1.86	2.13	2.41	2.79	3.04	3.77	4.43	5.28	6.19
10	0.31	0.47	0.58	0.78	0.96	1.08	1.16	1.40	1.72	2.13	2.42	2.76	3.17	3.44	4.24	4.96	5.89	6.90
25	0.41	0.62	0.77	1.04	1.29	1.41	1.47	1.71	2.07	2.49	2.83	3.22	3.69	3.98	4.83	5.65	6.64	7.78
50	0.51	0.78	0.96	1.29	1.60	1.73	1.76	1.97	2.37	2.78	3.14	3.60	4.09	4.38	5.25	6.14	7.17	8.41
100	0.63	0.96	1.19	1.60	1.98	2.12	2.15	2.29	2.70	3.06	3.47	3.98	4.50	4.78	5.67	6.63	7.67	9.01
200	0.78	1.19	1.47	1.98	2.46	2.61	2.61	2.67	3.07	3.36	3.80	4.38	4.92	5.17	6.06	7.10	8.11	9.53
500	1.03	1.57	1.95	2.62	3.25	3.42	3.46	3.49	3.69	3.76	4.25	4.93	5.49	5.69	6.55	7.67	8.63	10.16
1000	1.27	1.94	2.40	3.23	4.00	4.19	4.23	4.27	4.32	4.36	4.59	5.37	5.92	6.07	6.89	8.09	8.94	10.56

The upper bound of the confidence interval at 90% confidence level is the value which 5% of the simulated quantile values for a given frequency are greater than.
* These precipitation frequency estimates are based on a partial duration series. ARI is the Average Recurrence Interval.

Please refer to the [illegible] for more information. NOTE: Formatting prevents estimates near zero to appear as zero.

* Lower bound of the 90% confidence interval
Precipitation Frequency Estimates (inches)

ARI * (years)	5 min	10 min	15 min	30 min	60 min	120 min	3 hr	6 hr	12 hr	24 hr	48 hr	4 day	7 day	10 day	20 day	30 day	45 day	60 day
1	0.11	0.16	0.20	0.27	0.33	0.42	0.50	0.67	0.84	1.00	1.17	1.33	1.54	1.70	2.14	2.55	3.11	3.66
2	0.14	0.21	0.26	0.34	0.42	0.53	0.62	0.82	1.03	1.24	1.44	1.64	1.90	2.09	2.64	3.14	3.83	4.50
5	0.18	0.28	0.35	0.47	0.58	0.69	0.77	0.99	1.25	1.50	1.73	1.98	2.28	2.51	3.15	3.75	4.53	5.33
10	0.23	0.35	0.43	0.58	0.72	0.83	0.91	1.15	1.43	1.71	1.97	2.25	2.59	2.85	3.54	4.19	5.07	5.94
25	0.30	0.45	0.56	0.76	0.93	1.05	1.13	1.37	1.69	1.99	2.29	2.61	3.01	3.28	4.04	4.77	5.72	6.70
50	0.35	0.54	0.67	0.90	1.11	1.24	1.31	1.55	1.89	2.20	2.53	2.90	3.31	3.59	4.38	5.16	6.17	7.22
100	0.42	0.64	0.79	1.06	1.32	1.45	1.53	1.74	2.10	2.42	2.77	3.18	3.62	3.90	4.71	5.54	6.58	7.71

Water Features

Davis Weber Area Utah

[Depths of layers are in feet See text for definitions of terms used in this table Estimates of the frequency of ponding and flooding apply to the whole year rather than to individual months Absence of an entry indicates that the feature is not a concern or that data were not estimated This report shows only the major soils in each map unit]

Map symbol and soil name	Hydrologic group	Surface runoff	Months	Water table		Ponding			Flooding	
				Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
				Ft	Ft	Ft				
BaE										
Barton gravelly loam	B	Medium	Jan Dec					None		None
Barton stony loam	B	Medium	Jan Dec					None		None
Rock outcrop			Jan Dec					None		None
BrG										
Barton	B	High	Jan Dec					None		None
Barton	B	High	Jan Dec					None		None
Rock outcrop			Jan Dec					None		None
GP										
Gravel pits			Jan Dec					None		None
La										
Lakeshore	D	Negligible	January	0 0 1 7	>6 0			None		None
			February	0 0 1 7	>6 0			None		None
			March	0 0 1 7	>6 0	0 1 0 5	Long	Frequent		None
			April	0 0 1 7	>6 0	0 1 0 5	Long	Frequent		None
			May	0 0 1 7	>6 0	0 1 0 5	Long	Frequent		None
			June	0 0 1 7	>6 0	0 1 0 5	Long	Frequent		None
			July	0 0 1 7	>6 0	0 1 0 5	Long	Frequent		None
			August	0 0 1 7	>6 0			None		None
			September	0 0 1 7	>6 0			None		None
			October	0 0 1 7	>6 0			None		None
			November	0 0 1 7	>6 0			None		None
			December	0 0 1 7	>6 0			None		None

Established Series
Rev AJE TBN MJD-JVC
02/2006

BARTON SERIES

The Barton series consists of very deep well drained soils that formed in colluvium and residuum derived from metamorphic rocks Barton soils are on hills Slopes are 5 to 40 percent The mean annual precipitation is about 15 inches and the mean annual temperature is about 50 degrees F

TAXONOMIC CLASS Coarse loamy, mixed, superactive mesic Typic Argixerolls

TYPICAL PEDON Barton gravelly loam -rangeland (Colors are for dry soil unless otherwise noted)

A1 0 to 5 inches dark grayish brown (10YR 4/2) gravelly loam very dark grayish brown (10YR 3/2) moist weak medium granular structure, soft, friable slightly sticky and nonplastic few mica flakes, many fine roots, few fine pores, neutral (pH 6 8) clear smooth boundary (3 to 6 inches thick)

A2 5 to 13 inches, dark grayish brown (10YR 4/2) gravelly loam very dark grayish brown (10YR 3/2) moist weak medium granular structure, slightly hard, friable, slightly sticky and slightly plastic few mica flakes many fine roots, common fine roots, common fine pores neutral (pH 6 8), clear smooth boundary (4 to 10 inches thick)

Bt 13 to 19 inches dark grayish brown (10YR 4/2) gravelly loam, very dark grayish brown (10YR 3/2) moist weak medium subangular blocky structure, slightly hard friable slightly sticky and slightly plastic few mica flakes, common fine roots, common fine pores common thin clay films neutral (pH 6 8) clear wavy boundary (4 to 8 inches thick)

C1 19 to 31 inches brown (10YR 5/3) very cobbly loam, dark grayish brown (2 5Y 4/2) moist, massive slightly hard friable slightly sticky and nonplastic, few mica flakes, few fine roots and few fine pores neutral (pH 7 0), clear wavy boundary (10 to 18 inches thick)

C2 31 to 60 inches light brownish gray (10YR 6/2) very stony sandy loam dark grayish brown (10YR 4/2) moist single grain, neutral

TYPE LOCATION Weber County, Utah on Little Mountain about 1 mile north of the gravel pit about 1,000 feet west and 350 feet north from the center of section 7 T 6 N R 3 W

RANGE IN CHARACTERISTICS

Mollic epipedon thickness - 10 to 19 inches includes the Bt horizon in some pedons

Particle size control section Clay content 12 to 18 percent, Rock fragments 20 to 35 percent mainly gravel

Depth to very cobbly or very stony material 18 to 30 inches

A1 horizon Value 3 or 4 dry 2 or 3 moist
Chroma 2 or 3 dry or moist
Organic matter content 2 to 4 percent
Texture Gravelly loam very gravelly loam stony loam or very stony loam

A2 horizon Value 3 or 4 dry 2 or 3 moist
Chroma 2 or 3 dry or moist
Organic matter content 1 to 3 percent

Bt horizon Value 4 or 5 dry 3 or 4 moist
Texture Gravelly loam or gravelly fine sandy loam
Clay content 12 to 18 percent
Rock fragments 20 to 35 percent
Organic matter content 0 5 to 1 percent

C horizons Hue 10YR or 2 5Y
Value 5 or 6 dry, 4 or 5 moist
Chroma 2 or 3, dry or moist
Texture Very cobbly loam very stony loam very cobbly sandy loam or very stony sandy loam
Rock fragments 35 to 60 percent
Effervescence Noneffervescent to strongly effervescent

COMPETING SERIES This is the Sorrell (T) series Sorrell soils are moderately deep to paralithic contacts

GEOGRAPHIC SETTING Barton soils are on hills above the surrounding lake plain of Great Salt Lake These soils formed in colluvium and residuum derived from metamorphic rocks such as tillite fluvial conglomerate varved slate and graywacke Slopes are 5 to 40 percent The climate is dry subhumid The mean annual precipitation is 13 to 16 inches The mean annual temperature is 48 to 52 degrees F and the mean summer temperature is 68 to 72 degrees F The frost-free period is 140 to 160 days

GEOGRAPHICALLY ASSOCIATED SOILS These are the Leland Saltan and Warm Springs soils Leland soils are fine loamy, have ochric epipedons and natric horizons, and occur on lake terraces Saltan soils are fine silty, have ochric epipedons and salic horizons, and occur on lake plains Warm Springs soils are fine loamy have calcic horizons and occur on lake terraces

DRAINAGE AND PERMEABILITY Well drained, medium or high surface runoff, moderate permeability (moderately high or high saturated hydraulic conductivity)

USE AND VEGETATION Barton soils are used as rangeland with part of the area used for industrial activities The native vegetation is mainly Sandberg's bluegrass threeawn grass Wyoming big sagebrush prairie junegrass stork's bill and sunflower

DISTRIBUTION AND EXTENT Northwestern Utah These soils are not extensive with about 1 300 acres of the series mapped to date MLRA 28A

MLRA OFFICE RESPONSIBLE Reno, Nevada

SERIES ESTABLISHED Weber County Utah 1974

REMARKS Diagnostic horizons and features recognized m this pedon are

Mollic epipedon The zone from the soil surface to 19 inches (A1 A2 and Bt horizon)

Argillic horizon The zone from 13 to 19 inches (Bt horizon)

Particle size control section The zone fiom 13 to 19 inches (Bt horizon)

The superactive cation exchange activity class was added in 03/2003 to the taxonomic classification by the National Soil Survey Centei on request of the Reno MLRA office without review of the soil series property data

ADDITIONAL DATA The typical pedon at the series type location has partial characterization data by the Soils Laboratory from Utah State University (USU) Logan UT and is published on pages 138 139 Table 11 of the Soil Survey of Davis Weber Area Utah The pH values in the typical pedon are from the oiiginal field description

National Cooperative Soil Survey
U S A

Established Series
Rev AJE-MJD RJL JVC
03/2006

LAKESHORE SERIES

The Lakeshore series consists of very deep poorly drained soils that formed in lacustrine deposits derived from mixed rocks Lakeshore soils are on lake plains and lake terraces Slopes are 0 to 1 percent The mean annual precipitation is about 15 inches and the mean annual temperature is about 50 degrees F

TAXONOMIC CLASS Coarse-silty, mixed superactive mesic Typic Aquisalids

TYPICAL PEDON Lakeshore silt loam rangeland (Colors are for moist soil unless otherwise noted) The soil surface has a 3 millimeter thick salt crust

Az 0 to 4 inches grayish brown (2 5Y 5/2) silt loam, light gray (2 5Y 7/2) dry weak medium platy structure, slightly hard friable slightly sticky and slightly plastic, many fine pores, violently effervescent 16 percent calcium carbonate equivalent strongly saline (EC 55 mmhos/cm), moderately alkaline (pH 8 1) clear smooth boundary (2 to 5 inches thick)

Czg1--4 to 8 inches light olive brown (2 5Y 5/3) silt loam pale yellow (2 5Y 7/3) dry, massive, soft very friable, slightly sticky and slightly plastic, many fine and medium pores common medium prominent yellowish brown (10YR 5/6) masses of iron accumulation, violently effervescent 19 percent calcium carbonate equivalent strongly saline (EC 73 mmhos/cm), moderately alkaline (pH 8 0), clear smooth boundary (3 to 15 inches thick)

Czg2 8 to 13 inches olive (5Y 5/3) very fine sandy loam pale yellow (5Y 7/3) dry, massive, soft, very friable, nonsticky and nonplastic, common medium and fine pores, common fine prominent light olive brown (2 5Y 5/6) masses of iron accumulation violently effervescent, moderately alkaline (pH 8 1) clear wavy boundary (0 to 8 inches thick)

Czg3--13 to 19 inches olive (5Y 5/3) loam pale yellow (5Y 7/3) dry, massive slightly hard, very friable slightly sticky and slightly plastic, common medium pores, common medium prominent light olive brown (2 5Y 5/6) masses of iron accumulation violently effervescent, 11 percent calcium carbonate equivalent strongly saline (EC 87 mmhos/cm), slightly alkaline (pH 7 7), clear smooth boundary (4 to 11 inches thick)

Czg4--19 to 51 inches, olive (5Y 5/3) silt loam, pale yellow (5Y 7/3) dry, massive slightly hard very friable, slightly sticky and slightly plastic few fine and medium pores common fine prominent light olive brown (2 5Y 5/6) masses of iron accumulation violently effervescent, 10 percent calcium carbonate equivalent strongly saline (EC 72 mmhos/cm) slightly alkaline (pH 7 7) clear wavy boundary (12 to 20 inches thick)

Czg5--51 to 64 inches dark gray (5Y 4/1) silt loam, gray (5Y 6/1) dry, massive slightly hard friable slightly sticky and slightly plastic few fine and medium pores violently effervescent 13 percent calcium carbonate equivalent strongly saline (EC 72 mmhos/cm) neutral (pH 7 0)

TYPE LOCATION Weber County Utah, about 3 miles west of West Warren Church, approximately 1 320 feet east and 1 000 feet north of the southwest corner of section 17 T 6 N R 3 W USGS Plain City SW 7 5 minute topographic quadrangle 41 degrees 15 minutes 11 seconds north latitude and 112 degrees 12 minutes 49 seconds west longitude NAD83 UTM zone 12N 398330E 4567557N, NAD83

RANGE IN CHARACTERISTICS

Soil moisture The soils are saturated with water during most of the year within a depth of 40 inches the upper part of the moisture control section is dry during summer months in normal years, Aquic moisture regime during seasonal periods of saturation and reduction

Mean annual soil temperature 50 to 54 degrees F

Particle size control section Clay content Averages 8 to 18 percent

Salinity Surface is typically crusted with a thin layer of salt (mostly sodium chloride) salic horizon begins at the soil surface

Az horizon - Hue 2 5Y or 5Y
Value 4 or 5 moist, 6 or 7 dry
Chroma 1 or 2, dry or moist
Texture Silt loam or fine sandy loam
Salinity (EC) 32 to 90 mmhos/cm
Sodicity (SAR) 13 to 90
Calcium carbonate equivalent 5 to 25 percent
Reaction Slightly alkaline through strongly alkaline

Czg horizons Hue 2 5Y or 5Y
Value 4 through 6 moist
Chroma 1 through 3, dry or moist
Texture Loam silt loam, or very fine sandy loam
Salinity (EC) 32 to 90 mmhos/cm
Sodicity (SAR) 13 to 90
Calcium carbonate equivalent 5 to 25 percent
Reaction Neutral through strongly alkaline

COMPETING SERIES There are currently no other series in this family

GEOGRAPHIC SETTING Lakeshore soils are on lake plains and lake terraces adjoining small ponds These soils formed in lacustrine deposits derived from mixed rocks such as limestone quartzite shale and sandstone Slopes are 0 to 1 percent Elevations range from 4 200 to 4 400 feet The climate is dry subhumid The mean annual precipitation is 14 to 18 inches The mean annual temperature is 48 to 52 degrees F , the mean summer temperature is 66 to 71 degrees F and the frost free period is 160 to 180 days

GEOGRAPHICALLY ASSOCIATED SOILS These are the Leland Saltan and Warm Springs soils Leland soils are fine-loamy have natric horizons have seasonal high water tables at 30 to 48 inches in depth, and occur under alkali sacaton and black greasewood Saltan soils are fine silty Warm

Springs soils are fine loamy have mollic epipedons and calcic horizons and occur under alkali sacaton

DRAINAGE AND PERMEABILITY Poorly drained, negligible surface runoff, slow permeability (moderately low or moderately high saturated hydraulic conductivity) Endosaturation is present with an apparent seasonal high water table between the soil surface and 1 7 feet (very shallow and shallow free water occurrence classes) year round Cumulative annual duration class is Persistent These soils are susceptible to occasional ponding for brief duration from March through July with water up to 6 inches deep

USE AND VEGETATION Lakeshore soils are used for rangeland and wildlife habitat The soil surface is about 90 percent bare ground with some scattered vegetation that is usually inland saltgrass and pickleweed

DISTRIBUTION AND EXTENT Northwestern Utah These soils are not extensive with about 9 400 acres of the series mapped to date MLRA 28A

MLRA OFFICE RESPONSIBLE Reno Nevada

SERIES ESTABLISHED Weber County (Davis Weber Area), Utah, 1967

REMARKS Diagnostic horizons and features recognized in this pedon are

Ochric epipedon The zone from the soil surface to 4 inches (Az horizon)

Salic horizon - The zone from the soil surface to 64 inches (Az, Czg1 Czg2 Czg3, Czg4 and Czg5 horizons)

Aquic conditions - The conditions of endosaturation reduction, and redoximorphic features between the soil surface and 20 inches at certain times during nonnal years (parts of the Az Czg1 Czg2 Czg3, and Czg4 horizons)

Particle-size control section - The zone from 10 to 40 inches (Czg3 horizon and parts of the Czg2 and Czg4 horizons)

The soil was last reviewed in the field in 1965 It needs to be determined if the soil moisture control section is dry in some or all parts at some time during normal years The height and duration of the seasonal high water needs to be verified m the field

ADDITIONAL DATA The typical pedon at the series type location has partial characterization data by the Soils Laboratory from Utah State University (USU) Logan UT and is published on pages 140 141 Table 11 of the Soil Survey of Davis-Weber Area, Utah The pH values in the typical pedon are from saturated paste

National Cooperative Soil Survey
U S A

Runoff Volume for a 10 year - 24hr Storm

$$Q = \frac{(P - 0 2 S)^2}{(P + 0 8 S)}$$

where $S = \frac{1000}{CN} - 10 \Rightarrow CN = 69$ (TR-55, B type soil, fair condition Pasture)

$$S = \frac{1000}{69} - 10 = 4 49$$

$P = 1 9$ in

$$Q = \frac{(1 9 - 0 2(4 49))^2}{(1 9 + 0 8(4 49))}$$

$= 0.18$ in

$A \approx 3$ acres

$$V = 0 18 \text{ in} \left(\frac{1 \text{ ft}}{12 \text{ in}}\right) \cdot 3 \text{ acres}$$

$= 0.045$ ac-ft or 1960 ft^3

APPENDIX B

NPDES STORM WATER PERMIT

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 UTR355013

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 UTR355013 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 oermit ALL NECESSARY INFORMATION MUST BE PROVIDED ON THIS FORM

Is this NOI seeking continuation for previously expired permit coverage at the same site? Y (Y or N)
If yes what is the number of the previous permit coverage? Permit No UTR110683

Permit Start Date 01/14/11 **Permit Expiration Date** 01/14/12

I OPERATOR INFORMATION Date NOI is received at DWQ (to be completed by DWO)

Name (Main operator) Weber County Corp Phone 801 399 8416

Address 2830 S Washington Blvd Status of Owner/Operator M Public

City Ogden State UT Zip 84401

Contact Person Gary Laird Phone 801 399 8803

Name (1st Co permittee) Moulding and Sons Phone 801 399 9994

Address 10485 W 900 S Status of Owner/Operator P Pnvate

City Ogden State UT Zip 84401

Contact Person Randy Moulding Phone 801 725 2722

Name (2nd Co permittee) Phone

Address Status of Owner/Operator

City State Zip

Contact Person Phone

Name (3rd Co permittee) 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 in Indian Country? N (Y or N)

Name Office Sue

Project No (if any) ______________________

Address 10485 W 900 S County WEBER

City OGDEN State UT Zip 84401

Latitude 41 248317 Longitude 112 231583

Method (checkone) ☐ USGS Topo Map Scale ☐ EPA Web site ☐ CPS ☒ Other

III SITE ACIVITY INFORMATION

Municipal Separate Storm Sewer System (MS4) Operator Name None

Receiving Water Body Great Salt Lake (this is known)

How far to the nearest water body? 24000 ft

List the Number of any other UPDES permits at the site ______ ______ ______

IV TYPE OF CONSTRUCTION (Check all that apply)

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

8 ☐ Other (Please list) ______

V MANAGEMENT PRACTICES

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

1 ☐ Silt Fences 2 ☐ Sediment Pond 3 ☒ Seeding/Preservation of Vegetation 4 ☐ Mulching/Geotexules 5 ☐ Check Dams

6 ☐ 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 Y (Y or N)
(A pollution prevention plan is required to be on hand before submittal of the NOI)

Project Start Date 01/14/11 Completion Date 03/14/11 All coverage s issued under this NOI will terminate on June 30 2013)

VII CERTIFICATION I certify under penalty of law that I have read and understand the Part 1 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 1 and Part 3 of this permit I understand that continued coverage under this storm water general permit is contingent upon maintaining eligibility as provided for in Part 1

I also certify under penalty of law that this document and all attachments were prepared under the direction or supervision of those who have placed 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) Date

Gary Laird

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 the 3rd co permittee from first page) Date

Signature

Amount of Permit Fee Enclosed $ 100

INSTRUCTIONS

Nouce Of Intent (NOI) For Permit Coverage Under the UPDES General Permit For Storm Water Discharges From Construction Activities

Who Must File A Notice Of Intent (NOI) Form State law at UAC R317 8-3 9 prohibits point source discharges of storm water from construction activities to a water body(ies) of the State without a Utah Pollutant Discharge Elimination System (UPDES) permit The operator of a construction activity that has such a storm water discharge must submit a NOI to obtain coverage under the UPDES Storm Water General Permit If you have questions about whether you need a permit under the UPDES Storm Water program or if you need information as to whether a particular program is administered by EPA or a state agency contact the storm water coordinator at (801) 538 6146

Where To File NOI Form NOIs with fee payment(s) must be sent to the following address

Department of Environmental Quality
Division of Water Quality
P O Box 144870
Salt Lake City UT 84114-4870

(The NOI can also be completed on line at http //www waterquality utah gov/ UPDES/stormwatercon htm)

Beginning of Coverage Storm Water General Permits cover a facility quickly avoiding delays therefore coverage is immediate after submitting an NOI with submission of the permit fee The permittee should be aware that though you may not have a permit in hand if you have sent in a completed NOI with the permit fee you are covered by the conditions in the permit and will be expected to comply with these conditions If you wish contact the Division of Water Quality at (801) 538-6146 to receive a generic copy of the permit or you can print a copy from the DWQ web site or it can be downloaded during the on line application process

Permit Fees (MAKE CHECKS PAYABLE TO. DIVISION OF WATER QUALITY) Construction projects are prorated from the time they begin disturbing ground until the time the disturbed surface is stabilized and the permit is terminated by the permittee with a submittal of a Notice of Termination (NOT) form That time period may or may not be that same time period as what could be considered project start date and project end date Fees are prorated at $8 34 per month of coverage needed except there is a $100 minimum and a $500 00 maximum EXAMPLE if you need 5 months of coverage 5 x $8 34 = $41 70 then you will need to submit the $100 minimum if 18 months of coverage is needed 18 x $8 34 = $150 12 your total fee will be $150 12 The $500 00 maximum will provide permit coverage for five years and then expire at the end of the five year period Permit coverage is calculated on the dollar amount of the permit fee submitted The minimum time period that a permit can be issued for is one year If stabilization occurs before one year the permittee must submit an NOT State or local political subdivisions are exempt from the permit fee The fee must be received with the NOI before permit coverage is given

Length of Coverage Storm Water Construction Permits get coverage starting on the day that the NOI and fee payment is received at DWQ (on line if that is the case) and ending on the date that the fee pays up to The minimum fee is $100 therefore all permits where the minimum fee is paid will automatically receive coverage for one year If a permittee does not need coverage for a full year and does not want to be held accountable for permit conditions they must submit the NOT (associated with the permit) after the site has been stabilized (or when other requirements are met so that the permittee can legally terminate the permit) to terminate coverage

The Storm Water General Permit for Construction Activities UTR300000 will expire on June 30 2013

SECTION I FACILITY OPERATOR INFORMATION Give the legal name(s) of the person(s) firm(s) public organization(s) or any other entity(ies) that conducts the construction operation at the facility or site described in this application The name of the operator(s) may be the developer the owner the general contractor the design firm the excavation contractor and/or others (e g anyone that fits the definition of operator) An operator is anyone that has control over site/project specifications and/or control of day to day operational activities Do not use a colloquial name

Enter the complete address and telephone number of the operator(s) Enter the appropriate letter to indicate the legal status of the operator of the facility

F = Federal M = Public (other than Fed or State) S = State P = Private

SECTION II FACILITY/SITE LOCATION INFORMATION Enter the facility name or legal name and project number (if any) of the site and complete street address including city state and ZIP code The latitude and longitude of the facility must be included to the approximate centroid of the site and the method of how the Lat/Long was obtained (USGS maps GPS Internet Map sites [such as Google Earth) other) The township and range is desirable but not necessary

Indicate whether the facility is located in Indian Country If the facility is located in Indian Country do not complete this NOI instead complete form 3510 6 and submit to EPA Region VIII except for facilities on the Navajo Reservation or on the Goshute Reservation which should submit EPA form 3510-6 to Region IX

SECTION III - SITE ACTIVITY INFORMATION If the storm water discharges to a municipal separate storm sewer system (MS4) enter the name of the operator of the MS4 (e g municipality name county name) and the receiving water of the discharge from the MS4 if it is known (if it is not known please estimate or guess and indicate so) (An MS4 is defined as a conveyance or system of conveyances (including roads with drainage systems municipal streets catch basins curbs gutters ditches man made channels or storm drains) that is owned or operated by a state city town county district association or other public body which is designed or used for collecting or conveying storm water)

SECTION IV - TYPE OF CONSTRUCTION Check each type of construction that applies to this application

SECTION V - BEST MANAGEMENT PRACTICES Check each type of best management practice that will be used to control storm water runoff at the job site

SECTION VI - ADDITIONAL INFORMATION REQUIRED Enter the project start date and the estimated completion date for the entire development plan All coverage s issued under this NOI terminate on June 30 2013 Provide an estimate of the total number of acres of the site on which soil will be disturbed (round to the nearest acre) Indicate whether the storm water pollution prevention plan for the site is in compliance with approved state and/or local sediment and erosion plans permits or storm water management plans

SECTION VII - CERTIFICATION State statutes provide for severe penalties for submitting false information on this application form State regulations require this application to be signed as follows

For *a* corporation by a responsible corporate officer which means (i) president secretary treasurer or vice president of the corporation in charge of a principal business function or any other person who performs similar policy or decision making functions or (ii) the manager of one or more manufacturing production or operating facilities employing more than 250 persons or having gross annual sales or expenditures exceeding $25 million (in second quarter 1980 dollars) if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures

For *a* partnership or sole proprietorship by a general partner or the proprietor or

For a municipality state Federal or other public facility by either a principal executive officer or ranking elected official

POLLUTION PREVENTION PLAN A storm water pollution prevention plan (SWP3) is required to be in hand before the NOI can be submitted It is important to know SWP3 requirements (contained in the permit) even during the design portion of the project A copy of the permit can be obtained from the Division of Water Quality s storm water construction web site Guidance material for developing a SWP3 can be obtained from EPA (NTIS) or copied from EPA material at the Division of Water Quality s storm water construction web site

NOTICE OF TERMINATION (NOT) A completed Notice of Termination (NOT) form is required to terminate your permit at the end of construction Please complete the NOT form including the projects assigned permit number and return it to the Division of Water Quality If you apply on line you will receive a partially filled out NOT at the time of application for which you will need to fill in the termination date and provide a signature for submission Please contact the storm water coordinator at (801) 538 6146 for any questions or for a copy of the NOT form

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 **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 UTR355013

Final stabilization has been achieved on all portions of the site for which you are responsible
Partial site NOT ☐ Full site NOT ☐

Another party has assumed control of the site for which you are responsible through appropriate transfer of responsibility
Partial site ☐ Full site ☐

Coverage under another Storm Water Construction permit or an alternative UPDES permit has been obtained
Partial site ☐ Full site ☐

For residential construction only temporary stabilization has been completed and the residence has been transferred to the homeowner ☐
(list each of the addresses of the lots transferred to a homeowner on a separate sheet and attach it to this sheet before submitting)

II Facility Operator Information

Name Weber County Corp Phone 801 399 8416

Address 2830 S Washington Blvd

City Ogden State UT Zip 84401

III Facility Site/Location Information

Name Office Sue

Address 10485 W 900 S County WEBER

City OGDEN State UT Zip 84401

Latitude 41 248317 Longitude 112 231583

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 Date

Gary Laird

Signature

Instructions for Completing Notice of Termination (NOT) Form

Who May File A Notice Of Termination (NOT) Form

Permittees who are presendy covered under die State issued Utah Pollutant Discharge Elimination System (UPDES) General Storm Water Permit for Construcuon Activity may submit a notice of termmaoon (NOT) form when their faciboes no longer have any storm water discharges associated with industnal acovity as defmed in the storm water regulaoons at UAC R317 8-3 8(b)(c) and (d) or when diey are no longer the operator of die facdiues

For construction activines elimination of all storm water discharges associated with mdustnal activity occurs when disturbed sods at the construction sue have been finally stabdized and temporary erosion and sediment control measures have been removed or wdl be removed at an appropnate time or diat all storm water discharges associated with construction activity from the construcoon site diat are authonzed by a UPDES general penmt have otherwise been elimmaied Final stabilization means that all soddisturbing activioes at the site have been completed and that a uniform perennial vegetative cover with a density of 70Y of die cover for unpaved areas and areas not covered by permanent structures has been established or equivalent permanent stabdization measures (such as the use of nprap gabions or geotexides) have been employed

Where to File NOT Form

Send this form to die following address

Division of Water Quality
288 Nordi 1460 West
P O Box 144870
Salt Lake City Utah 84114 4870

Completmg the Form

Type or pnnt using upper case leners m die appropnate areas only Please place each character between the marks Abbreviate if necessary to stay within the number of characters allowed for each item Use only one space for breaks between words but not for punctuanon marks unless they are needed to clanfy your response If you have any questions about this form call the Division of Water Quality at (801) 538 6146

Section I – Permit Information

Enter the existing UPDES Storm Water General Permit number assigned to the facdity or sue idenofied in Secnon III If you do not know the permit number contact the Division of Water Quality at (801) 538 6146

Indicate your reason for submittmg dus Nouce of Termmanon by checkmg die appropnate box

If diere has been a change of operator and you are no longer the operator of the facdity or site identified in Secoon III Check die corresponding box
If all storm water discharges at the facdity or sue idennfied in Section III have been terminated check the corresponding box

Section II – Facility Operator Information

There may be more than one operator for a consuucoon project This form must be fdled out and submitted by each of die operators listed on the notice of intent (NOI) diat was submitted for receiving coverage under this permit In dis secoon give die legal name of the person firm pubbc organizaoon or any other enoty diat is filed as an operator at the facdity or sue descnbed m this application that is desinng to terminate coverage The name of die operator may or may not be the same name as the facdity The operator of die facility is the legal entity which controls the facdity s operation (refernng to operation of construcuon activity) or a portion of it rather diat die plant or sue manager of die finished or rehabilitated facdity Do not use a colloquial name Enter die complete address and telephone number of the operator

Section III – Facility/Site Location Informauon

Enter die facility s or site s official or legal name and complete address mcludmg city state and ZIP code and die laomde and longimde of the facdity to the nearest 15 seconds of the approximate center of the site It is preferred that the locauon address be the same as that which the sue used in die submission of the NOI

Section IV – Certification

State statues provide for severe penalnes for submitting false informanon on dis application form State regulauons require this appbcation to be signed as follows

For a rorporonon by a responsible corporate officer which means (1) president secretary oeasurer or vice president of the corporauon m charge of a pnncipal business function or any odier person who performs simdar policy or decision making functions or (u) the manager of one or more manufactunng producuon or operanng facdiues employmg more dian 250 persons or having gross annual sales or expenditures exceeding $25 mdlion (in second quaner 1980 dollars) if audionty to sign documents has been assigned or delegated to die manager in accordance with corporate procedures

For a pormership or *sole* proprietorship by a general parmer or die propnetor respecovely or

For a municipohry *State* Feder*a*l or other pubhc *f*acihty by either a pnncipal executive officer or ranking elected official

STATE OF UTAH DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF WATER QUALITY

Authorization to Discharge Under the
Utah Pollutant Discharge Elimination System

Storm Water General Permit for
Construction Activities
Permit No **UTR300000**

This Permit is issued in compliance with the provisions of the Utah Water Quality Act Title 19, Chapter 5, Utah Code Annotated 2004 as amended (the 'Act") and the federal Water Pollution Control Act (33 U S C §§ 1251 *et seq* as amended to date) and the rules and Regulations made pursuant to those statutes

This Permit authorizes storm water discharges to waters of the State of Utah resulting from construction activities including construction support activities, anywhere within the State of Utah as provided in Parts 1 4 and 1 5 of this Permit This authorization is conditioned upon a discharger meeting the eligibility requirements in Part 1 2 2 of this Permit including preparation of a Storm Water Pollution Prevention Plan prior to filing a Notice of Intent (NOI) to discharge under this General Permit A discharger is not covered by this Permit if the discharger submits an NOI but has not met these conditions

This authorization is subject to the authority of the Utah Water Quality Board or the Executive Secretary of the Utah Water Quality Board to reopen this Permit (*see* Part 5 15 of this Permit) or to require a discharger to obtain an individual permit or use an alternative general permit (*see* Part 2 3 of this Permit) The issuance of a discharge permit authorization under this general Permit does not relieve Permittees of other duties and responsibilities under the Act or rules made under that Act Significant terms used in this Permit are defined in Part 6 of this Permit

This Permit shall become effective on July 1 2008

This Permit and the authorization to discharge shall expire at midnight June 30 2013 except as described in Part 2 4 of this Permit

Signed this 26th day of June 2008

Walter L Baker P E
Executive Secretary
Utah Water Quality Board

TABLE OF CONTENTS

PART 1 PERMIT SCOPE AND COVERAGE

1 1 Persons required to obtain authonzation for discharge No person may conduct construction activities that disturb an area greater than or equal to one acre without authorization for storm water discharge from the Executive Secretary (*See* Utah Admin Code Sections R317 8-3 9(6)(d)(10) and R317-8-3 9(6)(e)(1)) In addition, no person may conduct construction activities that disturb an area smaller than one acre if the disturbance is part of a larger common plan of development or sale that will ultimately disturb an area greater than or equal to one acre *Id* *See* Part 6 5 of this Permit for a definition of 'construction activities'

1 2 Permit Area and Eligibility
- 1 2 1 Construction activities located within the State of Utah except for Indian Country (*see* Part 6 16 of this Permit for a definition of ' Indian Country ') may be eligible to be covered under this Permit
- 1 2 2 Eligibility for authonzation to discharge under this Permit is conditioned upon
  - a Preparation of a Storm Water Pollution Prevention Plan ("SWPPP") (see Part 3 of this permit) prior to submission of a Notice of Intent ("NOI"),
  - b Submission of a complete and accurate Notice of Intent to be covered by this Permit (see Part 1 8 of this Permit), and
  - c Payment of applicable fees

1 3 Authorization to Discharge This Permit authorizes discharges of storm water from construction activities that disturb an area greater than or equal to one acre, and from construction activities that disturb an area smaller than one acre if the disturbance is part of a larger common plan of development or sale that will ultimately disturb an area greater than or equal to one acre This authorization is subject to all of the terms and conditions of this Permit, including the requirement that the discharger must submit a Notice of Intent ("NOI"), and the prohibitions on discharges specified in Part 1 6

1 4 Allowable Storm Water Discharges Subject to compliance with the terms and conditions of this Permit, a Permittee is authorized to discharge pollutants in
- 1 4 1 Storm water associated with construction activity as that term is defined in Part 6 5 of this Permit (but see Part 1 4 3 of this Permit for limitations on discharges from construction support activities),
- 1 4 2 Storm water discharges designated by the Executive Secretary as needing a storm water permit under R317-8-3 9(6)(e)(2),
- 1 4 3 Discharges from construction support activities as that term is defined in Part 6 6 of this Permit, provided
  - a The support activity is directly related to the construction site required to have UPDES permit coverage for discharges of storm water associated with construction activity,
  - b The support activity is not a commercial operation serving multiple unrelated construction projects by different owners/operators and does not operate beyond the completion of the construction activity at the last construction project it supports, and
  - c Appropriate controls and measures are identified in a Storm Water Pollution

Prevention Plan (SWPPP) covering the discharges from the support activity areas, and

1 4 4 Discharges composed of allowable discharges listed in Part 1 4 and 1 5 of this Permit commingled with a discharge authorized by a different UPDES permit and/or a discharge that does not require UPDES permit authorization

1 5 Allowable Non-storm Water Discharges A Permittee is authorized to make the following non-storm water discharges, provided the non-storm water component of the discharge is in compliance with Part 3 5 5 of this Permit

1 5 1 Discharges from fire-fighting activities,
1 5 2 Fire hydrant flushings,
1 5 3 Waters used to wash vehicles where detergents are not used,
1 5 4 Water used to control dust in accordance with Part 3 5 2(c)(2),
1 5 5 Potable water including uncontaminated water line flushings,
1 5 6 Routine external building wash down that does not use detergents,
1 5 7 Pavement wash waters where spills or leaks of toxic or hazardous materials have not occurred (unless all spilled material has been removed) and where detergents are not used,
1 5 8 Uncontaminated air conditioning or compressor condensate,
1 5 9 Uncontaminated ground water or spring water,
1 5 10 Foundation or footing drains where flows are not contaminated with process materials such as solvents,
1 5 11 Landscape and other irrigation drainage

1 6 Discharges not allowed under this Permit Notwithstanding any other language in this Permit, the following storm water discharges are not authorized by this Permit

1 6 1 Discharges from Construction Activities within Indian Country This Permit does not cover discharges within Indian Country as that term is defined in Part 6 16 of this Permit,[1]

1 6 2 Post Construction Discharges Storm water discharges that originate from the site after construction activities have been completed and the site has undergone final stabilization,

1 6 3 Discharges Mixed with Non storm Water Discharges that are mixed with sources of non-storm water other than discharges which are identified in Part 1 5 of this Permit and in compliance with Part 3 5 5 (non storm water discharges) of this Permit,

1 6 4 Discharges Covered by Another Permit Storm water discharges associated with construction activity for which an individual permit has been issued, or for which the owner/operator is required to or may obtain coverage under an individual permit or an alternative general permit (*see* Part 2 3 of this Permit), including a general

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[1] The State of Utah, *Division of Water Quality*, does not have permit authority for Indian Country Storm water permits for Indian Country within the State must be acquired through EPA Region VIII, except for facilities on the Navajo Reservation or on the Goshute Reservation which must acquire storm water permits through EPA Region IX

permıt ıssued for areas regulated by a qualıfied munıcıpal Separate Storm Sewer System Program,

1 6 5 Dıscharges Threatenıng Water Qualıty Storm water dıscharges from constructıon actıvıtıes that cause or have the reasonable potentıal to cause a vıolatıon of a water qualıty standard *See* Part 2 2 of thıs Permıt,

1 6 6 Dıscharges from commercıal constructıon support and related actıvıtıes Storm water dıscharges from constructıon support actıvıtıes unless they are ıncluded wıthın the definıtıon ın Part 6 6 of thıs permıt,

1 6 7 Spılls This Permıt does not authorıze the dıscharge of hazardous substances or oıl resultıng from an on-sıte spıll, and

1 6 8 Dıscharges that result from vıolatıons of thıs Permıt

1 7 Authorızatıon to Dıscharge Date

1 7 1 Thıs permıt ıs effectıve as of July 1, 2008 and ıs effectıve for five years expırıng at 11 59 p m on June 30, 2013

1 7 2 Unless notıfied by the Executıve Secretary to the contrary, a dıscharger ıs authorızed for coverage under thıs Permıt and may begın constructıon actıvıtıes ımmedıately after preparıng a SWPPP for the constructıon actıvıtıes (*see* Part 1 2 2(a) of thıs Permıt), and after submıttıng an NOI and permıt fee (*see* Part 1 2 2(b) and (c) of thıs Permıt) The date of submıssıon of the NOI or a permıt fee shall be the date of ıts receıpt by the Executıve Secretary, or the date the NOI or permıt fee are submıtted electronıcally usıng the websıte for the Utah Dıvısıon of Water Qualıty Any NOIs maıled to the Executıve Secretary shall be maıled to the address specıfied ın Part 5 11 of thıs Permıt

1 7 3 The Executıve Secretary may, wıth wrıtten notıce (ıncludıng electronıc notıce) delay authorızatıon to verıfy an applıcant's elıgıbılıty or resolve other concerns In these ınstances, a dıscharger ıs not authorızed for coverage under thıs permıt untıl ıt receıves notıce from the Executıve Secretary

1 8 Notıce of Intent

1 8 1 A person who wıshes to submıt an NOI must use the NOI form provıded by the Executıve Secretary (or a copy thereof), or submıt an NOI electronıcally (see (https //secure utah gov/stormwater/))

1 8 2 All questıons m an NOI form provıded by the Executıve Secretary or answered ın the course of submıttıng an NOI electronıcally must be answered completely and accurately

1 8 3 The NOI, whether on the form provıded by the Executıve Secretary or submıtted electronıcally, must ınclude a certıficatıon statement, and must be sıgned and dated by an authorızed representatıve as specıfied ın Part 5 16 of thıs Permıt

1 9 Coverage before June 30, 2010 Permıttee's that prevıously receıved authorızatıon to dıscharge under the October 1, 2002 General Permıt (2002 General Permıt) and stıll have actıve coverage shall wıthout submıssıon of an NOI contınue coverage under UTR200000 untıl June 30, 2010 at whıch tıme, or before ıf desıred, the Permıttee shall, by submıssıon of an NOI (eıther on-lıne www waterqualıty utah gov/updes/stormwatercon htm or by paper submıssıon) obtaın coverage under thıs Permıt (UTR300000)

1 10 <u>Late Notifications</u> Persons are not prohibited from submitting NOIs after initiating clearing, grading, excavation activities, or other construction activities When a late NOI is submitted, authorization for discharges occurs consistent with Subpart 2 1 The Agency reserves the right to take enforcement action for any un-permitted discharges that occur between the commencement of construction and discharge authorization

PART 2 SPECIAL CONDITIONS, MANAGEMENT PRACTICES, RESPONSIBILITIES, AND OTHER NON-NUMERIC LIMITATIONS

2 1 Releases in excess of Reportable Quantities The discharge of hazardous substances or oil in the storm water discharge(s) from a site shall be prevented or minimized in accordance with the applicable SWTPP for the site This Permit does not relieve the Permittee of the reporting requirements of 40 CFR part 117, 40 CFR 110, and 40 CFR part 302 Where a release containing a hazardous substance in an amount equal to or in excess of a reportable quantity established under either 40 CFR 117, 40 CFR 110, or 40 CFR 302, occurs during a 24 hour period

2 1 1 The Permittee is required to notify the National Response Center (NRC) (800-424 8802) in accordance with the requirements of 40 CFR 117, 40 CFR 110 and 40 CFR 302 and the Division of Water Quality (DWQ) (801-538-6146) or the 24 hour DWQ answering service at 801-536-4123 as soon as he or she has knowledge of the discharge,

2 1 2 The Permittee shall submit within 14 calendar days of knowledge of the release a written description of the release (including the type and estimate of the amount of material released) the date that such release occurred, the circumstances leading to the release the measures taken and/or planned to be taken to cleanup the release, and steps to be taken to minimize the chance of future occurrences to the Executive Secretary, and

2 1 3 The SWPPP required under Part 3 of this Permit must be modified withm 14 calendar days of knowledge of the release to provide a description of the release, the circumstances leading to the release, and the date of the release In addition, the SWPPP must be reviewed to identify measures to prevent the reoccurrence of such releases and to respond to such releases, and the SWPPP must be modified where appropriate

2 2 Discharge Compliance with Water Quality Standards and TMDL requirements
Storm water discharges from construction activities that cause or have the reasonable potential to cause a violation of a water quality standard or a violation of Total Maximum Daily Load (TMDL") requirements are not authorized by this Permit If there is a TMDL requirement for the receiving water, that requirement, rather than a water quality standard, will govern If a discharge that would otherwise be covered by this Permit causes a violation or if there is a reasonable potential a discharge will cause a violation the Permitteee will take all necessary actions to ensure future discharges do not cause or contribute to the violation of a water quahty standard or a TMDL requirement and shall document these actions in the SWPPP

If the Executive Secretary determines that construction activities have caused or have the reasonable potential to cause a violation of a water quality standard or a TMDL requirement, the discharger will be notified by the Executive Secretary of additional requirements for treatment or handling of the discharge to ensure future discharges do not cause or contribute to the violation The Permittee will document these requirements in the SWPPP The Executive Secretary may authorize continued coverage under this Permit after appropriate controls and implementation procedures designed to bring the discharges ınto complıance wıth water qualıty standards or TMDL requırements, have been ıncluded ın the SWPPP

Alternatıvely, the Executıve Secretary may notıfy the Permıttee that an ındıvıdual permıt applıcatıon ıs necessary (see Part 2 3 of thıs Permıt)

If vıolatıons remaın or re-occur, then coverage under thıs Permıt may be termınated by the Executıve Secretary and an alternatıve permıt may be ıssued or denıed Complıance wıth thıs requırement does not preclude any enforcement actıvıty as provıded by the Water Qualıty Act for the underlyıng vıolatıon

2 3 Requınng an Indıvıdual Permıt or an Ahematıve General Permıt

2 3 1 The Executıve Secretary may require any person authorızed by thıs Permıt to apply for and/or obtaın eıther an ındıvıdual UPDES permıt or an altemattve UPDES general permıt Any ınterested person may petıtıon the Executıve Secretary to take actıon under thıs paragraph Where the Executıve Secretary requıres a dıscharger authonzed to dıscharge under thıs Permıt to apply for an ındıvıdual UPDES permıt, the Executıve Secretary shall notıfy the dıscharger m wntıng that a permıt applıcatıon ıs requıred Thıs notıficatıon shall ınclude a bnef statement of the reasons for thıs decısıon, an applıcatıon form or reference to the applıcatıon requırements, a statement settıng a deadlıne for the dıscharger to file the applıcatıon, and a statement that on the effectıve date of ıssuance or demal of the ındıvıdual UPDES permıt or the alternatıve general permıt as ıt applıes to the ındıvıdual Permıttee, coverage under thıs general Permıt shall automatıcally termınate Applıcatıons shall be submıtted to the address of the Dıvısıon of Water Quahty shown m Part 5 11 of thıs Permıt The Executıve Secretary may grant addıtıonal tıme to submıt the applıcatıon upon request of the applıcant If a dıscharger faıls to submıt ın a tımely manner an ındıvıdual UPDES permıt applıcatıon as requıred by the Executıve Secretary under thıs paragraph, then the applıcabılıty of thıs Permıt to the ındıvıdual UPDES permıttee ıs automatıcally termınated at the end of the day specıfied for applıcatıon submıttal

2 3 2 Any dıscharger authonzed by thıs Permıt may request to be excluded from the coverage of thıs Permıt by applyıng for an ındıvıdual permıt In such cases, the dıscharger shall submıt an ındıvıdual applıcatıon m accordance wıth the requırements of Utah Admınıstratıve Code ("UAC") R317-8-3 9(2)(b)2 wıth reasons supportıng the request, to the Executıve Secretary at the address for the Dıvısıon of Water Qualıty ın Part 5 11 of thıs Permıt The request may be granted by ıssuance of any ındıvıdual permıt or an alternatıve general permıt ıf the reasons cıted by the Permıttee are adequate to support the request

2 3 3 When an ındıvıdual UPDES permıt ıs ıssued to a dıscharger who would otherwıse be subject to thıs Permıt, or the dıscharger ıs authorızed to dıscharge under an alternatıve UPDES general permıt, the applıcabılıty of thıs Permıt to the ındıvıdual UPDES permıttee ıs automatıcally termmated on the effectıve date of the ındıvıdual permtı or the date of authorızatıon for coverage under the alternatıve general permıt, whıchever the case may be When an ındıvıdual UPDES permıt ıs denıed to a dıscharger otherwıse subject to thıs Permıt or the dıscharger ıs denıed for coverage under an alternatıve UPDES general permıt, the applıcabılıty of thıs Permıt to the

individual UPDES permittee is automatically terminated on the date of such denial, unless otherwise specified by the Executive Secretary

2 4 Continuation of the Expired General Permit This Permit expires on June 30, 2013 However, an expired general permit shall continue in force and effect after the expiration date until a new general permit is issued If a discharger was eligible for and permitted under this Permit, and this Permit expires, the discharger will remain covered by this Permit until the earliest of

2 4 1 One himdred twenty days after re-issuance or replacement of this Permit,
2 4 2 The discharger submits a Notice of Termination in compliance with this Permit,
2 4 3 The discharger is issued an individual permit for the project s discharges, or
2 4 4 180 days after the Executive Secretary makes a formal decision not to reissue or replace this Permit, at which time the discharger must seek coverage imder an alternative general permit or an individual permit

PART 3 STORM WATER POLLUTION PREVENTION PLANS

3 1 SWPPP required A Storm Water Pollution Prevention Plan ("SWPPP") shall be developed for each construction project covered by this Permit prior to submission of an NOI A SWPPP shall be prepared in accordance with good engineering practices It is recommended that the plan be signed by a Professional Engineer (P E) registered in the State The SWPPP shall identify potential sources of pollution which may reasonably be expected to affect the quality of storm water discharges from the construction site, shall describe and ensure the implementation of practices which will be used to reduce the pollutants m storm water discharges associated with construction activity at the construction site and to assure compliance with the terms and conditions of this Permit, and shall otherwise meet the requirements of this Permit As a condition of this Permit, Permittees must implement the SWPPP as written or modified from commencement of construction until final stabilization is complete and an NOT has been submitted (This provision is not intended to address the potential liability of a Permittee or other current or former operator or owner in the event of a discharge of pollution from the property of an individual homeowner)

3 2 SWPPP Location, Availability, Revision, and Signature

3 2 1 SWPPP Location A copy of the SWPPP, including a copy of the Permit, the NOI and any amendments to the SWPPP, shall be retained on-site at the site which generates the storm water discharge in accordance with this Part 3 2 and with Part 5 10 of this Permit If the site is inactive or does not have an onsite location adequate to store the copy of the SWPPP reasonable local access to a copy of the SWPPP during normal working hours (e g , at a local library or government building), must be provided and the location of the SWPPP, along with a contact phone number, shall be posted on site at a publicly-accessible location For linear construction projects, such as pipelines, the posted notice shall be located at a publicly accessible location near the active part of the construction project

3 2 2 SWPPP Availability The Permittee shall make the copy of the SWPPP that is kept on site or kept locally available for review upon request to the Executive Secretary, EPA, other local agencies approving sediment and erosion plans, grading plans, or storm water management plans, local government officials, or to the operators of a municipal separate storm sewer receiving discharges from the site The Permittee need not provide a free copy of the SWPPP to these entities upon request, but if it chooses not to do so, it shall keep two copies of the SWPPP, in its entirety, and shall allow these entities to borrow one to make a copy at their own expense

3 2 3 Original SWPPP If requested by the Executive Secretary, the original SWPPP, including any previous versions requested, shall be provided to the Executive Secretary within five working days of the request The original provided shall be signed in accordance with Part 5 16 of this Permit

3 2 4 SWPPP Availability to the Public The Permittee shall also make a copy of the SWPPP available to the public to review at reasonable times during regular business hours Advance notice by the public of the desire to view the SWPPP may be required, not to exceed two working days The Permittee need not provide a free copy of the SWPPP to members of the public, but if it chooses not to do so, it shall

keep two copies of the SWPPP, in its entirety, and shall allow members of the public to borrow one to make a copy at their own expense

3 2 5 Compelled Revisions The Executive Secretary, or an authorized representative of the Executive Secretary, may notify the Permittee (co Permittees) at any time that the SWPPP does not meet one or more of the minimum requirements of this Part 3 Such notification shall identify those provisions of the Permit which are not being met by the SWPPP, and identify which provisions of the SWPPP require modifications in order to meet the minimum requirements of this Part 3 Within 7 days of such notification from the Executive Secretary, (or as otherwise provided by the Executive Secretary), or authorized representative, the Permittee shall make the required changes to the SWPPP and shall submit to the Executive Secretary a written certification that the changes have been made The Executive Secretary may take appropriate enforcement action for the period of time the Permittee was operating under a SWPPP that did not meet the minimum requirements of the Permit

3 2 6 All SWPPPs must be signed and certified in accordance with Part 5 16 of this Permit

3 3 Keeping SWPPPs Current

3 3 1 The Permittee shall amend the SWPPP whenever there is a change in design, construction, operation, or maintenance, which has a significant effect on the discharge of pollutants to the waters of the State and which has not otherwise been addressed in the SWPPP

3 3 2 The Permittee shall amend the SWPPP whenever inspections or investigations by site operators, local, state, or federal officials indicate the SWPPP is proving ineffective in eliminating or significantly minimizing pollutants from sources identified under Part 3 5 1 of this Permit, or is otherwise not achieving the general objectives of controlling pollutants in storm water discharges associated with construction activity

3 3 3 The Permittee shall amend the SWPPP whenever a new owner/operator becomes responsible for implementing all or part of the SWPPP, as further described in Part 3 4 and Part 4 3 of this Permit

3 3 4 The following records of activities shall be maintained as part of the SWPPP

a Dates when major grading activities occur,

b Dates when construction activities temporarily or permanently cease on a portion of or all of the site, and

c Dates when stabilization measures are initiated

3 3 5 Once an area has been finally stabilized, the Permittee may identify this area in the SWPPP and no further SWPPP or inspection requirements shall apply to that area

3 4 More than one Permittee A SWPPP may identify more than one Permittee and may specify the responsibilities of each Permittee by task, area, and/or timing Permittees may coordinate and prepare more than one SWPPP to accomplish this However, in the event there is a requirement under the SWPPP for which responsibility is ambiguous or is not included in the SWPPP(s), each Permittee shall be responsible for implementation of that requirement Each Permittee is also responsible for assuring that its activities do not render another Permittee's controls ineffective

3 5 Contents of SWPPP The SWPPP shall include the following items

3 5 1 Site Description Each SWPPP shall provide a description of pollutant sources and other information as indicated

a A description of the nature of the construction activity,

b A description of the intended sequence of major activities which disturb soils for major portions of the site (e g grubbing, excavation, grading, utilities, and infrastructure installation),

c Estimates of the total area of the site and the total area of the site that is expected to be disturbed by excavation, grading, or other activities, including areas for construction support,

d An estimate of the runoff coefficient of the site after construction activities are completed and existing data describing the soil or the quality of any discharge from the site,

e A general location map (e g portion of a city or county map or similar scale) and a site map indicating

1) drainage patterns and approximate slopes anticipated after major grading activities,

2) construction boundaries and a description of existing vegetation prior to grading activities,

3) areas of soil disturbance, and areas of no disturbance,

4) the location of major structures and nonstructural controls identified in the SWPPP,

5) Locations of areas used for construction support,

6) the location of areas where stabilization practices are expected to occur,

7) the location of surface waters (including wetlands), and

8) locations where storm water is discharged or will discharge to a surface water,

f A description of any discharge associated with industrial activity other than construction at the site (including storm water discharges from dedicated portable asphalt plants and dedicated portable concrete plants), whether or not those discharges are covered by the Permit and the location of that activity,

g The name of the receiving water(s), and aerial extent of wetland acreage at the site, and

h A copy of this Permit

3 5 2 Controls The SWPPP shall employ best management practices to control pollutants in storm water discharges Each plan shall include a description of appropriate controls and measures that will be implemented during construction activity and while the site is unstabilized The plan must clearly describe for each major activity identified in Part 3 5 1(b) appropriate control measures and the timing during the construction process that the measures will be implemented The description and implementation of controls shall address the following minimum components

a Erosion and Sediment Controls

1) Short and Long Term Goals and Criteria

A) The construction-phase erosion and sediment controls should be designed to retain sediment on site to the maximum extent practicable

B) All control measures must be properly selected, installed, and maintained in accordance with the manufacturer's specifications and good engineering practices If periodic inspections or other information indicates a control has been used inappropriately, incorrectly, or is ineffective the Permittee must replace or modify the control for site situations

C) If sediments escape the construction site, off-site accumulations of sediment must be removed at a frequency sufficient to minimize the possibility of offsite impacts such as fugitive sediments washing into storm sewers by the next rain or posing a safety hazard to users of public streets

D) Sediment must be removed from sediment traps or sedimentation ponds when design capacity has been reduced by 50%

E) Litter, construction debris, and construction chemicals exposed to storm water shall be picked up prior to anticipated storm events (e g forecasted by local weather reports), or otherwise prevented from becoming a pollutant source for storm water discharges (e g screening outfalls, picked up daily, etc)

F) Offsite material storage areas (also including overburden and stockpiles of dirt, etc) used solely by the Permitted project are considered a part of the project and, unless a Permittee submits a separate NOI for such areas or they are subject to a separate UPDES permit, they shall be addressed in the SWPPP

2) <u>Stabilization Practices</u> A description of existing interim and permanent stabilization practices, including site-specific scheduling of the implementation of the practices SWPPPs should ensure that existing vegetation is preserved where attainable and that disturbed portions of the site are stabilized Stabilization practices may include temporary seeding, permanent seeding, mulching, geo-textiles, sod stabilization, vegetative buffer strips, protection of trees, preservation of mature vegetation, and other appropriate measures Use of impervious surfaces for stabilization should be avoided Except as provided in paragraphs (A) and (B) below (Parts 3 5 2(a)(2)(A) and (B)), stabilization measures shall be initiated as soon as practicable in portions of the site where construction activities have temporarily or permanently ceased, but in no case more than 14 days after the construction activity in that portion of the site has temporarily or permanently ceased

A) Where the initiation of stabilization measures by the 14th day after construction activity temporarily or permanently ceases is precluded by snow cover or frozen ground conditions, stabilization measures shall be initiated as soon as practicable

B) Where construction activity on a portion of the site is temporarily ceased, and earth disturbing activities will be resumed within 21 days, temporary stabilization measures do not have to be initiated on that portion of the site

3) <u>Structural Practices</u> The permittee shall provide a description of

structural practices that divert flows from exposed soils, store flows or otherwise limit runoff and the discharge of pollutants from exposed areas of the site to the degree attainable Such practices may include silt fences, earth dikes, drainage swales sediment traps, check dams, subsurface drains, pipe slope drains, level spreaders, storm drain inlet protection, rock outlet protection reinforced soil retaining systems, gabions, and temporary or permanent sediment basins Placement of structural practices in floodplains should be avoided to the degree attainable The installation of these devices may be subject to Section 404 of the federal Clean Water Act ("CWA ")

A) <u>10 Acre Sediment Basin Requirement</u> Where attainable, for common drainage locations that serve areas with 10 or more acres disturbed at one time, the Permittee shall provide a temporary (or permanent) sediment basin that provides storage for a 10 year, 24 hour storm event, a calculated volume of runoff for disturbed acres drained, or equivalent control measures, until final stabilization of the site Where calculations are not performed, a sediment basin providing 3 600 cubic feet of storage per acre drained (a 1 inch storm event), or equivalent control measures, shall be provided where attainable until final stabilization of the site The required sizing of the sediment basin does not include flows from offsite areas and flows from onsite areas that are either undisturbed or have undergone final stabilization where such flows are diverted around both the disturbed area and the sediment basin In determining whether installing a sediment basin is attainable, factors such as site soils, slope, and available area on site shall be considered For drainage locations which serve 10 or more disturbed acres at one time and where a temporary sediment basin or equivalent controls is not attainable, smaller sediment basins and/or sediment traps (with comparable storage) must be used, or

   (i) at a minimum, equivalent controls in silt fences, vegetative buffer strips, sod mulch, geo-textiles, stepped check dams, pipe slope drains or other sediment or erosion controls are required for all erodible areas, down slope boundaries of the construction area and side slope boundaries deemed appropriate as dictated by individual site conditions, or

   (ii) it can be shown that site meteorological conditions do not warrant equivalent storage during the time period the 10-acres are destabilized (little or no chance of precipitation for the period of surface destabilization)

B) <u>Less Than 10 Acre BMP Requirement</u> For drainage locations serving less than 10 acres, sediment basins and/or sediment traps should be used At a minimum, silt fences, vegetative buffer strips or equivalent sediment controls are required for all down slope boundaries (and those side slope boundaries deemed appropriate as dictated by individual site conditions) of the construction area unless a sediment basm providing storage for

3,600 cubıc feet of storage per acre draıned ıs provıded

b Storm Water Management Descnptıon of measures that wıll be ınstalled durıng the constructıon process to control pollutants ın storm water dıscharges that wıll occur after constructıon operatıons have been completed Structural measures should be placed on upland soıls to the degree attaınable The ınstallatıon of these devıces may be subject to Sectıon 404 of the CWA Thıs Permıt only addresses the ınstallatıon of storm water management measures, and not the ultımate operatıon and maıntenance of such structures after the constructıon actıvıtıes have been completed and the sıte has ımdergone fınal stabılızatıon Permıttees are only responsıble for the ınstallatıon and maıntenance of storm water management measures pnor to fınal stabılızatıon of the sıte, and are not responsıble for maıntenance after storm water dıscharges assocıated wıth constructıon actıvıty have been elımınated from the sıte However, post-constructıon storm water BMPs that dıscharge pollutants from poınt sources once constructıon ıs completed, may ın themselves, need authonzatıon under a separate UPDES permıt and are lıkely regulated under local munıcıpal requırements

1) Such measures may ınclude
   A) storm water detentıon sttuctures (ıncludıng wet ponds),
   B) storm water retentıon stmctures,
   C) flow-atıenuatıon by use of open vegetated swales and natural depressıons
   D) ınfıltratıon of runoff onsıte, and
   E) sequentıal systems (whıch combıne several practıces)
2) The SWPPP shall ınclude an explanatıon of the technıcal basıs used to select the practıces to control pollutıon where flows exceed predevelopment levels
3) Storm water velocıty dıssıpatıon devıces shall be placed at dıscharge locatıons and along the length of any outfall channel for the purpose of provıdıng a non-erosıve flow velocıty from the structure to a water course so that the natural physıcal and bıologıcal characterıstıcs and functıons are maıntaıned and protected The objectıve ıs to mınımıze sıgnıfıcant changes ın the hydrologıcal regıme of the receıvıng water

c Other Controls

1) Waste Dısposal No solıd materıals, ıncludıng buıldıng materıals shall be dıscharged to waters of the State, except as authorızed by a federal CWA Sectıon 404 permıts
2) Off-sıte Trackıng Off-sıte vehıcle trackıng of sedıments and the generatıon of dust shall be mımmızed
3) Septıc, Waste, and Sanıtary Sewer Dısposal The SWPPP shall ensure and demonstrate complıance wıth applıcable State and/or local waste dısposal, sanıtary sewer or septıc system regulatıons
4) Exposure to Constructıon Matenals The SWPPP shall ınclude a narratıve descrıptıon of practıces to reduce pollutants from constmctıon related materıals whıch are stored onsıte ıncludıng an ınventory of constructıon materıals (ıncludıng waste materıals), storage practıces to mınımıze exposure of the materıals to storm water, and spıll preventıon and

response

5) Support Areas A description of pollutant sources from areas other than construction (including storm water discharges from dedicated portable asphalt plants and dedicated portable concrete plants), and a description of controls and measures that will be implemented at those sites

d Other Laws and Requirements

1) Local Storm Water Control Requirements This Permit does not relieve the Permittee from compliance with other laws effecting erosion and sediment control or requirements for the permanent storm water system Where applicable compliance efforts to these requirements should be reflected in the SWPPP

2) Threatened or Endangered Species & Historic Properties This Permit does not relieve the Permittee from compliance with Federal or State laws pertaining to threatened or endangered species or historic properties Where applicable compliance efforts to these laws should be reflected in the SWPPP

3) Variance of Permit Requirements Dischargers seeking alternative permit requirements shall submit an individual UPDES permit application in accordance with applicable law to the address indicated in Part 5 11 of this Permit along with a description of why requirements in this Permit should not be applicable as a condition of a UPDES permit

3 5 3 Maintenance All vegetation, erosion and sediment control measures and other protective measures identified m the SWPPP shall be maintained in effective operating condition A description of procedures to ensure the timely maintenance of these measures shall be identified in the SWPPP Maintenance needs identified in inspections or by other means shall be accomplished before the next anticipated storm event, or as necessary to maintain the continued effectiveness of storm water controls If maintenance prior to the next anticipated storm event is impracticable, maintenance must be scheduled and accomplished as soon as practicable

3 5 4 Inspections

a Inspections must be conducted in accordance with one of the two schedules listed below The Permittee shall specify in its SWPPP which schedule it will be followmg

1) At least once every 7 calendar days, or

2) At least once every 14 calendar days and within 24 hours of the end of a storm event of 0 5 inches or greater

b Inspection frequency may be reduced to at least once every month if

1) The entire site is temporarily stabilized, or

2) Runoff is unlikely due to winter conditions (e g , site is covered with snow, ice, or the groımd is frozen)

c The inspection requirement is waived until one month before thawing conditions are expected to result in a discbarge if all of the following requirements are met

1) The project is located in an area where frozen conditions are anticipated to continue for extended periods of time (i e , more than one month),

2) Land disturbance activities have been suspended, and
3) The beginning and ending dates of the waiver period are documented in the SWPPP

d Inspections must be conducted by qualified personnel (provided by the operator or cooperatively by multiple operators) "Qualified personnel" means a person knowledgeable in the principles and practice of erosion and sediment controls who possesses the skills to assess conditions at the construction site that could impact storm water quality and to assess the effectiveness of any sediment and erosion control measures selected to control the quality of storm water discharges from the construction activity

e Inspections must include all areas of the site disturbed by construction activity and areas used for storage of materials that are exposed to precipitation Inspectors must look for evidence of, or the potential for, pollutants entering the storm water conveyance system Sedimentation and erosion control measures identified in the SWPPP must be observed to ensure proper operation Discharge locations must be inspected to ascertain whether erosion control measures are effective in preventing significant impacts to waters of the United States where accessible Where discharge locations are inaccessible, nearby downstream locations must be inspected to the extent that such inspections are practicable Locations where vehicles enter or exit the site must be inspected for evidence of off-site sediment tracking

f Inspections at construction sites involving utility line installation, pipeline construction, and other long, narrow, linear construction may be more limited if the areas described in Part 3 5 4(e) of this Permit are not reasonably accessible or could cause additional disturbance of soils and increase the potential for erosion In these circumstances, controls must be inspected at the same frequency as other construction projects, but personnel may instead inspect controls along the construction site for 0 25 mile above and below each access point where a roadway, undisturbed right-of-way, or other similar feature intersects the construction site and allows access to the areas described above In the absence of evidence to the contrary, the conditions of the controls along each inspected 0 25 mile segment may be considered as representative of the condition of controls along that reach extending from the end of the 0 25 mile segment to either the end of the next 0 25 mile inspected segment, or to the end of the project, whichever occurs first

g For each inspection required above, the inspector must complete an inspection report At a minimum, the inspection report must include
1) The inspection date,
2) Names, titles, and qualifications of personnel making the inspection,
3) Weather information for the period since the last inspection (or since commencement of construction activity if the first inspection) including a best estimate of the beginning of each storm event, duration of each storm event, approximate amount of rainfall for each storm event (in inches), and whether any discharges occurred,
4) Weather information and a description of any discharges occurring at the time of the inspection,
5) Location(s) of discharges of sediment or other pollutants from the site,

6) Location(s) of BMPs that need to be maintained,
7) Location(s) of BMPs that failed to operate as designed or proved inadequate for a particular location,
8) Location(s) where additional BMPs are needed that did not exist at the time of inspection, and
9) Corrective action required including any changes to the SWPPP necessary and implementation dates

h A record of each inspection and of any actions taken in accordance with this Part 3 must be retained as part of the SWPPP for at least three years from the date that permit coverage expires or is terminated The inspection reports must identify any incidents of non-compliance with the permit conditions Where a report does not identify any incidents of non-compliance, the report must contain a certification that the construction project or site is in compliance with the SWPPP and this permit The report must be signed in accordance with Part 5 16 of this Permit

3 5 5 Non-Storm Water Discharges Except for flows from fire fighting activities, sources of non-storm water listed in Part 1 5 of this Permit that are combined with storm water discharges associated with industrial activity must be identified in the SWPPP The SWPPP shall identify and ensure the implementation of appropnate pollution prevention measures for the non storm water component(s) of the discharge

PART 4 TERMINATION/CHANGES IN OWNER/OPERATOR FOR SITE

4 1 Termination of Coverage Permittees may or shall (as specified) terminate coverage under this Permit under the followmg conditions

4 1 1 Completion of construction activities and site stabilization Permittees shall terminate coverage under this Permit by submitting a Notice of Termination ("NOT") withm thirty days after completton of all construction activities, completion of final stabilization of all areas of the site as defined in Part 6 15 The NOT shall be submitted on the form specified by the Executive Secretary

4 1 2 Partial completion of constructton acttvities and site stabilization A Permittee who, as specified in Part 3 4 of this Permit, is identified in the SWPPP as responsible for a specific area may terminate coverage under this Permtt by submitting an NOT within thirty days after completion, for that area, of all construction activities, completion of final stabilization of all areas for which the Permittee was responsible and that were disturbed The NOT shall be submitted on the form specified by the Executive Secretary and the Permittee shall indicate on the form that it is a partial NOT

4 1 3 New responsible owner/operator A Permittee may terminate its coverage under this Permit by submitting an NOT if another party (or parties) assumes responsibility for all remaining SWPPP requirements Termination of the Permittee's responsibilities under the SWPPP will not be final until the other party (or parties) submits an NOI If the new responsible owner/operator fails to submit an NOI, the Permittee may complete terminatton by demonstrating to the Executive Secretary that it has entered into contracts that obligate the new owner/operator to undertake all remaining responsibilittes under the SWPPP

4 2 Condittons for Submitting an NOT A Permittee may not submit an NOT unless it meets the requirements specified in Part 4 1 Appropriate enforcement actions may be taken if an NOT is submitted without these requirements having been met, and the Permittee may also continue to be responsible for any Permit violations

4 3 Updating the SWPPP If an NOT is submitted under Part 4 1 2 or 4 1 3, the SWPPP shall be updated by the remaining Permittee(s) to meet the requirements of Part 3 4 of the Permit

PART 5 STANDARD PERMIT CONDITIONS

5 1 Duty to Comply

5 1 1 The Permıttee must comply wıth all condıtıons of thıs Permtt Any Permıt noncomplıance constıtutes a vıolatıon of the Act and ıs grounds for enforcement actıon, for Permıt termınatıon, revocatıon and reıssuance, or modıficatıon, or for denıal of a permıt renewal applıcatıon

5 1 2 Penahıes for Vıolatıons of Permıt Condıtıons

a Vıolatıons The Act provıdes that any person who vıolates the Act, Utah wastewater rules, or condıtıons of a permıt ıssued under the Act ıs subject to a fine of $10,000 per day

b Wıllful or Gross Neglıgence The Act provıdes that any person who dıscharges a pollutant to waters of the State as a result of cnmınal neglıgence or who ıntenttonally dıscharges ıs crımınally lıable and ıs subject to ımpnsonment and a fine of up to $50 000 per day Utah Code Ann § 19 5-115

c False Statements The Act provıdes that any person who knowıngly makes any false materıal statement, representatıon, or certıficatton m any applıcatıon, record, report, plan, or other document filed or requıred to be maıntaıned under the Act, the rules, or thıs Permıt, or who knowıngly falsıfies, tampers wıth or renders ınaccurate, any monıtonng devıce or method requıred to be maıntaıned under the Act shall upon convıctıon , be punıshed by a fine of not more than $10 000 or by ımpnsonment for 6 months or by both Utah Code Ann § 19-5-115(4)

5 2 Dut y to Reapply If a Permıttee wıshes to contınue an actıvıty regulated by thıs permıt after the expıratıon date of thıs permıt, ıt must apply for and obtaın a new permıt except as provıded ın Part 2 4 of thıs Permıt

5 3 Need to halt or reduce acttvıty not a defense It shall not be a defense for a Permıttee ın an enforcement actıon that ıt would have been necessary to halt or reduce the permıtted actıvıty m order to maıntaın complıance wıth the condıtıons of thıs Permıt

5 4 Duty to Mıtıgate The Permıttee shall take all reasonable steps to mınımıze or prevent any dıscharge ın vıolatıon of thıs Permıt whıch has a reasonable lıkelıhood of adversely affectıng human health or the envıronment

5 5 Duty to Provıde Informatıon The Permıttee shall furnısh to the Executıve Secretary or an authorızed representatıve, wıthın a reasonable tıme, any ınformatıon whıch ıs requested to determıne complıance wıth thıs Permıt The Permıttee must also fumısh to the Executıve Secretary or an authorızed representatıve copıes of records to be kept by thıs Permıt

5 6 Other Informatıon When the Permıttee becomes aware that he or she faıled to submıt any relevant facts or submıtted ıncorrect ınformatıon ın the Notıce of Intent or m any other report to the Executıve Secretary, he or she shall promptly submıt such facts or ınformatıon

5 7 Oil and Hazardous Substance Liability Nothing in this Permit shall be construed to preclude the institution of any legal action or relieve the Permittee from any responsibilities, liabilities, or penalties to which the Permittee is or may be subject under the "Act"

5 8 Property Rights The issuance of this Permit does not convey any property rights of any sort, nor any exclusive privileges, nor does it authorize any injury to private property nor any invasion of personal rights, nor any infringement of Federal, State or local laws or regulations

5 9 Severability The provisions of this Permit are severable, and if any provision of this Permit, or the application of any provision of this Permit to any circumstance, is held invalid, the application of such provision to other circumstances and the remainder of this Permit shall not be affected thereby

5 10 Record Retention

5 10 1 The Permittee shall retain copies of SWPPPs and all reports required by this Permit, and records of all data used to complete the Notice of Intent to be covered by this Permtt, for a period of at least three years from the date that the site is finally stabilized This period may be extended by request of the Executive Secretary at any time

5 10 2 After final stabilization of the constmction site is complete, the SWPPP is no longer required to be maintained on site, but may be maintained by the Permittee(s) at its pnmary headquarters Access to the SWPPP will continue as described in Part 3 2, however

5 11 Addresses All written correspondence under this permit shall be directed to the Division of Water Quality at the following address

Department of Environmental Quality
Division of Water Quality
288 North 1460 West
PO Box 144870
Sah Lake City, Utah 84114-4870

5 12 State Laws

5 12 1 Nothing in this Permit shall be construed to preclude the institution of any legal action or relieve the Permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable State law or regulation under authority preserved by Utah Code Ann § 19-5-117

5 12 2 No condition of this Permit shall release the Permittee from any responsibility or requirements under other environmental statutes or regulations

5 13 Proper Operation and Maintenance The Permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the Permittee to achieve compliance with the conditions

of this Permit and with the requirements of SWPPPs Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures Proper operation and maintenance requires the operation of backup or auxiliary facilities or similar systems, installed by a Permittee only when necessary to achieve compliance with the conditions of the Permit

5 14 Inspection and Entry The Permittee shall allow, upon presentation of credentials, the Executive Secretary or an authorized representative

5 14 1 To enter upon the Permittee's premises where a regulated facility or activity is located or conducted or where records must be kept under the conditions of this Permit,

5 14 2 Have access to and copy at reasonable times, any records that must be kept under the conditions of this Permit

5 14 3 Inspect at reasonable times any facilities, equipment (including montioring and control equipment) practices, or operations regulated or required under this Permit, and

5 14 4 Sample or monitor at reasonable times, for the purposes of assuring permit compliance or as otherwise authorized by law, any substances or parameters at any location

5 15 Reopener Clause

5 15 1 Reopener Due to Water Quality Impacts If there is evidence indicating that the storm water discharges authorized by this Permit cause, have the reasonable potential to cause or contribute to, a violation of a water quality standard, the discharger may be required to obtain an individual permit or an alternative general permit in accordance with Part 2 3 of this Permit or the Permit may be modified to include different limitations and/or requirements

5 15 2 Reopener Guidelines Permit modification or revocation will be conducted according to UAC R317-8-5 6 and UAC R317-8-6 2

5 15 3 Permit Actions This Permit may be modified revoked and reissued, or terminated for cause The filing of a request by the Permittee for a Permit modification, revocation and reissuance, or termination, or a notification of plaimed changes or anticipated noncompliance does not stay any Permit condition

5 16 Signatory Requirements

5 16 1 All Notices of Intent, SWPPPs, reports, certifications or information submitted to the Executive Secretary, or that this Permit requires be maintained by the Permittee, shall be signed as follows

a All Notices of Intent shall be signed as follows

1) For a corporation by a responsible corporate officer For the purpose of this section, a responsible corporate officer means a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making fimctions for the corporation or the manager of one or more manufacturing, production or operatmg facilities employmg more than 250 persons or having gross annual sales or expenditures exceeding $25,000,000 (in second-quarter 1980 dollars) if authority to sign

documents has been assigned or delegated to the manager in accordance with corporate procedures,

2) For a partnership of sole proprietorship by a general partner or the proprietor, respectively, or

3) For a municipality, State, Federal, or other public agency by either a principal executive officer or ranking elected official For purposes of this section, a principal executive officer of a Federal agency includes (1) the chief executive officer of the agency, or (2) a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e g Regional Administrators of EPA)

b All reports required by the Permit and other information requested by the Executive Secretary or by an authorized representative of the Executive Secretary shall be signed by a person described above or by a duly authorized representative of that person A person is a duly authorized representative only if

1) The authorization is made in writing by a person described above and submitted to the Executive Secretary, and

2) The authorization specifies either an individual or a position having responsibility for overall operation of the regulated site, facility or activity, such as the position of manager, operator superintendent, or position of equivalent responsibility or an individual or position having overall responsibility for environmental matters for the company (A duly authorized representative may thus be either a named individual or any individual occupying a named position)

c Certification Any person signing documents under this Part 5 16 shall make the following 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 gathered and evaluated 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

5 16 2 If a document is to be signed electronically, the Division's rules regarding electtonic transactions govern

PART 6 DEFINITIONS

As used in this Permit

6 1 "Act" means the "Utah Water Quality Act"

6 2 "Best Management Practices ' ("BMPs') means schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the discharge of pollutants to waters of the State BMPs also include treatment requirements, operating procedures, and practices to control plant site runoff, spillage or leaks, sludge or waste disposal or drainage from raw material storage

6 3 Common plan of development or sale" means one plan for development or sale, separate parts of which are related by any announcement, piece of documentation (including a sign, public notice or hearing, sales pitch, advertisement, drawing, plat, blueprint, contract, permit application, zoning request, computer design, etc), physical demarcation (including boundary signs, lot stakes, surveyor markings, etc), or continuing obligation (including contracts) that identify the scope of the project A plan may still be a common plan of development or sale even if it is taking place in separate stages or phases, is planned in combination with other construction activities, or is implemented by different owners or operators

6 4 'Commencement of Construction" means the initial disturbance of soils associated with clearing, grading, or excavating activities or other construction activities

6 5 Construction activity" means soil disturbing activities such as clearing, grading, and excavating of land The term also includes construction support activities

6 6 Construction support activities" means construction material and equipment storage and maintenance, concrete or asphalt batch plants, except as provided m Part 1 4 3 of this Permit

6 7 Control Measure" refers to any Best Management Practice or other method used to prevent or reduce the discharge of pollutants to waters of the State

6 8 'CWA' means Clean Water Act or the Federal Water Pollution Control Act

6 9 "Dedicated portable asphalt plant" means a portable asphalt plant that is located on or contiguous to a construction site and that provides asphalt only to the construction site that the plant is located on or adjacent to

6 10 'Dedicated portable concrete plant" means a portable concrete plant that is located on or contiguous to a construction site and that provides concrete only to the construction site that the plant is located on or adjacent to

6 11 Discharge " when used without qualification, means the discharge of a pollutant

6 12 "EPA" means the United States Environmental Protection Agency

6 13 "Eligible" means qualified for authorization to discharge storm water under this general permit

6 14 "Executive Secretary" means Executive Secretary of the Utah Water Quality Board

6 15 "Final Stabilization" means that all soil disturbing activities at the site have been completed and that a uniform (e g evenly distributed without large bare areas) perennial vegetative cover with a density of 70% of the native background vegetative cover for the area has been established on all unpaved areas and areas not covered by permanent structures, or equivalent permanent stabilization measures (such as the use of riprap, gabions, or geo-textiles) have been employed In some parts of the country, background native vegetation will cover less than 100% of the ground (e g arid areas) Establishing at least 70% of the natural cover of native vegetation meets the vegetative cover criteria for final stabilization For example, if the native vegetation covers 50% of the ground, 70% of 50% would require 35% total cover for final stabilization For individual lots in residential construction, final stabilization means that either the homebuilder has completed final stabilization as specified above or the homebuilder has established temporary stabilization including perimeter controls for an individual lot prior to occupation of the home by the homeowner and has obligated the homeowner by contract to complete the requirements for final stabilization within two years

6 16 'Indian Country" is defined as in 40 CFR §122 2 to mean

1 All land within the limits of any Indian reservation under the jurisdiction of the United States Government, notwithstanding the issuance of any patent and, including rights-of-way running through the reservation,
2 All dependent Indian communities within the borders of the United States whether within the originally or subsequently acquired territorv thereof, and whether within or without the limits of a state, and
3 All Indian allotments, the Indian titles to which have not been extinguished, including rights-of-ways running through the same

6 17 "Municipal Separate Storm Sewer System" refers to all separate storm sewers that are owned or operated by the United States, a State, city, town, county, district association, or other public body having jurisdiction over disposal of sewage, industrial wastes, storm water, or other wastes including special districts under State law such as a sewer districts, flood control districts or drainage districts, or similar entity that discharges to waters of the State

6 18 "NOI" means notice of intent to be covered by this Permit

6 19 "NOT" means notice of termination

6 20 "Point Source" means any discernible, confined and discrete conveyance, including but not limited to any pipe ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, landfill leachate collection system,

vessel or other floating craft from which pollutants are or may be discharged This term does not include return flows from irrigated agriculture or agricultural storm water runoff

6 21 "Runoff coefficient" means the fraction of total rainfall that will appear at conveyance as runoff

6 22 "Site" means the land or water area where any "facility or activity" is physically located or conducted, including adjacent land used in connection with the facility or activity

6 23 'Storm water" means storm water runoff snow melt runoff, and surface runoff and drainage

6 24 "Storm water discharge associated with industrial activity" is defined in the Utah Administrative Code (UAC) R317-8-3 9(6)(c) & (d) and incorporated here by reference Most relevant to this Permit is UAC R317-8 3 9(6)(d)10, which relates to construction activity including clearing, grading and excavation activities

6 25 SWPPP means Storm Water Pollution Prevention Plan referring to the plan required in Part 3 of this Permit

6 26 Total Maximum Daily Load" or "TMDL" means the sum of the individual wasteload allocations (WLAs) for point sources and load allocations (LAs) for nonpoint sources and natural background If a receiving water has only one point source discharger, the TMDL is the sum of that point source WLA plus the LAs for any nonpoint sources of pollution and natural background sources, tributaries, or adjacent segments TMDLs can be expressed in terms of either mass per time, toxicity, or other appropriate measure

6 27 Waters of the State means all streams, lakes, ponds, marshes, water-courses, waterways wells, springs, irrigation systems, drainage systems, and all other bodies or accumulations of water, surface and underground, natural or artificial, public or private, which are contained within, flow throw or border upon this state or any portion thereof, except that bodies of water confined to and retained within the limits of private property, and which do not develop into or constitute a nuisance, or a public health hazard, or a menace to fish and wildlife, shall not be considered to be waters of the state (UAC R317-1-1 31)

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 ____________________

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

II Facility Operator Information

Name ____________________ Phone ____________________

Address ____

City ____________________ State ______ Zip ____________________

III Facility Site/Location Information

Name ____

Address ____________________ County __________

City ____________________ State ______ Zip ____________________

Latitude ____________________ Longitude ____________________

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 bad 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 ____________________ Date __________

Signature ____________________

Instructions for Completing Notice of Termination (NOT) Form

Who May File A Notice Of Termination (NOT) Form

Permittees who are presently covered under the State issued Utah Pollutant Discharge Elimination System (UPDES) General Storm Water Permit for Construction Activity may submit a notice of termination (NOT) form when their facilities no longer have any storm water discharges associated with industrial activity as defined in the storm water regulations at UAC R317 8 3 9(b)(c) and (d) or when they are no longer the operator of the facilities

For construction activities elimination of all storm water discharges associated with industrial activity occurs when disturbed soils at the construction site have been finally stabilized and temporary erosion and sediment control measures have been removed or will be removed at an appropriate time or that all storm water discharges associated with construction activity from the construction site that are authorized by a UPDES general permit have otherwise been eliminated Final stabilization means that all soil disturbing activities at the site have been completed and that a uniform perennial vegetative cover with a density of 70% of the cover for unpaved areas and areas not covered by permanent structures has been established or equivalent permanent stabilization measures (such as the use of riprap gabions or geotextiles) have been employed

Where to File NOT Form

Send this form to the following address

Division of Water Quality
288 North 1460 West
P O Box 144870
Salt Lake City Utah 84114 4870

Completing the Form

Type or print using upper case letters in the appropriate areas only Please place each character between the marks Abbreviate if necessary to stay within the number of characters allowed for each item Use only one space for breaks between words but not for punctuation marks unless they are needed to clarify your response If you have any questions about this form call the Division of Water Quality at (801) 538 6146

Section I Permit Information

Enter the existing UPDES Storm Water General Permit number assigned to the facility or site identified in Section III If you do not know the permit number contact the Division of Water Quality at (801) 538 6146

Indicate your reason for submitting this Notice of Termination by checking the appropriate box

If there has been a change of operator and you are no longer the operator of the facility or site identified in Section III Check the corresponding box

If all storm water discharges at the facility or site identified in Section III have been terminated check the corresponding box

Section II Facility Operator Information

There may be more than one operator for a construction project This form must be filled out and submitted by each of the operators listed on the notice of intent (NOI) that was submitted for receiving coverage under this permit In this section give the legal name of the person firm public organization or any other entity that is filed as an operator at the facility or site described in this application that is desiring to terminate coverage The name of the operator may or may not be the same name as the facility The operator of the facility is the legal entity which controls the facility s operation (referring to operation of construction activity) or a portion of it rather that the plant or site manager of the finished or rehabilitated facility Do not use a colloquial name Enter the complete address and telephone number of the operator

Section III Facility/Site Location Information

Enter the facility s or site s official or legal name and complete address including city state and ZIP code and the latitude and longitude of the facility to the nearest 15 seconds of the approximate center of the site It is preferred that the location address be the same as that which the site used in the submission of the NOI

Section IV Certification

State statues provide for severe penalties for submitting false information on this application form State regulations require this application to be signed as follows

For a corporation by a responsible corporate officer which means (i) president secretary treasurer or vice president of the corporation in charge of a principal business function or any other person who performs similar policy or decision making functions or (ii) the manager of one or more manufacturing production or operating facilities employing more than 250 persons or having gross annual sales or expenditures exceeding $25 million (in second quarter 1980 dollars) if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures

For a partnership or sole proprietorship by a general partner or the proprietor respectively or

For a municipality State Federal or other public facility by either a principal executive officer or ranking elected official

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) ______________________ Phone ____________

Address ______________________ Status of Owner/Operator ☐

City ______________________ State ____ Zip ____________

Contact Person ______________________ Phone ____________

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) ______________________ 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) ☐

Name ______________________

Project No (if any) ______________________

Address ______________________ County ____________

City ______________________ State ____ Zip ____________

Latitude ______________________ Longitude ______________________

INSTRUCTIONS

Notice Of Intent (NOI) For Covered Under the UPDES General Permit
Storm Water Discharges From Construction Activities

Who Must File A Notice Of Intent (NOI) Form

State law at UAC R317 8 3 9 prohibits point source discharges of storm water from construction activities to a water body(ies) of the State without a Utah Pollutant Discharge Elimination System (UPDES) permit. The operator of s construction activity that has such a storm water discharge must submit a NOI to obtain coverage under the UPDES Storm Water General Permit If you have questions about whether you need a permit under the UPDES Storm Water program or if you need information as to whether a particular program is administered by EPA or a state agency contact the storm water coordinator at (801) 538-6146

Where To File NOI Form

NOIs with fee payment(s) must be sent to the following address

Department of Environmental Quality
Division of Water Quality
P O Box 144870
Salt Lake City UT 84114-4870

Completing The NOI Form

You must type or print, using upper case letters in the appropriate areas only Please place each character between the marks Abbreviate if necessary to stay within the number of characters allowed for each item Use one space for breaks between words but not for punctuation marks unless they are needed to clarify your response If you have any questions on this form please call the storm water coordinator at (801) 538-6146

Beginning of Coverage

Storm Water General Permits cover a facility quickly avoiding delays therefore coverage is immediate after NOI with submission of the permit fee. The permittee should be aware that though you may not have a permit in hand if you have sent in a completed NOI with permit fee you are covered by the conditions in the permit and will be expected to comply with these conditions If you wish contact the Division of Water Quality at (801) 538 6146 to receive a generic copy of the permit. After we receive the NOI and the permit fee we will send you an official copy of the permit with your permit number

Permit Fees (*MAKE CHECKS PAYABLE TO DIVISION OF WATER QUALITY*)

Construction projects are prorated from the time they begin disturbing ground until the time the disturbed surface is stabilized and the permit is terminated by the permittee with a submittal of a Notice of Termination (NOT) form Fees are prorated at $8 34 per month of coverage needed except a $100 minimum EXAMPLE if you need 9 months of coverage 9 x $8 34 = $75 06 then you will need to submit the $100 minimum if 18 months of coverage is needed 18 x $8 34 = $150 12 your total fee will be $150 12 Permit coverages extending beyond the expiration date of the general permit will be extended under the reissued general permit State or local political subdivisions are exempt from the permit fee. The fee must be received with the NOI before permit coverage is given

General

Facilities within Salt Lake City or Salt Lake County must contact the city or county and notify them of the new permit status for the facility

SECTION I FACILITY OPERATOR INFORMATION

Give the legal name(s) of the person(s) firm(s) public organization(s) or any other entity(ies) that conducts the construction operation at the facility or site described in this application The name of the operator(s) may be the developer the owner the general contractor the design firm the excavation contractor and/or others (e.g anyone that fits the definition of operator) An operator is anyone that has control over site/project specifications and/or control of day to day operational activities Do not use a colloquial name. Enter the complete address and telephone number of the operator(s)

Enter the appropriate letter to indicate the legal status of the operator of the facility
F = Federal M = Public (other than Fed or State) S = State P = Private

SECTION II FACILITY/SITE LOCATION INFORMATION

Enter the facility s or site s official or legal name and project number (if any) and complete street address including city state and ZIP code If the facility or site lacks a [illegible]el address indicate the latitude and longitude of the facility to the nearest 15 seconds of the approximate center of the site

Indicate whether the facility is located on Indian Lands

If the facility is located on Indian Lands EPA form 3510-6 should be used and submitted to EPA Region VIII except for facilities on the Navajo Reservation or on the Goshute Reservation which should submit EPA form 3510-6 to Region IX

SECTION III SITE ACTIVITY INFORMATION

If the storm water discharges to a municipal separate storm sewer system (MS4) enter the name of the operator of the MS4 (e g municipality name, county name) <u>and</u> the receiving water of the discharge from the MS4 if it is known (A MS4 is defined as a conveyance or system of conveyances (including roads with drainage systems municipal streets catch basins curbs gutters ditches man made channels or storm drains) that is owned or operated by a state, city town county district association or other public body which is designed or used for collecting or conveying storm water)

SECTION IV TYPE OF CONSTRUCTION

Check each type of construction that applies to this application

SECTION V MANAGEMENT PRACTICES

Check each type of management practices that will be used to control storm water runoff at the job site.

SECTION VI ADDITIONAL INFORMATION REQUIRED

Enter the project start date and the estimated completion date for the entire development plan

Provide an estimate of the total number of acres of the site on which soil will be disturbed (round to the nearest acre)

Indicate whether the storm water pollution prevention plan for the site is in compliance with approved state and/or local sediment and erosion plans permits or storm water management plans

SECTION VII CERTIFICATION

State statutes provide for severe penalties for submitting false information on this application form State regulations require this application to be signed as follows

For a corporation by a responsible corporate officer which means (I) president, secretary treasurer or vice-president of the corporation in charge of a principal business function or any other person who performs similar policy or decision making functions or (ii) the manager of one or more manufacturing production or operating facilities employing more than 250 persons or having gross annual sales or expenditures exceeding $25 million (in second quarter 1980 dollars) if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures

For a partnership or sole proprietorship by a general partner or the proprietor or

For a municipality state Federal, or other public facility by either a principal executive officer or ranking elected official

POLLUTION PREVENTION PLAN

A storm water pollution prevention plan (SWP3) is required to be in hand before the NOI can be submitted It is important to know SWP3 requirements (contained in the permit) even during the design portion of the project. A copy of the permit can be obtained from the Division of Water Quality Guidance material for developing a SWP3 can be obtained from EPA (NTIS) or copied from EPA material at the Division of Water Quality

NOTICE OF TERMINATION (NOT)

A completed Notice of Termination (NOT) form is required to terminate your permit at the end of construction Please complete the NOT form including the project s assigned permit number and return it to the Division of Water Quality Please contact the storm water coordinator at (801) 538 6146 for any questions or for a copy of the NOT form

10/30/97

III SITE ACTIVITY INFORMATION

Municipal Separate Storm Sewer System (MS4) Operator Name ______________________

Receiving Water Body ______________________ How far to the nearest water body? __________ ft. miles (circle one)

List the Number of any other UPDES permits at the site ______________________

IV TYPE OF CONSTRUCTION (Check all that apply)

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

7 ☐ Other (Please list) ______________________

VI ADDITIONAL INFORMATION REQUIRED

Project Start Date __________ Completion Date __________ Estimated Area to be Disturbed (in Acres) __________

A storm wafer 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 (Y or N) ☐ (A pollution prevention plan is required to be on hand before submittal of the NOI)

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) ______________________ 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 $ __________

APPENDIX C

STATE WATER QUALITY STANDARDS

R317-2-14 Numeric Criteria

TABLE 2 14 1
NUMERIC CRITERIA FOR DOMESTIC,
RECREATION, AND AGRICULTURAL USES

Parameter	Domestic Source 1C	Recreation and Aesthetics 2A	2B	Agri-culture 4
BACTERIOLOGICAL (30-DAY GEOMETRIC MEAN) (NO)/100 ML) (7)				
E coli	206	126	206	
MAXIMUM (NO)/100 ML) (7)				
E coli	940	576	940	
PHYSICAL				
pH (RANGE)	6 5-9 0	6 5-9 0	6 5-9 0	6 5-9 0
Turbidity Increase (NTU)		10	10	
METALS (DISSOLVED, MAXIMUM MG/L) (2)				
Arsenic	0 01			0 1
Barium	1 0			
Beryllium	<0 004			
Cadmium	0 01			0 01
Chromium	0 05			0 10
Copper				0 2
Lead	0 015			0 1
Mercury	0 002			
Selenium	0 05			0 05
Silver	0 05			
INORGANICS (MAXIMUM MG/L)				
Bromate	0 01			
Boron				0 75
Chlorite	<1 0			
Fluoride (3)	1 4-2 4			
Nitrates as N	10			
Total Dissolved Solids (4)	Irrigation			1200
	Stock Watering			2000
RADIOLOCICAL (MAXIMUM pCi/L)				
Cross Alpha	15			15
Gross Beta	4 mrem/yr			

Radium 226, 228 (Combined)	5
Strontium 90	8
Tritium	20000
Uranium	30

ORGANICS
(MAXIMUM UG/L)

Chlorophenoxy Herbicides	
2,4-D	70
2,4,5-TP	10
Methoxychlor	40

POLLUTION
INDICATORS (5)

BOD (MG/L)			5	5	5
Nitrate as N (MG/L)	4	4			
Total Phosphorus as P (MG/L)(6)		0 05	0 05		

FOOTNOTES

(1) Reserved

(2) The dissolved metals method involves filtration of the sample in the field, acidification of the sample in the field, no digestion process in the laboratory, and analysis by atomic absorption or inductively coupled plasma (ICP) spectrophotometry

(3) Maximum concentration varies according to the daily maximum mean air temperature

TEMP (C)	MG/L
12 0	2 4
12 1-14 6	2 2
14 7-17 6	2 0
17 7-21 4	1 8
21 5-26 2	1 6
26 3-32 5	1 4

(4) Total dissolved solids (TDS) limits may be adjusted if such adjustment does not impair the designated beneficial use of the receiving water The total dissolved solids (TDS) standards shall be at background where it can be shown that natural or un-alterable conditions prevent its attainment In such cases rulemaking will be undertaken to modify the standard accordingly

(5) Investigations should be conducted to develop more information where these pollution indicator levels are exceeded

(6) Total Phosphorus as P (mg/l) indicator for lakes and reservoirs shall be 0 025

(7) Where the criteria are exceeded and there is a reasonable basis for concluding that the indicator bacteria are primarily from natural sources (wildlife),

e g , in National Wildlife Refuges and State Waterfowl Management Areas, the criteria may be considered attained Exceedences of bacteriological numeric criteria from nonhuman nonpoint sources will generally be addressed through appropriate Federal, State, and local nonpoint source programs

TABLE 2 14 2
NUMERIC CRITERIA FOR AQUATIC WILDLIFE

Parameter	Aquatic Wildlife 3A	3B	3C	3D
PHYSICAL				
Total Dissolved Gases	(1)	(1)		
Minimum Dissolved Oxygen (MG/L) (2)				
30 Day Average	6 5	5 5	5 0	5 0
7 Day Average	9 5/5 0	6 0/4 0		
1 Day Average	8 0/4 0	5 0/3 0	3 0	3 0
Max Temperature(C)(3)	20	27	27	
Max Temperature Change (C)(3)	2	4	4	
pH (Range)	6 5-9 0	6 5-9 0	6 5-9 0	6 5-9 0
Turbidity Increase (NTU)	10	10	15	15
METALS (4) (DISSOLVED, UG/L)(5)				
Aluminum				
4 Day Average (6)	87	87	87	87
1 Hour Average	750	750	750	750
Arsenic (Trivalent)				
4 Day Average	150	150	150	150
1 Hour Average	340	340	340	340
Cadmium (7)				
4 Day Average	0 25	0 25	0 25	0 25
1 Hour Average	2 0	2 0	2 0	2 0
Chromium (Hexavalent)				
4 Day Average	11	11	11	11
1 Hour Average	16	16	16	16
Chromium (Trivalent) (7)				
4 Day Average	74	74	74	74
1 Hour Average	570	570	570	570
Copper (7)				
4 Day Average	9	9	9	9
1 Hour Average	13	13	13	13
Cyanide (Free)				
4 Day Average	5 2	5 2	5 2	
1 Hour Average	22	22	22	22
Iron (Maximum)	1000	1000	1000	1000
Lead (7)				

4 Day Average	2 5	2 5	2 5	2 5
1 Hour Average	65	65	65	65
Mercury				
4 Day Average	0 012	0 012	0 012	0 012
1 Hour Average	2 4	2 4	2 4	2 4
Nickel (7)				
4 Day Average	52	52	52	52
1 Hour Average	468	468	468	468
Selenium				
4 Day Average	4 6	4 6	4 6	4 6
1 Hour Average	18 4	18 4	18 4	18 4
Silver				
1 Hour Average (7)	1 6	1 6	1 6	1 6
Zinc (7)				
4 Day Average	120	120	120	120
1 Hour Average	120	120	120	120
INORGANICS (MG/L) (4)				
Total Ammonia as N (9)				
30 Day Average	(9a)	(9a)		
1 Hour Average	(9b)	(9b)	(9b)	(9b)
Chlorine (Total Residual)				
4 Day Average	0 011	0 011	0 011	0 011
1 Hour Average	0 019	0 019	0 019	0 019
Hydrogen Sulfide (13) (Undissociated, Max UG/L)	2 0	2 0	2 0	2 0
Phenol (Maximum)	0 01	0 01	0 01	0 01
RADIOLOGICAL (MAXIMUM pCi/L)				
Gross Alpha (10)	15	15	15	15
ORGANICS (UG/L) (4)				
Aldrin				
1 Hour Average	1 5	1 5	1 5	1 5
Chlordane				
4 Day Average	0 0043	0 0043	0 0043	0 0043
1 Hour Average	1 2	1 2	1 2	1 2
4,4' -DDT				
4 Day Average	0 0010	0 0010	0 0010	0 0010
1 Hour Average	0 55	0 55	0 55	0 55
Dieldrin				
4 Day Average	0 056	0 056	0 056	0 056
1 Hour Average	0 24	0 24	0 24	0 24
Alpha-Endosulfan				
4 Day Average	0 056	0 056	0 056	0 056
1 Hour Average	0 11	0 11	0 11	0 11
beta-Endosulfan				
4 Day Average	0 056	0 056	0 056	0 056
1 Day Average	0 11	0 11	0 11	0 11
Endrin				
4 Day Average	0 036	0 036	0 036	0 036
1 Hour Average	0 086	0 086	0 086	0 086
Heptachlor				

4 Day Average	0 0038	0 0038	0 0038	0 0038
1 Hour Average	0 26	0 26	0 26	0 26
Heptachlor epoxide				
4 Day Average	0 0038	0 0038	0 0038	0 0038
1 Hour Average	0 26	0 26	0 26	0 26
Hexachlorocyclohexane (Lindane)				
4 Day Average	0 08	0 08	0 08	0 08
1 Hour Average	1 0	1 0	1 0	1 0
Methoxychlor (Maximum)	0 03	0 03	0 03	0 03
Mirex (Maximum)	0 001	0 001	0 001	0 001
Parathion				
4 Day Average	0 013	0 013	0 013	0 013
1 Hour Average	0 066	0 066	0 066	0 066
PCB's				
4 Day Average	0 014	0 014	0 014	0 014
Pentachlorophenol (11)				
4 Day Average	15	15	15	15
1 Hour Average	19	19	19	19
Toxaphene				
4 Day Average	0 0002	0 0002	0 0002	0 0002
1 Hour Average	0 73	0 73	0 73	0 73
POLLUTION INDICATORS (11)				
Gross Beta (pCi/L)	50	50	50	50
BOD (MG/L)	5	5	5	5
Nitrate as N (MG/L)	4	4	4	
Total Phosphorus as P (MG/L) (12)	0 05	0 05		

FOOTNOTES

(1) Not to exceed 110% of saturation

(2) These limits are not applicable to lower water levels in deep impoundments First number in column is for when early life stages are present, second number is for when all other life stages present

(3) The temperature standard shall be at background where it can be shown that natural or un-alterable conditions prevent its attainment In such cases rulemaking will be undertaken to modify the standard accordingly

Site Specific Standards for Temperature

Ken's Lake From June 1^{st} - September 20^{th}, 27 degrees C

(4) Where criteria are listed as 4-day average and 1-hour average concentrations, these concentrations should not be exceeded more often than once every three years on the average

(5) The dissolved metals method involves filtration of the sample in the field, acidification of the sample in the field, no digestion process in the laboratory, and analysis by atomic absorption spectrophotometry or inductively coupled plasma (ICP)

(6) The criterion for aluminum will be implemented as follows

Where the pH is equal to or greater than 7 0 and the hardness is equal to or greater than 50 ppm as $CaCO_3$ in the receiving water after mixing, the 87 ug/l chronic criterion (expressed as total recoverable) will not apply, and aluminum will be regulated based on compliance with the 750 ug/l acute aluminum criterion (expressed as total recoverable)

(7) Hardness dependent criteria 100 mg/l used Conversion factors for ratio of total recoverable metals to dissolved metals must also be applied In waters with a hardness greater than 400 mg/l as $CaCO_3$, calculations will assume a hardness of 400 mg/l as $CaCO_3$ See Table 2 14 3 for complete equations for hardness and conversion factors

(8) Reserved

(9) The following equations are used to calculate Ammonia criteria concentrations

(9a) The thirty-day average concentration of total ammonia nitrogen (in mg/l as N) does not exceed, more than once every three years on the average, the chronic criterion calculated using the following equations

Fish Early Life Stages are Present

mg/l as N (Chronic)= $((0\ 0577/1+10^{7\ 688-pH}) + (2\ 487/1+10^{PH-7\ 688}))$
$*$ MIN $(2\ 85,\ 1\ 45*10^{0\ 028\ (25-T)})$

Fish Early Life Stages are Absent

mg/l as N (Chronic) = $((0\ 0577/1+10^{7\ 688-pH}) + (2\ 487/1+10^{pH-7\ 688}))$
$*\ 1\ 45*10^{0\ 028*\ (25-MAX(T\ 7))}$

(9b) The one-hour average concentration of total ammonia nitrogen (in mg/l as N) does not exceed, more than once every three years on the average the acute criterion calculated using the following equations

Class 3A

mg/l as N (Acute) = $(0\ 275/(I+I0^{7\ 204-pH})) + (39\ 0/1+10^{pH-7\ 204}))$

Class 3B, 3C, 3D

mg/l as N (Acute) = $0\ 411/(I+I0^{7\ 204-pH})) + (58\ 4/(1+10^{pH-7\ 204}))$

In addition, the highest four-day average within the 30-day period should not exceed 2 5 times the chronic criterion The "Fish Early Life Stages are Present" 30-day average total ammonia criterion will be applied by default unless it is determined by the Division, on a site-specific basis, that it is appropriate to apply the "Fish Early Life Stages are Absent" 30-day average criterion for all or some portion of the year At a minimum, the "Fish Early Life Stages are Present" criterion will apply from the beginning of spawning through the end of the early life stages Early life stages include the pre-hatch embryonic stage, the post-hatch free embryo or yolk-sac fry stage, and the larval stage for the species of fish expected to occur at the site The division will consult with the Division of Wildlife Resources in making such determinations The Division will maintain information regarding the waterbodies and time periods where application of the "Early Life Stages are Absent" criterion is determined to be appropriate

(10) Investigation should be conducted to develop more information where these levels are exceeded

(11) pH dependent criteria pH 7 8 used in table See

Table 2 14 4 for equation

(12) Total Phosphorus as P (mg/l) indicator for lakes and reservoirs shall be 0 025

(13) Formula to convert dissolved sulfide to un-disassociated hydrogen sulfide is H_2S = Dissolved Sulfide * $e^{((-1\ 92 + pH) + 12\ 05)}$

TABLE
1-HOUR AVERAGE (ACUTE) CONCENTRATION OF
TOTAL AMMONIA AS N (MG/L)

pH	Class 3A	Class 3B, 3C, 3D
6 5	32 6	48 8
6 6	31 3	46 8
6 7	29 8	44 6
6 8	28 1	42 0
6 9	26 2	39 1
7 0	24 1	36 1
7 1	22 0	32 8
7 2	19 7	29 5
7 3	17 5	26 2
7 4	15 4	23 0
7 5	13 3	19 9
7 6	11 4	17 0
7 7	9 65	14 4
7 8	8 11	12 1
7 9	6 77	10 1
8 0	5 62	8 40
8 1	4 64	6 95
8 2	3 83	5 72
8 3	3 15	4 71
8 4	2 59	3 88
8 5	2 14	3 20
8 6	1 77	2 65
8 7	1 47	2 20
8 8	1 23	1 84
8 9	1 04	1 56
9 0	0 89	1 32

TABLE
30-DAY AVERAGE (CHRONIC) CONCENTRATION OF
TOTAL AMMONIA AS N (MG/1)

Fish Early Life Stages Present
Temperature, C

pH	0	14	16	18	20	22	24	26	28	30
6 5	6 67	6 67	6 06	5 33	4 68	4 12	3 62	3 18	2 80	2 46
6 6	6 57	6 57	5 97	5 25	4 61	4 05	3 56	3 13	2 75	2 42
6 7	6 44	6 44	5 86	5 15	4 52	3 98	3 50	3 07	2 70	2 37
6 8	6 29	6 29	5 72	5 03	4 42	3 89	3 42	3 00	2 64	2 32
6 9	6 12	6 12	5 56	4 89	4 30	3 78	3 32	2 92	2 57	2 25
7 0	5 91	5 91	5 37	4 72	4 15	3 65	3 21	2 82	2 48	2 18
7 1	5 67	5 67	5 15	4 53	3 98	3 50	3 08	2 70	2 38	2 09

7 2	5 39	5 39	4 90	4 31	3 78	3 33	2 92	2 57	2 26	1 99
7 3	5 08	5 08	4 61	4 06	3 57	3 13	2 76	2 42	2 13	1 87
7 4	4 73	4 73	4 30	3 78	3 32	2 92	2 57	2 26	1 98	1 74
7 5	4 36	4 36	3 97	3 49	3 06	2 69	2 37	2 08	1 83	1 61
7 6	3 98	3 98	3 61	3 18	2 79	2 45	2 16	1 90	1 67	1 47
7 7	3 58	3 58	3 25	2 86	2 51	2 21	1 94	1 71	1 50	1 32
7 8	3 18	3 18	2 89	2 54	2 23	1 96	1 73	1 52	1 33	1 17
7 9	2 80	2 80	2 54	2 24	1 96	1 73	1 52	1 33	1 17	1 03
8 0	2 43	2 43	2 21	1 94	1 71	1 50	1 32	1 16	1 02	0 90
8 1	2 10	2 10	1 91	1 68	1 47	1 29	1 14	1 00	0 88	0 77
8 2	1 79	1 79	1 63	1 43	1 26	1 11	0 97	0 86	0 75	0 66
8 3	1 52	1 52	1 39	1 22	1 07	0 94	0 83	0 73	0 64	0 56
8 4	1 29	1 29	1 17	1 03	0 91	0 80	0 70	0 62	0 54	0 48
8 5	1 09	1 09	0 99	0 87	0 76	0 67	0 59	0 52	0 46	0 40
8 6	0 92	0 92	0 84	0 73	0 65	0 57	0 50	0 44	0 39	0 34
8 7	0 78	0 78	0 71	0 62	0 55	0 48	0 42	0 37	0 33	0 29
8 8	0 66	0 66	0 60	0 53	0 46	0 41	0 36	0 32	0 28	0 24
8 9	0 56	0 56	0 51	0 45	0 40	0 35	0 31	0 27	0 24	0 21
9 0	0 49	0 49	0 44	0 39	0 34	0 30	0 26	0 23	0 20	0 18

TABLE
30-DAY AVERAGE (CHRONIC) CONCENTRATION OF
TOTAL AMMONIA AS N (MG/1)

Fish Early Life Stages Absent
Temperature, C

pH	0-7	8	9	10	11	12	13	14	16
6 5	10 8	10 1	9 51	8 92	8 36	7 84	7 36	6 89	6 06
6 6	10 7	10 1	9 37	9 37	8 79	8 24	7 72	7 24	6 36
6 7	10 5	9 99	9 20	8 62	8 08	7 58	7 11	6 66	5 86
6 8	10 2	9 81	8 98	8 42	7 90	7 40	6 94	6 51	5 72
6 9	9 93	9 31	8 73	8 19	7 68	7 20	6 75	6 33	5 56
7 0	9 60	9 00	8 43	7 91	7 41	6 95	6 52	6 11	5 37
7 1	9 20	8 63	8 09	7 58	7 11	6 67	6 25	5 86	5 15
7 2	8 75	8 20	7 69	7 21	6 76	6 34	5 94	5 57	4 90
7 3	8 24	7 73	7 25	6 79	6 37	5 97	5 60	5 25	4 61
7 4	7 69	7 21	6 76	6 33	5 94	5 57	5 22	4 89	4 30
7 5	7 09	6 64	6 23	5 84	5 48	5 13	4 81	4 51	3 97
7 6	6 46	6 05	5 67	5 32	4 99	4 68	4 38	4 11	3 61
7 7	5 81	5 45	5 11	4 79	4 49	4 21	3 95	3 70	3 25
7 8	5 17	4 84	4 54	4 26	3 99	3 74	3 51	3 29	2 89
7 9	4 54	4 26	3 99	3 74	3 51	3 29	3 09	2 89	2 54
8 0	3 95	3 70	3 47	3 26	3 05	2 86	2 68	2 52	2 21
8 1	3 41	3 19	2 99	2 81	2 63	2 47	2 31	2 17	1 91
8 2	2 91	2 73	2 56	2 40	2 25	2 11	1 98	1 85	1 63
8 3	2 47	2 32	2 18	2 04	1 91	1 79	1 68	1 58	1 39
8 4	2 09	1 96	1 84	1 73	1 62	1 52	1 42	1 33	1 17
8 5	1 77	1 66	1 55	1 46	1 37	1 28	1 20	1 13	0 990
8 6	1 49	1 40	1 31	1 23	1 15	1 08	1 01	0 951	0 836
8 7	1 26	1 18	1 11	1 04	0 976	0 915	0 858	0 805	0 707
8 8	1 07	1 01	0 944	0 885	0 829	0 778	0 729	0 684	0 601
8 9	0 917	0 860	0 806	0 758	0 709	0 664	0 623	0 584	0 513

9 0	0 790	0 740	694	0 651	0 610	0 572	0 536	0 503	0 442

pH	18	20	22	24	26	28	30
6 5	5 33	4 68	4 12	3 62	3 18	2 80	2 46
6 6	5 25	4 61	4 05	3 56	3 13	2 75	2 42
6 7	5 15	4 52	3 98	3 50	3 07	2 70	2 37
6 8	5 03	4 42	3 89	3 42	3 00	2 64	2 32
6 9	4 89	4 30	3 78	3 32	2 92	2 57	2 25
7 0	4 72	4 15	3 65	3 21	2 82	2 48	2 18
7 1	4 53	3 98	3 50	3 08	2 70	2 38	2 09
7 2	4 41	3 78	3 33	2 92	2 57	2 26	1 99
7 3	4 06	3 57	3 13	2 76	2 42	2 13	1 87
7 4	3 78	3 32	2 92	2 57	2 26	1 98	1 74
7 5	3 49	3 06	2 69	2 37	2 08	1 83	1 61
7 6	3 18	2 79	2 45	2 16	1 90	1 67	1 47
7 7	2 86	2 51	2 21	1 94	1 71	1 50	1 32
7 8	2 54	2 23	1 96	1 73	1 52	1 33	1 17
7 9	2 24	1 96	1 73	1 52	1 33	1 17	1 03
8 0	0 94	1 71	1 50	1 32	1 16	1 02	0 897
8 1	0 68	1 47	1 29	1 14	1 00	0 879	0 733
8 2	0 43	1 26	1 11	0 073	0 855	0 752	0 661
8 3	0 22	1 07	0 941	0 827	0 727	0 639	0 562
8 4	0 03	0 906	0 796	0 700	0 615	0 541	0 475
8 5	0 870	0 765	0 672	0 591	0 520	0 457	0 401
8 6	0 735	0 646	0 568	0 499	0 439	0 396	0 339
8 7	0 622	0 547	0 480	0 422	0 371	0 326	0 287
8 8	0 528	0 464	0 408	0 359	0 315	0 277	0 244
8 9	0 451	0 397	0 349	0 306	0 269	0 237	0 208
9 0	0 389	0 342	0 300	0 264	0 232	0 204	0 179

APPENDIX D

STANDARDS AND SPECIFICATIONS FOR SELECTED BMPs

4.1 Source Control BMPs

BMP C101 Preserving Natural Vegetation

Purpose

The purpose of preserving natural vegetation is to reduce erosion wherever practicable. Limiting site disturbance is the single most effective method for reducing erosion. For example, conifers can hold up to about 50 percent of all rain that falls during a storm. Up to 20-30 percent of this rain may never reach the ground but is taken up by the tree or evaporates. Another benefit is that the rain held in the tree can be released slowly to the ground after the storm.

Conditions of Use

- Natural vegetation should be preserved on steep slopes, near perennial and intermittent watercourses or swales, and on building sites in wooded areas.
- As required by local governments.

Design and Installation Specifications

Natural vegetation can be preserved in natural clumps or as individual trees, shrubs and vines.

The preservation of individual plants is more difficult because heavy equipment is generally used to remove unwanted vegetation. The points to remember when attempting to save individual plants are:

- Is the plant worth saving? Consider the location, species, size, age, vigor, and the work involved. Local governments may also have ordinances to save natural vegetation and trees.
- Fence or clearly mark areas around trees that are to be saved. It is preferable to keep ground disturbance away from the trees at least as far out as the dripline.

Plants need protection from three kinds of injuries:

- *Construction Equipment* - This injury can be above or below the ground level. Damage results from scarring, cutting of roots, and compaction of the soil. Placing a fenced buffer zone around plants to be saved prior to construction can prevent construction equipment injuries.
- *Grade Changes* - Changing the natural ground level will alter grades, which affects the plant's ability to obtain the necessary air, water, and minerals. Minor fills usually do not cause problems although sensitivity between species does vary and should be checked. Trees can tolerate fill of 6 inches or less. For shrubs and other plants, the fill should be less.

  When there are major changes in grade, it may become necessary to supply air to the roots of plants. This can be done by placing a layer of gravel and a tile system over the roots before the fill is made. A tile system protects a tree from a raised grade The tile system should be laid out on the original grade leading from a dry well around the tree trunk The system should then be covered with small stones to allow air to circulate over the root area

Lowering the natural ground level can seriously damage trees and shrubs The highest percentage of the plant roots are in the upper 12 inches of the soil and cuts of only 2-3 inches can cause serious injury To protect the roots it may be necessary to terrace the immediate area around the plants to be saved If roots are exposed, construction of retaining walls may be needed to keep the soil in place Plants can also be preserved by leaving them on an undisturbed, gently sloping mound To increase the chances for survival, it is best to limit grade changes and other soil disturbances to areas outside the dripline of the plant

- *Excavations* - Protect trees and other plants when excavating for drainfields, power, water, and sewer lines Where possible, the trenches should be routed around trees and large shrubs When this is not possible, it is best to tunnel under them This can be done with hand tools or with power augers If it is not possible to route the trench around plants to be saved, then the following should be observed

  Cut as few roots as possible When you have to cut cut clean Paint cut root ends with a wood dressing like asphalt base paint

  Backfill the trench as soon as possible

  Tunnel beneath root systems as close to the center of the main trunk to preserve most of the important feeder roots

Some problems that can be encountered with a few specific trees are

- Maple, Dogwood, Red alder, Western hemlock Western red cedar and Douglas fir do not readily adjust to changes in environment and special care should be taken to protect these trees
- The windthrow hazard of Pacific silver fir and madronna is high, while that of Western hemlock is moderate The danger of windthrow increases where dense stands have been thinned Other species (unless they are on shallow, wet soils less than 20 inches deep) have a low windthrow hazard
- Cottonwoods, maples, and willows have water seeking roots These can cause trouble in sewer lines and infiltration fields On the other hand, they thrive in high moisture conditions that other trees would not
- Thinning operations in pure or mixed stands of Grand fir Pacific silver fir Noble fir, Sitka spruce Western red cedar Western hemlock

Pacıfic dogwood, and Red alder can cause senous dısease problems Dısease can become establıshed through damaged lımbs, tmnks, roots and freshly cut stumps Dıseased and weakened trees are also susceptıble to ınsect attack

Maıntenance Standaı ds

- Inspect flagged and/or fenced areas regularly to make suı e flaggıng or fencıng has not been removed or damaged If the flaggıng or fencıng has been damaged oı vısıbılıty reduced, ıt shall be ı epaıred or replaced ımmedıately and vısıbılıty restored
- If tree roots have been exposed or ınjured, prnne cleanly wıth an appı opı ıate prnnmg saw or lopeı s dırecfly above the damaged roots and recover wıth natıve soıls Tı eatment of sap flowıng trees (fir, hemlock, pıne, soft maples) ıs not advısed as sap forms a natural healıng barı ieı

BMP C102 Buffer Zones

Puipose

An undisturbed area or stnp of natural vegetation or an established suitable planting that will provide a living filtei to reduce soil eiosion and mnoff velocities

Conditions af Use

Natural buffer zones are used along streams, wetlands and other bodies of watei that need protection from erosion and sedimentation Vegetative buffer zones can be used to piotect natural swales and can be incoipoiated into the natural landscaping of an aiea

Cntical areas buffer zones should not be used as sediment tieatment aieas These areas shall remain completely undisturbed The local pennitting authonty may expand the buffei widths tempoiarily to allow the use of the expanded area for removal of sediment

Design and Installation Specifications

- Preserving natural vegetation or plantings in clumps, blocks or stnps is generally the easiest and most successful method
- Leave all unstable steep slopes in natural vegetation
- Mark cleanng limits and keep all equipment and constmction debns out of the natural areas Steel constmction fencing is the most effective method m protecting sensitive aieas and buffers Alternatively, wire-backed silt fence on steel posts is marginally effective Flagging alone is typically not effective
- Keep all excavations outside the dnpline of tiees and shrubs
- Do not push debns or extra soil into the buffer zone area because it will cause damage from burying and smothenng
- Vegetative buffer zones for streams, lakes or other waterways shall be established by the local permitting authonty or othei state or federal permits or approvals

Maintenance Standards

- Inspect the area fiequently to make sure flagging remains m place and the aiea iemains undisturbed

BMP C105 Stabilized Construction Entrance

Purpose Construction entrances are stabilized to reduce the amount of sediment transported onto paved roads by vehicles or equipment by constructing a stabilized pad of quarry spalls at entrances to construction sites

Conditions of Use Construction entrances shall be stabilized wherever traffic will be leaving a construction site and traveling on paved roads or other paved areas within 1,000 feet of the site

On large commercial highway, and road projects, the designer should include enough extra materials in the contract to allow for additional stabilized entrances not shown in the initial Construction SWPPP It is difficult to determine exactly where access to these projects will take place, additional materials will enable the contractor to install them where needed

Design and Installation Specifications

- See Figure 4 2 for details Note the 100 minimum length of the entrance shall be reduced to the maximum practicable size when the size or configuration of the site does not allow the full length (100)
- A separation geotextile shall be placed under the spalls to prevent fine sediment from pumping up into the rock pad The geotextile shall meet the following standards

Grab Tensile Strength (ASTM D4751)	200 psi min
Grab Tensile Elongation (ASTM D4632)	30% max
Mullen Burst Strength (ASTM D3786 80a)	400 psi min
AOS (ASTM D4751)	20-45 (U S standard sieve size)

- Consider early installation of the first lift of asphalt in areas that will paved, this can be used as a stabilized entrance Also consider the installation of excess concrete as a stabilized entrance During large concrete pours, excess concrete is often available for this purpose
- Hog fuel (wood based mulch) may be substituted for or combined with quarry spalls in areas that will not be used for permanent roads Hog fuel is generally less effective at stabilizing construction entrances and should be used only at sites where the amount of traffic is very limited Hog fuel is not recommended for entrance stabilization in urban areas The effectiveness of hog fuel is highly variable and it generally requires more maintenance than quarry spalls The inspector may at any time require the use of quarry spalls if the hog fuel is not preventing sediment from being tracked onto pavement or if the hog fuel is being carried onto pavement Hog fuel is prohibited in permanent roadbeds because organics in the subgrade soils cause degradation of the subgrade support over time
- Fencing (see BMPs C103 and C104) shall be installed as necessary to restrict traffic to the construction entrance

- Whenever possible, the entrance shall be constructed on a firm compacted subgrade This can substantially increase the effectiveness of the pad and reduce the need for maintenance

Maintenance Standards

- Quarry spalls (or hog fuel) shall be added if the pad is no longer in accordance with the specifications
- If the entrance is not preventing sediment from being tracked onto pavement, then alternative measures to keep the streets free of sediment shall be used This may include street sweeping, an increase in the dimensions of the entrance, or the installation of a wheel wash
- Any sediment that is tracked onto pavement shall be removed by shoveling or street sweeping The sediment collected by sweeping shall be removed or stabilized on site The pavement shall not be cleaned by washing down the street, except when sweeping is ineffective and there is a threat to public safety If it is necessary to wash the streets, the construction of a small sump shall be considered The sediment would then be washed into the sump where it can be controlled
- Any quarry spalls that are loosened from the pad which end up on the roadway shall be removed immediately
- If vehicles are entering or exiting the site at points other than the construction entrance(s), fencing (see BMPs C103 and C104) shall be installed to control traffic
- Upon project completion and site stabilization, all construction accesses intended as permanent access for maintenance shall be permanently stabilized

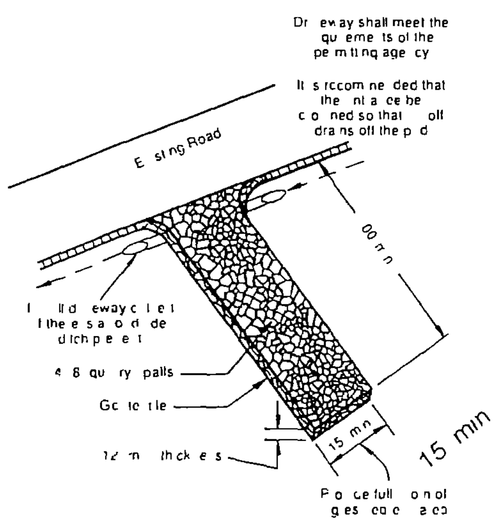


Figure 4 2 – Stabilized Construction Entrance

BMP C106 Wheel Wash

Purpose

Wheel washes reduce the amount of sediment transported onto paved roads by motor vehicles

Conditions of Use

When a stabilized construction entrance (see BMP C105) is not preventing sediment from being tracked onto pavement

- Wheel washing is generally an effective BMP when installed with careful attention to topography For example, a wheel wash can be detrimental if installed at the top of a slope abutting a right-of-way where the water from the dripping truck can run unimpeded into the street
- Pressure washing combined with an adequately sized and surfaced pad with direct drainage to a large 10-foot x 10 foot sump can be very effective

Design and Installation Specifications

Suggested details are shown in Figure 4 3 The Local Permitting Authority may allow other designs A minimum of 6 inches of asphalt treated base (ATB) over crushed base material or 8 inches over a good subgrade is recommended to pave the wheel wash

Use a low clearance truck to test the wheel wash before paving Either a belly dump or lowboy will work well to test clearance

Keep the water level from 12 to 14 inches deep to avoid damage to truck hubs and filling the truck tongues with water

Midpoint spray nozzles are only needed in extremely muddy conditions

Wheel wash systems should be designed with a small grade change 6 to 12 inches for a 10-foot-wide pond, to allow sediment to flow to the low side of pond to help prevent re-suspension of sediment A drainpipe with a 2 to 3-foot riser should be installed on the low side of the pond to allow for easy cleaning and refilling Polymers may be used to promote coagulation and flocculation in a closed loop system Polyacrylamide (PAM) added to the wheel wash water at a rate of 0 25 0 5 pounds per 1,000 gallons of water increases effectiveness and reduces cleanup time If PAM is already being used for dust or erosion control and is being applied by a water truck, the same truck can be used to change the wash water

Maintenance Standards

The wheel wash should start out the day with fresh water

The wash water should be changed a minimum of once per day On large earthwork jobs where more than 10 20 trucks per hour are expected, the wash water will need to be changed more often

Wheel wash or tire bath wastewater shall be discharged to a separate on site treament system, such as closed loop recirculation or land application, or to the sanitary sewer with proper local sewer district approval

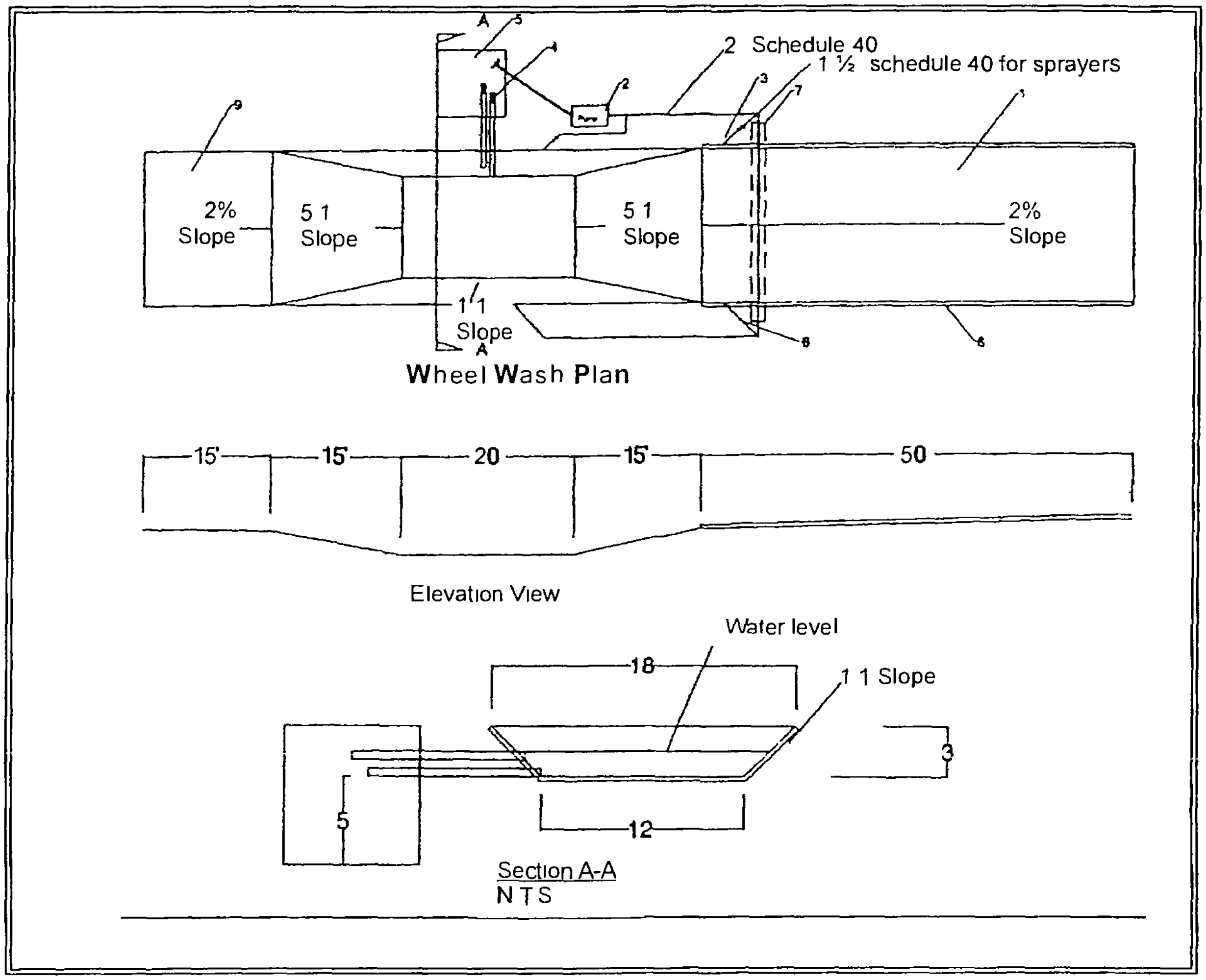


Figure 4 3 Wheel Wash

Notes

1 Asphalt construction entrance 6 in asphalt treated base (ATB)
2 3 inch trash pump with floats on the suction hose
3 Midpoint spray nozzles if needed
4 6 inch sewer pipe with butterfly valves Bottom one is a drain Locate top pipe s invert 1 foot above bottom of wheel wash
5 8 foot x 8 foot sump with 5 feet of catch Build so can be cleaned with trackhoe
6 Asphalt curb on the low road side to direct water back to pond
7 6 inch sleeve under road
8 Ball valves
9 15 foot ATB apron to protect ground from splashing water

BMP C123 Plastic Covering

Purpose

Plastic covering provides immediate, short-term erosion protection to slopes and disturbed areas.

Conditions of Use

- Plastic covering may be used on disturbed areas that require cover measures for less than 30 days, except as stated below.
- Plastic is particularly useful for protecting cut and fill slopes and stockpiles. Note: The relatively rapid breakdown of most polyethylene sheeting makes it unsuitable for long term (greater than six months) applications.
- Clear plastic sheeting can be used over newly seeded areas to create a greenhouse effect and encourage grass growth if the hydroseed was installed too late in the season to establish 75 percent grass cover, or if the wet season started earlier than normal. Clear plastic should not be used for this purpose during the summer months because the resulting high temperatures can kill the grass.
- Due to rapid runoff caused by plastic sheeting, this method shall not be used upslope of areas that might be adversely impacted by concentrated runoff. Such areas include steep and/or unstable slopes.
- While plastic is inexpensive to purchase, the added cost of installation, maintenance, removal, and disposal make this an expensive material, up to $1.50-2.00 per square yard.
- Whenever plastic is used to protect slopes, water collection measures must be installed at the base of the slope. These measures include plastic-covered berms, channels, and pipes used to covey clean rainwater away from bare soil and disturbed areas. At no time is clean runoff from a plastic covered slope to be mixed with dirty runoff from a project.
- Other uses for plastic include:
  1. Temporary ditch liner.
  2. Pond liner in temporary sediment pond.
  3. Liner for bermed temporary fuel storage area if plastic is not reactive to the type of fuel being stored.
  4. Emergency slope protection during heavy rains; and,
  5. Temporary drainpipe ("elephant trunk") used to direct water.

Design and Installation Specifications

- Plastic slope cover must be installed as follows
  1. Run plastic up and down slope not across slope,
  2. Plastic may be installed perpendicular to a slope if the slope length is less than 10 feet,
  3. Minimum of 8-inch overlap at seams
  4. On long or wide slopes or slopes subject to wind all seams should be taped
  5. Place plastic into a small (12-inch wide by 6-inch deep) slot trench at the top of the slope and backfill with soil to keep water from flowing underneath,
  6. Place sand filled burlap or geotextile bags every 3 to 6 feet along seams and pound a wooden stake through each to hold them in place,
  7. Inspect plastic for rips tears, and open seams regularly and repair immediately This prevents high velocity runoff from contacting bare soil which causes extreme erosion
  8. Sandbags may be lowered into place tied to ropes However, all sandbags must be staked in place
- Plastic sheeting shall have a minimum thickness of 0 06 millimeters
- If erosion at the toe of a slope is likely, a gravel berm, riprap, or other suitable protection shall be installed at the toe of the slope in order to reduce the velocity of runoff

Maintenance Standards

- Torn sheets must be replaced and open seams repaired
- If the plastic begins to deteriorate due to ultraviolet radiation, it must be completely removed and replaced
- When the plastic is no longer needed it shall be completely removed
- Dispose of old tires appropriately

Erosion Control Improved

Increased Efficiency

Easily applied with conventional hydraulic seeding equipment which is less expensive than blankets or erosion control netting ENVIRO SHIELD bonded fiber matrix is the only Easy Lawn approved BFM that can be used via jet agitation mixing from an Easy Lawn TURFMASTER® series 350 600 Gallon Hydroseeder as well as larger units from all hydraulic seeding machine manufacturers

Improved Soil Quality

Only ENVIRO-SHIELD bonded fiber matrix is made from gypsum, which supplies calcium sulfur and other nutrients to the soil Gypsum also improves the structure of high clay content soils buffers soil pH and helps drive sodium out of the root profile in areas where high soil sodium is a problem

Safe

Totally biodegradable and harmless to fish, birds, plants and animals, ENVIRO SHIELD bonded fiber matrix is easily applied where steep slopes or inaccessible terrain make the installation of blankets difficult Where public safety is a concern, especially around retail or school areas, there are no staples' (typically used with sod or erosion control blankets) that turn into dangerous projectiles when mowed

Economical

Whether steep slopes, open tracts or narrow embankments, effective coverage is achieved at recommended application rates of just 3,500 pounds of product (70 bags) per acre With less ground preparation and less labor than a roll-out or sod blanket application ENVIRO SHIELD bonded fiber matrix is up to 30% less expensive than other erosion control methods

Long-Lasting

Meeting or exceeding the erosion qualities of temporary erosion control blankets, ENVIRO SHIELD bonded fiber matrix s blend of fiber and bonding ingredients creates a crust that enhances germination by protecting the seed to promote plant growth

Effective

Special water holding ingredients improve the retention of moisture from rain water, facilitating quick and effective germination of plant cover

Versatile

Can be used for roadway and airport runway shoulders golf courses, oil, drilling, construction mining industrial and cement manufacturing sites feedlots landfills power stations and new or existing housing developments

Technical Data

- Can be mixed at 70 (+/−10 lbs.) per 100 gallons of water
- Packaging net weight is 50-lb. bales
- One truckload equals 840 bales or 24 pallets (40"x48" pallet)

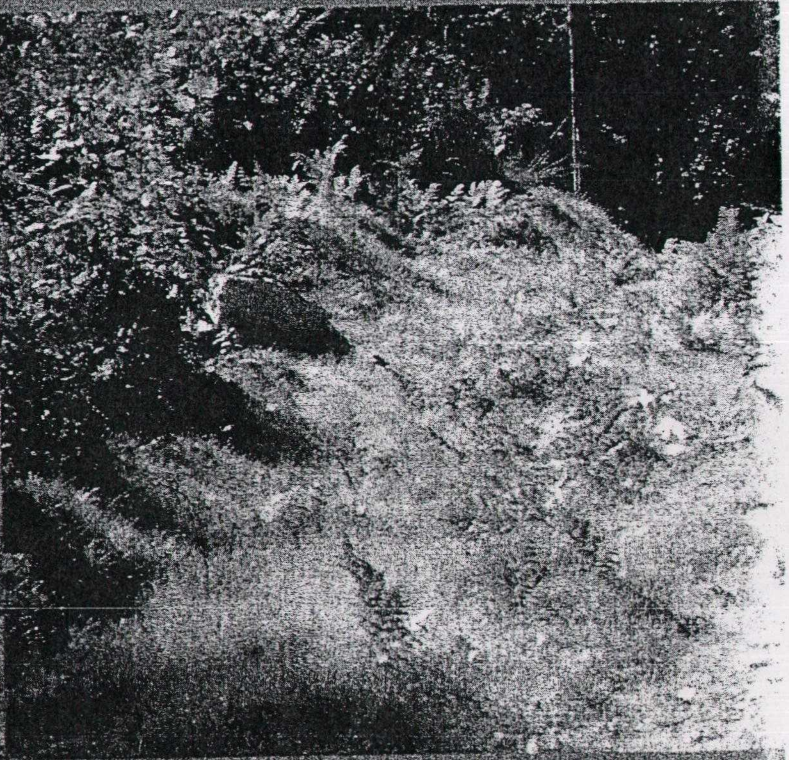
Typical Application Rates

Area	Pounds/AC
< 3:1 slope	3000 lbs/ac
3:1 to 2:1	3500 lbs/ac
> 2:1 slope	4000 lbs/ac

Components

Enviro-Shield bonded fiber matrix contains the following biodegradable and environmentally safe ingredients:

- A gypsum-based binder
- Cellulosic fiber mulch (paper/soft wood)
- Specially developed plant-based tackifiers (short-term binding agents)
- Nonpetroleum-based polymers (long-term binding agents)
- Surfactant
- Water-holding ingredients, (polyacrylmides (PAM))
- Dye (green)



BMP C130 Surface Roughening

Purpose

Surface roughening aids in the establishment of vegetative cover, reduces runoff velocity increases infiltration, and provides for sediment trapping through the provision of a rough soil surface Horizontal depressions are created by operating a tiller or other suitable equipment on the contour or by leaving slopes in a roughened condition by not fine grading them

Conditions for Use

- All slopes steeper than 3 1 and greater than 5 vertical feet require surface roughening
- Areas with grades steeper than 3 1 should be roughened to a depth of 2 to 4 inches prior to seeding
- Areas that will not be stabilized immediately may be roughened to reduce runoff velocity until seeding takes place
- Slopes with a stable rock face do not require roughening
- Slopes where mowing is planned should not be excessively roughened

Design and Installation Specifications

There are different methods for achieving a roughened soil surface on a slope, and the selection of an appropriate method depends upon the type of slope Roughening methods include stair step grading, grooving, contour furrows, and tracking See Figure 4 6 for tracking and contour furrows Factors to be considered in choosing a method are slope steepness, mowing requirements, and whether the slope is formed by cutting or filling

- Disturbed areas that will not require mowing may be stair step graded, grooved, or left rough after filling
- Stair step grading is particularly appropriate in soils containing large amounts of soft rock Each "step" catches material that sloughs from above, and provides a level site where vegetation can become established Stairs should be wide enough to work with standard earth moving equipment Stair steps must be on contour or gullies will form on the slope
- Areas that will be mowed (these areas should have slopes less steep than 3 1) may have small furrows left by disking, harrowing, raking or seed-planting machinery operated on the contour
- Graded areas with slopes greater than 3 1 but less than 2 1 should be roughened before seeding This can be accomplished in a variety of ways, including "track walking," or driving a crawler tractor up and down the slope leaving a pattern of cleat imprints parallel to slope contours
- Tracking is done by operating equipment up and down the slope to leave horizontal depressions in the soil

Maintenance Standards

- Areas that are graded in this manner should be seeded as quickly as possible
- Regular inspections should be made of the area If rills appear they should be re graded and re-seeded immediately

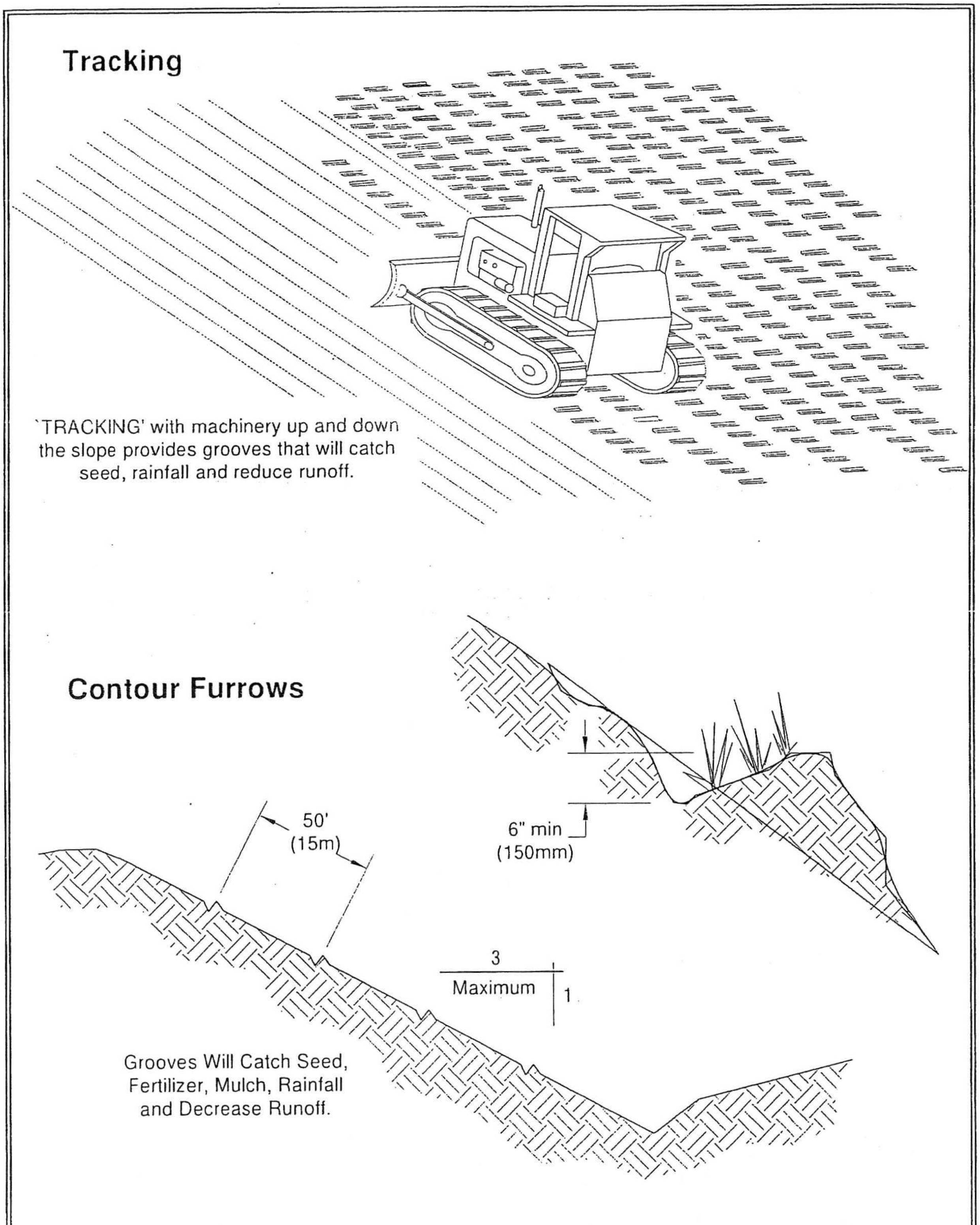


Figure 4.6 – Surface Roughening by Tracking and Contour Furrows

BMP C131 Gradient Terraces

Purpose

Gradient terraces reduce erosion damage by intercepting surface runoff and conducting it to a stable outlet at a non erosive velocity

Conditions of Use

- Gradient terraces normally are limited to denuded land having a water erosion problem They should not be constructed on deep sands or on soils that are too stony, steep, or shallow to permit practical and economical installation and maintenance Gradient terraces may be used only where suitable outlets are or will be made available See Figure 4 7 for gradient terraces

Design and Installation Specifications

- The maximum spacing of gradient terraces should be determined by the following method

$$VI = (0.8)s + y$$

Where VI = vertical interval in feet

s = land rise per 100 feet, expressed in feet

y = a soil and cover variable with values from 1 0 to 4 0

Values of "y" are influenced by soil erodibility and cover practices The lower values are applicable to erosive soils where little to no residue is left on the surface The higher value is applicable only to erosion-resistant soils where a large amount of residue (1½ tons of straw/acre equivalent) is on the surface

- The minimum constructed cross section should meet the design dimensions
- The top of the constructed ridge should not be lower at any point than the design elevation plus the specified overfill for settlement The opening at the outlet end of the terrace should have a cross section equal to that specified for the terrace channel
- Channel grades may be either uniform or variable with a maximum grade of 0 6 feet per 100 feet length For short distances, terrace grades may be increased to improve alignment The channel velocity should not exceed that which is nonerosive for the soil type with the planned treatment
- All gradient terraces should have adequate outlets Such an outlet may be a grassed waterway, vegetated area or tile outlet In all cases the outlet must convey runoff from the terrace or terrace system to a point where the outflow will not cause damage Vegetative cover should be used in the outlet channel
- The design elevation of the water surface of the terrace should not be lower than the design elevation of the water surface in the outlet at their junction when both are operating at design flow

- Vertical spacing determined by the above methods may be increased as much as 0 5 feet or 10 percent, whichever is greater, to provide better alignment or location, to avoid obstacles, to adjust for equipment size, or to reach a satisfactory outlet
- The drainage area above the top should not exceed the area that would be drained by a terrace with normal spacing
- The terrace should have enough capacity to handle the peak runoff expected from a 2 year 24-hour design storm without overtopping
- The terrace cross-section should be proportioned to fit the land slope The ridge height should include a reasonable settlement factor The ridge should have a minimum top width of 3 feet at the design height The minimum cross sectional area of the terrace channel should be 8 square feet for land slopes of 5 percent or less, 7 square feet for slopes from 5 to 8 percent, and 6 square feet for slopes steeper than 8 percent The terrace can be constructed wide enough to be maintained using a small cat

Maintenance Standards

- Maintenance should be performed as needed Terraces should be inspected regularly, at least once a year and after large storm events

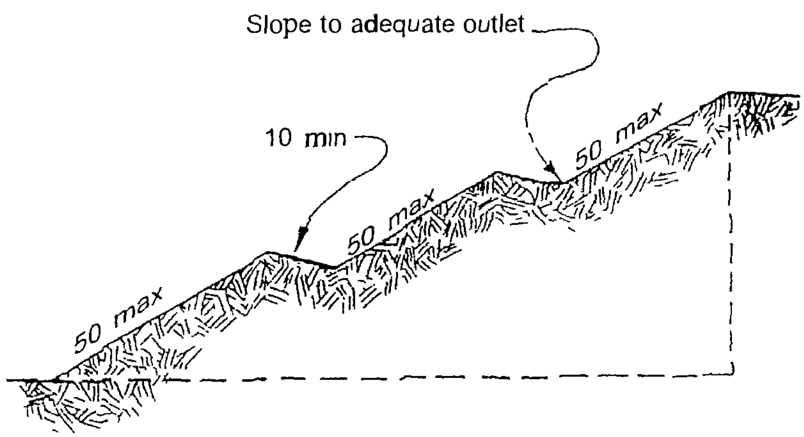


Figure 4 7 Gradient Terraces

BMP C209 Outlet Protection

Purpose

Outlet protection prevents scour at conveyance outlets and minimizes the potential for downstream erosion by reducing the velocity of concentrated stormwater flows

Conditions of use

Outlet protection is required at the outlets of all ponds, pipes, ditches or other conveyances, and where runoff is conveyed to a natural or manmade drainage feature such as a stream, wetland lake, or ditch

Design and Installation Specifications

The receiving channel at the outlet of a culvert shall be protected from erosion by rock lining a minimum of 6 feet downstream and extending up the channel sides a minimum of 1–foot above the maximum tailwater elevation or 1 foot above the crown, whichever is higher For large pipes (more than 18 inches in diameter), the outlet protection lining of the channel is lengthened to four times the diameter of the culvert

- Standard wingwalls, and tapered outlets and paved channels should also be considered when appropriate for permanent culvert outlet protection (See WSDOT Hydraulic Manual available through WSDOT Engineering Publications)
- Organic or synthetic erosion blankets, with or without vegetation, are usually more effective than rock, cheaper, and easier to install Materials can be chosen using manufacturer product specifications ASTM test results are available for most products and the designer can choose the correct material for the expected flow
- With low flows, vegetation (including sod) can be effective
- The following guidelines shall be used for riprap outlet protection
    1. If the discharge velocity at the outlet is less than 5 fps (pipe slope less than 1 percent), use 2 inch to 8 inch riprap Minimum thickness is 1-foot
    2. For 5 to 10 fps discharge velocity at the outlet (pipe slope less than 3 percent), use 24-inch to 4-foot riprap Minimum thickness is 2 feet
    3. For outlets at the base of steep slope pipes (pipe slope greater than 10 percent), an engineered energy dissipater shall be used
- Filter fabric or erosion control blankets should always be used under riprap to prevent scour and channel erosion
- New pipe outfalls can provide an opportunity for low cost fish habitat improvements For example an alcove of low velocity water can be created by constructing the pipe outfall and associated energy dissipater back from the stream edge and digging a channel over widened to the upstream side from the outfall Overwintering juvenile and migrating adult salmonids may use the alcove as shelter during

high flows Bank stabilization, bioengineering, and habitat features may be required for disturbed areas See Volume V for more information on outfall system design

Maintenance Standards

- Inspect and repair as needed
- Add rock as needed to maintain the intended function
- Clean energy dissipater if sediment builds up

BMP C233: Silt Fence

Purpose

Use of a silt fence reduces the transport of coarse sediment from a construction site by providing a temporary physical barrier to sediment and reducing the runoff velocities of overland flow. See Figure 4.19 for details on silt fence construction.

Conditions of Use

Silt fence may be used downslope of all disturbed areas.

- Silt fence is not intended to treat concentrated flows, nor is it intended to treat substantial amounts of overland flow. Any concentrated flows must be conveyed through the drainage system to a sediment pond. The only circumstance in which overland flow can be treated solely by a silt fence, rather than by a sediment pond, is when the area draining to the fence is one acre or less and flow rates are less than 0.5 cfs.
- Silt fences should not be constructed in streams or used in V-shaped ditches. They are not an adequate method of silt control for anything deeper than sheet or overland flow.

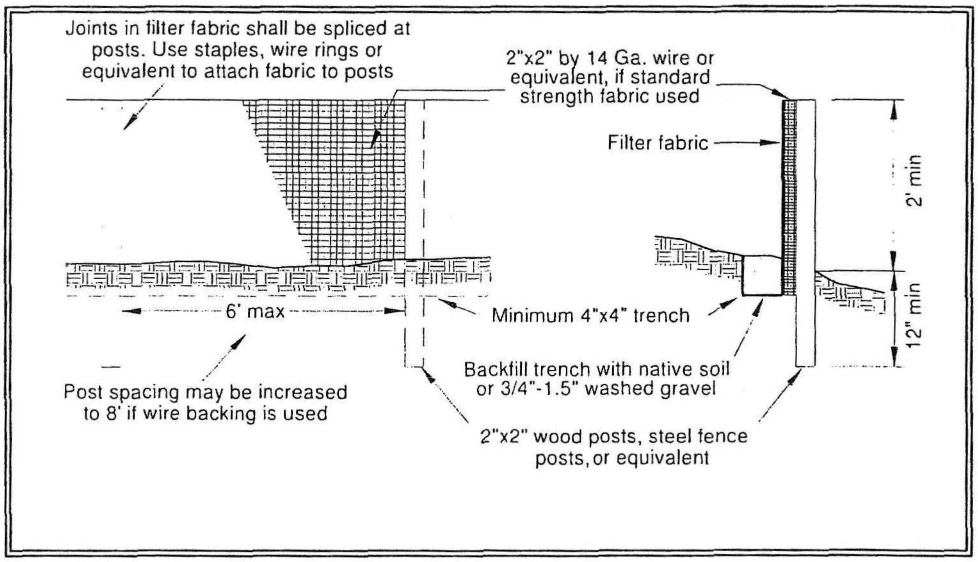


Figure 4.19 – Silt Fence

Design and Installation Specifications

- Drainage area of 1 acre or less or in combination with sediment basin in a larger site.
- Maximum slope steepness (normal (perpendicular) to fence line) 1:1.
- Maximum sheet or overland flow path length to the fence of 100 feet.
- No flows greater than 0.5 cfs.
- The geotextile used shall meet the following standards. All geotextile properties listed below are minimum average roll values (i.e., the test result for any sampled roll in a lot shall meet or exceed the values shown in Table 4.10):

Table 4 10 Geotextile Standards	
Polymeric Mesh AOS (ASTM D4751)	0 60 mm maximum for slit film wovens (#30 sieve) 0 30 mm maximum for all other geotextile types (#50 sieve) 0 15 mm minimum for all fabric types (#100 sieve)
Water Permittivity (ASTM D4491)	0 02 sec^{1} minimum
Grab Tensile Strength (ASTM D4632)	180 lbs Minimum for extra strength fabric 100 lbs minimum for standard strength fabric
Grab Tensile Strength (ASTM D4632)	30% maximum
Ultraviolet Resistance (ASTM D4355)	70% minimum

- Standard strength fabrics shall be supported with wire mesh chicken wire, 2-inch x 2 inch wire safety fence, or jute mesh to increase the strength of the fabric Silt fence materials are available that have synthetic mesh backing attached
- Filter fabric material shall contain ultraviolet ray inhibitors and stabilizers to provide a minimum of six months of expected usable construction life at a temperature range of 0°F to 120°F
- 100 percent biodegradable silt fence is available that is strong, long lasting, and can be left in place after the project is completed, if permitted by local regulations
- Standard Notes for construction plans and specifications follow Refer to Figure 4 19 for standard silt fence details

  The contractor shall install and maintain temporary silt fences at the locations shown in the Plans The silt fences shall be constructed in the areas of clearing, grading, or drainage prior to starting those activities A silt fence shall not be considered temporary if the silt fence must function beyond the life of the contract The silt fence shall prevent soil carried by runoff water from going beneath, through, or over the top of the silt fence but shall allow the water to pass through the fence

  The minimum height of the top of silt fence shall be 2 feet and the maximum height shall be 2½ feet above the original ground surface

  The geotextile shall be sewn together at the point of manufacture or at an approved location as determined by the Engineer to form geotextile lengths as required All sewn seams shall be located at a support post Alternatively, two sections of silt fence can be overlapped provided the Contractor can demonstrate, to the satisfaction of the Engineer that the overlap is long enough and that the adjacent fence sections are close enough together to prevent silt laden water from escaping through the fence at the overlap

The geotextile shall be attached on the up slope side of the posts and support system with staples, wire, or in accordance with the manufacturer s recommendations The geotextile shall be attached to the posts in a manner that reduces the potential for geotextile tearing at the staples, wire, or other connection device Silt fence back up support for the geotextile in the form of a wire or plastic mesh is dependent on the properties of the geotextile selected for use If wire or plastic back-up mesh is used, the mesh shall be fastened securely to the up-slope of the posts with the geotextile being up slope of the mesh back up support

The geotextile at the bottom of the fence shall be buried in a trench to a minimum depth of 4 inches below the ground surface The trench shall be backfilled and the soil tamped in place over the buried portion of the geotextile, such that no flow can pass beneath the fence and scouring can not occur When wire or polymeric back up support mesh is used, the wire or polymeric mesh shall extend into the trench a minimum of 3 inches

The fence posts shall be placed or driven a minimum of 18 inches A minimum depth of 12 inches is allowed if topsoil or other soft subgrade soil is not present and a minimum depth of 18 inches cannot be reached Fence post depths shall be increased by 6 inches if the fence is located on slopes of 3 1 or steeper and the slope is perpendicular to the fence If required post depths cannot be obtained, the posts shall be adequately secured by bracing or guying to prevent overturning of the fence due to sediment loading

Silt fences shall be located on contour as much as possible, except at the ends of the fence, where the fence shall be turned uphill such that the silt fence captures the runoff water and prevents water from flowing around the end of the fence

If the fence must cross contours, with the exception of the ends of the fence, gravel check dams placed perpendicular to the back of the fence shall be used to minimize concentrated flow and erosion along the back of the fence The gravel check dams shall be approximately 1 foot deep at the back of the fence It shall be continued perpendicular to the fence at the same elevation until the top of the check dam intercepts the ground surface behind the fence The gravel check dams shall consist of crushed surfacing base course, gravel backfill for walls, or shoulder ballast The gravel check dams shall be located every 10 feet along the fence where the fence must cross contours The slope of the fence line where contours must be crossed shall not be steeper than 3 1

Wood steel or equivalent posts shall be used Wood posts shall have minimum dimensions of 2 inches by 2 inches by 3 feet minimum length and shall be free of defects such as knots splits or gouges

Steel posts shall consist of either size No 6 rebar or larger, ASTM A 120 steel pipe with a minimum diameter of 1-inch, U, T, L or C shape steel posts with a minimum weight of 1 35 lbs /ft or other steel posts having equivalent strength and bending resistance to the post sizes listed The spacing of the support posts shall be a maximum of 6 feet

Fence back up support, if used, shall consist of steel wire with a maximum mesh spacing of 2 inches, or a prefabricated polymeric mesh The strength of the wire or polymeric mesh shall be equivalent to or greater than 180 lbs grab tensile strength The polymeric mesh must be as resistant to ultraviolet radiation as the geotextile it supports

- Silt fence installation using the slicing method specification details follow Refer to Figure 4 20 for slicing method details

  The base of both end posts must be at least 2 to 4 inches above the top of the silt fence fabric on the middle posts for ditch checks to drain properly Use a hand level or string level, if necessary to mark base points before installation

  Install posts 3 to 4 feet apart in critical retention areas and 6 to 7 feet apart in standard applications

  Install posts 24 inches deep on the downstream side of the silt fence, and as close as possible to the fabric enabling posts to support the fabric from upstream water pressure

  Install posts with the nipples facing away from the silt fence fabric

  Attach the fabric to each post with three ties all spaced within the top 8 inches of the fabric Attach each tie diagonally 45 degrees through the fabric, with each puncture at least 1 inch vertically apart In addition, each tie should be positioned to hang on a post nipple when tightening to prevent sagging

  Wrap approximately 6 inches of fabric around the end posts and secure with 3 ties

  No more than 24 inches of a 36 inch fabric is allowed above ground level

  The rope lock system must be used in all ditch check applications

  The installation should be checked and corrected for any deviation before compaction Use a flat-bladed shovel to tuck fabric deeper into the ground if necessary

  Compaction is vitally important for effective results Compact the soil immediately next to the silt fence fabric with the front wheel of the tractor skid steer or roller exerting at least 60 pounds per square inch Compact the upstream side first and then each side twice for a total of four trips

Maintenance Standards

- Any damage shall be repaired immediately.
- If concentrated flows are evident uphill of the fence, they must be intercepted and conveyed to a sediment pond.
- It is important to check the uphill side of the fence for signs of the fence clogging and acting as a barrier to flow and then causing channelization of flows parallel to the fence. If this occurs, replace the fence or remove the trapped sediment.
- Sediment deposits shall either be removed when the deposit reaches approximately one-third the height of the silt fence, or a second silt fence shall be installed.
- If the filter fabric (geotextile) has deteriorated due to ultraviolet breakdown, it shall be replaced.

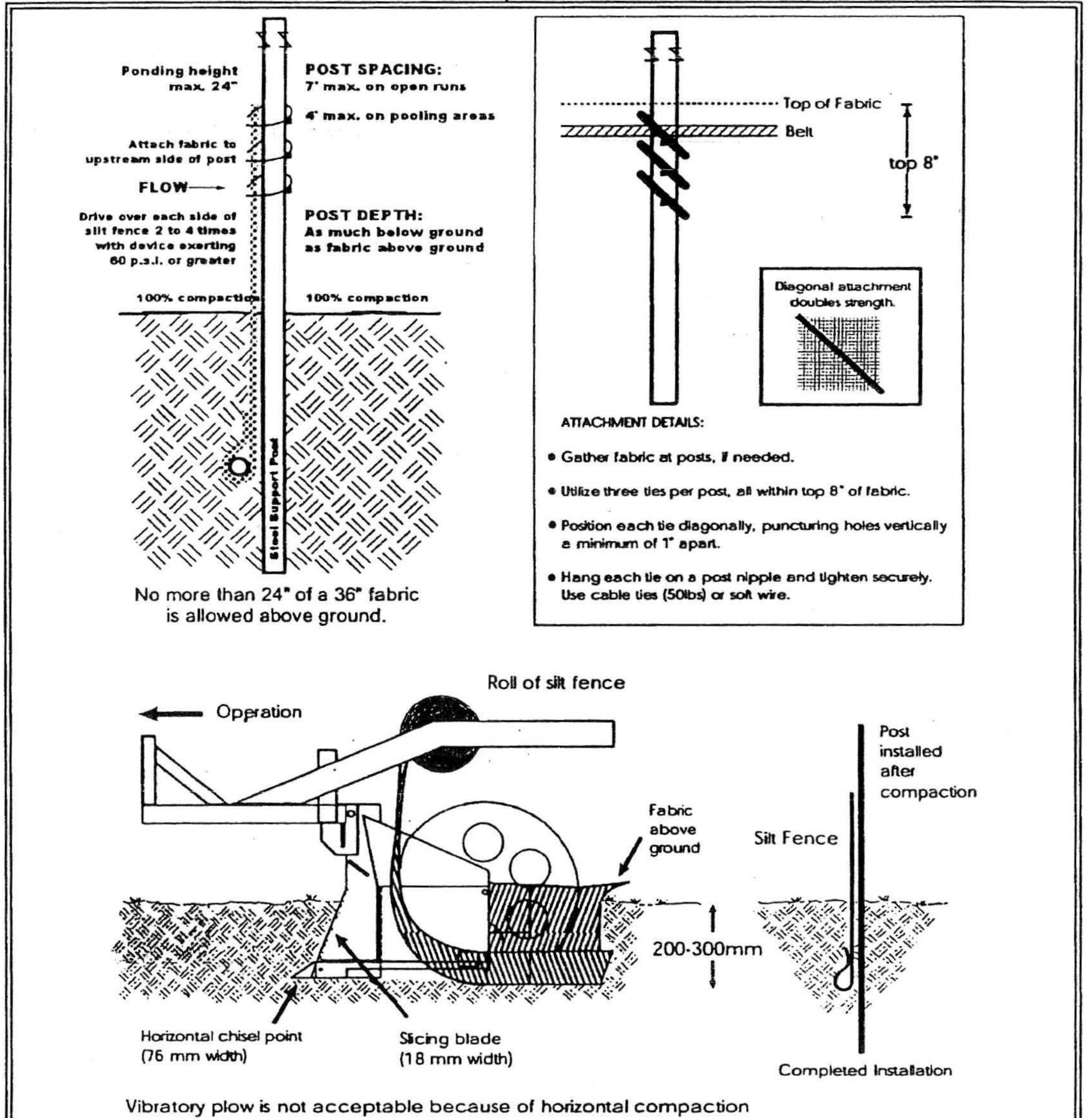


Figure 4.20 – Silt Fence Installation by Slicing Method

APPENDIX E

MATERIAL SAFETY DATA SHEETS

MATERIAL SAFETY DATA SHEET
USG ENVIRO-SHIELD™ Brand Bonded Fiber Matrix

United States Gypsum Company
125 South Franklin Street
Chicago Illinois 60606 4678
A Subsidiary of USG Corporation

Product Safety 1 (800) 507 8899
www usg com
Version Date December 21 2004
Version 1

SECTION 1
CHEMICAL PRODUCT AND IDENTIFICATION

PRODUCT(S) USG ENVIRO SHIELD™ Bonded Fiber Matrix
CHEMICAL FAMILY Paper and Wood Fibers Calcium Sulfate Hemihydrate ($CaSO_4 \bullet ½H_2O$) and Guar Gum

SECTION 2
COMPOSITION, INFORMATION ON INGREDIENTS

MATERIAL	WT%	TLV (mg/m^3)	PEL(mg/m^3)	CAS NUMBER
Cellulosic Fiber (Paper/ Soft Wood)	<75	10	15(T)/5(R)	9004-34-6
Plaster of Paris (CaSO4•½H2O)	>20	10	15(T)/5(R)	26499-65-0
Guar Gum	<5	10	15(T)/5(R)	7783-20-2
Crystalline Silica	<1	0 05(R)	0 1(R)	14808-60-7

(T) – Total (R) – Respirable (NE) – Not Established
Respirable crystalline silica IARC Group 1 carcinogen NTP Known human carcinogen The weight percent of crystalline silica given represents total quartz and not the respirable fraction Testing of dust from USG plaster of pans has not detected respirable crystalline silica

FDA Food and Drug Administration [CFR Title 21 v 3 sec 184 1230] – Calcium Sulfate is Generally Recognized as Safe (GRAS)

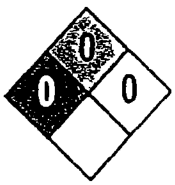
FDA Food and Drug Administration [CFR Title 21 v 3 sec 184 1339] – Guar Gum is Generally Recognized as Safe (GRAS)

All ingredients of this product are included in the U S Environmental Protection Agency s Toxic Substances Control Act Chemical Substance Inventory All components of this product are included in the Canadian Domestic Substances List (DSL)

SECTION 3
HAZARD IDENTIFICATION

INFORMATION FOR HANDLING AND IDENTIFICATION OF CHEMICAL HAZARDS

NFPA Ratings	
Health	0
Fire	0
Reactivity	0



HIMS Ratings	
Health	*0
Fire	0
Reactivity	1

HEALTH	*	0
FLAMMABILITY		0
PHYSICAL HAZARD		1
PERSONAL PROTECTION		E

0 = Minimal Hazard
1 = Slight Hazard
2 = Moderate Hazard
3 = Senous Hazard
4 = Severe Hazard

Personal Protection Use eye and skin protection Use NIOSH/MSHA approved respiratory protection when necessary
*Respirable crystalline silica can cause lung disease and/or cancer E – Safety glasses gloves and dust respirator

EMERGENCY OVERVIEW
This product is not expected to produce any unusual hazards dunng normal use Exposure to high dust levels may irritate the skin eyes nose throat or upper respiratory tract When mixed with water this material hardens and becomes very hot – sometimes quickly **DO NOT** attempt to make a cast enclosing any part of the body using this material

MATERIAL SAFETY DATA SHEET
USG ENVIRO-SHIELD™ Brand Bonded Fiber Matrix

SECTION 3 HAZARD IDENTIFICATION (continued)

POTENTIAL HEALTH EFFECTS

ACUTE

Eyes Direct contact can cause mechanical irritation of eyes If burning redness itching pain or other symptoms persist or develop consult physician

Skin When mixed with water this material hardens and becomes very hot – sometimes quickly **DO NOT** attempt to make a cost enclosing any part of the body using this matenal Failure to follow these instructions can cause severe burns that may require surgical removal of affected tissue or amputation of limb Direct prolonged or repeated contact with the skin may cause irritation Rinse with water until skin is free of matenal to avoid irritation then wash skin thoroughly with mild soap and water Repeated exposure may dry skin

Inhalation Dust exposures generated dunng the handling of the product may irritate eyes skin nose throat and upper respiratory tract Persons subjected lo large amounts of this dust will be forced to leave area because of nuisance conditions such as coughing sneezing and nasal irritation Labored breathing may occur after excessive inhalation Occupational asthma has been reported for workers in the industnal production of guar gum If respiratory symptoms persist consult physician

Ingestion Guar gum is a natural food additive although direct use in food in powder or pill form is banned by the FDA due to the risk of respiratory or gastrointestinal blockage Swallowing small amounts of powder could result in the material swelling in throat possibly causing blockage of the throat and choking Plaster of pans may also cause gastnc disturbances if swallowed Plaster of pans is non toxic however ingestion of a sufficient quantity could lead to mechanical obstruction of the gut especially the pylonc region See First Aid Measures Ingestion (Section 4)

CHRONIC

Raw guar contains natural proteins that can cause allergic reactions such as asthma and rhinitis Processed guar such as this product contains far less protein and therefore has a lower risk of sensitization Occupational asthma has been reported for workers in the industnal production of guar gum

Inhalation Testing of dust from USG plaster of pans has not detected respirable crystalline silica Exposures to respirable crystalline silica are not expected dunng the normal use of this product however actual levels must be determined by workplace hygiene testing The weight percent of respirable crystalline silica has not been measured in this product

The wood fiber in this product is from a soft wood pnmarily pine Wood dust depending on species (including pine) may cause respiratory sensitization

Prolonged and repeated exposure to airborne free respirable crystalline silica can result in lung disease (i e silicosis) and/or lung cancer The development of silicosis may increase the nsks of additional health effects The risk of developing silicosis is dependent upon the exposure intensity and duration

Skin The wood fiber in this product is from a soft wood pnmanly pine Wood dust depending on species (including pine) may cause irritation and/or dermatitis on prolonged repetitive contact

Repeated contact to plaster of pans may dry the skin causing cracking or dermatitis Sensitive individuals may develop an allergic dermatitis

Eyes No known effects

Ingestion No known effects

TARGET ORGANS Eyes skin and respiratory system

PRIMARY ROUTES OF ENTRY Inhalation eyes and skin contact

SECTION 4
FIRST AID MEASURES

FIRST AID PROCEDURES

Eyes Flush thoroughly with water for 15 minutes If irritation persists consult physician

Skin Wash with mild soap and water A commercially available hand lotion may be used to treat dry skin areas If skin has become cracked take appropriate action to prevent infection and promote healing If irritation persists consult physician

SECTION 4 FIRST AID MEASURES (continued)

Inhalation Remove to fresh air Leave the area of dust exposure and remain away until coughing and other symptoms subside Assure that the victim is breathing If breathing is difficult administer oxygen if available If victim is not breathing administer CPR (cardiopulmonary resuscitation) Seek medical attention

Ingestion This product is not intended to be ingested or eaten Swallowing small amounts of powder could result in the matenal swelling in throat possibly causing blockage of the throat and choking If the victim is conscious and alert give 1 2 glasses of water to dnnk to prevent esophageal obstruction Do not give anything by mouth to an unconscious person Seek medical attention Do not leave victim unattended If gastric disturbance occurs call physician This product contains gypsum plaster Plaster of pans hardens and if ingested may result in obstruction of the gut especially the pylonc region

MEDICAL CONDITIONS WHICH MAY BE AGGRAVATED Pre existing upper respiratory and lung diseases such as but not limited to bronchitis emphysema and asthma Pre existing skin diseases such as but not limited to rashes and dermatitis

Notes to Physician Treatment should be directed at the control of symptoms and the clinical condition

SECTION 5
FIRE FIGHTING MEASURES

General Fire Hazards	Greater than 200°F non combustible at standard temperature pressure difficult to ignite		
Extinguishing Media	Water or use extinguishing media appropriate for surrounding fire		
Special Fire Fighting Procedures	Wear appropnate personal protective equipment (See section 8)		
Unusual Fire and Explosion Hazards	None		
Hazardous Combustion Products	Above 1450° C decomposes to calcium oxide (CaO) and sulfur dioxide (SO_2)		
Flash Point	None Known	Auto Ignition	Not Applicable
Method Used	Not Applicable	Flammability Classification	Not Applicable may act as a fire retardant
Upper Flammable Limit (UFL)	Not Applicable		
Lower Flammable Limit (LFL)	Not Applicable	Rate of Burning	Not Applicable

SECTION 6
ACCIDENTAL RELEASE MEASURES

CONTAINMENT

No special precautions Wear appropnate personal protection (See Section 8)

CLEAN UP

Use normal clean up procedures If dry shovel or sweep up material from spillage and place collected matenal into a container for recovery or waste disposal Avoid dust generation Avoid inhalation of dust and contact with eyes and skin Wear appropriate protective equipment Maintain proper ventilation If vacuum is used to collect dust use an industrial vacuum cleaner with a high efficiency air filter If sweeping is necessary use dust suppressant Do not use compressed air for clean up These procedures will help minimize potential exposures If washed down may plug drains If already mixed with water scrape up and place in container

DISPOSAL

Follow all local state provincial and federal regulations Never discharge large releases directly into sewers or surface waters Slurry may plug drains Trace amounts of residue can be flushed to a drain using plenty of water

MATERIAL SAFETY DATA SHEET
USG ENVIRO-SHIELD™ Brand Bonded Fiber Matrix

SECTION 7
HANDLING AND STORAGE

HANDLING

Avoid dust contact with eyes Wear the appropriate eye protection against dust (See Section 8)

Avoid breathing dust Wear the appropnate respiratory protection against dust in poorly ventilated areas and if TLV is exceeded (see Sections 2 and 8)

Minimize dust generation and accumulation Use good safety and industnal hygiene practices

Guar gum is a known dust explosion hazard Guar gum comprises less than 5% of this product the explosion hazard of this product has not been evaluated

STORAGE

Store in a cool dry ventilated area away from sources of heat moisture and incompatibilities (see Section 10)

Dew point conditions or other conditions causing presence of liquid will harden this material during storage

Protect product bags or containers from physical damage and weather

Keep bags or other containers tightly closed to prevent moisture contact

SECTION 8
EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING CONTROLS

Provide ventilation sufficient to control airborne dust levels especially respirable crystalline silica

If user operations generate airborne dust use ventilation to keep dust concentrations below permissible exposure limits (See Section 2)

Where general ventilation is inadequate use process enclosures local exhaust ventilation or other engineenng controls to control dust levels below permissible exposure limits (see Section 2) If engineenng controls are not possible wear a properly fitted NIOSH/MSHA approved particulate respirator

RESPIRATORY PROTECTION

Wear a NIOSH/MSHA approved respirator equipped with particulate cartridges when dusty in poorly ventilated areas and if TLV is exceeded A respiratory program that meets OSHA s 29 CFR 1910 134 and ANSI Z88 2 requirements must be followed whenever workplace conditions warrant a respirator s use

OTHER PERSONAL PROTECTIVE EQUIPMENT

Eye/Face Wear eye protection (safety glasses or goggles) to avoid possible eye irritation

Skin Wear gloves and protective clothing to prevent repeated or prolonged skin contact Barrier creams or skin lotion may be applied to face neck wrist and hands when skin is exposed to help prevent drying of skin

General Selection of Personal Protective Equipment will depend on environmental working conditions and operations

SECTION 9
PHYSICAL AND CHEMICAL PROPERTIES

Appearance	Tan grayish-green	Viscosity	Not Applicable
Physical State	Solid (mulched)	Solubility (H2O)	Insoluble will disperse in water
Odor	Low to no odor	Boiling Point	Not Applicable
pH @ 25 ° C	~7	Melting Pomt	Not Applicable
Particle Size	Vanes	Softening Point	Not Applicable
Molecular Weight	Mixture	Freezing Point	Not Applicable
Bulk Density	~ 0 97 g/cm	Vapor Density (Air = 1)	Not Applicable
Specific Gravity (H_20 = 1)	Not Determined	Vapor Pressure (mm Hg)	Not Applicable
Percent Volatile	None	Evaporation Rate (BuAc = 1)	Not Applicable
VOC Content	None		

SECTION 10
CHEMICAL STABILITY AND REACTIVITY

STABILITY	Stable in dry environments Dew point conditions or other conditions causing presence of liquid will harden this material
CONDITIONS TO AVOID	Contact with acids water high humidity and incompatibles Dusting conditions extreme heat open flame and sparks
INCOMPATIBILITY	Acids Exposure to water and acids must be supervised because the reactions are vigorous and produce large amounts of heat
HAZARDOUS POLYMERIZATION	Will not occur
HAZARDOUS DECOMPOSITION	Above 1450° C calcium oxide (CaO) and sulfur dioxide SO_2

SECTION 11
TOXICOLOGICAL INFORMATION

ACUTE EFFECTS

The sulfate ion has caused gastro intestinal disturbance in humans following large oral doses

Limited studies involving the repeated inhalation of an (unspecified) calcium sulfate failed to identify any particular target organs in monkeys rats and hamsters

No evidence of mutagenicity was found in Ames bacterial tests

Plaster of paris	Oral LD50 rat > 5000 mg/kg
	Dermal LD50 – None Determined
	Skin Irritation LD50 – None Determined
	Eye Irritation LD50– None Determined

LD_{50} Not Available for product
LC_{50} Not Available for product

CHRONIC EFFECTS / CARCINOGENICITY

Wood dusts The wood fiber in this product is from a soft wood primarily pine Wood dust depending on species (including pine) may cause respiratory sensitization irritation and/or dermatitis on prolonged repetitive contact

Crystalline silica Testing of dust from USG plaster of paris has not detected respirable crystalline silica Exposures to respirable crystalline silica are not expected during the normal use of this product however actual levels must be determined by workplace hygiene testing The weight percent of respirable crystalline silica has not been measured in this product

Prolonged and repeated exposure to airborne free respirable crystalline silica can result in lung disease (i e silicosis) and/or lung cancer The development of silicosis may increase the risks of additional health effects The risk of developing silicosis is dependent upon the exposure intensity and duration

In June 1997 IARC classified crystalline silica (quartz and cristobalite) as a human carcinogen In making the overall evaluation the IARC Working Group noted that carcinogenicity in humans was not detected in all industrial circumstances studied Carcinogenicity may be dependent on inherent characteristics of the crystalline silica or on external factors affecting its biological activity or distribution of its polymorphs

IARC states that crystalline silica inhaled in the form of quartz or cristobalite from occupational sources is carcinogenic to humans (Group 1)

Nonylphenol Ethoxylates Nonyl phenol ethoxylate is an alkylphenol ethoxylate and this group of chemicals has come under increasing scrutiny as possible endocrine disrupters in wildlife In laboratory tests nonylphenol ethoxylate (NPE) and its break down ethoxylates disrupt the endocrine systems of fish birds and mammals They cause feminization and demasculinization of male fish causing them to synthesize egg yolk protein They caused a reduction in testicular size in rainbow trout They also caused proliferation of estrogen sensitive human breast tumor cells Trace amounts of 1 4 dioxane ethylene oxide acetaldehyde and formaldehyde may be associated with the production of nonylphenol ethoxylate Any exposure to these substances is expected to remain well below OSHA regulatory and ACGIH recommended limits during normal handling and use of this product

SECTION 12
ECOLOGICAL INFORMATION

ENVIRONMENTAL TOXICITY This product has no known adverse effect on ecology
Ecotoxicity value Not determined

SECTION 13
DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHOD
Dispose of matenal in accordance with federal state and local regulations Never discharge directly into sewers or surface waters Consult with environmental regulatory agencies for guidance on acceptable disposal practices Slurry may plug drains

SECTION 14
TRANSPORT INFORMATION

U S DOT INFORMATION	Not a hazardous matenal per DOT shipping requirements Not classified or regulated
Shipping Name	Same as product name
Hazard Class	Not classified
UN/NA #	None Not classified
Packing Group	None
Label (s) Required	Not applicable
GGVSec/MDG-Code	Not classified
ICAO/IATA DGR	Not applicable
RID/ADR	None
ADNR	None

SECTION 15
REGULATORY INFORMATION

UNITED STATES REGULATIONS
All ingredients of this product are included in the U S Environmental Protection Agency s Toxic Substances Control Act Chemical Substance Inventory

MATERIAL	WT%	302	304	313	CERCLA	CAA Sec 112	RCRA Code
Cellulosic Fiber (Paper/ Soft Wood)	<75	NL	NL	NL	NL	NL	NL
Plaster of Paris ($CaSO_4 \bullet ½H_2O$)	>20	NL	NL	NL	NL	NL	NL
Guar Gum	<5	NL	NL	NL	NL	NL	NL
Crystalline Silica	<1	NL	NL	NL	NL	NL	NL

Key NL = Not Listed
SARA Title III Section 302 (EPCRA) Extremely Hazardous Substances Threshold Planning Quantity (TPQ)
SARA Title III Section 304 (EPCRA) Extremely Hazardous Substances Reportable Quantity (RQ)
SARA Title III Section 313 (EPCRA) Toxic Chemicals X= Subject to reporting under section 313
CERCLA Hazardous Substances Reportable Quantity (RQ)
CAA Section 112 (r) Regulated Chemicals for Accidental Release Prevention Threshold Quantities(TQ)
RCRA Hazardous Waste RCRA hazardous waste code

SECTION 15 REGULATORY INFORMATION (continued)

Food and Drug Administration [CFR Title 21 v 3 sec 184 1230] – Calcium Sulfate is Generally Recognized as Safe (GRAS)

Food and Drug Administration [CFR Title 21 v 3 sec 184 1339] – Guar Gum is Generally Recognized as Safe (GRAS)

CANADIAN REGULATIONS

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations All components of this product are included in the Canadian Domestic Substances List (DSL)

MATERIAL	WT%	IDL Item #	WHMIS Classification
Cellulosic Fiber (Paper/ Soft Wood)	<75	Not Listed	Not Listed
Plaster of Paris ($CaSO_4 \cdot ½H_2O$)	>20	Not Listed	Not Listed
Guar Gum	<5	Not Listed	Not Listed
Crystalline Silica	<1	1406	D2A

IDL Item# Canadian Hazardous Products Act – Ingredient Disclosure List Item #

WHMIS Classification Workplace Hazardous Material Information System

CARCINOGENICITY CLASSIFICATION OF INGREDIENT(S) All substances listed are associated with the nature of the raw materials used in the manufacture of this product and are not independent components of the product formulation All substances if present are at levels well below regulatory limits See Section 11 Toxicology Information for detailed information

MATERIAL	IARC	NTP	ACGIH	CAL 65
Respirable Crystalline Silica	1	1	A2	Listed
1 4 Dioxane	2B	2	A3	Listed
Ethylene Oxide	1	1	A2	Listed
Acetaldehyde	2B	2	A3	Listed
Formaldehyde	1	2	A2	Listed

See Section 11 Toxicology Information for detailed information

IARC – International Agency for Research on Cancer (World Health Organization)

1 Carcinogenic to humans

2A – Probably carcinogenic to humans

2B – Possibly carcinogenic to humans

3 Not classifiable as a carcinogen

4 – Probably not a carcinogen

NTP – National Toxicology Program (Health and Human Services Dept Public Health Service NIH/NIEHS)

1 Known to be carcinogen

2 Anticipated to be carcinogens

ACGIH – American Conference of Governmental Industrial Hygienists

A1 – Confirmed human carcinogen

A2 – Suspected human carcinogen

A3 – Animal carcinogen

A4 Not classifiable as a carcinogen

A5 – Not suspected as a human carcinogen

CAL 65 – California Proposition 65 Chemicals known to the State of California to Cause Cancer

MATERIAL SAFETY DATA SHEET
USG ENVIRO-SHIELD™ Brand Bonded Fiber Matrix

SECTION 16
OTHER INFORMATION

Label Information

ΔWARNING!

When mixed with water this material hardens and becomes very hot – sometimes quickly DO NOT attempt to make a cost enclosing any part of the body using this material Failure to follow these instructions can cause severe burns that may require surgical removal of affected tissue or amputation of limb
Dust created from product may cause eye skin nose throat or upper respiratory irritation Occupational asthma has been reported for workers in the industrial production of guar gum Avoid inhalation of dust and eye contact Use in a well ventilated area Wear a NIOSH/MSHA approved respirator when dusty Use proper ventilation to reduce dust exposure Wear eye protection If eye contact occurs flush thoroughly with water for 15 minutes If irritation persists call physician Wash thoroughly with soap and water after use Do not ingest If ingested call physician
Product safety information (800) 507-8899 or www usg com
KEEP OUT OF REACH OF CHILDREN

Key/Legend

TLV	Threshold Limit Value
PEL	Permissible Exposure Limit
CAS	Chemical Abstracts Service (Registry Number)
NIOSH	National Institute for Occupational Safety and Health
MSHA	Mine Safety and Health Administration
OSHA	Occupational Health and Safety Administration
ACGIH	American Conference of Governmental Industrial Hygienists
IARC	International Agency for Research on Cancer
DOT	United States Department of Transportation
EPA	United States Environmental Protection Agency
NFPA	National Fire Protection Association
HMIS	Hazardous Materials Identification System
PPE	Personal Protection Equipment
TSCA	Toxic Substances Control Act
DSL	Canadian Domestic Substances List
NDSL	Canadian Non Domestic Substances List
SARA	Superfund Amendments and Reauthorization Act of 1986
CAA	Clean Air Act
EPCRA	Emergency Planning & Community Right to know Act
RCRA	Resource Conservation and Recovery Act
CERCLA	Comprehensive Environmental Response Compensation and Liability Act of 1980
UN/NA#	United Nations/North America number
CFR	Code of Federal Regulations
WHMIS	Workplace Hazardous Material Information System

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END

APPENDIX F

A SUMMARY OF ENVIRONMENTAL REGULATIONS REQUIRING IMMEDIATE TO WITHIN 24 HOUR NOTIFICATION AND CONTACT INFORMATION

A Summary of Utah State and Federal Hazardous Substance/Waste/Material Environmental Regulations Requiring Immediate to Within 24 Hour Notification of Utah DEQ or EPA

Regulation	When Required	Information Required	Notify Whom	Oral Notice Time	Phone Numbers	Written Notice Time
Air Quality						
R307-107.2	Air pollution control equipment breakdown > 2 hrs	Not specified	Div. of Air Quality.	3-18 hrs	536-4000 536-4123 (off hours)	7 days
40 CFR 58	Air pollution control malfunction	Not specified	State	24 hours	536-4000 536-4123 (off hours)	14 days
40 CFR 59	Monitoring system malfunctions	Not specified	State Air Program Director.	24 hours	536-4000 536-4123 (off hours)	14 days
40 CFR 52	When in violation of National Ambient Air Quality Standards	Not specified	State Air Program Director	24 hours	536-4000 536-4123 (off hours)	
Hazardous Waste/Material/Substance						
R315-9-1(b)	Spill of one kilogram of "acutely hazardous waste", which includes: 1. "P" wastes, 2. F999 wastes (chemical warfare agents), and 3. "F" wastes with a hazard code of "H" (identified in 40 CFR 261.31 and includes wastes from the production or use of chlorphenols and chlorobenzenes). Spill of 100 kilograms of other hazardous waste. Notify for a spill of a lesser quantity if there is a potential threat to human health or the environment.	Name, phone number, and address of responsible party. Name, title and phone of person reporting. Time and date of the spill. Spill location. Nearest town, city, highway or waterway. Waste description and amount. Cause. Extent of injuries. Potential hazards to human health or the environment. Estimated quantity and disposition of recovered material.	Div. of Solid & Hazardous Waste	Immediately	538-6170 536-4123 (off hours)	15 days
40 CFR 263.30	When a transporter spills a hazardous waste, immediate action must be taken to protect the environment, including notification of local authorities.	Not specified	Div. of Solid & Hazardous Waste	Immediately	538-6170 536-4123 (off hours)	
CERCLA 103	Any CERCLA listed substance spilled over the reportable quantity into the environment.	Name, phone number, and address of responsible party; name, title and phone of person reporting; time and date of the spill; spill location; nearest town, city, highway or waterway; waste description and amount; cause; action taken.	NRC	Immediately	1-800-424-8802	
40 CFR 302.6	Discharge of a hazardous substance in quantities greater than the reportable quantity over 24 hours	Not specified	NRC	Immediately	1-800-424-8802	

This brief summary is meant to be used for general information only, may not include all regulatory reporting requirements, and does not contain the detail in the actual text.
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Hazardous Waste/Material/Substance Continued						
Regulation	When Required	Information Required	Notify Whom	Oral Notice Time	Phone Numbers	Written Notice Time
49 CFR 171.15 49 CFR 195.52	Hazardous materials release (as defined by DOT in 29 CFR 171.8) causes death, serious injury, major property damage, evacuation, closure of a major highway, aircraft flight path altered, pollution of a water body, release of infectious substance, or continuing danger to life	Reporter name and phone number, name and address of carrier, incident date, time and location, extent of injuries, classification, name and quantity of hazardous materials involved, type of incident and nature of hazardous materials involvement, whether a continuing danger to life exists.	NRC	earliest practicable moment	1-800-4248802	30 days (see 49 CFR 171.16 for details)
EPCRA 304 40 CFR 355.40	Release of "Extremely Hazardous Substance" or CERCLA substance, over the RQ, exposing persons outside the facility boundaries	Chemical name, quantity, release time and duration, health risks, medical advice, precautions, contact names and phone numbers	LEPC SERC	Immediately	Various 536-4123 (24 hours)	As soon as practicable
R315-8-4.7(a) R315-7-11.7(a)	Any imminent or actual emergency at a hazardous waste Treatment, Storage or Disposal (TSD) permitted facility	Facility name, address, EPA ID number; Incident date, time and type. Quantity of waste. Injuries.	DEQ, federal OSC, State and local response agencies	Immediately		15 days
40 CFR 264.56/ 265.56 40 CFR 279.52	Imminent or actual emergency situation at a TSD or used oil processor or used oil refiner facility	Facility name, address, EPA ID number. Incident date, time and type. Quantity of waste. Injuries. Possible hazards to human health or the environment outside the facility.	State and local response agencies, NRC	Immediately	1-800-424-8802	15 days
40 CFR 262.34 40 CFR 264.56	When a fire, explosion or other release at a hazardous waste generator or TSD facility could threaten human health outside the facility, or when the spill has reached surface water	Facility name, address, EPA ID number Incident date, time and type. Quantity of waste Injuries. Quantity of recovered materials. Possible hazards to human health or the environment outside the facility.	NRC	Immediately	1-800-424-8802	15 days
R315-8-4.7(d) R315-7-11.7(d)	When a fire, explosion or other release at a hazardous waste TSD facility could threaten human health or the environment outside the facility	Name and phone number of reporter. Facility name, address. Incident date, time and type. Name and quantity of waste. Injuries. Human health or environmental hazards.	DEQ Federal OSC NRC	Immediately	538-4170 1-303-293-1788 1-800-424-8802	5 days
R315-3-10(i)(6) 40 CFR 270.30	Any TSD permittee noncompliance which may endanger health or the environment	Releases of hazardous waste that may cause endangerment to public drinking water systems. Information on releases of hazardous waste or fire or explosions which could threaten the environment or human health outside the facility. Name and phone number of reporter. Facility name, address. Incident date, time and type. Name and quantity of waste. Injuries. Description of occurrence. Human health or environmental hazards. Estimated quantity and disposition of recovered material.	Div of Solid & Hazardous Waste	24 hours	536-6170	5 days

Hazardous Waste/Material/Substance Continued						
Regulation	When Required	Information Required	Notify Whom	Oral Notice Time	Phone Numbers	Written Notice Time
40 CFR 264.196(d) 265.196(d) R315-8-10 R315-7-12	When a hazardous waste disposal facility discovers a tank or secondary containment system leak	Not specified	EPA administrator Div of Solid & Hazardous Waste	24 hours	1-303-293-1788 538-6170	
40 CFR 761.125	When PCB contaminated material contaminates surface water, sewers, drinking water, grazing lands or vegetable gardens.	Not specified	EPA Region	24 hours	1-303-293-1788	
40 CFR 302.6	Release of PCB's into the environment in amounts greater than 1 pound.	Not specified	NRC	Immediately	1-800-424-8802	
R315-303-5(7)(c)	When a landfill operator discovers receipt of a hazardous waste or PCB contaminated waste	Not specified	Div of Solid & Hazardous Waste, Hauler, Generator	24 hours	538-6170 536-4123 (off hours)	
R315-303-4-(5)	When methane levels at a landfill exceed state limits in R315-303(2)(a)	Not specified	Div. of Solid & Hazardous Waste	Immediately	538-6170 536-4123 (off hours)	
40 CFR 258.23	When methane levels at a landfill exceed specified federal limits.	Not specified	State Director	Immediately	538-6170 536-4123 (off hours)	
Radioactive Materials						
R313-38-77(2)(b)	If a sealed radiation source or device containing radioactive material is damaged, or if contamination is detected at the surface after the source is used in a subsurface tracer study.	Circumstances of the loss and request approval of abandonment procedures	Div of Rad. Control	Immediately	536-4250 536-4123 (off hours)	
R313-38-77(5)(b)	If radioactive material has been lost in or to an underground potable water source.	Well location. Magnitude and extent of radioactive material loss. Consequences of such loss. Efforts being taken to mitigate these consequences.	Div of Rad. Control	Immediately	536-4250 536-4123 (off hours)	
R313-32-33(1)	Misadministration of a radioactive material in a therapy procedure	Not specified	Div of Rad. Control	24 hours	536-4250 536-4123 (off hours)	
R313-15-1202(1)	Event involving a radioactive material which caused or threatens to cause a specified exposure or specified amount of property damage	Not specified	Div. of Rad. Control	Immediately	536-4250 536-4123 (off hours)	

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Revised July 2000

Radioactive Materials Continued						
Regulation	When Required	Information Required	Notify Whom	Oral Notice Time	Phone Numbers	Written Notice Time
R313-15-1202(2)	Loss of licensed or registered source of radiation that may have caused or threatens to cause a specified exposure or specified amount of property damage.	Not specified	Div. of Rad. Control	24 hours	536-4250 536-4123 (off hours)	
Releases From Underground Storage Tanks						
Utah Code 19-6-420 (3)	Releases from an underground storage tank presenting the possibility of an imminent and substantial danger to public health or the environment	Abatement action taken	Div. of Env. Response & Remediation	24 hours	**536-4123 (24 hours)**	
R311-201-7	Discovery of a release from an underground storage tank	Not specified	Div. of Env. Response & Remediation	24 hours	**536-4123 (24 hours)**	
40 CFR 280.50	Release of a regulated substance, unusual operation conditions or monitoring results that indicate a release	Not specified	State	24 hours	**536-4123 (24 hours)**	
40 CFR 280.53	A spill or overfill that is: 1. > 25 gallons; or 2. causes a sheen on surface water; or 3. > reportable quantity of a CERCLA hazardous substance into the environment; or 4. In violation of Clean Water Act 311(b)(3)	Not specified	Div. of Env. Response and Remediation (see also ref 8,31,32)	24 hours	**536-4123 (24 hours)**	
Used Oil						
R315-15-9	Used oil spills > 25 gallons or potential threat to human health or environment.	Name, phone number and address of person responsible for spill. Name, title and phone number of individual reporting. Time and date of spill. Spill location - including nearest city, highway, or waterway. Amount and description of material spilled. Cause of the spill. Action taken to minimize threats to human health and the environment.	DEQ	Immediately	536-4123	15 Days

Water Quality						
Regulation	When Required	Information Required	Notify Whom	Oral Notice Time	Phone Numbers	Written Notice Time
Utah Code 19-5-114	Spill of substance which could pollute the waters of the state	Material, actions taken, cleanup and disposal plan	Div. of Water Quality	Immediately	538-6146 536-4123 (off hours)	
40 CFR 110	If oil or hazardous substance release: (1)causes a sheen; or (2)violates water quality standards; or (3) causes sludge or emulsion to be deposited below water level	Not specified	NRC	Immediately	1-800-424-8802	
R317-8-4 (b)(12)(f)	Any UPDES permittee noncompliance which may endanger health or the environment including, but not limited to: (1) unanticipated bypasses which exceed effluent permit limitations; (2) any upset which exceeds effluent limitation; (3) violation of maximum daily discharge limitation for permit listed pollutants.	Name and telephone number of reporting party. Time and type of incident. Name and quantity of materials released Injuries. Health hazards	Div. of Water Quality	24 hours	538-6146 536-4123 (off hours)	5 days
R318-8.10 (7)(b) R318-8.13 (c) and 8.14 (3)(b)	1. Sampling indicates a violation of water pollution control pretreatment standards. 2. A pretreatment system "upset" that exceeds pretreatment standards. 3. An unanticipated pretreatment bypass.	Not specified	"Control Authority", which is DEQ or the POTW, depending on the permit.	24 hours		
40 CFR 403.12 40 CFR 403.16/17	1. Sampling indicates a violation of water pollution control pretreatment standards. 2. A pretreatment system "upset" that exceeds pretreatment standards. 3. An unanticipated pretreatment bypass.	Not specified	"Control Authority", which is DEQ or the POTW, depending on the permit.	24 hours		
R317-6-6.13	Mechanical or discharge system failures affecting the chemical characteristics or volume of a ground water discharge	Not specified	Div. of Water Quality	Immediately	538-6146 536-4123 (off hours)	30 days
R317-6-6.11	Commencement of groundwater discharge	Not specified	Div of Water Quality	Immediately	538-6146 536-4123 (off hours)	
R317-6-6.11	Discontinuance of groundwater discharge due to spill, leak or accidental release	Not specified	Div. of Water Quality	Immediately	538-6146 536-4123 (off hours)	5 days
R317-6-6.18	Out of compliance with ground water discharge permit	Not specified	Div. of Water Quality	Immediately	538-6146 536-4123 (off hours)	5 days

EXHIBIT I

FINANCIAL ASSURANCE CALCULATIONS

Client Weber County / Moulding & Sons Landfill LLC
Project Weber County C&D Landfill
Feature C&D Closure Construction Cost Calculations
Date 01/15/09

C&D Landfill Closure Construction

Description	Unit	Total Calculated Quantity	Total Estimated Payment Quantity	Estimated Unit Cost	Total Estimated Construction Cost	Constructed To Date		Remaining Construction Quantity		
						Estimated Quantity	Payment Quantity	Calculated Quantity	Payment Quantity	Remaining Construction Cost
Earth Work										
Closure Soil	cy	343 156	360 313	$4 28	$1 542 141 24	0	$0 00	360 313	360 313	$1 542 141 24
Vegetation	ac	105	112	$1 038 89	$115 010 11	0	$0 00	112	112	$116 010 11
Stone Mulch	cy	0	0	$30 00	$0 00	0	$0 00	0	0	$0 00
Pipe Installations										
18 Dia Single CPE Pipe (Storm Drain)	lf	80	80	$39 68	$3 174 40	0	$0 00	80	80	$3 174 40
21 Dia Single CPE Pipe (Storm Drain)	lf	500	500	$39 68	$19 840 00	0	$0 00	500	500	$19 840 00
24 Dia Single CPE Pipe (Storm Drain)	lf	0	0	$39 68	$0 00	0	$0 00	0	0	$0 00
4 x4 Concrete Inlet Boxes	ea	4	4	$2 584 82	$10 339 28	0	$0 00	4	4	$10 339 28
Operational Facilities										
Mobile Office	lsum	1	1	$579 55	$579 55	0	$0 00	1	1	$579 55
Shop (Assume 40 x 60)	lsum	1	1	$30 811 77	$30 811 77	0	$0 00	1	1	$30 811 77
Hard Surface Roads	sy	3 307	3 307	$7 25	$23 974 94	0	$0 00	3 307	3 307	$23 974 94
Concrete pads (trailer and electric)	sy	1 104	1 104	$5 39	$5 950 55	0	$0 00	1 104	1 104	$5 950 56
Engineering Design and CQC/CQA During Construction										
Design (2% of Construction Costs)			100%	$35 056 44	$35 056 44	0%	$0 00	100%	100%	$35 056 44
Construction Surveying (1% of Construction Costs)			100%	$17 528 22	$17 528 22	0%	$0 00	100%	100%	$17 528 22
CQC/CQA During Construction (1% of Construction Costs)			100%	$17 528 22	$17 528 22	0%	$0 00	100%	100%	$17 528 22
Total of Closure Construction Costs					$1 822 934 73		$0 00			$1 822,934 73
Cost Per Acre	100 5	acres =	$18 130 16	per acre						
Cost Per CY of Waste	16 000 000	CY =	$0 11	per cubic yard						

Client Weber County / Moulding & Sons Landfill LLC
Project Weber County C&D Landfill
Feature Facility Post Closure Cost Calculations
Date 01/15/09

30 Year Maintenance

Description	Unit	Total Calculated Quantity	Estimated Unit Cost	Total Estimated Construction Cost	Completed To Date		Remaining To Date	
					Estimated Quantity	Payment Amount	Calculated Quantity	Remaining Construction Cost
Inspections								
Inspection and Reporting	Annual LS	30	$2 400 00	$72 000 00	0	$0 00	30	$72 000 00
Maintenance								
Security – Fences Gates Signs Access Etc	Annual LS	30	$3 284 04	$98 521 20	0	$0 00	30	$98 521 20
Erosion/Settlement Repairs Erosion Control Repair	Annual LS	30	$5 668 02	$170 040 60	0	$0 00	30	$170 040 60
Surface Water Facilities (run on/run off) Maintenance	Annual LS	30	$1 200 88	$36 026 40	0	$0 00	30	$36 026 40
Storm Drainage Pipe Maintenance	Annual LS	30	$1 110 44	$33 313 20	0	$0 00	30	$33 313 20
Total of Closure Construction Costs				$409 901 40		$0 00		$409 901 40
Cost Per Acre	100 5	acres =	$4 076 71	per acre				
Cost Per CY of Waste	16 000 000	CY =	$0 03	per cubic yard				

Facility: Weber County C&D Landfill
Feature: Unit Cost Estimates for Closure and Post Closure Care
Date: 1/15/2009

Note No.	Description	Estimated Unit Cost	Unit	Explanation
		CLOSURE COSTS		
	Supply & Placement of Closure Cap			
1	General Contractor Mobilization/Demobilization	$ 30,000.00	lump sum	Lump sum price is assumed based on mobilization of similar equipment to this project, some scrapers, dozer and motor grader. Assume using a local contractor to the Ogden providing a short mobilization distance.
2	Final Cover (24")	$ 4.28	cy	2008 RS Means (page 225) shows a cost of $1.85/cy to place and spread fill material with no compaction and 2.63/cy for borrowing and 1/2 mile round trip hauling using 22 cy off road haulers. The total is (1.85 + 2.63) x 0.928 = $4.16/cy x 1.028 = $4.28
3	Grading of Waste/Surface Preparation	$ 1,123.16	Acre	Assume 1/3 day of grading per acre using a motor grader and a dozer. 2008 RS Means (pages 449 and 450) provides daily costs of $1,102 for a 55,000 lb grader and $2,430 for a 500 H.P. dozer which includes the crew cost. Total daily cost is, therefore, $3,532 and factored by the local multiplier of 0.928 gives a daily cost of $3,277.70 or $1,092.57 per acre x 1.028 = $1,123.16
4	Surveying for Grade Control	$ 300.00	acre	Assume 2 hours of surveying per acre at a rate of $155 per hour for GPS surveying (typical local GPS survey rate) for a cost of $310.00/acre.
5	Seeding	$ 1,038.89	Acre	Assumed for tractor seeding using a drill. The cost is obtained using 6 lb per 1000 square feet or 260 lbs per acre for a rye seed mix which will be similar to other range grasses. 2008 RS Means (page 283) shows the cost to be $25/1000 square feet or $1,089/acre which includes overhead and profit. After multiplying by the local factor of 0.928 gives $1,010.59/acre x 1.028 = $1,038.89
	Stormwater/Groundwater Controls			
6	Downdrain Pipe	$ 39.68	LF	RS Means, page 312, provides a materials and labor cost of $26/lf for installation of 24" diameter HDPE Type S storm drainage pipe. Trench excavation is $2.97/cy (RS Means Page 210, 1.5 cy bucket) and with a 3' x 3' trench, it would be $2.97 x 0.33 cy/lf = $0.98/lf. Backfill is $27.00/cy with no compaction requirements, the cost is (27.00 x 0.33 = 8.91) $8.91/lf. Assume the trench is compacted by hand for $17.25/cy for a cost of (17.25 x 0.33 = 5.70) $5.70/lf (RS Means 222). The total per foot cost is therefore $26.00 (pipe) + $0.98 (excavation) + $8.91 (backfill) + $5.70 (compaction) = $41.59/lf (Total). Applying a local factor of 0.928 gives an adjusted total of $38.60 x 1.028 = $39.68
7	Inlet Boxes	$ 2,584.82	EA	RS Means, page 318, provides a cast-in-place drainage inlet box 4' x 4' x 4' deep at $1,975, grating is $24.00/sf (page 114, RS Means) with about 24 sq. ft., and backfill is $79.25/cy (page 222) for hand placement and compaction in 6" lifts. Assume 2 cy of backfill gives a total cost of $1,975 (concrete box) + $576 (grating) + $158.50 (backfill) = $2,709.50 (Total). Applying a local factor of 0.928 gives an adjusted total of $2,514.42 x 1.028 = $2,584.82
8	Pond Excavation/Earthwork	$ 1.33	CY	2009 ENR Costbook, page 53. Cost is $1.42/cy large area excavations using a 2-1/2 cy bucket front end loader. Assume that deposition of excavated materials to be around the perimeter of the pond areas for very little haul distance from side to side. Applying a factor of 0.93 for local costs gives a cost of $1.33/cy.
	Operations Facilities			
9	Mobile Office	$ 579.55	LS	Assume the mobile office is sufficiently aged that there is no salvage value or sales value. Move the office to the landfill area for disposal. Assume 2 hours dozer (¼ day) to pull to landfill and to crush. 2008 RS Means (pages 449 and 450) provides daily costs of $2,430 for a 500 H.P. dozer which includes the crew cost. 0.25 x 2430 x 0.928 = $563.76 x 1.028 = $579.55
10	Shop (demolish and dispose, recycle steel, etc.)	$ 30,811.77	LS	Is not expected to be constructed the first year of operation. However, the shop will be 2400 square feet or less of steel building with a restroom, office, and concrete floor. 2008 RS Means (page 33 and 34) shows a demolition cost per cubic foot of building volume standing. A small steel building with no salvage value provides a cost of $0.30/cf. Assuming a building that averages 25 feet in height provides a volume of 60,000 cf. Demolition cost is 0.30 x 60000 x 0.928 = $16,704. Concrete slab is $5.65/sf for a cost of 5.65 x 2400 x 0.928 = $12,583.68. Footings of 18" thick and 6' x 6' wide are about $41.00/lf (double a 3' wide footing). Assume the footings to only exist at column supports for the building every 20 feet around the perimeter. This results in 6 columns for a total length of 18 lf. Assume on-site disposal in the landfill for a total cost of 18 x 41 x .928 = $684.86. The total cost of the demolition is about $29,972.54 x 1.028 = $30,811.77. Demolition materials to be disposed in the landfill.
11	Concrete Pad Demolition (remove and dispose)	$ 5.39	SF	Concrete pads include the mobile office pad, possible transformer pad, steps to the east door of the mobile office and the steps and ADA ramp to the west door of the mobile office. 2008 RS Means (page 34) provides a cost of $5.65/sf x .928 = $5.24/sf x 1.028 = $5.39 (demolition materials to be disposed in the landfill)
12	Bituminous Pavements (remove and dispose)	$ 7.25	SY	RS Means (page 23) provides a cost of $7.60/sy for a 4" to 6" pavement when adjusted to local costs gives 7.60 x 0.928 = $7.05/sy x 1.028 = $7.25. The pavement the first year will only extend to about 50 feet south of the entrance gate but may eventually include the entire entrance drive to the access control gates, the parking area west of the mobile office and the access road to the parking area. Demolition materials to be disposed in the landfill.
	Other: (List)			
13	Engineering Site Evaluation	2	%	Assume 2% of the construction costs
14	Design, Specification & CQA/CQC Manual	1	%	Assume 1% of the construction costs
15	Project Mgmt. & QA/QC, Oversight, Testing, & Reportin	1	%	Assume 1% of the construction costs
		POST CLOSURE/POST CLOSURE CARE COSTS		
	Maintenance Costs			
16	Security, fencing, gates, signs, access, etc.	$ 3,482.04	Yr	Barbed wire fencing is estimated at about $36.50/lf (2008 RS Means, page 273). Assume repairs average about 100 lf per year. Therefore, the cost is about $3,650 per year. Adjusting for the regional multiplier of 0.928 gives a cost of $3,387.20 x 1.028 = $3,482.04/year. Welded wire fabric fence with 2" x 4" spaces and 12.5 gage is $20.50/lf. Use the barbed wire cost.
17	Erosion repair, settlement repair, revegetation, stone mulch replacement.	$ 5,668.02	Yr	Assume erosion and settlement repairs require 2 days effort using a dozer, dump truck and a wheel loader. The combined cost is $1,388 (dozer) + $502.80 (dump truck) + $536 (loader) = $2,426.80/day (RS Means, pages 449, 451 & 451). Assume seeding to be 1 acres per year where repairs may occur at a price of $1,009.50/ac from above. Total cost is ($2,426.80 x 2 x 0.928) + ($1009.50 x 1) = $5,513.64 x 1.028 = $5,668.02.
18	Surface water control maintenance (run-on/run-off)	$ 1,200.88	Yr	Assume repairs and maintenance may require 3 days effort using a backhoe, dump truck and a wheel loader assumed every 5 years. The combined cost is $1,060 (excavator) + $502.80 (dump truck) + $536 (loader) = $2,098.80/day (RS Means, pages 449, 451 & 451). These costs will include the cost for general repair and cleaning sediments, if ever needed. Total cost is (($2,098.80 x 3 days x 0.928)/5 yrs = $1,168.17 x 1.028 = $1,200.88/yr average.
19	Storm Drainage Pipe Maintenance	$ 1,110.44	Yr	Pipe cleaning costs are between $3.10/lf and $8.06/lf, use $6.00/lf (RS Means, page 292. Cleaning will probably only be needed every 5 years and will include roughly 970 lf storm drains and down drains. The cost is, therefore, (970 x $6 x 0.928)/5 = $1,080.19 x 1.028 = $1,110.44/year.
	Monitoring Costs			
20	Part time Employee monitoring for Storm Water and Site Monitoring.	$ 2,400.00	Yr	Assume 8 hours per quarter to walk the fence lines, storm drainage facilities, and the closure cap surface. Assume a going rate (cost plus overhead and benefits) of about $75.00/hr. 8 x4 x 75 = $2,400/year

Notes:

RS Means - RS Means Heavy Construction Cost Data, 22nd Edition, 2008
ENR Costbook - ENR Square Foot Costbook, 2009 Edition
DSHW Year over Year Allowable Inflation Rate Adjustment is 2.8%.
RS Means Regional Price Adjustment Factor for the Ogden area = 0.928, RS Means, Page 506.
ENR Costbook Retional Price Adjustment Factor = 0.93, ENR Costbook, Page 181.

Client Weber County / Moulding & Sons Landfill LLC
Project Weber County C&D Landfill
Feature C&D Closure Construction Quantity Calculations
Date 01/15/09

2 5H 1V Plan to Slope Area Conversion =		1 078		
10% Plan to Slope Area Conversion =		1 005		
6H 1V Plan to Slope Area Conversion =		1 014		
Closure Soil Thickness =	2	ft		
Stone Mulch Thickness =	3	inches =	0 25	ft
Top Soil Thickness =	6	inches =	0 5	ft

C&D Closure Construction
Areas

Description	North Slope Plan Area (sf)	North Slope Slope Area (sf)
Top 10% Slope Area	771 531	775 388
Upper 2 5 1 Slope	553 728	596 919
Upper Bench	96 229	97 576
Upper Middle 2 5 1 Slope	733 774	791 009
Upper Middle Bench	118 118	119 771
Lower Middle 2 5 1 Slope	873 382	941 506
Lower Middle Bench	135 562	137 460
Lower 2 5 1 Slope	967 477	1 042 940
Lower Perimeter Road	130 031	130,031
Total Closure Area	4,379,832	4,632,601
Closure Soil Quantity, cy		343,156

RSMeans

Heavy Construction Cost Data

22nd Annual Edition

2008

02 21 Surveys

02 21 13 – Site Surveys

02 21 13.09 Topographical Surveys		Crew	Daily Output	Labor-Hours	Unit	Material	2008 Bare Costs Labor	Equipment	Total	Total Incl O&P
0010	**TOPOGRAPHICAL SURVEYS**									
0020	Topographical surveying, conventional, minimum	A-7	3.30	7.273	Acre	17	305	21	343	505
0100	Maximum	A-8	.60	53.333		52	2,175	115	2,342	3,500

02 21 13.13 Boundary and Survey Markers

		Crew	Daily Output	Labor-Hours	Unit	Material	Labor	Equipment	Total	Total Incl O&P
0010	**BOUNDARY AND SURVEY MARKERS**									
0300	Lot location and lines, large quantities, minimum	A-7	2	12	Acre	30	500	34.50	564.50	840
0320	Average	"	1.25	19.200		48	800	55	903	1,350
0400	Small quantities, maximum	A-8	1	32		64	1,300	69	1,433	2,150
0600	Monuments, 3' long	A-7	10	2.400	Ea.	30	100	6.90	136.90	195
0800	Property lines, perimeter, cleared land	"	1000	.024	L.F.	.03	1	.07	1.10	1.65

02 21 13.16 Aerial Surveys

		Crew	Daily Output	Labor-Hours	Unit	Material	Labor	Equipment	Total	Total Incl O&P
0010	**AERIAL SURVEYS**									
1500	Aerial surveying, including ground control, minimum fee, 10 acres				Total					5,700
1510	100 acres									9,500
1550	From existing photography, deduct									1,370
1600	2' contours, 10 acres				Acre					460
1650	20 acres									315
1800	50 acres									95
1850	100 acres									85
2150	For 1' contours and									
2160	dense urban areas, add to above				Acre					40%
3000	Inertial guidance system for									
3010	locating coordinates, rent per day				Ea.					4,000

02 32 Geotechnical Investigations

02 32 13 – Subsurface Drilling and Sampling

02 32 13.10 Boring and Exploratory Drilling

		Crew	Daily Output	Labor-Hours	Unit	Material	Labor	Equipment	Total	Total Incl O&P
0010	**BORING AND EXPLORATORY DRILLING**									
0020	Borings, initial field stake out & determination of elevations	A-6	1	16	Day		615	69	684	1,025
0100	Drawings showing boring details				Total		233.10		233.10	340.20
0200	Report and recommendations from P.E.						525		525	766.50
0300	Mobilization and demobilization, minimum	B-55	4	6			180	231	411	535
0350	For over 100 miles, per added mile		450	.053	Mile		1.60	2.06	3.66	4.74
0600	Auger holes in earth, no samples, 2-1/2" diameter		78.60	.305	L.F.		9.15	11.80	20.95	27
0650	4" diameter		67.50	.356			10.65	13.70	24.35	31.50
0800	Cased borings in earth, with samples, 2-1/2" diameter		55.50	.432		17.40	12.95	16.70	47.05	57.50
0850	4" diameter		32.60	.736		27.50	22	28.50	78	95.50
1000	Drilling in rock, "BX" core, no sampling	B-56	34.90	.458			15.60	37	52.60	64.50
1050	With casing & sampling		31.70	.505		17.40	17.15	41	75.55	90.50
1200	"NX" core, no sampling		25.92	.617			21	50	71	87
1250	With casing and sampling		25	.640		21	22	51.50	94.50	114
1400	Borings, earth, drill rig and crew with truck mounted auger	B-55	1	24	Day		720	925	1,645	2,150
1450	Rock using crawler type drill	B-56	1	16	"		545	1,300	1,845	2,250
1500	For inner city borings add, minimum									10%
1510	Maximum									20%

02 32 19 – Exploratory Excavations

02 32 19.10 Test Pits

		Crew	Daily Output	Labor-Hours	Unit	Material	Labor	Equipment	Total	Total Incl O&P
0010	**TEST PITS**									
0020	Hand digging, light soil	1 Clab	4.50	1.778	C.Y.		54		54	83.50
0100	Heavy soil	"	2.50	3.200			97		97	151

02 32 Geotechnical Investigations

02 32 19 – Exploratory Excavations

[illegible]2 19.10 Test Pits		Crew	Daily Output	Labor-Hours	Unit	Material	2008 Bare Costs Labor	Equipment	Total	Total Incl O&P
[illegible]	Loader-backhoe, light soil	B-11M	28	.571	C.Y.		20	12.15	32.15	44
[illegible]	Heavy soil	"	20	.800			28	17.05	45.05	62
1000	Subsurface exploration, mobilization				Mile				7.50	8.63
1010	Difficult access for rig, add				Hr.				150	172.20
1020	Auger borings, drill rig, incl. samples				L.F.				17.27	19.87
1030	Hand auger								25.52	29.36
1050	Drill and sample every 5', split spoon								22.52	25.90
1060	Extra samples				Ea.				30.45	35.02

02 41 Demolition

02 41 13 – Selective Site Demolition

02 41 13.15 Hydrodemolition

		Crew	Daily Output	Labor-Hours	Unit	Material	Labor	Equipment	Total	Total Incl O&P
0010	HYDRODEMOLITION R024119-10									
0015	Hydrodemolition, concrete pavement, 4000 PSI, 2" depth	B-5	500	.112	S.F.		3.73	2.17	5.90	8.15
0120	4" depth		450	.124			4.14	2.41	6.55	9.05
0130	6" depth		400	.140			4.66	2.71	7.37	10.15
0410	6000 PSI, 2" depth		410	.137			4.55	2.65	7.20	9.90
0420	4" depth		350	.160			5.30	3.10	8.40	11.60
0430	6" depth		300	.187			6.20	3.62	9.82	13.55
0510	8000 PSI, 2" depth		330	.170			5.65	3.29	8.94	12.30
0520	4" depth		280	.200			6.65	3.88	10.53	14.50
[illegible]	6" depth		240	.233			7.75	4.52	12.27	16.90

[illegible] 13.17 Demolish, Remove Pavement and Curb

		Crew	Daily Output	Labor-Hours	Unit	Material	Labor	Equipment	Total	Total Incl O&P
[illegible]	DEMOLISH, REMOVE PAVEMENT AND CURB R024119-10									
5010	Pavement removal, bituminous roads, 3" thick	B-38	690	.058	S.Y.		1.98	1.45	3.43	4.63
5050	4" to 6" thick		420	.095			3.24	2.39	5.63	7.60
5100	Bituminous driveways		640	.063			2.13	1.57	3.70	4.99
5200	Concrete to 6" thick, hydraulic hammer, mesh reinforced		255	.157			5.35	3.93	9.28	12.50
5300	Rod reinforced		200	.200			6.80	5	11.80	15.95
5400	Concrete, 7" to 24" thick, plain		33	1.212	C.Y.		41.50	30.50	72	97
5500	Reinforced		24	1.667	"		57	42	99	133
5600	With hand held air equipment, bituminous, to 6" thick	B-39	1900	.025	S.F.		.80	.10	.90	1.35
5700	Concrete to 6" thick, no reinforcing		1600	.030			.95	.12	1.07	1.61
5800	Mesh reinforced		1400	.034			1.09	.14	1.23	1.84
5900	Rod reinforced		765	.063			2	.25	2.25	3.37
6000	Curbs, concrete, plain	B-6	360	.067	L.F.		2.18	.79	2.97	4.23
6100	Reinforced		275	.087			2.86	1.04	3.90	5.55
6200	Granite		360	.067			2.18	.79	2.97	4.23
6300	Bituminous		528	.045			1.49	.54	2.03	2.88
6500	Site demo, berms under 4" in height, bituminous		528	.045			1.49	.54	2.03	2.88
6600	4" or over in height		300	.080			2.62	.95	3.57	5.10

02 41 13.20 Selective Demo, Highway Guard Rails & Barriers

		Crew	Daily Output	Labor-Hours	Unit	Material	Labor	Equipment	Total	Total Incl O&P
0010	SELECTIVE DEMOLITION, HIGHWAY GUARD RAILS & BARRIERS									
0100	Guard rail, corrugated steel	B-6	600	.040	L.F.		1.31	.48	1.79	2.53
0200	End sections		40	.600	Ea.		19.65	7.15	26.80	38
[illegible]	Wrap around		40	.600	"		19.65	7.15	26.80	38
[illegible]	Timber 4" x 8"		600	.040	L.F.		1.31	.48	1.79	2.53
0500	Three 3/4" cables		600	.040	"		1.31	.48	1.79	2.53
0600	Wood posts		240	.100	Ea.		3.28	1.19	4.47	6.35
0700	Guide rail, 6" x 6" box beam	B-80B	120	.267	L.F.		8.55	1.87	10.42	15.25

05 53 19 – Aluminum Floor Grating

05 53 19.50 Floor Grating, Aluminum		Crew	Daily Output	Labor-Hours	Unit	2008 Bare Costs Material	Labor	Equipment	Total	Total Incl O&P
1900	2-1/4" deep, 5.0# per S.F.	E-4	875	.037	S.F.	19.20	1.59	.15	20.94	24
2100	For safety serrated surface, add					15%				

05 53 21 – Steel Floor Grating

05 53 21.50 Floor Grating, Steel		Crew	Daily Output	Labor-Hours	Unit	Material	Labor	Equipment	Total	Total Incl O&P
0010	**FLOOR GRATING, STEEL**, field fabricated from panels									
0050	Labor for installing, from ground/floor	E-4	845	.038	S.F.		1.65	.16	1.81	3.14
0100	Elevated		460	.070	"		3.03	.29	3.32	5.75
0300	Platforms, to 12' high, rectangular		3150	.010	Lb.	1.54	.44	.04	2.02	2.54
0400	Circular		2300	.014	"	1.69	.61	.06	2.36	3.01
0410	Painted bearing bars @ 1-3/16"									
0412	Cross bars @ 4" O.C., 3/4" x 1/8" bar, up to 300 S.F.	E-2	500	.112	S.F.	6.45	4.69	3.13	14.27	18.65
0414	Over 300 S.F.		750	.075		5.85	3.13	2.09	11.07	14.15
0422	1-1/4" x 3/16", up to 300 S.F.		400	.140		8.70	5.85	3.92	18.47	24
0424	Over 300 S.F.		600	.093		7.90	3.91	2.61	14.42	18.30
0432	1-1/2" x 1/8", up to 300 S.F.		400	.140		7.80	5.85	3.92	17.57	23
0434	Over 300 S.F.		600	.093		7.10	3.91	2.61	13.62	17.40
0436	1-3/4" x 3/16", up to 300 S.F.		400	.140		11.35	5.85	3.92	21.12	27
0438	Over 300 S.F.		600	.093		10.30	3.91	2.61	16.82	21
0452	2-1/4" x 3/16", up to 300 S.F.		300	.187		13.45	7.80	5.20	26.45	34
0454	Over 300 S.F.		450	.124		12.20	5.20	3.48	20.88	26.50
0462	Cross bars @ 2" O.C., 3/4" x 1/8", up to 300 S.F.		500	.112		12.45	4.69	3.13	20.27	25.50
0464	Over 300 S.F.		750	.075		10.35	3.13	2.09	15.57	19.10
0472	1-1/4" x 3/16", up to 300 S.F.		400	.140		18.65	5.85	3.92	28.42	35
0474	Over 300 S.F.		600	.093		15.55	3.91	2.61	22.07	26.50
0482	1-1/2" x 1/8", up to 300 S.F.		400	.140		14.40	5.85	3.92	24.17	30.50
0484	Over 300 S.F.		600	.093		12	3.91	2.61	18.52	23
0486	1-3/4" x 3/16", up to 300 S.F.		400	.140		19.45	5.85	3.92	29.22	36
0488	Over 300 S.F.		600	.093		16.20	3.91	2.61	22.72	27.50
0502	2-1/4" x 3/16", up to 300 S.F.		300	.187		23	7.80	5.20	36	45
0504	Over 300 S.F.		450	.124		19.30	5.20	3.48	27.98	34.50
0601	Painted bearing bars @ 15/16" O.C., cross bars @ 4" O.C.,									
0612	Up to 300 S.F., 3/4" x 1/8" bars	E-4	850	.038	S.F.	8.05	1.64	.16	9.85	11.95
0622	1-1/4" x 3/16" bars		600	.053		11.35	2.32	.22	13.89	16.90
0632	1-1/2" x 1/8" bars		550	.058		10.35	2.53	.24	13.12	16.20
0636	1-3/4" x 3/16" bars		450	.071		14.95	3.09	.29	18.33	22.50
0652	2-1/4" x 3/16" bars	E-2	300	.187		19.55	7.80	5.20	32.55	41
0662	Cross bars @ 2" O.C., up to 300 S.F., 3/4" x 1/8"		500	.112		13.70	4.69	3.13	21.52	26.50
0672	1-1/4" x 3/16" bars		400	.140		14.75	5.85	3.92	24.52	30.50
0682	1-1/2" x 1/8" bars		400	.140		14.05	5.85	3.92	23.82	30
0686	1-3/4" x 3/16" bars		300	.187		19.10	7.80	5.20	32.10	40.50
0690	For galvanized grating, add					25%				
0800	For straight cuts, add				L.F.	2.82			2.82	3.10
0900	For curved cuts, add					3.88			3.88	4.27
1000	For straight banding, add					3.29			3.29	3.62
1100	For curved banding, add					5.10			5.10	5.60
1200	For checkered plate nosings, add					5.80			5.80	6.40
1300	For straight toe or kick plate, add					8.20			8.20	9
1400	For curved toe or kick plate, add					9.95			9.95	10.95
1500	For abrasive nosings, add					6			6	6.60
1600	For safety serrated surface, minimum, add					15%				
1700	Maximum, add					25%				
2000	Stainless steel gratings, close spaced, 1" x 1/8" bars, up to 300 S.F.	E-4	450	.071	S.F.	38.50	3.09	.29	41.88	48

31 23 16.13 Excavating, Trench		Crew	Daily Output	Labor-Hours	Unit	Material	2008 Bare Costs Labor	Equipment	Total	Total Incl O&P
0500	6' to 10' deep, 3/4 C.Y. excavator	B-12F	225	.071	B.C.Y.		2.53	2.44	4.97	6.55
0510	1 C.Y. excavator	B-12A	400	.040			1.42	1.62	3.04	3.96
0600	1 C.Y. excavator, truck mounted	B-12K	400	.040			1.42	2.72	4.14	5.15
0610	1-1/2 C.Y.excavator	B-12B	600	.027			.95	1.38	2.33	2.97
0620	2-1/2 C.Y. excavator	B-12S	1000	.016			.57	1.47	2.04	2.48
0900	10' to 14' deep, 3/4 C.Y. excavator	B-12F	200	.080			2.85	2.75	5.60	7.35
0910	1 C.Y. excavator	B-12A	360	.044			1.58	1.80	3.38	4.40
1000	1-1/2 C.Y. excavator	B-12B	540	.030			1.05	1.54	2.59	3.30
1020	2-1/2 C.Y. excavator	B-12S	1000	.016			.57	1.47	2.04	2.48
1030	3 C.Y. excavator	B-12D	1400	.011			.41	1.67	2.08	2.46
1040	3-1/2 C.Y. excavator	"	1800	.009			.32	1.30	1.62	1.97
1300	14' to 20' deep, 1 C.Y. excavator	B-12A	320	.050			1.78	2.02	3.80	4.94
1310	1-1/2 C.Y. excavator	B-12B	480	.033			1.19	1.73	2.92	3.71
1320	2-1/2 C.Y. excavator	B-12S	850	.019			.67	1.72	2.39	2.92
1330	3 C.Y. excavator	B-12D	1000	.016			.57	2.34	2.91	3.44
1335	3-1/2 C.Y. excavator	"	1150	.014			.50	2.03	2.53	2.99
1340	20' to 24' deep, 1 C.Y. excavator	B-12A	288	.056			1.98	2.25	4.23	5.50
1342	1-1/2 C.Y. excavator	B-12B	432	.037			1.32	1.92	3.24	4.13
1344	2-1/2 C.Y. excavator	B-12S	765	.021			.74	1.92	2.66	3.25
1346	3 C.Y. excavator	B-12D	900	.018			.63	2.60	3.23	3.83
1348	3-1/2 C.Y. excavator	"	1050	.015			.54	2.23	2.77	3.28
1352	4' to 6' deep, 1/2 C.Y. excavator w/trench box	B-13H	188	.085			3.03	5.55	8.58	10.75
1354	5/8 C.Y. excavator	"	235	.068			2.42	4.45	6.87	8.60
1356	3/4 C.Y. excavator	B-13G	282	.057			2.02	2.35	4.37	5.70
1358	1 C.Y. excavator/ trench box	B-13D	376	.043			1.51	2.02	3.53	4.53
1360	1-1/2 C.Y. excavator/ trench box	B-13E	508	.032			1.12	1.86	2.98	3.75
1362	6' to 10' deep, 3/4 C.Y. excavator w/trench box	B-13G	212	.075			2.69	3.13	5.82	7.55
1370	1 C.Y. excavator/ trench box	B-13D	376	.043			1.51	2.02	3.53	4.53
1371	1-1/2 C.Y. excavator/ trench box	B-13E	564	.028			1.01	1.67	2.68	3.38
1372	2-1/2 C.Y. excavator/ trench box	B-13J	940	.017			.61	1.68	2.29	2.78
1374	10' to 14' deep, 3/4 C.Y. excavator w/trench box	B-13G	188	.085			3.03	3.53	6.56	8.50
1375	1 C.Y. excavator/ trench box	B-13D	338	.047			1.69	2.25	3.94	5.05
1376	1-1/2 C.Y. excavator/ trench box	B-13E	508	.032			1.12	1.86	2.98	3.75
1377	2-1/2 C.Y. excavator/ trench box	B-13J	940	.017			.61	1.68	2.29	2.78
1378	3 C.Y. excavator/ trench box	B-13F	1316	.012			.43	1.86	2.29	2.71
1380	3-1/2 C.Y. excavator/ trench box	"	1692	.009			.34	1.45	1.79	2.10
1381	14' to 20' deep, 1 C.Y. excavator w/trench box	B-13D	301	.053			1.89	2.53	4.42	5.65
1382	1-1/2 C.Y. excavator/ trench box	B-13E	451	.035			1.26	2.09	3.35	4.23
1383	2-1/2 C.Y. excavator/ trench box	B-13J	799	.020			.71	1.98	2.69	3.26
1384	3 C.Y. excavator/ trench box	B-13F	940	.017			.61	2.61	3.22	3.80
1385	3-1/2 C.Y. excavator/ trench box	"	1081	.015			.53	2.27	2.80	3.30
1386	20' to 24' deep, 1 C.Y. excavator w/trench box	B-13D	271	.059			2.10	2.80	4.90	6.30
1387	1-1/2 C.Y. excavator/ trench box	B-13E	406	.039			1.40	2.32	3.72	4.70
1388	2-1/2 C.Y. excavator/ trench box	B-13J	719	.022			.79	2.20	2.99	3.63
1389	3 C.Y. excavator/ trench box	B-13F	846	.019			.67	2.90	3.57	4.22
1390	3-1/2 C.Y. excavator/ trench box	"	987	.016			.58	2.48	3.06	3.61
1391	Shoring by SF/day trench wall protected loose matl, 4' W	B-6	3200	.008	SF Wall	.47	.25	.09	.81	.99
1392	Rent shoring per week per SF wall protected, loose matl, 4' W					1.29			1.29	1.42
1395	Hydraulic shoring, SF trench wall protected stable matl, 4' W	2 Clab	2700	.006		.15	.18		.33	.44
1397	semi-stable material, 4' W	"	2400	.007		.21	.20		.41	.55
1398	Rent hyroulic shoring per day/SF wall, stable matl. 4' W					.15			.15	.16
1399	semi-stable material					.21			.21	.24
1400	By hand with pick and shovel 2' to 6' deep, light soil	1 Clab	8	1	B.C.Y.		30.50		30.50	47

31 23 19 – Dewatering

31 23 19.20 Dewatering Systems		Crew	Daily Output	Labor-Hours	Unit	2008 Bare Costs Material	Labor	Equipment	Total	Total Incl O&P
1600	Sump hole construction, incl. excavation and gravel, pit	B-6	1250	.019	C.F.	.91	.63	.23	1.77	2.2
1700	With 12" gravel collar, 12" pipe, corrugated, 16 ga.		70	.343	L.F.	18.75	11.25	4.08	34.08	42
1800	15" pipe, corrugated, 16 ga.		55	.436		24	14.30	5.20	43.50	54
1900	18" pipe, corrugated, 16 ga.		50	.480		28	15.70	5.70	49.40	61.5
2000	24" pipe, corrugated, 14 ga.		40	.600		33.50	19.65	7.15	60.30	75
2200	Wood lining, up to 4' x 4', add		300	.080	SFCA	15.90	2.62	.95	19.47	22.5
9950	See Div. 31 23 19.40 for wellpoints									
9960	See Div. 31 23 19.30 for deep well systems									
9970	See Div. 22 11 23 for pumps									

31 23 19.30 Wells

		Crew	Daily Output	Labor-Hours	Unit	Material	Labor	Equipment	Total	Total Incl O&P
0010	**WELLS**									
0011	For dewatering 10' to 20' deep, 2' diameter									
0020	with steel casing, minimum	B-6	165	.145	V.L.F.	39	4.76	1.73	45.49	52
0050	Average		98	.245		39	8	2.91	49.91	58
0100	Maximum		49	.490		39	16.05	5.80	60.85	74
0300	For dewatering pumps see 01 54 33 in Reference Section									
0500	For domestic water wells, see Div. 33 21 13.10									

31 23 19.40 Wellpoints

		Crew	Daily Output	Labor-Hours	Unit	Material	Labor	Equipment	Total	Total Incl O&P
0010	**WELLPOINTS**									
0011	For equipment rental, see 01 54 33 in Reference Section									
0100	Installation and removal of single stage system									
0110	Labor only, .75 labor-hours per L.F., minimum	1 Clab	10.70	.748	LF Hdr		22.50		22.50	35
0200	2.0 labor-hours per L.F., maximum	"	4	2	"		60.50		60.50	94
0400	Pump operation, 4 @ 6 hr. shifts									
0410	Per 24 hour day	4 Eqlt	1.27	25.197	Day		950		950	1,425
0500	Per 168 hour week, 160 hr. straight, 8 hr. double time		.18	177	Week		6,700		6,700	10,100
0550	Per 4.3 week month		.04	800	Month		30,200		30,200	45,600
0600	Complete installation, operation, equipment rental, fuel &									
0610	removal of system with 2" wellpoints 5' O.C.									
0700	100' long header, 6" diameter, first month	4 Eqlt	3.23	9.907	LF Hdr	148	375		523	730
0800	Thereafter, per month		4.13	7.748		118	292		410	570
1000	200' long header, 8" diameter, first month		6	5.333		131	201		332	450
1100	Thereafter, per month		8.39	3.814		66.50	144		210.50	290
1300	500' long header, 8" diameter, first month		10.63	3.010		52	114		166	228
1400	Thereafter, per month		20.91	1.530		37	58		95	128
1600	1,000' long header, 10" diameter, first month		11.62	2.754		44.50	104		148.50	206
1700	Thereafter, per month		41.81	.765		22	29		51	68
1900	Note: above figures include pumping 168 hrs. per week									
1910	and include the pump operator and one stand-by pump.									

31 23 23 – Fill

31 23 23.13 Backfill

		Crew	Daily Output	Labor-Hours	Unit	Material	Labor	Equipment	Total	Total Incl O&P
0010	**BACKFILL**									
0015	By hand, no compaction, light soil	1 Clab	14	.571	L.C.Y.		17.30		17.30	27
0100	Heavy soil		11	.727	"		22		22	34
0300	Compaction in 6" layers, hand tamp, add to above		20.60	.388	E.C.Y.		11.75		11.75	18
0400	Roller compaction operator walking, add	B-10A	100	.120			4.40	1.43	5.83	8
0500	Air tamp, add	B-9D	190	.211			6.45	1.16	7.61	11
0600	Vibrating plate, add	A-1D	60	.133			4.03	.52	4.55	6
0800	Compaction in 12" layers, hand tamp, add to above	1 Clab	34	.235			7.10		7.10	11
0900	Roller compaction operator walking, add	B-10A	150	.080			2.93	.95	3.88	5
1000	Air tamp, add	B-9	285	.140			4.30	.67	4.97	7
1100	Vibrating plate, add	A-1E	90	.089			2.69	.43	3.12	4

32 31 26 – Wire Fences and Gates

32 31 26.10 Fences, Misc. Metal		Crew	Daily Output	Labor-Hours	Unit	2008 Bare Costs Material	Labor	Equipment	Total	Total Incl O&P
[illegible]	14 ga., 1" x 2" mesh, 3' high	B-80C	300	.080	L.F.	2.88	2.40	.62	5.90	7.55
0500	5' high		300	.080		3.98	2.40	.62	7	8.80
1000	Kennel fencing, 1-1/2" mesh, 6' long, 3'-6" wide, 6'-2" high	2 Clab	4	4	Ea.	450	121		571	690
1050	12' long		4	4		545	121		666	785
1200	Top covers, 1-1/2" mesh, 6' long		15	1.067		92	32.50		124.50	151
1250	12' long		12	1.333		147	40.50		187.50	225
4500	Security fence, prison grade, set in concrete, 12' high	B-80	25	1.280	L.F.	40	41.50	25	106.50	136
4600	16' high	"	20	1.600	"	48	52	31.50	131.50	167

32 31 26.20 Wire Fencing, General		Crew	Daily Output	Labor-Hours	Unit	Material	Labor	Equipment	Total	Total Incl O&P
0010	**WIRE FENCING, GENERAL**									
0015	Barbed wire, galvanized, domestic steel, hi-tensile 15-1/2 ga.				M.L.F.	33			33	36.50
0020	Standard, 12-3/4 ga.					44.50			44.50	49
0210	Barbless wire, 2-strand galvanized, 12-1/2 ga.					44.50			44.50	49
0500	Helical razor ribbon, stainless steel, 18" dia x 18" spacing				C.L.F.	129			129	142
0600	Hardware cloth galv., 1/4" mesh, 23 ga., 2' wide				C.S.F.	58			58	63.50
0700	3' wide					56.50			56.50	62
0900	1/2" mesh, 19 ga., 2' wide					51			51	56.50
1000	4' wide					50			50	55
1200	Chain link fabric, steel, 2" mesh, 6 ga., galvanized					191			191	211
1300	9 ga., galvanized					94.50			94.50	104
1350	Vinyl coated					79			79	87
1360	Aluminized					123			123	135
1400	2-1/4" mesh, 11.5 ga, galvanized					64			64	70
[illegible]	1-3/4" mesh (tennis courts), 11.5 ga (core), vinyl coated					90.50			90.50	99.50
[illegible]	9 ga, galvanized					81.50			81.50	89.50
2100	Welded wire fabric, galvanized, 1" x 2", 14 ga.					54			54	59.50
2200	2" x 4", 12-1/2 ga.					18.50			18.50	20.50

32 31 29 – Wood Fences and Gates

32 31 29.10 Fence, Wood		Crew	Daily Output	Labor-Hours	Unit	Material	Labor	Equipment	Total	Total Incl O&P
0010	**FENCE, WOOD**									
0011	Basket weave, 3/8" x 4" boards, 2" x 4"									
0020	stringers on spreaders, 4" x 4" posts									
0050	No. 1 cedar, 6' high	B-80C	160	.150	L.F.	8.85	4.50	1.16	14.51	18.05
0070	Treated pine, 6' high	"	150	.160	"	10.75	4.80	1.24	16.79	20.50
0200	Board fence, 1" x 4" boards, 2" x 4" rails, 4" x 4" post									
0220	Preservative treated, 2 rail, 3' high	B-80C	145	.166	L.F.	6.60	4.96	1.28	12.84	16.35
0240	4' high		135	.178		7.25	5.35	1.38	13.98	17.70
0260	3 rail, 5' high		130	.185		8.15	5.55	1.43	15.13	19.10
0300	6' high		125	.192		9.35	5.75	1.49	16.59	21
0320	No. 2 grade western cedar, 2 rail, 3' high		145	.166		7.20	4.96	1.28	13.44	17
0340	4' high		135	.178		8.50	5.35	1.38	15.23	19.10
0360	3 rail, 5' high		130	.185		9.80	5.55	1.43	16.78	21
0400	6' high		125	.192		10.75	5.75	1.49	17.99	22.50
0420	No. 1 grade cedar, 2 rail, 3' high		145	.166		10.80	4.96	1.28	17.04	21
0440	4' high		135	.178		12.25	5.35	1.38	18.98	23.50
0460	3 rail, 5' high		130	.185		14.20	5.55	1.43	21.18	26
0500	6' high		125	.192		15.80	5.75	1.49	23.04	28
[illegible]	Open rail fence, split rails, 2 rail 3' high, no. 1 cedar		160	.150		5.95	4.50	1.16	11.61	14.85
[illegible]70	No. 2 cedar		160	.150		4.64	4.50	1.16	10.30	13.40
0880	3 rail, 4' high, no. 1 cedar		150	.160		8.05	4.80	1.24	14.09	17.65
0890	No. 2 cedar		150	.160		5.30	4.80	1.24	11.34	14.60
0920	Rustic rails, 2 rail 3' high, no. 1 cedar		160	.150		3.72	4.50	1.16	9.38	12.35

33 01 10 – Operation and Maintenance of Water Utilities

33 01 10.20 Pipe Repair

	33 01 10.20 Pipe Repair	Crew	Daily Output	Labor-Hours	Unit	Material	Labor	Equipment	Total	Total Incl O&P
[illegible]20	3" diameter pipe	1 Plum	15.60	.513	Ea.	99.50	24		123.50	145
[illegible]0	3-1/2" diameter pipe		15	.533		109	25		134	158
1740	4" diameter pipe	B-20	40	.600		119	20.50		139.50	163
1750	6" diameter pipe		34	.706		149	24		173	202
1760	8" diameter pipe		21	1.143		199	39		238	280
1770	10" diameter pipe		20	1.200		229	41		270	315
1780	12" diameter pipe		17	1.412		248	48		296	350
1800	For 9" long, add					40%	45%			
1810	For 12" long, add					60%	80%			
1820	For 18" long, add					120%	110%			
2000	Clamp, stainless steel, two section									
2040	Full seal, for iron, steel, PVC pipe									
2100	6" long, 4" diameter pipe	B-20	24	1	Ea.	169	34		203	239
2110	6" diameter pipe		20	1.200		199	41		240	283
2120	8" diameter pipe		13	1.846		219	62.50		281.50	340
2130	10" diameter pipe		12	2		320	68		388	455
2140	12" diameter pipe		10	2.400		350	81.50		431.50	505
2200	9" long, 4" diameter pipe		16	1.500		219	51		270	320
2210	6" diameter pipe		13	1.846		248	62.50		310.50	370
2220	8" diameter pipe		9	2.667		258	90.50		348.50	425
2230	10" diameter pipe		8	3		360	102		462	555
2240	12" diameter pipe		7	3.429		395	116		511	615
2250	14" diameter pipe		6.40	3.750		595	127		722	855
2260	16" diameter pipe		6	4		625	136		761	900
2270	18" diameter pipe		5	4.800		645	163		808	965
[illegible]0	20" diameter pipe		4.60	5.217		695	177		872	1,050
2290	24" diameter pipe		4	6		1,200	204		1,404	1,625
2320	For 12" long, add to 9"					15%	25%			
2330	For 18" long, add to 9"					70%	55%			
8000	For internal cleaning and inspection, see Div. 33 01 30.16									
8100	For pipe testing, see Div. 23 05 93.50									

33 01 30 – Operation and Maintenance of Sewer Utilities

33 01 30.16 TV Inspection of Sewer Pipelines

	33 01 30.16 TV Inspection of Sewer Pipelines	Crew	Daily Output	Labor-Hours	Unit	Material	Labor	Equipment	Total	Total Incl O&P
0010	TV INSPECTION OF SEWER PIPELINES									
0100	Pipe internal cleaning & inspection, cleaning, pressure pipe systems									
0120	Pig method, lengths 1000' to 10,000'									
0140	4" diameter thru 24" diameter, minimum				L.F.				2.70	3.10
0160	Maximum				"				6.74	8.06
6000	Sewage/sanitary systems									
6100	Power rodder with header & cutters									
6110	Mobilization charge, minimum				Total				403.20	472.50
6120	Mobilization charge, maximum				"				945	1,071
6140	4" diameter				L.F.				1.34	1.55
6150	6" diameter								1.69	1.95
6160	8" diameter								2.02	2.35
6170	10" diameter								2.35	2.70
6180	12" diameter								2.56	2.96
6190	14" diameter								2.70	3.10
[illegible]00	16" diameter								3.03	3.51
[illegible]210	18" diameter								3.38	3.84
6220	20" diameter								3.51	4.04
6230	24" diameter								3.91	4.51

33 05 23 – Trenchless Utility Installation

05 23.20 Horizontal Boring

	05 23.20 Horizontal Boring	Crew	Daily Output	Labor-Hours	Unit	Material	Labor	Equipment	Total	Total Incl O&P
						2008 Bare Costs				
[illegible]	HORIZONTAL BORING									
0011	Casing only, 100' minimum,									
0020	not incl. jacking pits or dewatering									
0100	Roadwork, 1/2" thick wall, 24" diameter casing	B-42	20	3.200	L.F.	90.50	109	68	267.50	345
0200	36" diameter		16	4		144	136	85	365	465
0300	48" diameter		15	4.267		211	145	90.50	446.50	560
0500	Railroad work, 24" diameter		15	4.267		90.50	145	90.50	326	430
0600	36" diameter		14	4.571		144	156	97	397	510
0700	48" diameter		12	5.333		211	182	113	506	645
0900	For ledge, add								195.30	239.40
1000	Small diameter boring, 3", sandy soil	B-82	900	.018		.24	.60	.09	24.69	27
1040	Rocky soil	"	500	.032		24	1.09	.15	25.24	28
1100	Prepare jacking pits, incl. mobilization & demobilization, minimum				Ea.				2,992	3,543
1101	Maximum				"				17,750.25	21,278.25

33 05 23.22 Directional Drilling

	33 05 23.22 Directional Drilling	Crew	Daily Output	Labor-Hours	Unit	Material	Labor	Equipment	Total	Total Incl O&P
0010	DIRECTIONAL DRILLING									
0011	Excluding cost of conduit, 100' minimum									
0100	Small equipment to 300', not to exceed 12" diam.									
0102	small unit mobilization to site	B-82A	2	8	Ea.		272	460	732	925
0105	small unit setup per drill		4	4			136	231	367	460
0109	minimum charge gravel, sand & silt, up to 12" diam.		3.20	5		3.75	170	289	462.75	585
0110	gravel, sand & silt, up to 12" diam.		300	.053	L.F.	.03	1.81	3.08	4.92	6.20
0118	min charge , clay & soft sandstone, up to 10" diam.		3.20	5	Ea.	12.75	170	289	471.75	595
[illegible]	Clay & soft sandstone, up to 10" diam.		300	.053	L.F.	.09	1.81	3.08	4.98	6.25
0128	min charge , hard clay & cobble, up to 8" diam.		1	16	Ea.	42	545	925	1,512	1,900
0130	Hard clay & cobble, up to 8" diam.		100	.160	L.F.	.42	5.45	9.25	15.12	18.90
0200	Medium equipment to 600', not to exceed 12" diam.									
0202	medium unit mobilization to site	B-82B	2	12	Ea.		395	585	980	1,250
0205	medium unit setup per drill		4	6			197	292	489	620
0209	minimum charge gravel, sand & silt, up to 12" diam.		3.20	7.500		3.75	246	365	614.75	785
0210	gravel, sand & silt, up to 12" diam.		350	.069	L.F.	.03	2.25	3.33	5.61	7.15
0218	min charge , clay & soft sandstone, up to 10" diam.		3.20	7.500	Ea.	12.75	246	365	623.75	795
0220	Clay & soft sandstone, up to 10" diam.		300	.080	L.F.	.09	2.62	3.89	6.60	8.40
0228	min charge , hard clay & cobble, up to 8" diam.		1.78	13.483	Ea.	42	440	655	1,137	1,450
0230	Hard clay & cobble, up to 8" diam.		150	.160	L.F.	.42	5.25	7.75	13.42	17.05
0300	Large equipment to 1000', not to exceed 12" diam.									
0302	large unit mobilization to site	B-82C	2	12	Ea.		395	720	1,115	1,400
0305	large unit setup per drill		4	6			197	360	557	695
0309	minimum charge gravel, sand & silt, up to 12" diam.		4	6		3.75	197	360	560.75	700
0310	gravel, sand & silt, up to 12" diam.		400	.060	L.F.	.03	1.97	3.60	5.60	7
0318	min charge , clay & soft sandstone, up to 12" diam.		3.20	7.500	Ea.	12.75	246	450	708.75	890
0320	Clay & soft sandstone, up to 12" diam.		350	.069	L.F.	.09	2.25	4.11	6.45	8.05
0328	min charge , hard clay & cobble, up to 10" diam.		1.78	13.483	Ea.	42	440	810	1,292	1,625
0330	Rock & cobble, up to 10" diam.		150	.160	L.F.	.42	5.25	9.60	15.27	19.05
0400	Directional drilling, mud trailer per day	B-82D	1	8	Day		300	267	567	750
1000	Additional charges for mobilization may apply at some locations									

33 05 26 – Utility Line Signs, Markers, and Flags

05 26.10 Utility Accessories

	05 26.10 Utility Accessories	Crew	Daily Output	Labor-Hours	Unit	Material	Labor	Equipment	Total	Total Incl O&P
0010	UTILITY ACCESSORIES									
0400	Underground tape, detectable, reinforced, alum. foil core, 2"	1 Clab	150	.053	C.L.F.	2	1.61		3.61	4.71
0500	6"	"	140	.057	"	5	1.73		6.73	8.20

33 41 13.50 Piping, Drainage & Sewage, Corrug. HDPE Type S		Crew	Daily Output	Labor-Hours	Unit	2008 Bare Costs Material	Labor	Equipment	Total	Total Incl O&P
0020	Not including excavation & backfill, bell & spigot									
1000	With gaskets, 4" diameter	B-20	425	.056	L.F.	.72	1.92		2.64	[illegible]
1010	6" diameter		400	.060		1.65	2.04		3.69	[illegible]
1020	8" diameter		380	.063		3.15	2.15		5.30	6.80
1030	10" diameter		370	.065		4.36	2.20		6.56	8.25
1040	12" diameter		340	.071		5.95	2.40		8.35	10.25
1050	15" diameter		300	.080		8.05	2.72		10.77	13.10
1060	18" diameter	B-21	275	.102		11.45	3.56	.47	15.48	[illegible]
1070	24" diameter		250	.112		17.80	3.92	.52	22.24	26
1080	30" diameter		200	.140		28	4.89	.65	33.54	39.50
1090	36" diameter		180	.156		35.50	5.45	.72	41.67	48.50
1100	42" diameter		175	.160		44.50	5.60	.74	50.84	58.50
1110	48" diameter		170	.165		58	5.75	.76	64.51	73
1120	54" diameter		160	.175		89.50	6.10	.81	96.41	108
1130	60" diameter		150	.187		104	6.55	.86	111.41	126
1135	Add 15% to material pipe cost for water tight connection bell & spigot									
1140	HDPE type s, elbows 12" diameter	B-20	11	2.182	Ea.	49	74		123	169
1150	15" diameter	"	9	2.667		76	90.50		166.50	225
1160	18" diameter	B-21	9	3.111		125	109	14.35	248.35	320
1170	24" diameter		9	3.111		266	109	14.35	389.35	475
1180	30" diameter		8	3.500		425	122	16.15	563.15	670
1190	36" diameter		8	3.500		545	122	16.15	683.15	805
1240	HDPE type s, Tee 12" diameter	B-20	7	3.429		111	116		227	305
1260	15" diameter		6	4		131	136		267	355
1280	18" diameter	B-21	6	4.667		193	163	21.50	377.50	490
1300	24" diameter		5	5.600		253	196	26	475	615
1320	30" diameter		5	5.600		475	196	26	697	860
1340	36" diameter		4	7		620	245	32.50	897.50	1,100
1360	42" diameter		4	7		1,075	245	32.50	1,352.50	1,600
1380	48" diameter		4	7		1,775	245	32.50	2,052.50	2,375
1400	Add to basic installation cost for each split coupling joint									
1402	HDPE type s, split coupling, 12" diameter	B-20	17	1.412	Ea.	5.40	48		53.40	80.50
1420	15" diameter		15	1.600		6	54.50		60.50	91
1440	18" diameter		13	1.846		10.40	62.50		72.90	109
1460	24" diameter		12	2		15.20	68		83.20	123
1480	30" diameter		10	2.400		25	81.50		106.50	155
1500	36" diameter		9	2.667		32	90.50		122.50	176
1520	42" diameter		8	3		38.50	102		140.50	200
1540	48" diameter		8	3		49.50	102		151.50	213

33 41 13.60 Sewage/Drainage Collection, Concrete Pipe		Crew	Daily Output	Labor-Hours	Unit	Material	Labor	Equipment	Total	Total Incl O&P
0010	SEWAGE/DRAINAGE COLLECTION, CONCRETE PIPE									
0020	Not including excavation or backfill									
0050	Box culvert, cast in place, 6' x 6'	C-15	16	4.500	L.F.	181	162		343	450
0060	8' x 8'		14	5.143		266	185		451	580
0070	12' x 12'		10	7.200		520	259		779	975
0100	Box culvert, precast, base price, 8' long, 6' x 3'	B-69	140	.343		283	11.40	9.20	303.60	340
0150	6' x 7'		125	.384		430	12.75	10.30	453.05	500
0200	8' x 3'		133	.361		390	11.95	9.70	411.65	460
0250	8' x 8'		100	.480		525	15.95	12.90	553.85	620
0300	10' x 3'		110	.436		580	14.50	11.75	606.25	670
0350	10' x 8'		80	.600		655	19.90	16.15	691.05	770
0400	12' x 3'		100	.480		560	15.95	12.90	588.85	655

33 42 Culverts

33 42 16 – Concrete Culverts

33 42 16.15 Oval Arch Culverts		Crew	Daily Output	Labor-Hours	Unit	2008 Bare Costs Material	Labor	Equipment	Total	Total Incl O&P
[illegible]	57" x 38", 12 ga., 48" equivalent	B-13	75	.747	L.F.	73	24.50	10.50	108	130
3320	End sections, 17" x 13"		22	2.545	Ea.	97.50	83.50	35.50	216.50	275
3340	42" x 29"		17	3.294	"	400	108	46.50	554.50	655
3360	Multi-plate arch, steel	B-20	1690	.014	Lb.	1.12	.48		1.60	1.98

33 44 Storm Utility Water Drains

33 44 13 – Utility Area Drains

33 44 13.13 Catchbasins

		Crew	Daily Output	Labor-Hours	Unit	Material	Labor	Equipment	Total	Total Incl O&P
0010	CATCHBASINS									
0011	Not including footing & excavation									
1580	Curb inlet frame, grate, and curb box									
1582	Large 24" x 36" heavy duty	B-24	2	12	Ea.	440	420		860	1,125
1590	Small 10" x 21" medium duty	"	2	12		310	420		730	990
1600	Frames & covers, C.I., 24" square, 500 lb.	B-6	7.80	3.077		249	101	36.50	386.50	470
1700	26" D shape, 600 lb.		7	3.429		425	112	41	578	690
1800	Light traffic, 18" diameter, 100 lb.		10	2.400		139	78.50	28.50	246	305
1900	24" diameter, 300 lb.		8.70	2.759		215	90.50	33	338.50	410
2000	36" diameter, 900 lb.		5.80	4.138		430	136	49	615	735
2100	Heavy traffic, 24" diameter, 400 lb.		7.80	3.077		208	101	36.50	345.50	425
2200	36" diameter, 1150 lb.		3	8		690	262	95	1,047	1,275
2300	Mass. State standard, 26" diameter, 475 lb.		7	3.429		520	112	41	673	795
2400	30" diameter, 620 lb.		7	3.429		330	112	41	483	585
[illegible]	Watertight, 24" diameter, 350 lb.		7.80	3.077		355	101	36.50	492.50	585
[illegible]	26" diameter, 500 lb.		7	3.429		335	112	41	488	590
2700	32" diameter, 575 lb.		6	4		745	131	47.50	923.50	1,075
2800	3 piece cover & frame, 10" deep,									
2900	1200 lbs., for heavy equipment	B-6	3	8	Ea.	1,075	262	95	1,432	1,675
3000	Raised for paving 1-1/4" to 2" high,									
3100	4 piece expansion ring									
3200	20" to 26" diameter	1 Clab	3	2.667	Ea.	117	80.50		197.50	253
3300	30" to 36" diameter	"	3	2.667	"	162	80.50		242.50	305
3320	Frames and covers, existing, raised for paving, 2", including									
3340	row of brick, concrete collar, up to 12" wide frame	B-6	18	1.333	Ea.	36.50	43.50	15.85	95.85	124
3360	20" to 26" wide frame		11	2.182		57.50	71.50	26	155	202
3380	30" to 36" wide frame		9	2.667		71	87.50	31.50	190	248
3400	Inverts, single channel brick	D-1	3	5.333		80	186		266	370
3500	Concrete		5	3.200		62.50	112		174.50	239
3600	Triple channel, brick		2	8		121	279		400	560
3700	Concrete		3	5.333		107	186		293	400

33 47 Ponds and Reservoirs

33 47 13 – Pond and Reservoir Liners

33 47 13.53 Reservoir Liners HDPE		Crew	Daily Output	Labor-Hours	Unit	Material (2008 Bare Costs)	Labor (2008 Bare Costs)	Equipment (2008 Bare Costs)	Total (2008 Bare Costs)	Total Incl O&P
0010	RESERVOIR LINERS HDPE									
0011	membrane lining									
1100	30 mil thick	3 Skwk	1850	.013	S.F.	.35	.51		.86	1.18
1200	60 mil thick		1600	.015	"	.65	.59		1.24	1.64
1220	60 mil thick		1.60	15	M.S.F.	650	590		1,240	1,625
1300	120 mil thick		1440	.017	S.F.	1.47	.66		2.13	2.64

33 49 Storm Drainage Structures

33 49 13 – Storm Drainage Manholes, Frames, and Covers

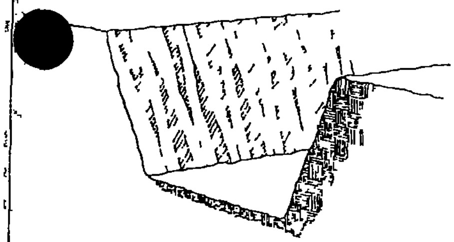
33 49 13.10 Storm Drainage Manholes, Frames and Covers

		Crew	Daily Output	Labor-Hours	Unit	Material	Labor	Equipment	Total	Total Incl O&P
0010	STORM DRAINAGE MANHOLES, FRAMES & COVERS									
0020	Excludes footing, excavation, backfill (See line items for frame & cover)									
0050	Brick, 4' inside diameter, 4' deep	D-1	1	16	Ea.	395	560		955	1,275
0100	6' deep		.70	22.857		555	795		1,350	1,825
0150	8' deep		.50	32		710	1,125		1,835	2,475
0200	For depths over 8', add		4	4	V.L.F.	147	140		287	375
0400	Concrete blocks (radial), 4' I.D., 4' deep		1.50	10.667	Ea.	340	370		710	940
0500	6' deep		1	16		450	560		1,010	1,350
0600	8' deep		.70	22.857		560	795		1,355	1,850
0700	For depths over 8', add		5.50	2.909	V.L.F.	57.50	101		158.50	217
0800	Concrete, cast in place, 4' x 4', 8" thick, 4' deep	C-14H	2	24	Ea.	510	905	12.50	1,427.50	1,975
0900	6' deep		1.50	32		740	1,200	16.65	1,956.65	2,700
1000	8' deep		1	48		1,050	1,800	25	2,875	4,025
1100	For depths over 8', add		8	6	V.L.F.	120	227	3.12	350.12	490
1110	Precast, 4' I.D., 4' deep	B-22	4.10	7.317	Ea.	680	259	47.50	986.50	1,200
1120	6' deep		3	10		850	355	64.50	1,269.50	1,550
1130	8' deep		2	15		1,025	530	97	1,652	2,050
1140	For depths over 8', add		16	1.875	V.L.F.	139	66.50	12.15	217.65	268
1150	5' I.D., 4' deep	B-6	3	8	Ea.	700	262	95	1,057	1,275
1160	6' deep		2	12		945	395	143	1,483	1,800
1170	8' deep		1.50	16		1,200	525	190	1,915	2,325
1180	For depths over 8', add		12	2	V.L.F.	155	65.50	24	244.50	298
1190	6' I.D., 4' deep		2	12	Ea.	1,150	395	143	1,688	2,000
1200	6' deep		1.50	16		1,500	525	190	2,215	2,650
1210	8' deep		1	24		1,825	785	285	2,895	3,550
1220	For depths over 8', add		8	3	V.L.F.	240	98.50	35.50	374	455
1250	Slab tops, precast, 8" thick									
1300	4' diameter manhole	B-6	8	3	Ea.	161	98.50	35.50	295	365
1400	5' diameter manhole		7.50	3.200		315	105	38	458	555
1500	6' diameter manhole		7	3.429		460	112	41	613	725
3800	Steps, heavyweight cast iron, 7" x 9"	1 Bric	40	.200		12.95	7.85		20.80	26
3900	8" x 9"		40	.200		19.45	7.85		27.30	33.50
3928	12" x 10-1/2"		40	.200		18.40	7.85		26.25	32
4000	Standard sizes, galvanized steel		40	.200		15.60	7.85		23.45	29
4100	Aluminum		40	.200		21	7.85		28.85	35.50

G1030 Site Earthwork

1030 105	Cut & Fill Gravel	COST PER C.Y.		
		EQUIP.	LABOR	TOTAL
[illegible]	300' haul, 5" lift, 2 passes	5.60	3.35	8.95
2850	4 passes	5.70	3.48	9.18
2700	12" lift, 2 passes	5.55	3.25	8.81
2750	4 passes	5.65	3.39	9.04
3000	300 HP dozer & roller compactors, 150' haul, 6" lift, 2 passes	2.69	1.39	4.08
3050	4 passes	2.79	1.52	4.31
3100	12" lift, 2 passes	2.62	1.30	3.92
3150	4 passes	2.72	1.43	4.15
3200	300' haul, 5" lift, 2 passes	4.61	2.23	6.84
3250	4 passes	4.71	2.36	7.07
3300	12" lift, 2 passes	4.54	2.14	6.68
3350	4 passes	4.64	2.27	6.91
4200	10 C.Y. elevating scraper & roller compacter, 1500' haul, 6" lift, 2 passes	2.89	1.82	4.71
4250	4 passes	3.21	2.14	5.35
4300	12" lift, 2 passes	2.71	1.64	4.35
4350	4 passes	2.92	1.85	4.78
4800	5000' haul, 6" lift, 2 passes	3.64	2.24	5.88
4850	4 passes	3.95	2.56	6.52
4900	12" lift, 2 passes	3.46	2.06	5.52
4950	4 passes	3.57	2.28	5.95
5000	15 C.Y. S.P. scraper & roller compactor, 1500' haul, 6" lift, 2 passes	3.53	1.54	5.07
5050	4 passes	3.85	1.85	5.71
5100	12" lift, 2 passes	3.35	1.36	4.71
5150	4 passes	3.56	1.58	5.14
5400	5000' haul, 6" lift, 2 passes	4.66	1.90	6.56
50	4 passes	4.98	2.22	7.20
[illegible]	12" lift, 2 passes	4.48	1.72	5.20
[illegible]	4 passes	4.69	1.94	6.63
5600	21 C.Y. S.P. scraper & roller compactor, 1500' haul, 6" lift, 2 passes	3.82	1.35	5.17
5650	4 passes	4.14	1.67	5.81
5700	12" lift, 2 passes	3.64	1.17	4.81
5750	4 passes	3.85	1.39	6.24
6000	5000' haul, 5" lift, 2 passes	6.50	1.73	7.23
6050	4 passes	5.85	2.05	7.90
6100	12" lift, 2 passes	5.35	1.55	6.90
6150	4 passes	5.55	1.77	7.32

G1030 Site Earthwork



Trenching Systems are shown on a cost per linear foot basis The systems include excavation backfill and removal of spoil and compaction for various depths and trench bottom widths The backfill has been reduced to accommodate a pipe of suitable diameter and bedding

The slope for trench sides varies from none to 1 1

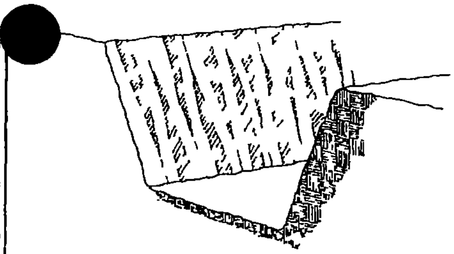
The Expanded System Listing shows Trenching Systems that range from 2 to 12 in width Depths range from 2 to 25

System Components	QUANTITY	UNIT	COST PER L F EQUIP	COST PER L F LABOR	COST PER L F TOTAL
SYSTEM G1030 805 1310					
TRENCHING COMMON EARTH NO SLOPE 2 WIDE 2 DP 3/8 C Y BUCKET					
Excavation trench hyd backhoe track mtd 3/8 C Y bucket	148	C Y	31	84	1 15
Backfill and load spoil from stockpile	153	C Y	09	26	35
Compaction by vibrating plate 6 lifts 4 passes	118	E C Y	03	32	35
Remove excess spoil 8 C Y dump truck 2 mile roundtrip	040	C Y	14	15	29
TOTAL			57	1 57	2 14

G1030 805	Trenching Common Earth	COST PER L F EQUIP	COST PER L F LABOR	COST PER L F TOTAL
1310	Trenching common earth no slope 2 wide 2 deep 3/8 C Y bucket	57	1 57	2 14
1320	3 deep 3/8 C Y bucket	81	2 36	3 17
[illegible]	4 deep 3/8 C Y bucket	1 03	3 14	4 17
[illegible]	6 deep 3/8 C Y bucket	1 40	4 06	5 45
[illegible]	8 deep 1/2 C Y bucket	1 82	5 35	7 17
1350	10 deep 1 C Y bucket	2 84	6 40	9 24
1400	4 wide 2 deep 3/8 C Y bucket	1 32	3 13	4 45
1410	3 deep 3/8 C Y bucket	1 78	4 69	6 47
1420	4 deep 1/2 C Y bucket	2 06	5 20	7 25
1430	5 deep 1/2 C Y bucket	3 33	8 30	11 53
1440	8 deep 1/2 C Y bucket	5 35	10 70	16 05
1450	10 deep 1 C Y bucket	6 50	13 30	19 80
1460	12 deep 1 C Y bucket	8 40	16 90	25 30
1470	15 deep 1 1/2 C Y bucket	7 45	15 10	22 55
1480	18 deep 2 1/2 C Y bucket	10 30	21	31 30
1520	6 wide 6 deep 5/8 C Y bucket w/trench box	7 40	12 50	19 90
1530	8 deep 3/4 C Y bucket	9 55	16 15	25 70
1540	10 deep 1 C Y bucket	9 45	16 80	26 25
1550	12 deep 1 1/2 C Y bucket	10 15	18 05	28 20
1560	16 deep 2 1/2 C Y bucket	13 80	22	35 80
1570	20 deep 3-1/2 C Y bucket	19 50	27	46 50
1580	24 deep 3-1/2 C Y bucket	23 50	32 50	55
1540	8 wide 12 deep 1 1/2 C Y bucket w/trench box	14 25	23	37 25
1550	15 deep 1 1/2 C Y bucket	18 60	30	46 50
1560	18 deep 2 1/2 C Y bucket	20	29 50	49 50
1580	24 deep 3-1/2 C Y bucket	31 50	42	73 50
1730	10 wide 20 deep 3-1/2 C Y bucket w/trench box	25	40	65
1740	24 deep 3 1/2 C Y bucket	38 50	48	85 50
1800	1/2 to 1 slope 2 wide 2 deep 3/8 C Y bucket	81	2 36	3 17
[illegible]	3 deep 3/8 C Y bucket	1 33	4 12	5 45
[illegible]	4 deep 3/8 C Y bucket	1 97	6 25	8 22
[illegible]	6 deep 3/8 C Y bucket	3 35	10 20	13 55
1850	8 deeo 1/2 C Y bucket	5 25	15 20	21 45
1880	10 deep 1 C Y bucket	9 80	22 50	32 30

G1030 805	Trenching Common Earth	COST PER L F		
		EQUIP	LABOR	TOTAL
2300	4 wide 2 deep 3/8 C Y bucket	1 55	3 91	5 46
2310	3 deep 3/8 C Y bucket	2 31	6 45	8 76
2320	4 deep 1/2 C Y bucket	2 94	7 90	10 84
2340	5 deep 1/2 C Y bucket	5 60	14 70	20 30
2350	8 deep 1/2 C Y bucket	10 35	21 50	31 85
2380	10 deep 1 C Y bucket	14 40	30 50	44 90
2400	12 deep 1 C Y bucket	19 10	41	60 10
2430	15 deep 1 1/2 C Y bucket	21	44	65
2460	18 deep 2 1/2 C Y bucket	37	67 50	104 50
2840	6 wide 6 deep 5/8 C Y bucket w/trench box	10 65	18 25	28 90
2860	8 deep 3/4 C Y bucket	15 45	27 50	42 95
2880	10 deep 1 C Y bucket	15 20	28	43 20
2900	12 deep 1 1/2 C Y bucket	19 20	36 50	55 70
2940	16 deep 2 1/2 C Y bucket	31 50	52 50	84
2980	20 deep 3-1/2 C Y bucket	48 50	72 50	121
3020	24 deep 3-1/2 C Y bucket	69	99	168
3100	8 wide 12 deep 1 1/2 C Y bucket w/trench box	24	41 50	65 50
3120	15 deep 1 1/2 C Y bucket	34 50	60 50	95
3140	18 deep 2 1/2 C Y bucket	43 50	70 50	114
3180	24 deep 3-1/2 C Y bucket	77 50	108	185 50
3270	10 wide 20 deep 3-1/2 C Y bucket w/trench box	48 50	83 50	132
3280	24 deep 3-1/2 C Y bucket	85 50	118	203 50
3370	12 wide 20 deep 3 1/2 C Y bucket w/ trench box	72	97	169
3380	25 deep 3-1/2 C Y bucket	100	138	238
3500	1 to 1 slope 2 wide 2 deep 3/8 C Y bucket	1 03	3 14	4 17
3520	3 deep 3/8 C Y bucket	3 07	7 25	10 32
3540	4 deep 3/8 C Y bucket	2 90	9 40	12 30
3550	5 deep 3/8 C Y bucket	3 35	10 15	13 50
3580	8 deep 1/2 C Y bucket	6 55	20 50	27 05
3600	10 deep 1 C Y bucket	16 70	38 50	55 20
3800	4 wide 2 deep 3/8 C Y bucket	1 78	4 69	6 47
3820	3 deep 3/8 C Y bucket	2 82	8 20	11 02
3840	4 deep 1/2 C Y bucket	3 80	10 60	14 40
3860	6 deep 1/2 C Y bucket	7 90	21	28 90
3880	8 deep 1/2 C Y bucket	15 40	32 50	47 90
3900	10 deep 1 C Y bucket	22 50	47 50	70
3920	12 deep 1 C Y bucket	33	68 50	101 50
3940	15 deep 1 1/2 C Y bucket	34 50	73	107 50
3960	18 deep 2 1/2 C Y bucket	51	93	144
4030	6 wide 5 deep 5/8 C Y bucket w/trench box	14	24 50	38 50
4040	8 deep 3/4 C Y bucket	20 50	34	54 50
4050	10 deep 1 C Y bucket	22	41	63
4060	12 deep 1 1/2 C Y bucket	29 50	55 50	85
4070	16 deep 2 1/2 C Y bucket	49	83 50	132 50
4080	20 deep 3-1/2 C Y bucket	78 50	118	196 50
4090	24 deep 3-1/2 C Y bucket	115	166	281
4500	8 wide 12 deep 1 1/2 C Y bucket w/trench box	33 50	60 50	94
4650	15 deep 1 1/2 C Y bucket	51	91	142
4600	18 deep 2 1/2 C Y bucket	66	109	175
4650	24 deep 3-1/2 C Y bucket	123	175	298
4800	10 wide 20 deep 3 1/2 C Y bucket w/trench box	71 50	127	198 50
4850	24 deep 3-1/2 C Y bucket	131	185	316
4950	12 wide 20 deep 3-1/2 C Y bucket w/ trench box	104	143	247
4980	25 deep 3-1/2 C Y bucket	149	209	358

G1030 Site Earthwork



Trenching Systems are shown on a cost per linear foot basis The systems include excavation backfill and removal of spoil and compaction for vanous depths and trench bottom widths The backfill has been reduced to accommodate a pipe of suitable diameter and bedding

The slope for trench sides vanes from none to 1 1

The Expanded System Listing shows Trenching Systems that range from 2 to 12 in width Depths range from 2 to 25

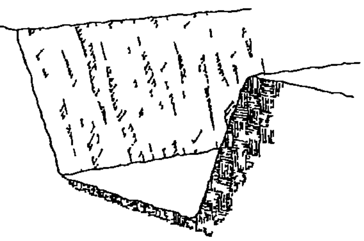
System Components	QUANTITY	UNIT	COST PER L F EQUIP	COST PER L F LABOR	COST PER L F TOTAL
SYSTEM G1030 806 1310					
TRENCHING LOAM & SANDY CLAY NO SLOPE 2 WIDE, 2 DP 3/8 C Y BUCKET					
Excavation trench hyd backhoe track mtd 3/8 C Y bucket	148	B C Y	29	78	1 07
Backfill and load spoil from stockpile	165	C Y	10	28	38
Compaction by vibrabng plate 18 wide 5 lifts 4 passes	118	E C Y	03	32	35
Remove excess spoil 8 C Y dump tmck 2 mile roundtrip	042	C Y	14	16	30
TOTAL			57	1 57	2 14

G1030 806	Trenching Loam & Sandy Clay	COST PER L F EQUIP	COST PER L F LABOR	COST PER L F TOTAL
1310	Trenching loam & sandy clay no slope 2 wide 2 deep 3/8 C Y bucket	56	1 54	2 10
320	3 deep 3/8 C Y bucket	87	2 53	3 40
30	4 deep 3/8 C Y bucket	1	3 07	4 07
0	6 deep 3/8 C Y bucket	1 48	3 54	5 10
1350	8 deep 1/2 C Y bucket	1 93	4 79	6 70
1360	10 deep 1 C Y bucket	2 13	5 15	7 30
1400	4 wide 2 deep 3/8 C Y bucket	1 32	3 08	4 40
1410	3 deep 3/8 C Y bucket	1 78	4 51	6 40
1420	4 deep 1/2 C Y bucket	2 05	5 10	7 15
1430	6 deep 1/2 C Y bucket	3 51	7 40	10 90
1440	8 deep 1/2 C Y bucket	5 20	10 55	15 75
1450	10 deep 1 C Y bucket	5 10	10 80	15 90
1460	12 deep 1 C Y bucket	6 40	13 45	19 85
1470	15 deep 1 1/2 C Y bucket	7 75	15 55	23 50
1480	18 deep 2 1/2 C Y bucket	9 25	16 90	25
1520	6 wide 6 deep 5/8 C Y bucket w/trench box	7 15	12 30	19 45
1530	8 deep 3/4 C Y bucket	9 15	15 85	25
1540	10 deep 1 C Y bucket	8 70	16 15	25
1550	12 deep 1 1/2 C Y bucket	9 85	18 10	28
1560	15 deep 2 1/2 C Y bucket	13 40	22 50	36
1570	20 deep 3-1/2 C Y bucket	17 80	27	45
1580	24 deep 3-1/2 C Y bucket	22 50	33	56 50
1640	8 wide 12 deep 1 1/4 C Y bucket w/trench box	14 05	23	37
1650	15 deep 1 1/2 C Y bucket	17 16	29	46
1560	18 deep 2 1/2 C Y bucket	20 50	32 50	53
1680	24 deep 3-1/2 C Y bucket	30 50	42 50	73
1730	10 wide 20 deep 3-1/2 C Y bucket w/trench box	31	43	74
1740	24 deep 3 1/2 C Y bucket	38 50	52 50	91
1780	12 wide 20 deep 3-1/2 C Y bucket w/trench box	37	61	88
90	25 deep bucket	48 50	65 50	114
0	1/2 1 slope 2 wide 2 deep 3/8 C Y BK	79	2 31	3 10
1810	3 deep 3/8 C Y bucket	1 29	4 03	5 30
1820	4 deep 3/8 C Y bucket	1 92	6 15	8 05
1840	6 deep 3/8 C Y bucket	3 54	9 10	12 65

G1030 Site Earthwork

G1030 806	Trenching Loam & Sandy Clay	COST PER L F		
		EQUIP	LABOR	TOTAL
1860	8 deep 1/2 C Y bucket	5 50	14 50	20
1880	10 deep 1 C Y bucket	7 25	18 20	25 50
2300	4 wide 2 deep 3/8 C Y bucket	1 55	3 84	5 40
2310	3 deep 3/8 C Y bucket	2 29	6 35	8 65
2320	4 deep 1/2 C Y bucket	2 91	7 75	10 65
2340	6 deep 1/2 C Y bucket	5 90	13 20	19 10
2360	8 deep 1/2 C Y bucket	10 05	21 50	31 50
2380	10 deep 1 C Y bucket	11 15	25	35
2400	12 deep 1 C Y bucket	18 65	41	59 50
2430	15 deep 1 1/2 C Y bucket	22	45 50	57 50
2460	18 deep 2 1/2 C Y bucket	36	58 50	105
2840	6 wide 6 deep 5/8 C Y bucket w/trench box	10 35	18 50	29
2860	8 deep 3/4 C Y bucket	14 80	27	42
2880	10 deep 1 C Y bucket	15 45	30 50	45
2900	12 deep 1 1/2 C Y bucket	19 15	37	56
2940	16 deep 2 1/2 C Y bucket	30 50	53 50	84
2980	20 deep 3-1/2 C Y bucket	46 50	73 50	120
3020	24 deep 3-1/2 C Y bucket	66 50	100	157
3100	8 wide 12 deep 1 1/2 C Y bucket w/trench box	23 50	42	65 50
3120	15 deep 1 1/2 C Y bucket	31 50	59	90 50
3140	18 deep 2 1/2 C Y bucket	42	71 50	114
3180	24 deep 3-1/2 C Y bucket	74 50	110	185
3270	10 wide 20 deep 3-1/2 C Y bucket w/trench box	59 50	89	149
3280	24 deep 3-1/2 C Y bucket	82 50	120	203
3320	12 wide 20 deep 3-1/2 C Y bucket w/trench box	66	97	153
3380	25 deep 3-1/2 C Y bucket w/trench box	90 50	130	221
3500	1 1 slope 2 wide 2 deep 3/8 C Y bucket	1	3 07	4 07
3520	3 deep 3/8 C Y bucket	1 81	5 75	7 55
3540	4 deep 3/8 C Y bucket	2 82	9 20	12
3550	6 deep 3/8 C Y bucket	3 54	9 10	12 65
3580	8 deep 1/2 C Y bucket	9 25	24	33 50
3500	10 deep 1 C Y bucket	12 35	31	43 50
3800	2 deep 3/8 C Y bucket	1 78	4 62	5 40
3820	4 wide 3 deep 3/8 C Y bucket	2 79	8 05	10 85
3840	4 deep 1/2 C Y bucket	3 75	10 40	14 15
3850	6 deep 1/2 C Y bucket	8 30	19	27 50
3880	8 deep 1/2 C Y bucket	14 95	32	47
3900	10 deep 1 C Y bucket	17 20	39	56
3920	12 deep 1 C Y bucket	25	55	80
3940	15 deep 1 1/2 C Y bucket	36	75 50	112
3950	18 deep 2 1/2 C Y bucket	50	94 50	145
4030	6 wide 6 deep 5/8 C Y bucket w/trench box	13 55	24 50	38
4040	8 deep 3/4 C Y bucket	20 50	38	58 50
4050	10 deep 1 C Y bucket	22	44 50	65 50
4060	12 deep 1 1/2 C Y bucket	28 50	56	84 50
4080	20 deep 3-1/2 C Y bucket	75 50	120	195
4090	24 deep 3-1/2 C Y bucket	110	168	278
4500	8 wide 12 deep 1 1/4 C Y bucket w/trench box	32 50	51	93 50
4550	15 deep 1 1/2 C Y bucket	46	88 50	135
4500	18 deep 2 1/2 C Y bucket	64	111	176
4650	24 deep 3-1/2 C Y bucket	118	178	296
4800	10 wide 20 deep 3-1/2 C Y bucket w/trench box	88 50	135	225
4850	24 deep 3-1/2 C Y bucket	126	188	316
4950	12 wide 20 deep 3-1/2 C Y bucket w/trench box	95	144	239
4980	25 deep bucket	144	212	355

G1030 Site Earthwork



Trenching Systems are shown on a cost per linear foot basis The systems include excavation backfill and removal of spoil and compaction for vanous depths and trench bottom widths The backfill has been reduced to accommodate a pipe of suitable diameter and bedding

The slope for trench sides varies from none to 1 1

The Expanded System Listing shows Trenching Systems that range from 2 to 12' in width Depths range from 2 to 25

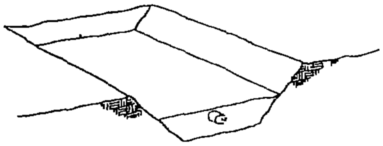
System Components	QUANTITY	UNIT	COST PER L F EQUIP	LABOR	TOTAL
SYSTEM G1030 807 1310					
TRENCHING SAND & GRAVEL NO SLOPE 2 WIDE 2 DEEP 3/8 C Y BUCKET					
Excavation trench hyd backhoe track mtd 3/8 C Y bucket	148	B C Y	28	77	1 05
Backfill and load spoil, from stockpile	118	C Y	07	20	27
Compaction by vibrating plate 18 wide 6 lifts 4 passes	118	E C Y	03	32	35
Remove excess spoil B C Y dump truck 2 mile roundtrip	035	C Y	12	13	25
TOTAL			50	1 42	1 92

G1030 807	Trenching Sand & Gravel	COST PER L F EQUIP	LABOR	TOTAL
1310	Trenching sand & gravel no slope 2 wide 2 deep 3/8 C Y bucket	50	1 42	1 92
1320	3 deep 3/8 C Y bucket	82	2 43	3 25
1330	4 deep 3/8 C Y bucket	93	2 91	3 84
1340	6 deep 3/8 C Y bucket	1 40	3 47	4 87
1350	8 deep 1/2 C Y bucket	1 84	4 57	5 40
1360	10 deep 1 C Y bucket	1 99	4 84	6 85
1400	4 wide 2 deep 3/8 C Y bucket	1 19	2 90	4 09
1410	3 deep 3/8 C Y bucket	1 52	4 35	6
1420	4 deep 1/2 C Y bucket	1 89	4 82	6 70
1430	6 deep 1/2 C Y bucket	3 34	7 10	10 45
1440	8 deep 1/2 C Y bucket	4 91	10	14 90
1450	10 deep 1 C Y bucket	4 80	10 20	15
1460	12 deep 1 C Y bucket	6 05	12 75	18 80
1470	15 deep 1 1/2 C Y bucket	7 35	14 75	22
1480	18 deep 2 1/2 C Y bucket	8 70	15 85	24 50
1520	6 wide 6 deep 5/8 C Y bucket w/trench box	6 75	11 60	18 35
1530	8 deep 3/4 C Y bucket	8 70	15 05	24
1540	10 deep 1 C Y bucket	8 20	15 25	23 50
1550	12 deep 1 1/2 C Y bucket	9 35	17 05	26 50
1560	16 deep 2 C Y bucket	12 80	21	34
1570	20 deep 3-1/2 C Y bucket	16 90	25 50	42 50
1580	24 deep 3-1/2 C Y bucket	21 50	31	52 50
1640	8 wide 12 deep 1 1/2 C Y bucket w/trench box	13 20	21 50	34 50
1650	15 deep 1 1/2 C Y bucket	16 05	27 50	43 50
1660	18 deep 2 1/2 C Y bucket	19 35	30	49 50
1680	24 deep 3-1/2 C Y bucket	29	40	69
1730	10 wide 20 deep 3-1/2 C Y bucket w/trench box	29	40	69
1740	24 deep 3 1/2 C Y bucket	36 50	49 50	86
1780	12 wide 20 deep 3 1/2 C Y bucket w/trench box	35	47 60	82 50
1790	25 deep bucket	45	61	107
1800	1/2 1 slope 2 wide 2 deep 3/8 CY bk	73	2 19	2 92
1810	3 deep 3/8 C Y bucket	1 21	3 83	5 05
1820	4 deep 3/8 C Y bucket	1 80	5 85	7 65
1840	6 deep 3/8 C Y bucket	3 38	8 70	12 10

G1030 Site Earthwork

G1030 807	Trenching Sand & Gravel	COST PER L F		
		EQUIP	LABOR	TOTAL
1860	8 deep 1/2 C Y bucket	5 35	13 85	19
1880	10 deep 1 C Y bucket	6 80	17 15	24
2300	4 wide 2 deep 3/8 C Y bucket	1 41	3 63	6
2310	3 deep 3/8 C Y bucket	2 10	6	8
2320	4 deep 1/2 C Y bucket	2 69	7 35	10
2340	5 deep 1/2 C Y bucket	5 65	12 65	18
2360	8 deep 1/2 C Y bucket	9 55	20	29
2380	10 deep 1 C Y bucket	10 55	23 50	34
2400	12 deep 1 C Y bucket	17 70	39	56
2430	15 deep 1 1/2 C Y bucket	20 50	43	63
2460	18 deep 2 1/2 C Y bucket	34 50	64 50	99
2840	6 wide 5 deep 5/8 C Y bucket w/trench box	9 80	17 50	27
2860	8 deep 3/4 C Y bucket	14 10	25 50	39
2880	10 deep 1 C Y bucket	14 65	28 50	43
2900	12 deep 1 1/2 C Y bucket	18 15	35	53
2940	15 deep 2 C Y bucket	29 50	50 60	80
2980	20 deep 3 1/2 C Y bucket	44 50	59	114
3020	24 deep 3-1/2 C Y bucket	63 50	94 50	158
3100	8 wide 12 deep 1 1/4 C Y-bucket w/trench box	22	39 50	61
3120	15 deep 1 1/2 C Y bucket	30	55 50	85
3140	18 deep 2 1/2 C Y bucket	40	57	107
3180	24 deep 3-1/2 C Y bucket	71	103	174
3270	10 wide 20 deep 3-1/2 C Y bucket w/trench box	56 50	83 50	140
3280	24 deep 3-1/2 C Y bucket	78 50	113	192
3370	12 wide 20 deep 3-1/2 C Y bucket w/trench box	63	93	156
3380	25 deep bucket	91 50	130	222
3600	1 1 slope 2 wide 2 deep 3/8 CY bk	1 73	3 73	5
3520	3 deep 3/8 C Y bucket	1 69	5 45	71
3540	4 deep 3/8 C Y bucket	2 65	8 75	11
3560	6 deep 3/8 C Y bucket	3 38	8 70	12
3580	8 deep 1/2 C Y bucket	8 85	23	32
3600	10 deep 1 C Y bucket	11 60	29 50	41
3800	4 wide 2 deep 3/8 C Y bucket	1 52	4 36	6
3820	3 deep 3/8 C Y bucket	2 58	7 65	10
3840	4 deep 1/2 C Y bucket	3 47	9 90	13
3850	5 deep 1/2 C Y bucket	7 95	18 20	26
3880	8 deep 1/2 C Y bucket	14 20	30 50	44
3900	10 deep 1 C Y bucket	16 30	36 50	53
3920	12 deep 1 C Y bucket	23 50	52	75
3940	15 deep 1 1/2 C Y bucket	34	71 50	106
3950	18 deep 2 1/2 C Y bucket	47	89	136
4030	6 wide 6 deep 5/8 C Y bucket w/trench box	12 85	23 50	36
4040	8 deep 3/4 C Y bucket	19 55	35	55
4050	10 deep 1 C Y bucket	21	42	53
4050	12 deep 1 1/2 C Y bucket	27	53	80
4070	16 deep 2 C Y bucket	45 50	79 50	125
4080	20 deep 3-1/2 C Y bucket	72	112	184
4090	24 deep 3-1/2 C Y bucket	105	158	263
4500	8 wide 12 deep 1 1/2 C Y bucket w/trench box	31	57 50	88 5
4550	15 deep 1 1/2 C Y bucket	43 60	83 60	127
4600	18 deep 2 1/2 C Y bucket	60 50	104	155
4650	24 deep 3 1/2 C Y bucket	113	157	280
4800	10 wide 20 deep 3-1/2 C Y bucket w/trench box	84	127	211
4850	24 deep 3-1/2 C Y bucket	121	175	297
4950	12 wide 20 deep 3 1/2 C Y bucket w/trench box	90	134	224
4980	25 deep bucket	137	199	335

G1030 Site Earthwork



The Pipe Bedding System is shown for various pipe diameters Compacted bank sand is used for pipe bedding and to fill 12 over the pipe No backfill is included Various side slopes are shown to accommodate different soil conditions Pipe sizes vary from 6 to 84 diameter

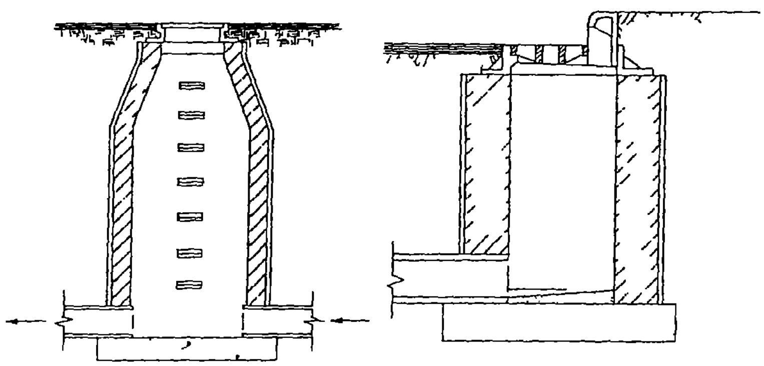
System Components	QUANTITY	UNIT	COST PER L F MAT	INST	TOTAL
SYSTEM G1030 815 1440					
PIPE BEDDING SIDE SLOPE 0 TO 1 1 WIDE PIPE SIZE 6 DIAMETER					
Borrow bank sand 2 mile haul machine spread	067	C Y	74	42	1 16
Compaction vibrabng plate	067	C Y		14	14
TOTAL			74	56	1 30

G1030 815	Pipe Bedding	COST PER L F MAT	INST	TOTAL
1440	Pipe bedding side slope 0 to 1 1 wide pipe size 6 diameter	74	56	1 30
1460	2 wide pipe size 8 diameter	1 63	1 22	2 85
1480	Pipe size 10" diameter	1 67	1 26	2 93
1600	Pipe size 12 diameter	1 72	1 28	3
1520	3 wide pipe size 14 diameter	2 83	2 11	4 94
1540	Pipe size 16 diameter	2 86	2 14	5
[illegible]0	Pipe size 16 diameter	2 89	2 16	5 06
[illegible]0	Pipe size 18 diameter	2 96	2 22	5 18
[illegible]0	4 wide pipe size 20" diameter	4 27	3 20	7 47
1620	Pipe size 21 diameter	4 31	3 23	7 54
1640	Pipe size 24 diameter	4 42	3 32	7 74
1660	Pipe size 30" diameter	4 52	3 39	7 91
1680	6 wide pipe size 32 diameter	7 90	6 90	13 80
1700	Pipe size 36 diameter	8 10	6 10	14 20
1720	7 wide pipe size 48 diameter	10 55	7 90	18 46
1740	8 wide pipe size 60" diameter	13 20	9 86	23 05
1760	10 wide pipe size 72 diameter	19 05	14 25	33 30
1780	12 wide pipe size 84 diameter	26	19 35	45 35
2140	Side slope 1/2 to 1 1 wide pipe size 6 diameter	1 55	1 17	2 72
2160	2 wide pipe size 8 diameter	2 57	1 93	4 50
2180	Pipe size 10 diameter	2 79	2 09	4 88
2200	Pipe size 12 diameter	2 98	2 23	5 21
2220	3 wide pipe size 14 diameter	4 28	3 21	7 49
2240	Pipe size 15 diameter	4 39	3 29	7 68
2260	Pipe size 16 diameter	4 52	3 39	7 91
2280	Pipe size 18 diameter	4 79	3 59	8 38
2300	4 wide pipe size 20" diameter	6 30	4 74	11 04
2320	Pipe size 21 diameter	6 45	4 85	11 30
2340	Pipe size 24 diameter	6 95	5 20	12 15
2360	Pipe size 30 diameter	7 80	5 80	13 60
2380	6 wide pipe size 32 diameter	11 45	8 60	20 05
2400	Pipe size 36 diameter	12 25	9 15	21 40
2420	7 wide pipe size 48 diameter	16 76	12 65	29 30
[illegible]0	8 wide pipe size 60 diameter	22	16 35	38 36
[illegible]0	10 wide pipe size 72 diameter	30 50	23	53 50
[illegible]80	12 wide pipe size 84 diameter	40 50	30 60	71
2620	Side slope 1 to 1 1 wide pipe size 6 diameter	2 37	1 77	4 14
2640	2 wide pipe size 8 diameter	3 55	2 66	6 21

G1030 Site Earthwork

G1030 815	Pipe Bedding	COST PER L F		
		MAT	INST	TOTAL
2660	Pipe size 10" diameter	3 89	2 92	6 81
2680	Pipe size 12 diameter	4 28	3 21	7 49
2700	3 wide pipe size 14 diameter	5 75	4 30	10 05
2720	Pipe size 15 diameter	5 95	4 43	10 38
2740	Pipe size 15 diameter	6 15	4 61	10 76
2760	Pipe size 18 diameter	6 60	4 95	11 55
2780	4 wide pipe size 20 diameter	8 35	6 25	14 60
2800	Pipe size 21 diameter	8 60	6 45	15 05
2820	Pipe size 24 diameter	9 40	7 05	16 45
2840	Pipe size 30 diameter	11	8 25	19 25
2860	6 wide pipe size 32 diameter	15	11 25	26 25
2880	Pipe size 35 diameter	16 35	12 25	28 60
2900	7 wide pipe size 48 diameter	23	17 20	40 20
2920	8 wide pipe size 60' diameter	30 50	23	53 50
2940	10 wide pipe size 72 diameter	42	31 50	73 50
2960	12 wide pipe size 84 diameter	55 50	41 50	97

G3030 Storm Sewer



Manhole Catch Basin

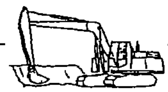
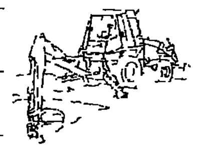
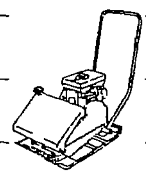
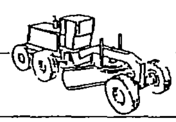
The Manhole and Catch Basin System includes excavation with a backhoe a formed concrete footing frame and cover cast iron steps and compacted backfill

The Expanded System Listing shows manholes that have a 4 5' and 6 inside diameter riser Depths range from 4 to 14 Construction material shown is either concrete concrete block precast concrete or brick

System Components	QUANTITY	UNIT	COST PER EACH MAT	COST PER EACH INST	COST PER EACH TOTAL
SYSTEM G3030 210 1920					
MANHOLE/CATCH BASIN BRICK 4 I D RISER 4 DEEP					
Excavation hydraulic backhoe 3/8 C Y bucket	14 815	C Y		97 18	97 18
Trim sides and bottom of excavation	64 000	S f		51 20	51 20
Forms in place manhole base 4 uses	20 000	SFCA	14	87	101
Reinforcing in place footings #4 to #7	019	Ton	18 53	20 43	38 96
Concrete 3000 psi	925	C Y	101 75		101 75
Place and vibrate concrete footing direct chute	925	C Y		40 23	40 23
Catch basin or MH brick 4 ID 4 deep	1 000	Ea	436	850	1 285
Catch basin or MH steps heavy galvanized cast iron	1 000	Ea	14 25	11 90	25 15
Catch basin or MH frame and cover	1 000	Ea	229	195 50	424 50
Fill granular	12 954	C Y	206 62		206 62
Backfill spread with wheeled front end loader	12 954	C Y		26 56	26 56
Air tamp add	12 954	C Y		96 38	96 38
TOTAL			1 019 15	1 476 38	2 495 53

G3030 210	Manholes & Catch Basins	COST PER EACH MAT	COST PER EACH INST	COST PER EACH TOTAL
1920	Manhole/catch basin brick 4 I0 riser 4 deep	1 025	1 475	2 500
1940	6 deep	1 400	2 075	3 475
1960	8 deep	1 825	2 825	4 650
1980	10 deep	2 325	3 450	5 775
3000	12 deep	3 025	3 800	6 825
3020	14 deep	3 800	5 275	9 075
3200	Block 4 ID riser 4 deep	960	1 175	2 135
3220	6 deep	1 275	1 700	2 975
3240	8 deep	1 675	2 350	4 025
3260	10 deep	1 975	2 875	4 860
3280	12 deep	2 475	3 650	6 125
3300	14 deep	3 050	4 450	7 500
4520	Concrete cast-in-place 4 ID riser 4 deep	1 150	2 050	3 200
4640	6 deep	1 600	2 725	4 325
4660	8 deep	2 225	3 975	6 200
4680	10 deep	2 575	4 925	7 600
4700	12 deep	3 300	6 100	9 400
4720	14 deep	4 026	7 300	11 325
5820	Concrete precast 4 ID riser 4 deep	1 325	1 075	2 400
5840	6 deep	1 725	1 450	3 175

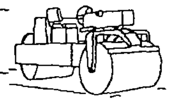
01 54 33 | Equipment Rental

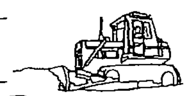
		UNIT	HOURLY OPER COST	RENT PER DAY	RENT PER WEEK	RENT PER MONTH	CREW EQUIPMENT COST/DAY	
0120	5/8 C Y capacity R015433 10	Ea	24 05	510	1 525	4 575	497 40	20
0140	3/4 C Y capacity		27 30	550	1 655	4 975	549 40	
0150	1 C Y capacity		34 70	615	1 845	5 525	646 60	
0200	1 1/2 C Y capacity 		42 50	815	2 450	7 350	830	
0300	2 C Y capacity		56 25	1 025	3 050	9 150	1 060	
0320	2 1/2 C Y capacity		75 95	1 425	4 290	12 900	1 466	
0340	3-1/2 C Y capacity		118 75	2 300	6 935	20 800	2 337	
0341	Attachments							
0342	Bucket thumbs		2 60	215	645	1 925	149 80	
0345	Grapples		2 40	187	560	1 675	131 20	
0350	Gradall type truck mounted 3 ton @ 15 radius 5/8 C Y		46 95	930	2 785	8 350	932 60	
0370	1 C Y capacity		52 15	1 125	3 360	10 100	1 089	
0400	Backhoe loader 40 to 45 H P 5/8 C Y capacity		11 20	215	645	1 925	218 60	
0450	45 H P to 60 H P 3/4 C Y capacity		15 05	275	825	2 475	285 40	
0460	80 H P 1 1/4 C Y capacity 		18 10	325	980	2 950	340 80	
0470	112 H P 1 1/2 C Y capacity		24 30	465	1 390	4 175	472 40	
0480	Attachments							
0482	Compactor 20 000 lb		4 70	123	370	1 100	111 60	
0485	Hydraulic hammer 750 ft lbs		2 70	88 50	265	795	74 60	
0486	Hydraulic hammer 1200 ft-lbs		3 60	162	485	1 450	125 80	
0500	Brush chipper gas engine 6 cutter head 35 H P		8 40	107	320	960	131 20	
0550	12 cutter head 130 H P		13 95	173	520	1 550	215 60	
0600	15 cutter head 165 H P		20 90	218	655	1 975	298 20	
0750	Bucket clamshell general purpose 3/8 C Y		1 05	36 50	110	330	30 40	
0800	1/2 C Y		1 20	43 50	130	390	35 60	
0850	3/4 C Y		1 35	53 50	160	480	42 80	
0900	1 C Y		1 40	58 50	175	525	46 20	
0950	1 1/2 C Y		2 20	78 50	235	705	64 60	
1000	2 C Y		2 30	88 50	265	795	71 40	
1010	Bucket dragline medium duty 1/2 C Y		60	23 50	70	210	18 80	
1020	3/4 C Y		65	24 50	73	219	19 80	
1030	1 C Y		65	26	78	234	20 80	
1040	1 1/2 C Y		1 05	40	120	360	32 40	
1050	2 C Y		1 10	45	135	405	35 80	
1070	3 C Y		1 60	55	165	495	45 80	
1200	Compactor manually guided 2-drum vibratory smooth roller 7 5 H P		5 75	162	485	1 450	143	
1250	Rammer compactor gas 1000 lb blow		2 25	41 50	125	375	43	
1300	Vibratory plate gas 18 plate 3000 lb blow 		2 20	22 50	67	201	31	
1350	21 plate 5000 lb blow		2 70	28	84	252	38 40	
1370	Curb builder/extruder 14 H P gas single screw		11 30	238	715	2 150	233 40	
1390	Double screw		11 95	278	835	2 500	262 60	
1500	Disc harrow attachment for tractor		39	64 50	193	580	41 70	
1750	Extractor piling see lines 2500 to 2750							
1810	Feller buncher shearing & accumulating trees 100 H P	Ea	27 30	545	1 630	4 900	544 40	
1860	Grader self-propelled 25 000 lb		23 65	445	1 340	4 025	457 20	
1910	30 000 lb 		27 30	525	1 580	4 750	534 40	
1920	40 000 lb		38 60	810	2 425	7 275	793 80	
1930	55 000 lb		51 10	1 150	3 465	10 400	1 102	
1950	Hammer pavement demo hyd gas self-prop 1000 to 1250 lb		22 35	325	970	2 900	372 80	
2000	Diesel 1300 to 1500 lb		33 53	645	1 940	5 825	656 25	
2050	Pile driving hammer steam or air 4150 ft lb @ 225 BPM		7 00	283	850	2 550	226	
2100	8750 ft -lb @ 145 BPM		8 55	425	1 275	3 825	323 40	
2150	15 000 ft-lb @ 60 BPM		8 90	460	1 375	4 125	346 20	
2200	24 450 ft lb @ 111 BPM		12 35	545	1 635	4 900	425 80	
2250	Leads 20 long for pile driving hammers up to 20 000 ft -lb		95	28 50	85	255	24 60	
2300	30 long for hammers over 20 000 ft -lb		1 55	71 50	215	645	55 40	

01 54 33 | Equipment Rental

R015433-10

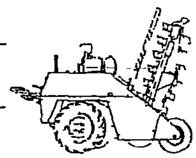
		01 54 33 Equipment Rental	UNIT	HOURLY OPER COST	RENT PER DAY	RENT PER WEEK	RENT PER MONTH	CREW EQUIPMENT COST/DAY
20	2350	Diesel type hammer 22 400 ll -lb	Ea	24 85	630	1 895	5 675	577 80
	2400	41 300 ft-lb		31 40	685	2 050	6 150	661 20
	2450	141 000 ft -lb		47 65	1 175	3 525	10 600	1 086
	2500	Vib elec hammer/extractor 200 KW diesel generator 34 H P		38 80	650	1 975	5 925	705 40
	2550	80 H P		69 40	965	2 895	8 575	1 134
	2500	150 H P		130 95	1 875	5 650	17 000	2 178
	2700	Extractor steam or air 700 ft -lb		15 40	480	1 440	4 325	411 20
	2750	1000 ft -lb		17 50	600	1 795	5 375	499
	2800	Log chipper up to 22 diam 500 H P		37 90	450	1 350	4 050	573 20
	2850	Logger for skidding & stacking logs 150 H P		42 80	875	2 520	7 850	866 40
	2900	Rake spring tooth with tractor		10 69	226	678	2 025	221 10
	3000	Roller vibratory tandem smooth drum 20 H P		6 65	128	385	1 150	130 20
	3050	35 H P		9 25	242	725	2 175	219
	3100	Towed type vibratory compactor smooth drum 50 H P		21 20	335	1 010	3 025	371 60
	3150	Sheepsfoot 50 H P		22 20	365	1 100	3 300	397 60
	3170	Landfill compactor 220 HP		65 95	1 275	3 805	11 400	1 289
	3200	Pneumatic tire roller 80 H P		13 10	340	1 015	3 050	307 80
	3250	120 H P		20 00	610	1 825	5 475	525
	3300	Sheepsfoot vibratory roller 200 H P		53 90	960	2 875	8 525	1 006
	3320	340 H P		76 10	1 400	4 235	12 700	1 456
	3350	Smooth drum vibratory roller 75 H P		19 55	525	1 570	4 700	470 40
	3400	125 H P		25 60	650	1 945	5 825	593 80
	3410	Rotary mower brush 50" with tractor		14 45	248	745	2 225	264 60
	3420	Rototiller 5 HP walk-behind		2 09	62 50	188	555	54 30
	3450	Scrapers towed type 9 to 12 C Y capacity		5 95	170	510	1 525	149 60
	3500	12 to 17 C Y capacity		6 55	185	555	1 675	163 40
	3550	Scrapers self-propelled 4 x 4 drive 2 engine 14 C Y capacity		113 05	1 625	4 890	14 700	1 882
	3600	2 engine 24 C Y capacity		157 55	2 625	7 845	23 500	2 829
	3640	32 44 C Y capacity		184 65	3 175	9 495	28 500	3 376
	3650	Self loading 11 C Y capacity		49 30	890	2 565	8 000	927 40
	3700	22 C Y capacity		93 80	1 875	5 610	16 800	1 872
	3710	Screening plant 110 H P w/ 5 x 10 screen		30 60	405	1 210	3 625	486 80
	3720	5 x 15 screen		32 70	505	1 520	4 550	565 60
	3850	Shovels see Cranes division 01590 600						
	3860	Shovel/backhoe bucket 1/2 C Y	Ea	2 00	58 50	175	525	51
	3870	3/4 C Y		2 05	66 50	200	500	56 40
	3880	1 C Y		2 15	75	225	675	62 20
	3890	1 1/2 C Y		2 30	88 50	265	795	71 40
	3910	3 C Y		2 60	123	370	1 100	94 80
	3960	Stump chipper 18 deep 30 H P		7 60	160	480	1 450	156 80
	4110	Tractor crawler with bulldozer torque converter diesel 80 H P		20 55	360	1 075	3 225	379 40
	4150	105 H P		28 80	505	1 510	4 525	532 40
	4200	140 H P		34 55	645	1 940	5 825	664 40
	4260	200 H P		52 85	1 075	3 240	9 725	1 071
	4310	300 H P		57 65	1 400	4 235	12 700	1 388
	4360	410 H P		90 40	1 825	5 470	15 400	1 817
	4370	500 H P		120 70	2 450	7 320	22 000	2 430
	4380	700 H P		179 00	3 750	11 250	33 800	3 682
	4400	Loader crawler torque conv diesel 1 1/2 C Y 80 H P		18 90	345	1 030	3 100	357 20
	4450	1 1/2 to 1 3/4 C Y 95 H P		22 20	435	1 305	3 925	438 60
	4510	1 3/4 to 2 1/4 C Y 130 H P		29 90	660	1 980	5 950	635 20
	4530	2 1/2 to 3-1/4 C Y 190 H P		42 80	920	2 755	8 275	893 40
	4560	3-1/2 to 5 C Y 275 H P		69 85	1 275	3 815	11 400	1 242
	4610	Tractor loader wheel torque conv 4 x 4 1 to 1 1/4 C Y 65 H P		13 30	200	600	1 800	226 40
	4620	1 1/2 to 1 3/4 C Y 80 H P		17 35	273	820	2 450	302 80
	4550	1 3/4 to 2 C Y 100 H P		19 70	315	940	2 825	345 60

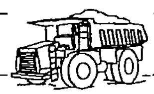




01 54 33 | Equipment Rental

			Unit	Hourly Oper Cost	Rent per Day	Rent per Week	Rent per Month	Crew Equipment Cost/Day	
20	4710	2 1/2 to 3-1/2 C Y 130 H P R015433 10	Ea	21 55	355	1 070	3 200	385 40	20
	4730	3 to 4-1/2 C Y 170 H P		28 00	520	1 560	4 575	536	
	4750	5-1/4 to 5 3/4 C Y 270 H P		45 35	775	2 320	6 950	825 80	
	4810	7 to 8 C Y 375 H P		77 35	1 450	4 340	13 000	1 487	
	4870	12 1/2 C Y 690 H P		105 25	2 225	6 655	20 000	2 181	
	4880	Wheeled skid steer 10 C F 30 H P gas		7 50	130	390	1 175	138	
	4890	1 C Y 78 H P diesel		14 05	223	570	2 000	246 40	
	4891	Attachments for all skid steer loaders							
	4892	Auger	Ea	52	87	261	785	56 35	
	4893	Backhoe		69	116	347	1 050	74 90	
	4894	Broom		71	118	355	1 075	76 70	
	4895	Forks		24	40 50	121	365	25 10	
	4896	Grapple		58	97 50	292	875	53 05	
	4897	Concrete hammer		1 02	170	511	1 525	110 35	
	4898	Tree spade		76	127	381	1 150	82 30	
	4899	Trencher		89	148	443	1 325	95 70	
	4900	Trencher chain boom type gas operator walking 12 H P		3 55	46 50	140	420	56 40	
	4910	Operator riding 40 H P		11 15	258	775	2 325	244 20	
	5000	Wheel type diesel 4 deep 12 wide		61 55	790	2 375	7 125	967 40	
	5100	Diesel 6 deep 20 wide		73 90	1 850	5 550	16 700	1 701	
	5150	Chain type diesel 5 deep 8 wide		27 45	575	1 725	5 175	564 60	
	5200	Diesel 8 deep 16 wide		70 75	1 950	5 850	17 600	1 736	
	5210	Tree spade self propelled		13 30	267	800	2 400	266 40	
	5250	Truck dump 2-axle 12 ton 8 CY payload 220 H P		22 95	208	625	1 875	308 60	
	5300	Three axle dump 16 ton 12 CY payload 400 H P		40 35	300	900	2 700	502 80	
	5350	Dump trailer only rear dump 16-1/2 C Y		4 50	125	375	1 125	111	
	5400	20 C Y		4 85	142	425	1 275	123 80	
	5450	Flatbed single axle 1 1/2 ton rating		17 55	63 50	190	570	179 20	
	5500	3 ton rating		21 25	90	270	810	224	
	5550	Off highway rear dump 25 ton capacity		52 25	1 075	3 240	9 725	1 066	
	5500	35 ton capacity		53 15	1 100	3 320	9 950	1 089	
	5610	50 ton capacity		69 20	1 450	4 360	13 100	1 426	
	5620	65 ton capacity		74 25	1 550	4 615	13 800	1 517	
	5630	100 ton capacity		95 45	1 975	5 950	17 900	1 956	
	6000	Vibratory plow 25 H P walking		6 20	60	180	540	85 60	
40	0010	**GENERAL EQUIPMENT RENTAL** without operators R015433 10							40
	0150	Aerial lift scissor type to 15 high 1000 lb cap electric	Ea	2 60	55	165	495	53 80	
	0150	To 25 high 2000 lb capacity		3 05	80	240	720	72 40	
	0170	Telescoping boom to 40 high 500 lb capacity gas		16 75	310	925	2 775	319	
	0180	To 45 high 500 lb capacity		17 70	350	1 075	3 225	355 60	
	0190	To 60 high 500 lb capacity		19 80	475	1 420	4 250	442 40	
	0195	Air compressor portable 6 5 CFM electric		44	12	36	108	10 70	
	0196	Gasoline		73	18	54	162	16 55	
	0200	Air compressor portable gas engine 60 C F M		11 55	46 50	140	420	120 40	
	0300	160 C F M		13 45	50	150	450	137 50	
	0400	Diesel engine rotary screw 250 C F M		12 85	98 50	295	885	161 80	
	0500	365 C F M		17 35	122	355	1 100	211 80	
	0550	450 C F M		22 00	152	455	1 375	257	
	0600	600 C F M		38 55	213	540	1 925	436 40	
	0700	750 C F M		38 70	222	565	2 000	442 60	
	0800	For silenced models small sizes add		3%	5%	5%	5%		
	0900	Large sizes add		5%	7%	7%	7%		
	0920	Air tools and accessories							
	0930	Breaker pavement 50 lb	Ea	40	9	27	81	8 60	
	0940	80 lb		40	9 35	28	84	8 80	





How to Use the City Cost Indexes

What you should know before you begin

RSMeans City Cost Indexes (CCI) are an extremely useful tool to use when you want to compare costs from city to city and region to region.

This publication contains average construction cost indexes for 316 U.S. and Canadian cities covering over 930 three digit zip code locations, as listed directly under each city.

Keep in mind that a City Cost Index number is a percentage ratio of a specific city's cost to the national average cost of the same item at a stated time period.

In other words, these index figures represent relative construction factors (or, if you prefer, multipliers) for Material and Installation costs, as well as the weighted average for Total In Place costs for each CSI MasterFormat division. Installation costs include both labor and equipment rental costs. When estimating equipment rental rates only for a specific location, use 01543 CONTRACTOR EQUIPMENT index.

The 30 City Average Index is the average of 30 major U.S. cities and serves as a National Average.

Index figures for both material and installation are based on the 30 major city average of 100 and represent the cost relationship as of July 1, 2006. The index for each division is computed from representative material and labor quantities for that division. The weighted average for each city is a weighted total of the components listed above it, but does not include relative productivity between trades or cities.

As changes occur in local material prices, labor rates and equipment rental rates, the impact of these changes should be accurately measured by the change in the City Cost Index for each particular city (as compared to the 30 City Average).

Therefore, if you know (or have estimated) building costs in one city today, you can easily convert those costs to expected building costs in another city.

In addition, by using the Historical Cost Index, you can easily convert National Average building costs at a particular time to the approximate building costs for some other time. The City Cost Indexes can then be applied to calculate the costs for a particular city.

Quick Calculations

Location Adjustment Using the City Cost Indexes

$$\frac{\text{Index for City A}}{\text{Index for City B}} \times \text{Cost in City B} = \text{Cost in City A}$$

Time Adjustment for the National Average Using the Historical Cost Index

$$\frac{\text{Index for Year A}}{\text{Index for Year B}} \times \text{Cost in Year B} = \text{Cost in Year A}$$

Adjustment from the National Average

$$\frac{\text{Index for City A}}{100} \times \text{National Average Cost} = \text{Cost in City A}$$

Since each of the other RSMeans publications contains many different items, any one item multiplied by the particular city index may give incorrect results. However, the larger the number of items compiled, the closer the results should be to actual costs for that particular city.

The City Cost Indexes for Canadian cities are calculated using Canadian material and equipment prices and labor rates in Canadian dollars. Therefore, indexes for Canadian cities can be used to convert U.S. National Average prices to local costs in Canadian dollars.

How to use this section

1. Compare costs from city to city.

In using the RSMeans Indexes, remember that an index number is not a fixed number but a ratio: It's a percentage ratio of a building component's cost at any stated time to the National Average cost of that same component at the same time period. Put in the form of an equation:

$$\frac{\text{Specific City Cost}}{\text{National Average Cost}} \times 100 = \text{City Index Number}$$

Therefore, when making cost comparisons between cities, do not subtract one city's index number from the index number of another city and read the result as a percentage difference. Instead, divide one city's index number by that of the other city. The resulting number may then be used as a multiplier to calculate cost differences from city to city.

The formula used to find cost differences between cities for the purpose of comparison is as follows:

$$\frac{\text{City A Index}}{\text{City B Index}} \times \text{City B Cost (Known)} = \text{City A Cost (Unknown)}$$

In addition, you can use RSMeans CCI to calculate and compare costs division by division between cities using the same basic formula. (Just be sure that you're comparing similar divisions.)

2. Compare a specific city's construction costs with the National Average.

When you're studying construction location feasibility, it's advisable to compare a prospective project's cost index with an index of the National Average cost.

For example, divide the weighted average index of construction costs of a specific city by that of the 30 City Average, which = 100.

$$\frac{\text{City Index}}{100} = \text{\% of National Average}$$

As a result, you get a ratio that indicates the relative cost of construction in that city in comparison with the National Average.

3. Convert U.S. National Average to actual costs in Canadian City.

$$\frac{\text{Index for Canadian City}}{100} \times \text{National Average Cost} = \text{Cost in Canadian City in \$ CAN}$$

DIVISION		TEXAS																
		BEAUMONT			CORPUS CHRISTI			DALLAS			EL PASO			FORT WORTH			HOUSTON		
		MAT	INST	TOTAL	MAT	INST	TOTAL	MAT	INST	TOTAL	MAT	INST	TOTAL	MAT	INST	TOTAL	MAT	INST	TOTAL
015433	CONTRACTOR EQUIPMENT		88.4	88.4		95.4	95.4		98.4	98.4		87.3	87.3		87.3	87.3		99.1	99.1
0241, 31 - 34	SITE & INFRASTRUCTURE, DEMOLITION	99.7	85.2	89.6	125.7	80.5	94.2	123.3	86.4	97.6	100.7	84.5	89.4	102.4	85.3	90.5	125.8	84.0	95.7
0310	Concrete Forming & Accessories	105.4	49.5	57.3	98.0	36.3	44.9	95.0	56.0	61.4	97.3	44.4	51.7	93.5	55.2	60.5	94.4	64.1	68.3
0320	Concrete Reinforcing	99.1	40.8	71.0	84.1	46.3	65.9	97.3	52.9	75.9	94.0	45.1	70.4	94.0	52.8	74.1	101.0	60.2	81.3
0330	Cast-in-Place Concrete	92.3	51.5	77.2	100.6	43.4	79.4	93.1	53.2	78.4	87.0	39.0	69.3	95.4	49.0	78.2	95.2	68.7	85.4
03	CONCRETE	91.9	49.4	72.3	88.3	42.6	67.2	88.5	56.0	73.5	86.3	43.5	66.5	90.2	53.3	73.2	91.4	66.5	79.9
04	MASONRY	101.5	58.1	75.5	79.9	50.2	62.2	101.6	58.6	75.9	96.6	47.9	67.5	94.2	58.5	72.9	96.5	60.9	75.2
05	METALS	105.6	62.8	93.1	98.0	75.1	91.4	98.9	80.4	93.5	100.5	60.2	88.8	97.4	66.8	88.5	110.3	87.9	103.8
06	WOOD, PLASTICS & COMPOSITES	112.8	49.9	78.9	112.9	35.7	71.3	97.1	56.4	75.2	100.3	47.2	71.7	100.8	66.3	76.9	97.9	64.4	79.8
07	THERMAL & MOISTURE PROTECTION	104.7	56.7	86.0	95.2	45.3	75.8	94.2	62.8	81.9	95.7	53.8	79.4	100.2	51.9	81.4	97.6	64.1	84.5
08	OPENINGS	95.3	45.8	83.1	107.5	37.2	90.2	104.3	52.3	91.5	92.8	42.7	80.4	86.9	52.2	78.3	105.0	63.2	94.7
0920	Plaster & Gypsum Board	96.3	49.2	67.3	94.3	34.4	57.4	90.9	55.8	69.2	86.4	46.4	61.7	87.3	55.8	67.8	94.7	63.9	75.7
0950, 0980	Ceilings & Acoustic Treatment	100.9	49.2	69.2	87.7	34.4	55.0	94.1	55.8	70.6	89.2	46.4	62.9	91.7	55.8	69.6	101.4	63.9	78.[illegible]
0960	Flooring	112.0	73.0	101.4	108.9	44.8	91.4	99.9	54.9	87.6	113.4	64.3	100.1	147.1	43.9	119.1	99.1	60.5	88.6
0990	Wall Finishes & Painting/Coating	94.0	47.9	66.3	106.7	55.7	76.1	100.6	55.3	73.4	96.9	34.1	59.2	98.2	50.7	69.6	101.7	59.8	76.5
09	FINISHES	95.5	53.5	73.5	97.9	39.2	67.2	96.9	55.4	75.2	96.4	47.4	70.7	107.5	52.5	78.7	100.0	62.7	80.5
COVERS	DIVS. 10, 14, 25, 28, 41, 43, 44	100.0	78.1	95.5	100.0	75.3	94.9	100.0	79.4	95.8	100.0	65.7	93.0	100.0	79.0	95.7	100.0	83.1	96.9
21, 22, 23	FIRE PROTECTION, PLUMBING & HVAC	100.0	61.5	84.2	99.8	42.2	76.2	99.8	65.3	85.6	100.0	36.2	73.8	100.0	64.6	81.4	100.0	69.7	87.5
26, 27, 3370	ELECTRICAL, COMMUNICATIONS & UTIL.	93.8	66.9	80.6	98.4	51.5	75.4	97.2	71.2	84.4	95.1	53.4	74.6	97.2	62.1	79.9	95.8	68.2	82.3
MF2004	WEIGHTED AVERAGE	98.8	60.9	82.6	98.3	50.9	78.0	98.8	65.8	84.6	96.6	50.2	76.8	97.3	59.9	81.3	101.1	70.0	87.8

DIVISION		TEXAS																
		LAREDO			LUBBOCK			ODESSA			SAN ANTONIO			WACO			WICHITA FALLS		
		MAT	INST	TOTAL	MAT	INST	TOTAL	MAT	INST	TOTAL	MAT	INST	TOTAL	MAT	INST	TOTAL	MAT	INST	TOTAL
015433	CONTRACTOR EQUIPMENT		86.7	86.7		97.6	97.6		87.3	87.3		89.6	89.6		87.3	87.3		87.3	87.3
0241, 31 - 34	SITE & INFRASTRUCTURE, DEMOLITION	91.0	85.0	86.8	132.0	83.1	97.9	102.4	85.3	90.5	90.7	90.0	90.2	101.0	85.3	90.1	101.8	85.0	90.7
0310	Concrete Forming & Accessories	92.5	36.6	44.3	97.2	39.3	47.3	97.8	37.3	45.7	92.5	55.2	60.4	98.5	38.8	47.1	98.5	40.4	48.5
0320	Concrete Reinforcing	84.8	46.3	66.3	95.3	48.3	72.6	94.0	48.2	71.9	90.6	49.7	70.9	94.0	47.7	71.7	94.0	48.9	72.3
0330	Cast-in-Place Concrete	77.5	59.5	70.8	93.2	46.0	75.8	93.1	42.1	74.2	75.0	67.4	72.8	84.0	50.5	71.6	89.7	45.6	73.4
03	CONCRETE	78.6	47.3	64.2	88.4	45.3	68.5	89.3	42.2	67.6	78.8	59.0	69.7	84.8	45.6	66.7	87.7	44.9	67.9
04	MASONRY	87.5	49.7	64.9	97.8	46.0	66.8	98.5	46.2	67.2	87.3	60.3	71.2	95.2	55.2	71.3	95.7	58.2	73.3
05	METALS	99.4	61.3	88.3	104.4	78.5	96.9	100.1	63.6	89.5	100.1	66.4	90.3	100.6	64.0	90.0	100.6	65.7	90.4
06	WOOD, PLASTICS & COMPOSITES	94.5	35.5	62.7	100.8	39.4	67.8	100.7	37.4	66.6	94.5	53.6	72.5	106.9	34.7	68.0	106.9	39.3	70.5
07	THERMAL & MOISTURE PROTECTION	91.5	50.2	75.4	90.4	47.9	73.8	99.0	43.4	77.3	91.5	63.6	80.6	99.5	47.4	79.2	99.5	52.3	81.1
08	OPENINGS	100.7	37.8	85.2	104.2	40.3	88.4	92.8	38.9	79.5	102.6	53.6	90.6	86.9	36.1	74.4	86.9	41.9	75.8
0920	Plaster & Gypsum Board	91.6	34.4	56.3	88.4	38.3	57.5	88.0	36.3	56.1	91.6	52.9	67.7	88.0	33.6	54.4	88.0	38.3	57.3
0950, 0980	Ceilings & Acoustic Treatment	87.7	34.4	55.0	93.5	38.3	59.6	91.7	36.3	57.7	87.7	52.9	66.3	91.7	33.6	56.1	91.7	38.3	58.9
0960	Flooring	93.3	44.8	80.1	105.1	37.2	86.6	113.4	36.8	92.6	93.3	66.5	86.6	147.1	34.1	116.4	148.4	77.3	129.0
0990	Wall Finishes & Painting/Coating	93.6	52.1	68.7	108.4	31.9	62.4	96.9	31.9	57.8	93.6	52.1	68.7	98.2	32.9	58.9	101.9	52.1	72.0
09	FINISHES	90.5	38.7	63.4	99.7	37.2	66.9	97.4	35.9	65.2	90.5	56.3	72.6	107.6	35.9	70.0	108.2	48.0	76.7
COVERS	DIVS. 10, 14, 25, 28, 41, 43, 44	100.0	72.9	94.5	100.0	74.3	94.7	100.0	64.9	92.8	100.0	79.1	95.7	100.0	76.5	95.2	100.0	65.7	93.0
21, 22, 23	FIRE PROTECTION, PLUMBING & HVAC	99.8	38.0	74.4	99.6	47.6	78.3	100.1	34.6	73.2	99.8	67.1	86.4	100.1	55.3	61.7	100.1	47.4	78
26, 27, 3370	ELECTRICAL, COMMUNICATIONS & UTIL.	100.1	64.8	82.8	95.5	42.3	69.4	97.1	39.4	68.8	100.6	64.8	83.0	97.1	74.0	85.7	99.3	62.4	61.
MF2004	WEIGHTED AVERAGE	95.4	51.7	76.7	99.6	51.2	78.9	97.5	45.9	75.4	95.7	65.0	82.6	97.2	56.8	79.9	97.9	55.5	79.1

DIVISION		UTAH												VERMONT					
		LOGAN			OGDEN			PROVO			SALT LAKE CITY			BURLINGTON			RUTLAND		
		MAT	INST	TOTAL	MAT	INST	TOTAL	MAT	INST	TOTAL	MAT	INST	TOTAL	MAT	INST	TOTAL	MAT	INST	TOTA
015433	CONTRACTOR EQUIPMENT		100.2	100.2		100.2	100.2		99.0	99.0		100.2	100.2		100.6	100.6		100.6	100
0241, 31 - 34	SITE & INFRASTRUCTURE, DEMOLITION	89.2	99.2	96.2	77.9	99.2	92.8	85.8	97.3	93.8	77.7	99.2	92.7	77.3	97.8	91.6	77.2	97.8	91
0310	Concrete Forming & Accessories	102.5	57.1	63.4	102.5	57.1	63.4	103.3	57.3	63.7	102.3	57.3	63.5	95.2	57.5	62.7	98.9	58.1	63
0320	Concrete Reinforcing	103.3	72.1	88.3	103.0	72.1	88.1	111.8	72.2	92.7	105.4	72.2	89.4	102.0	84.1	93.4	102.0	84.1	93
0330	Cast-in-Place Concrete	91.9	72.0	84.5	93.3	72.0	85.4	92.0	72.0	84.6	102.0	72.0	90.9	95.5	110.5	101.0	86.1	110.7	96
03	CONCRETE	111.8	65.5	90.5	101.5	65.5	84.9	111.7	65.6	90.4	121.2	65.6	95.6	105.9	81.0	94.4	102.4	81.4	92.
04	MASONRY	114.4	60.1	81.9	107.9	60.1	79.3	119.7	60.1	84.0	122.1	60.1	85.0	104.7	55.7	75.4	85.5	55.7	67
05	METALS	101.6	72.5	93.2	102.1	72.5	93.5	99.9	72.6	92.0	106.5	72.6	96.7	94.9	78.6	90.2	93.4	79.2	89
06	WOOD, PLASTICS & COMPOSITES	85.7	54.1	68.6	85.7	54.1	68.6	87.1	54.1	69.3	87.5	54.1	69.5	94.7	57.9	74.9	100.4	57.9	77
07	THERMAL & MOISTURE PROTECTION	97.7	65.8	85.3	96.4	65.8	84.5	99.6	65.8	86.4	99.7	65.8	86.5	99.0	56.0	82.2	99.0	64.8	85
08	OPENINGS	88.6	55.7	80.5	88.6	55.7	80.5	92.6	55.7	83.5	90.4	55.7	81.9	105.3	57.5	93.5	105.3	57.5	93
0920	Plaster & Gypsum Board	79.9	52.7	63.1	79.9	52.7	63.1	80.3	52.7	63.3	82.2	52.7	64.0	104.7	56.0	74.7	103.7	56.0	74
0950, 0980	Ceilings & Acoustic Treatment	106.4	52.7	73.4	106.4	52.7	73.4	106.4	52.7	73.4	100.7	52.7	71.2	89.4	55.0	68.9	90.2	56.0	69
0960	Flooring	105.9	55.1	92.1	103.6	55.1	90.4	106.7	55.1	92.7	104.8	55.1	91.3	96.5	63.7	87.6	96.3	63.7	87
0990	Wall Finishes & Painting/Coating	98.8	44.9	66.4	98.6	44.9	66.4	98.8	63.3	77.4	101.3	63.3	78.5	91.6	37.2	58.9	91.6	37.2	58
09	FINISHES	100.3	54.7	76.4	96.5	54.7	75.6	101.1	56.7	77.9	98.6	56.7	76.7	97.3	55.8	75.6	97.2	55.8	75
COVERS	DIVS. 10, 14, 25, 28, 41, 43, 44	100.0	64.7	92.8	100.0	64.7	92.8	100.0	64.7	92.8	100.0	64.7	92.8	100.0	83.6	96.6	100.0	83.6	96
21, 22, 23	FIRE PROTECTION, PLUMBING & HVAC	99.9	67.4	86.5	99.9	67.4	86.5	99.9	67.4	86.5	100.0	67.4	86.6	100.0	65.6	85.9	100.1	65.6	86
26, 27, 3370	ELECTRICAL, COMMUNICATIONS & UTIL.	92.7	68.7	80.9	93.0	68.7	81.1	93.3	71.7	82.7	96.2	71.7	84.2	98.2	64.6	81.7	97.6	64.7	81
MF2004	WEIGHTED AVERAGE	100.0	67.3	86.0	98.1	67.3	84.9	100.5	67.9	86.5	102.5	68.0	87.8	99.5	69.0	86.4	97.9	69.4	85

A	Area Square Feet, Ampere
ABS	Acrylonitrile Butadiene Stryrene
	Asbestos Bonded Steel
	Altemating Current
	Air-Conditionung
	Asbestos Cement,
	Plywood Grade A & C
A C I	Amencan Concrete Institute
AD	Plywood Gradc A & D
Addit	Additional
Adj	Adjustable
af	Audio-frequcncy
A.G.A.	Amencan Gas Assocnuon
Agg	Aggregate
A.H	Ampere Hours
A hr	Ampere hour
A H U	Air Handling Unit
A I A.	Amencan Institute of Arclntects
AIC	Ampere Interrupting Capacity
Allow	Allowance
alt	Altitude
Alum	Alummum
a m	Ante Meridiem
Amp	Ampere
Anod	Anodized
Approx	Approximate
Apt	Apartment
Ash	Asbestos
A.S B C	Amencan Standard Building Code
Asbe	Asbestos Worker
A S H R.A E	Amencan Society of Heating
	Refrig & AC Engineers
A.S M E.	Amencan Society of Mechanical
	Engineers
A.S TM	Amencan Society for Testing and
	Matenals
Attchmt	Attaclment
	Average
	American Wire Gauge
	American Water Works Assoc
	Barrel
B&B	Grade B and Bener
	Balled & Burlapped
B &S	Bell and Spigot
B &W	Bbck and Wlute
b c c	Body-centered Cubic
B C Y.	Bank Cubic Yards
BE	Bevel End
B F	Board Feet
Bg ccm	Bag of Cement
BHP	Boiler Horsepower
	Brake Horsepower
B I	Black Iron
Bit Bitum.	Bitummous
Bk.	Backed
Bkrs	Breakers
Bldg	Building
Blk.	Block
Bm	Beam
Boil	Boilermal er
B PM	Blows per Minute
BR	Bedroom
Brg	Beanng
Brhe	Bncklayer Helper
Bric	Bncklayer
Brk.	Bnck
Brng	Bearing
Brs	Bnss
Brz	Bronze
Bsn.	Basin
Btt	Better
BTU	Bntish Ttiemial Umt
BTUH	BTU per Hour
B.U.R.	Budt up Roofing
	Interlocked Armored Cable
c	Conductivity Copper Sweit
C	Hundred Centigrade
C/C	Center to Center Cedar on Cedar
Cab	Cabmet
Cair	Air Tool Laborer
Calc	Calculated
Cap	Capacity
Carp	Caqpenter
C B	Circuit Breaker
C C A	Chromate Copper Arsenate
C C F	Hundred Cubic Feet
cd	Candela
cd/sf	Candela per Square Foot
CD	Grade of Plywood Face & Back
CDX	Plywood Grade C & D extenor
	glue
Cefi	Cement Finisher
Cem	Cement
CF	Hundred Feet
C F	Cubic Feet
CFM	Cubic Feet per Minute
c g	Center of Gravity
CHW	Chilled Water
	Conunercial Hot Water
C I	Cast Iron
C I P	Cast in Place
Circ	Circuit
C L	Carload Lot
Clab	Common Laborer
Clam	Common niaintcnance laborer
C L F	Hundred Lmear Feet
CLF	Curreot Lmuting Fuse
CLP	Cross Linked Polyethylene
cm	Cenumeier
CMP	Corr Metal Pipe
C M U	Concrete Masonry Umt
CN	Change Notice
Col	Column
CO	Carbon Dioxide
Comb	Combinauon
Compr	Compressor
Conc	Concrete
Cont	Contmuous Contmued
Corr	Corrugated
Cos	Cosme
Cot	Cotangent
Cov	Cover
C/P	Cedar on Panelmg
CPA	Control Pomt Adjustmem
Cplg	Coupling
C PM	Cnucal Path Method
CPVC	Chlorinated Polyvinyl Chloride
C Pc	Hundred Pair
CRC	Cold Rolled Channel
Creos	Creosote
Crpt	Carpet & Lmoleum Layer
CRT	Cathode ray Tube
CS	Carbon Steel Constant Shear Bar
	Joist
Csc	Cosecant
C S F	Hundred Squaie Feet
CSI	Construction Specifications
	Institute
C T	Current Transformer
CTS	Copper Tube Size
Cu	Copper Cubic
Cu Ft	Cubic Foot
cw	Contmuous Wave
C W	Cool Wlnte Cold Water
Cwi	100 Pounds
C WX	Cool White Deluxe
C Y.	Cubic Yard (27 cubic feet)
C Y/Hr	Cubic Yard per Hour
Cyl	Cylmder
d	Penny (nail size)
D	Deep Depdi Discliarge
Dis Disch	Discharge
Db	Decibel
Dbl	Double
DC	Direct Current
DDC	Direct Digital Conuol
Demob	Demobilizauon
d f u	Dramage Fixture Units
D H	Double Hung
DHW	Domcsoc Hot Water
Diag	Diagonal
Diam	Diameter
Distrib	Distnbution
Div	Division
Dk.	Deck
D L	Dead Load Diesel
DLH	Deep Long Span Bar Joist
Do	Ditto
Dp	Depth
D PS T	Double Pole Single Throw
Dt	Dnver
Dnnk	Dnnking
D S	Double Strength
D S.A.	Double Strength A Grade
D S B	Double Strength B Grade
Dty	Duty
DWV	Drain Waste Vent
DX	Deluxe White Direct Expansion
dyn	Dyne
e	Eccentricity
E	Equipment Only East
Ea.	Each
E B	Encased Bunal
Econ.	Economy
E C Y.	Embankment Cubic Yards
EDP	Electronic Data Processing
EIFS	Extenor Insulauon Finish System
E D R.	Equiv Duect Radtauon
Eq	Equation
Elec	Elccuician Elcctncal
Elev	Elevator Elevating
EMT	Elecuical Mctallic Conduit
	Thin Wall Conduit
Eng	Engme Engineered
EPDM	Ethylene Propylene Dicne
	Monomer
EPS	Expanded Polystyrene
Eqhv	Equip Oper Heavy
Eqlt	Equip Oper Light
Eqmd	Equip Oper Medium
Eqmm	Equip Oper Master Mechanic
EqoL	Equip Oper Oilers
Equip	Equipment
ERW	Elecuic Resistance Welded
E S	Energy Saver
Est	Estimated
esu	Electrostatic Umts
E W	Each Way
EWT	Entcrmg Water Temperature
Excav	Excavation
Exp	Expansion Exposure
Ext.	Extenor
Extru	Extrusion
f	Fiber stress
F	Fahrenheit, Female Fill
Fab	Fabncated
FBGS	Fiberglass
FC	Footcandles
f e e	Face-centered Cubic
f'c	Compressive Stress in Concrete
	Extreme Compressive Stress
FE	Front End
FEP	Fluonnated Ethylene Propylene
	(Teflon)
FG	Flat Gram
FH A	Federal Housing Administration
Fig	Figure
Fin	Finished
Fixt.	Fixture
Fl Oz	Fluid Ounces
Flr	Floor
FM	Frequency Modulation
	Factory Mutual
Fmg	Framing
Fndn	Foundation
Fori	Foreman Inside

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2009 Edition

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Engineering News Record

Design & Construction Resources

	Unit	Total
02110 50 TREE CUTTING & CLEARING (Cont)		
Loading and trucking		
For machine load per load round trip		
1 mile	EA	84 50
3 mile	EA	96 00
5 mile	EA	110
10 mile	EA	140
20 mile	EA	210
Hand loaded round trip		
1 mile	EA	210
3 mile	EA	240
5 mile	EA	270
10 mile	EA	330
20 mile	EA	410
02210 10 HAULING MATERIAL		
Haul material by 10 cy dump truck round trip		
1 mile	C Y	4 56
2 mile	C Y	5 47
5 mile	C Y	7 47
10 mile	C Y	8 21
20 mile	C Y	9 12
30 mile	C Y	11 00
Site grading cut & fill sandy clay 200 haul 75	C Y	3 28
Spread topsoil by equipment on site	C Y	3 65
Site grading (cut and fill lo 6) less than 1 acre		
75 hp dozer	C Y	5 47
1 5 cy backhoe/loader	C Y	8 21
02210 30 BULK EXCAVATION		
Excavation by small dozer		
Large areas	C Y	1 64
Small areas	C Y	2 74
Trim banks	C Y	4 11
Hydraulic excavator		
1 cy capacity		
Light material	C Y	3 52
Medium material	C Y	4 23
Wet material	C Y	5 28
Blasted rock	C Y	6 04
1 1/2 cy capacity		
Light material	C Y	1 42
Medium material	C Y	1 89
Wet material	C Y	2 27
Wheel mounted front end loader		
7/8 cy capacity		
Light material	C Y	2 83
Medium material	C Y	3 24
Wet material	C Y	3 78
Blasted rock	C Y	4 53
1 1/2 cy capacity		
Light material	C Y	1 62
Medium material	C Y	1 74
Wet material	C Y	1 89
Blasted rock	C Y	2 06
2 1/2 cy capacity		
Light material	C Y	1 33
Medium material	C Y	1 42
Wet material	C Y	1 51
Blasted rock	C Y	1 62
Track mounted front end loader		
1 1/2 cy capacity		
Light material	C Y	1 89
Medium material	C Y	2 06
Wet material	C Y	2 27
Blasted rock	C Y	2 52
2 3/4 cy capacity		
Light material	C Y	1 13
Medium material	C Y	1 26