2702 South 1030 West, Suite 10
Salt Lake City, Utah 84119
Ph: 801.270.9400 Fax: 801.270.9401

TRANSMITTAL

TO:	Ty Howard State of Utah Department of Environmental Quality Division of Waste Management and Radiation Control 195 North 1950 West Salt Lake City, Utah 84114 Attn: Matt Sullivan	DATE: 11/6/20 IGES JOB #: 00853 SENT VIA: Email

We are delivering to you the following:

Copies	Date	Description
1	11/6/20	NPSWSSD Construction and Demolition (C&D) Repermit Application
1	11/6/20	Class VI Permit Checklist

X	For approval		Approved as submitted		Resubmit		Copies for approval
	For your use		Approved as noted		Submit		Copies for distribution
	As requested		Returned for corrections		Return		Corrected prints
	For your review and comment		Other				

Remarks:
Attached are PDF files associated with the NPSWSSD Construction and Demolition (C&D) Repermit Application. Please call or email with any questions or comments.

SIGNED: Brett Wickstrom

NPSWSSD CONSTRUCTION AND DEMOLITION (C&D) 2020 LANDFILL REPERMIT APPLICATION

November 6, 2020

NPSWSSD CONSTRUCTION AND DEMOLITION (C&D)
2020 LANDFILL REPERMIT
APPLICATION

Submitted by:

Prepared by

IGES, INC.

2702 South 1030 West, Suite 10

Salt Lake City, Utah 84119

November 6, 2020

ANNOTATED TABLE OF CONTENTS

Part **Title**

Introduction

Includes summary of permit with technical and operational issues highlighted

I. General Information

Includes State of Utah Solid Waste Permit Application forms

II. General Report

Includes information required by Utah Administrative Rule R315-305

III. Technical Report

Includes information required by Utah Administrative Rule R315-305

APPENDICES

APPENDIX A – Drawings
APPENDIX B – Evidence of Ownership
APPENDIX C – Landfill Forms
APPENDIX D – 2010 Permit Renewal Application
APPENDIX E – Financial Assurance

INTRODUCTION

This document presents an application to repermit and operate a construction and demolition (C&D) landfill south of Fairfield in Utah County, Utah. The landfill is on land owned by North Pointe Solid Waste Special Service District (NPSWSSD) and operated by NPSWSSD personnel. The Class VI Landfill is currently operated under permit number 0012R2 issued by the Utah Division of Waste Management and Radiation Control (DWMRC) Board.

The area to be permitted is in the west quarter Section 5, Township 7 South, Range 2 West, Salt Lake Baseline and Meridian, Utah County, Utah. Drawing 1 (Appendix A) shows the location of the landfill.

Part I of this document duplicates the standard form outlining General Information pertaining to the site. Part II is a General Report that includes a facility description and landfill operations plan. Part III is the Technical Report and includes details on the design of the site closure, post-closure care and financial assurance.

PART I – GENERAL INFORMATION

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 ☒ Renewal Application ☐ Facility Expansion ☐ Modification

For Renewal Applications, Facility Expansion Applications and Modifications Enter Current Permit Number 0012R2

III. Facility Name and Location

Name of Facility: North Pointe C&D Landfill

Site Address (street or directions to site)	County	City	Zip Code	Telephone
480N 18150 W	Utah	Fairfield	84043	

Township	Range	Section(s)	Quarter/Quarter Section	Quarter Section
7S	2	5&8		

Main Gate Latitude	degrees	minutes	seconds	Longitude	degrees	minutes	seconds
	40	14	28		112	5	49

IV. Facility Owner(s) Information

Name of Facility Owner: North Pointe Solid Waste Special Service District

Address (mailing): 2000 West 200 South

City	State	Zip Code	Telephone
Lindon	UT	84042	(801) 225-8538

V. Facility Operator(s) Information

Name of Facility Operator: Same as above

Address (mailing):

City	State	Zip Code	Telephone

VI. Property Owner(s) Information

Name of Property Owner: Same as above

Address (mailing):

City	State	Zip Code	Telephone

VII. Contact Information

Owner Contact	Title
Neil Schwendiman	District Manager

Address (mailing): 2000 West 200 South

City	State	Zip Code	Telephone	Email Address	Alternative Telephone (cell or other)
Lindon	UT	84042	(801) 225-8538	neil.np@gmail.com	(435) 668-5799

Operator Contact	Title

Address (mailing): Same as above

City	State	Zip Code	Telephone	Email Address	Alternative Telephone (cell or other)

Property Owner Contact	Title

Address (mailing): Same as above

City	State	Zip Code	Telephone	Email Address	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 _____	☐	☐

Note: Disposal of dead animals must be approved by the Director

IX. Facility Area

Facility Area	298	acres
Disposal Area	51	acres
Design Capacity		
Years	50+	
Cubic Yards	27000000	
Tons	13500000	

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 of Authorized Owner Representative: [signature]	Title: DISTRICT MANAGER	Date: 11/10/2020
Name typed or printed: NEIL SCHWENDIMAN	Address: 2000 W 2005 LINDON UT 84042	
Email Address: neil.northpointe@gmail.com	Alternative Telephone (cell or other): 435-668-5799	
Signature of Authorized Land Owner Representative (if applicable)	Title	Date
Name typed or printed	Address	
Email Address	Alternative Telephone (cell or other)	
Signature of Authorized Operator Representative (if applicable)	Title	Date
Name typed or printed	Address	
Email Address	Alternative Telephone (cell or other)	

PART II - GENERAL REPORT

TABLE OF CONTENTS

1.0 - FACILITY DESCRIPTION

The North Pointe Construction and Demolition (C&D) Landfill is located in the Town of Fairfield in Utah County. The facility is located 1.5 miles south of the center of town. The facility is a Class VI landfill that receives yard waste, inert waste, and construction and demolition (C&D) waste. The landfill consists of 298 acres of property which is flat and generally sloping to the south and east with approximately 70 acres of the property currently fenced. Of the 70 acres currently fenced, 6 acres have been closed with 51 acres currently being utilized for disposal. Site structures include a scale and scale house, small office, and a diesel fuel tank. The landfill site is operated by excavating each cell below grade to provide both airspace for waste disposal as well as to provide soils for landfill operations. The location of the Landfill is presented in the drawings in Appendix A.

1.1 AREA SERVED

The Landfill primarily serves the residents and businesses located in the western side of Utah County.

1.2 WASTE TYPES

Based upon the recent C&D waste stream and estimates of future trends; approximately 450-550 tons per day of C&D waste is expected to be delivered to the Landfill.

The waste diverted into the Landfill shall be limited to the following wastes:

- Yard Waste – brush, branches, clippings, leaves and grass.
- Construction Wastes – waste generated from construction and includes building materials used in construction. Construction related materials include packaging materials from products, waste lumber, wallboard, boxes from appliances, empty paint cans, empty caulking tubes, and empty sealer and adhesive cans. “EMPTY” means that no more than 10% of the product remains inside the container.

- Demolition Wastes – waste generated from the destruction or remodeling of buildings and houses. Demolition Wastes may include furnaces, pipes, ducting and water heaters. Furniture and other materials that are not part of the building structure must be removed before demolition.
- Untreated wood, including pallets and crates
- Asphalt from roads and other surfaces

Waste materials that are specifically prohibited from the landfill include the following:

- Household Wastes (Municipal Solid Waste)
- Contaminated Soils
- Friable asbestos
- Tanks of any kind
- Railroad ties
- Cardboard not directly generated from construction or demolition activities
- Furniture of all kind
- Metal not directly generated from construction or demolition activities
- Electronics of all kind
- Treated lumber

1.3 FACILITY HOURS

The operating hours for the facility are 8:00 a.m. to 5:00 p.m. year-round. The facility is open Monday through Friday with the following holidays being observed:

- New Year's Day
- Memorial Day
- Independence Day (July 4th)
- Labor Day
- Thanksgiving Day
- Christmas Day

The following facility information is posted at the gate:

- Landfill Owner
- Days of Landfill Operation
- Hours of Landfill Operation
- Instructional Signs (no scavenging, no hazardous materials, dump in designated areas, etc.)
- Emergency Telephone Numbers

1.4 LANDFILL EQUIPMENT

The following equipment is on site and used in Landfill operations:

- Dozer
- Loader
- Compactor
- Scraper
- Water Truck
- Fuel Truck
- Dump Truck

1.5 LANDFILL PERSONNEL

The following briefly presents the responsibilities for all on-site Landfill personnel at the Landfill:

District Manager - The District Manager (Manager) is responsible for all matters relating to the solid waste program for the Landfill. The Manager is responsible for the landfill operations meeting all Division of Waste Management and Radiation Control (DWMRC) permit requirements. The Manager conducts regular facility inspections and monitors all Landfill

activities. The Manager is responsible for all operational documentation including the preparation of the annual reports to DWMRC.

Landfill Supervisor - The Landfill Supervisor (Supervisor) is responsible for all matters relating to the day-to-day solid waste program for the Landfill; including the overall landfill operations, equipment operations, waste management and site development. The Supervisor is responsible that the Landfill operations meet all DWMRC permit requirements. The Supervisor conducts regular facility inspections and monitors all Landfill activities.

Landfill Operators – The Landfill Operators (Operators) are responsible for all day-to-day equipment and waste placement activities at the Landfill. These responsibilities include, waste acceptance and placement, traffic control, visual inspection of incoming waste, random waste screening operations, and general construction as it pertains to Landfill operations.

Scale House Attendant – The Scale House Attendants (Attendants) are responsible for the initial screening of all incoming waste. The Attendants track all incoming waste and updates Landfill records as required. The Attendants are also responsible for all transactions at the scale house, and the receipt of all monies.

2.0 - LEGAL DESCRIPTION

The landfill is located on property currently owned by North Pointe Solid Waste Special Service District. The facility is located in Township 7 South, Range 2 West, Sections 5 & 8, Salt Lake Baseline Meridian, Utah County, Utah.

The overall legal description is as follows:

Commencing at a point in the center land of a county road, said point being located N00°45'22"W along the Section Line 1343.60 feet, and East 1257.45 feet from the West Quarter Corner of Section 5, Township 7 South, Range 2 West, Salt Lake Base and Meridian, thence S89°42'06"E, 74.22 feet, thence S00°16'40"E, 1347.56 feet, thence S89°48'26"E along the quarter section line 1320.48 feet to the center of Section 5, thence S00°12'08"W, along the quarter section line 2646.06 feet to the quarter corner common to Section 5 and Section 8, thence S00°20'54"W along the quarter section line 2707.93 feet to the center off said section 8, Township 7 South, Range 2 West, thence N89°32'40"E, along the quarter section line 1327.91 feet, thence S00°20'12"W, 1325.56 feet, thence N89°34'40"E, 1328.17 feet, thence S00°19'3l"W, along the section line 1326.33 feet to the Southeast Corner off said Section 8, thence S89°36'40"W, along the section line 2656.85 feet to the South Quarter Corner off said Section 8, thence S89°36'21 "W, along the Section line 837.61 feet to the center line of a county road, thence along the center line of said county road as follows N00°12'43"E, 302.92 feet, thence N00°39'59"E, 1196.28 feet, thence N00°37'44"E, 2427.90 feet, thence N00°35'40"E, 1861.44 feet, thence N00°52' l 2"E, 405.93 feet, thence along the arc of a 400.00 foot radius curve to the left 316.45 feet (chord bears N21 °47'38"W, 308.26 feet), thence N44°27'28"W, 473.22 feet, thence N45°02'02"W, 137.61 feet, thence N44°56'18"W, 131.01 feet, thence N42°46'2l"W, 92.34 feet, thence along the arc of a 360.00 foot radius curve to the right, 313.28 feet (chord bears Nl7°50'34"W, 303.49 feet), thence N07°05'14"E, 428.46 feet, thence N05°05'24"E, 201.10 feet, thence N04°53'03"E, 678.65 feet, thence N06°19'16"E, 569.05 feet,

thence along the arc of a 2550.00 foot radius curve to the left, 130.05 feet (chord bears N04°51 '36"E, 130.04 feet) to the point of beginning Less and exempting the following:
Beginning at a point in the center line of a county road said point being located N00°45'22"W, along the Section Line 1343.60 feet, and East 1257.45 feet from the West Quarter Corner of Section 5, Township 7 South, Range 2 West, Salt Lake Base and Meridian and running thence S89°42'06"E, 74.22 feet, thence S00°16'40"E, 447.43 feet to a fence line, thence S 89°59'07"W 122.66 feet along said fence line and the extension thereof to the center of said county road, thence N06°19' 16"E, 320.22 feet along the center line of said county road, thence northerly 130.06 feet along the arc of a curve to the left, having a radius of 2550.00 feet (chord bears N04°51 '36"E, 130.037 feet) to the point of beginning.

Evidence of ownership is included as Appendix B.

3.0 – NORTH POINTE C&D LANDFILL OPERATIONS PLAN

The Operation Plan for the Landfill has been written to address the requirements of Utah State Solid Waste Regulations and describes the ongoing operations of the North Pointe C&D Landfill.

The general arrangement of the Landfill is as indicated on Drawing 2 (Appendix A). The following section details the operational specifics of the Landfill. Forms used to document the operations of the Landfill are included in Appendix C.

3.1 SCHEDULE OF CONSTRUCTION

The Landfill was an ongoing C&D landfill operation owed by Cedar Valley Landfill LC that started operation in 2002 and was purchased by NPSWSSD in 2013. Formal permit to operate the facility was formally transferred to NPSWSSD on May 2, 2013.

The construction of the Landfill started at the north property boundary with the scale house and scale operation and the initial landfill operations just south of the existing entrance. The Landfill operation continues to move south with plans to relocate the scale house and scale southward at some point in the future.

3.2 DESCRIPTION OF WASTE HANDLING PROCEDURES

3.2.1 General

The waste control program is designed to detect and deter attempts to dispose of hazardous, municipal solid waste or other unacceptable wastes at the Landfill. The program is designed to protect the health and safety of employees, customers, and the general public, as well as to protect against the contamination of the environment.

The Landfill is open for public and private disposal. Signs are posted along the Landfill access road to clearly indicate (1) the types of wastes that are accepted at the C&D facility; (2) the types of wastes not accepted at the site; and (3) the penalty for illegal disposal.

- All vehicles delivering wastes enter through the scale house area and are met by the Scale House Attendant. The Attendant inquires as to the contents of each incoming load and enter the description of the vehicle and waste content into the scale software program.
- Any vehicle suspected of carrying unacceptable materials (liquid waste, sludges, or hazardous waste) will be prevented from entering the disposal areas unless the driver can provide evidence that the waste is acceptable for disposal at the site. NPSWSSD reserves the right to refuse service to any suspect load. Vehicles carrying unacceptable materials will be required to exit the site without discharging their loads.

- Loads will be regularly surveyed at the tipping area. If a discharged load contains inappropriate or unacceptable material, the discharger will be required to reload the material and remove it from the Landfill. If the discharger is not immediately identified, the area where the unacceptable material was discharged will be cordoned off. Unacceptable material will be moved to a designated area for identification and preparation for proper disposal.

No open burning or smoking is allowed near the work face.

3.2.2 Waste Acceptance Records

A monthly summary of all landfill transactions is created and kept on file at the Landfill or at the NPSWSSD operations at the Lindon Transfer Station as part of the monthly billing activities. Any or all transactions may be retrieved as necessary.

3.2.3 Waste Disposal

Ideally, the C&D wastes will be dumped at the toe of the work face when possible and spread up the slope in one to two-foot lifts, keeping the slope at a typical five to one (horizontal to vertical) configuration. Depending on the configuration of the working face and site access, the waste will occasionally be pushed downslope into the working face.

Work face dimensions will be kept narrow enough to minimize blowing litter and reduce the amount of soil needed for cover.

Typically, the Compactor is operated with the blade facing uphill. Equipment operations across the slope are avoided to minimize the potential of equipment tipping over. In addition to safety concerns, a toe of slope to crest of slope working orientation provides the following benefits:

- Increases effective compaction.
- Increased visibility for waste placement and compaction.
- More uniform waste distribution.

The wastes will be compacted by making three to five passes up and down the slope. Compaction reduces litter, differential settlement, and the quantities of cover soil needed. Compaction also extends the life of the site, reduces unit costs, and leaves fewer voids to help reduce potential vector problems. Care is taken that no holes are left in the compacted waste. Voids are filled with additional waste as they develop. At a minimum, cover soils will be applied to all areas of the active cell at a minimum of every 30 days. Historically, the waste is been covered with soil weekly to minimize the impact of any potential landfill fires.

3.2.4 Special Wastes – Wastes Excluded from the Landfill

3.2.4.1 Used Oil and Batteries

Used Oil and Batteries are not accepted at the Landfill. NPSWSSD directs patrons with used oil to "Used Oil Recycling Centers."

3.2.4.2 Appliances

White goods are not accepted at the Landfill.

3.2.4.3 Tires

The Landfill accepts small quantities of tires from the general public. Only tires larger than a rim size of 24.5 inches are accepted at the facility.

3.2.4.4 Dead Animals

Dead animals are not accepted at the Landfill.

3.2.4.5 Asbestos Waste

Asbestos waste is not accepted at the Landfill.

3.2.4.6 Grease By-Products

Grease By-Product wastes are not accepted at the Landfill.

3.2.4.7 Sewer Sludge

Sewer sludge of any nature (wet or dry) is not accepted at the Landfill.

3.3 WASTE INSPECTION

3.3.1 Landfill Spotting

Learning to identify and exclude prohibited and hazardous waste from the Landfill is required to maintain the Class VI classification and necessary for the safe operation of the Landfill. The Operators are required to receive initial and periodic hazardous waste screening inspection training. Waste screening certificates of the training received are kept in the personnel files.

3.3.2 Random Waste Screening

Random inspections of incoming loads are conducted at least weekly or on a minimum of 1% of incoming loads (whichever is greater). If frequent violations are detected, additional random checks will be scheduled at the discretion of the Supervisor.

If a suspicious or unknown waste is encountered, the Operators proceeds with the waste screening as follows:

- The driver of the vehicle containing the suspect material is directed to the waste screening area.
- The Random Load Inspection form (Appendix C) is completed.
- The suspect material is spread out with landfill equipment or hand tools and visually examined. Suspicious marking or materials, like the ones listed below, are investigated further:
  - Containers labeled hazardous
  - Material with unusual amounts of moisture
  - Biomedical (red bag) waste
  - Unidentified powders, smoke, or vapors
  - Liquids, sludges, pastes, or slurries
  - Asbestos or asbestos contaminated materials

- Batteries
- Other wastes not accepted by the Landfill

- The District Manager is called if unstable wastes that cannot be handled safely or radioactive wastes are discovered or suspected.

3.3.3 Removal of Hazardous or Prohibited Waste

Should hazardous or prohibited wastes be discovered during random waste screening or during tipping, the waste will be removed from the Landfill as follows:

- The waste will be loaded back on the hauler's vehicle. The hauler is then informed of the proper disposal options.
- If the hauler or generator is no longer on the premises and is known, they will be asked to retrieve the waste and informed of the proper disposal options.
- The Supervisor will arrange to have the waste transported to the proper disposal site and then bill the original hauler or generator.

A record of the removal of all hazardous or prohibited wastes will be kept in the site operational records.

3.3.4 Hazardous or Prohibited Waste Discovered After the Fact

If hazardous or prohibited wastes are discovered at the Landfill after the hauler has left the premises, the following procedure will be used to remove them:

- Access to the area will be restricted.
- The Manager will be immediately notified.
- The Operator will remove the waste from the working face if it is safe to do so.
- The waste will be isolated in a secure area of the Landfill and the area cordoned off.
- Local authorities will be notified as appropriate.

The DWMRC, the hauler (if known), and the generator (if known) will be notified within 24 hours of the discovery. The generator (if known) will be responsible for the proper cleanup, transportation, and disposal of the waste.

3.3.5 Notification Procedures

The following agencies and people are contacted if any hazardous materials are discovered at the Landfill:

- Neil Schwendiman, District Manager .....(435) 668-5799
- Utah County Central Dispatch 911
- Utah County Fire Department .....(801) 851-4141
- Utah County Health Department .....(801) 851-7095
- Director, DWMRC.....(801) 536-0200

A record of conversation will be completed as each of the entities is contacted. The record of conversation will be kept in the site operational records.

3.4 FACILITY MONITORING AND INSPECTION

3.4.1 Groundwater

The Landfill is not required to monitor groundwater.

3.4.2 Surface Water

Run-on diversion structures have been installed around the perimeter of the active Landfill during the initial construction. The diversion structures include both ditches and berms. Potential run-on waters will be diverted away from the working face of the Landfill.

In general, surface water that falls within the Landfill will naturally be contained in the active area of the landfill. All potential run-on will be directed away from the Landfill via berms.

Run-off from the final cover will be managed by a combination of berms and ditches. The berms will be placed to divert the water around the active area to ditches. The Drawings (Appendix A) illustrate the locations and details of the run-off control structures.

Facility staff will inspect the drainage system monthly. Temporary repairs will be made as required to any observed deficiencies until permanent repairs can be scheduled. NPSWSSD or a licensed general contractor will repair drainage facilities as required.

3.4.3 Leachate Collection

The Landfill is not required to collect or monitor leachate.

3.4.4 Landfill Gas

The Landfill is not required to monitor landfill gas.

3.4.5 General Inspections

Routine inspections are necessary to prevent malfunctions and deterioration, operator errors, and discharges that may cause or lead to release of wastes to the environment or a threat to human health. Operators are responsible for conducting and recording routine inspections of the landfill facilities according to the following schedule:

- Operators perform pre-operational inspections of all equipment daily. A post-operational inspection is performed at the end of each shift while equipment is cooling down.
- All equipment is on a regular maintenance schedule. A logbook is maintained on each piece of equipment and any repairs and comments concerning the inspection are contained in the log.

- Facility inspections are completed on a quarterly basis. Any needed corrective action items are recorded and the Operators complete needed repairs. If a problem is of an urgent nature, the problem will be corrected immediately.

3.5 CONTIGENCY AND CORRECTIVE ACTION PLANS

The Utah County Fire Department will be contacted in all cases where hazardous materials are suspected to be involved. The following sections outline procedures to be followed in case of fire, explosion, run-on/run-off contamination, or suspected groundwater contamination:

3.5.1 Fire

The potential for fire is a concern in any landfill. The Landfill staff follows a waste handling procedure to minimize the potential for a landfill fire. If any load comes to the Landfill on fire, the driver of the vehicle will be directed to a pre-designated area away from the working face. The burning waste will be unloaded, spread out, and immediately covered with sufficient amounts of soil to smother the fire. Once the burning waste cools and is deemed safe, the material will then be incorporated into the working face. Some loads coming to the Landfill may be on fire but not detected until after being unloaded at the working face. If a load of waste that is on fire is unloaded at the working face, the load of waste will be immediately removed from the working face, spread out, and covered with soil.

The Utah County Fire department will be called if it appears that Landfill personnel and equipment cannot contain any fire at the Landfill. The Utah County Fire department will also be called if a fire is burning below the Landfill surface or is difficult to reach or isolate.

In case of fire, the District Manager will be notified immediately. A written report detailing the event will be placed in the operating record within seven days, including any corrective action taken.

3.5.2 Explosion

If an explosion occurs or seems possible, all personnel and customers will be accounted for and the Landfill evacuated. Corrective action will be immediately evaluated and implemented as soon as practicable.

The District Manager will be notified immediately and the Utah County Fire department called. The DWMRC Director will be notified immediately.

3.5.3 Failure of Run-On/Run-Off Containment

The purpose of the run-on/run-off control systems is to manage the stormwater falling in or near the Landfill. Were possible, water will be diverted away from the Landfill by utilizing ditches and berms. These ditches will be inspected on a regular basis and repaired as needed. All precipitation falling near the Landfill will flow around the perimeter of the Landfill and eventually towards the center of Cedar Valley.

If a run-off ditch or berm fails, temporary berms or ditches will be constructed until a permanent run-off structure can be repaired.

Any temporary berms or other structures will be checked at least every 2 hours during the storm event until storm water flow has stopped. Permanent improvements or repairs will be made as soon as practicable.

The Supervisor will be notified immediately if a failure of the run-off systems is discovered. The event will be fully documented in the operating record, including corrective action within 14 days.

3.5.4 Groundwater Contamination

The Landfill has no ground water monitoring wells. If ground water contamination is ever suspected, studies to evaluate the potential contamination will be conducted and the existence

and/or extent of contamination will be documented. This program may include the installation of ground water monitoring wells. A ground water monitoring program would be developed and corrective action taken as deemed necessary, with the approval of the DWMRC Director.

3.6 CONTINGENCY PLAN FOR ALTERNATIVE WASTE HANDLING

The most probable reason for a disruption in the waste handling procedures at the Landfill will be weather related. The Landfill may close during periods of inclement weather such as high winds, heavy rain, snow, flooding, or any other weather-related condition that would make travel or operations dangerous. The Landfill may also close for other reasons like fire, natural disaster, etc. In general, the NPSWSSD staff minimizes the possibility of disruption of waste disposal services from an operational standpoint.

In case of equipment failure, replacement equipment will be mobilized from the NPSWSSD Transfer Station operations or leased to continue operations while repairs are being made.

3.7 MAINTENANCE PLAN

3.7.1 Groundwater Monitoring System

The Landfill is currently exempt from requirements for groundwater monitoring. As a result, no groundwater monitoring system is planned.

3.7.2 Leachate Collection and Recovery System

The Landfill is currently exempt from requirements for leachate collection. As a result, no leachate collection and recovery system is planned.

3.7.3 Gas Monitoring System

The Landfill is currently exempt from requirements for a landfill gas monitoring system. No gas collection system is planned.

3.8 DISEASE AND VECTOR CONTROL

The vectors encountered at the Landfill are flies, birds, mosquitoes, rodents, skunks, and snakes. Due to the rural location of the landfill, stray house pets are occasionally encountered at the landfill. The program for controlling these vectors is as follows:

3.8.1 Insects

The elimination of breeding areas is essential in the control of insects. Landfill staff will minimize the breeding areas by covering the waste with soil at a minimum of every 30 days and maintaining surfaces to reduce ponded water.

3.8.2 Rodents

Reducing potential food sources minimizes rodent populations at the Landfill. Due to the nature of the C&D wastes, no significant numbers of mice or rats have been observed.

In the unlikely event of a significant increase in the number of rodents at the Landfill, a professional exterminator will be contacted. The exterminator would then establish an appropriate protocol for pest control in accordance with all county, state and federal regulations.

3.8.3 Birds

The Landfill has had minimal problems with birds. Good landfilling practices of waste compaction, daily covering of working faces, the minimization of ponded water, and the nature of the waste at the site has alleviated most of the bird problems. If the occasional need arises, the birds will be encouraged to leave by using cracker and whistler shells.

3.8.4 Household Pets

Because of the Landfills location, some stray cats and dogs may wander onto Landfill property. When stray animals are encountered (and can be caught), they are turned over to the animal

shelter. If the Operators are unable to apprehend the animals, they are chased off the property.

3.8.5 Wildlife

The Landfill has a variety of wildlife located on or near the landfill property. Wildlife includes deer, snakes, foxes, skunks, and coyotes. If problem skunks or snakes are encountered, they will be exterminated. If other site wildlife becomes a problem, the Landfill staff will coordinate with the Division of Wildlife Resources to provide methods and means to eliminate the problem.

In the event that any of these vectors become an unmanageable problem, the services of a professional exterminator will be employed.

3.8.6 Fugitive Dust

The roads leading to the Landfill are paved, however; access roads to the working face are improved dirt/gravel roads and will need occasional dust control measures. General operational activities and site access by vehicles compounded by the occasional high wind may present a fugitive dust problem. If the dust problem elevates above the "minimum avoidable dust level", the Operators will apply water to problem areas.

3.8.7 Litter Control

The nature of the C&D waste received at the Landfill is such that will naturally minimize the blowing of litter. However; due to the nature of Landfilling operations, blowing litter will still be an occasional problem. Landfill personnel perform routine litter cleanup to keep the Landfill and surrounding properties clear of windblown debris.

Whenever possible, the working face is placed downwind so that blowing litter is worked into the operating face. During windy conditions, landfill personnel minimize the spreading of the waste to reduce the amount of windblown debris.

3.9 RECYCLING

Currently, no recycling activities are conducted in conjunction with the ongoing C&D operations.

3.10 TRAINING PROGRAM

All personnel associated with the operation of the Landfill receive site specific training annually. The "Sanitary Landfill Operator Training Course" offered by the Solid Waste Association of North America (SWANA) is required by all employees. SWANA waste screening is also required of all Operators. Certificates of completion are kept in personnel files.

Regular safety and equipment maintenance training sessions are held to ensure that employees are aware of the latest technologies and that good safety practices are used at all times.

3.11 RECORDKEEPING

An operating record is maintained as part of a permanent record on the following items:

- Number of vehicles entering the landfill and types of wastes received on a monthly basis. Daily logs forms are submitted to the NPSWSSD Transfer Station operations for processing.
- Deviations from the approved Plan of Operation.
- Personnel training and notification procedures.
- Random load inspection log.

3.12 SUBMITTAL OF ANNUAL REPORT

NPSWSSD staff will submit a copy of its annual report to the DWMRC Director by March 1 of each year for the most recent calendar or fiscal year of facility operation. The annual report will include facility activities during the previous year and will include, at a minimum, the following:

- Name and address of facility.
- Calendar or fiscal year covered by the annual report.
- Annual quantity, in tons or volume, in cubic yards, and estimated in-place density in pounds per cubic yard of solid waste.
- Annual update of required financial assurances mechanism pursuant to Utah Administrative Code.
- Training programs completed.

3.13 INSPECTIONS

The District Manager, or his/her designee, will inspect the facility to minimize malfunctions and deterioration, operator errors, and discharges that may cause or lead to the release of wastes to the environment or to a threat to human health. These inspections will be conducted on a quarterly basis, at a minimum. A Facility Inspection Sheet (Appendix C) will be kept as part of the operating record. This log includes at least the date and time of inspection, the printed name and handwritten signature of the inspector, a notation of observations made, and the date and nature of any repairs or corrective actions. Inspection records are available to the DWMRC Director or an authorized representative upon request.

3.14 RECORDING WITH COUNTY RECORDER

Plats and other data, as required by the County Recorder, will be recorded with the Utah County Recorder as part of the record of title no later than 60 days after certification of closure.

3.15 STATE AND LOCAL REQUIREMENTS

The Landfill personnel will maintain compliance with all applicable state and local requirements including zoning, fire protection, water pollution prevention, air pollution prevention, and nuisance control.

3.16 SAFETY

Landfill personnel are required to participate in an ongoing safety program. This program complies with the Occupational Safety and Health Administration (OSHA), and the National Institute of Occupational Safety and Health (NIOSH) regulations as applicable. This program is designed to make the site and equipment as secure as possible and to educate landfill personnel about safe work practices.

3.17 EMERGENCY PROCEDURES

In the event of an accident or any other emergency situation, the Operator will immediately contact the Supervisor and proceeds as directed. If the Supervisor is not available, the Operator will call the District Manager or appropriate emergency number posted by the telephone. The emergency telephone numbers are:

- Neil Schwendiman, District Manager .....(435) 668-5799
- Utah County Central Dispatch 911
- Utah County Fire Department .....(801) 851-4141
- Utah County Health Department .....(801) 851-7095
- Director, DWMRC.....(801) 536-0200

PART III - TECHNICAL REPORT

TABLE OF CONTENTS

1.0 – ENGINEERING REPORT

1.1 CELL DESIGN

The North Pointe Construction and Demolition Landfill (Landfill) is an ongoing C&D landfill operation located south of Fairfield in Utah County. The landfill is operated as a continuous cell with no specific boundaries to indicate individual landfill cells. The operation of the landfill is progressing from north to south while bringing the elevation of the final waste to design final cover elevations. Permit Drawings (Appendix A) shows the general arrangement of the landfill.

The landfill is designed such that operational soils are excavated some 10 feet to 15 feet below the existing grade to generate operational soils for monthly cover, landfill berms and final cover construction. The excavation of the 10 to 15 feet of operational soil is also shallow enough to ensure that the bottom of the landfill is more than 10 feet above the highest ground water elevations projected for the site. A Central Valley Water Reclamation stock water well located immediately west of the landfill shows ground water at 32 feet below the ground surface.

1.1.1 Fill Method

As described in Section 3.2.3 of Part II – General Report, waste is dumped at the toe of the working face and pushed uphill into place where possible. The C&D wastes will continue to be dumped at the toe of the work face when possible and spread up the slope in one to two-foot lifts, keeping the slope at a typical five to one (horizontal to vertical) configuration. The C&D wastes will then be compacted by making three to five passes up and down the slope. Site specific geometries associated with the landfill tipper are such that waste may need to be place at the top of the working face and pushed downhill for processing.

1.1.2 Interim Cover

Interim cover will be placed in compliance with the DWMRC Class VI requirements. Section R315-305 stipulates that timbers, wood, and other combustible waste be covered as needed to avoid a fire.

1.1.3 Final Cover

As specified in Rule R315-305-5, the final cover will consist of a minimum of two feet of soil, the upper six inches of which will be topsoil material capable of sustaining native vegetation. The topsoil layer will then be seeded with indigenous grasses and other shallow rooted vegetation.

1.1.4 Final Cover Elevations

The maximum elevation for the final cover is planned to be approximately 50 to 70 feet above surrounding grade along the west edge of the landfill. The top of the final cover will slope a minimum of 5% to the east and west to provide for a positive drainage of the final cover after potential settlement. The side slopes of the final cover have been planned to be as steep as 2.4:1 for the initial areas of the landfill but will be no steeper than to 3:1 for future side slopes. These slopes will allow for some settlement without compromising the run-off characteristics of the cover soil. The Drawings (Appendix A) details the topography of the final cover.

1.2 DESIGN AND LOCATION OF RUN-ON/RUN-OFF CONTROL SYSTEMS

Run-on control berms have been installed to intercept potential run-on precipitation from areas surrounding the Landfill. Given the nature of C&D debris, most of the precipitation falling within the operating area of the Landfill will infiltrate or be stored on site until the precipitation evaporates. Any precipitation that does not infiltrate or evaporate will be contained by the run-off control berms. The run-on and run-off control berms constructed are as indicated on the Drawings (Appendix A).

The Landfill operation has had all perimeter berms and ditches installed associated with the initial landfill operations. All precipitation that falls on the site will remain on the site. As the landfill operations continues to be developed to the south, additional perimeter ditches and berms will be constructed to route the water from the Landfill's operational face but maintain the water on-site.

Appendix D (2010 Application for Permit Renewal for Cedar Valley Construction and Demolition Landfill) contains the initial design of the ditches and berms for the facility. Specifically, Appendix G of the 2010 Application for Permit Renewal for Cedar Valley Construction and Demolition Landfill contains the data utilized to generate the storm water

calculations. IGES has reviewed the initial hydrological assessment along with site records and find the existing water diversion structures to be adequate.

1.3 REGIONAL GEOLOGY

The Landfill is located in Cedar Valley in Utah County. Appendix D (2010 Application for Permit Renewal for the Cedar Valley Construction and Demolition Landfill) presents the regional geology in that documents Appendix I.

1.4 SITE SOILS

Excavations across the site that were made in conjunction with the development of the Landfill indicate that the site is predominantly silty fine sand or fine sandy silts. Geologic maps identify the soils as:

> Qlf: Lacustrine fine-grained deposits (upper Pleistocene)
> Sand, silt, marl, and calcareous clay of Lake Bonneville; thinly to very thick bedded; locally includes the white marl of Gilbert (1890); thickness to 100 feet (30 m) or more.

1.5 FLOODPLAIN

The Landfill is not located in a floodplain.

1.6 WETLANDS

The Landfill is not located in or near wetlands.

1.7 GROUND WATER

The depth to ground water; measured in the Central Valley Water Reclamation stock water well located immediately west of the landfill indicates ground water at approximately 32 feet below the ground surface. Additional information on the ground water resources in the Cedar Valley can be found in Appendix D.

2.0 – CLOSURE PLAN

2.1 CLOSURE SCHEDULE

The Landfill will be closed incrementally as portions of the landfill reach final grade. Currently, six acres of the landfill have been closed while 51 acres are currently being operated for C&D waste disposal. Based on facility life calculations using a one- and one-half percent growth rate, final closure of the facility is expected to be more than 50 years in the future.

2.2 DESIGN OF FINAL COVER

As discussed previously, the final cover will consist of a minimum of two feet of soil six inches of which will consist of a topsoil material. The future side slopes of the final cover will be no steeper than a 3:1 (horizontal to vertical) with no portion of the final cover less than a 5% slope. The cover soil will be seeded with indigenous grasses.

2.3 CAPACITY OF SITE IN VOLUME AND TONNAGE

The Landfill capacity and projected life are presented in the following summary table:

YEAR	ESTIMATED DAILY C&D WASTE (Tons)*	DAYS OF OPERATION	ESTIMATED YEARLY C&D WASTE (Tons)	ESTIMATED YEARLY C&D WASTE (Cu. Yds.)	CUMULATIVE WASTE (Cubic Yards)	REMAINING LANDFILL CAPACITY (Cu. Yds.)
						23,625,000
2020	558	260	145,145	290,290	290,290	23,048,710
2025	601	260	156,362	312,725	312,725	21,530,624
2030	648	260	168,447	336,893	336,893	19,895,214
2035	698	260	181,465	362,930	362,930	18,133,412
2040	752	260	195,489	390,979	390,979	16,235,452
2045	810	260	210,597	421,195	421,195	14,190,810
2050	873	260	226,873	453,747	453,747	11,988,150
2055	940	260	244,407	488,814	488,814	9,615,259
2060	1013	260	263,296	526,591	526,591	7,058,982
2065	1091	260	283,644	567,288	567,288	4,305,145
2070	1175	260	305,565	611,131	611,131	1,338,481

Approximate Initial Waste Disposal Capacity (Cubic Yards) =	27,000,000
Soil Usage is Approximately 12.5 Percent (Cubic Yards) =	3,375,000
Net Airspace (Cubic Yards) =	23,625,000

* Annual Growth Rate of 1.5%.

**Conversion of Tons of Waste to Cubic Yards of Waste is Based Upon an Estimated Conversion Rate of 1,000 Pounds per One Cubic Yard

2.4 FINAL INSPECTION

A final inspection will be performed at the Landfill site at the termination of landfilling activities. The final inspection will determine if the Landfill meets all the closure requirements as outlined in the permit and closure plans. The final inspection will be performed by both NPSWSSD and State of Utah DWMRC personnel.

3.0 – POST-CLOSURE CARE PLAN

3.1 SITE MONITORING

There are no post-closure monitoring requirements for ground water, leachate, or landfill gas at the Landfill since there are no ground water, leachate or gas collection systems at the facility. However; the landfill cover and other physical aspects of the Landfill will be monitored on a quarterly basis during the post-closure care period.

Landfill topography shall be visually checked for depressions that could result in ponding or rapid erosion. Irregularities in the surface of the final cover will be regraded and revegetated as needed to protect the surface from erosion and to eliminate ponding.

Side slopes will be maintained or regraded to original slopes and the top slopes will be maintained or regraded to prevent ponding. The frequency of monitoring may be reduced only after a successful demonstration to the DWMRC Director that the closed Landfill has stabilized.

During the post-closure care period, run-off from the covered Landfill will be directed toward ditches constructed to collect and transport runoff to natural drainages east and southeast of the site. The ditches will be inspected quarterly through the post-closure period. Repairs to the ditches will be completed as part of the maintenance activities.

3.2 CHANGES TO RECORD OF TITLE, LAND USE AND ZONING

The Utah County Recorder will be provided plats and a statement of fact concerning the location of any disposal site no later than 60-days after certification of closure. If necessary, the closed Landfill will be rezoned to conform to the existing Utah County zoning regulations after final closure. A description of the Landfill history and filled areas will be permanently appended to the record of title. Land use restrictions will be assigned to the site in compliance with existing regulations for closed landfills at the time of closure.

3.3 MAINTENANCE

Post-closure maintenance activities will be designed and implemented under the direction of a licensed professional engineer in response to results of inspections. Results of post-closure

maintenance shall be reported to the DWMRC Director by a professional engineer licensed in the state of Utah.

Because of the arid climate in Utah County, maintenance of final covers and run-on/run-off systems should be minimal. Final cover and control structures will be inspected quarterly as indicated previously.

Run-on/run-off control structures and final covers could be damaged by an unusually intense storm. Consequently, an unscheduled inspection may be required after any occurrence of an unusual storm event within a five-mile radius of the site. If the post-storm inspection discloses damage, it will be appraised by a licensed engineer. NPSWSSD staff will solicit bids if necessary and supervise repair construction as necessary. Funds for payment for the repair work will be disbursed from the Financial Assurance Funds after approval by the DWMRC Director.

3.4 POST-CLOSURE CONTACTS

North Pointe SWSSD .....(801) 225-8538

4.0 – FINANCIAL ASSURANCE

4.1 CLOSURE COSTS

The North Pointe Construction and Demolition (C&D) Landfill will be closed as portions of the Landfill reach final grade. The typical size of each closure is anticipated to be no larger than 10–acres. The closure cost estimates are based on the cost to close the largest area open which is the existing 51 acres. Closure cost estimates include the cost of obtaining, moving and placing the cover material, final grading, placing topsoil, fertilizing and seeding.

4.2 POST CLOSURE CARE COSTS

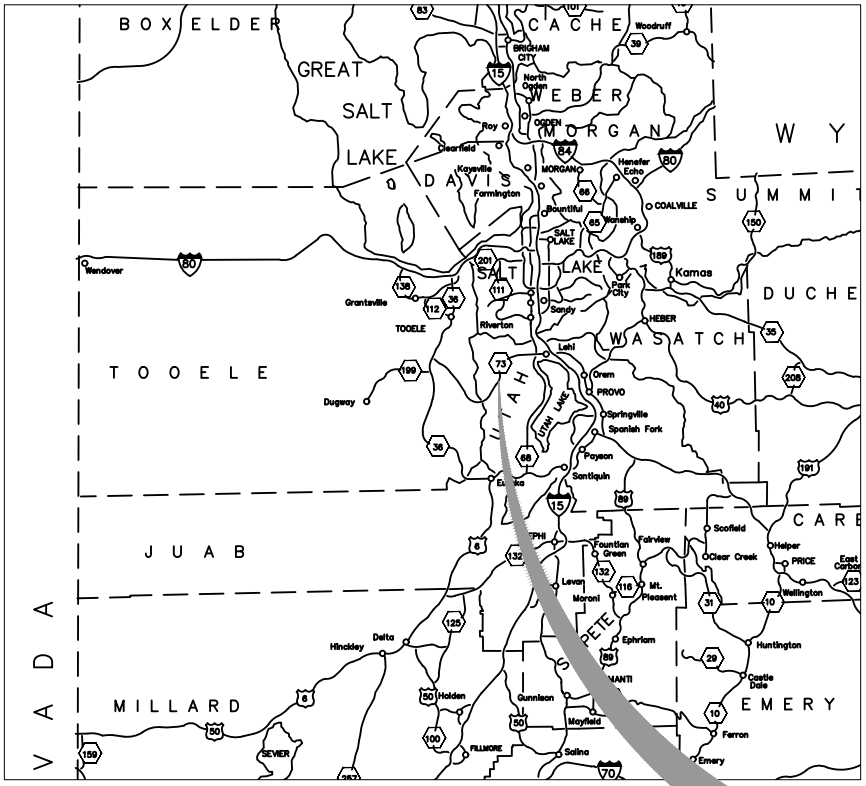
The post-closure estimate must be the cost for completing care reasonably expected during the 30-year post-closure period. These tasks include site inspections, maintenance, and record keeping.

4.3 FINANCIAL ASSURANCE MECHANISM

Financial assurance cost estimates and PTIF fund paperwork are presented in Appendix E.

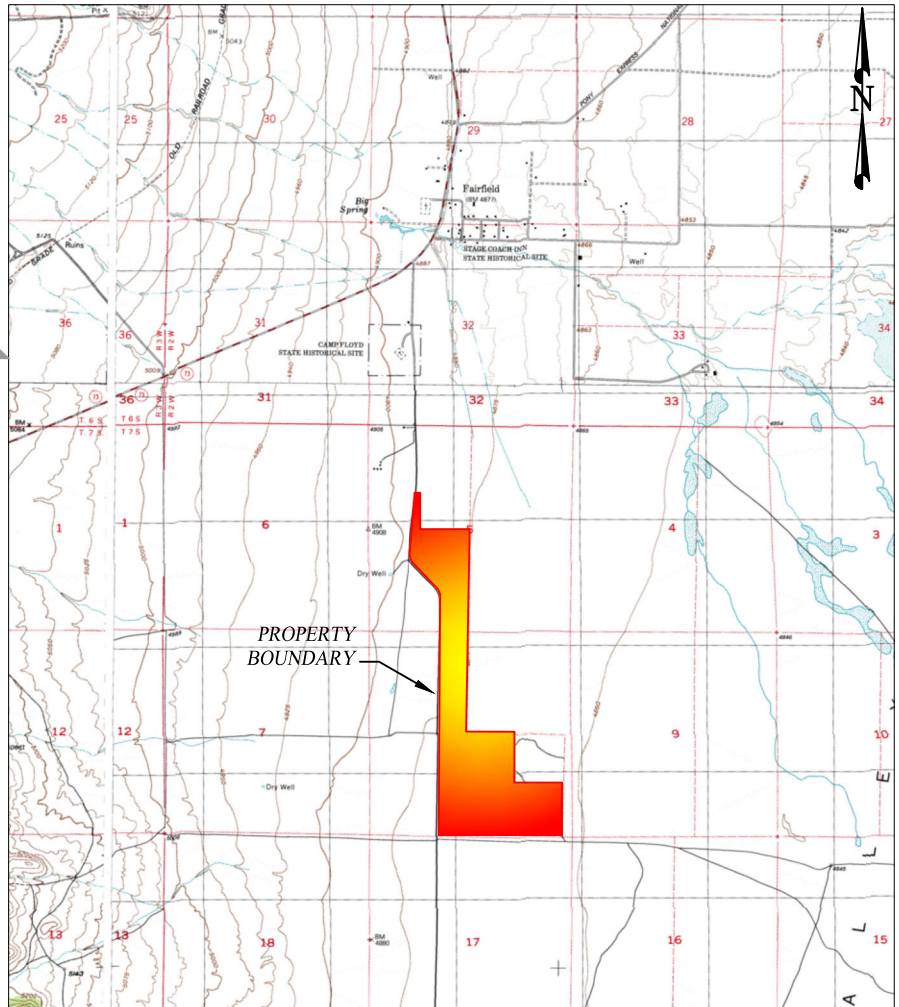
APPENDIX A

CEDAR VALL
CLASS VI LAN
2020 PERMIT RE



LOCATION MAP
(NOT TO SCALE)

VICINITY MAP



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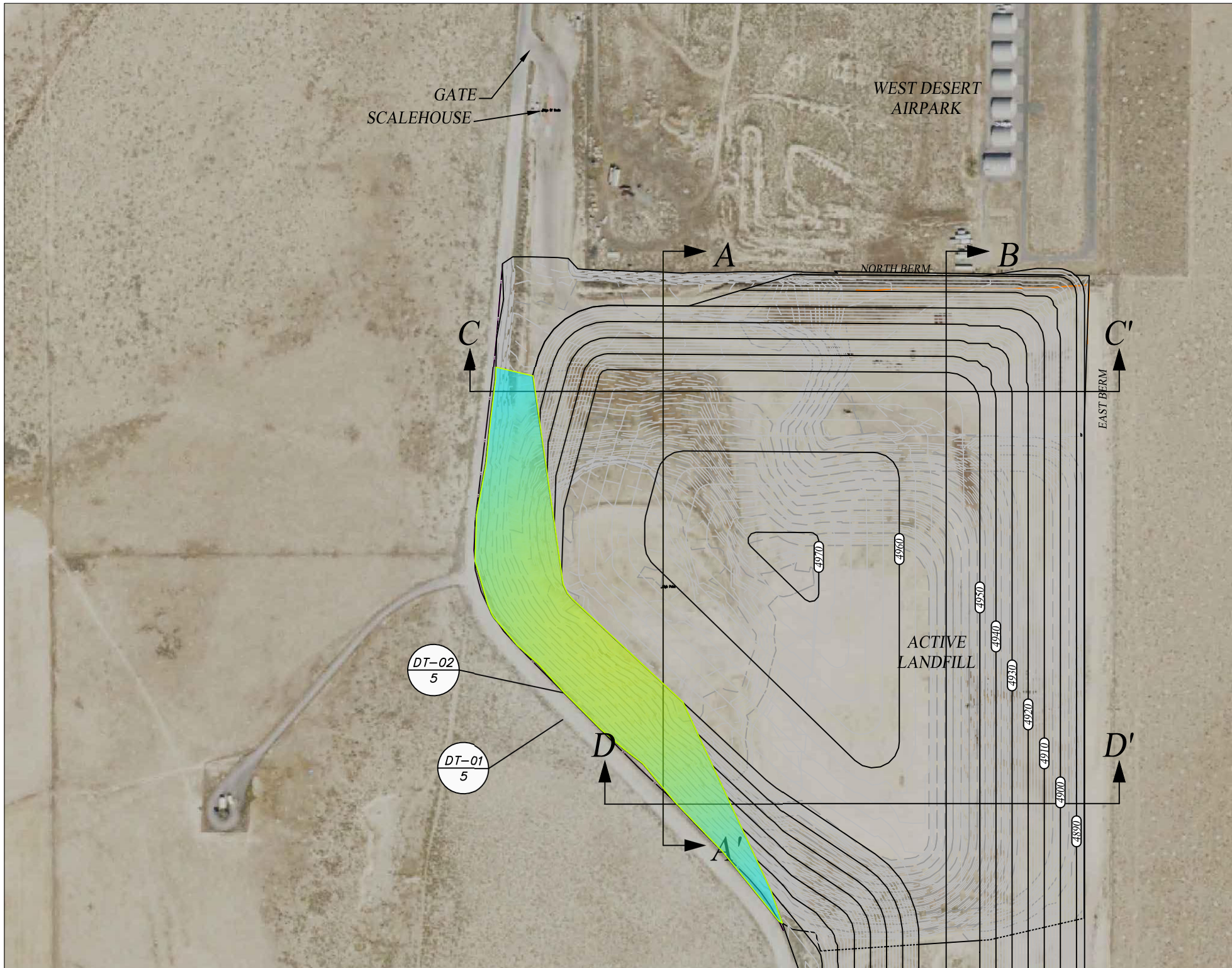
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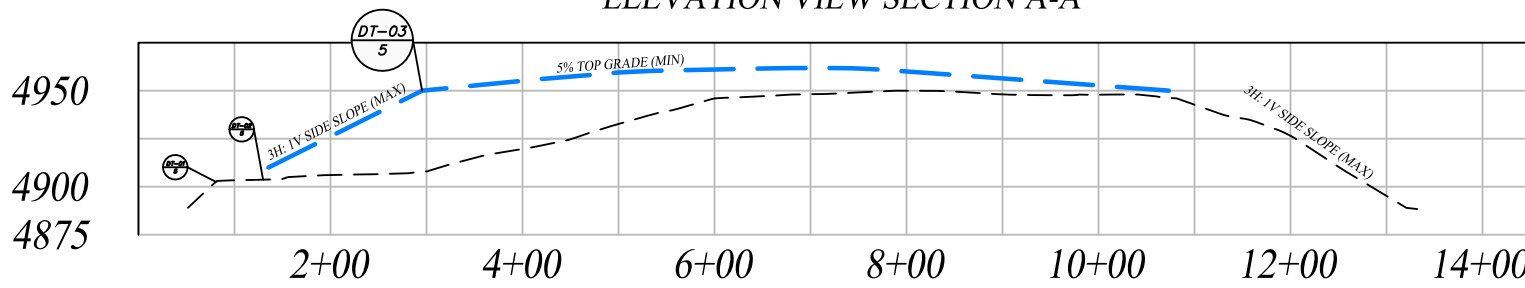
ELEVATION VIEW SECTION A-A'



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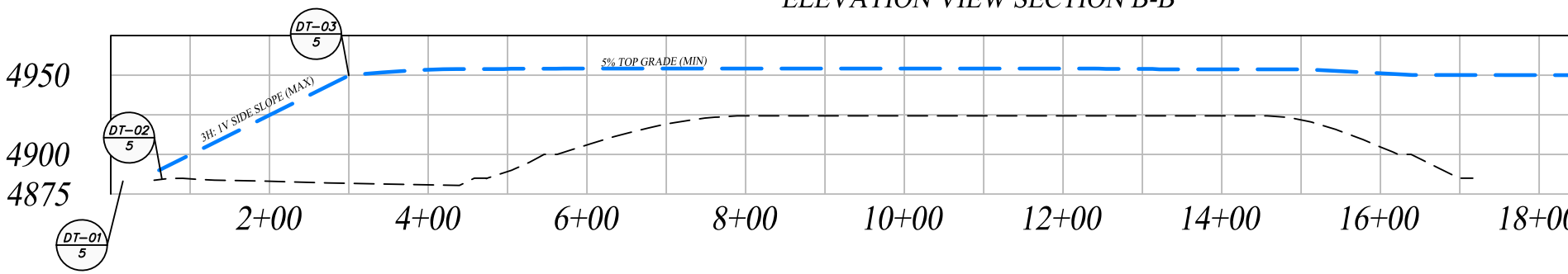
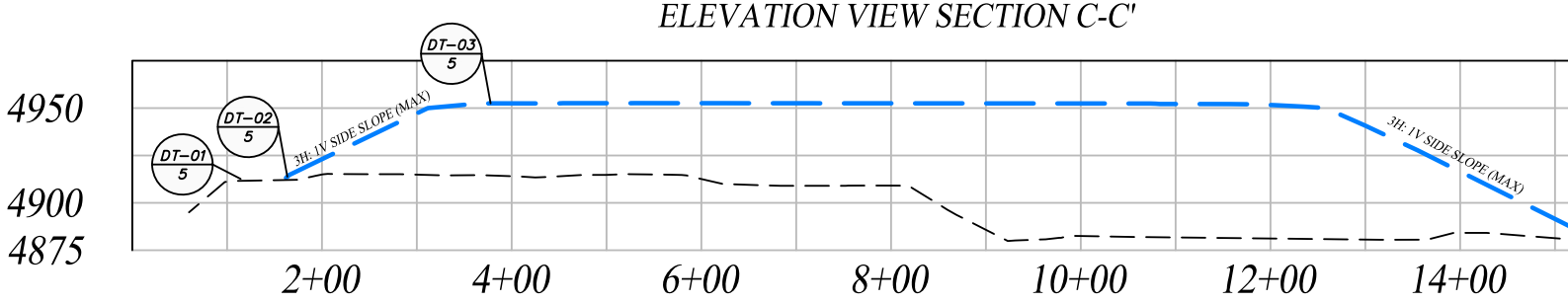
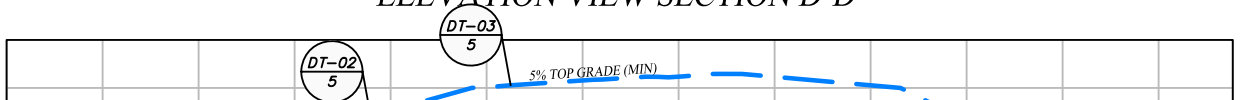
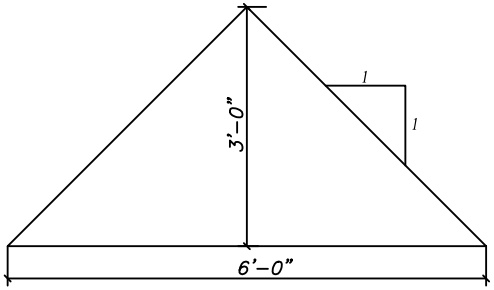


ELEVATION VIEW SECTION C-C'

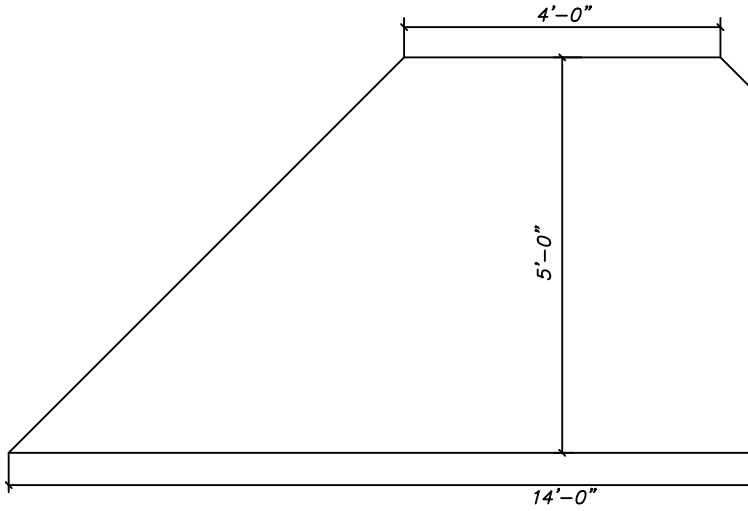


ELEVATION VIEW SECTION D-D'

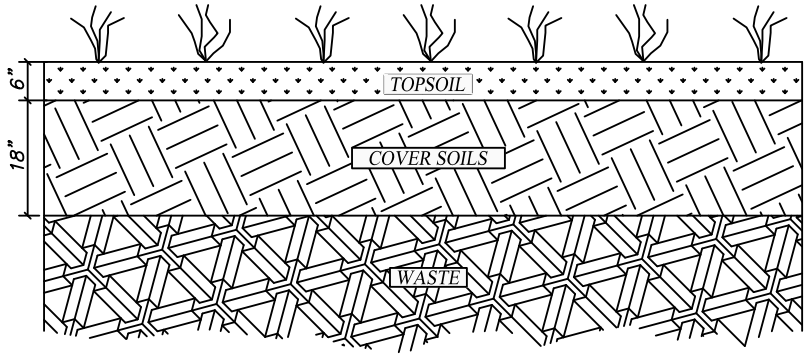




DT–01 3,4 RUN–ON DIVERSION BERM – TYPICAL CROSS SECTION
NTS



DT–02 3,4 RUN–OFF CONTROL BERM – TYPICAL
NTS



APPENDIX B

WHEN RECORDED, MAIL TO:
FAIRFIELD TOWN
P.O. Box 271
Cedar Valley, Utah 84013

ENT 29924:2012 PG 1 of 3
JEFFERY SMITH
UTAH COUNTY RECORDER
2012 Apr 12 1:32 pm FEE 0.00 BY DRG
RECORDED FOR FAIRFIELD TOWN

Quit-Claim Deed

Parcel # 59:116:0014

Utah County

NORTH POINTE SOLID WASTE SPECIAL SERVICE DISTRICT, **Grantor,** hereby Grants quit-claims and conveys to the FAIRFIELD TOWN, UTAH, a political subdivision of the State of Utah, herein referred to as **Grantee,** for the sum of Ten Dollars, and other good and valuable considerations, the following described parcel of land for use as a city street right-of-way in Utah County, State of Utah, without warranties of title, to-wit:

A parcel of land being part of tract of property situate in the South Half of Section 8, T-7-S., R-2-W., S.L.B. & M. The boundaries of said right-of-way parcel are described as follows:

Beginning at the South Quarter Corner of Section 8, Township 7 South, Range 2 West, Salt Lake Base and Meridian; thence along the South Line of Said Section 8, South 89°36'09" West 837.61 feet; thence North 0°12'31" East (record North 0°12'43" East) along the westerly boundary of the NORTH POINTE parcel 33.00 feet; thence North 89°36'09" East along a line parallel and 33.00 feet distant northerly from the South line of said Section 8, 837.26 feet; thence North 89°36'36" East along a line parallel and 33.00 feet distant northerly from the South line of said Section 8, 2657.27 feet to the East line of said Section 8; thence along the East line of said Section 8, South 0°19'06" West 33.00 feet to the Southeast Corner of said Section 8; thence along the South line of said Section 8, South 89°36'36" West 2656.86 feet to the South Quarter Corner of said Section 8, and the point of beginning.

Containing 2.65 Acres

(Note: Basis of Bearing: Utah State Plane Coordinate System, Utah Central Zone, (NAD 1983)

IN WITNESS WHEREOF, said North Pointe Solid Waste Special Service District have caused this instrument to be executed thereunto duly authorized, this 12th day of April, A.D. 20 12.

North Pointe Solid Waste Special Service District

By: Rodger D. Harper
Its Chairman

STATE OF UTAH)
) ss.
County of Utah)

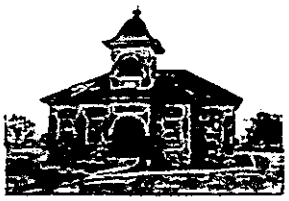
On the date first above written personally appeared before me, Rodger D. Harper, who, being by me duly sworn say that he is the Chairman of North Pointe Solid Waste special Service District and executed the same.

WITNESS my hand and official stamp the date in this certificate first above written:

ABBY M. ROWETT
NOTARY PUBLIC • STATE OF UTAH
COMMISSION# 577717
COMM. EXP. 02-23-2013

Notary Public

(SEAL)



Fairfield School House, 1898

FAIRFIELD

Established 1856 - Incorporated 2004

Mayor Michael Burch
P.O. Box 271
Cedar Valley, Utah 84013
(801) 766-3509

April 2, 2012

Jeff Smith
Utah County Recorder
100 East Center Street, Room 1300
Provo, Utah 84606

RE: Acknowledgment of exchange of property for proposed landfill road right-of-way.

Mr. Smith,

This letter is to inform you that the Town of Fairfield acknowledges that the following described parcels of land owned by North Pointe Solid Waste Special Service District and ROC Fund Landfill Holdings LLC is to be granted and conveyed to the town for use as a city street right-of-way in Utah County, State of Utah.

North Pointe Solid Waste Special Service District property is a parcel of land being part of tract of property situate in the South Half of Section 8, T-7-S., R-2-W., S.L.B. & M.

ROC Fund Landfill Holdings LLC property is a parcel of land being part of tract of property situate in the Northwest Quarter of Section 16, T-7-S., R-2-W., S.L.B. & M.

Should you have any questions, please contact me at (801) 631-5451.

Sincerely,

Michael J. Burch

Michael Burch
Mayor

APPENDIX C

North Pointe Cedar Valley Landfill
Facility Inspection Sheet

Date:_____ Inspector:_____

This inspections sheet is used to document the condition of the facility on Monthly basis.

Scale:_____

_____

_____

ToolShack:_____

_____

Perimeter Fences:

_____

_____

_____

Fire Extinguishers & Other Items:

_____

_____

_____

Roadways:

_____

_____

_____

_____

Signature

North Pointe Cedar Valley Landfill
Random Load Inspection

Date:_____

Inspector:_____

Customer:_____

Load Size:_____

Contents:

Description	Yes	No
Lumber		
Concrete		
Plastic		
Paper		
Large Tires		
Metal		

_____
Customer Signature

_____
Inspector Signature

APPENDIX D

HAND DELIVERED
2010,02112
JUN 2 1 2010
UTAH DIVISION OF SOLID & HAZARDOUS WASTE

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 ☒ Renewal Application ☐ Facility Expansion ☐ Modification

For Renewal Applications Facility Expansion Applications and Modifications Enter Current Permit Number 0012

III Facility Name and Location

Legal Name of Facility: CEDAR VALLEY LANDFILL LC

Site Address (street or directions to site): 18150 WEST ALLEN RANCH ROAD | County: UTAH

City: FAIRFIELD | Zip Code: 84043 | Telephone: (801) 437-9502

Township: 7 S | Range: 2 W | Section(s): 5 & 8 | Quarter/Quarter Section: | Quarter Section:

Mam Gale Latitude: 40 degrees 14 minutes 28 seconds N | Longitude: 112 degrees 05 minutes 49 seconds W

IV Facility Owner(s) Information

Legal Name of Facility Owner: CEDAR VALLEY LANOFILL LC / GZ ROCK LLC

Address (mailing): P.O BOX 1503

City: OREM | State: UT | Zip Code: 84059 | Telephone: (801) 437-9502

V Facility Operator(s) Information

Legal Name of Facility Operator: CEOAR VLLEY LANDFILL LC

Address (mailng): P O BOX 1503

City: OREM | State: UT | Zip Code: 84069 | Telephone: (801)437-9502

VI Property Owner(s) Information

Legal Name of Property Owner: GZ ROCK LLC

Address (mailng): 1819 EAST MORTON AVENUE

City: PHOENIX | State: AZ | Zip Code: 85020 | Telephone: (602) 943-2360

VII Contact Information

Owner Contact: DAVID JOHNSTON | Title: MANAGER

Address (mailing): P O BOX 1503

City: OREM | State: UT | Zip Code: 84059 | Telephone: (801) 437-9502

Email Address: david@sunmitdevelop.coin | Alternative Telephone (cell or other): (801) 420-1924

Operator Contact: DAVID JOHNSTON | Tide: MANAGER

Address (meiling): P O BOX 1503

City: OREM | State: UT | Zip Code: 84069 | Telephone: (801) 437-9502

Email Address: david@summitdevelop com | Alternative Telephone (cell or other): (801) 420-1924

Property Owner Contact: BARRY ZEMEL | Title: MANAGER

Address (mailng): 1819 EAST MORTON AVENUE

City: PHOENIX | State: AZ | Zip Code: 85020 | Telephone: (602) 943-2360

Email Address: zeinel36@yahoo com | 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	Monolith Unit
☒ Construction & Demolition	☐	☐
☐ Tires	☐	☐
☒ Yard Waste	☐	☐
☐ Animals	☐	☐
☐ Contaminated Soil	☐	☐
☐ Other _____	☐	☐

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

IX Facility Area

Facility Area	298 6	acres
Disposal Area	270	acres
Design Capacity		
Years	58	
Cubic Yards	29.5 million	
Tons	14 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 DCA 19 6 108(9) and (10)

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

Signature of Authorized Owner Representative David N. Johnston DAVID N. JOHNSTON Name typed or printed	Title Manager	Date 2/15/11
	Address PO Box 1503 Orem, Ut. 84059	
Signature of Authorized Land Owner Representative (if applicable) Barry Jensen Name typed or printed	Title Mgr mbr G2 Investments	Date 2.0.11
	Address 1819 E Morgan Pkwy Ave 850 W	
Signature of Authorized Operator Representative (if applicable) David N. Johnston DAVID N. JOHNSTON Name typed or printed	Title Manager	Date 2/15/11
	Address PO Box 1503, Orem Ut. 84059	

Cedar Valley Construction and Demolition Landfill

Class VI Landfill

Application for Permit Renewal

June 2010

Current Permit No
0012

Cedar Valley Landfill
P O Box 1503
Orem, Utah 84059

Application Form

Cedar Valley Construction and Demolition Landfill

Table of Contents

Part II General Report

1.0 General Facility Description

Cedar Valley Construction and Demolition Landfill is located in the Town of Fairfield in Utah County, Utah The facility is located 1 5 miles southerly of the main center of Town The facility is a Class VI landfill that receives yard waste, inert waste, and construction and demolition waste It contains 298 6 acres of land all of which is flat and generally sloping to the south and east Currently 69 5 acres of land is fenced with a 6' chain link fence topped with 3 strands of barbed wire Located on site are a scale and scale house, a 120,000 gallon water reservoir, a water shed, and a small office house The landfill site is first excavated below ground to create a pit for dumping The waste is covered and mixed with soil as it fills in The site is bermed on the sides and extends above grade at a slope of 2 4 1

1.1 Legal Description

The overall legal description is as follows

Commencing at a point in the center line of a county road, said point being located N00°45'22"W along the Section Line 1343 60 feet, and East 1257 45 feet from the West Quarter Corner of Section 5, Township 7 South, Range 2 West, Salt Lake Base and Meridian, thence S89°42'06"E, 74 22 feet, thence S00°16'40"E, 1347 56 feet, thence S89°48'26"E along the quarter section line 1320 48 feet to the center of Section 5, thence S00°12'08"W, along the quarter section line 2646 06 feet to the quarter corner common to Section 5 and Section 8, thence S00°20'54"W along the quarter section line 2707 93 feet to the center of said section 8, Township 7 South, Range 2 West, thence N89°32'40"E, along the quarter section line 1327 91 feet, thence S00°20'12"W, 1325 56 feet, thence N89°34'40"E, 1328 17 feet, thence S00°19'31"W, along the section line 1326 33 feet to the Southeast Corner of said Section 8, thence S89°36'40"W, along the section line 2656 85 feet to the South Quarter Corner of said Section 8, thence S89°36'21"W, along the Section line 837 61 feet to the center line of a county road, thence along the center lme of said county road as follows N00°12'43"E, 302 92 feet, thence N00°39'59"E, 1196 28 feet, thence N00°37'44"E, 2427 90 feet, thence N00°35'40"E, 1861 44 feet, thence N00°52'12"E, 405 93 feet, thence along the arc of a 400 00 foot radius curve to the left 316 45 feet (chord bears N21°47'38"W, 308 26 feet), thence N44°27'28"W, 473 22 feet, thence N45°02'02"W, 137 61 feet, thence N44°56'18"W, 131 01 feet, thence N42°46'21"W, 92 34 feet, thence along the arc of a 360 00 foot radius curve to the right, 313 28 feet (chord bears N17°50'34"W, 303 49 feet), th ence N07°05'14"E, 428 46 feet, thence N05°05'24"E, 201 10 feet, thence N04°53'03"E, 678 65 feet, thence N06°19'16"E, 569 05 feet, thence along the arc of a 2550 00 foot

radius curve to the left, 130 05 feet (chord bears N04°51'36"E, 130 04 feet) to the point of beginning

Less and exceptmg the following

Beginning at a point in the center line of a county road said point being located N00°45'22"W, along the Section Line 1343 60 feet, and East 1257 45 feet from the West Quarter Corner of Section 5, Township 7 South, Range 2 West, Salt Lake Base and Meridian and running thence S89°42'06"E, 74 22 feet, thence S00°16'40"E, 447 43 feet to a fence line, thence S 89°59'07"W 122 66 feet along said fence line and the extension thereof to the center of said county road, thence N06°19'16"E, 320 22 feet along the center line of said county road, thence northerly 130 06 feet along the arc of a curve to the left, having a radius of 2550 00 feet (chord bears N04°51'36"E, 130 037 feet) to the point of beginning

1.2 Proof of Ownership

The property is currently owned by GZ Rock, LLC A copy of the recorded Trustee's Deed is attached in Appendix A The facility owner and operator is Cedar Vally Landfill, LC

1.3 Waste Type

Waste accepted for disposal at this site is construction and demolition waste, inert waste, and yard waste comprised mainly of wood, cardboard, wallboard, and any and all waste that meet the requirements of the UAC R315-301-2(17)(37)(87) Waste not accepted includes, but not limited to municipal, industrial, medical, and hazardous wastes, liquids, used oils, contaminated soils, dead animals, and tires

Construction and Demolition Waste is defined in R305-301-2(17) means solid waste from building materials, packaging, and rubble resulting from construction, remodeling, repair, abatement, rehabilitation, renovation, and demolition operations on pavements, houses, commercial buildings, and other structures, including waste from a conditionally exempt small quantity generator of hazardous waste, as defined by R315-2-5, that may be generated by these operations

(a) Such waste may include

(i) Concrete, bricks, and other masonry materials

(ii) Soil and rock

(iii) Waste asphalt

(iv) Rebar contamed m concrete

(v) Untreated wood and tree stumps

Inert Waste is defined in R315-301-2(37) and means, noncombustible nonhazardous solid wastes that retam their physical and chemical stmcture under expected conditions of disposal, including resistance to biological or chemical attack

Yard Waste is defined in R315-301-2(87) means vegetative matter resulting from landscapmg, yard maintenance, and land clearing operations including grass clippings, pruning, and other discarded material generated from yards, gardens, parks, and similar types of facilities Yard waste does not include garbage paper, plastic, processed wood, sludge, septage, or manure

The daily volume anticipated for the landfill is approximately 260 cubic yards per day This is based on last years amount of 50,000 tons of waste received at the landfill

1.4 Schedule of Construction

The permit application is for renewal The landfill is constmcted and in operation

2.0 Plan of Operation

2.1 Waste Handling Procedures

The landfill operates by excavatmg and removmg the existmg soil from the site to a depth of approximately 20 feet deep Beyond the 20 feet deep, the amount of soil removed becomes burdensome to the overall productivity of the landfill The soil is stock piled to be mixed with the waste and also to cover the site after the desired height is obtained When waste is brought to the site it is first weighed at the scales and then taken to a location on the site to be dumped A cat and or compactor pushes

the waste to consolidate and compact it, and mix it with soil The compactor is used to remove voids withm the dumped waste Dirt is mixed with the waste, as well as dumped over the surface of the waste to bind the waste and to keep it from blowmg from the site, and to better control the possibility of combustion Tmcks that have dumped waste will again pass over the scales to determine the amount of waste that was deposited on the site

See sample form for weight recordmg m Appendix B

The workmg surface of the site is covered by a minimum of 6" of native soil This covering allows for a better driving surface, as well as to provide the cover required to avoid combustion of the waste This cover is applied daily to the working surface

2.2 Inspections and Monitoring

Inspections are performed to satisfy R315-302-2(5)(a) A brief visual inspection of equipment and the facility is completed daily All problems found which threaten human health or environmental quality will be noted and fixed immediately All other findings of these brief visual inspections will be fixed in a timely manner A thorough inspection of the whole facility will be done quarterly Its findings will be logged and any and all corrective action will be noted See Appendix C for sample form (please note that not all of the items apply)

2 3 Fire and Explosion

Facility personnel will be prepared for immediate fire suppression in the event of a fire mvolvmg the waste Fire extinguishers are mounted on equipment On-site cover fill will be used to cover the known fire, or smoldering areas Water will be applied to the affected areas only as a last resort, thus to mimmize water to waste contact In the event that the on-site personnel can not manage the fire because of its size, or a dangerous condition is evident, the Eagle Mountam Fire Department will be notified The Fire Department is located m Eagle Mountain City approximately

10 miles away Response time is estimated at 15 minutes The responding Fire Department will then take responsibility for fire suppression and extinguishing

2.4 Fugitive Dust

Dust can be a problem from May through October as these are the drier and warmer times of the year The soil on the site consists mainly of clay and silty sands A water truck is employed to keep the site damp especially in the traveled areas Crushed concrete and road base are used at the site entrance to keep a roadway that is more dust free Also, the main road to the site is being improved by widening the roadway and placing road base and eventually asphalt

As the height of the landfill increases, the new exposed sides are planted with a native seed mix This planting is accomplished in the fall, October or November of each year By planting in the fall, the seed will remain dormant through the winter and then have the spring moisture to germinate The vegetation around the landfill holds the soil from blowing and creating dust from the perimeter slopes

2.5 Litter Control

Blowing litter has been a problem and continues to be a challenge on the site The active portion of the site is fenced with a six-foot chain link fence to attempt to keep blowing litter from leaving the site However, the fence alone does not keep litter from blowing In addition to the fence portable "wind screens" have been fabricated to collect litter that is blown from the landfill The "wind screens" are located on top of the berm allowing for maximum efficiency As the operations continue to be refined, more dirt is mixed with the waste The additional cover and mixture of dirt also keeps litter from blowing from the site Occasionally, a wind storm has come across the site that has picked up litter and blown it from the site When this occurs, the litter is gathered manually and brought back to the site and buried

(Portable Wind Screens located on the site)

2.6 Prohibited Waste Exclusion Plan

Wastes which are prohibited from disposal at the Cedar Valley Landfill include, but are not limited to, municipal, industrial, and medical wastes, hazardous wastes, liquids, used oils, contaminated soils, dead animals, and tires. Pursuant to UAC 315-303-4(7), an owner or operator of a solid waste disposal facility shall not knowingly dispose, treat, store, or otherwise handle hazardous waste or waste containing PCBs. An owner or operator of a solid waste disposal facility shall include and implement, as part of the plan of operation, a plan that will inspect loads or take other steps as approved by the Executive Secretary that will prevent the disposal of prohibited hazardous waste or prohibited waste containing PCB's (R315-303-4-(7)(b)). This plan includes random inspections, separate inspection area, training of on-site personnel to identify prohibited waste, and a written record of the inspections signed by the inspector.

Containers holding liquid, larger than household containers, are not acceptable at the landfill Containers exceeding this requirement are loaded back on to the tmck they arrived in and hauled off

2.6.1 Random Inspections

Tmcks using the facility will be subject to random inspections performed by an on-site attendant who will be trained and qualified to identify hazardous waste and waste containing PCB's Drivers will be notified by the scale house attendant to proceed to the special inspections area The contents will be spread with a front loader or dozer, and inspected for regulated hazardous waste or waste containing PCB's Acceptance of the load will depend on the findings of the following procedures

- The load will be dumped and spread in a designated area
- The vehicle and driver will be required to wait until the contents have been properly inspected and verified
- The contents will be spread out, with special attention not to break or mpture any unknown or unmarked containers, by a front loader or dozer
- Any containers such as 55 gallon drums, that are unmarked or are not easily identifiable will be treated a hazardous waste and will be opened only by trained and qualified personnel
- If the waste has been inspected and is deemed safe, it will be allowed to be disposed of at the face of the landfill

If the inspection of the waste determines that it contains hazardous waste or waste-containng PCB's, the inspection area will be immediately closed to the public and on-site personnel The operator will immediately contact AET Environmental they will then be responsible for the proper management, transport, and care of the waste If known, the hauler of the waste will be notified that they have transported hazardous waste or waste containing PCB's into the facility A copy of the Random Inspection Form is included in Appendix D

In addition to the random inspections, the on-site attendant that will operate near the face of the landfill will have the responsibility to momtor the waste of in-coming loads and to remove any questionable material from the site as to facility guidelines

2.6.2 Training of Facility Personnel

All facility personnel will be trained to identify suspected hazardous waste or waste containing PCB's usmg standard labels used to mark said waste Traimng will include identification, handling, safety precautions, and documentation requirements All records of training will be maintained in the facilities operating record

2 6.3 Written Record of Inspections

Inspections will be recorded on the Random Load Inspection Form (See appendix D) Inspection records will include, but are not limited to inspector's name, date, and time of inspection, hauler information, tmck and driver information, observations of the inspector, results of inspection, description of any questionable materials, and the reason for rejection of the waste

2,6.4 Notification of the Solid Waste Management Authority

Within 24 hours of the receipt of suspected hazardous or PCB contaimng waste the operator will notify the Utah Division of Environmental Quality A record of the notification will be submitted to the Utah Division of Environmental Quality that identifies the date and time of discovery, type of material (if possible), probable hauler, an estimate of the material quantity, and actions proposed for the removal of the material from the facility A record of the notification will then be entered into the operating record of the facility

2.7 Controlling Disease Vectors

Cedar Valley Landfill will be accepting only constmction and demolition waste and yard waste In accepting only these wastes it is hoped that any available food source for rodents or wild animals will be an absolute minimum The presence of wild ammals will Imit the choice of animal control All effort will be made to keep the debris face compacted and graded to keep the area unacceptable for habitation for

rodents and other wild animals Smoke devices and sonar techniques will be employed first if a problem is discovered Poisons will be the absolute last option attempted

Some ammals present in the surrounding area (mule deer and antelope) may not be stopped from encroaching on the facility by the fencing If these ammals are found in an active area of the site, they will be escorted off of the facility with as little stress as possible At no time will any animals be purposely injured or killed to remove them Any migrating birds that locate on the storage pond will be left alone

2.8 Alternative Waste Handling

The Cedar Valley Landfill is open Monday through Friday from 7 30 am to 5 00 pm There will be enough capacity at the site to hold 15 working days worth of material without having to move any borrow If a major equipment failure occurs, the facility will replace the damaged equipment with a rental or lease machine within 1 working day If the Cedar Valley Landfill can not accept incoming waste because of an unforeseen or unknown problem, major customers will be contacted and told of their options These options include North Point Transfer Station, Trans Jordan Landfill, and the Payson Landfill All of these options are inside a fifty-mile radius of the site

2.9 General Training and Safety Plan for Site Operations

The employees and management of the Cedar Valley Landfill will receive instruction and training in landfill and equipment operations The training of all personnel will be an ongoing process Basic first aid, site safety, and CPR certification will also be included Seminars to keep all personnel up to date on any new procedures for landfill operations will be held at least once a year The training of personnel will be noted and entered into the operating record of the facility (See form in Appendix E)

Basic first aid will be administered to non-life threatening injuries 9-1-1 will be called if any injury appears to be life threatemng or beyond basic first aid techniques

2.10 Recycling Programs

Cedar Valley Landfill recognizes the importance of recycling and makes it part of their plan of operation Currently loads of concrete and asphalt are graded to a specific area on the site Concrete and asphalt is crushed to create a road base material Also, metals that are found within loads are currently set aside and recycled As a market exists for other materials, recycling will continue to be incorporated in day to day site operations

2.11 Site Specific Information

Because of the remoteness of the Cedar Valley Landfill, the possibility of illegal after hours dumping on or near the site will be monitored Security cameras have been set up that monitor the site and record 24 hours a day

3.0 Engineering Reports

3.1 General Construction Plan

Plans are included in Appendix F showing the general construction standards of the site The plans show the site being constructed so as to use excavated material to berm and cover the waste As waste is dumped on site it will be moved and shaped to allow for 2 4 1 side slopes and a minimum of a 2-foot cap The plans also propose a phasing plan

3.2 Run On and Run Off Control Systems.

Storm water will not be allowed to run off the active area of the landfill A berm has been constructed around the active portion of the landfill in the magnitude of 8 to 10 feet high Storm Drainage Calculations are included in Appendix G showing that a 25 year 1 hour storm will generate approximately 50,000 cubic feet of water This will stay within the 10-feet high berms As the water flows to the low point on the site it will pond in an area approximately 225 feet by 225 feet, 1-foot deep As the site is not smoothly graded, much of this water will not reach the low point, rather, the storm water will be spread out over the 69 5 acre site

The same berm keeping storm water on site prohibits storm water from flowing onto the site The flow from the surrounding area after a 1 hour storm may be 1-inch deep This flow will be diverted by the berm around the landfill Eventually, all storm water will slowly percolate into the soil, or evaporate from the site

3.3 Facility Life

The facility has a life expectancy of approximately 60 years The life expectancy is based on the assumptions that the conversion of tons to yards is 2 yards per ton of waste In 2004, approximately 135,000 tons of waste was accepted at the landfill The "build-out" volume of the landfill is approximately 30 million cubic yards There are many assumptions and variables that may alter the calculations for this site The conversion from tons of material to yards is dependant on the material, the compaction that is achieved of the waste to fill voids, and the amount of on-site dirt that is mixed with the soil The landfill has been in operation since 2002 and currently encompasses approximately 21 acres The total acreage of the landfill is over 298 acres, and the operation plan may vary as the amount of waste increases to the site

3.4 Location Standards

Floodplain – The Cedar Valley Landfill is not located within a floodplain, or near any body of water

Wetlands – The Cedar Valley Landfill is not located near any Wetlands A copy of the wetland documentation from previous permit included in Appendix H

Ground Water Clearance – The site is excavated down approximately 20 feet from the surface Initial ground water depths and subsequent test holes have determined the ground water to vary from 33 feet to over 43 feet from the surface (pending

location on the site) The 20-foot depth allows for keepmg a 10-foot clearance above the groundwater A copy of a Groundwater Study is included m Appendix I

3.5 Borrow Sources

The final cover for the site will use native material from the site

3.6 Run-off Collection

No run-off collection, treatment, or disposal is anticipated from the site

4.0 Closure Plan

Closure of Cedar Valley Landfill is not anticipated for many years As the northern portion of the facility fills with waste, and the face of the landfill moves to the south, it may be possible to begin closure of portions of the landfill With the normal operating plan that includes slopmg the sides at a 2 4 1 slope, and yearly vegetation of the slopes, part of the closure procedures will be worked in As the engineering detail shows m Appendix F, Sheet 3, the closure includes a 2-foot mimmum cap, vegetation, and 2 4 1 side slopes The native soil is a clay and silty-clay soil This native soil will be used m the construction of the 2-foot cap

The seeding of the slopes will occur m the fall of each year The seed is put on by hydro-seeding which allows the seed to lay dormant through the winter months and have the benefit of the spring moisture to germinate The seed type is a native plant that will grow in the on-site soil It is not anticipated that top-soil will need to be imported to the site

The facility is planned to be m operation for many years It is anticipated that the overall tonnage exceeds 15 million tons of waste to be stored and the landfill site At least 90 days before the final date of operation of the landfill, Cedar Valley Landfill will notify the Department of Environmental Quality and begin the implementation of the closure plan The construction schedule to complete the closure plan is anticipated to be 180 days

Currently Cedar Valley Landfill, LC, is anticipated to be the main contact through the life and closure of the facility As the design life is many years, any change in ownership will be reported as required

5.0 Post Closure Care Plan

The post closure care plan shall require monthly inspections of the site to check the landfill for settlement and erosion Should settlement occurs that is excessive, or erosion that removes the cap of the landfill, new soil will be hauled and filled into the areas of settlement or erosion and reseeded to prevent further erosion As necessary, matting, or hydro-seeding may be used The intent of the post closure plan is to momtor the integrity of the final cap

Cedar Valley Landfill, LC, will be responsible for Post Closure Care Contact mformation is as follows

Cedar Valley Landfill
Attn David Johnston
P O Box 1503
Orem, Utah 84059
(801) 437-9502

6.0 Financial Assurance

Cedar Valley Landfill maintains a letter of credit posted with the Division of Environmental Quality This Letter of Credit will be adjusted by pending the amount of landfill that is under operation As area is closed and opened, the bond amount may need to be adjusted

A copy of the letter of credit and bond amount for 21 acres of area is included m Appendix J

Cedar Valley Landfill
21 05 Acre
Phase Closure Bond

Item	Quantity	Unit	Unit Cost	Total Cost
2-foot Cap				
Soil (located on site)	67921 3	cu yd	$0 00	$0 00
Load / Haul	67921 3	cu yd	$0 95	$64,525 24
Spread and grade	67921 3	cu yd	$0 30	$20,376 39
Landscape				
Native Seed Mix	421 0	PLS lbs	$4 63	$1,949 23
Fourwing saltbush		10		
Wyoming big sagebrush		0 75		
Alkali sacation		1		
Blue grama		2 5		
Bluebunch wheatgrass		14 25		
Streambank wheatgrass		13		
Smooth brome		15 5		
Intermediate wheatgrass		10		
Sandberg bluegrass		2		
Sheep fescue		3		
Slender wheatgrass		11		
Western wheatgrass		17		
		100%		
Planting with Gram Drill		hrs		
Post Closure Care				
Inspection *	60 0	ea	$150 00	$9,000 00
Fence Repair **	300 0	lf	$9 00	$2,700 00
Soil Repair ***	3000 0	sf	$1 25	$3,750 00
Total Bond Amount				**$102,300 86**

* Inspection assumes twice per year for 30 years
** Fence repair assumes 20 feet per year
*** Cap repair assumes 100 sq ft per year

APPENDIX A

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RODNEY D. CAMPBELL
UTAH COUNTY RECORDER
2010 May 14 1 00 pm FEE 22 00 BY SS
RECORDED FOR JONES WALDO HOLBROOK &2

WHEN RECORDED RETURN TO

Kyle V Leishman
Jones, Waldo, Holbrook & McDonough
170 South Main Street, Suite 1500
Salt Lake City, UT 84101

MAIL TAX NOTICE TO

GZ Rock, LLC
P O Box 47638
Phoenix, AZ 85068
Attn Barry Zemel

TRUSTEE'S DEED

BY THIS TRUSTEE'S DEED, made this 13th day of May, 2010, Kyle V Leishman, a member of the Utah State Bar, whose address is 170 South Main Street, Suite 1500, Salt Lake City, Utah 84101, as Trustee (hereinafter Grantor), under that certain Deed of Trust and Assignment of Rents dated December 2, 2005, recorded December 7, 2005, as Entry No 141656 2005, in the records of the County Recorder of Utah County, State of Utah, executed by CEDAR VALLEY LANDFILL, LC , a limited liability company, as to 49% interest, THE WASTE GROUP, LC, a limited liability company, as to a 36 6% interest, DON FLOYD PHILLIPS and SHEILA PHILLIPS, husband and wife as joint tenants, as to a 7% interest, and M TIMOTHY ROSS and MARIE ROSS, husband and wife as joint tenants, as to a 7 4% interest, collectively as Trustor, in favor of STEWART TITLE & TRUST OF PHOENIX, INC , a Delaware corporation, as Trustee, and KENWOOD MORTGAGE & INVESTMENT, INC , an Arizona corporation, as Beneficiary (the "Deed of Trust"), grants and conveys to GZ ROCK, LLC, an Arizona limited liability company (hereinafter "Grantee") all of the title of the Trustee

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under the Deed of Trust and all of the nght, title interest and claim of CEDAR VALLEY LANDFILL, LC , THE WASTE GROUP, LC, DON FLOYD PHILLIPS, SHEILA PHILLIPS, M TIMOTHY ROSS, and MARIE ROSS, and of all persons claiming by, through or under them, including all such nght, title, interest and claim acquired by CEDAR VALLEY LANDFILL, LC , THE WASTE GROUP, LC, DON FLOYD PHILLIPS, SHEILA PHILLIPS, M TIMOTHY ROSS, and MARIE ROSS, or their successors in interest subsequent to the execution of the Deed of Trust in and to the real property and all other property situated at or on the property described in Exhibit "A" attached hereto, in Utah County, State of Utah, together with all appurtenances thereto (the "Trust Property")

The Trust Property was also described in the Notice of Default and Election to Sell under Deed of Trust (the "Notice of Default") dated February 18, 2009 and recorded February 18, 2009, as Entry No 16689 2009, in the Records of the Utah County Recorder, State of Utah

Grantor makes this transfer and conveyance pursuant to the powers conferred by the Deed of Trust Grantor, as Trustee, conveys the Trust Property for the benefit of PEACHTREE MORTGAGE, LTD , an Arizona corporation, and RANDOLPH O PERSSON, Trustee of the Randolph O Persson Separate Property Trust dated May 1, 2000, the current Beneficiaries under the Deed of Trust This grant and conveyance is made after the fulfillment of the conditions specified in said Deed of Trust and authorizing the same as follows

1 Breach and default under the terms of the Deed of Trust as set forth in particular in the Notice of Default referred to herein, which default continued to the time of sale under said Deed of Trust

2 Notice of the declaration of said default was duly given to the Trustor and demand for sale pursuant to the terms of said Deed of Trust made, and thereafter, the Notice of Default

was filed as set forth above, and required copies were sent to the Trustor and to other persons having requested and entitled to the same m accordance with the provisions of the applicable statutes within ten (10) days of such filing for record

3 At least three (3) months elapsed after the filing of said Notice of Default, at which time the Grantor executed a Notice of Trustee's Sale stating that, by virtue of authonty granted pursuant to said Deed of Trust, Grantor would sell at public auction to the highest bidder, for cash in lawfiil money of the United States, the afore-descnbed Trust Property Said Notice of Trustee's Sale fixed the time and place of sale as March 24, 2010 at 10 30 a m , at the front entrance of the Fourth Judicial District Court, located at 125 North 100 West, Provo, Utah, at which time and place the Trustee's Sale was postponed by Trustee until Apnl 27, 2010

4 The Trustee gave written notice of the time and place of sale, particularly descnbmg the property to be sold, as follows (a) Grantor caused a copy of said Notice of Trustee's Sale to be published once a week for three (3) consecutive weeks in a newspaper having general circulation in Utah County, the county in which the said property is situated, the dates of publication being February 27, 2010, March 6, 2010 and the last date of such publication being March 13, 2010, (b) by publishing the Notice of Sale on the website created by the Utah Press Association in accordance with Utah Code Section 45-1-101, (c) by posting such notice at least twenty days pnor to the date of sale at the following locations (i) Utah County Recorder's Office located at 100 East Center Street, #1300, Provo, Utah, and (ii) the property located at 18150 West Allen Ranch Road, Fairfield, Utah, and (in) by mailing, by certified mail, with postage prepaid, at least twenty days prior to the date of sale, a copy of the Notice of Trustee's Sale to the Trustor and other parties entitled to notice thereof

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5 All applicable statutory provisions of the State of Utah and all of the provisions of said Deed of Trust have been complied with as to acts to be performed and notices to be given

6 The Grantor, at the time and place of sale fixed in accordance with the foregoing, then and there sold, at public auction, to Grantee, who was the highest bidder therefor, the Trust Property hereinbefore described, in full accordance with the laws of the State of Utah and with the terms of the said Deed of Trust

THIS SALE AND CONVEYANCE IS MADE WITHOUT ANY COVENANT OR WARRANTY, EXPRESS OR IMPLIED, AS TO TITLE, POSSESSION, OR OTHERWISE WITH RESPECT TO THE TRUST PROPERTY

DATED this 13th day of May, 2010

GRANTOR/TRUSTEE

Kyle V Leishman, Trustee

STATE OF UTAH)
) ss
COUNTY OF SALT LAKE)

This instrument was acknowledged and executed before me this 13th day of May, 2010, by Kyle V Leishman who acknowledged to me or proved to me on the basis of satisfactory evidence, to be the persons whose names are subscribed to the withm instrument and acknowledged to me that he executed the same in his audionzed capacity, and that by his signature on the instrument the person or the entity upon behalf of which the person acted, executed the instrument

WITNESS my hand and official seal

My Commission Expires Notary Public

929507_1 DOC

BARBARA K PARRY
NOTARY PUBLIC STATE OF UTAH
170 S. MAIN STREET #1500
SALT LAKE CITY, UT 84101
My Comm Exp 11/04/2011

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EXHIBIT "A"

That certain property situated in Utah County, State of Utah, and more particularly described as follows

Commencing at a point in the center line of a county road said point being located North 00°45'22" West along the Section line 1343 60 feet and East 1257 45 feet from the West quarter corner of Section 5, Township 7 South, Range 2 West, Salt Lake Base and Meridian, thence South 89°42'06" East 74 22 feet, thence South 00°16'40" East 1347 56 feet, thence South 89°48'26" East along the quarter section line 1320 48 feet to the center of said Section 5, thence South 00°12'08" West along the quarter section line 2646 06 feet to the quarter corner common to Section 5 and Section 8, thence South 00°20'54" West along the quarter section line 2707 93 feet to the center of said Section 8, Township 7 South, Range 2 West, thence North 89°32'40" East along the quarter section line 1327 91 feet, thence South 00°20'12" West 1325 56 feet, thence North 89°34'40" East 1328 17 feet, thence South 00°19'31" West along the Section line 1326 33 feet to the Southeast corner of said Section 8, thence South 89°36'40" West along the Section line 2656 85 feet to the South quarter corner of said Section 8, thence South 89°36'21" West along the Section line 837 61 feet to the center line of a county road, thence along the center line of said county road as follows North 00°12'43" East 302 92 feet, thence North 00°39'59" East 1196 28 feet, thence North 00°37'44" East 2427 90 feet, thence North 00°35'40" East 1861 44 feet, thence North 00°52'12" East 405 93 feet, along the arc of a 400 00 foot radius curve to the left 316 45 feet (chord bears North 21°47'38" West 308 26 feet), thence North 44°27'28" West 473 22 feet, thence North 45°02'02" West 137 61 feet, thence North 44°56'18" West 131 01 feet, thence North 42°46'21" West 92 34 feet, along the arc of a 360 00 foot radius curve to the right 313 28 feet (chord bears North 17°50'34" West 303 49 feet), thence North 07°05'14" East 428 46 feet, thence North 05°05'24" East 201 10 feet, thence North 04°53'03" East 678 65 feet, thence North 06°19'16" East 569 05 feet, along the arc of a 2550 00 foot radius curve to the left 130 05 feet (chord bears North 04°51'36" East 130 04 feet) to the point of beginning

929507_1 DOC

APPENDIX B

Cedar Valley Landfill Daily Hauling Log

Cedar Valley Landfill, LC
P O Box 1503
Orem, UT 84059
(801) 437-9502

Date ____________________

Load No	Load Time	Weight	Cubic Yards	Ticket No	Customer Name

APPENDIX C

Landfill Inspection End of Day Check-Out Procedure

Day of Week Mon Tues Wed Thurs Fri Sat Date _____ Time _____

Weather Conditions _____

Item	Acceptable	Unacceptable
MSW Disposal Cell – Required Daily Cover (Note if ADC is used)	_____	_____
Dead Animal Pit – Required Daily Cover	_____	_____
Class IV Disposal Cell – Cover Soil Provided as Needed	_____	_____
Green Waste Storage Pile – Non-Green Waste Removed	_____	_____
Metals Recycling Area – No Solid Waste Present	_____	_____
Litter Control – Blown litter picked up - as needed	_____	_____
Litter Control Fence – Maintained and cleaned	_____	_____
Inactive Disposal Area – Adequate cover material	_____	_____
Explosive Gas Detectors – Functioning	_____	_____
Entrance Gate Locked/Penmeter Secured – Prevent Unauthorized Entry	_____	_____

Comments

Describe details of any Unacceptable conditions and describe needed corrective action Provide any related comments or problem which could affect the site's integrity (Use additional sheets if needed)

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Signature of Person Completing Form _____

APPENDIX D

Cedar Valley Landfill

Random Record Inspection Form

Date Received _____
Time Received _____

Driver s Name _____

Vehicle Identification _____

_____

Source of Waste Generator

_____
_____
_____
_____

Observations Made During Inspection

_____
_____
_____
_____

Non-Conforming Items
Included in Load (if any)

_____
_____
_____
_____

If Rejected, Reason for Rejection

_____
_____
_____
_____

Notes

_____
_____
_____
_____
_____

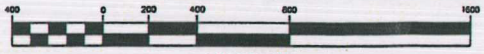
APPENDIX E

Annual Training and /or Procedures Completed

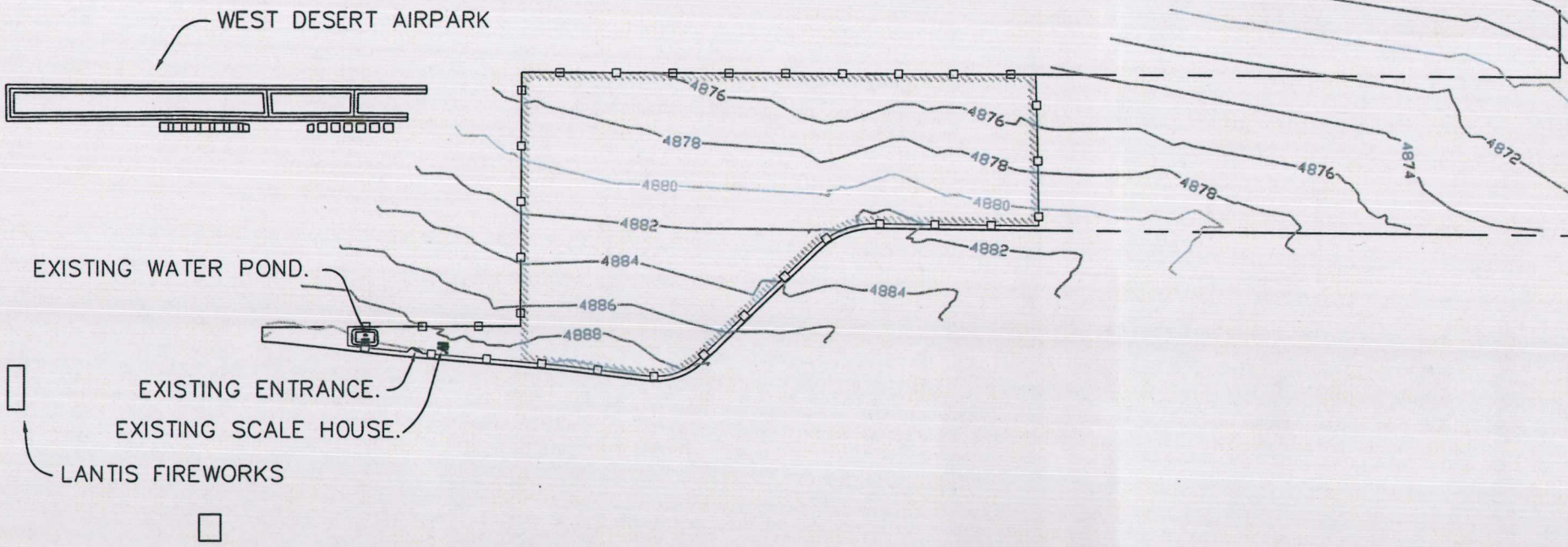
Person	Traimng Course	Date Completed

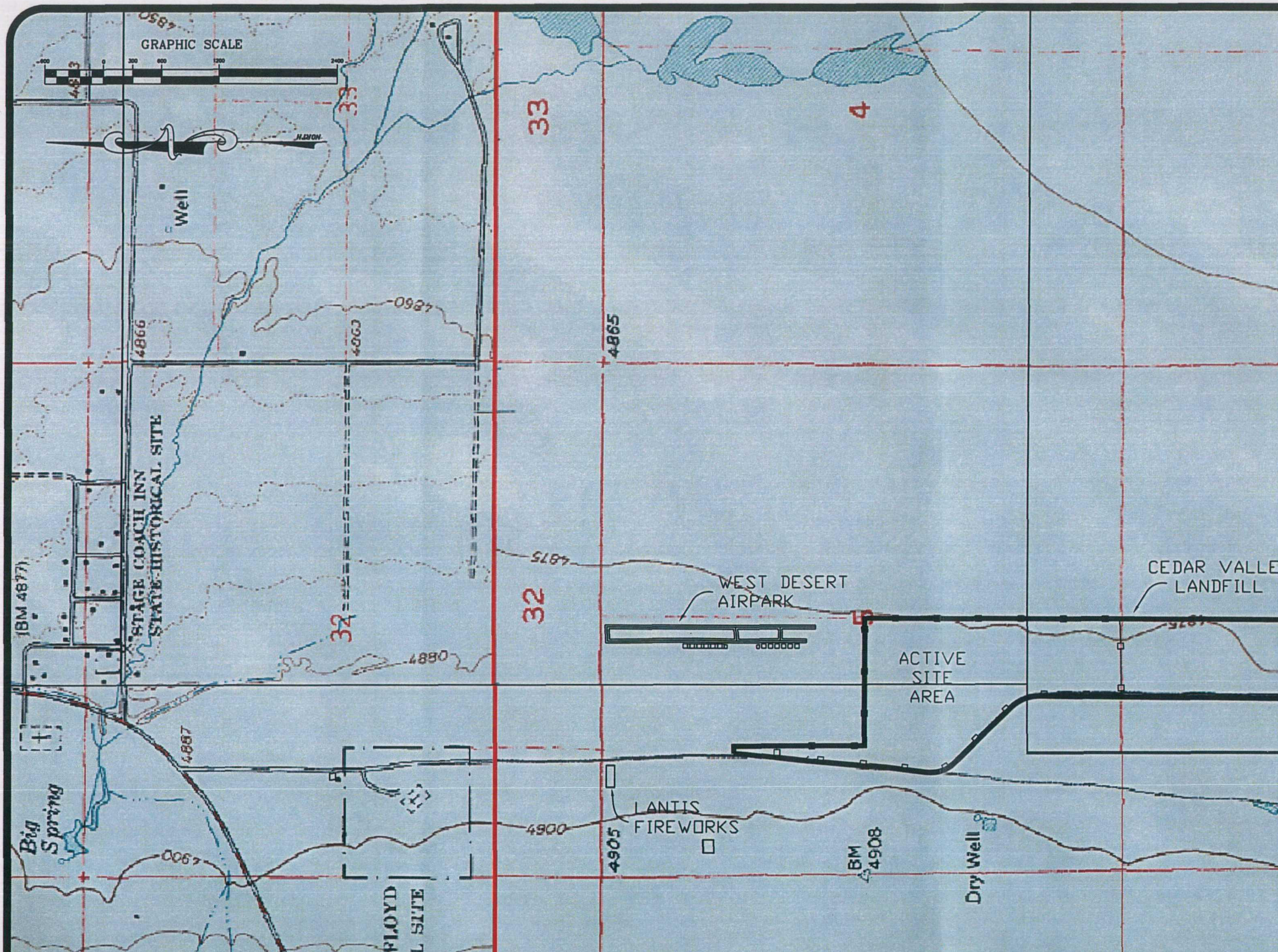
APPENDIX F

GRAPHIC SCALE



(IN FEET)
1 inch = 800 ft.





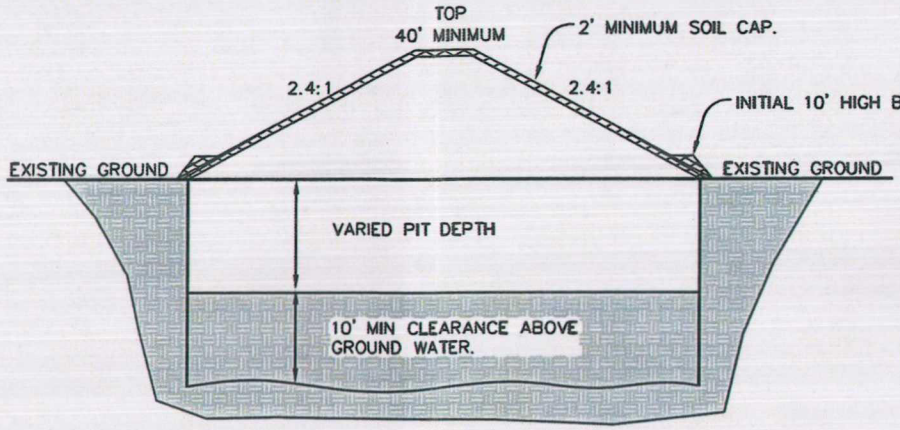
GRAPHIC SCALE
NORTH
Well
STAGE COACH INN
STATE HISTORICAL SITE
BM 4877
Big Spring
4866
4865
4875
4880
4887
4900
4905
4908
33
32
4
WEST DESERT
AIRPARK
CEDAR VALLE
LANDFILL
ACTIVE
SITE
AREA
LANTIS
FIREWORKS
BM
Dry Well
FLOYD
L SITE

GRAPHIC SCALE

400 0 200 400 800 1600

(IN FEET)
1 inch = 800 ft.

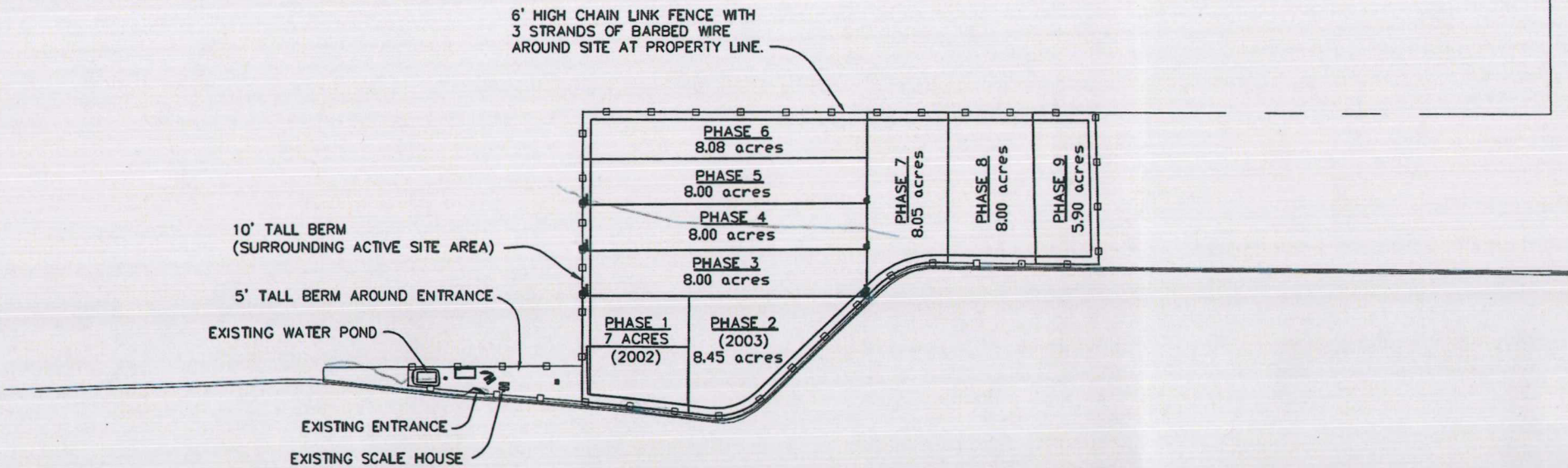
NORTH



OVERALL PIT AND BERM
NTS

NOTE:

SOIL CAP TO BE SEEDED ANUALLY IN THE FALL TO CONTROL EROSION AND DUST.



APPENDIX G

CEDAR VALLEY LANDFILL

Area	Total (AC)	Impervious (AC)	Pervious (AC)
Landfill	69 5	0	69 50
Runoff Coefficient		0 9	0 2
Weighted Area	13 90	0 00	13 90

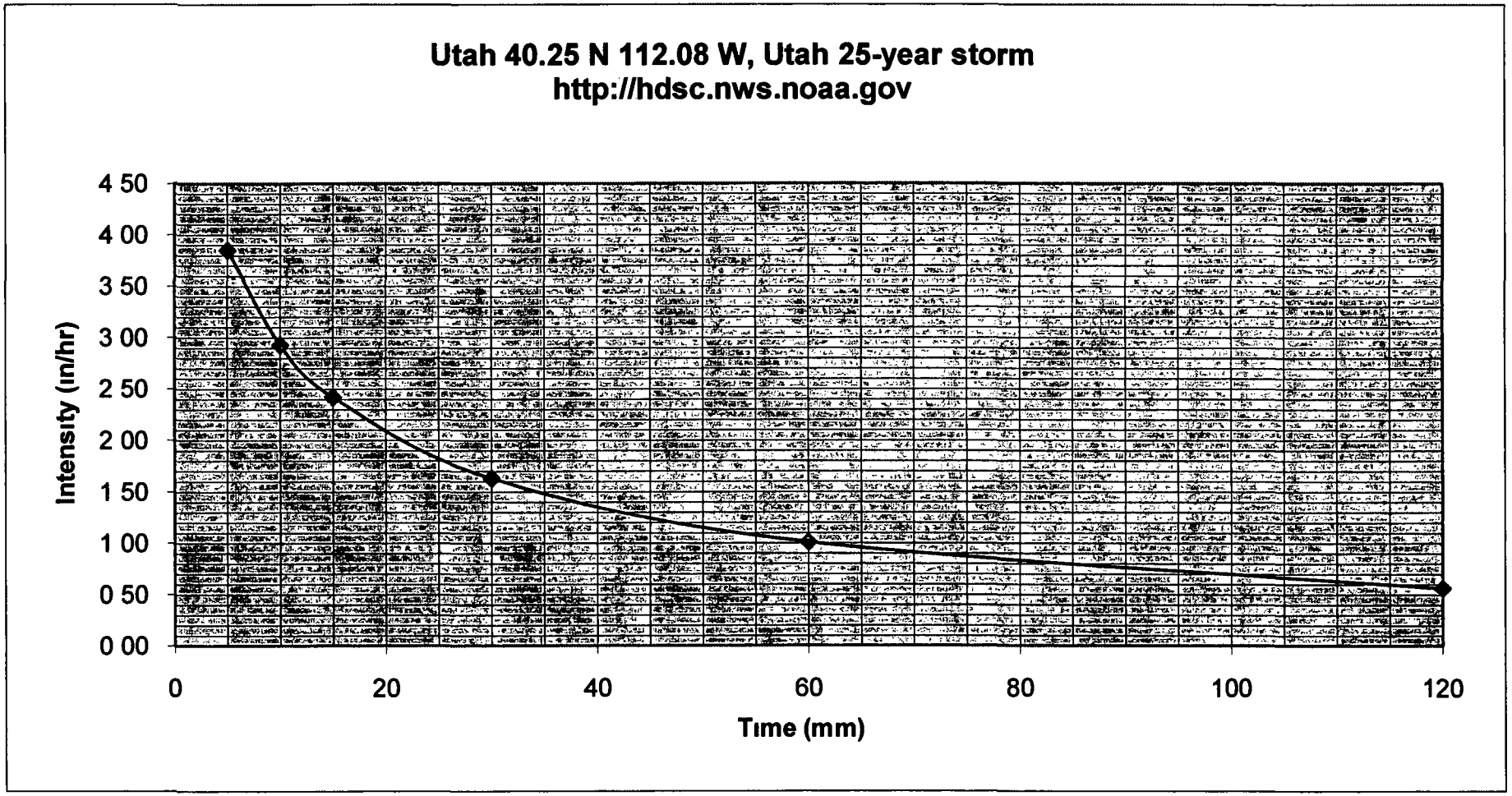
Storm Depth = 1 01 in (25-year 1-hour)

Storm Volume 50962 (CF)

No Allowable Discharge 0 cfs

Duration (min)	Intensity (in/hr)	Runoff (cfs)	Total Runoff (CF)	Allow Discharge (CF)	Storage Req'd (CF)
5	3 85	53 52	16054 50	0 00	16054 50
10	2 93	40 73	24436 20	0 00	24436 20
15	2 42	33 64	30274 20	0 00	30274 20
30	1 63	22 66	40782 60	0 00	40782 60
60	1 01	14 04	50540 40	0 00	50540 40

Total Pond Voi Required - I 50540 CF


Utah 40.25 N 112.08 W, Utah 25-year storm
http://hdsc.nws.noaa.gov
Intensity (in/hr)
4 50
4 00
3 50
3 00
2 50
2 00
1 50
1 00
0 50
0 00
0
20
40
60
80
100
120
Time (mm)

APPENDIX H

American Land Resources, Inc. 1176 North Compton Rd, Farmingtoa, UT 84025
amlandresources@cs com (801) 451-7695, (208) 841-5766

April 13, 2000

Mr Mel Radmall
Cedar Valley Landfill
P O. Box 952
American Fork, Utah 84003

Re: Proposed Cedar Valley Landfill Wetland Delineation

Dear Mr Radmall,

I am writing this letter to document our field visit to document the existence of any special aquatic sites including jurisdiction wetlands within the boundaries of the above referenced project

There are no special aquatic sites including jurisdictional wetlands found within 2000 feet or within the property boundaries The entire site was a typical Great Basin high desert scrub-shrub vegetative community characterized by sagebrush (*Artemisia tridentata*), rabbitbrush (*Chrysothamnus nanseosus*), greasewood (*Sarcobatus vermiculatus*), and various grasses including tall wheatgrass (*Elymus elongatum*) and cheatgrass (*Bromus tectorum*).

If you have any questions, please call me at (208) 841-5766

Sincerely,

Brian Young
Sr. Wetland Scientist

c: File

Goshen Pass USGS 7.5 mm Map

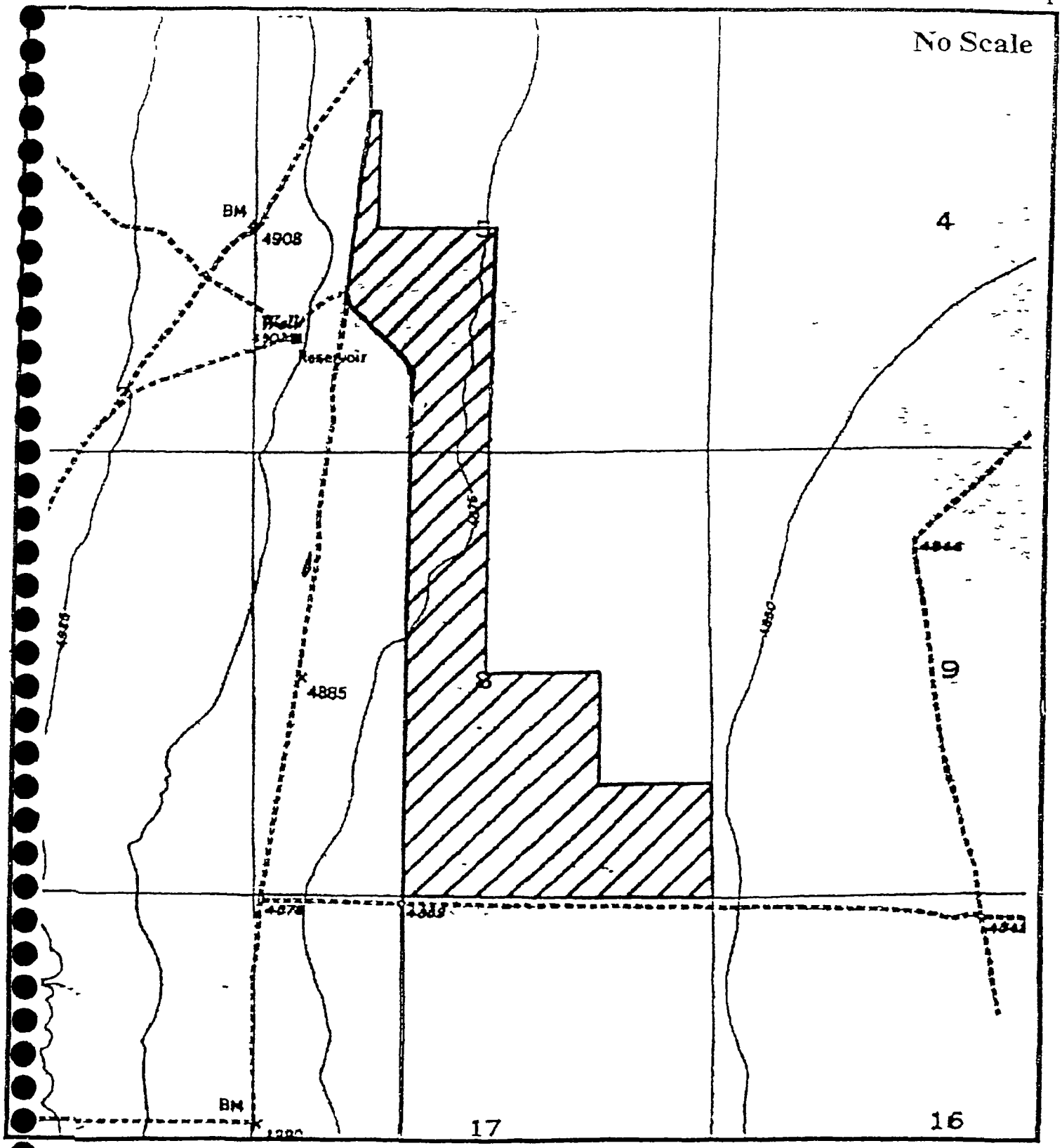


Figure 1.0: Cedar Valley Landfill

Cedar Valley Site Map

APPENDIX I

UTAH STATE ENGINEER
Technical Publication No. 16

GROUND-WATER CONDITIONS IN CEDAR VALLEY, UTAH COUNTY, UTAH

by R D. Feltis

Geologist, U S Geological Survey

Prepared by the U. S. Geological Survey

in cooperation with

The Utah State Engineer

1967

CONTENTS

ILLUSTRATIONS

TABLES

GROUND-WATER CONDITIONS IN CEDAR VALLEY, UTAH COUNTY, UTAH

by R. D Feltis

Geologist, U S Geological Survey

ABSTRACT

Cedar Valley is in north-central Utah about 20 miles west of Provo in Utah County The valley is mostly a topographically closed basin, developed in a structural trough caused principally by faulting, and is bordered by mountains largely composed of Paleozoic sedimentary rock The valley is filled with semiconsolidated to unconsolidated alluvial, colluvial, lacustrine, and eolian deposits of Tertiary and Quaternary age

Ground water occurs under both water-table and artesian conditions, but most of the wells are developed in the artesian aquifer The source of most recharge to the ground-water reservoir is in the Oquirrh Mountains in the northwest corner of the valley After seeping into the ground, water moves directly from the bedrock in the valley fill, thence east and southeast across the valley The estimated subsurface outflow along the east edge of the valley ranges from about 10,000 to 20,000 acre-feet per year

Water levels and spring discharges generally fluctuate in response to variations of precipitation, but they have declined markedly in response to pumping at nearby irrigation wells During 1965, about 1,900 acre-feet of water was pumped from eight irrigation wells in the valley

The coefficient of transmissibility of the artesian aquifer in the north-central part of the valley, as determined by pumping and recovery tests at wells, ranges from about 5,000 to 26,000 gallons per day per foot The specific capacities of irrigation wells in the center of the basin range from about 1 to 7 gallons per minute per foot of drawdown, but two wells at the west edge of the basin had specific capacities of 30 and 37 gallons per minute per foot of drawdown

Most of the ground water in the north half and southwest corner of the valley is of good chemical quality, containing less than 500 parts per million of dissolved solids In the southeast part of the valley, the water is of poor quality, containing more than 1,000 parts per million of dissolved solids

INTRODUCTION

Purpose and Scope

This study of the ground-water conditions in Cedar Valley, Utah, was made by the U S Geological Survey in cooperation with the Utah State Engineer during the period July 1965-July 1966 The purposes of the study were to estimate the recharge to and the yield of the ground-water reservoir and to determine the direction of ground-water movement through Cedar Valley

Water levels have been measured in observation wells in Cedar Valley from time to time since 1943 During the present investigation, water-level measurements were made in 38 observation wells, and 5 test wells were drilled to provide additional observation wells and

also to provide information that would be helpful in understanding the subsurface geology of the valley Geophysical logs were run in several wells and test wells to aid in interpreting the subsurface geology and to show the occurrence of ground-water aquifers Tables 2-7 contain the basic data collected for the investigation and include records of selected wells and springs, chemical analyses of water, water-level measurements, drillers' logs of wells, and logs of test wells The locations of wells are shown in figure 4 and of springs in figure 7

Location of the area

Cedar Valley is in the northwest corner of Utah County, Utah, about 20 miles west of Provo, and lies between 39°58' and 40°29' north latitude and between 111°55' and 112°13' west longitude (figure 1) The drainage basin for the valley includes about 300 square miles, but the valley proper includes only about 140 square miles The valley has a maximum north-south length of about 25 miles and a maximum east-west width of about 8 miles The valley is a topographically closed basin except at the extreme north end where the surface drainage is into northern Utah Valley The valley is almost completely surrounded by mountains or low hills, and altitudes range from about 4,840 feet on the valley floor to 10,626 feet in the Oquirrh Mountains along the northwest edge of the valley Mountains on the east side and south end of the valley reach altitudes of 7,647 and 7,828 feet

Acknowledgments

Many thanks are owed to the residents and landowners of Cedar Valley who furnished or permitted the collection of hydrologic data and water samples from wells and springs and who gave permission to construct test holes for the collection of geologic and hydrologic data

Well-numbering system used in Utah

The system of numbering wells in Utah is based on the cadastral land-survey system of the Federal Government The well number, in addition to designating the well, locates its position to the nearest 10-acre tract in the land net By this system the State is divided into four quadrants by the Salt Lake base and meridian, and these quadrants are designated by the capital letters A, B, C, and D A is the northeast quadrant, B is the northwest, C is the southwest, and D is the southeast Numbers designating the township and range follow the quadrant letter, and all three are enclosed in parentheses The number after the parentheses designates the section, and the lowercase letters give the location of the well within the section The first letter indicates the quarter section, which is generally a tract of 160 acres, the second letter indicates the 40-acre tract, and the third letter indicates the 10-acre tract The number following the letters indicates the serial number of the well within the 10-acre tract Thus, well (C-6-2)13caa-1 in Utah County is in the NE¼NE¼SW¼ sec 13, T 6 S , R 2 W , and is the first well constructed or visited in that tract Figure 2 shows the method of numbering wells as described above In this report springs and sampling sites are also located by using this system, but the serial number within a 10-acre-tract is omitted

GEOLOGY

Consolidated rocks of Paleozoic age

The mountains surrounding Cedar Valley contain mostly rocks of Paleozoic age that include limestone, dolomite, quartzite, conglomerate, sandstone, and shale (figure 3) Each rock type is generally present in each mountain range, but limestone and dolomite predomi-

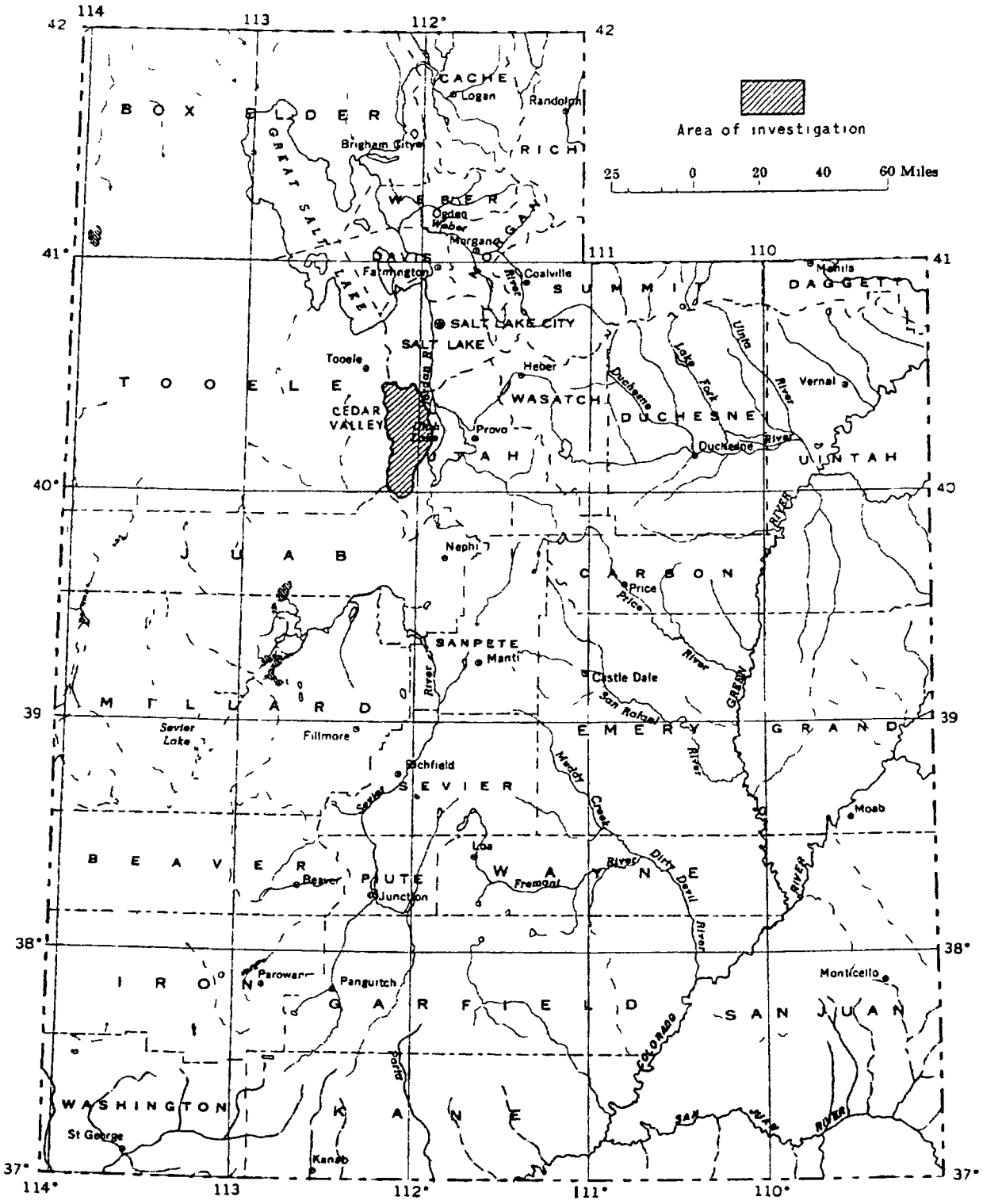


Figure 1 — Index map of Utah showing location of the Cedar Valley drainage basm

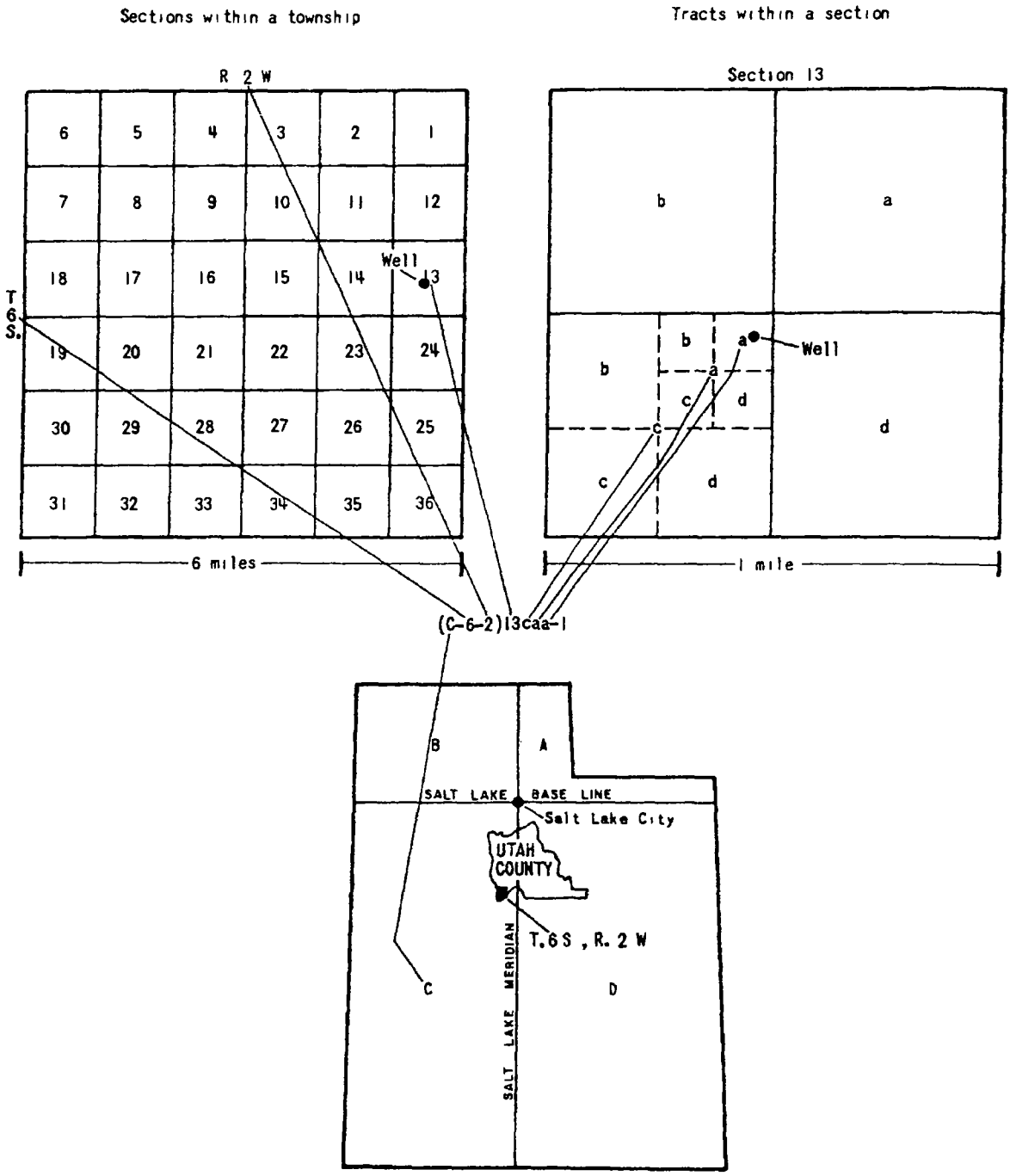


Figure 2 — Well-numbering system used m Utah

nate The age of the formations ranges from Devonian to Permian in the Lake Mountains, from Cambrian to Permian in the East Tintic Mountains, and from Mississippian to Pennsylvanian in the Oquirrh and Traverse Mountains

Sedimentary and igneous rocks of Tertiary age

Sedimentary rocks.—Scattered exposures of limestone and fresh and argillized tuff in the low hills southwest of the Lake Mountains is part of an unnamed sequence believed to be of early Tertiary—probably late or middle or early late Eocene—age (Morris and Lovering, 1961, p 126) The limestone is fine to medium grained The argillized tuff, where it has been mined, consists of halloysite and montmorillonite

The Salt Lake Formation of Pliocene age probably occurs along the mountain fronts and in the subsurface of Cedar Valley, although it has not been mapped within the drainage basin of Cedar Valley by those who have described the geology of the surrounding mountains The formation has been described by Morris and Lovering (1961, p 126-127) in Rush and Tintic Valleys to the west and southwest of Cedar Valley as "* * * marly limestone, bentonitic tuff, sandy silt, and gravel * * * " In the Jordan Narrows, northeast of Cedar Valley, it is described by Hunt and others (1953, p 13), as " * * * alternating dark-gray silt and white or light-gray, firm, ledge-forming beds that probably are cemented, reworked tuffs The individual beds range from 2 to 20 feet in thickness, included with them are a few, very thin, clay partings * * * These light-colored beds are overlain unconformably by a series of buff beds with a basal conglomerate * * * The basal conglomerate is about 15 feet thick * * * Above this is 50 feet of moderately consolidated buff sand and silt, which apparently is reworked crystal tuff partly cemented by lime carbonate "

The upper part of the Salt Lake Formation is not easily distinguished from younger alluvial deposits Some of the partly indurated alluvium around the edges of the valley and in canyons of the mountains, that is mapped as unconsolidated Quaternary deposits in figure 3, may be Salt Lake Formation.

Igneous rocks.—Most of the igneous rocks around Cedar Valley crop out in the Traverse Mountains, northeast of the valley, and the East Tintic Mountains, in the southwest corner of the valley. Gilluly (1932, p 41) described the extrusive igneous rocks in the Traverse Mountains as " * * * chiefly latite and quartz latite, with some minor flows of basalt, rhyolite obsidian, and nephelite basalt Among the extrusive rocks, flows, although numerous, are quantitatively subordinate to breccias " The intrusive igneous rocks of the Traverse Mountains are several small rhyolite plugs.

Morris and Lovering (1961, p 124) described the igneous rocks of the East Tintic Mountains as " * * * deeply eroded remnants of a large composite volcano * * *." These igneous rocks include intrusive bodies and thick lava flows as well as the bedded tuffs, breccias, agglomerates, and volcanic gravels that can be considered to be, in part at least, sedimentary deposits " The extrusive rocks are latite tuffs, flows, agglomerates, volcanic gravels, quartz latite, and basalt flows The intrusive rocks consist of quartz monzonite, monzonite, monzonite porphyry, lamprophyre, andesite, and diabase

Unconsolidated rocks of Quaternary age

The Quaternary deposits of the basin fill of Cedar Valley consist mostly of alluvial fans, lacustrine clay, silt, sand, and gravel, and eolian sand and silt

The alluvial fans, composed largely of silt, sand, and gravel, extend from within the canyons of the mountains toward the center of the basin, where they interfinger with lake

and eolian deposits The fans range in age from early Pleistocene to Recent and in some areas may be lithologically similar to and indistinguishable from the upper part of the Salt Lake Formation of late Pliocene age The individual fans coalesce along the mountain front to form a continuous undulating surface around the edge of the valley The fans are generally very coarse grained and permeable near the mountains but become finer grained and less permeable toward the center of the valley A large alluvial fan in the north end of Cedar Valley extends from the mouth of West Canyon southward to the latitude of Cedar Fort It has overlapped the bedrock in the northeast corner of the valley, diverting the West Canyon drainage into Utah Valley

Lakes have probably occupied Cedar Valley during the several periods of glaciation of the Pleistocene Epoch The resultant lacustrine deposits are mostly impermeable, well-sorted, tabular beds of lake-bottom silt and clay, with some permeable lenticular beds of shoreline sand and gravel deposits Few large deposits of sand and gravel are present, because no large perennial streams carried coarse debris into the lakes and because the sheltered nature of the valley prevented strong lake currents which could have deposited material on the lakeshore Lake Bonneville was the last of the Pleistocene lakes that occupied the valley, and its shoreline can be seen etched in the alluvium around the basin

Active sand dunes as much as 15 feet thick are present about 2 miles south of Fairfield Goode (in Morris and Lovering, 1961, p 137) reports that the dunes probably were formed during or immediately after the recession of Lake Bonneville and are now being reattacked by the wind Blowouts in low stabilized dunes and in underlying lake beds are common across the floor of the valley and result in scattered, shifting masses of silt and sand

Other Quaternary deposits in the valley include colluvium, talus, and landslide debris which occur along the edges of the valley and in the canyons of the mountains. Glacial moraines are at the heads of West Canyon and the Left Fork of West Canyon in the Oquirrh Mountains.

Structure

Cedar Valley is a basin similar in structure to the many basins of the Basin and Range physiographic province in Utah and Nevada It is principally a graben produced by a system of faults that has uplifted and tilted the surrounding mountain blocks relative to the valley floor A gravity map of Cedar Valley (Cook and Berg, 1961, pl 13) shows the north-central part of the basin (T 6 S , R 2 W) to be deepest The fault system that produced the basins of western Utah is still active, therefore, Cedar Valley may shll be in the process of development.

The rocks in the mountains surrounding the basm generally have been folded into broad, north to northwest trending folds (figure 3) These broad folds and their subsidiary faults and folds were probably made during Cretaceous and early Tertiary time, prior to development of the Cedar Valley graben The structural elements of the bedrock are of great importance to the hydrology of the valley because of their partial control of movement of ground water into and from Cedar Valley

WATER RESOURCES

Volume of precipitation

The range in the normal annual precipitation in Cedar Valley and surrounding mountains is generally from 12 to 40 inches. The isohyetal lines of figure 4 show that the greatest precipitation is on the Oquirrh Mountains, from which most of the surface and ground water in Cedar Valley is derived.

Not all precipitation in the Cedar Valley drainage basin is available to recharge the ground-water reservoir. It is assumed that only areas above the 12-inch isohyetal line on the west side of the basin receive precipitation that is effective in recharging the reservoir. Precipitation directly on the valley floor is used by vegetation or evaporated back to the atmosphere, and water from precipitation on the Lake Mountains moves eastward away from Cedar Valley (see p. 12).

The normal annual precipitation that falls above the 12-inch isohyetal line in the Cedar Valley drainage basin is about 150,000 acre-feet (table 1). Of this amount about 80,000 acre-feet falls above the 16-inch isohyetal line on the Oquirrh Mountains.

Surface water

The only perennial stream in Cedar Valley is in West Canyon in the Oquirrh Mountains, and all the water is diverted in sec. 7, T. 5 S., R. 2 W. for irrigation near Cedar Fort. The discharge from West Canyon from July 1965 through June 1966, as determined at a gaging station in sec. 7, T. 5 S., R. 2 W., was 2,100 acre-feet of water. Although the stream channel crosses the north end of Cedar Valley and drains into northern Utah Valley, surface water leaves the valley only in flash floods or as runoff from local snowmelt.

Ground water

Recharge.—The principal recharge area of the ground-water reservoir in Cedar Valley is in the Oquirrh Mountains along the northwest edge of the valley, where snowmelt percolates directly into fractures and solution channels of the rock. The alignment of springs (C-4-3)20dba, (C-1-3)26cbd, (C-4-3)26dda, and (C-4-3)27bab, and springs (C-5-3)36cba, (C-6-2)6cad, and (C-6-3)1aad, along the strike of the bedrock, shows that some strata transmit water more readily than others. (See figures 3 and 7.) Some precipitation also enters the alluvial and glacial deposits in the mountain valleys. Most of the water in the basin fill throughout Cedar Valley entered the ground in the Oquirrh Mountains (figure 4).

Table 1 — Annual precipitation over the recharge area and estimated water available for recharge to the ground-water reservoir in Cedar Valley

Interval of annual precipitation (inches)	Area (acres)	Average annual precipitation (feet)	Quantity of water from precipitation (acre-feet, rounded)	Estimated percentage of precipitation as recharge	Estimated water available for recharge to ground-water reservoir (acre-feet, rounded)
12-16	60,500	1.17	70,800	5	3,500
16-20	16,400	1.50	24,600	15	3,700
20-25	7,600	1.88	14,300	20	2,900
25-30	6,000	2.29	13,700	27	3,700
30-40	6,500	2.92	19,000	35	6,600
More than 40	2,700	3.33	9,000	40	3,600
Totals (rounded)			151,000		24,000

Other areas of recharge are the East Tintic Mountains, Topliff Hill, Thorpe Hills, and alluvial fans along the west side and north end of the valley above the 12-inch isohyetal line At the north end of the valley, discharge from West Canyon is a source of recharge beginning near the mouth of the canyon, extending south along the West Canyon ditch, and ending in the irrigated land east of Cedar Fort

The estimated water available for recharge to the ground-water reservoir from precipitation is about 24,000 acre-feet (table 1) The percentages used in the calculations are based on the method used by Eakin and Maxey (1951, p 79-81) in which an increased percentage of water from precipitation becomes available for recharge as the total precipitation increases with an increase in altitude of a mountain mass (isohyetal intervals of figure 4) Of the 24,000 acre-feet of water available for recharge, about 20,500 acre-feet originates above the 16-inch isohyetal line in the Oquirrh Mountains

The amount of recharge to the ground-water reservoir from West Canyon is probably less than 5 percent of the total recharge The valley fill in the area crossed by the stream, the West Canyon ditch, and the irrigated fields consists of permeable alluvial-fan deposits, and it is estimated that 50 percent of the water is recharged to the ground-water reservoir The recharge from streamflow in West Canyon for 1965-66 (See p 11) amounts to about 1,000 acre-feet

Occurrence —Ground water in the unconsolidated deposits in Cedar Valley occurs under both water-table (unconfined) and artesian (confined) conditions Water-table conditions predominate in the southern part of the valley, where stock wells have been hand dug to depths of more than 200 feet In the central part of the basin, south and east of Fairfield, water in the shallow beds is unconfined, and these beds extend from the land surface to depths of about 100 feet Water-table conditions occur around the edges of the basin fill as indicated by the water levels in wells (C-5-2)31dcd-1, (C-6-1)18dca-1, and (C-6-1)31dab-1

Artesian aquifers are present in the valley fill opposite the drainages of Pole and Manning Canyons, and possibly in the alluvial fan of West Canyon Permeable and impermeable beds in the lower parts of the alluvial fans in Pole and Manning Canyons form the aquifers and confining beds of the artesian system on the west side of the valley in sees 17, 29, 32, and 33, T 6 S , R 2 W Toward the center of the valley, as in sees 13, 14, 15, and 26, T 6 S , R 2 W , fine-grained lake-bottom deposits overlap the alluvial deposits and act as the confining beds for the artesian system The artesian aquifers between Cedar Fort and Fairfield, extending eastward across the basin, have had the greatest development as sources of ground water in Cedar Valley In the town of Fairfield, wells flow from the artesian aquifer at depths ranging from 100 to 824 feet Although the artesian system may extend across the central part of the basin, artesian pressures are not sufficient to cause wells in the center or topographically low parts of the basin to flow The low artesian pressure may be due to the discharge of water from the basin fill into the bedrock along the east edge of the valley Artesian conditions may occur at depths exceeding 200 feet in the southern part of the valley, but no substantiating data are available

Movement of ground water —The ground water in Cedar Valley moves generally from the west to the east side of the valley Figure 4 shows contour lines connecting points of equal altitude on the water surface in March 1966 Because ground water moves from points of higher alhtude to points of lower altitude, the contours indicate the direction of movement and the areas of ground-water recharge and discharge

Altitudes of the water surface are highest near Fairfield and Cedar Fort, where water from the Oquirrh Mountains enters the basin fill Nearly all the ground water in the central and southern parts of the valley has infiltrated along the Pole Canyon syncline (figure 3), and moved through fractures and solution channels in the rock, down the syncline, and into the valley fill

The lowest altitudes of the water surface are along the east edge and southeast corner of the valley. Along the base of the Lake Mountains from about sec. 24, T. 5 S., R. 2 W., southward to sec. 8, T. 7 S., R. 1 W., the beds of the west limb of the Lake Mountains syncline (figure 3) dip toward the east and water leaves Cedar Valley along the bedding planes and through fractures and solution channels in the rocks. The water may discharge in springs and seeps on the east side of the Lake Mountains, in the bottom of Utah Lake, or to the alluvium northeast of the Lake Mountains on the west side of northern Utah Valley.

Ground water also leaves Cedar Valley through bedrock in the low pass between the Lake and Traverse Mountains. This movement is indicated by the difference of water levels in test wells (C-5-1)20ddc-1 and (C-5-2)24aab-1, which are completed in bedrock at the north end of the Lake Mountains.

The ground-water trough extending southwest of sec. 25, T. 5 S., R. 2 W. (figure 4), is probably caused by ground water draining from the basin in the northeast corner of the valley and by pumping irrigation wells in sees. 13, 14, and 15, T. 6 S., R. 2 W.

Ground water may also leave the southeast corner of Cedar Valley through the bedrock of the eastern East Tintic Mountains in Tps. 8 and 9 S., R. 2 W. This water may move into the alluvium on the west side of Goshen Valley.

Water in bedrock in the western East Tintic Mountains in Tps. 8 and 9 S., R. 3 W., probably moves to the west and east, controlled by the structure of the North Tintic anticline (figure 3). Water from the west limb of the anticline probably moves into Rush Valley, whereas water from the east limb moves into the valley fill in the southern end of Cedar Valley.

Water-level fluctuations.—Water levels in observation wells in Cedar Valley rise and fall in response to recharge to and discharge from the ground-water reservoir.

The hydrograph of well (C-6-2)29cac-1 (figure 5) shows three general water-level conditions: a relatively steady trend of high water levels from 1943 through 1952, a generally declining trend from 1953 to 1964, and rising water levels during 1965 and the spring of 1966. These trends generally follow the curve of the cumulative departure from the 1943-65 average annual precipitation at Fairfield (figure 5). Lines trending upward on the cumulative-departure curve indicate periods of above-average precipitation, when recharge to the ground-water reservoir is comparatively great, and lines trending downward indicate periods of below-average precipitation, when recharge is comparatively small.

Precipitation was above average for most of the period 1944 through 1952, but water levels in well (C-6-2)29cac-1 did not rise continuously because the discharge of nearby Fairfield Spring, (C-6-2)29ccc, had a damping effect.

From 1952 to 1962, however, the nearly continuous below-average precipitation resulted in a nearly continuous decline in water levels. This decline was accentuated in 1963-64 by the pumping of irrigation wells in sees. 17 and 32, T. 6 S., R. 2 W.

Water levels rose in 1965 and early in 1966 because of a combination of above-average precipitation from 1963 to 1965 and cessation of pumping at the irrigation wells in sees. 17 and 32, T. 6 S., R. 2 W.

The hydrographs of wells (C-6-2)14cba-1 and (C-6-2)16baa-1 (figure 5) show the decline of water levels from 1954 to 1966 in an area 3 miles northeast of Fairfield where irrigation wells have been pumped annually during the entire period of the hydrograph. Although water levels rose in 1965, they declined in the pumping season of 1966 to record lows at each observation well.

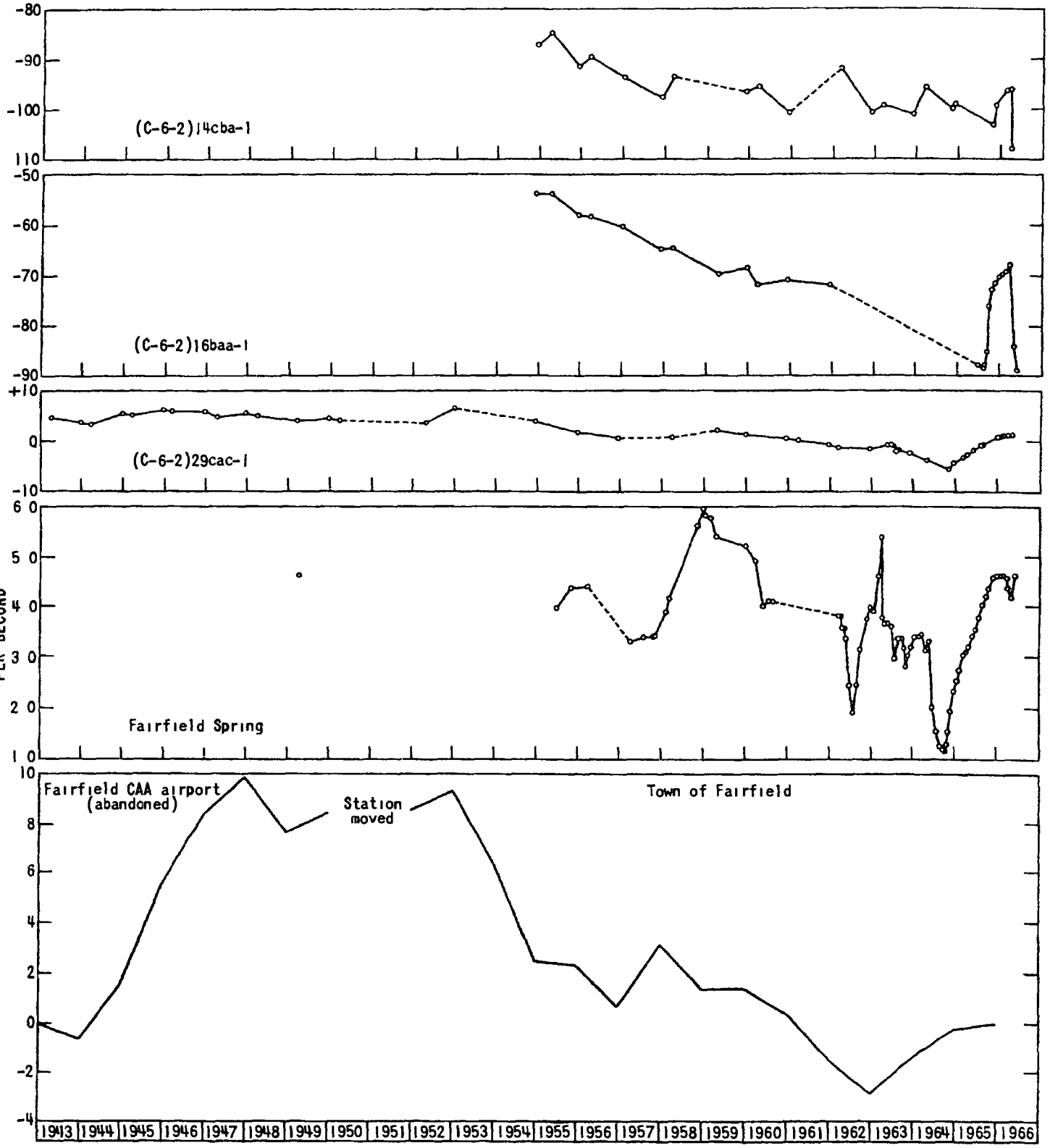


Figure 5. — Hydrographs of selected wells, discharge of Fairfield Spring, and cumulative departure from the 1943-65 average annual precipitation at Fairfield

The effects of pumping an irrigation well, (C-6-2)26cbb-1, on two wells of different depths are indicated by water-level measurements in table 5 The water level in well (C-6-2)27ccc-1 declined 11 1 feet from April 7 to June 9, 1966 while the irrigation well was being pumped The wells are about 1 mile apart, and both are 505 feet deep During the same period, however, water levels in well (C-6-2)27ccc-2, which is 100 feet deep, did not decline but rose 0 2 foot

Figure 6 shows the change of water levels in north-central Cedar Valley from March-April 1964 to March-April 1966 The rise of water levels in the western part of the valley reflects above-average precipitation in the recharge area from 1963 to 1965 and a cessation of pumping at the irrigation wells in secs 17 and 32, T 6 S , R 2 W , in 1965 The decline of water levels in the central part of the basin is the result of continued withdrawal of water for irrigation in that area (See well (C-6-2)14aba-1 in table 5)

Water-bearing characteristics of the aquifers —Information on the water-bearing characteristics of the aquifers in Cedar Valley is based on data obtained from a pumping test of well (C-6-2)14cac-1 and recovery tests of wells (C-6-2)13caa-1 and (C-6-2)26cbb-1 and calculations of specific capacities of wells in various sections of T 6 S , R 2 W

Data from the pumping test were used to determine the coefficients of transmissibility[1] and storage[2] of the aqmfer Well (C-6-2)14cac-1 was pumped at an average rate of 600 gpm (gallons per minute) from March 28 to April 1, 1966, at the beginning of the irrigation season and prior to the pumping of other irrigation wells Water-level fluctuations were observed in wells (C-6-2)14aba-1, (C-6-2)14cba-1, and (C-6-2)14dba-1 The coefficients of transmissibility and storage were computed using the nonequilibrium formula (Theis, 1935) The respective determined values for T at wells (C-6-2)14aba-1, (C-6-2)14cba-1, and (C-6-2)14dba-1 were 26,000, 12,000, and 8,000 gpd per ft (gallons per day per foot) and for S were 0 002, 0 001, and 0 0005

At the end of the 1965 pumping season, recovery tests were made at wells (C-6-2)26cbb-1 and (C-6-2)13caa-1 on Septemtier 15 and 17, respectively The coefficients of transmissibility were computed using the Theis recovery formula (Theis, 1935) The coefficient of transmissibility was 9,000 gpd pet ft at well (C-6-2)26cbb-1 and 5,000 gpd per ft at well (C-6-2)13caa-1

The specific capacities of irrigation wells in Cedar Valley range from 0 7 to 37 gpm per foot of drawdown (table 2) This wide range is due mostly to the variation in the composition of the aquifers Wells (C-6-2)17dcc-1 and (C-6-2)17dcc-2, which have respective specific capacities of 30 and 37 gpm per foot of drawdown, are developed in coarse-grained aquifers of the alluvial fan of Pole Canyon Wells in the central part of the basin, with specific capacities of 0 7 to 6 8 gpm per foot of drawdown, are developed in fine-grained lacustrine, eoban, and alluvial deposits Some of the lower specific capacities can be attributed to caving around the well, and several wells have been abandoned because of caving

Data from the pumping test, recovery tests, and specific capacities of wells indicate an increase in the coefficient of transmissibility from the center of the basin toward the north end and west side of the basin

Discharge.—Water is discharged from the ground-water reservoir in Cedar Valley by springs, by wells, by evapotranspiration, and by subsurface outflow from the basin

[1]The coefficient of transmissibility, T, is the rate of flow of water, in gallons per day, at the prevailing water temperature, through a vertical strip of the aquifer 1-foot wide extending the full saturated height of the aquifer under a hydraulic gradient of 100 percent

[2]The coefficient of storage, S, of an aquifer is the volume of water released or taken into storage per unit surface area of the aquifer per unit change in the component of head normal to that surface

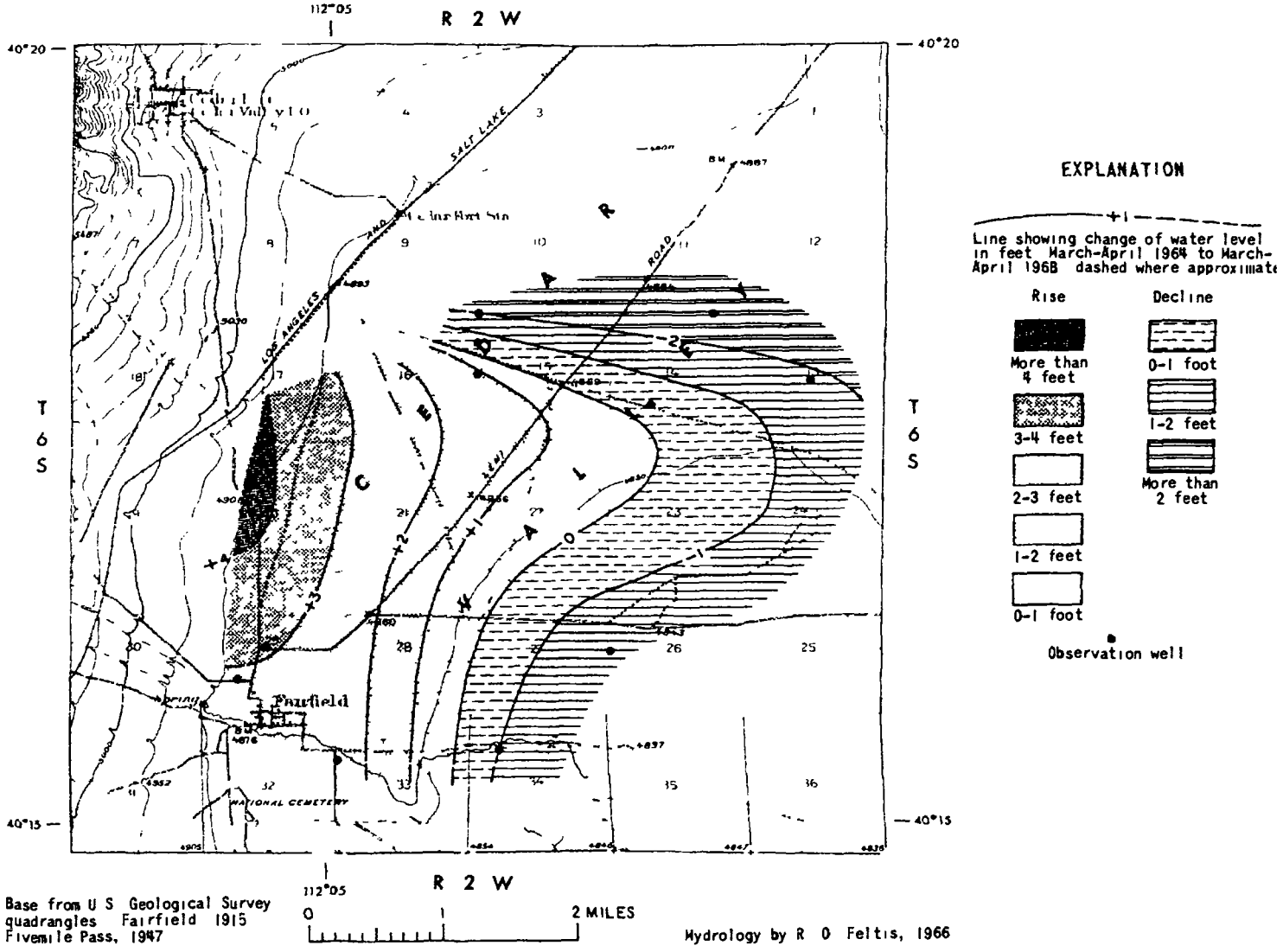


Figure 6 — Changes of water levels in the artesian aquifer, March-April 1964 to March-April 1966 in part of Cedar Valley

Fairfield Spring, (C-6-2)29ccc, at the west edge of Fairfield, is the largest spring in Cedar Valley It discharges water that is derived from precipitation on the Oquirrh Mountains The permeable coarse-grained aquifers at the head of the alluvial fans of Manning and Pole Canyons readily transmit the water, but increasingly finer grained deposits toward the toe of the fan and in the lake beds in the center of the basin retard the flow, forcing some of the water to the surface This discharges at the spring, which is at the break in slope of the alluvial fan with the valley floor

Fairfield Spring generally discharges between 3 and 5 cfs (cubic feet per second), and the maximum discharge on record is 5 96 cfs (figure 5) A comparison of the spring hydrograph with the curve showing the cumulative departure from average annual precipitation at Fairfield (figure 5) shows the time lag between precipitation on the Oquirrh Mountains and discharge from the spring For example, the above-average precipitation of 1957 resulted in a record high discharge of Fairfield Spring in late 1958 The sharp decrease in yield of the spring during the irrigation seasons of 1962-64 was due to pumping of irrigation wells in sec 17, T 6 S , R 2 W , which tap the same or intercommected aquifers

The water from Fairfield Spring is used mostly for irrigation near Fairfield in the summer and for irrigation of native pasture, from Fairfield southeast to the Sinks, during the winter The upper part of the valley fill between Fairfeld and the Sinks consists of fine grained lake beds with low permeability Much of the water applied for irrigation, therefore, is discharged by evapotranspiration Assuming an average discharge of 4 cfs from the spring, it is estimated that 70 percent of the water, or about 2 8 cfs (2,000 acre-feet per year), is consumed by evapotranspiration

The total annual discharge of three springs west of Cedar Fort, based upon measurements made in October 1965, was about 800 acre-feet About 50 percent of this water is returned to the ground-water reservoir, the remainder is consumed by evapotranspiration

Numerous springs discharge in the mountains, but their yields are generally less than 15 gpm They are used for stock watering

During 1965, about 10 acre-feet of water was withdrawn from small-diameter wells for domestic and stock use, and about 1,900 acre-feet of water was pumped at 8 large-diameter irrigation wells in sees 13 (1 well), 14 (3 wells), 15 (3 wells), and 26 (1 well), T 6 S , R 2 W The yield of the wells ranged from 130 to 1,115 gpm All the pumps are driven by electric motor, and the annual well discharge was computed from the amount of water discharged per 1,000 kilowatt hours of electricity used in 1965

During 1964, about 3,800 acre-feet of water was pumped at 11 irrigation wells These included the eight large-diameter irrigation wells mentioned above and three additional wells in sees 17 (2 wells) and 32 (1 well), T 6 S , R 2 W The two wells in sec 17 reportedly yielded 2,000 and 3,600 gpm upon their completion in 1961-62 The three wells in sees 17 and 32 produced 2,700 acre-feet of water in 1964 compared to 1,100 acre-feet from the 8 wells in sees 13, 14, 15, and 26 The wells in secs 17 and 32 tap more permeable, coarse-grained aquifers in alluvial fans along the west edge of the basin as compared to the fine-grained aquifers tapped by wells in sees 13, 14, 15, and 26 in the center of the basin

Evapotranspiration in sees 13, 14, 15, 26, and 32, T 6 S , R 2 W , probably consumes 90 percent of the water pumped for irrigation because the low permeability of the surface deposits prevents rapid downward percolation Thus in 1965, when the pumpage in these sections was about 1,900 acre-feet, approximately 1,700 acre-feet was consumed by evapotranspiration The rate of evapotranspiration is probably lower in sec 17, T 6 S , R 2 W., because the surface deposits consist of alluvial-fan sediments which permit a greater rate of infiltration

Two methods were used to estimate the subsurface outflow of water along the east edge of the basin The first method was based on transmissibility data obtained from aquifer tests and the hydraulic gradient of March 1966, determined from the water-table contour map (figure 4) The second method was a water budget for the ground-water reservoir

In the first method, the parts of the ground-water reservoir to which the calculations apply are shown by the line of reference in figure 4 The transmissibility and hydraulic gradient along each section of the line were assumed to be uniform The subsurface outflow beneath each segment of the line of reference was calculated using the formula

$$Q = 0.00112\ T\ I\ W$$

where Q is the outflow, in acre-feet per year, 0 00112 is a factor that converts gallons per day to acre-feet per year, T is the coefficient of transmissibility, in gallons per day per foot, I is the hydraulic gradient, in feet per mile, and W is the length of the segment, in miles

No aquifer test data are available for the southern part of Cedar Valley The valley fill is relatively fine grained, however, and the coefficient of transmissibility along segment 1 is estimated to be about 7,000 gpd per ft The hydraulic gradient is about 8 feet per mile

Along segment 2, the hydrauhc gradient is about 31 feet per mile The coefficient of transmissibility based on data obtained during the recovery test at well (C-6-2)26cbb-1 is 9,000 gpd per ft

Segment 3 is across an area where the depression of ground-water contours has been accentuated by pumping irrigation wells in sees 13, 14, and 15, T 6 S , R 2 W The transmissibility along this segment is based on the change in hydraulic gradient across the segment for an annual rate of discharge from wells of 1,500 acre-feet per year The formula used to calculate the transmissibility of the segment is

$$T = \frac{Q}{0.00112\ (I-I')W}$$

where T is the transmissibility, in gallons per day per foot, Q is the discharge of wells, 1,500 acre-feet per year, 0 00112 is a factor converting gallons per day to acre-feet per year, I is the average hydraulic gradient as determined from figure 4, 50 feet per mile, I' is the estimated average hydraulic gradient before pumping began, 33 feet per mile, and W is the length of the segment, 4 3 miles or

$$T = \frac{1{,}500}{0.00112\ (50-33)4.3} = 18{,}320, \text{ rounded to } 20{,}000 \text{ gpd per ft}$$

Aquifer-test data are not available for the north end of Cedar Valley, however, the valley fill in this area consists of coarse-grained sediments of the West Canyon alluvial fan, which are assumed to be as permeable as the sediments of the Pole Canyon alluvial fan, which underlie the line of segment 3 The coefficient of transmissibility along segment 4, therefore, is assumed to be 20,000 gpd per ft The hydraulic gradient is 73 feet per mile

Underflow for the four segments is presented in the following table

Segment (location shown in figure 4)	Coefficient of transmissibility (gallons per day per foot)	Hydraulic gradient (feet per mile)	Length of segment (miles)	Subsurface outflow past the segment (acre-feet per year)
1	7,000	8	6.1	400
2	9,000	31	8 4	2,600
3	20,000	33	4 3	3,200
4	20,000	73	2 2	3,600
		Total (rounded)		10,000

Thus the total subsurface outflow along the east edge of the basin is estimated to be 10,000 acre-feet per year

The second method used to estimate subsurface outflow was a water budget of the groundwater reservoir in Cedar Valley. This budget is only an approximation of true conditions, however, because few data are available for rates of precipitation, evapotranspiration, and recharge in irrigated and nonirrigated areas.

It is assumed that all the water leaving the basin along the eastern margin (figure 4) is subsurface outflow from the basin and is a constant quantity. On this basis, the equation of the hydrologic budget is as follows: subsurface outflow (S) from the basin equals recharge from precipitation (Rp) minus evapotranspiration of surface water from West Canyon (Es), and of ground water from Fanfield Spring (Ef) and the three springs west of Cedar Fort (Ec), and of water pumped from wells (Ep), or

$$S = Rp - (Es + Ef + Ec + Ep)$$

Substituting values determined in previous sections of this report,

$$S = 24\,000 - (1{,}000 + 2{,}000 + 400 + 1{,}700)$$

$$S = 19{,}000 \text{ acre-feet per year (rounded)}$$

Thus the subsurface outflow along the east edge of the basin is estimated by the budget method to be 19,000 acre-feet per year. Although this is almost twice as much as the outflow calculated by the first method, the two figures are of the same order of magnitude and they are a good indication of the magnitude of the actual quantity of outflow.

Test-well drilling.—Five test wells were drilled at four sites in Cedar Valley to construct water-level observation wells and to obtain additional data about the aquifers in parts of the valley. Descriptive data, water-level measurements, and logs for the test wells are given in tables 2, 5, and 7. Electric and gamma-ray logs for four of the wells are in the files of the U.S. Geological Survey in Salt Lake City.

Test wells (C-5-1)20ddc-1 and (C-5-2)24aab-1 were drilled in the pass between the Lake Mountains and the Traverse Mountains to determine the thickness of the alluvium, the depth to water, and whether or not water moves from Cedar Valley to Utah Valley through the alluvium. The alluvium was found to be 70 feet thick in well (C-5-1)20ddc-1 and 60 feet thick in well (C-5-2)24aab-1 (table 7). Water levels in the two test wells in May 1966 were 94 and 127 feet below the land surface, respectively. This indicates that the water does not leave Cedar Valley through the alluvium, but it does move through the bedrock.

Test well (C-6-2)1acc-1 was drilled to provide water-level data for the northeast corner of the valley and to define more closely the water-level contour lines of that area (figure 4). The test well was drilled entirely in unconsolidated valley-fill deposits, mostly sandy and clayey silt with occasional beds of fine to medium-grained sand or silty sand, ranging in thickness from 2 to 8 feet. The water level in the well was 175 feet below the land surface in March 1966.

Two test wells, about 15 feet apart, were drilled in sec. 27, T. 6 S., R. 2 W. Test well (C-6-2)27ccc-1 was drilled to a depth of 505 feet for observation of water levels in the deep artesian aquifer. It was drilled entirely in unconsolidated valley-fill deposits, mostly clayey and sandy silt with occasional beds of fine-grained sand or silty sand, ranging in thickness from 2 to 10 feet. Test well (C-6-2)27ccc-2 was drilled to a depth of 100 feet to provide water-level measurements in the shallow unconfined aquifer. A plug was installed in the annulus of the deep test well at a depth of 150 feet in an attempt to isolate the deep and shallow aquifers. Water levels in the shallow test well and the annulus of the deep test well were at the same level and almost 3 feet higher than the level within the deep test well itself during April 1966.

Chemical quality of water

The concentration of dissolved solids in the water in Cedar Valley ranges from 225 to 2,020 ppm (parts per million) Figure 7 shows the areal distribution of dissolved-solids concentrations and also illustrates the chemical composition of the water with lined diagrams Differences in chemical composition are shown by the differences in the slope and length of lines comprising the diagrams

The water from most of the wells and springs in the northern and south-western parts of the valley contains less than 500 ppm of dissolved solids, and the principal chemical constituents are calcium and bicarbonate The springs in the principal recharge area (Oquirrh Mountain slopes, west and northwest of Cedar Fort) yield a calcium bicarbonate type of water chemically similar to that of ground water in the north-central part of the valley The wells in the southeastern part of the valley yield water containing the highest concentration of dissolved solids, and the principal chemical constituents are sodium and sulfate

Most of the water in the valley is very hard (more than 180 ppm), but generally the chemical constituents do not exceed the recommended maximum concentrations of the U S Public Health Service (1962, p 7) as given below

Constituent	Recommended maximum concentration (parts per million)
Dissolved solids	500
Chloride (Cl)	250
Sulfate (SO_4)	250
Nitrate (NO_3)	45

Thirty water samples from wells and springs in Cedar Valley were evaluated for suitability for irrigation by using a method devised by the U S Salinity Laboratory Staff (1954, p 80) The water was classified in regard to salinity hazard and sodium hazard by plotting the specific conductance versus the sodium-adsorption ratio (figure 8) The interpretation of these quality-class ratings plotted in figure 8 are summarized by the U S Salinity Laboratory Staff (1954, p 79-81) as follows

"Medium-salinity water (C2) can be used if a moderate amount of leaching occurs Plants with moderate salt tolerance can be grown in most cases without special practices for salinity control

"High-salinity water (C3) cannot be used on soils with restricted drainage Even with adequate drainage, special management for salinity control may be required and plants with good salt tolerance should be selected

"Very high salinity water (C4) is not suitable for irrigation under ordinary conditions, but may be used occasionally under very special circumstances The soils must be permeable, drainage must be adequate, irrigation water must be applied in excess to provide considerable leaching, and very salt-tolerant crops should be selected

"Low-sodium water (S1) can be used for irrigation on almost all soils with little danger of the development of harmful levels of exchangeable sodium However, sodium-sensitive crops such as stone-fruit trees and avocados may accumulate injurious concentrations of sodium

"Medium-sodium water (S2) will present an appreciable sodium hazard in fine-textured soils having high cation-exchange-capacity, especially under low-leaching conditions, unless gypsum is present in the soil This water may be used on coarse-textured or organic soils with good permeability

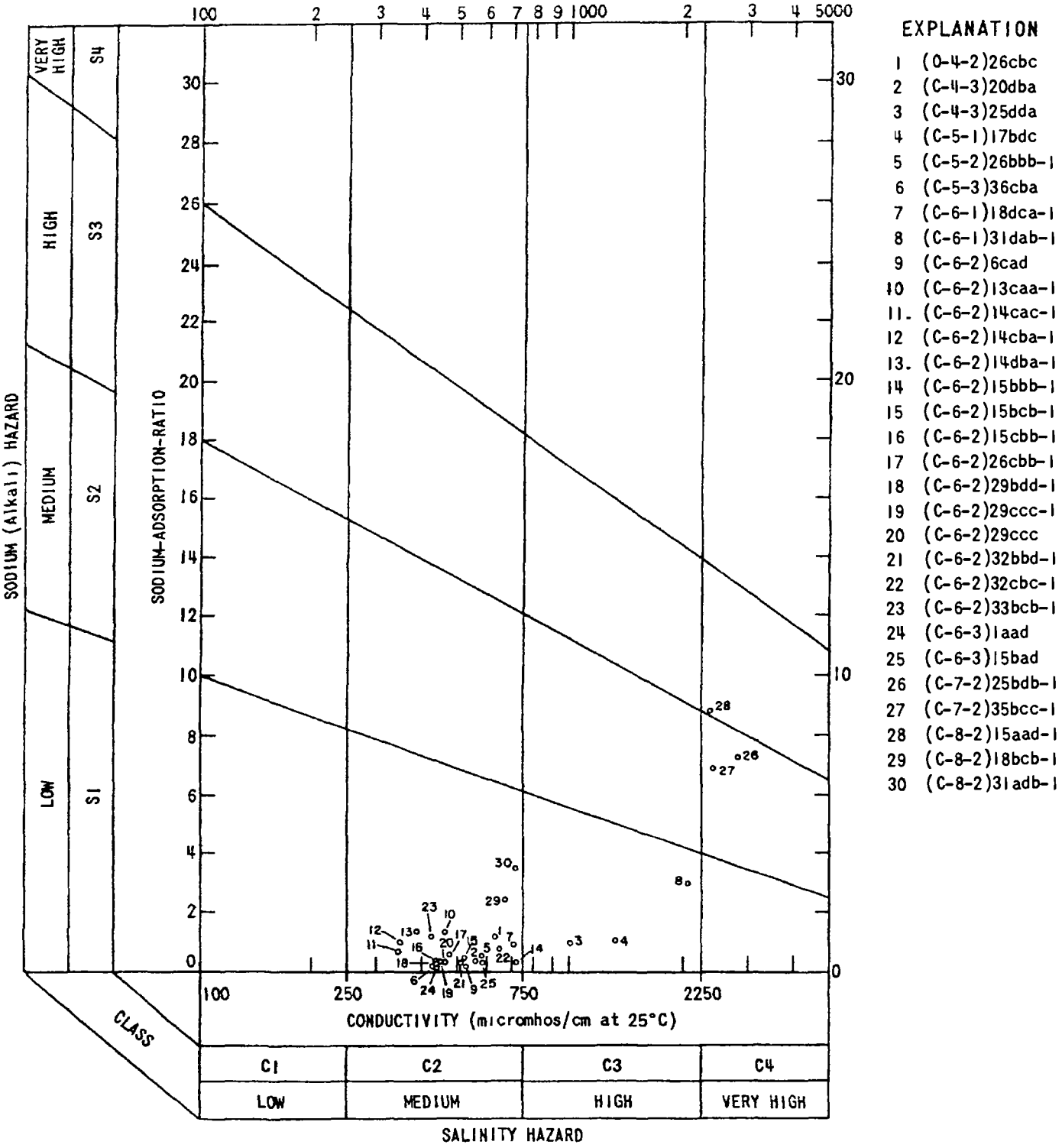


Figure 8 — Classification of water for irrigation in Cedar Valley (method of U S. Salinity Lab. Staff, 1954, p 80)
Numbers refer to analyses in table 4.

"High-sodium water (S3) may produce harmful levels of exchangeable sodium in most soils and will require special soil management—good drainage, high leaching, and organic matter additions Gypsiferous soils may not develop harmful levels of exchangeable sodium from such waters Chemical amendments may be required for replacement of exchangeable sodium, except that amendments may not be feasible with waters of very high salinity"

Water from most of the wells and springs that were sampled in Cedar Valley has a low-sodium hazard and a medium-salinity hazard (figure 8) The analyses of water from the three wells that were sampled in the southern part of the valley, however, suggests that water in a large area southeast of Fanfield probably has a very high sahnity hazard and medium to high-sodium hazard

SUMMARY AND CONCLUSIONS

Most of the water in the ground-water reservoir of Cedar Valley is derived from precipitation on the Oquirrh Mountains northwest of the valley After seeping into the ground, the water moves directly from the bedrock of the mountains into the aquifers of the valley fill, thence east and southeast across the valley

Most of the wells in the valley tap artesian aquifers in the north-central part of the basin and yield water of good quality for domestic use and irrigation Stock wells in the southeast part of the basin yield water of poor quality from aquifers under water-table conditions In the southwest corner of the valley, where some recharge occurs at the base of the East Tintic Mountains, stock wells yield water of good quality

During 1965, eight irrigation wells in sees 13, 14, 15, and 26, T. 6 S , R 2 W , discharged a total of 1,900 acre-feet of water The yields of the wells ranged from 130 to 1,115 gpm, and specific capacities ranged from 0 7 to 6 8 gpm per ft of drawdown During 1964, the eight wells discharged only 1,100 acre-feet of water, but three wells in sees 17 and 32 discharged an additional 2,700 acre-feet of water Two of the wells in sec 17, reportedly yielded 2,000 and 3,600 gpm, with specific capacities of about 30 and 37 gpm per ft of drawdown upon then completion in 1961-62 The difference in well performance in the two areas is an indication of more permeable aquifers on the west edge of the basin

Water levels in the valley generally fluctuate in response to variations of precipitation In sees 14 and 15, T 6 S , R 2 W , however, where nine irrigation wells were drilled during 1951-64, water levels have declined as much as 21 feet during the period 1954-66 Water levels in wells near Fanfield and the discharge of Fairfield Spring declined during the period 1962-64 when large irrigation wells in sec 17, T 6 S , R 2 W , were pumped in the same or interconnected aquifers

The estimated subsurface outflow of water from Cedar Valley along the east edge of the basin ranges from about 10 000 to 20,000 acre-feet per year Some of this water could be recovered in the valley by an increased withdrawal of water from wells, principally along the west edge of the basin in T 6 S , R 2 W , where most of the recharge enters the valley fill from the bedrock in the Oquirrh Mountains The aquifers in this area are the most permeable known in the basin, they are under artesian conditions, and the quality of the water is good The altitude of the area would permit gravitational flow of the water to nearly any area now being irrigated A long-term effect of pumping the wells, however, would be a decrease in the artesian pressure of the aquifers and a resultant decrease in or cessation of discharge from flowing wells and springs in the Fairfield area

Another area of potential ground-water development is the alluvial fan of West Canyon No well or water-level data are available for the large area north of Utah Highway 73, but permeable materials should be present in the fan which was built by the only perennial stream in the valley

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Table 2 — Records of selected wells in Cedar Valley

Well number See explanation for description and numbering system Locations are shown in figure 4
Type of well Dr drilled Du dug
Altitude of land surface datum Surveyed altitudes (from U S Geological Survey are given in feet and tenths altitudes interpolated from topographic maps are given in feet
Measuring point Description Ahp accessa hole in pump Apc access pipe in casing Bpb button of pump base Edp end of discharge pipe Mcp hole in casing Upb hole in pump base fpc hole in plate over casing Tca top of casing Tct top of adapter casing Tfc top of elbow in manifold Tfc top of flange on casing Tpc top of pipe to pump Trc top of reducer in casing Ttc top of tee on casing
Water level Measured distances to water levels are given in feet and tenths reported distances are given in feet
Method of lift Cy cylinder pump F flowing well N none pump and well does not flow T turbine pump Ts submersible turbine pump
Yield (gpm gallons per minute) B bailed C natural flow P pumped e estimated m measured r reported
Specific capacity gallons per minute per foot of drawdown
Use of water D domestic I irrigation N none Nt none drilled as test well S stock
Temperature r reported
Remarks and other data available C chemical analysis (table 4) GCA gamma ray logs on files of U S Geological Survey Salt Lake City H hydrograph (fig 5) L driller's log (table 6) perf casing perforated TW test well TWL test well log (table 7) W water level measurements (table 5)

Well number	Owner or user	Year drilled	Type of well	Depth of well (feet)	Diameter of well (inches)	Depth of casing (feet)	Altitude of land surface datum (feet)	Measuring point: Description	Measuring point: Above(+) or below(-) land surface datum (feet)	Water level: Above(+) or below(-) surface (feet)	Water level: Date of measurement	Method of lift	Yield: Rate (gpm)	Yield: Date of measurement	Drawdown: Amount	Drawdown: Duration of test (days)	Specific capacity (gpm/ft)	Use of water in 1965	Temperature (°F)	Remarks and other data available
(C 5 1)																				
9dob 1		1963	Dr	105	10 6	105	9C0			Dry	S 4 65	b						N		
20ddc 1	U S Geological Survey	1966	Dc	3C0	1	27C	4 795	Tca	+0 5	93	5 3 66	N						Nt		T 3 Perf 60 0 90 100 210 220 ft EGR TWL W
(C 3 2)																				
24aah 1	do	1966	Dr	155	1	155	4 989 7	Tca	0	127 3	5 3 66	N						Nt		TW 2 Perf 55 65 145 155 EGR TWL W
26bbb 1	State of Utah	1916	Dr	448	S	445	5 082 9			361	6-22 60	Cy	18Pr	6-22 60				S	53	C
11dcd 1	G S Cook	1903	Dr	325	9	321	5 8	Tca	+1 4	296 5	2 28 66	N						N		Bailer test April 1963 yield 12 gpm no drawdown after 1 hr Perf 300-320 fc L W
34dab 1		1943	Dr	280	6 4	280	4 962 2	Tca	+ 9	249 0	3-26 66	N						N		No perforations reported Water level 250 ft in April 1943 reported by well driller W
(C 4-)																				
8dca 1	Cooperative Security Corp	1948	Dr	264	t	264	4 387	Tca	0	230 0	3 14 66	Cy	2Pm	8 31 65				S	81	Perf 235-264 ft C W
31dab 1	do	1947	Dc	223	6	223	4 375	Tca	+1 1	195 3	3 14 66	Cy	6Pm	7 21 65				S	61	Perf 190 223 ft C W
(C 6 2)																				
1ace 1	U S Geological Survey	1966	Dr	300	1	300	4 891 5	Tca	0	174 6	3 30 66	N						Nt	-	TW 1 Perf 200 210 230 240 280 290 ft ECR TWL W
5ced 1		193_	Dr	105	4		4 972 8	Tca	3 3	82 9	2 28 66	N						N		Local resident reported well drilled in early 1930's as drought relief well to depth of about 200 fc Well was never used W
13caa 1	Cooperative Security Corp	1962	Dr	525	0	333	4 856 6	Ape	+1 5	119 8	3 18 66	T	400Pm	5 3 66	72	(1)	5 3	I	61	Well was gravel packed 15 339 ft perf 0 339 ft sealed 0-15 ft with bentonite and 20 inch surface casing C L W
14aba 1	do	1954	De	1 238	20 12	1 254	4 965 7	Tca	0	121 7	3-28-66	N	90Pr	2 54			-	N		Perf 150-300 306 I 254 ft L W
14aca 1	do	1954	Dr	1 014	20 12	1 014	4 862 6	Tca	0	109	2-28 56	N						N		Perf 130 274 280 I 014 ft W
14cac 1	do	1951	Dr	1 230	14 10	1 250	4 855 1	Edp	+14 4	87 1	3 28-66	T	33CPm	5 3 66				I	59	Perf below 300 ft C W
14cca 1	do	1954	Dr	1 007	16	1 007	4 856 7	Mca	1 0	99 2	3 28 66	T	330Pm	5 3 66	-			D I	59	Perf 98 1 007 fc C W W
14dna 1	do	1964	Or	810	20 12 10	600	4 858 4	Bpb	+1 9	97 3	3 28-66	T	130Pm	5 3 66	174	(1)	7	I	64	Casing 20-inch from 0-556 ft 12 inch from 0-350 ft and 10 inch from 350 to 600 fc Perf 120 356 ft in 20 inch casing 170-600 ft in 12- and 10 inch casing Gravel packed between 20 inch and 12- and 10 inch casing 0 600 fc C W
15adb 1	do	1961	Dr	2 366	16 10 S	2 085	4 864 9	Tca	0	120 4	3 27-66	N	47CPm	7 1 63	-	-		N	-	Well deepened from 460 to 890 ft in 1959 and from 890 to 2 366 fc in 1961 Perf 222 440 985 995 1 045 1 375 1 440-1 485 1 844 2 070 c L W
15hbb 1	do	1957	Dr	835	16	835	4 871 7	Ape	0	8 9	2-28-66	T	515Pm	5 3 66	134	33	3 8	I	53	Perf below 185 ft C W
13hcb 1	do	1959	Dr	955	16 10	955	4 864 6	Ape	+2 5	58 9	3 24 66	T	390Pm	5 3 66	140	(1)	2 8	I	53	Perf 278-955 ft C W
15cbb 1	do	1957	Dr	455	16	415	4 860 5	Apo	+1 5	71 4	3-28-66	T	500Pm	5 3 66	138	(1)	3 6	I	53	Perf 190-340 395 403 fc C W
16hma 1	N E Whita	1951	Or	505	10	505	4 876 5	Npb	+1 3	67 9	4 1-66	I	335Pm	7 10 63				I		Perf below 80 fc N W
17dcc 1	do	1961	Dr	600	16	562	4 913 6	Ahp	+ 5	20 7	3 31-66	T	2 000Pr 2 890Pm	12 30 61 7 1 64	67	2 6	30	I		Perf 150-175 237 246 350-376 422 432 445-492 525-535 fc The south wall of two wells L W
1ddcc 2	do	1962	Dr	595	16	595	4 920 9	Ahp	+ 5	27 9	3 31-66	I	3 600Pr 2 765Pm	2 24 62 7 1 64	97	1	3	I	-	Perf 170-174 238 248 325 350 365 371 410-440 465 481 488 493 530-544 550 574 582 587 ft The north well of two wells W
25cbc 1	Cooperative Security Corp	-	Dr				4 838 8	Tca	+1 7	68 9	3 30-66	Cy	-	-				S		W
2bcbb 1	do	1962	Or	505	18	505	4 844 1	Ape	+3 3	59 2	4- 7-66	I	1 115Pm	5 3 66	164	26	6 8	I	53	Perf 210 505 ft C L W
27cca 1	S D Nicholas	1953	Dr	80	6	90	4 842 8	Tcc	+ 6	34 6	4- 7 66	N						N	-	Perf below 35 fc W
27ccc 1	W S Geological Survey	1966	Dr	505	1	505	4 843 2	Tca	0	27 9	4- 7 66	N						He		TW 4 Perf 265-275 455 465 485 495 fc EGR IML W
27c c 2	do	1966	Dr	100	1	100	4 843 2	Tca	0	5 1	4- 7 66	N	-				-	Nt		TW 5 Perf 90-100 ft Located 15 ft from well (C 6 2)27ccc 1 W
28bac 1	S D Nicholas	7953	Dr	80	6	80	4 858	Tcc	+ 5	20 0	3-11 66	N					-	W		Perf below 20 ft W
29bdd	E R Carson		D	150	3	150	4 875 1	Trc	+1 2	+13 1	4 7 66	r	1 SFm	7 30 65			-	S	51	C W
29cac 1	L M Mainzer	-	Dr	350	4	330	4 888 4	Tca	0	+ 9	4 6 66	r	<1Fe	4 6 66			-	H	50	C N W
29cac 2	do	1953	Dr	220	4	220	4 888 7	Tca	+ 5	4	4- 6 66	N					-	N		L W
29ccc 1	C R Carann	-	Dr	189	3	389	4 886 7	Tlc	+1 8	+2 3	3 11 66	P	4 7Fm	9 9 65	-		-	1 S	52	C W
12bbd 1	M K White	1964	Dr	619	16	601	4 880	-				F T	42 8Pm 750Pr	9 10 65 3 14-64	145	1 3	- 2	I		Perf at 14 intervals between 205 and 595 ft C L

Table 2 — Records of selected wells in Cedar Valley — Continued

Well number	Owner or user	Year drilled	Type of well	Depth of well (feet)	Diameter of well (inches)	Depth of casing (feet)	Altitude of land surface datum (feet)	Measuring point: Description	Measuring point: Above(+) or below(-) land surface datum (feet)	Water level: Above(+) or below(-) surface (feet)	Water level: Date of measurement	Method of lift	Yield: Rate (gpm)	Yield: Date of measurement	Drawdown: Amount	Drawdown: Duration of test (days)	Specific capacity (gpm/ft)	Use of water in 1965	Temperature (°F)	Remarks and other data available
(C 6 2)																				
32dc 1	Utah State Parks and Recreation Comm		Dr	64	4	64	4 890					T	6Pr					I		C
13bcb 1	Ruben Carsoo	-	Dr	525	2	525	4 862 4	Tac	+2 0	+10 6	4- 7 66	F	<1Fm	4- 7 66				D I		C W
34aac 1	S O Nicholas	1953	Dr	275	6	80	4 843 5	Tca	+1 7	30 9	3-11 66	N	25Pr	8- 53				N		Well depth sounded at 55 fc below the top of casing in May 1963 ferf below 30 ft W
(C 7 2)																				
5cbe 1	W McKinney		Du	54	72x72		4 902			45		N					-	S		Water level reported by Snyder (1963 p 522)
23bcc 1	R J McKinney	1948	Dr	220	4	220	4 835	Spc	0	114 6	3-21 66	Cy	10Pr	7 22 48				S	58r	L W
25bdb 1	do		Du	200		200	4 846		-			Cy	-					S	54	Original dug well backfilled around 6 inch tile casing with 4 inch steel pump column C
29dbc 1	L A Fitzgerald		Du	198			4 860	Tfc	+ 3	169 0	3 11-66	Ts						S		Original dug well backfilled around 6 inch tile casing with 4 inch steel pump column W
35bec 1	R J McKinney	1948	Dr	225	5	225	4 8	Tca	0	180 4	3 11 66	Cy	0Br	7 14 48				S	60r	C W
(C 8 2)																				
15aad 1	J d Allen		Du	275			4 895	Tpc	+ 6	240 8	3 11 66	Cy						S		Original dug well backfilled around 6 inch tile casing with 4 inch steel pump column C W
18b b 1	do		Du	290	7x72		4 930					Cy						S		C
31adb 1	do		Du	365			5 016	Tca	+ 8	343 0	3 11 66	Cy						S		Original dug well backfilled around 6 inch steel casing with 4 inch pump column C W

1/ Well had been pumped for about 1 month since the beginning of the irrigation seasoc

Table 3 — Records of selected springs in Cedar Valley

Location See figure
Geologic source Oquirrh Formation is of Pennsylvanian and Permian age
Use of water D domestic I irrigation S stock
Dependability C good F fair
Yield (gpm gallons per minute) e estimated m measured
Remarks and other data available C chemical analysis (table 4) H hydrograph (fig 5) K specific conductance (table 4)

Location	Owner or user	Name	Geologic source		Use of water	Temperature (°F)	Dependability	Improvements	Yield (gpm) and date of measurement	Deposits	Remarks and other data available
			Formation or type of rock	Nature of openings							
(C 4 2)26cbc		Tickville Spring	Alluvium in contact with igneous rock of Tertiary age	Large seep area in stream channel	S		G	None	10e 4 7 66	None	C
(C 4 3)20dba			Oquirrh Formation	Joints and solution channels in limestone	S	48		do	15m 1 -3-65	do	C
26cbd		Coconuood Spring	do	do	S	>1	G	Water trough	15e 11 3-65	Tufa	K
26dda			do	do	S	49	G	do	15e 11 3 65	do	C
27bab			do	do	S	46	G	None	17m 11-3-65	do	K
(C 5 1)17bdc			Alluvium	Seep area in stream channel	S		F	Water trough	<1e 8 ?> 65	None	C
(C 5 3)4cdc			Oquirrh Formation	Joints and solution channels in limestone	S	44		None	10e 11 2 65	do	K
4dcd			Alluvium	Seep area in canyon fill	S	42	C	Pipeline and trough	5m 11 2 65	do	Water piped about half a mile to water trough K
36cba	Cedar Fort Irrigation Co		Oquirrh Formation	Joints and solution channels in limestone	I S	46	G	None	300e 7 22 65	Tufa	C
(C 6 2)6cad	do		Alluvium overlying Oquirrh Formation		D I S	50	D	Headhouse and pipeline	>124m 7 22 65	None	C
29ccc	Fairfield Irrigation Co	Fairfield Spring	Alluvial fan	Large seep and spring area at toe of alluvial fan	D I S	52	G	Headhouse pipeline and diversion system	2 070m 3 1 66	do	C H
(L 6 3)1aad	Cedar Fort Irrigation Co		Oquirrh Formation	Joints and solution channels in limestone	D I S	47	G	Tunnel and pipeline	>88m 7 22 65	Tufa	C
15had			do	do	S	52	F	None	7m 6 21 65	None	G
(C 9 2)29b and 32c	J H Allen		Alluvium	Seep area	D S		C	Pipeline and tanks			Water piped about 4 miles from two spring sites to ranch house and several stock tanks K

Table 4 — Chemical analyses of water from wells and springs in Cedar Valley

Disso ved solids Residue on evapo-atloo st 180 C unless Indlcated otherwlsc

Sampling site	Date of collection	Temperature (°F)	Parts per million													Sodium adsorption ratio (SAR)	Specific conductance (micromhos/cm at 25 C)	pH
			Silica (SiO_2)	Calcium (Ca)	Magnesium (Mg)	Na + K		Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Dissolved solids	Hardness as $CaCO_3$	Noncarbonate hardness as $CaCO_3$			
						Sodium (Na)	Potassium (K)											
(C 4 2)26cbc	4 7 66		48	77	10	41		220	0	33	76	0 8	431	234	54	1 2	634	7 7
(C 4 3)20d6a	11 3 65	46	7 0	95	13	10		330	0	25	11	3	323	290	19	3	558	7 6
26cbd	11- 3 65	51	-	-	-									-			773	-
26ddA	11- 3 65	49	12	130	28	47		447	0	38	80	1	558	438	71	1 0	1 000	7 7
27bab	13- 3-63	48			-												670	-
(C 5 1)17bdc	8 2> 65	-	49	148	30	57		148	12	56	295	2 3	853	494	353	1 3	1 360	8 3
(C 5 2)26bbb 1	6 30-65	53	19	50	14	21		262	0	37	34	1 1	337	257	42	6	572	7 6
(C 5-))4ede	11 3-65	45															477	
4dc&	11 2-6>	42			-			-		-		-			-		518	-
36cba	7 22-65	46	6 5	62	16	2 9		240	0	15	8 0	3 5	227	220	23	1	424	7 6
(C 6-1)18dca 1	7 1-63	91	21	73	25	35		240	0	70	66	1 4	421	288	91	9	706	7 7
31dah 1/	7 1-65	61	46	32	116	179		324	0	291	335	7	2/1 230	680	414	3 0	2 060	7 8
(C 6 2)6cad	7 22-65	50	8 0	88	12	5 5		288	0	27	11	2 1	290	269	33	3	520	7 7
13eaa 1	7 1-65	61	55	35	18	37		208	0	38	21	4	300	160	0	1 3	461	8 0
14cae 1	6 8-65	59	53	31	14	20		170	0	14	16	0	229	134	0	7	344	8 0
4cba 1	6 8-65	59	48	27	13	26		174	0	14	14	2	225	120	0	1 0	346	7 6
14dba 1	6 9 65	64	46	29	13	36		198	0	22	14	0	253	126	0	1 4	393	8 1
15bob 1	6 8 65	53	40	80	32	14		263	0	36	78	7	451	332	116	3	709	7 7
15bcb 1	6 8-65	53	38	55	26	16		248	0	37	26	0	313	244	41	4	512	8 1
15cbb 1	6 8-6>	53	40	46	20	8 6		194	6	23	17	2 1	273	200	43	3	434	8 4
26cob 1	7 1-6>	53	53	36	30	20		246	0	27	19	2	298	212	10	6	470	3 2
29bdd 1	7 30 65	53	11	58	17	5 9		228	0	17	15	2 7	235	215	28	2	430	7 6
29cac 1	1 3-66	50			-				-		17	-	-	-	-		421	-
29ccc-1	9 9-65	52	11	57	18	9 2		232	0	18	17	3 4	262	234	24	3	444	7 7
29ccc	6 3 65		10	39	20	8 7		236	0	29	18	2 3	253	232	38	3	457	8 1
32bbd 1	6 30 65	-	14	36	27	12		248	0	40	21	1 0	290	250	47	3	502	8 1
32eoc 1	10 4-63	-	19	67	30	31		325	0	49	29	3	360	292	26	8	647	7 9
33bcb 1	1 3-66	-	15	32	16	33		393	0	34	16	3	237	146	0	1 2	424	8 0
(C 6 3)1aad	7 22-65	47	6 8	65	16	4 0		248	0	17	8 7	3 2	235	227	24	1	436	8 2
15bad	6-21-65	32	6 9	67	29	12		303	0	38	20	2	321	289	41	3	586	7 7
(C 7 2)25bdb 1/	3 31 66	54	32	28	135	426	54	338	0	941	140	4	2/2 020	625	200	7 4	2 870	8 1
35bcc-1	3 29 66		23	42	114	383		487	0	842	94	4	2/1 740	575	376	7 0	2 430	7 8
(C 8 2)15aad 1	3 66	-	52	30	92	439		764	0	638	84	5	2/1 710	455	0	8 9	2 410	8 1
18bcb-1	3 66	-	30	31	24	75		226	0	72	56	1 5	391	176	0	2 5	668	7 e
31adb	3 66		38	26	19	101		218	0	64	79	5	448	146	0	3 6	717	7 7
(C 9 2)29b and 32e		-														-	381	

1/ Analysis includes 2 2 ppm fluorlde
2/ Calculated from dacarminad cunstituents
3/ Analysis includes 0 00 ppm iron (at time ol analysis) 4 0 ppm fluoride and 1 3 ppm borom

Table 5 — Water levels in observation wells in Cedar Valley

Water levels in feet below land surface datum are designated by a minus (-) sign immediately before the first entry in each column of the table. Those above land surface datum are designated algebraically by a plus (+) sign. The sign applied to any water level applies to all succeeding water levels until a change is indicated.

An asterisk (*) immediately after a measurement indicates that the measurement is from data supplied by the Office of the Utah State Engineer. A dagger (†) after a measurement indicates that the measurement is from data supplied by private consultant. All other measurements were made by the U.S. Geological Survey.

(C 5)20ddc 1	Records available 1965														
Mar	18	1966	1/	-49 7	Ma	30	1966	2/	88	May	3	1966	3/	91 3	
Mar	21		1/	60 0	Apr	1		1/	42 4	June	9			91 3	
Mar	26		1/	80 8	Apr	7		3/	3 9						
(C 5 2)24aab 1	Records available 1966														
Mar	26	1966	1/	67 0	Apr	1	1966	-/	101 2	June	9	966	1/	131 0	
Mac	30		1/	96 7	May	3		-/	127 3						
(C 5 2)31dcd 1	Records available 1965 66														
Aug	1	1965		-299 9	Oct	29	1965		298 6	Feb	1	1966		297 1	
Aug	31			299 7	Nov	30			297 9	Feb	28			246 7	
Oc	4			299 0	Jan	3,	1966		297 4						
(C 5 2)14dab 1	Records available 1966														
May	26	1966		49 0											
(C 6 1)18dca 1	Records available 1964 66														
Apr	28	1964		227 1	July	21	1965		229 9	Oct	4	1965		229 8	
Nov	9			228 8	Aug	3			229 7	Oct	29			230 0	
Mar	9	1965		229 6	Aug	12		4/	210 2	Ma	14	1966		230 0	
Apr	12			232 8	Sept	3			229 9						
(C 6 1)11dab 1	Records available 1964 66														
Apr	28	1964		194 2	Aug	12	1965		94 9	Nov	30	1965		193 3	
Dec	16			194 7	Sapc	1			195 0	Jan	4	1966		195 3	
Mar	26	1965		194 6	Oct	4			193 1	Mar	14			195 3	
Aug	1			194 9	Oct	29			195 2						
(C 6 2)1acc 1	Records available 1966														
Mar	21	966	1/	116 0	Mar	10	1966		174 4	May	3	1966		174 8	
Mar	22		1/	154 7	Apr	1			1 4 5	Juna	9			174 6	
Mar	6			174 5	Apr	7			174 5						
(C 6 2)5cad 1	Records available 1965-66														
Aug	17	1965		85 6	Oct	29	1965		- 81 3	Feb	1	1966		82 8	
Aug	31			94 5	Nov	30			S3 4	Feb	28			82 6	
Oct	4			81,7											
(C 6 2)13eaa-1	Records available 1963-66														
Mar	29	1961		117 1*	Apr	12	1965	4/	119 5	Nov	30	1965		122 8	
Apr	5			117 4*	Sept	9		4/	119 5	Jan	3	1966		121 4	
June	6		*/	116 6	Sept	7		4/	169 3	Feb	1			120 6	
July	10		4/	133 1	Sept	18		4/	141 9	Mar	14			120 0	
Mar	25	196/		118 1	Sept	19		4/	136 6	Mar	27			119 8	
Oct	10			122 3	Sapc	20		4/	134 1	Mar	28			118 8	
Dec	16			120 6	Oct	4			127 4	May	3		5/	192 1	
Mar	9	1963		120 1	Oct	29			124 6						
Mar	26		4/	124 6											
(8-6 2)14aba-1	Records available 1954 55, 1963 66														
Dec	9	1954		111 0	Mar	25	1964		118 9	July	11	1965		119 1	
Apr	12	1953		109 1	Oct	1			129 6	Aug	11			114 9	
Mar	23	1963		119 9*	Nov	10			123 7	Sept	17			133 2	
Ma	29			122 4*	Dec	1a			122 3	Sept	50			129 9	
Apr	5			127 0*	Dec	31			122 0	Oct	31			125 2	
Apr	30			129 5*	Jan	31	1965		121 6	Nov	30			123 7	
May	7			129 9*	Feb	25			121 4	Dec	31			122 3	
May	11			130 7*	Mar	1			121 2	Feb	1	1966		122 3	
May	23			132 4*	Mar	11			128 8	Mar	1			121 9	
June	6			111 1	Apr	30			129 6	Mar	28			121 7	
June	15			112 1*	May	11			131 8	May	3			133 0	
July	1			128 4*	June	30			136 7	June	9			116 3	
July	20			132 6*											
(C-6 2)14aea 1	Records available 1954 55, 1963 66														
Dec	9	1954		- 98 4	Mar	25	1964		109 3	Occ	4	1965		120 1	
Apr	12	1955		95 7	Mar	9	1965		109 7	Oct	29			114 7	
Mar	21	1963		110 6*	July	1			145 4	Nov	30			112 3	
Mar	29			120 1*	July	10			150 5	Jan	3	1966		111 t	
Apr	5			133 1*	Aug	12			155 4	Feb	1			110 2	
Apr	30			130 0*	Aug	11			131 5	Mar	1			109 7	
June	6			139 2	Sept	17			135 7						
(C 6 2)14cac-1	Records available 1951-55, 1964 66														
May	17	1951		76 8	Dec	22	1955		- 82 7	Oct	29	1965		92 7	
Juna	6			76 7	Ma	25	1964		86 6	Nov	lu			89 7	
Apr	22	1952		77 6	Occ	2			100 8*	Jan	1	1966		88 6	
Dec	31			78 2	Oct	22			92 3*	Feb	1			87 8	
Apr	22	1953		77 8	Nov	10			91 1	Mar	1			87 3	
May	14			77 8	Dec	16			89 2	Mar	28			8 1	
Dec	9,	1934		79 2	Apr	12,	1965	6/	08 1						
(C 6-2)14eha 1	Accurds available 1954 60, 1962 66														
Dec	9	1954		8 1	Mar	13	1959	4/	110 2	Apr	30	1963	4/	150 3*	
Apr	12	1955		84 9	Dec	24			96 4	Dec	5			101 3	
Dee	22			91 6	Mar	25	1960		95 6	Mar	25	1964		96 7	
Mar	28	1956		89 6	Dec	7			100 8	Nov	19			100 1	
Jan	2	1957		93 8	Mar	5	1962		92 0	Dec	16			99 0	
Dec	6			98 0	Oac	-			100 3	Apr	12	1965	4/	116 0	
Mac	14	1958		93 5	Ma	23	196)		99 3*	July	1		4/	161 6	

(C 6 2)14cba-1	Continued														
Aug	25	1963	4/	39 6	Sept	19	1965	4/	130 7	Mar	1	1966		96 3	
Aug	11		4/	123 8	Oct	4			111 8	Mar	28			86 1	
Sept	9		4/	121 3	Oct	29			103 2	Mar	29		6/	102 2	
Sept	16		5/	2 8 4	Nov	30			99 3	Mar	30		6/	104 6	
Sept	17		4/	154 3	Jan	3	1966		98 1	Mar	11		4/	106 6	
Sept	18		4/	143 3	Feb	1		4/	100 7	Apr	1		6/	107 9	
(C-6-2)14dba-1	Records available 1964 66														
Occ	10	1964		-101 9	Sept	18	1963		-148 8	Mar	1	1966		- 97 5	
Dec	16			105 3	Sapc	19			119 1	Mar	28			97 1	
Mar	9	1963		102 4	Sept	20			111 3	Mar	29		6/	102 7	
Apr	12			120 2	Oct	4			112 6	Mar	30		6/	103 9	
July	1			169 7	Oct	29			104 4	Mac	31		6/	108 3	
Aug	25			147 1	Nov	30			100 6	Apr	1		6/	110 0	
Aug	11			128 6	Jon	1	1966		99 1	May	3		8/	271 2	
Sapc	17			195 8	Feb	1			98 2						
(C 6-2)13abb 1	Records available 1964 66														
Mar	25	1964		123 9	Aug	11	1965		116 3	Oct	29	1965		121 9	
Nov	10			122 3	Sept	16			135 3	Nov	30			122 4	
Dec	16			121 2	Sepc	17			134 9	Jan	3	1966		121 6	
Mar	9	1965		121 3	Sepc	18			134 3	Feb	1			121 1	
Apr	12			124 9	Sepc	19			133 6	Feb	28			20	
July	1			136 1	Scpc	20			132 8	Mar	27			120 4	
July	30			137 3	Sept	27			128 8	May	4			133 1	
Aug	12			138 3	Oct	4			126 9						
(C 6 2)15bbb 1	Records available 1958 61, 1964 66														
Mar	14	1958		101 9	Nov	6	1964		120 9*	Oct	4	1965		-127 4	
Dec	24	1959		107 6	Nov	10			120 4	Oct	29			121 1	
Mar	25	1960	6/	123 7	Dec	16			119 1	Nov	30			121 4	
Dec	7			131 2	Apr	12	1963		124 1	Jan	3	1966		120 2	
Mar	22	1961		118 1	Aug	24			145 0	Fen	1			119 4	
Mar	25	1964		116 6	Sapc	9		5/	240 2	Feb	28			119 0	
Oct	2			126 0*	Sapt	16			165 9	Mar	10			118 6	
Oct	22			122 0*	Sept	20			141 9	May	1		3/	252 1	
(C 6 2)15bcb 1	Records available 1961 66														
Mar	21	1961		96 5*	Dec	16	1964		90 1	Oct	29	1965		- 96 0	
July	1		4/	127 4	Mar	9	1965		96 8	Nov	30			93 2	
Mar	25	1964		88 4	Apr	12			9/ 9	Jaa	3	1966		92 2	
Oc	2			107 4*	Sapt	19		4/	152 1	Feb	1			90 0	
Occ	22			95 0*	Sapt	20		4/	145 1	Mar	1			89 2	
Nov	6			91 0*	Oct	4			103 9	Mar	30			88 8	
Nov	10			97.1											
(0 6 2)15cbb 1	Records available 1963-66														
Mar	23	1963	6/	74 0*	Apr	29	1964	6/	78 8*	Sapt	18	1965	4/	-124 8	
Mar	29		6/	79 4*	Oct	22			78 7*	Sapc	19		4/	118 0	
Apt	5		6/	93 0*	Nov	6			76 6*	Sapt	20		4/	113 2	
Apr	10			91 7*	Nov	10			75 6	Oct	4			86 9	
May	7		6/	98 5*	Dec	16			73 6	Oct	29			78 4	
May	11			95 8*	Mar	9	1965		72 2	Nov	30			75 2	
Juna	6			94 2	Apr	12		6/	79 3	Jan	1	1966		71 4	
June	15		6/	102 2*	Sape	*		4/	114 4	Feb	1			72 J	
July	1			95 3*	Sept	15		5/	213 3	Mar	1			71 7	
July	20		6/	117 2*	Sapc	16		4/	140 8	Mar	24			71 5	
Mar	25	1964		72 8	Sapc	17		4/	133 3	Mar	28			71 4	
(0 6 2)16baa 1	Records available 1954-61, 1965 66														
Dac	9	1954		- 51 7	Dac	7	1960		70 6	Sept	19	1965		85 2	
Apr	12	1953		51 8	Dac	20	1961		71 8	Oct	4			75 9	
Dac	22			58 0	July	1	1965	6/	87 7	Oct	29			72 7	
Mar	28	1936		58 3	July	30		6/	87 3	Nov	30			1 2	
Jan	2	1937		60 4	Aug	12		6/	88 3	Jan	3	1966		70 3	
Dac	6			64 7	Aug	25		6/	84 8	Feb	1			69 7	
Mar	14	1938		64 6	Aug	31		6/	87 7	Feb	28			69 2	
Apr	11	1959		69 6	Sapc	16		6/	87 7	Apr	1			67 9	
Dac	24			68 1	Sapt	17			87 0	May	3			84 2	
Mar	25,	1960		71 8	Sapt	15			86 1	Juaa	9			88 9	
(C 6 2)17dec 1	Maeirds available 1961-66														
Mar	2	1963		- 23 6*	Nov	1	1964		29 4t	July	3	1965		23 8t	
Mar	23			21 1*	Nov	6			29 0*	July	10			23 6t	
Mar	29			23 3*	Nuv	7			28 9t	July	30			23 2	
Ipr	5			23 3*	Nov	13			28 8	Aug	12			22 8	
Ipr	30			23 2*	Dac	17			27 6	Aug	2			22 9	
May	7			23 1*	Fab	17	1965		25 8*	Aug	31			22 1	
May	11			23 1*	Mar	9			25 8	Oct	4			21 3	
May	23			23 2*	Apr	2			25 2*	Oct	29			21 2	
Juna	3			23 6	Apr	10			25 1*	Sov	30			20 8	
uly	3			23 1*	Apr	12			25 6	Jan	3	1966		20 7	
July	20			23 2*	Apr	17			25 2t	Feb	2			20 8	
Apr	8	1964		24 2	Juna	5			24 3t	Fab	28			20 7	
Apr	29			24 0*	Juna	19			24 t	Mar	28			20 7	
Oct	31			29 7t	July	1			23 8	Mar	31			20 7	
(C 6 2)_7dec-2	Records available 1963 66														
Mar	2	1963		- 30 7*	Apr	5	1963		10 5e	May	11	1963		- 30 4*	
Mar	23			30 5*	Apr	30			30 *e	May	23			30 5*	
Mar	29			30 6*	May	7			30 4*	June	3			31 0	

Table 5 — Water levels in observation wells in Cedar Valley — Continued

(C 6)1 dcc 2		Continued																	
July	3	1963		30	*	a	16	1965		33	6†	July	10	1965		30	8
J ly	20			30	5*	Fan	13			13	1†	J ly	30			30	5
Mar	24	1964		32	0	Feb	1			33	0*	Aug	12			10	1
Apr	8			31	5	Mar	9			33	1	Aug	25			30	1
Apr	29			31	3*	Apr	2			1	*	Aug	1?			29	6
Oct	31			36	9‡	Apr	3			12	6†	Oct	4			28	7
Nov	1			36	†	Apr	10			3	3*	Oct	29			28	4
Nov	6			16	3*	Apr	12			12	9	Nov	30			28	0
Nov	7			36	2†	Apr	17			32	5	Jan	3	1966		7	9
Nov	15			36	1	June	5			31	6†	Fan	2			28	1
Nov	14			35	7†	June	19			11	3*	Fan	28			27	9
Nov	21			35	3‡	July	1			31	1	Mar	28			28	0
Dec	17			14	9	July	1			11	0†	Mar	31			27	9
Dec,	26			34	0†												

(C 6 2)2cbc 1		Records available 1964 66																	
Dec	17	1964		67	8	Aug	12	1963		68	4	Jan	4	1966		66	9
Mar	9	1963		67	9	Aug	31			68	2	Feb	1			68	9
Apr	20			68	7	Oct	4			68	7	Mar	11			68	9
July	1			68	0	Oct	29			68	7	Mar	30			68	9
July	30			68	0	Nov	30			68	9						

(C 6 2)26cbo 1		Records available 1963 66																	
Mar	2	1963	-	53	1*	Apr	12	1965	4/	56	1	Feb	1	1966		60	5
Apr	30		4/	62	7*	June	5		4/	62	7†	Mar	11			59	5
May	7			60	7*	Sept	13		2/	225	7	Mar	28			59	2
Mar	24	1964		58	1	Sept	16		4/	107	2	Mar	29			59	3
Apr	29			57	8*	Sept	18		4/	97	1	Mar	30			59	2
Oct	2			68	3*	Sept	19		4/	92	4	Mar	31			59	2
O	22			63	6*	Sept	20		4/	88	4	Apr	1			59	1
Nc	6			62	0*	Oct	4			74	0	Apr	6			59	2
Nov	10			61	6	Oct	9			72	3	Apr				59	3
Dec	1			59	8	Nov	30			63	9	May	3		5/	22	8
Ma	9,	1965		58	0	Jan	4	1966		61	5						

(C 6 2)2 cce 1		Records available 1963 66																	
May	7	1961		31	2*	Aor	29	1964		32	9*	July	30	1965		14	6
May	11			31	2*	Oct	2			34	2*	Aug	12			14	7
May	22			31	3*	Oct	10			34	3*	Aug	31			34	9
June	3			31	8	Oct	22			34	4*	Oct	4			35	2
June	3			31	6	Nov	6			34	3*	Oct	29			35	4
June	15			31	6*	Nov	20			34	3	Nov	30			33	4
July	3			31	8*	Dec	17			34	6	Jan	4			33	2
July	9			30	4	Mar	9	1965		34	1	Feb	2			33	0
July	20			32	1*	Apr	12			34	0	Mar	1			34	8
A g	21			12	5	Apr	15			33	9	Apr	7			34	6
Mar	24	1964		33	2	July	1			33	9						

(C 6-2)27cce 1		Records available 1966																	
Mar	31	1966		27	7	Apr	6	1966	-	27	9	May	3	1966		14	1
Apr	1			27	9	Ap	7			27	9	Jura	9			39	0

(C 6 2)2 ccc ?		Records available 1966																	
Mar	31	1966		25	2	Apr	6	1966		25	1	May	1	1966		24	9
Apr	1			25	1	Apr	7			25	1	uuna	9			24	9

(C-6-2)28bae 1		Records available 1963 66																	
May	11	1963	-	19	7*	Apr	29	1964	-	20	3*	Aug	12	1965		19	4
May	23			19	7*	Nov	6			20	4*	Aug	31			19	5
June	1			19	5	Nov	20			20	4	Oct	4			19	0
June	15			19	4*	Dec	17			20	4	Oct	29			19	6
J ly	3			19	7*	Mar	9	1965		20	1	Nov	30			19	9
July	20			19	0*	Apr	12			20	0	Jan	3	1966		20	1
Aug	21			20	5	July	1			19	2	Feb	2			20	1
Ma	24,	1964		20	8	July	20			19	7	Ma	11			20	0

(C 6-)29bdd 1		Records available 1961 66																	
June	5	1963	+	11	0	Apr	12	1965	†	8	9	Nov	30	1965	+	12	9
July	9			1	0	July	1			10	3	Jan	1	1966		3	1
Aug	21			9	5	A g	12			10	9	Feb	2			11	0
Mar	24	1964		9	8	A g	31			11	5	Feb	28			13	2
Nov	10			6	1	Oct	4			12	4	Apr	7			13	1
Dec	14			7	6	Oct	29			12	8	May	1			11	1
Mar	9,	1965		8	6												

(C 6-2)29eac 1		Records available 1943-50, 1952, 1954-56, 1958-66																	
Mar	31	1943	+	4	7	Mar	29	1948	*	3	0	Apr	13	1959	+	3	1
Dae	28			3	9	Mai	15	1945		3	9	Dae	24			1	3
Mar	24	1944		3	4	Dec	15			4	3	Dec	7	1960			4
Dec	28			5	5	Mar	21	1950		4	0	Mac	22	1961	+		1
Mar	13	1945		3	0	Apr	22	1932		3	6	Dae	20				9
Dae	18			6	2	Dec	31			6	4	Mar	5	1962		1	2
Mar	6	1946		3	9	Dec	9	1954		3	9	Dae	4			1	6
Dee	16			5	9	Dec	20	1955		1	7	May	21	1963		1	0*
Apr	8	1947		4	7	Dae	13	2956		6		June	5			9	
Dec	16			5	5	Mar	14	1958		7		J no	15			1	0*

(C 6 2)29cac 1		Continued																	
ul,	5	1963		1	0*	Nov	9	1964		5	8	Aug	3	1965		0	7
July	9			1	0	Dec	16			4	4	Jan	3	1966	+		8
J y	27			1	8*	Mar	9	1965		3	3	Feb	2				8
uly	29			2	2*	Apr	12			3	0	Feb	28				9
Aug	21				J	Juoa	9			2	0	Apr	6			1	0
Dec	5				6	Aug	12			1	0	May	3			1	1
Apr	29,	1964		4	1*												

(C 4 2)29cac 2		Records available 1954, 1958, 1960-66																	
Oct	9	1954	+	2	3	Sept	17	1964		7	9*	Feb	17	1965		4	1*
Mar	14	1958			0	Sept	19			8	0†	Mar	9			4	1
Mar	5	1960	+		1	Sept	26			9	1†	Apr	2			3	9*
Dec	7				1	Oct	2			5	1*	Apr	10			3	7*
Mar	27	1961			4	Oc	3			8	2†	Apr	12			1	7
Dec	20			1	5	Oe	10			8	1*	June	9			2	8
Mar	3	1962		1	9	Oct	17			8	3†	June	30			2	6
Dec	4			2	2	Oct	18			8	2†	July	21			2	3
Mar	8	1963		1	8	Oct	20			8	0†	July	30			2	2
May	23			1	7*	Oct	22			7	8*	Aug	12			2	0
J ne	5			1	6	Oc	21			8	3t	Aug	31			1	7
June	13			1	6*	Oct	29			7	4*	Oct	4				8
July	3			1	7*	Oct	11			8	4†	Occ	29				6
July	9			1	7	Nov	1			7	2†	Nov	30				5
July	20			1	7*	Nov	6			6	7*	Jan	3	1966			5
July	27			2	5*	Nov	7			6	7†	Jan	1		1/		2
July	29			2	7	Nnv	9			6	5	Jan	4				6
Aug	21			2	5	Nov	14			6	2†	Fab	1				6
Dec	5			1	1	Nov	21			6	0†	Mar	27				6
Mar	24	1964		2	5	Dec	5			5	6†	Apr	6				5
Apr	29				1*	Dec	16			5	?	Apr	6		1/		4
Aug	13			7	2*	Dec	26			4	9†	May	1				4
Sept	5			7	9*	Jan	16	1965		4	6†	May	3		1/		3
Sept	12			8	3†	Fan	11			4	31	June	9				3

(C-6 2)29ccc 1		Records available 1965 66																	
Sept	9	1965	+	1	7	Nov	30	1965	+	2	9	Feb	2	1966	+	2	8
Oct	4			2	3	Jan	4	1966		2	9	Mar	11			2	8

(C 6 2)33beb 1		Records available 1950-51, 1954-56, 1958-66																	
Aug	7	1950	+	14	9	Mar	22	1961	+	9	7	July	1	1963	+	6	7
Dae	5			14	4	Dec	20			9	1	July	30			8	1
Mar	30	1951		15	0	Mar	5	1962		10	4	Aug	12			8	2
Dec	9	1954		15	1	Dae	4			9	1	Aug	31			8	6
Apr	12	1953		13	1	Mar	8	1963		7	7	Occ	4			9	0
Dec	20			13	3	June	6			9	9	Occ	29			9	6
Mar	28	1956		13	6	Joly	9			10	0	Nov	10			9	8
Dec	13			12	6	Aug	21			8	7	Jan	1	1966		10	3
Mar	14	1958		11	8	Dec	5			6	9	Feb	2			10	4
Apr	13	1959		11	4	Mar	24	1964		7	9	Feb	28			10	2
Dec	24			12	3	Mo	9			3	0	Apr	7			10	6
Mar	25	1960		12	6	Dec	17			5	1	May	3			11	1
Dec	7			11	3	Mar	9,	1965		6	4						

(C 6 2)34bac 1		Records available 1963 66																	
May	7	1963		28	4*	Mar	24	1964		29	9	July	30	1965		31	5
May	11			28	4*	Apr	29			29	6*	Aug	12			31	8
May	22			28	5*	Oct	10			31	3*	Aug	31			11	9
June	5			28	7	Nov	6			31	5a	Occ	4			31	7
June	13			28	8*	Nov	10			31	5	Oct	29			31	8
July	3			29	2*	Dec	17			30	0	Nov	30			31	8
July	20			29	5*	Mar	9	1965		30	8	Jan	4	1966		31	6
July	27			29	3*	Apr	20			30	3	Feb	2			30	3
Aug	21			29	5	July	1			30	7	Mar	11			30	9

(C 7 2)23bcc 1		Records available 1964 66																	
Apr	28	1964		114	6	A g	3	1965		114	6	Nov	30	1965		114	8
Mar	26	1965		114	5	Aug	31			114	7	Jan	4	1966		114	7
Apr	12			1	4	5	Oct	5			114	7	Mar	11		114	6
July	21			114	6	Oct	9			114	8						

(C 7 2) 9dbe 1		Records available 1965 66																	
Nov	30,	1965		170	1	Mar	11,	1966		169	4								

(C-7-2)35bcc 1		Records available 1965 66																	
Oct	19	1965		180	4	Nov	30	1965		-180	4	Mar	11	1966		-180	4
Oct	29			180	5	Jan	4	1966		180	2						

(C 8-2)15aad 1		Records available 1965 66																	
Sept	10	1965		240	6	Nov	30	1965		-241	2	Feb	1	1966		241	4
Oct	5			240	6	Jan	4	1966		241	3	Mar	11			241	4
Oct,	29			240	,												

(C 9 2)3adb 1		Records available 1965-66																	
Aug	3	1965		343	6	Oct	29	1965		-343	7	Feb	1	1966		-341	7
Aug	31			341	7	Nov	30			343	7	Mar	11			343	8
Oct	5			341	7	Jan	4	1966		343	7						

1/ Water le el d ckl ing alter completi n t drilling and flu h ng of observati n well
2/ Water to al prior t flual a well f datarjment e l t n
3/ Water laval daclin ng altar fl w ing observat n well
4/ Well race tly pmpvd
5/ Well waa buing pumped
6/ Nearby vail waa bailg pumped
7/ Nearly flowing we l with ln for 30 minutes

Table 6 — Selected drillers' logs of wells in Cedar Valley

(Surveyed altitude of land surface at the well by U.S. Geological Survey are given in feet and tenths. Altitude interpolated from topographic maps are given in feet.)

Thickness: Given in feet
Depth: Given in feet below land surface

	Thickness	Depth
(C 5 2)31dcd 1 Logged by E. W. Hale. Alt. 1814.1		
Boulders	15	15
Clay and sand	50	65
Boulders	2	67
Clay	9	76
Gouleaar	2	78
Clay	17	95
Hardpan	1	96
Clay and sand	22	118
Boulders	3	121
Clay	3	124
Boulders	2	126
Clay	10	136
Souldaes	1	137
Clay and sand	27	164
Boulders	2	166
Clay	26	191
Boulders	1	193
Clay	26	219
Clay and sand	31	250
Boulders	2	252
Clay	24	276
Boulders	2	278
Clay	16	297
Gouldars	2	296
Clay	4	100
Sand and gravel water	25	32
(C 6 1)18dca 1 Log by L. E. Hale. Alt. 4 887.9 1		
Sand and clay	70	70
Clay with gravel	159	229
Craval	5	234
Clay	4	238
Sand	5	243
Clay	7	250
Quicksand	2	252
Crave	12	264
(C 6-2)13caa 1 Log by Robinson Drilling Co. Alt. A 856.6 ft.		
Silt	2	2
Clay and hatdpan	2	4
Clay blue	41	45
Clay yellow	50	95
Clay and sand	10	105
Clay yellav	40	145
Clay gray	3	148
Clay and gravel small anoun of water	2	150
Clay gray	10	160
Clay yellow	30	190
Clay blue	15	205
Clay yellow	47	252
Sand	16	268
Clay and sand	82	350
Clay and sand hard and so streaks	45	395
Clay and sand	40	435
Clay and gravel mixed	5	443
Clay and sand	82	525
(C 6-2)14eba 1 log by Roscoa Moss Drilling C. Alt. 4 865.7 tt.		
Soil	4	4
Clay gray	66	70
Clay brown sandy	47	217
Clay brown	508	725
Sand gravel and ulay	13	738
Clay gray hard sandy	17	753
Clay brann soft	29	784
Clay hrwn hard sandy	6	790
Clay brwn soft streaks ot aand	20	810
Clay blue soft	15	825
Clay brwu sult	15	b40
Clay brwn hard sa dy	20	860
Clay brwn xtraak f aa l	27	387
Clay light luc	15	902
Clay gray screaks t sand	01	1 003
Clay nrwn soft	102	1 103
Sand and gravel streakn of tlay	50	1 155
Sand and gravel hard clay streaks	71	1 226
Sand aud gravel hard	32	1 258

	Thickness	Depth
(C 6-2)15ahh Log by Robinson Drilling Co. Alt. 4 864.9 ft.		
Clay yell w	42	42
Clay blue	11	51
Clay yall w	29	82
Cravel lry	4	86
Clay yallnu	31	117
Sand f ia mak ng water	4	121
Clay and gravel sandy yellow	6	127
Sand fine	10	137
Sand and gravel	9	146
Clay yallnu	56	202
Clay sandy yellow	22	224
Clav sand and gravel	20	244
Clay yellnu and t na gravel	28	272
Llay sticky	10	282
Clay sandv	6	288
Clay sttcav	3	291
Clay and fina gravel	3	294
Cla stlckv	5	29
Clay and fine gravel	3	300
Clay stlckv llgn brown	8	308
Clay sardy llgit brown	28	336
Clay and gravel	11	34
Clay stlcky ligh brown	4	351
Gravel	9	160
Clav stlcky light brnw	5	165
Clay sardy light brown	5	402
Sand and cubb ea	4	406
Cla, andy light brown	5	411
Sand and c hblea hard	2	413
Clay s lcky light brown	21	442
Clay white sandy	4	446
Clay s lcky light brown	54	500
Clay val uw	34	534
Clay f um	4	538
Clay yell w	22	360
Gravel and clay	3	565
Clay vellow	15	388
Cravel and clay	10	590
Clay vellow	12	602
Gravel and clay	4	606
Clay vellow	29	635
Sand hard	8	643
Clay yellow	19	662
Clay blue	4	666
Clay yellow	109	2 5
Clay yel ow with some line gravel	40	815
Clay yellow	15	830
Clay and gravel	8	833
Clay brown	35	871
Sand hard brwn	12	885
Clay sticay ya low	32	917
Clay sticky blua	69	986
G aval and sand 1 tnch gravel	10	996
Clay yellow	49	1 045
Clay vallow sandy	30	1 075
Clay blue	27	1 102
Clay yellow	13	1 115
Clay sticky brown	32	1 442
Sand brown and stands up	23	1 465
Clay brwo and white	5	1 470
Clay white and red	5	1 475
Clay sandy vellow	10	1 485
Clay s lcky brown	230	1 715
Clay brown and gravel mixed 1/4 inch gravel	10	1 725
Clay brown	10	1 735
Clav brown and f'ne gravel mlxed 1/4-inch graval	10	1 745
Clay brwn	20	1 765
Clay sandy lrown	10	1 775
Clay brwn	35	1 810
Clay sti ky lrwn	15	1 825
Clay sandy lrwun	15	1 840
Clay lrwn mixod ulth Tina graval 1/8 inch grovel	30	1 870
Clav lrwn with streaks line graval 1/2 nch gravel	10	1 ddo
Sand and tluo e aval with a brwn clai mlxed	25	1 905
Sand hald	9	1 913
Sand and lina gtavel	12	1 925
Sand and gravel 1/? nch gravel	5	1 930
Clay brewo	5	1 935
Gravel	2	1 937

	Thickness	Depth
(C 6-2)15ahh 1 Continued		
Clay brown	3	960
Sand and fine gravel 1/2 inch gravel	15	1 955
Sand and gravel 3/4-inch graval	10	1 965
Sand and gravel 1 inch grava	35	2 000
Sand nard	5	2 005
Sand and gravel nch gravel	20	2 025
Bentunite	5	2 030
Sand and graval	5	2 035
Clay sand and gra el nixed	5	2 040
Ja vl and Aravel	2	2 042
Cra el clay and sand	3	2 045
Clat olue and and shells	5	2 050
Clay hlua	6	2 056
Sand hard	4	2 060
Shala bl a bacd and sticky	5	2 065
Sand hard and gravel	5	2 070
Shale blue hard and st'eky	5	2 075
Shale blie wi h hard sand shell	13	2 090
Limas ona gray hard and eharp	18	2 128
Sand hard and s arp	8	2 136
L me grav ha d	3	2 139
Sand ard	9	2 48
Lima gra ua d	53	2 20
L raat ne d fferent c lors extra nard	3	2 204
Limastone hard brown	3	2 207
Limas ne grav	12	2 219
Limestone gray astra hard and sharp	36	2 255
Shale gray with llne shells	18	2 273
Limesi ne gray hard	18	2 291
Fault fractured zone gray limestone	18	2 309
Gravel 3/4 inch diancter	1	2 310
Fault zone limest ne	5	2 315
Lime gray	31	2 366
(C 6 2)17dcc 1 Log by J. S. Lae and Sons. Alt. 4 913.6 ft.		
Tup soil	2	2
Clay	3	5
Cravel	3	10
Clay	50	60
Sand surface water	5	65
Clay	82	147
Sand and gravel	8	155
Clay and gravel	20	175
Clav	35	210
Clay and gravel	15	225
Sand and gravel	10	235
Cravel camantad	11	246
Clay	39	285
Cravel cemanted	10	295
Clay	20	3 5
stir	30	345
Cravel	31	176
Clay	34	410
Clay and gravel	5	415
Conglmerate	10	423
Cravel	7	432
Clay and gravel	13	445
Cravel	16	461
Cvnglomerate	19	480
Cravel and b ulders	12	492
Llar	29	521
Cungl merate	64	585
Clay	15	600
(C b 2)26cbb 1 Lng hy Rnbinaun Dri lLng Lo Alt 6 844 1 f		
Clay gray	30	30
Clay vell w	25	5
Llay ray	13	68
Sand and gravel smal aun ort of water	2	70
Clay gro	10	80
Llay vell w	30	110
Clay and sard	15	1 5
Clay vell w	35	160
Clay hi a	15	175
Clay yallnw	35	210
Clay tlue and sand	40	250
Clay vell nr	5	255

Table 6 — Selected drillers' logs of wells in Cedar Valley — Continued

	Thickness	Depth
(C 6-2)26.bb Continued		
Clay blue and sand	17	272
Sand	6	278
Clay blue and sand	27	305
Clay yellow	25	330
Gravel	3	335
Clay yellow	35	370
Sand hard	10	380
Gravel	22	402
Clay hard	8	410
Clay yellow	10	420
Clay yellow and sand	18	438
Sand hard	20	458
Clay yellow	7	465
Clay yellow and sand	15	300
Clay yellow	5	505
(C 6 2)29eac 2 Log by L M Heincac Alt 4 888 7 ft		
Clay and hardpan layers	110	110
Gravel black 1/4 to 1 inch	6	116
Clay	44	160
Hardpan on sandstone	1	161
(C 6 2)29cac 2 Continued		
Clay	47	208
Gravel black 1/4 to 1 inch	10	218
Hardpan	2	220
Quicksand		
(C 6 2)32bbd 1 Log by J s Lae and Sons Alt 4 880 ft		
Clay brown	60	60
Sand	1	61
Clay brown	62	123
Clay and gravel	7	130
Clay brown	3	203
Gravel	3	208
Clay sand and gravel	45	253
Conglomerate	7	260
Clay sand and gravel	37	297
Gravel	2	299
Clay and gravel	31	330
Gravel	3	333
Clay and gravel	21	354
Conglomerate	10	364
Clay and gravel	68	432
(C A 2)32bad 1 Continued		
Conglomerate	13	445
Clay brown	7	452
Gravel	11	463
Clay and gravel	22	485
Conglomerate	2	487
Clay brown	1	490
Conglomerate	16	506
Clay	4	310
Conglomerate	23	535
Clay and gravel	13	548
Conglomerate	4	552
Gravel	7	359
Conglomerate	16	575
Clay sand and gravel	11	586
Gravel	9	595
Clay and gravel	10	605
Clay yellow	9	613
(C 7 2)23bec 1 Log by J P Felghry Alt 4 833 ft		
Clay	180	188
Clay soft with water	15	193
Clay	23	220

Table 7. — Logs of test wells in Cedar Valley

(Logs by U S Geological Survey Surveyed altitudes of land surface at the well by U S Geological Survey are given in feet and tenths altitudes interpolated from topographic maps are given in feet)

Thickness Given in feet
Depth Given in feet below land surface

	Thickness	Depth
(C 5 1)20dde 1 Alt 4 795 ft		
Recent and Pleistocene deposits		
Sand very fine to very coarse and very clay gravel silty		
Gravel is subrounded to rounded Composed of sedimentary and ignaous rocks	12	12
Gravel very fine to very coarse and small cobbles angular to rounded Composed of sedimentary and ignaous rocks		
Slight caving	2	14
Silt brown and light gray sandy and clayey Contains some very fine to medium gravel angular to subroundad Composed of sedimentary and ignaous rocks	29	43
Gravel very fine to very coarse and small cobbles angular to rounded Composed of sedimentary and ignaous rocks Interval contains brown sandy silt matrix from 43 to 38 feet and yellow brown clayey silt from 38 to 60 feet Poor circulation between 45 and 55 feet	17	60
Cobbles small and coarse gravel mostly quarzite but some limestone and ignaous rocks Slight loss of circulation	10	70
Manning Canyon Shale of Pennsylvanian and Mississippian age		
Claystone gray gray brown and olive and gray silty clay	21	91
Shale rust-brown fissile Poor circulation while drilling	5	96
Claystone gray to dark gray gray brown olive and black and gray to gray brown sand clay	46	142
Clay and claystone dark gray to black Formation changed color of drilling mud from brown to black	63	205
Shale black	95	300
(C 3 2)24aab-1 Alt 4 989 7 ft		
Recent and Pleistocene deposits		
Silt brown and tan sandy and clayey	39	39
Sand very fine to very coarse and very fine to coarse gravel Gravel is angular to rounded and composed of sedimentary and ignaous rocks Poor circulation while drilling	4	43
Silt brown clayey and sandy	7	30
Gravel very fine to very coarse angular to rounded Composed of sedimentary and ignaous rocks	2	52
Silt brown sandy and clayey as a matrix in very fine to coarse gravel Interval to about 50 percent silt and 50 percent gravel Gravel is angular to subrounded and composed of sedimentary and ignaous rocks	8	60
Ignaous rock of Tertiary age Probably lower Tertiary andesite-trachyte basalt flows (Stokes 1963)	87	147
Limestone of Paleocene age Probably Oquirrh Formation of Permian and Pennsylvanian age	8	155
(C 6 2)1ace 1 Alt 4 891 3 ft		
Recent and Pleistocene deposits		
Silt and clay tan and light gray	8	8
Silt and very fine to medium sand tan and gray	14	22
Silt and clay tan and light gray	13	35
(C 6 2)5lace 1 - Continued		
Recent and Pleistocene deposits Continued		
Silt and very fine to medium sand tan	14	49
Sand very fine to medium silty tan	7	56
Silt clayey and sandy tan	7	63
Silt and very fine to medium sand brown Contains fine gravel angular to rounded composed of quartzite and limestone from 70 to 71 feet	10	73
Silt and clay brown	13	86
Silt and very fine to coarse sand light brown to brown	12	98
Silt and clay brown	8	106
Silt and very fine to medium sand brown slightly clayey	9	113
Silt and clay brown	4	119
Silt and very fine to medium sand brown Contains very fine to medium gravel angular to subroundad composed of quarzite and limestone from 131 to 132 feet Slightly clayey from 132 to 133 feet	22	141
Silt and clay brown	3	144
Gravel fine to coarse angular to subroundad composed of quarzite and limestone Contains brown silt	4	148
Silt brown clayey and occasionally sandy	54	202
Sand very fine to medium silty from 202 to 208 feet	11	213
Silt brown clayey Sandy from 220 to 222 feet	18	231
Sand very fine to coarse silty	7	238
Silt brown clayey	12	250
Sand very fine to medium silty	3	255
Silt brown clayey	10	265
Sand very fine to medium silty	2	267
Silt brown clayey from 273 to 288 feet and sandy from 288 to 291 feet	33	300
(C 8 2)27ecc 1 Alt 4 843 2 ft		
Recent and Pleistocene deposits		
Clay light gray silty	31	51
Clay dark gray to blue gray silty	39	90
Silt light grey and light to dark brown sandy and clayey	33	125
Clay gray silty	23	148
Silt brown sandy and clayey Color grades to gray-brown at 163 to 170 feet	32	155
Clay gray silty Contains chin less than 1 foot bade of white clay	41	226
Silt tan and brown sandy and clayey	38	264
Sand very fine to medium silty	8	272
Silt tan and brown sandy and clayey interbadded with 2 to 6 foot beds of silty sand	40	312
Sand very fine to medium silty	10	322
Silt gray sandy and clayey Contains 2 to 6 foot thick beds of silty sand	86	408
Silt gray brown sandy and clayey Contains 2 to 10 foot thick beds of silty sand	36	464
Silt gray and blue gray sandy and clayey	41	505

PUBLICATIONS OF THE UTAH STATE ENGINEER'S OFFICE

(*) — Out of Print

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No 1 Underground leakage from artesian wells in the Flowell area, near Fillmore, Utah, by Penn Livingston and G B Maxey, U S Geological Survey, 1944

No 2 The Ogden Valley artesian reservoir, Weber County, Utah, by H E Thomas, U S Geological Survey, 1945

*No 3 Ground water in Pavant Valley, Millard County, Utah, by P E Dennis, G B Maxey, and H E Thomas, U S Geological Survey, 1946

*No 4 Ground water in Tooele Valley, Tooele County, Utah, by H E Thomas, U S Geological Survey, in Utah State Eng 25th Bienn Rept , p 91-238, pls 1-6, 1946

*No 5 Ground water in the East Shore area, Utah Part I, Bountiful District, Davis County, Utah by H E Thomas and W B Nelson U S Geological Survey, in Utah State Eng 26th Bienn Rept , p 53-206, pls 1-2, 1948

*No 6 Ground water in the Escalante Valley, Beaver Iron, and Washington Counties, Utah, by P F Fix, W B Nelson, B E Lofgren, and R G Butler, U S Geological Survey, in Utah State Eng 27th Bienn Rept , p 107-210, pls 1-10, 1950

No 7 Status of development of selected ground-water basins in Utah, by H E Thomas, W B Nelson, B E Lofgren, and R G Butler, U S Geological Survey, 1952

*No 8 Consumptive use of water and irrigation requirements of crops in Utah, by C O Roskelly and Wayne D Criddle, 1952

No 8 (Revised) Consumptive use and water requirements for Utah, by W D Criddle, K Harris, and L S Willardson, 1962

No 9 Progress report on selected ground water basins in Utah, by H A Waite, W B Nelson, and others, U S Geological Survey, 1954

No 10 A compilation of chemical quality data for ground and surface waters in Utah, by J G Connor, C G Mitchell, and others, U S Geological Survey, 1958

No 11 Ground water in northern Utah Valley, Utah A progress report for the period 1948-1963, by R M Cordova and Seymour Subitzky, U S Geological Survey, 1965

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No 14 Water-resources appraisal of the Snake Valley area, Utah and Nevada, by J W Hood and F E Rush, U S Geological Survey, 1966

No 15 Water from bedrock in the Colorado Plateau of Utah, by R D Feltis, U S Geological Survey, 1966

WATER CIRCULAR

No 1 Ground water in the Jordan Valley, Salt Lake County, Utah, by Ted Arnow, U S Geological Survey, 1965

BASIC-DATA REPORTS

No 1 Records and water-level measurements of selected wells and chemical analyses of ground water, East Shore area, Davis, Weber, and Box Elder Counties, Utah, by R E Smith, U S Geological Survey, 1961

No 2 Records of selected wells and springs, selected drillers' logs of wells, and chemical analyses of ground and surface waters, northern Utah Valley, Utah County, Utah, by Seymour Subitzky, U S Geological Survey, 1962

No 3 Ground-water data, central Sevier Valley, parts of Sanpete, Sevier, and Piute Counties, Utah, by C H Carpenter and R A Young, U S Geological Survey, 1963

No 4 Selected hydrologic data, Jordan Valley, Salt Lake County, Utah, by I W Marine and Don Price, U S Geological Survey, 1963

No 5 Selected hydrologic data, Pavant Valley, Millard County, Utah, by R W Mower, U S Geological Survey, 1963

*No 6 Ground-water data, parts of Washington, Iron, Beaver, and Millard Counties, Utah, by G W Sandberg, U S Geological Survey, 1963

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No 8 Selected hydrologic data, upper Sevier River basin, Utah, by C H Carpenter, G B Robinson, Jr, and L J Bjorklund, U S Geological Survey, 1964

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No 10 Quality of surface water in the Sevier Lake basin, Utah, by D C Hahl and R E Cabell, U S Geological Survey, 1965

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*No 1 Plan of work for the Sevier River Basin (Sec 6, P L 566), United States Department of Agriculture, 1960

No 2 Water production from oil wells in Utah, by Jerry Tuttle, Utah State Engineer's Office, 1960

No 3 Ground water areas and well logs, central Sevier Valley, Utah, by R A Young, United States Geological Survey, 1960

*No 4 Ground water investigations in Utah in 1960 and reports published by the United States Geological Survey or the Utah State Engineer prior to 1960, by H D Goode, United States Geological Survey, 1960

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*No 6 Work outline and report outline for Sevier River basin survey, (Sec 6, P L 566), United States Department of Agriculture, 1961

No 7 Relation of the deep and shallow artesian aquifers near Lynndyl, Utah, by R W Mower, United States Geological Survey, 1961

No 8 Projected 1975 municipal water use requirements, Davis County, Utah, by Utah State Engineer's Office, 1962

No 9 Projected 1975 municipal water use requirements, Weber County, Utah, by Utah State Engineer's Office, 1962

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No 15 Ground-water conditions and related water administration problems in Cedar City Valley, Iron County, Utah, February, 1966, by Jack A Barnett and Francis T Mayo, Utah State Engineer's Office

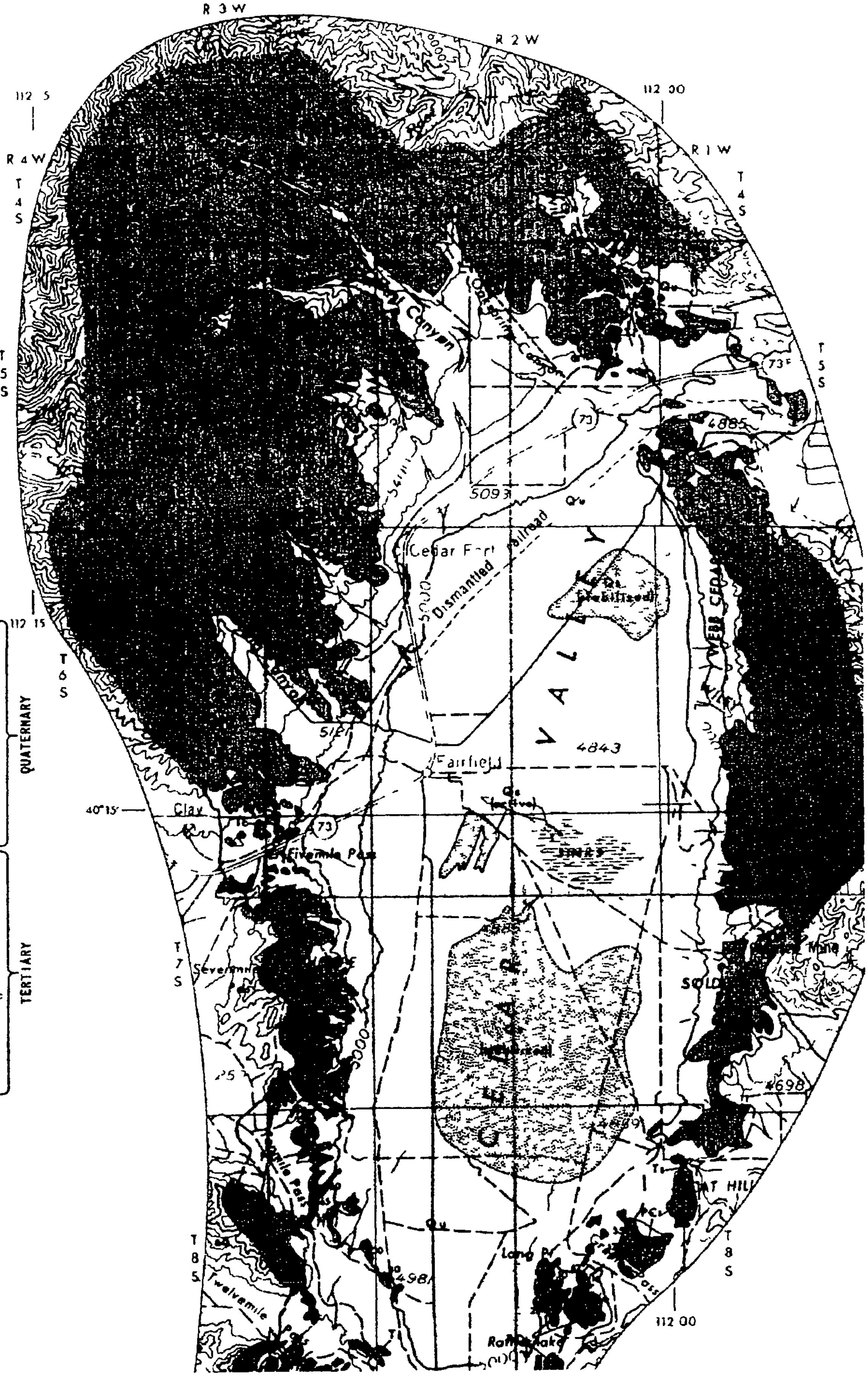
No 16 Summary of water well drilling activities in Utah, 1960 through 1965, compiled by Utah State Engineer's Office, 1966

No 17 Bibliography of U S Geological Survey Water Resources Reports for Utah, compiled by Ohve A Keller, U S Geological Survey, 1966

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

STATE OF UTAH
STATE ENGINEER

TECHNICAL PUBLICATION
FIGURE 3



EXPLANATION

QUATERNARY — Pleistocene and Recent

Qs — **Sand dunes**
Active dunes with maximum height of 15 feet and low stabilized dunes and shifting sand

Glacial moraine deposits of probable Wisconsin age

Qu — **Unconsolidated deposits**
Alluvial-fan debris colluvium Lake Bonneville Group and pre Lake Bonneville valley fill deposits

TERTIARY — Eocene(?)

Sedimentary rocks and tuffs
Limestone and fresh and argillized tuff

TERTIARY — Eocene

Conglomerate
Poorly sorted boulders of limestone sandstone and quartzite embedded in a matrix of red-orange weathering clay grades upward into gray volcanic agglomerate (Dishrow 1957)

Igneous rocks
Includes intrusive bodies lava flows bedded tuffs breccias and agglomerates

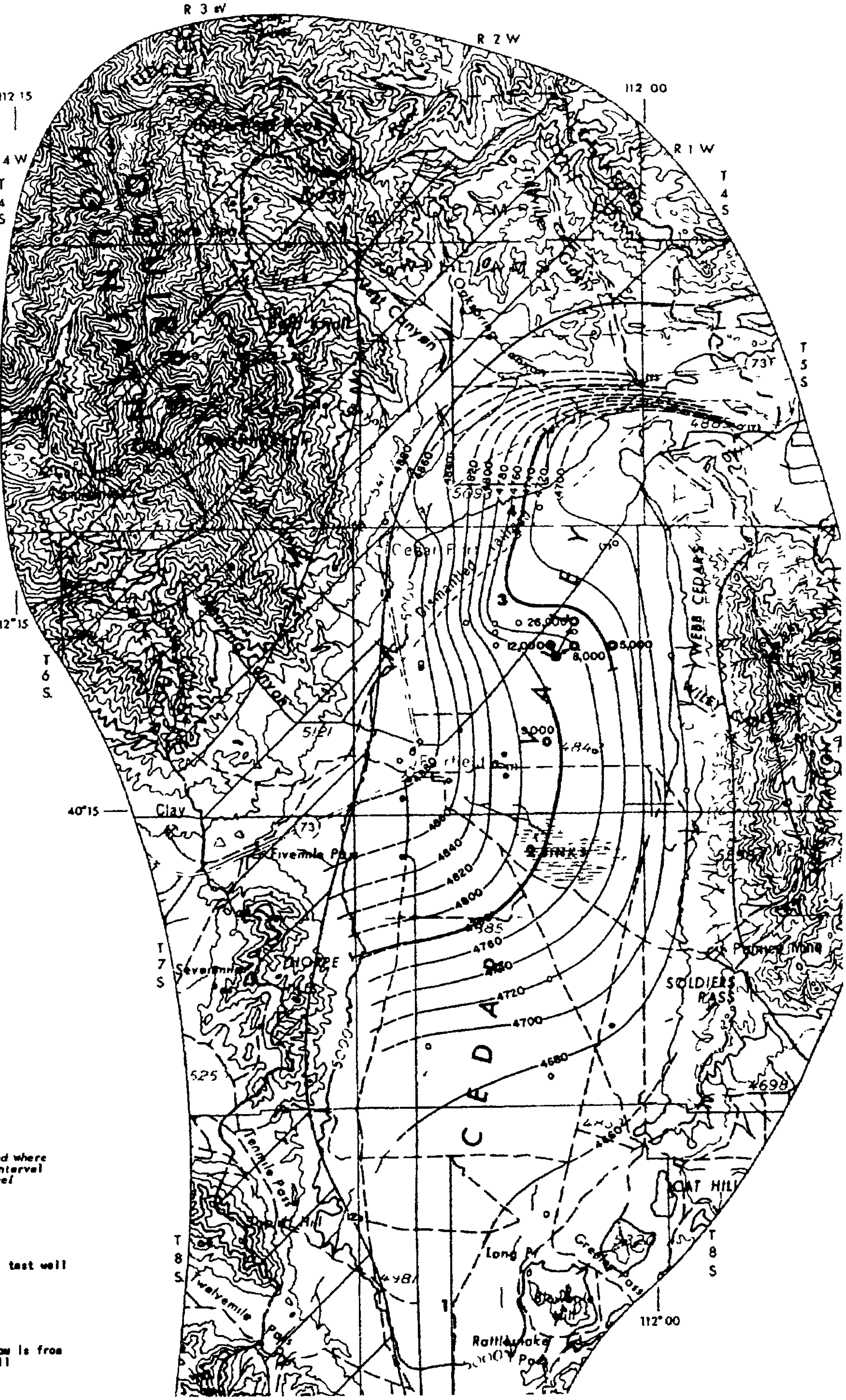
Permian through Cambrian sedimentary rocks
Includes limestone dolomite quartzite conglomerate sandstone and shale

Contact
Dashed where approximate

Highest shoreline of Lake Bonneville on alluvial deposits

Strike-slip fault
Dashed to indicate continuation Arrows show relative movement

Anticline
Show n4 trace of plane and d rec on of



EXPLANATION

——4800——

Water-table contour

Shows altitude of water table, dashed where approximate or doubtful. Contour interval 20 feet. Datum is mean sea level

•

Well

◦(T)

Observation well for water levels (T) test well

●

Well pumped for aquifer test

—→◦ 8,000

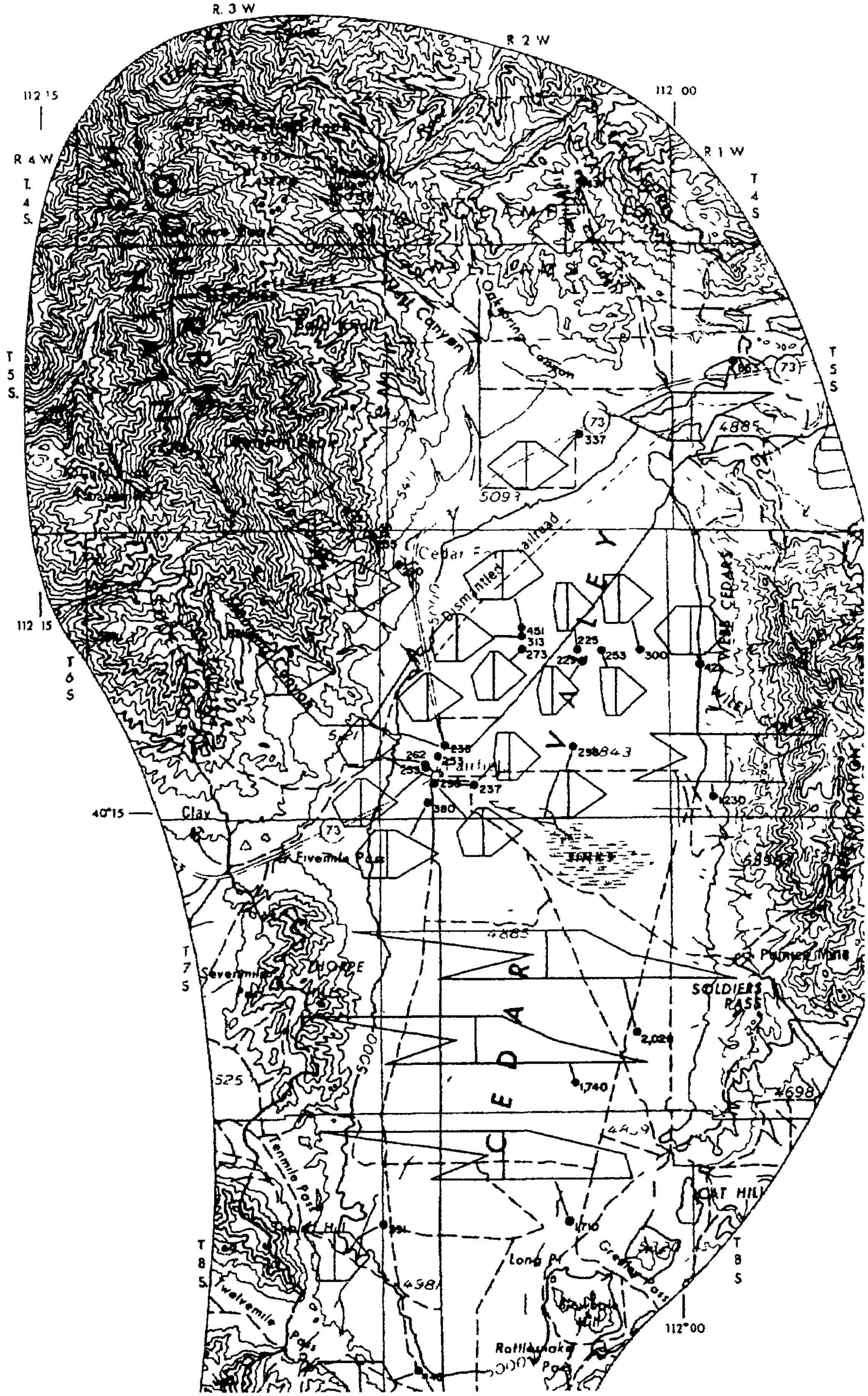
Observation well for aquifer test, arrow is from pumped well to observation well

◦ 5,000

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

STATE OF UTAH
STATE ENGINEER

TECHNICAL PUBLICATION
FIGURE 7



EXPLANATION

Sampling site

298
Well

323
Spring

APPENDIX J

HAND DELIVERED

JAN 0 4 2011

SW177

UTAH DIVISION OF
SOLID & HAZARDOUS WASTE

2011.00013

CENTRAL
BANK

IRREVOCABLE STANDBY LETTER OF CREDIT NO 125113803
DATE December 10, 2010
EXPIRATION DATE December 10, 2011
CORPORATION NAME Cedar Valley Landfill, LC
FACILITY NAME Cedar Valley Landfill
FACILITY PERMIT NO 0012R1

Executive Secretary Solid and Hazardous Waste Control Board of the State of Utah
PO Box 144880
Salt Lake City, Utah 84114-4880

We hereby issue our IRREVOCABLE STANDBY LETTER OF CREDIT No 125113803 in your favor on behalf of Cedar Valley Landfill hereinafter known as the Company, for a sum of One Hundred Five Thousand dollars and no/100's U S dollars $105,000 00, available by your drafts at sight drawn on our institutionCentral Bank Drafts must be marked "Drawn under 125113803,IRREVOCABLE STANDBY LETTER OF CREDIT No 125113803," dated today's date This IRREVOCABLE STANDBY LETTER OF CREDIT is issued to provide financial assurance to the Executive Secretary of the Solid and Hazardous Waste Control Board for the cost of closure, post-closure maintenance and monitoring, and if necessary, corrective action pursuant to Utah Code Annotated 19-6-108(9)(c) and Utah Administrative Code (UAC) R315-309-7, for the solid waste disposal facility known as

Cedar Valley Landfill LC
located at
Fairfield Utah

Requests to draw on this IRREVOCABLE STANDBY LETTER OF CREDIT must be accompanied by the
following documents
1 Your signed statement as follows I, (Executive Secretary), certify that t have issued a Notice of Violation or other order to the Company indicating that the Company has failed to comply with the closure, post-closure maintenance and monitoring, or corrective action requirements of UAC R315-301 through 320
and
2 A copy of the Notice of Violation or other order issued to the Company by the Executive Secretary,
or
3 Your signed statement as follows I, (Executive Secretary), certify that the Company has failed to
provide the Executive Secretary with an extension of Letter of Credit No 125113803, or with an acceptable replacement irrevocable standby letter of credit or other acceptable financial assurance within the 90 days of receipt of the expiration or cancellation notice by the issuing institution
and

4 Your sight draft, bearing reference to this IRREVOCABLE STANDBY LETTER OF CREDIT No 125113803
Partial drawings are permitted This original IRREVOCABLE STANDBY LETTER OF CREDIT No 125113803 must be submitted to us together with any drawings hereunder for our endorsement of any payments effected by us and/or cancellation
This IRREVOCABLE STANDBY LETTER OF CREDIT is effective as of 12/10/2010 and shall expire on 12/10/2011, but such expiration date shall be automatically extended for a penod of at least one year on 12/10/2011 and on each successive expiration date, unless the issuing institution has cancelled the IRREVOCABLE STANDBY LETTER OF CREDIT by sending notice of cancellation by certified mail to the Executive Secretary and the company 120 days in advance of cancellation
In the event the Executive Secretary is so notified, any unused portion of the credit shall be available upon presentation of a sight draft for 120 days after the date of receipt by both the Executive Secretary and Cedar Valley Landfill as shown on the signed return receipts
Whenever this IRREVOCABLE STANDBY LETTER OF CREDIT is drawn on under and in compliance with the terms of this credit, we shall duly honor such draft upon presentation to us, [insert, [we shall deposit the amount of the draft directly into a STANDBY TRUST of the [insert, owner's or operator's name]] or [we shall provide for partial drawings to third parties]] in accordance with the Executive
Secretary's instructions
The ISSUING INSTITUTION further warrants that this IRREVOCABLE STANDBY LETTER OF CREDIT conforms in all respects with the requirements Utah Administrative Code R315-309, as applicable and as such regulations were constituted on the date shown immediately below It is agreed that any provision of this IRREVOCABLE STANDBY LETTER OF CREDIT that is inconsistent with such regulations is hereby amended to eliminate such inconsistency

Type Name of Authorized Representative

Signature Institution
Jared V Peterson
Assistant Manager, 175 East Main Street, American Fork UT 84003

This IRREVOCABLE STANDBY LETTER OF CREDIT No 125113803 is subject to the most recent edition of the Uniform Customs and Practice for Documentary Credits, published and copyrighted by the International Chamber of Commerce," or "the Uniform Commercial Code

Cedar Valley Landfill
21.05 Acre
Phase Closure Bond

Item	Quantity	Unit	Unit Cost	Total Cost
2-foot Cap				
Soil (located on site)	67921 3	cu yd	$0 00	$0 00
Load / Haul	67921 3	cu yd	$0 95	$64,525 24
Spread and grade	67921 3	cu yd	$0 30	$20,376 39
Landscape				
Native Seed Mix	421 0	PLS lbs	$4 63	$1,949 23
Fourwing saltbush		10		
Wyoming big sagebrush		0 75		
Alkali sacaton		1		
Blue grama		2 5		
Bluebunch wheatgrass		14 25		
Streambank wheatgrass		13		
Smooth brome		15 5		
Intermediate wheatgrass		10		
Sandberg bluegrass		2		
Sheep fescue		3		
Slender wheatgrass		11		
Western wheatgrass		17		
		100%		
Planting *with* Grain Drill		hrs		
Post Closure Care				
Inspection *	60 0	ea	$150 00	$9,000 00
Fence Repair **	300 0	lf	$9 00	$2,700 00
Soil Repair ***	3000 0	sf	$1 25	$3,750 00
Total Bond Amount				$102,300 86

* Inspection assumes twice per year for 30 years
** Fence repair assumes 20 feet per year
*** Cap repair assumes 100 sq ft per year

APPENDIX E

2020 Closure/Post Closure

North Pointe Cedar Valley Landfill

57 Acres

Financial Assurance Plan

Item	Quantity	Unit	Unit Cost	Total Cost
CLOSURE COSTS				
Active Cell				
Final Cover	27	Acres		
Soil (located on site)				
Load & Haul	43560	Cu Yd	$ 1.89	$ 82,479.99
Spread & Grade	43560	Cu Yd	$ 0.56	$ 24,517.87
Intermediate Covered Cell	6			
Load & Haul	9680		$ 1.89	$ 18,295.20
Spread & Grade	9680		$ 0.56	$ 5,392.53
Landscape	51	Acres	$ 1,161.56	$ 59,239.63
Closed Area	6	Acres		
POST CLOSURE CARE	30	Years	$ 2,147.18	$ 64,415.38
				$ 254,340.60

Total Financial Assurance Amount

Price includes 1.018 Inflation factor

2019 Closure/Post Closure

North Pointe Cedar Valley Landfill

47.5 Acres

Financial Assurance Plan

Item	Quantity	Unit	Unit Cost	Total Cost
CLOSURE COSTS				
Active Cell				
2 foot Cap	7	Acres		
Soil (located on site)				
Load & Haul	17170	Cu Yd	$ 1.11	$ 18,986.61
Spread & Grade	17170	Cu Yd	$ 0.55	$ 9,493.30
Intermediate Covered Cell	34.5			
Load & Haul	25570		$ 1.11	$ 28,348.53
Spread & Grade	25570		$ 0.55	$ 14,039.27
Landscape	42	Acres	$ 1,141.02	$ 47,922.97
Closed Area	6	Acres		
POST CLOSURE CARE	30	Years	$ 2,109.21	$ 63,276.40
				$ 182,067.08

Total Financial Assurance Amount

Price includes 1.02389 Inflation factor

STATEMENT OF ACCOUNT

PTIF

UTAH PUBLIC TREASURERS' INVESTMENT FUND

David Damschen, Utah State Treasurer, Fund Manager
PO Box 142315
350 N State Street, Suite 180
Salt Lake City, Utah 84114-2315
Local Call (801) 538-1042 Toll Free (800) 395-7665
www.treasurer.utah.gov

ESC NO POINTE SSD LANDFILL ACCT
RODGER HARPER
2000 W 200 S
LINDON UT 84042

Account	Account Period
7363	September 01, 2020 through September 30, 2020

Summary

Beginning Balance	$ 256,130.69	Average Daily Balance	$ 256,130.69
Deposits	$ 111.58	Interest Earned	$ 111.58
Withdrawals	$ 0.00	360 Day Rate	0.5228
Ending Balance	$ 256,242.27	365 Day Rate	0.5300

Date	Activity	Deposits	Withdrawals	Balance
09/01/2020	FORWARD BALANCE	$ 0.00	$ 0.00	$ 256,130.69
09/30/2020	REINVESTMENT	$ 111.58	$ 0.00	$ 256,242.27
09/30/2020	ENDING BALANCE	$ 0.00	$ 0.00	$ 256,242.27