crossroads ventures llc

DRAFT
Environmental Impact Statement

Appendix 7

Water Supply Reports

Big Indian Plateau Water Supply

- R2 Test and Reports
- Simultaneous Testing Report
- Surface and Groundwater Assessment including the Water Budget Analysis
- R1 Test and Report

Wildacres Resort Water Supply

- Spring and Stream Flow Measurements
- Village of Fleischmanns Water Supply
- Water Budget Analysis
- Village of Fleischmanns Water Supply Daily Logs

The Belleayre Resort at Catskill Park

THE
BELLEAYRE RESORT
AT
CATSKILL PARK

CONCEPTUAL DESIGN REPORT

BIG INDIAN PLATEAU WATER SUPPLY, TREATMENT and DISTRIBUTION

December 2002

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Table of Contents

Tables

Exhibits

1.0 INTRODUCTION

1.1 General

Crossroads Ventures, LLC (Crossroads Ventures) owns approximately 1,960 acres in the Catskill Mountains, located south of New York Route 28 and on lands on either side of Belleayre Mountain Ski Center, in New York State. Crossroads Ventures is proposing to develop the area and create a recreation-oriented resort development. Consistent with numerous economic and land use studies that have been prepared for the region, it is the intent of Crossroads Ventures to provide recreational and residential facilities that will enhance the tourism attractiveness of the area as a four-season recreation destination. Development plans include a mixture of recreational and lodging facilities.

The overall project proposed by Crossroads Ventures is entitled, *Belleayre Resort at Catskill Park.* Of the 1,960 acres, approximately 573 acres would be affected by the development of the project while the remaining 1,387 acres would remain undeveloped.

There are several alternatives available for the supply, treatment and distribution of potable water for the resort developments. This plan has been prepared for Crossroads Ventures by Delaware Engineering, P.C. (Delaware Engineering), to address the water supply needs of two areas of the project. These areas are collectively referred to as *Big Indian Plateau.* Individually, they are referred to as the *Big Indian Resort and Spa/Big Indian Country Club* and the *Belleayre Highlands* developments. Potable water needs for the developments listed above can be satisfied by utilizing Rosenthal Well R2 and Silo A Spring. Non-potable water for irrigation can be supplied from Rosenthal Well R1, effluent from the wastewater treatment plant and collected storm and rainwater. The potable water would be circulated through a new distribution system and the non-potable water would be pumped raw to on-site ponds.

1.2 Project Description

The overall project site lies within two non-contiguous tracts of land, one tract located on either side of the Belleayre Mountain Ski Center. **Drawing 1** (Exhibit A) depicts the size and location of the project site.

The smaller of the two tracts is located to the west of the Ski Center. The Ulster-Delaware County Line bisects this property, which includes acreage in the Towns of Shandaken and Middletown. These lands are located north of County Route 49A, south of NYS Route 28, and on either side of Gunnison Road. Specifically, the lands include the former Highmount Ski Area, Marlowe Mansion, lands directly to the west on Galli Curci Road (County Route 49A) and lands between County Route 49A and County Route 49. Of the approximate 718 acres described, 242 acres will be developed and about 476 acres will remain undeveloped and preserved. Wastewater collection, treatment and disposal for this area is not the subject of this plan and will be discussed under separate cover.

The larger tract of land for this project is approximately 1,242 acres (**Drawing 2** in Exhibit A). It is located in Ulster County to the east of the Belleayre Mountain Ski Center and extending from Lost Clove on the southeastern boundary to Woodchuck Hollow on the western boundary. These lands are primarily second growth forests but there is a large house known as the Brisbane Mansion and a few smaller seasonal dwellings located on this land. Currently, none of the residences are inhabited. Development of this tract, entitled *Big Indian Plateau,* will largely be confined to 331 acres and consist of two areas, designated the *Big Indian Resort and Spa/ Big Indian Country Club* and the *Belleayre Highlands.*

The *Big Indian Resort and Spa/ Big Indian Country Club* will encompass the easternmost portion of land and is planned to include an eighteen-hole championship golf course; a driving range and golf course clubhouse (Big Indian Country Club) with a pro shop, locker room with both steam and sauna, and a 40-seat snack bar; 95 detached lodging (club membership) units; and a 150-room hotel which will include a full service spa with lap pool, ballroom, offices/meeting space, two restaurants with a combined total capacity of 225 patrons, and a 50-seat beverage lounge. Adjacent to these facilities and moving toward the Ski Center and across Giggle Hollow will be the *Belleayre Highlands* area. This will include the existing restored Brisbane (formerly known as Turner) Mansion (containing a game room, 25-seat snack bar, and offices), and the existing Caretaker's House and carriage barn, around which is planned 88 detached lodging (club membership) units, a pool, and tennis courts. A gatehouse is also proposed for the main entrance to *Big Indian Plateau.*

The development projection described above takes into account all foreseen future expansions of the *Big Indian Plateau.* The approximate 911 acres will remain undeveloped.

2.0 SITE CONDITIONS

The 1,242-acre parcel of land designated for the proposed *Big Indian Plateau* development is located in Ulster County, New York, south of the Hamlet of Pine Hill (**Drawing 2**). The parcel is east of the Belleayre Mountain Ski Center and extends from Lost Clove on the southeastern boundary to Woodchuck Hollow on the western boundary. These lands are primarily made up of second growth forest.

Big Indian Plateau is located in the Town of Shandaken. Per Shandaken Code, these lands are primarily zoned Residential District R5 with some sections of R1.5. R5 is described in Article III Section 116-5 C1 of the Code. R1.5 is described in Article III, Section 116-5c3 of the Town of Shandaken Code.

Wetlands are present on the proposed *Big Indian Resort and Spa/ Big Indian Country Club* site. The surface area of the individual wetlands range from 0.02 acres to 1.23 acres. The *Belleayre Highlands* site also contains two wetland areas (0.18 and 0.05 acres). In total, approximately 3 acres of the 331-acre development are designated as wetlands.

2.1 Water Works Systems

As previously noted, a majority of *Big Indian Plateau* area is currently second growth forest with the exception of Brisbane Mansion and a few smaller seasonal dwellings. Historically, these units used individual wells and springs for their potable water needs.

Downgradient from *Big Indian Plateau*, the Hamlet of Pine Hill is serviced by the Pine Hill Water Company (PHWC). PHWC provides potable drinking water to approximately 140 service connections. The active source for the PHWC is the Bonnie View Springs. These springs are located downgradient of the proposed development, adjacent to Crystal Spring Brook in the Hamlet of Pine Hill. The water supplied by the Bonnie View Springs is considered groundwater and is therefore not filtered, but chlorinated. The water also receives chemical addition for corrosion control and is then distributed directly to customers. In addition to the Bonnie View Springs, the PHWC owns or controls Depot 'Station' Road Spring (on a 0.6-acre parcel), two drilled wells, and leases a third bedrock well from an adjacent property.

The PHWC has been privately owned since its inception, circa 1893. Anecdotal information indicates that the system was efficient and well maintained for many years. However, for at least the last 25 years the system has experienced problems with maintenance, storage, treatment, and distribution. In 1984, the Ulster County Health Department (UCHD) notified the owners that the PHWC was in violation of various Department codes. The conditions remained the same until the water company was purchased in August 2000 by Dean Gitter (See Department of Public Service Decision, Exhibit B). Since that time, the owner of the water company has embarked on a number of initiatives to improve the quality and quantity of the drinking water to the residents of Pine Hill. Although many improvements have been realized (including, but not limited to, the installation of the aforementioned corrosion control system and reparation of a number of leaks), many more improvements and repairs must be completed.

The Drinking Water State Revolving Fund (DWSRF) application submitted by PHWC was approved by the New York State Environmental Facilities Corporation (NYS EFC). Approval of the DWSRF application will provide funding for a wide array of much needed upgrades to the existing system without requiring substantial financial contribution from the rate-payers. The implementation of existing and additional source development, installation of new distribution piping and appurtenances and the erection of a new storage tank are just some of the improvements included in the upgrade project.

The PHWC and the Town of Shandaken recently entered an agreement to transfer the assets of the PHWC to the Town. A closing has not yet been scheduled and permission of the New York State Department of Public Service is required prior to the asset transfer.

Per Shandaken Zoning Code, PHWC must be considered a potential potable water source for the contiguous *Big Indian Plateau* development.

2.2 Topography

The topography of the lands that make up the proposed *Big Indian Plateau* development have local variations in slope gradient and direction. In general *Big Indian Resort and Spa/ Big Indian Country Club* is located on a plateau at the crest of a hill and the ground surface decreases in elevation to the north, east, and south. The southwest portion of the site is located at the highest elevation, 2,720 feet amsl. The lowest elevation of developed land will be to the northeast at an elevation of approximately 2,000 feet amsl. *Belleayre Highlands* will occupy lands ranging in elevations of 2,175 feet amsl in the north to and 2,350 feet amsl in the south.

2.3 Soil and Water Conditions

Based on the soil survey prepared for the DEIS, the *Big Indian Plateau* site is mostly areas of shallow and moderately deep, very stony soils formed in glacial till soils that are derived from red shale and sandstone. Both the *Big Indian Resort and Spa/ Big Indian Country Club* and *Belleayre Highlands* sites currently contain rock outcrops. Those that are present in *Big Indian Resort and Spa/ Big Indian Country Club* primarily are positioned from the west to east. See DEIS Section 3.6 Soils for more information.

Twenty test pits and twelve percolation tests were conducted in November 2000 in various locations throughout the proposed *Big Indian Plateau* development to further characterize the subsurface conditions. The findings indicated that at every test pit location the typical boundary condition was an impervious layer (fragipan) at 25 to 35 inches below the surface. Deeper percolation tests revealed that the upper, browner glacial soils which are loamier, "perced" more rapidly than the underlying redder glacial till soils. These soils are derived from red shale and silt and contain more clay. The percolation rates were found to be 1.5 minutes per inch or less in the shallow test pits and over 100 minutes per inch in the deeper test pits.

3.0 WATER USAGE

This section provides an estimate of the projected water supply demand required for the *Big Indian Plateau* development. The estimated average daily flow demand was determined by multiplying the number of planned development units (e.g. detached lodging units, restaurant seats, etc.) by unit flow rate standards established by the New York State Department of Health (NYSDOH), entitled *Rural Water Supply*.

In determining expected average daily loadings, it was assumed that the usage or occupancy of the facilities would be at capacity for each day of the year. Even though the proposed developments are intended to be a "four-season" resort, the level of occupancy will vary during the year. It was also assumed that conveyance piping leakage would not be considered since the distribution system will be newly installed. Additionally, it should be noted that this estimate takes into account all the anticipated development to the 1,242-acre parcel. For these reasons, the estimate is considered conservative. Table 1 provides an estimate of the water supply demand.

3.1 Potable Flow Requirements

The projected average daily demand from both portions of the Big Indian Plateau development is estimated to be 114,817 gallons or approximately 80 gallons per minute (gpm). In accordance with Section 15-0314 of the NYS Environmental Conservation Law, all of the planned development units will be constructed with water-saving plumbing facilities. This would result in an approximately 20- percent reduction in the estimated average daily flow, for a total of 91,854 design average daily flow (64 gpm).

The maximum daily demand was determined by assuming it to be 1.65 times the average daily demand. At an average daily demand of 114,817 gpd, the maximum daily demand is approximately 189,448 gpd. Assuming a 20- percent reduction in flow from the use of water-saving fixtures, the design maximum day demand would be 151,558 gpd.

The maximum design hourly demand is expected to be 3 times the average, or 275,562 gpd (11,482 gph). This would compensate for those times of the day when there is abnormally high water usage (e.g. morning showers, etc.).

Based on the above estimates, nearly 83 percent of the anticipated potable water demand will be from residential type facilities (e.g. detached lodging units). The remainder will be from restaurant usage and the laundry facilities located at the hotel facilities.

3.2 Non-Potable Flow Estimates

The non-potable daily flow for the proposed *Big Indian Plateau* developments will include irrigation water for the golf course fairways, putting greens, etc at *Big Indian Country Club*. The amount of irrigation water needed will vary depending on weather conditions, particularly temperature and rainfall. Larger quantities will be required during the period when the turf is being established.

3.3 Fire Flow Requirements

Recommended fire flows associated with the proposed *Big Indian Plateau* were computed in accordance with the requirements of the Insurance Services Office (ISO). Table 2 summarizes the calculation results. Based on the fire flow projections for the 150-room hotel (facility requiring the greatest demand), the finished water storage tank will have a capacity of at least 249,817 gallons (135,000 gallons [1,125x60x2] for fire flow plus the average daily potable consumption of 91,854 gallons [irrigation water would be stored in on-site ponds]) for the *Big Indian Plateau*. The complete fire flow calculations can be referenced in Exhibit C.

The fire/potable water distribution system (containing hydrants, tanks, valving, and installation locations) will be designed in compliance with the *Recommended Standards For Water Works-Great Lakes Upper Mississippi River Board of State Public Health & Environmental Managers*. A more detailed discussion of the distribution system can be reviewed in Section 8.3 of this report. Conceptual plan view drawings can be referenced in Exhibit A, **Drawings 2 through 8**, of this document.

4.0 SEWERAGE SYSTEM

Delaware Engineering has prepared and submitted a conceptual wastewater treatment and disposal plan for the *Big Indian Plateau* development, for review and comment, concurrently with this report.

The neighboring Hamlet of Pine Hill utilizes Pine Hill Wastewater Treatment Plant for their sewage treatment needs. This New York City Department of Environmental Protection (NYCDEP) owned and operated plant discharges tertiary treated wastewater to Birch Creek. Under a SPDES permit issued by the NYSDEC, the plant is permitted to discharge up to 500,000 gallons per day. Currently, the plant discharges approximately 80,000 gallons per day.

Per Shandaken Zoning 105-21-G3e, any subdivision contiguous to an existing water or sewer district or contiguous to or within a planned expansion of an existing water or sewer district shall make application to become a part of or to be serviced by the existing district. No subdivision shall be approved where it is intended to use individual wells and/or septic tanks where the facilities of an existing water and sewer district may be utilized.

5.0 POTENTIAL WATER SUPPLY SOURCES

Alpha Geoscience (Alpha) of Clifton Park, NY was hired by Crossroads Ventures to conduct an investigation of the local potential water supplies. The primary objective of the investigation was to determine if any of the local springs/wells had the capacity to meet the water demand of the proposed *Big Indian Plateau* developments. Alpha evaluated the water supplies by collecting baseline water quality data and quantified the available yields from the springs/wells. To that end, Alpha conducted monthly spring flow measurements from January 2000 through October 2001 on the various springs/wells located in close proximity or within the proposed development properties. Additional monitoring of one spring source was continued through December 2001. A copy of the spring and stream flow measurements and a sketch identifying those of primary interest can be referenced in Exhibit D. Table 3 provides the Part V analytical results from Alpha's sampling event of the primary sources of interest.

Recommended Standards For Water Works-Great Lakes Upper Mississippi River Board of State Public Health & Environmental Managers dictates that a potable water source must have a capacity such that, 'the total developed groundwater source capacity shall equal or exceed the design maximum day demand' (1.65 x design average day demand) 'and equal or exceed the design average day demand with the largest producing well out of service'.

During the assessment of potential water sources, Delaware Engineering and Alpha evaluated the primary sources based on the design maximum daily demand of 151,558 gpd, which takes the 20- percent reduction for use of water saving fixtures into account. Further, the back-up or emergency sources were reviewed based on the design average day demand of 91,854 gpd.

The evaluations of the potential water sources are described below.

5.1. Rosenthal Well R2

A test well was installed northeast of the NYSDEC's Belleayre Beach at Pine Hill Lake on property previously owned by the Rosenthal family. The well was drilled into bedrock and has a total depth of 274 feet. A 72-hour pump test was performed to determine the sustainable capacity of the well. The capacity was found to be 118,080 gpd or 82 gpm (see Exhibit E). This capacity indicates that the well is suitable for use as a primary or back-up source and the well's construction meets the requirements of the *Recommended Standards for Water Works-Great Lakes Upper Mississippi River Board of State Public Health & Environmental Managers*.

The pump test report contained in the Exhibit E describes a relationship between well R2 and an adjacent well designated R1 which is to be used for irrigation water. The water level in well R1 dropped slightly during pump testing of well R2. This relationship between the wells does not preclude the use of well R1 for irrigation and well R2 for potable water supply. Given the volumes of both potable and non-potable storage, it is not anticipated that both wells will be pumped continuously nor will they operate simultaneously on a regular basis. Irrigation will take place during the night hours, and while the highest potable demand will be during the day.

A Simultaneous Test of wells R1 and R2 was performed under drought conditions to better characterize the nature of the observed relationship between the water resources (See Exhibit F). Specifically, the combined well yield, aquifer response to pumping both wells simultaneously and water quality were analyzed. The wells were pumped for 72 hours at average rates of 57 gpm and 71 gpm for wells R1 and R2 respectively. Pumping at these rates did not affect Birch Creek and the water in R2 was deemed to be of potable quality based on laboratory analysis. The Simultaneous Test demonstrated that well R1 is capable of sustaining a long term irrigation pond replenishment rate of 57 gpm and well R2 is capable of sustaining a long term average daily potable demand of 64 gpm without adversely impacting neighboring water supplies and surface water bodies.

Part V analysis of well R2 water, which was conducted during the original 72-hour pump test in late 2001 and again during the recent Simultaneous Test, indicates that it is suitable for use as a drinking water supply and will require treatment for both corrosion control and to address taste and odor associated with the presence of sulfur in the water in addition to disinfection. The slightly corrosive nature of the water and the presence of sulfur do not pose health risks. This well is designated as the primary source of potable water for the Big Indian development.

5.2 Silo A Spring

Silo A is located on Bonnie View Avenue, southwest of the Hamlet of Pine Hill and approximately 1,600 feet northwest of the *Belleayre Highlands* development, at an elevation of 1,660 feet amsl and approximately 700 feet downgradient of *Belleayre Highlands*. Silo A is owned by Crossroads Venture, LLC.

Silo A was one of the springs monitored by Alpha. This monitoring was performed from January 2000 through December 2001. The values of October through December 2001 represent measurements during a NYSDEC defined drought. The results of the monitoring indicated a sustainable capacity of 99,792 gpd or 69 gpm (see Exhibit G) during drought conditions. This source has a capacity sufficient to be either the primary or back-up potable water source for *Big Indian Plateau.*

The water quality analytical results reveal that the water will require minimal treatment for disinfection and pH adjustment purposes. If this source is utilized, the spring water will be collected and protected from potential pollutants by constructing a reinforced concrete basin (similar to a large diameter manhole with an open bottom) over the source. This water source is designated as the backup source for the Big Indian Plateau.

5.3 Upper Spring (Woodchuck Hollow Spring)

The Upper Spring is located approximately 1,400 feet southwest of the intersection of Woodchuck Hollow Road and Depot 'Station' Road, at an elevation of 1,830 feet amsl, on lands owned by Crossroads Ventures, LLC. The State of New York owns all the immediately surrounding lands. The rights to the spring are owned by The Silk Road Organization NY, Inc, the managing member of Crossroads Ventures, LLC, which has a conveyance easement through the State lands to access the waters.

This spring was monitored from June through December 2000 and again from April through October 2001. The August 2001 flow measurement was 12 gpm (17,280 gpd). This value alone does not have the required capacity necessary to meet either the primary or back-up potable water source. This source is not proposed for use to supply water to the Big Indian Plateau.

5.4 Silo B Spring

The Silo B Spring is located approximately 300 feet southeast of the Bonnie View Avenue and Depot 'Station' Road intersection. This spring is owned by The Silk Road Organization NY, Inc., the managing member of Crossroads Ventures, LLC.

The production capacity of this spring was measured by taking flow readings from the Silo B 4-inch pipe and the Silo B overflow and adding them together. The month that demonstrated the lowest Silo B flow was August 2001. Therefore 27.5 gpm was used for the analysis. This source alone does not meet the required capacity necessary to be the primary or back-up potable water source for *Big Indian Plateau*.

Additionally, the water quality analytical results reveal that the water will require minimal treatment for disinfection and pH adjustment purposes. A reinforced concrete basin would be constructed over the source to protect and preserve the water quality. Silo B Spring is not proposed for use as a water source to the Big Indian Plateau. Silo B is under contract of sale to the Town of Shandaken.

5.5 Railroad Spring

Railroad Spring is located approximately 500 feet southwest of the Bonnie View Springs, along the abandoned railroad tracks and between Crystal Spring Brook and Cathedral Glen Brook. Railroad Spring is on Ulster County property.

This spring was monitored from May 2000 through December 2001. This spring ran dry during the drought in July of 2001. Should this source be considered for supplementary use, the water quality analytical results reveal that the water will require minimal treatment for disinfection and pH adjustment purposes and a reinforced concrete basin would be constructed over the source to protect and preserve the water quality. This source is not proposed for use to supply water to the Big Indian Plateau.

5.6 Rosenthal Well R1

A second well was installed on the same property as the well designated R2. Well R1 was installed approximately 170 feet north of well R2 and is also a bedrock well with a total depth of 224 feet. A subsequent 24-hour pumping test indicated that the well has an individual well capacity of 100 gpm or 144,000 gpd. This testing demonstrated the well's potential to meet the primary or back-up source capacity criteria.

Step rate and constant rate pump test of water production from well R1 were performed to evaluate the well's drawdown characteristics, performance, water quality and yield. Well R1 was pumped for 72 hours at an average rate of 77 gpm. Pumping of well R1 at this rate did not affect Birch Creek. Laboratory analysis of water quality measures indicated that well R1 is suitable for use as a source of irrigation water. The constant rate test of well R1 demonstrates that well R1 is capable of sustaining a long-term pond replenishment rate of 57 gpm without adversely impacting neighboring water supplies and surface water bodies.

In addition, a Simultaneous Test of wells R1 and R2 was performed to better characterize the nature of the observed relationship between the water resources (See Exhibit F). Specifically, the combined well yield, aquifer response to pumping both wells simultaneously and water quality were analyzed. The wells were pumped for 72 hours at average rates of 57 gpm and 71 gpm for wells R1 and R2 respectively. Pumping at these rates did not negatively affect Birch Creek and the water in R2 was deemed to be of potable quality based on laboratory analysis. The Simultaneous Test demonstrated that well R1 is capable of sustaining a long term irrigation pond replenishment rate of 57 gpm and well R2 is capable of sustaining a long term average daily potable demand of 64 gpm without adversely impacting neighboring water supplies and surface water bodies.

If identified as a back-up potable water source, the well would be upgraded and tested to adhere to the *Recommended Standards for Water Works-Great Lakes Upper Mississippi River Board of State Public Health & Environmental Managers*. This well will supply irrigation water for the *Big Indian Plateau*. Well information is provided in Exhibit H.

5.7 Existing On-Site Wells

The historic water supplies for the existing developed areas of the site consisted of wells and springs. The well located adjacent to Brisbane Mansion is estimated to be approximately 15 years old. The capacity is not known. A spring fed concrete reservoir with the capacity to hold 22,440 gallons of water is located south of the mansion.

An additional well, the 'mid-road' well, was installed in shale in October of 1999. The 6-inch diameter well was constructed southeast of the main entrance at an elevation of 1700 feet amsl. This well was installed to a depth of 698 feet below ground surface and yields 6 gpm.

These wells could be utilized to meet localized landscape irrigation needs.

5.8 Pine Hill Water Company

The Pine Hill Water Company (PHWC) owns a series of three springs known as the Bonnie View Springs (#1-#3) (on a 0.787-acre parcel) and Depot 'Station' Road Spring (on a 0.6-acre parcel). In addition, the PHWC owns two drilled wells and leases a third bedrock well from an adjacent property. PHWC also owns two reservoirs, known as the Bonnie View Reservoir and the Depot 'Station' Road Reservoir, and a 0.9-acre parcel of unimproved land.

The neighboring Hamlet of Pine Hill receives their potable water from the PHWC and specifically the Bonnie View Springs. The three springs are situated at the end of Bonnie View Avenue parallel to Crystal Spring Brook. They are located at an elevation of approximately 1,550 feet amsl. The water generated at each of the three springs is directed to the PHWC treatment system. The water receives treatment for corrosion and disinfection prior to being discharged into the Pine Hill distribution system.

The Bonnie View Springs were one of the sources monitored by Alpha. The flow could not be monitored directly due to the source protection covering the spring, known leaks in the collection piping and overflow losses of the spring and PHWC reservoir. Therefore, the maximum potential spring production was calculated by measuring the flow of Crystal Spring Brook below the spring minus Crystal Spring Brook flow above the spring and adding Bonnie View side ditch flow (overflow), Pine Hill Water Supply flow, and Pine Hill water supply overflow. Alpha compiled the flow measurements for each of these locations individually. Delaware calculated the maximum potential spring production from those values. The low flow for the entire monitoring period was measured as 85 gpm (122,400 gpd) during the drought of August 2001. Average monthly flows, which are significantly higher, are shown on Table 1B in Exhibit D.

Depot 'Station' Road Spring is located approximately 1,700 feet southeast of the Bonnie View Springs, adjacent to where Bonnie View Avenue intersects Station Road. Depot 'Station' Road Spring and its adjacent reservoir are currently in a state of disrepair. Neither of the assets is connected to the existing water supply system or operational, nor have they been for some time. The low flow for this spring during the monitoring period was during the drought in August 2001 and represents 28 gpm or 40,320 gpd. Average monthly flows, which are significantly higher, are shown on Table 1B in Exhibit D. The spring could be accessed in a relatively short period of time to temporarily serve the Hamlet in times of emergency by utilizing a portable pump, a generator, overland pipe, and temporary casing. Use of this source in an emergency would also require a boil water order since no treatment would be provided.

An 'Application for Modification of a Public Water Supply Permit' was submitted to the NYSDEC in April 2001. The purpose of the application was to clarify and document the existing assets of the PHWC. Additionally, the permit application requested approval for the taking of up to 210,000 gpd of water. This total taking provides for both the demand of the current system customers (average 75,407 gpd in 2001) and reserve capacity for the system. A Water Supply Permit was issued on September 12, 2002 based on this application. The permit is approved with a total taking of 211,000 gpd. Therefore, the PHWC has an excess capacity of up to approximately 135,593 gpd (211,000 gpd total taking minus 75,407 gpd average use). This value is sufficient to meet the back-up potable water source requirements of the *Big Indian Plateau* development. As required by Shandaken Zoning, inquiries as to the availability of PHWC as a source of supply to the development were conducted. The PHWC has determined that it will reserve its excess capacity at this time and will not approve any application to serve the development.

The PHWC and the Town of Shandaken recently entered an agreement to transfer the assets of the PHWC to the Town. A closing has not yet been scheduled and permission of the New York State Department of Public Service is required prior to the asset transfer.

5.9 Selected Water Supply Sources

Upon analysis of the potential sources of potable water supply, Rosenthal Well R2 (118,080 gpd) and Silo A (99,792 gpd) will provide the potable water system for the *Big Indian Plateau* development.

Utilization of this well and spring meets the potable water source criteria set-forth in the *Recommended Standards For Water Works-Great Lakes Upper Mississippi River Board of State Public Health & Environmental Managers.*

Rosenthal Well R1 is proposed to meet irrigation demands. Effluent from the wastewater treatment plant and captured stormwater will also be used for irrigation purposes.

Rosenthal Well R2 is located down gradient of the proposed development, near the NYSDEC Belleayre Beach at Pine Hill Lake and on Friendship Manor Road in Pine Hill. The immediate area near well R2 is undeveloped. The well is located 70 from Birch Creek. Silo A spring is located in a relatively secluded area adjacent to secondary roads (Bonnie View Avenue that services the PHWC, Depot 'Station' Road, and Woodchuck Hollow Road). Immediately up-gradient to the south and west, are heavily forested State lands. Approximately 2.5 miles to the southwest is the State owned and operated Belleayre Mountain Ski Center. The closest surrounding developments are residential housing downgradient and to the north in Pine Hill and the proposed *Belleayre Highlands* development portion of *Big Indian Plateau*, which is 0.7 miles to the southeast. Silo A is located approximately 150 feet north of the historically utilized railroad tracks.

To ensure that the spring source would not be compromised by potential pollutants, a reinforced concrete basin would be constructed over and around the source. It would be constructed pursuant to design details set-forth in standards established by the NYSDOH, found in the *Rural Water Supply* handbook. An additional advantage of the spring location is the proximity to the aforementioned roadways. This allows easy access to the pumps and treatment equipment that will be needed to transfer and treat the water for the *Big Indian Plateau* during operation and maintenance activities.

Usage of these selected sources will not diminish the quality or impact the production of the spring waters from the PHWCs' Bonnie View Springs (#1-#3), Crystal Spring Brook or Birch Creek as demonstrated in the Surface Water and Ground Water Assessment for Big Indian Plateau that is contained in Exhibit G.

6.0 PROPOSED TREATMENT PROCESS

Since spring water and ground water unaffected by surface waters will be utilized to meet the potable water needs of the proposed developments, the waters will not require filtration. Based on the review of the analytical data for the potential water supply (see Table 3), the anticipated on-site treatment system will consist of disinfection and corrosion control.

6.1 Disinfection

The methods currently approved for the routine disinfection of drinking water are:

- Addition of gaseous chlorine or a sodium hypochlorite solution.
- Ultraviolet (UV) light exposure of a specified wavelength is used for bacteria reduction.
- Addition of ozone (O^3) gas.
- Addition of chloramines in the form of chlorine and ammonia.
- Addition of chlorine dioxide.

Of the above methods, chlorine is most frequently employed. UV disinfection and ozone are used occasionally, and are in wider use in Europe. The primary if not only, reason UV and ozone are used instead of chlorine to reduce the likelihood that, some of the organic matter present in the surface water is converted to trihalomethane (THM) compounds, which are a health risk. Chlorine dioxide and chloramines are more difficult to correctly apply, and can result in nuisance taste and odor in water. Ozone is used in a few limited instances, but equipment costs and electricity to generate the ozone tend to be high. The primary benefit of chlorine over UV is that the chlorine provides residual disinfection, whereas UV does not. The advantage of residual disinfection capability is that, in the event that contamination occurs after water has left the treatment plant, the chlorine can destroy such bacterial contamination. Due to the advantages of chlorine and the lack of any compelling reason to apply the alternative methods here, chlorine would be used for disinfection.

The two methods of chlorine application typically used for drinking water are chlorine gas or the injection of liquid sodium hypochlorite solution. When introduced into the water, the same chemical reactions occur using either method, and the net result of their application is the same. The factors to be considered in selecting between the two chlorination methods are cost and the risk to workers and nearby residents. Sodium hypochlorite solution is made from chlorine gas, and is therefore more expensive to produce, distribute, and apply than the pure gas. For a large water plant, the material cost can outweigh the costs of providing the safeguards needed. When chlorine gas is used, it must be stored in a dedicated room, complete with gas monitors, remote alarms, and other worker safeguards. Chlorine gas exposure can cause affects ranging from severe lung damage to mortality. Two employees need to be present (with one waiting outside) when a chlorine room is entered or equipment is serviced. An emergency spill and evacuation plan must be developed for the vicinity of the site; areas downhill of the location are at particular risk since the gas is heavier than air and "flows" downhill in the event a cylinder leaks. For an approximate 100,000-gallon a day plant, the cost savings of chlorine gas over a liquid chlorine solution are marginal and are typically outweighed by the cost of facility construction and contingency planning.

For the preceding reasons, application of sodium hypochlorite solution is the preferred disinfection process. Chlorine would be applied using a metering pump with a variable speed drive that could increase or decrease chlorine application in response to the flow rate indicated on a flow meter.

Preliminary calculations indicate that the disinfection system will consist of a 30-gallon polyethylene day tank and two (one for backup) Pulsatron Model LPA2-MA-VTC1-520 Metering Pump capable of pumping at a rate of 6 gallon per day at 150 psi. At peak flow nearly 4.5 gallons per day of sodium hypochlorite will be required. At average flow only 1.49 gallons per day will be needed.

A 15% sodium hypochlorite solution, containing 2 parts per million (ppm) chlorine, would be injected into the supply water line as it leaves the spring supply area. Application at this point will result in approximately 2 hours of contact time before it reaches the first user. This application point should provide the required 0.2 mg/l of minimum free chlorine residual throughout the water distribution system. If this is found to not be the case either the concentration of chlorine will be increased or a second disinfection point will be installed on the effluent port of the finished water storage tank.

Exhibit J contains the calculations and example equipment that would be required for the disinfection system.

6.2 Corrosion Control

Corrosion occurs due to chemical or electrochemical conditions in the water that are not compatible with the pipes conveying the water. One commonly used screening factor is the Langelier Saturation Index (LSI), which mainly reflects the acidity and the hardness of the water. A positive LSI indicates scale may form, a negative LSI indicates the water may be corrosive. Testing of the Pine Hill water source (Bonnie View Springs), which is approximately 1,500 feet northwest of the Silo A Spring, indicated a LSI of (-) 3.05, which suggests that the water in the area is at least moderately corrosive. Reported corrosion of the Pine Hill water mains, prior to the installation of the new corrosion control system, also suggests that the waters may be corrosive. To evaluate and address this type of problem, a Corrosion Control Study is required. The study is performed in stages beginning with a desktop evaluation and usually proceeds to pilot testing of a corrosion control method. One corrosion control strategy is to increase the alkalinity of the water though the injection of chemicals, such as soda ash (NaOH). The liquid compounds are injected directly into the water in much the same way as the sodium hypochlorite solution is added for disinfection. As part of the design phase for the project, a Corrosion Control Study would be performed to determine the need for control and if necessary, to select and test a control method.

Analytical results from an October 6, 2000 sampling event of the Pine Hill water supply were utilized to estimate the chemical demands. A copy of the calculations and laboratory report can be referenced in Exhibit K.

The calculations indicate the corrosion control system will consist of a 30-gallon polyethylene day tank and two (one for backup) Pulsatron Model LPA2-MA-KTC1-500 metering pump capable of pumping at a rate of 3 gallon per day at 300 psi. At peak flow, 9.24 gallons per day of a 50% NaOH solution and a NaOH concentration of 10.5 ppm will be required. At average flow only 2.31 gallons per day will be needed. The 50% NaOH solution will be injected into the supply water line after the water leaves the supply pump station and has been disinfected.

7.0 AUTOMATION

A number of measures can be taken to automate operations of the system. The objectives of automation included in this project are to eliminate frequent repetitive adjustments, provide automatic collection of routine operating data where possible, and to alert the operators when systems cease to function as required. Local automation can be used to open valves or start pumps under certain conditions. This level of automation can be used to link operations at one site to another, such as to start up the supply transfer pumps when the water level in the storage tank drops below the set level based on pressure. Remote automation uses telephone or radio communications to relay signals from one point to another, and can provide the added benefit of reporting the status of operations to a central point such as an existing office. Remote automation can consist of continuous communications between systems that automatically work together. It can also consist of a simpler dial-up system to allow the operator to start or stop equipment and check the status of levels, pressures, flow, etc. at remote sites via a computer interface.

The proposed level of automation for this project employs a limited number of locally automated processes such as: a dial-up system for remote operation; data logging of total flow entering the supply line and water entering the on-site ponds from the irrigation wells; level indicators in clear-well to shut-off the transfer pumps in the adjacent dry well when the springs are not gravity feeding the clear well at an adequate rate; automatic switch over to back-up pumps when primary pumps are malfunctioning (if applicable); pressure sensor in the finished water storage tank to de/activate the supply transfer pumps or trigger alarms; pH and chlorine residual monitors and recorders; and metering pumps with a variable speed drive that could increase or decrease treatment application in response to the flow rate indicated on a flow meter. The telephone based system would be capable of calling several phone numbers or a pager in the event of problems.

8.0 PROJECT SITE SELECTION

Siting issues for the project are relevant to location of the spring/wells and the treatment systems. The main factors considered in site evaluation and selection are:

- Hydraulic conditions and maintenance of gravity flow to the proposed developments to the extent possible,
- Physical conditions at the site which relate to construction, such as poor soils or high groundwater, and
- Availability of property or easements.

8.1 Big Indian Plateau Water Sources

As previously discussed, based on conservatively estimated monitoring results, Rosenthal Well R2 and Silo A demonstrated average production capacities of 118,080 gpd and 61,920 gpd, respectively.

These capacities exceed those necessary to meet the requirements for potable water sources set-forth in the *Recommended Standards For Water Works-Great Lakes Upper Mississippi River Board of State Public Health & Environmental Managers.* Additionally, the water quality analytical results reveal that the waters will require minimal treatment for disinfection and corrosion control.

The construction of well R2 meets the requirements of *Recommended Standards For Water Works-Great Lakes Upper Mississippi River Board of State Public Health & Environmental Managers* for the development of groundwater sources. The well is cased and grouted with a sanitary seal. In addition, the well will provide protection from flooding and other sources of contamination. A 100 gpm submersible well pump providing 960 feet of head will be used to pump treated water through a sanitary transmission line from the well to the water storage tank. The water lines for both well R1 and well R2 while separate, will be buried in the same trench to minimize cost and environmental impact. Well information is provided in Exhibit C.

In order to collect the spring water and protect it from potential pollutants, a reinforced basin (similar to a large diameter manhole with an open bottom) would be constructed over the spring source. It would be constructed pursuant to design details set-forth in standards established by the NYSDOH, found in the *Rural Water Supply* handbook. The water that accumulates in the spring basin would be gravity fed, via a valved, dedicated water line, to a clearwell with a capacity of 25,000 gallons. A dry well would be installed adjacent to the clearwell to house the duplex pump station, equipped with 150 gpm (@ 1,000 feet of head) pumps, needed to transfer the water to the finished water storage tank on the *Big Indian Country Club* portion of *Big Indian Plateau.* Spring supply information is provided in Exhibit D.

Source protection for both well R2 and Silo A are anticipated to be conditions of a water supply permit. Source protection will include measures to prevent pollution of the ground or groundwater by direct ownership, protective easements or use restrictions in the immediate area surrounding each ground water source. The areas designated for source protection will be protected from pollution by surface waters through the construction of suitable diversion ditches or embankments. In addition, well R2 is grouted and sealed to prevent surface water intrusion and the collection box for Silo A spring will be similarly protected from surface contamination and/or vector intrusion. Measures to limit access to the groundwater source sites such as fencing and locked well/spring housing structures are planned.

The irrigation water needs are to be satisfied through the use of a well, effluent from the wastewater treatment plant and captured stormwater. Well R1 and captured stormwater is the preferred option to supply irrigation water. A 100 gpm (@ 960 feet of head) submersible well pump would provide the lift necessary to transfer the water from the well to the on-site storage ponds located approximately 8,400 feet south and 900 feet upgradient. The well will have an independent transmission pipe to isolate this non-potable supply from the potable water supply. Even though the well will not be used for potable purposes, it will be constructed to comply with the well construction standards specified in the *Recommended Standards For Water Works-Great Lakes Upper Mississippi River Board of State Public Health & Environmental Managers*. Well information logs is provided in Exhibit E. Treatment systems would be installed at Rosenthal Well R2 and Silo A to provide disinfection and corrosion control.

8.2 Corrosion Control/Disinfection Treatment Systems

As stated previously, the corrosion control systems would be installed following and adjacent to the pump stations. The systems would be housed for protection from vandalism and weather and to provide chemical, mechanical and spare part storage.

For well R2, additional chemical treatment will be used to address taste and odor caused by the presence of sulfur in the source water.

The disinfection systems would be housed in the same treatment sheds as the corrosion control. The 15% sodium hypochlorite solution would be injected into the water source force main as the water leaves the pump stations.

In-line mixers would provide the necessary blending of the solutions following application.

The housing and chemical storage facilities would be constructed in compliance with the *Recommended Standards for Water Works-Great Lakes Upper Mississippi River Board of State Public Health & Environmental Managers*.

8.3 Distribution System

8.3.1 Finished Water Storage Tank

The *Big Indian Plateau* would have one water storage tank located in the southwest corner of the *Big Indian Country Club* development at a ground elevation of 2,550 amsl (see Exhibit A, **Drawings 5 and 9** for location and details). The location was chosen such that the finished water could be gravity fed to the various lodging/recreational units throughout both developments with the minimum required pressure of 35 pounds per square inch (psi). Pressure reducing valves (PRVs) would be necessary at certain points in the distribution system to bring the pressure below the maximum recommended pressure of 80 psi.

The tank was sized to accommodate the average day potable water needs and the fire flow requirements. Based on the fire flow projections for the 150-room hotel (facility requiring the greatest demand), the finished water storage tank will have a capacity of at least 249,817 gallons (135,000 gallons [1,125x60x2] for fire flow plus the average daily potable consumption of 114,817 gallons). In order to accommodate this volume, a 19-foot high, 50-foot diameter tank can be used. The maximum capacity of this concrete floor tank is 286,000 gallons. The tank is designed to meet the structural requirements of the AWWA D-103 Standard and will be compliant with Part 7 of the *Recommended Standards For Water Works-Great Lakes Upper Mississippi River Board of State Public Health & Environmental Managers*. The tank would be fitted with a pressure sensor near the bottom of the tank that would control the supply transfer pumps located in the dry well. The sensor would be set to activate the pumps when the pressure decreases to 5 psi (172,000 gallons; 11.5 feet of water) and switch the pumps off when the tank contains 246,800 gallons (16.5 feet) of treated water. A visual and/or audible alarm signal could be sent when the water level reaches an equivalent set low-low pressure or a high-high pressure.

The irrigation water for *Big Indian Plateau* would be stored in the 7.4 million gallon capacity on-site lined ponds.

8.3.2 Transmission Lines

Approximately 15,000 linear feet of eight inch diameter, cement lined, Class 52, ductile iron, force main would convey the collected spring water from Silo A to the *Belleayre Highlands* and the finished water storage tank on *Big Indian Country Club*. The watermain would follow the path detailed in Exhibit A on **Drawings 3, 4, and 5**. As can be seen from the drawings, the pipe would transverse a brook and a railroad along the way.

Approximately 21,500 linear feet of eight-inch diameter, cement lined, Class 52, ductile iron, watermain will convey finished water from Rosenthal Well #2 to the storage tank to the *Big Indian Country Club* development. *Belleayre Highlands* would also receive water from the finished water storage tank when the supply pumps were not activated.

The distribution lines are shown on **Drawings 2 through 8** in Exhibit A. The hydrants and gate valves are spaced and would be installed according to the *Recommended Standards For Water Works-Great Lakes Upper Mississippi River Board of State Public Health & Environmental Managers*. Specifically, every 600 feet for hydrants and 1,000 feet for valves, per linear feet of water main, in the developed areas. Locations for pressure reducing valves, check valves and air relief valves are also shown. These locations were chosen based on preliminary water pressure calculations, hydraulic modeling results, and the topography of the site.

Water service lines would be installed with the necessary corporation stops, Type K copper piping, and curb box, stop, and valve. The sizing of these items varies with the type of service needed. Generally, the smaller club membership units would require ¾-inch appurtenances, the larger club membership unit blocks would require 1.5-inch appurtenances, and the hotel would require six-inch appurtenances.

Drawing 10 and 11 provides details of typical valve manholes, hydrants and their appurtenances, service laterals, and thrust blocks.

Approximately 8,400 linear feet of six-inch diameter, cement lined, Class 52, ductile iron, water main would convey well R1 water to the 7.4 million-gallon capacity ponds on the *Big Indian Country Club* development for irrigation purposes. The main would follow the path detailed in Exhibit A on **Drawings 6, 7, and 8**. Two service lines off the six-inch irrigation main would supply potable water to the golf maintenance buildings and the main entrance Gate House.

All piping would be installed below the frost zone and on continuous, uniform, and adequately compacted bedding. Prior to backfill placement, the piping would receive pressure and leakage testing in compliance with the current AWWA Standard C600. Backfill material would then be placed in tamped layers to a determined height above the pipe for protection and support. Native soils and/or finished grade materials can then be placed.

In instances where it is necessary for water piping to cross or border the sanitary sewer system, the minimum separation distances given in Part 8.6 of the *Recommended Standards For Water Works-Great Lakes Upper Mississippi River Board of State Public Health & Environmental Managers* will be adhered to. Surface water crossings would also be designed to adhere to the *Recommended Standards*.

8.3.3 Pumping Stations

A number of pumping locations/stations are necessary throughout the water system proposed for the *Big Indian Plateau* due, in part, to the variable topography found at the project site. The pumping stations and their requirements are as follows:

Pump Station/Location	Number of Pumps	Pump Specifications (or equivalent)
Silo A	2 plus spare	150 gpm @ 1000 TDH 60 HP / 1775 rpm

Disinfection System	2 plus spare	Pulsatron Metering Pump Model LPA2-MA-VTC1-520 6 gpd / 150 psi discharge press. 1 ph / 230 V / 50/60 Hz / 4.4 amps 1012 W
Corrosion Control System	2 plus spare	Pulsatron Metering Pump Model LPK2-MA-KTC1-500 3 gpd / 300 psi discharge press. 1 ph / 230 V / 50/60 Hz / 4.4 amps 1012 W
Rosenthal Well R2	2 plus spare	100 gpm @ 960 TDH 50 HP/3450 rpm

The sizing of these pumps were based on calculations that accounted for elevation changes, head losses due to piping and valving, and desired flows. Following the calculation procedure, the estimated requirements were provided to a pump manufacturer and Delaware Engineering was supplied with recommended pumps.

All pumping facilities would be designed and installed per the *Recommended Standards For Water Works-Great Lakes Upper Mississippi River Board of State Public Health & Environmental Managers*. **Drawing 9** details a typical pump station.

9.0 FINANCING

There may be several different ownership scenarios within the developments.

A first option is that one single owner is the water supply and/or SPDES permit holder. Users of the development, be they residential or commercial, will pay one "utility" rate that covers all costs, similar to a management fee. In that case, rates would be a factor of the initial capital expense including debt service amortized over time in conjunction with a budgeted O&M cost as a rate per thousand gallons of "assumed" use. Assumed water use would be defined as something like 300 gallon/day/club membership units, with factors added (using NYSDOH Equivalent Dwelling Unit (EDU) calculations) for higher use customers. Meters would still be installed to allow for accurate assumed use calculations, but they would not be used for monthly or regular billing.

Water and sewer rates are subject to guidelines provided by the NYS Public Service Commission (PSC). PSC review procedures would be followed.

TABLES

Table 1:

Estimated Water Demand for *Big Indian Plateau*

Facility Type	Units	Number	Daily Demand [1] (gal/unit/day)	Water Demand [2] (gpd)
Big Indian Resort and Spa/ Big Indian Country Club				
Hotel	Rooms	150	120	18,000
Golf Course Clubhouse	Members	154	25	3,850
** w/ 40 Seat Snack Bar (4 seatings)	Patrons	160	2	320
**Sauna/ Steam	Patrons	75	5	375
Restaurant (2 rest; 225 seats total; 4 seatings)	Patrons	900	7	6,300
50 Seat Beverage Lounge (3 seatings)	Patrons	150	2	300
Spa with 15 Treatment Rooms and Lap Pool	Patrons	150	12	1,800
Ballroom	Seats	200	3	600
Meeting Space	100 SF	15.5	12	186
Offices: Admininstration/Operating	100 SF	68	12	816
35-4 Bdrm Club Membership Units	Bedrooms	140	150	21,000
60-3 Bdrm Club Membership Units	Bedrooms	180	150	27,000
**20 Triplex Buildings				
Golf Maintenance	100 SF	85	12	1,020
Satellite Golf Maintenance	100 SF	15	12	180
Gate House	100 SF	1	12	12
			Potable Total	81,759
Belleayre Highlands				
Club Membership Units (88-2 Bdrm)	Bedrooms	176	150	26,400
Caretakers Offices	100 SF	3	12	36
Carriage Barn Office/Shop	100 SF	10	12	120
Brisbane Mansion Clubhouse	Members	120	25	3,000
** w/ 25 Seat Snack Bar (2 seatings) (Pool and	Patrons	50	2	100
Cabana Building w/ Lockers and Showers)	Swimmers	333	10	3,330
Reception / Sales / Operational Offices	100SF	6	12	72
			Potable Total	33,058
			Combined Potable Total	114,817

[1] All hydraulic demand rates taken from *'rural water supply'-New York State Department of Health* and the *'Community Water Systems Source Book-Fifth Edition-Sixth Printing'*
[2] Demand (gpd)='Number' Value *Daily Demand (gal/unit/day)

Table 2:

Recommended Fire Flows for *Big Indian Plateau*

Facility	Recommended Fire Flow (gpm)	Duration In Hours	Minimum Residual Pressure (psi)
Big Indian Resort and Spa/ Big Indian Country Club			
150-Room Hotel	1125	2	20
95-Club Membership Units	1000	2	20
Belleayre Highlands			
Brisbane (Turner) Mansion Clubhouse	1100	2	20
88-Club Membership Units	1250	2	20

Table 3:

Part V Water Quality Analytical Results of Potential Sources

Compound	Max. Contaminants Limits	Units	Railroad Spring	Silo A	Rosenthal Well #2
			10/27/2000	12/6/2001	11/29/2001
E. Coli	0	/100 mls	0	0	0
Total Coliform	1/month	/100 mls	2	1	0
BOD5	2	mg/L	<2	Not Analyzed	Not Analyzed
pH	6.5-8.5		**6.2**	**6.26**	**8.17**
Turbidity	5	ntu	0.25	0.1	0.66
Chloride	250	mg/L	29	26	66
Nitrite as Nitrogen	1	mg/L	<.01	<.01	<.01
Nitrate as Nitrogen	10	mg/L	0.47	0.53	0.24
Iron	0.3	mg/L	0.014	0.006	0.022
Sodium	20*	mg/L	12	9.27	**47.1**
Total Phosphorous	--	mg/L	0.035	Not Analyzed	Not Analyzed
Total Dissolved Solids	500	mg/L	72	86	200
Total Suspended Solids	5	mg/L	<5	Not Analyzed	Not Analyzed
Pesticides	Varies	μg/L	ND	ND	ND

1. Analyses performed by Phoenix Environmental Laboratories, Inc.
2. ND = Not Detected

* Recommended Value for Health Reasons

EXHIBITS

Exhibit A

Drawings
(Separate Attachment)

Exhibit B

Department of Public Service Decision

STATE OF NEW YORK
PUBLIC SERVICE COMMISSION

At a session of the Public Service
Commission held in the City of
Albany on October 24, 2001

COMMISSIONERS PRESENT:

Maureen O. Helmer, Chairman
Thomas J. Dunleavy
James D. Bennett
Leonard A. Weiss
Neal N. Galvin

CASE 01-W-0803 - Complaint of 25 or More Customers Against Pine Hill Water Company Concerning the Company's Ability to Meet its Obligations to its Customers.

ORDER DENYING COMPLAINT AND PETITION

(Issued and Effective October , 2001)

BY THE COMMISSION:

INTRODUCTION

On June 12, 2001, the Pine Hill Water District Coalition ("Water Coalition" or "Coalition") filed a complaint and petition (petition) pursuant to Public Service Law (PSL) §89-i. The petition requests that the Commission institute a proceeding and conduct a hearing to determine whether the property, equipment and appliances employed by the Pine Hill Water Company ("Pine Hill" or "water company") are sufficient to provide safe and adequate service.[1] Alternatively, the Water Coalition requests that the Commission investigate and issue a ruling that declares[2] whether: Pine Hill is complying with all applicable laws and regulations; any of the company's assets were transferred in violation of the PSL; the transfer of assets impaired the water company's ability to supply safe and adequate service; and, Commission approval is

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1 The Coalition also requests that the Commission identify the proper facilities required to service the public.

2 16 NYCRR §8.1.

required for a transfer of assets that are owned by Pine Hill. In a letter of reply dated August 14, 2001, the Coalition provided additional clarification and support for its allegation that Pine Hill assets were previously transferred in violation of the PSL and its claim that the adequacy of supply from Bonnie View Springs is a factual issue requiring an evidentiary hearing. The Water Coalition states that it is an organization concerned about the acquisition and protection of water resources in the Town of Shandaken (Town), New York and that a number of its members are customers of Pine Hill. Pine Hill supplies water service to about 129 customers in the Town.

On July 5, 2001, Pine Hill filed a response to the Coalition's petition asserting that: the Water Coalition failed to allege facts or circumstances sufficient for a complaint regarding adequacy of service under PSL §89-i; no past transfers of company stock or assets occurred in violation of the PSL; the Pine Hill assets are sufficient to provide safe and adequate service and fulfill the company's obligation to its customers; Pine Hill has made numerous repairs and improvements to the water system to restore and improve service; the company is finalizing plans that will secure necessary financing to substantially rebuild the company's antiquated system; and, the petitioners falsely stated in their filing that Pine Hill's water source could be contaminated by a sewer line.[3] Accordingly, the company requests that the Coalition petition be denied in all respects.

Pine Hill Assets

The Water Coalition asserts initially that recent transfers of water company assets, essential to the company's ability to provide adequate service, took place without Commission approval. According to the Coalition, the Pine Hill water system is comprised of the available sources identified in the water supply permit decision issued by the New York State Department of Environmental Conservation (DEC) in 1970.[4] The DEC decision, they say, included as Pine Hill's available water sources the Bonnie View Reservoir, Covered Reservoir (Covered Reservoir parcel), Station Road Reservoir and, Crystal Spring, a major water source. Further support for its claim that the Covered Reservoir and Crystal Spring are part of the water

3 The Water Coalition expressed a concern that the Bonnie View Springs, Pine Hill's sole source of supply, are subject to a high risk of contamination because they are in close proximity to the sewer line of the Belleayre Ski Center.

4 Pine Hill Water Company, Water Supply Application No. 5889, Decision (dated October 12, 1970).

company, the Coalition argues, is found in previous orders issued by the Commission. In 1983, the Commission issued an order approving the transfer of Pine Hill's stock, from Julia Schaedle to Robert Conklin.[5] The Coalition notes that as part of such transfer the water company would receive and obtain control over parcels of real property, including the Covered Reservoir and Crystal Spring, that it previously leased. In 1991, these parcels and Pine Hill were sold to Ben Odierno, who, in 1992, conveyed them to the Pine Hill Crystal Spring Company (PHCS). The Water Coalition claims that in a 1994 Order,[6] the Commission retroactively approved the 1991 transfer to Mr. Odierno and his 1992 transfer to PHCS. The Coalition further argues that the Commission's 1994 Order did not recognize and approve another transfer of Crystal Spring made by Mr. Odierno in December 1992 to 214 East 49th Street, a corporation that he owns. That transfer, the Coalition maintains, required Commission approval.

The Coalition also asserts that Covered Reservoir and Crystal Spring have historically been used as part of the water system. According to the Coalition, up until January 2000, Pine Hill utilized Silo B (a collection basin on the Covered Reservoir parcel) and Silo A (a basin on the White House Lodge parcel) to divert water from Crystal Spring to the Station Road pump house on the north side of the Covered Reservoir property and from there to the Pine Hill Water system.[7] As a result of the prior transfer approvals and historical use of the assets as part of the water system, the Water Coalition contends that Pine Hill's assets should comprise the parcels upon which Silo "B", the Covered Reservoir and pump house (Covered Reservoir Parcel), Crystal Spring, and, Silo "A" (Whitehouse property) are located.

The Coalition reports that in 2000, 214 East 49th Street conveyed the White House Lodge property to Crossroad Ventures, L.L.C. (Crossroads), a company owned by Dean Gitter, and transferred the properties containing the Covered Reservoir, Silo B, and the pump house, to

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[5] Case 28539, Pine Hill Water Company – Stock Transfer, Order Authorizing Stock Transfer (issued October 27, 1983) ("1983 order" or "Conklin transfer"). The Coalition states Mr. Conklin defaulted on the mortgage and the property was returned to Ms. Schaedle.

[6] Case 94-W-0483, Pine Hill Water Company – Transfer, Untitled Order (issued December 8, 1994).

[7] The Coalition alleges that the disconnection of these assets from the water system in January 2000 caused a loss in pressure at the lower end of the water system and contributed to the water outage that occurred in December 2000 and January 2001.

The Silk Road Organization New York, Inc. (Silk Road), a company that Mr. Gitter also owns.[8] Commission approval for the transfer of these assets was not obtained. The Water Coalition argues that these transfers without Commission approval necessitates an evidentiary hearing to determine whether these assets are necessary for Pine Hill to supply safe and adequate service and should be under Pine Hill's control, and, the extent to which retroactive approval for past transfers should be given. Alternatively, the Coalition requests a Commission ruling that determines the water company's rights and responsibilities, the legality of past Pine Hill and Crystal Spring transfers and the rights and responsibilities of the water company with respect to supplying water to its customers.

In its response and supporting exhibits, Pine Hill delineates its understanding of the history of transfers of the current water system properties,[9] White House Lodge property, Covered Reservoir, and Crystal Spring Parcels. The exhibits submitted with the response include a report from The Title Service Company and a supporting affidavit from its title examiner. The documents support Pine Hill's claims that there were no conveyances to Crossroads and Silk Road in 2000 of properties previously owned by the water company and that the water company's real property holdings consist of the Bonnie View Springs Parcel, the .9-acre parcel located west of the Bonnie View Springs property and adjacent to the railroad tracks, and, the Station Road Reservoir Parcel.

According to the water company, the 1983 Order did not result in Pine Hill's control and Commission jurisdiction over subsequent transfers of the PHCS, Crystal Spring, White House Lodge Parcel, and Covered Reservoir Parcel. The water company submitted a supporting exhibit of its title examiner, which reflects that no recorded evidence exists of a deeded transfer of these properties to Mr. Conklin. Pine Hill concludes that prior to Mr. Gitter's acquisition of the water company, no transfer of Pine Hill real property assets occurred and thus, that no Commission approval of the transfers was required. In addition, the Coalition's claim that Pine Hill used the Crystal Spring and other sources in years past to augment its water supply is

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8 The Water Coalition notes that the deed to Crossroads included an additional parcel of land containing an abandoned "high reservoir," an asset never utilized by Pine Hill.

9 Pine Hill also briefly described past proposals for acquisition of the water company by the Village of Pine Hill as early as 1956 and the Town last year. In previous discussions with the Department of Public Service Staff, the Water Coalition has expressed its desire that the water system be owned and operated by the Town.

unsupported, says the water company. No proof was submitted to show that the water company owned or leased these other sources of supply.

In its reply to Pine Hill's response, the Water Coalition reiterates that the water company has used these additional sources of supply to serve its customers. Moreover, they assert that the construction of the pump house on the Covered Reservoir Parcel in 1948, the offer to sell the entire water supply assets to the Village of Pine Hill in 1956, and the prior orders of the Commission in 1983 and 1994 memorialize the fact that the additional assets were considered part of Pine Hill's water system. They also note that in September 2000 the Ulster County Health Department (UCHD) directed the water company to put a batch chlorinator in operation by October 31, 2000 for the secondary water supplies. Finally, the Coalition states that Pine Hill and PHCS were dissolved during the 1990s. The Water Coalition asserts that Pine Hill's position that it only owns the Bonnie View Spring source would mean the water company was "reconstituted" after the dissolution, which action should have been reviewed by the Commission. They conclude that the fact the Commission did not review Pine Hill's reorganization and the prior Commission orders identifying the additional assets as being part of the water company indicate that the assets have historically been included as part of the water company.

Adequacy of Service

The Water Coalition claims that the transfer of the Pine Hill assets, which were historically used by the water company, to Crossroad and Silk Road, hinders the water company's ability to supply safe and adequate service to its customers. They acknowledge that the Pine Hill water system, constructed in the late 1800s, is antiquated, with leaks and numerous other problems. The Coalition alleges that during December 2000 and January 2001, approximately 15 customers either had no or low water pressure for up to 22 hours each day, and that the loss of pressure was related to the removal of the Station Road pump and interconnected assets from service. According to the Water Coalition, Pine Hill acknowledged in a recent application to amend its water supply permit[10] that the company has historically utilized the assets transferred to Silk Road and Crossroads to supply service to its customers. As a result of

[10] On April 11, 2001, Pine Hill filed Water Supply Application No. 10181 with the DEC to amend provisions of the DEC permit (No. 5889) issued to the water company in 1970.

the transfers, the Coalition contends that the only remaining source of supply for the Pine Hill customers is the company's Bonnie View Springs. It concludes that this water supply is insufficient to meet the needs of the company's existing customers.

Pine Hill denies the Water Coalition's claim that the water company cannot provide adequate service absent interconnection with and use of additional assets to serve its customers. The water company maintains that the water system supplies safe and adequate service. The Water Coalition's focus on the long standing "boil water notice"[11] and the December 2000 and January 2001 water main breaks and system leaks is erroneous, says Pine Hill. The long standing boil water notice, the water company points out, was issued prior to Mr. Gitter acquiring the water system and removed because of the emergency repairs and improvements that Mr. Gitter made. Pine Hill's response and supporting exhibits detail numerous repairs and improvements to the water system, including installation of corrosion control equipment.

The fact that certain customers at the outer reaches of the system experienced low pressure during December 2000 and January of 2001, Pine Hill continues, was the result of water main breaks and leakage in the system, and not the result of insufficient sources of supply. According to Pine Hill, the existing water sources have more than ample supply to meet the needs of customers. They point out that the system is more than 100 years old and has suffered from many years of neglect and lack of maintenance.[12] However, since Mr. Gitter acquired the water system, the water company says it has a "clear track record of improvement and delivery of adequate service," as recognized by the UCHD.[13]

Pine Hill acknowledges its continuing obligation to provide safe and adequate service to its customers. Further, it recognizes that extensive rehabilitation and/or replacement of the water system is required to ensure safe and adequate service in the future. In its response and

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[11] The water company described two boil water notices in effect for extended periods. The first notice issued by the UCHD, in August 1995 and lifted in March of 2000, related to corrosiveness of the water and non-compliance with drinking water standards. Pine Hill points out that the second notice was issued in response to a main break affecting water service to customers during December 2000 and January 2001.

[12] Exhibits submitted by Pine Hill show that the UCHD has cited the company in the past for numerous service and water quality problems.

[13] The exhibits included letters from the UCHD identifying various water system upgrades and improvements.

supporting exhibits, the water company highlights its efforts to pursue and secure financing of the estimated costs to rebuild the water system. According to Pine Hill, it is expeditiously proceeding with plans to replace most of its water system.[14] In May of this year, the New York State Environmental Facilities Corporation (EFC) informed the water company that it is eligible for a New York State Drinking Water Revolving Fund (DWSRF) grant of $948,000 and a $316,000 interest free loan to finance the costs of water system improvements. The water company submitted as an exhibit, a letter from Delaware Engineering, P. C. (Delaware Engineering), its engineering consultant; the letter discusses the necessary system improvements and the cost analysis performed in 2000. Delaware Engineering concluded that the necessary improvements, if privately funded, would result in an undue economic burden upon Pine Hill's customers.

In its reply, the Water Coalition challenges the water company's repair and improvements claim. The Coalition asserts that most of the work performed and expenses incurred involve maintenance activities and not repairs. Although the Water Coalition acknowledges that the water system was in a state of disrepair when Mr. Gitter acquired it, they allege that a more serious concern is Mr. Gitter's attempt to secure water supplies for a major project he is planning in the Town,[15] by directing the disputed Pine Hill supplies to the project.

In light of the service complaint, the Department of Public Service Staff (Staff) conducted an investigation to determine whether a formal hearing is required. Specifically, Staff inspected the water system and assets in dispute, interviewed Pine Hill's operator and Delaware Engineering, reviewed the previous engineering studies, UCHD reports, letters submitted by various interested agencies and individuals, spoke with a number of customers who signed the complaint, and administered water pressure tests at various locations on the water system.[16] Staff confirms that the water company made a number of water system improvements since last year to address deficiencies. Staff concludes that the water company is supplying safe and adequate service and notes that the company has demonstrated a willingness to address water

[14] The plans call, in part, for replacement of the transmission mains and distribution system, the principal source of the water system's leaks.

[15] The Belleayre Resort Project, in part, would include two hotels, lodges and two golf courses.

[16] The findings and conclusions of Staff's service investigation are included in the report attached to this Order.

system problems as quickly as possible after discovery. However, because of the water system's age and need for rehabilitation, Staff warns that periods of dirty water, low pressure and water outages may be expected. Staff also finds Pine Hill's plans and schedule for water system rehabilitation and replacement to be reasonable, particularly in light of the option of financing the improvements through the DWSRF grant and loan.

DISCUSSION AND CONCLUSION

The Water Coalition's request for a hearing and, alternatively, a declaratory ruling are denied. We find no basis to institute a separate proceeding and hold an evidentiary hearing to consider whether the Pine Hill facilities are supplying safe and adequate service and to adjudicate the issue of Pine Hill real property asset transfers. We further find no reason to specifically define the rights and responsibilities of Pine Hill and its customers. The information submitted by the water company, particularly the report of its title examiner, supports a conclusion that no Pine Hill assets were transferred prior to Mr. Gitter's acquisition of the water system without the requisite Commission approval.[17] The Coalition focus on the 1983 order is misplaced. In the order authorizing the transfer of Pine Hill's stock, the Commission recognized the purchasers' plan to utilize the additional assets, in part, to serve the Pine Hill system. However, the documentation provided by the water company indicates that the transfer of assets was not completed and that title to the real properties remained with Ms. Schaedle. We recognize the additional confusion caused by the 1994 order. The order, based on representations made to Staff, purportedly approves the transfer of the Pine Hill water system to PHCS. The report of the title examiner indicates, however, that no such conveyance of the water company's real properties was ever recorded. It appears that the conveyance was, instead, a stock purchase by individuals in their own names and that Pine Hill's stock was not thereafter transferred to PHCS.

We do not find that Pine Hill failed to provide safe and adequate service during December 2000 and January 2001. Staff thoroughly examined the past and present service issues. We conclude service was adequate and see no reason for further hearings on the matter. As noted in Staff's service investigation report, the water company responded timely upon

[17] Records of the Department of State, submitted by the water company, do not reflect that Pine Hill dissolved in the 1990s, as the PHWDC claims.

discovery of the water pressure reduction, utilized leak detection professionals, and exhibited a conscientious effort to locate and correct the problem. Pine Hill and the Water Coalition acknowledge, and Staff's investigation confirms, that the Pine Hill water system has suffered from many years of neglect and disrepair.[18] The delay in Pine Hill's discovery of the leak appears to be primarily due to its location on the water system and existing snow and ice cover. Further, the Staff Report indicates that the water service reduction and outages were related to water system leaks and not to an inadequate source of supply. The evidence does not support the Coalition's claim that Pine Hill needs additional resources (Covered Reservoir, Silo A and Silo B) to augment its supply and serve Pine Hill's customers. The UCHD reported that it never approved the interconnection and use of the assets and that it is unlikely that it would approve them for Pine Hill's use, absent substantial repairs and improvements. There is also no evidence to suggest that the water company has a lease to use these additional assets. Absent empirical evidence to the contrary, Pine Hill appears to have sufficient supply from the Bonnie View Springs to serve system demands.[19] Whether the water company needs an additional source to satisfy UCHD redundancy requirements, however, rests with the UCHD.

Since Mr. Gitters' acquisition, Pine Hill has made a number of repairs and improvements to the water system. The water company's records demonstrate that the repairs have drastically reduced its level of lost and unaccounted for water (LAUF). Although the LAUF level still appears excessive, we believe further significant reduction in the level will require a major water system overhaul and replacement of transmission and distribution mains. Unfortunately, because of the antiquated water system and preexisting state of disrepair, service interruptions or impaired service resulting from water main breaks, as occurred in December 2000 and January 2001, are to be expected.

The Pine Hill water system rehabilitation plans do not include integration and use of the Covered Reservoir. Given its existing condition, it is questionable whether the reservoir's use would benefit the water system, even if owned by or leased to the water company. According to Staff, a substantial capital investment would be required to rehabilitate and

[18] This fact is memorialized in correspondence of the UCHD and the Commission's 1994 Order (Case 94-W-0483, supra, Untitled Order, p. 2).

[19] Based upon the number of customers and the typical total consumption levels for the system (60,000 – 80,000 gallons per day), it appears that there is still considerable leakage in the system.

interconnect the Covered Reservoir to the system. Pine Hill is instead planning to locate an approximate 100,000 gallon storage tank on its .9-acre parcel near the Bonnie View Springs, considerably closer and at a much higher elevation than the Covered Reservoir and Silos A and B. The larger storage at the higher elevation should significantly increase available flows for fire service.

Finally, the concern raised by the Water Coalition, over the water company's single source of supply – the Bonnie View Springs – and the high risk of contamination due to the close proximity of the Belleayre Ski Center sewer line, appears moot. By letter dated May 27, 1998, the DEC stated that the sewer line had been relocated, so that at its closest point it is no closer than 400 feet from Pine Hill's water source.

The Commission orders:

1. The request of the Pine Hill Water District Coalition for a separate proceeding and evidentiary hearing and, alternatively, a declaratory ruling are denied.

2. This proceeding is closed.

By the Commission,

(SIGNED)

JANET HAND DEIXLER
Secretary

APPENDIX I

SERVICE INVESTIGATION
OF THE
PINE HILL WATER COMPANY
CASE 01-W-0803

By: John W. Agansky
Associate Valuation Engineer
Water Rates Section
Office of Gas and Water
September 5, 2001

CASE 01-W-0803

Purpose

This service investigation was undertaken in response to a petition filed by the Pine Hill Water District Coalition (Coalition), a group of people (customers and non-customers) who have an interest in the water service provided by Pine Hill Water Company (PHWC) in the hamlet of Pine Hill, and a complaint of twenty-five or more customers as to whether safe and adequate water service is being provided by the water company.

In conducting this investigation Staff reviewed several engineering reports, which were done over the years, health department reports and letters, and submissions from various interested parties. In addition, Staff discussed a number of matters with representatives from PHWC; Delaware Engineering P.C. (Delaware), PHWC's engineering consultant; New York State Department of Health (DOH); and Ulster County Health Department (UCHD). Staff also had discussions with a number of customers whose names were attached to the submitted petition. On July 10, 2001, engineering and legal Staff conducted an on site inspection of the water system, accompanied by the manager/operator, Delaware, UCHD and the company's attorney.

Background

PHWC provides fixture rate water service (rates which are based upon the number of water using fixtures present) to approximately 128 residential and commercial customers and metered water service to 1 commercial customer in and around the hamlet of Pine Hill, Town of Shandaken, Ulster County. No fire protection service is provided. The hamlet is located approximately 35 miles west of Kingston adjacent to Belleayre Mountain, a New York State owned ski resort in the Catskill Mountains.

The company was founded in 1893 and its ownership, along with other affiliated interests, has changed several times since its inception. The current owner, Mr. Dean Gitter, purchased the stock of the company in April of 2000. No Commission approval was required for this purchase.

The system, which is over 100 years old, is in extremely poor condition, especially the mains, and has suffered from years of neglect. At times, customers experience dirty water, low pressure and even periods of no water, depending upon the size and location of leaks in the system.

Current Operations

Before Mr. Gitter purchased PHWC, the system was under a boil water order, issued in the fall of 1995, from the UCHD due to the lack of proper chlorination. At the same time the company was cited by UCHD for exceeding lead and copper levels and not addressing the corrosiveness of the water. The boil water order was rescinded in March of 2000 (because of emergency repairs Mr. Gitter made to the system just before he purchased it and his commitment to do additional work), and the company is now in compliance with the lead and copper rules. Since taking over ownership of the company, Mr. Gitter installed chlorination equipment; increased the size of the treatment house; initiated treatment to address the high corrositivity of the water; installed approximately 1,400 feet of 2″ plastic main in order to provide temporary service to the last 12 houses on the system;[1] and installed an electrically operated valve in the treatment house to allow excess water to overflow before the treatment process, to prevent treated water from reaching the

[1] The original main, which was leaking profusely, was ultimately abandoned because it was buried under about 35 feet of fill as a result of the relocation of Rt. 28.

Esopus Creek, a trout stream in the area. In addition, in March of 2000 and, prior to taking over ownership, Mr. Gitter, at the urging of the UCHD, paid for the installation of approximately 400 feet of 2" plastic replacement main near the end of the system along Route 28 because the company, under its then current ownership, did not have the financial resources to make the necessary repairs. Appendix A, attached, provides a detailed description (per company) of the work that was performed since Mr. Gitter's purchase.

Subsequent to assuming ownership Mr. Gitter hired Delaware to address needed improvements and seek funding, on behalf of the company, for those improvements through the Drinking Water State Revolving Fund (DWSRF). In May 2001, the company was notified that it was eligible for a combination DWSRF grant/interest free loan of approximately $1.26 million ($948,208 in grant money and $316,069 in an interest free loan to be repaid over 30 years) to essentially rebuild the entire system. There remains however, a great deal of work required of the company to actually obtain the loan. Delaware expects to have its engineering report completed by the end of September or early October and final design plans approved by DOH and UCHD by the end of the year. Construction is expected to begin in early spring of 2002.

Overview of System

In summary, at the present time, the system is operated in the following manner. The source of the company's water are the three springs of the Bonnie View Springs, which are interconnected and piped to a treatment house. As the springs flow continuously, and usually at a rate greater than system demand, the company controls flow into the system by an overflow valve at the treatment house before treatment that diverts unneeded water to a stream. Needed water is treated and then piped to a storage reservoir, from the reservoir it is piped to the distribution system. Each of the system components are discussed in more detail below.

Water Supply Source

Based upon various reviewed sources of information, there are no documents to indicate that the water company ever owned or had written agreements to any sources of water other than those that it claims - the Bonnie View Springs, the Station Road Spring and the Bonnie View Well (Staff believes, however, that the Bonnie View Well is not on company property but rather on property owned by the New York State Department of Environmental Conservation (DEC)). Two of these sources, the Station Road Spring and the Bonnie View Well, are not operable. In the past, the company also used water from Crystal Springs, which was owned by the water company's previous stockholders and is now owned by one of Mr. Gitter's other companies. However, the only source of water currently approved for use, by either DOH or UCHD, is the Bonnie View Springs, which consist of three spring houses in close proximity to each other and interconnected by one 4″ pipe. However not all spring water is captured by the 4″ pipe. Some spring water flows over ground and is not used.

Alpha Geoscience (Alpha) of Latham, New York, was hired by Mr. Gitter to determine the capacities of the Bonnie View Springs and other water sources he has interests in. Alpha monitored the springs from January 2000 through January 2001 and concluded, based upon monthly readings, that the Springs are capable of supplying 273 gallons per minute (gpm) or approximately 393,000 gallons per day. Alpha reached this conclusion by using the month with the lowest flow (September 2000) and reduced that amount by 30% to arrive at a conservative estimate. The total capacity of the Bonnie View Springs was determined by measuring three parts: the amount of water flowing out of the spring houses over the ground, the overflow before the treatment process and finally the amount of water going into the system.

Both the Coalition and some customers have questioned whether the measurements taken once a month for thirteen months are sufficient to determine the actual capacity of the Springs and how drought conditions might affect the capacity[2].

For the purposes of this investigation, Staff's interests lie in whether the Bonnie View Springs, as they are now configured, reasonably supply sufficient water to the system and more specifically did a lack of supply cause the problems incurred in December 2000 and January 2001, particularly at the lower end of system.

Treatment

There is a treatment house between the Bonnie View springs and the reservoir where the water is chlorinated and treated with soda ash and other chemicals for corrosion control. The treatment house has an electric valve that permits unneeded water to overflow into a nearby brook, before it is processed.

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[2] The rated capacity of the springs and how that capacity is to be determined is not addressed herein because it falls directly under the jurisdiction of DOH and UCHD. The capacity of the Bonnie View Springs and the need for a secondary source of supply will be addressed by DOH or UCHD at the time they review the company's engineering report and final design plans and/or in the context of the company's water supply application.

Inside the treatment house is the master meter whose size limits the amount of water that can be treated and allowed to enter the water system to slightly more than 165,000 gallons per day. Typically, approximately 60,000 - 80,000 gallons per day are required to meet the current needs of the system, including considerable leakage.

Attached as Appendix B are the daily amounts of water going into the system for December 2000 and January and February 2001, as recorded on the master meter at the treatment house. Readings from these months are of particular importance because it is during this time period that approximately 12 customers at the lower end of the system experienced serious service problems. Staff notes that although the problems were experienced in December 2000 and January 2001, the complaints and allegations were not made until March 2001.

Storage

The company has one active reservoir with approximately 30,000 gallons of effective storage, which supplies the system by gravity, that is in fair condition. It also owns an abandoned reservoir, located at Station Road, which at one time held approximately 112,000 gallons of water and was primarily used for fire protection. The Station Road reservoir is no longer in use, and it appears to be beyond rehabilitation.

Distribution System

The distribution system consists primarily of 6″ and 4″ cast iron main and some 2″ inch galvanized pipe main, most of which is over 100 years old and in extremely poor condition. The company informed Staff that due to turburculation the mains operate at approximately half capacity, which is not surprising considering the age of the mains and the corrosiveness of the water.

The static pressure in the gravity fed system varies from 31 psi at the higher elevations to over 120 psi at the lower elevations of the system. There is one section of main at the highest elevation where 4 or 5 customers left the system and drilled their own wells because the company could not supply them with adequate water pressure.

Service Problem December 2000 – January 2001

On December 18, 2000, despite large amounts of water going into the system, the reservoir level was dropping and the 12 customers at the end of the system experienced very low pressure or no water at all. Unfortunately, the problem was not fully resolved until January 23, 2001, despite all the actions taken by the company (see Appendix A).

Staff interviewed the system manager/operator in detail concerning the listed dates and specific actions taken by the company. During the time period in question, the company brought in a professional leak detection company on three separate occasions and took actions based on its findings. The company also excavated various sections of pipe on its own and installed additional valves to limit the problems to the least number of customers. One of the biggest problems faced by the company was that this occurred in the middle of winter, the ground was frozen and covered with snow and ice, and the leaks did not come to the surface. As it turned out there were several major breaks at the far end of the system and one major break in a stream crossing on the upper end of the system near Station Road. The master meter readings listed in Appendix B, specifically for the periods before and after January 23, 2001, clearly show the effects of repairing the major leaks.

During December and January while problems persisted, UCHD placed a boil water order on the lower end of the system, affecting 12 customers. The company provided written notices (see Appendix C) to 6 of the customers directly and left copies of the notice at the other 6 houses, which were unoccupied. The notice explained that on December 18th the customers would have water from 8:00 PM to 10:00 PM and on December 19th from 5:00 AM to 9:00 AM, and where they could fill their own containers with drinking water. Based upon notes of the company's manager/operator, between December 20 to January 23, water to the lower end of the system was shut off except for approximately 3 – 4 hours in the morning and 4 – 5 hours in the evening. During this time only one customer was at times without water. As it turned out two of the major breaks were on each side of that customer's driveway. The extreme actions were necessary to preserve the remainder of the system until the company could locate and fix the extraordinary leaks. Once the leak in the stream crossing on Station Road was found, the one affected customer was advised to boil his water until the leak was fixed.

The company had over 165,000 gallons of water going into a system that normally should require between 60,000 and 80,000 gallons per day or less. Staff believes that the company had a sufficient quantity of water available from the Bonnie View Springs to meet more than twice the normal or typical usage of the customers. Although the company does not have a second source of water for purposes of supply reliability, the company is addressing that requirement as part of the system rehabilitation.

In past years it appears that the prior owners failed to address problems related to a decaying system because water was readily available and the company did not have adequate financial resources. Records indicate that it was common to put approximately 150,000 gallons per day into a system that should typically require less than half of that, if properly maintained.

The biggest problem facing the system today is finding and fixing leaks in an extremely old and decaying system, and maintaining the status quo until major renovations can be accomplished. The company relies on master meter recordings and pressure complaints as an indication of major leaks in the system. Since the recent change in ownership, it appears that the company has reasonably addressed problems as they became known.

Financial Overview

The company's last rate increase took effect in 1994. Currently the company's annual revenues are approximately $33,000, with an average annual bill of $258, and the company appears to be operating at a loss. The company's financial picture, however, is not affecting either how it operates or maintains the system. As additional funds are required for operations, they are borrowed, on a demand basis, from an affiliated company. As a result of this arrangement, the company is staying current with its vendors and suppliers. The company is not expected to address any rate issues until its engineering and financing plans are more complete. It is anticipated, however, that higher rates may be in order at that time.

The company's financial records are now computerized and bookkeeping and billing information is maintained by a professional accounting firm under contract to the water company.

The company has had to send out quite a few shut-off notices for non-payment, but the customers responded by either paying their bills in full or making arrangements for a payment schedule. When Mr. Gitter purchased the company there were approximately $3,000 in unpaid billings in dispute that were carried over from the previous owner. Because of poor records, the company chose to write-off the $3,000, rather than dispute the bills.

Issues with Other Agencies

In 1970 the water company applied to the Department of Environmental Conservation, through its Water Supply Application No. 5889, "for approval of its existing water supply and distribution system serving the Village of Pine Hill, Ulster County, and of the taking of a supply of water for that system from various existing sources". Four water sources are listed on the application – Bonnie View Springs, Crystal Spring, Depot (Station) Road Spring and the Depot (Station) Road Well. Based upon the "Findings of Fact" at that time and the representations made the company, a decision was rendered by the DEC in October 1970 incorporating those sources.

Under the ownership of Mr. Gitter, the company recently filed Water Supply Application No. 10,181 claiming that:

> The purposes of this requested modification to WSA No. 5889 are to clarify what assets are owned by PHWC, how the system operates, detail the historical operations of the facility, and to modify the WSA permit to formalize and accurately represent the current practices of the PHWC. No material change in permitted conditions or scope of activities is being sought.

The current owner claims that the company never owned Crystal Spring or the Depot Road Well, that there were no written agreements allowing for their use by the water company, and that they were not sources approved by UCHD. In its modification request the company claims it owns Bonnie View Springs, Depot Road Spring and a subsequently installed well adjacent to the Bonnie View Springs location known as the Bonnie View Well. The water company further claims that other companies affiliated with the water company currently own the Crystal Spring and the Depot Road Well, and they are not considered part of the water company. DEC has yet to render a decision on this matter.

In the past the company has been cited by UCHD for its failure to properly chlorinate, meet lead and copper standards and address the corrosiveness of the water. Those infractions have been corrected by the current owner. DOH also made the company aware that in order to avail itself of funds from the DWSRF, it must address the need for an alternate source of supply. Although DOH or UCHD must approve the use of a new source, they cannot require the company to use a specific source like either Crystal Spring or the Depot Road Well.

Customer and Coalition Issues

Thus far there have been a number of complaints, allegations, petitions and declaratory ruling requests filed with this Commission by the Coalition and a few customers of the water company. In addition, similar complaints and allegations have been filed with DOH, UCHD and elected officials. Furthermore, the company has met considerable opposition to attempt to modify its water supply permit from the DEC. In order to respond to these matters the company has had to avail itself of the services of both engineering and legal firms. It is unknown at this time how much the company has expended for these services. Thus far, the company has not given any indications whether it will seek recovery of these expenses through rates, although it may be entitled to do so.

The recently submitted petition has attached signatures from approximately 35 customers. Because most of these were on blank sheets of paper, Staff recently contacted a number of the customers in order to have a better understanding of their complaints. For the most part, all of the customers interviewed expressed concerns over the condition of the decaying system that had been neglected for years, what was to become of it, and periods of low pressure or no water. A number of people also complained that the company's telephone number was not readily available (that has been corrected and it now appears on the quarterly bills to the customers). Some customers expressed concern that UCHD removed the boil water order prematurely (such an action falls under their purview). The customers' biggest concern, however, was that Mr. Gitter purchased the system before the town was able to, and the customers believe that Mr. Gitter took sources of supply, which they felt belonged to the water company, that he planned on using for another project.

Future Plan for System

As previously noted, the company has submitted preliminary plans as part of its application for DWSRF money and the company was notified that it was eligible for $1.26 million from the DWSRF. In order to finalize the financing, further action is required by the company. The company must now complete its engineering report and plans and receive final design approval from either DOH or UCHD, as appropriate, and also receive approval from the DEC for the taking of an alternate source, unless it is already approved. The company anticipates having a final report by the end of September or early October and final DOH or UCHD design approval by the end of the year. Based upon that schedule, construction could begin in spring 2002.

The company's engineering report will address: the rehabilitation of the Bonnie View Springs; the addition of an alternate source of supply; the replacement of mains; additional storage requirements; rehabilitation of existing storage and treatment house; the raising of water pressure so that all customers in its service territory, even those in the highest elevation, will have adequate pressure; the extremely high pressures at the lower end of the system; fire protection services; and metering.

Based upon discussions with Delaware, the company appears to be on schedule.

Conclusions

The system is over 100 years old and suffers from many years of neglect. Based on past and recent flow records there have been problems of excessive leakage. Approximately 150,000 gallons per day was going into a system to satisfy a customer demand in the range of 60,000 to 80,000 gallons per day. Previous owners failed to properly chlorinate; make improvements and repairs; address the corrosiveness of the water; or meet the required lead and copper standards for drinking water. Under the ownership of Mr. Gitter these matters have been addressed and resolved. The company's new owner made many changes to the system and is providing water as safe and adequate as a system that is over 100 years old, and not properly maintained, will allow. In the future there will again, in all likelihood, be episodes of low pressure, dirty water and even no water at times until the system is completely rehabilitated. The company, however, has shown a willingness to address all problems as quickly as feasible.

The company qualified for $1.26 million from the DWSRF to essentially rebuild the entire system. Upon completion of the work the customers will essentially have a brand new system. It appears that without grant money from the DWSRF or possibly other types of grant programs, customers could not have afforded to make the necessary capital improvements.

The company seems to be on a reasonable schedule for completing its engineering plans, submitting its design plans for approval, following through with its financing and beginning construction next spring. Staff believes there is no need for any Commission action at this time. If there are undue delays, Staff is prepared to bring this matter to the Commission for further review.

Chronology of Repairs and Improvements
PINE HILL WATER COMPANY

April 25, 2000	Installed temporary 2" plastic main between Bridge at Pine Hill Lake and first house on lower end. (Did not increase pressure to lower end significantly.)
May 28, 2000	Installed temporary 2" plastic main around Pine Hill Lake and installed valve at start point. (Pressure on lower end went up to 75 psi. Inspection of old main revealed heavy tuberculation.)
July 01, 2000	Replaced curb valve at Wisnowski home on Birch Creek Rd

xt to Mail Persons home on Academy St.

d repaired supply line leak at Northbacker home on	August 07, 2000	Replaced two (2) curb valves an Upper Main St
1 for winter months and installed two (2) new valves and xd house next door	September 26-30, 2000	Buried temporary 2" plastic mai service line to Desmond home a
rvice line replaced at Museum Building on Academy St	October 10, 2000	New curb valve installed and se
k in supply line repaired at Meyers home on Academy	October 10, 2000	New curb valve installed and lea St
ected to house the equipment for corrosion control	October 24-30, 2000	Chlorinator building extension e
vice line replaced at Larry Smith home on Upper Main	November 02, 2000	New curb valve installed and ser St.
lle home on Route 28.	November 03, 2000	Repaired curb valve leak at LeHe
Chlorinator building and put on line. (Mixer motor t. Removed motor and returned to supplier.)	December 18, 2000	Soda ash pump and crock installed at (bearing N.G. after 1/2hour of operatio
top off. (Began rationing water to twelve (12)	December 18, 2000	Reservoirs level dropped and unable t lower end homes; see attached notice.)
(12) lower end homes isolating new 2" plastic n valve somewhere in 1600 ft. of lower end main continued to 12/22/00)	December 19, 2000	New main valve installed above twelv main. Leak confirmed below new mai (Rationing to the 12 lower end homes
in lower end main. Small leak repaired and	December 22, 2000	Utility Survey Company detected leak reservoir level okay until 12/28/00.
ine	December 23, 2000	Reinstalled soda ash mixer and put on
id not recover. (No success in isolating or e (12) lower end homes put in effect again so as	December 29, 2000	Reservoir level dropped again and wou detecting leaks. Rationing to the twel to maintain reservoir level.)

January 02, 2001	Open valve found by Matt Persons, in unoccupied house on Elm St. Shut curb valve previously shut in June 2000
January 03, 2001	Leak found in house next to Post Office tenant moved, shut off heat and pipes froze Curb valve closed to shut down house
January 05, 2001	Utility Survey Company unable to detect leak in lower end main and suggested uncovering prior leak. No leak found
January 12, 2001	Reservoir level dropped to 3 ft no leaks found (continued rationing to lower end in order to refill reservoir every day)
January 17, 2001	Located buried main valve near DEP WWTP on Route 28 (Isolated leak to 800 ft of main between valves)
January 19, 2001	Utility Survey Company (3rd time) detects two (2) possible small leaks and one (1) major leak
January 20, 2001	Old DEP WWTP line excavated and capped at main repairing one (1) leak (still not enough pressure in lower end)
January 22, 2001	Location of possible leaks excavated. Found two (2) main breaks and replaced section of main (old breaks) Rationing discontinued
January 22, 2001	Town Highway crew finds main leak in stream bed on Bonnieview Ave. Leak not visible during prior month. No apparent weather related cause
January 23, 2001	Stream main repaired
January 24, 2001	Meter flow to reservoir 75,000 G.P.D. Reservoir full to capacity
January 30, 2001	Boil Order on lower end discontinued by Ulster County Board of Health

WATER REQUIREMENTS OF SYSTEM[3]

(Gallons)

Date	December (2000)	January (2001)	February (2001)
1	139,900	165,600	71,200
2	133,350	144,300	68,800
3	140,900	160,400	70,300
4	138,300	157,200	95,600
5	128,400	156,000	72,100
6	131,100	148,100	62,300
7	131,900	165,100	79,100
8	131,600	160,600	71,100
9	138,500	162,800	69,800
10	139,400	166,000	79,500
11	133,600	163,500	76,100
12	134,000	164,300	74,500
13	140,100	167,500	68,600
14	135,400	163,800	71,500
15	146,200	164,100	78,100
16	143,600	165,700	75,300
17	146,600	164,900	78,300
18	156,300	162,900	75,300
19	176,700[4]	164,600	87,700
20	153,100	164,000	77,800
21	171,700	164,400	72,400
22	167,200	167,600	74,700
23	166,200	-[5]	70,000
24	165,900	100,900	86,800
25	164,600	79,000	86,900
26	154,600	76,800	59,300
27	162,000	75,800	71,300
28	165,000	85,000	69,500
29	160,300	74,100	
30	166,100	69,600	
31	158,500	70,500	

[3] Because meter readings, which represent the amount of water going into the system, are taken early in the morning they actually reflect consumption from the previous day.

[4] Reservoir began dropping.

[5] All major leaks repaired.

NOTICE

ALL WATER

from this source

MUST BE BOILED

before drinking

The proprietor will remove this only when the HEALTH DEPARTMENT has satisfactory evidence of delivery of a safe water supply

ULSTER COUNTY DEPARTMENT OF HEALTH

WE HAVE A MAJOR LEAK

You will only have water between 8:00 p.m. and 10:00 p.m. on Monday, December 18, 2000 and between 5:00 a.m. and 9:00 a.m. on Tuesday, December 19, 2000.

Drinking water can be picked up at the standpipe located in front of the Village Parking Lot (to the left of the flagpole in the Memorial Park). Bring your own containers.

We are sorry for the inconvenience; we are working to correct the problem.

Thank you for your patience.

Pine Hill Water Company

APPENDIX C

Exhibit C

Fire Flow Calculations

TURNER (BELLEAYRE HIGHLANDS)

A. POTABLE WATER NEEDS – ave flow 30,898 gpd
From Table 1 (21.5 gpm)

B. MAX. HOURLY DEMAND:
21.5 gpm · 3 (peaking factor) = 64.5 gpm

C. FIRE FLOW:

$F = 18CA^{0.5}$

AREAS

1. TIMESHARES – 7,600 SF / BLOCK
2. CLUBHOUSE – 2(125 ft · 125 ft) = 31,250 SF

F

Light fire load reduction by 25%
automatic sprinklers 75% reduction

1. $F = 18(1)(7,600)^{0.5}\ 0.75 \cdot 0.25 = 294 \rightarrow 500$

2. $F = 18(1.8)\ 31,250^{0.5}\ 0.75 \cdot 0.25 = 1074 \rightarrow 1100$

#2 has greatest demand @ 1,100 gpm
per Table 6-4 duration @ 1,100 gpm is 2 hr

$1100 \frac{gal}{min} \cdot \frac{60\ min}{1\ hr} \cdot 2\ hr = 132,000\ gal$

D. STORAGE NEEDS = 132,000 gal + 30,898 gal = 162,898 gal

E. Piping - NEEDS TO CARRY 1,100 gpm for fire flow

RIDGE (Winnisook Lodge)

A. POTABLE WATER - AVE. DEMAND 81,155 gpd (56.5 gpm)

NONPOTABLE - 300,000 gpd (208.33 gpm)

B. Max hourly

56.5 gpm · 3 (peaking factor) = 169.5 gpm

D. FIRE FLOW

$F = 18CA^{0.5}$

1. Lodge

$F = 18(0.8)162{,}500^{0.5} \cdot 0.25$ *

=

0.75 = 1125 gpm

2. 95 Separate Units 1000 gpm per Table 6-2 (dwelling 30-100 ft apart)

Lodge has greatest fire requirement of 1125 gpm. Per Table 6-4 use 2 hour duration

1125 gpm · 60 min/hr · 2 = 135,000 gal

E. STORAGE NEEDS = FIRE VOL. + AVE DAILY FLOW

= (135,000 + 79,600) gal

= 214,600 gal

F. Piping - NEEDS TO HANDLE FIRE FLOW REQU'TS OF 1125 gpm

* Want storage tank for irrigation? NO → use 5.3 MG POND

use Aquastore Tank 19'H x 50'D

COMBINE TO 1 TANK Fire Max 135000 gal + 112,053 ave. demand = 247,053 gal plumbing requiring pressure reducers in service connections, and undue stress is placed on mains in the ground. Pipe and fittings used in ordinary water distribution systems are designed for a maximum working pressure of 150 psi.

6-2 MUNICIPAL FIRE PROTECTION REQUIREMENTS

The Insurance Services Office (ISO)[1] has developed a standard schedule for the grading of municipalities with regard to their fire defenses and physical conditions. Fire defenses are weighted for evaluation on the basis of 39 percent for water supply, 39 percent for fire department, 13 percent for fire safety control, and 9 percent for fire service communications. In the evaluation of a municipality, deficiency points are assigned for deviations from the criteria published by the Insurance Services Office.[2] Reliability and adequacy of the following major water supply items are considered in the schedule: water supply source, pumping capacity, power supply, water supply mains, distribution mains, spacing of valves, and location of fire hydrants. These are all essential components for fire fighting facilities of a municipality.

Required Fire Flow

This is the rate of flow needed for fire fighting purposes to confine a major fire to the buildings within a block or other group complex. Determination of this flow depends on size, construction, occupancy, and exposure of buildings within and surrounding the block or group complex. The required fire flow is computed at appropriate locations in each section of the city. The minimum amount is 500 gpm, and the maximum for a single fire is 12,000 gpm. Where local conditions indicate that consideration must be given to simultaneous fires, an additional 2000 to 8000 gpm is required. A municipality will have domestic and commercial water demands at the time fires occur; therefore, an adequate system must be able to deliver the required fire flow for the specified duration with municipal consumption at the maximum daily rate. The maximum daily consumption is defined by the Insurance Services Office as the greatest total amount of water used during any 24-hr period in the past three years. This maximum daily rate, expressed in gallons per minute (liters per second) is the mean usage during the day of peak delivery. In cases where actual use figures are not available, the maximum consumption is estimated on the basis of use in other cities of similar character and climate. Such estimates are to be at least 50 percent greater than the average daily consumption, which is defined as the mean daily usage during a one-year period.

An estimate of fire flow required for a given fire area is calculated by the formula

$$F = 18C(A)^{0.5} \qquad (6\text{-}1)$$

where F = required fire flow, gallons per minute (answer is rounded off to the nearest 250 gpm).
C = coefficient related to type of construction: 1.5 for wood-frame construction, 1.0 for ordinary construction, 0.8 for non-combustible construction, and 0.6 for fire-resistive construction.
A = total floor area including all stories in the building, but excluding basements, square feet. For fire-resistive buildings, the six largest successive floor areas are used if the vertical openings are unprotected; but where the vertical openings are properly protected, only the three largest successive floor areas are included.

The fire flow formula, Eq. 6-1, expressed in SI metric units is

$$F = 3.7C(A)^{0.5} \qquad \text{(SI units)} \qquad (6\text{-}2)$$

where F = required fire flow, liters per second
A = total floor area, square meters

Regardless of the calculated value, the fire flow shall not exceed 8000 gpm (500 l/s) for wood-frame or ordinary construction, or 6000 gpm (380 l/s) for noncombustible or fire-resistive buildings. For a normal one-story building of any type, however, it may not exceed 6000 gpm. The fire flow shall not be less than 500 gpm (32 l/s). For groupings of single-family and small two-family dwellings no

Table 6-2. Required Fire Flows for Single-Family and Two-Family Residential Areas Not Exceeding Two Stories in Height

Distance Between Dwelling Units (ft)[b]	Required Fire Flows[a] (gpm)[c]
Over 100	500
31 to 100	750 to 1000
11 to 30	1000 to 1500
10 or less	1500 to 2000
Continuous buildings	2500

Source: Guide for Determination of Required Fire Flow, Insurance Services Office, December 1974.

[a] Where wood shingle roofs could contribute to spreading fires, add 500 gpm.
[b] 1.0 ft = 0.305 m
[c] 1.0 gpm = 0.0631 l/s

exceeding two stories in height, the fire flows in Table 6-2 may be used.

The value obtained by Eq. 6-1 (or Eq. 6-2) may be reduced up to 25 percent for occupancies having a light fire loading, or it may be increased up to 25 percent for high fire loading. Light fire loadings are occupancies of low hazard, such as all forms of housing, churches, hospitals, schools, offices, museums, and other public buildings. However, after credit is applied, the fire flow cannot be less than 500 gpm (32 l/s). High fire hazard loadings encompass all commercial and industrial activities that involve processing, mixing, storage, or dispensing of flammable and combustible materials. Chemical works, explosives, oil refineries, paint shops, and solvent extracting are examples.

Additional adjustments may be applicable to the fire flow as modified for occupancy. Completely automatic sprinkler protection may reduce the required flow up to 75 percent, but structures within 150 ft (45 m) of the fire area increase the required fire flow. The magnitude of increase for separation depends on the open distance, number of sides exposed, type of construction, occupancy, and other factors. The charge for one exposed side generally does not exceed a maximum of 25 percent, and the total penalty for all sides shall not exceed 75 percent.

Table 6-3. Approximate Fire Flow Requirements for the High-Value Districts in Small Communities

Population	Fire Flow (gpm)[a]	Duration (hr)
1000	1500	2
2500	2500	2
5000	3500	3
10,000	4000	4

[a] 1.0 gpm = 0.0631 l/s

After these final corrections, the fire flow shall not exceed 12,000 gpm (760 l/s) or be less than 500 gpm (32 l/s).

The *Guide*[3] was prepared for use by municipal survey and grading personnel of the Insurance Services Office and other fire insurance rating organizations. Although it is available to others as an aid in estimating fire flow requirements, considerable knowledge and experience in fire protection engineering are necessary for detailed application of the guidelines. For example, judgment is used for businesses and industries not specifically mentioned in the *Guide*. A thorough understanding of fire fighting operations is essential when considering the influences of accessibility and configuration of buildings.

Prior to the current grading schedule, municipal fire protection requirements were specified for high-value districts of a community based on population as given in Table 6-3. These requirements are still useful as rule-of-thumb values; however, they should be used only as guidelines in the absence of specific data for calculating the required fire flows. Many changes in community developments over recent years have led to the current ISO schedule. For instance, many towns and cities now have large shopping or office areas located in suburban districts away from the previous "downtown" high-value district.

Duration

The required duration for fire flow is given in Table 6-4. Major components of a water system, on which the reliability of fire flow depends—such as, pumping capacity, power source, supply mains, and treatment works—

Table 6-4. Required Duration for Fire Flow

Required Fire Flow (gpm)[a]	Required Duration (hr)
10,000 and greater	10
9500	9
9000	9
8500	8
8000	8
7500	7
7000	7
6500	6
6000	6
5500	5
5000	5
4500	4
4000	4
3500	3
3000	3
2500 or less	2

Source: Grading Schedule for Municipal Fire Protection, Insurance Services Office, 1974.

[a] 1.0 gpm = 0.0631 1/s

must have the ability to deliver the maximum daily consumption rate for several days plus the required fire flow for the number of hours specified at anytime during this interval. The period may be five, three, or two days depending on the system component under consideration and the anticipated out-of-service time needed for maintenance and repair work.

Pressure

The pressure in a distribution system must be high enough to permit pumpers of the fire department to obtain adequate flows from hydrants. In general, a minimum residual water pressure of 20 psi (140 kPa) is required during flow to overcome friction loss in the hydrant and suction hose. Higher pressure is needed where pumpers are not used; a residual pressure of not less than 75 psi permits effective use of streams direct from hydrants that are spaced close enough to allow short hose lines. Sustained high pressures are of value in permitting direct supply to automatic sprinkler systems, and building standpipe and hose systems.

Water-Supply Capacity

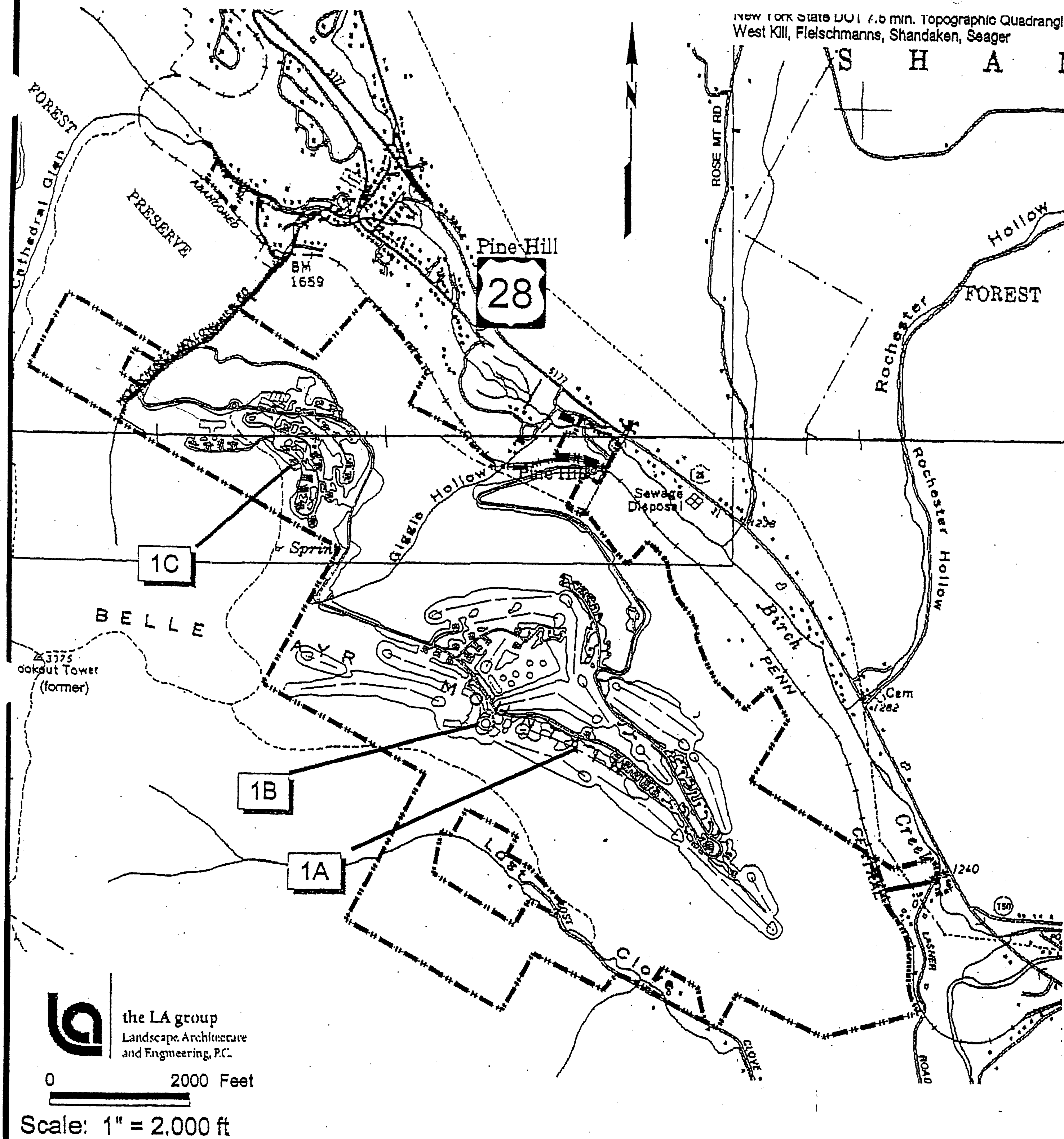
In evaluating a system, the ability to maintain the maximum daily consumption rate plus fire flow in the municipality, at minimum pressure, is considered with one or two pumps out of service. To have no insurance grading deficiency, the capacity remaining with the two most important pumps out of service, in conjunction with storage, must provide this flow for the specified duration any time during a five-day maximum consumption period. Some deficiency is charged against a system that can meet the requirement with only one inoperative pump. Where the capacity remaining, alone or with storage, does not equal the maximum daily use rate, only the amount that is available at required pressure may be considered.

Storage is frequently used to equalize pumping rates into the distribution system as well as to provide water for fire fighting. Since the volume of stored water fluctuates, only the normal minimum daily amount maintained is considered available for fire fighting. In determining the fire flow from storage, it is necessary to calculate the rate of delivery during a specified period. Even though the amount available in storage may be great, the flow to a hydrant cannot exceed the carrying capacity of the mains, and the residual pressure at the point of use cannot be less than 20 psi (140 kPa).

Although a gravity system, that is, delivering water without the use of pumps, is desirable from a fire protection standpoint because of reliability, well-designed and properly safeguarded pumping systems can be developed to such a high degree that no distinction is made between the reliability of gravity-fed and pump-fed systems by the Insurance Services Office. Where electric power is used, the supply should be so arranged that failure in any power line or repair of a transformer, or other power device, does not prevent delivery of required fire flow. Underground power lines laid directly from substation of the power utility to the water plant and

Exhibit D

Spring and Stream Flow Measurements



LEGEND

1A Big Indian Country Club and Golf Course
1B Big Indian Resort & Spa
1C Belleayre Highlands

Map adapted from The LA Group, P.C

ALPHA GEOSCIENCE

FIGURE 1
Big Indian Plateau Location Map

Belleayre Resort at Catskill Park
Pine Hill, New York

Alpha Project No. 00163

FILE: 00109-03.CNV

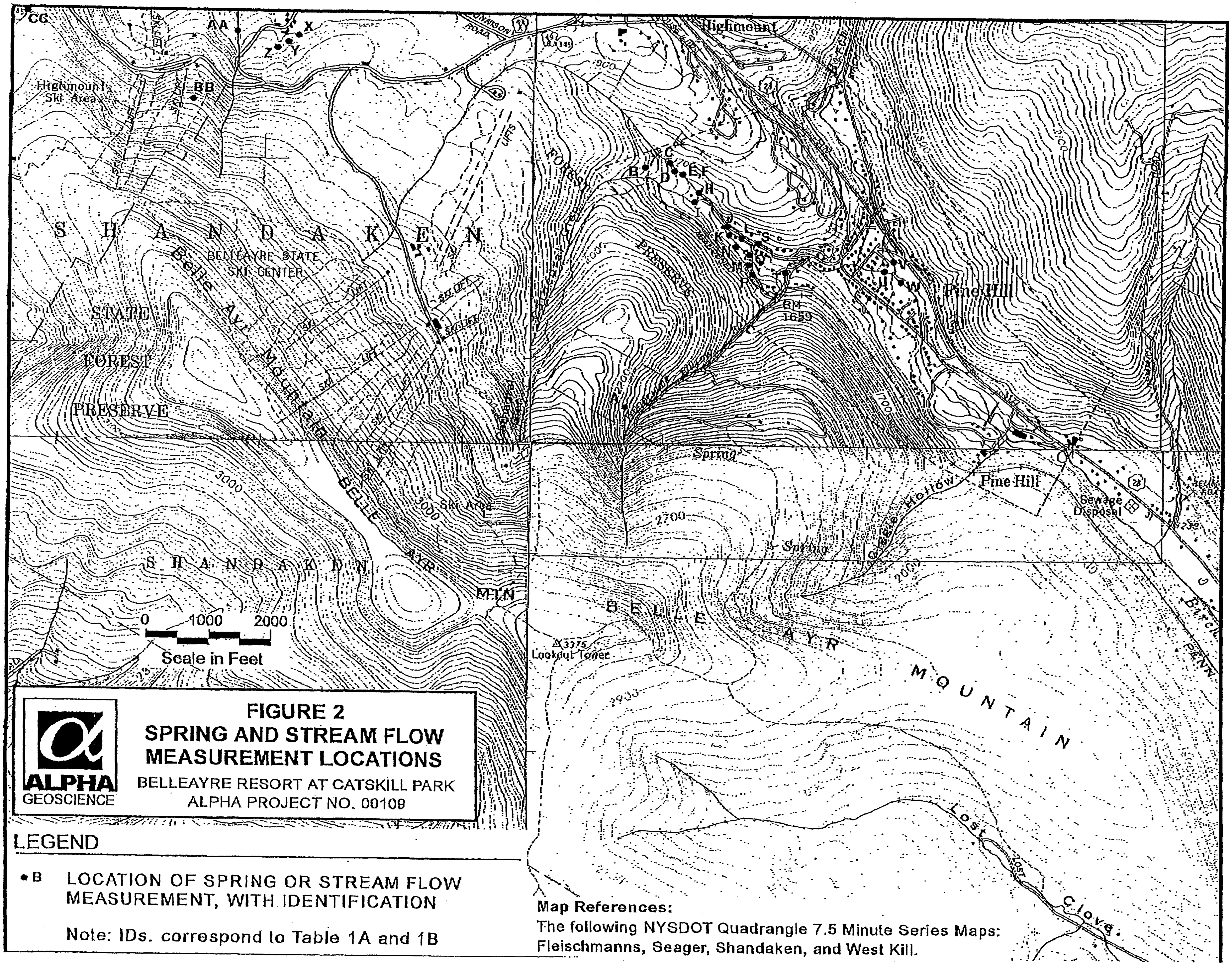


FIGURE 2
SPRING AND STREAM FLOW MEASUREMENT LOCATIONS

ALPHA GEOSCIENCE

BELLEAYRE RESORT AT CATSKILL PARK
ALPHA PROJECT NO. 00109

LEGEND

• B LOCATION OF SPRING OR STREAM FLOW MEASUREMENT, WITH IDENTIFICATION

Note: IDs. correspond to Table 1A and 1B

Map References:
The following NYSDOT Quadrangle 7.5 Minute Series Maps: Fleischmanns, Seager, Shandaken, and West Kill.

TABLE 1A
2000-2001 MONTHLY
SPRING AND STREAM FLOW MEASUREMENTS
Gallons Per Minute

Belleayre Resort
Alpha Project No. 00109

		2000												2001										
	Stream/Spring	18-Jan	2-Mar	27-Mar	20-Apr	22-May	26-Jun	26-Jul	29-Aug	28-Sep	26-Oct	28-Nov	27-Dec	30-Jan	28-Feb	29-Mar	25-Apr	30-May	29-Jun	30-Aug	1-Oct	13-Nov	29-Nov	14-Dec
A	Woodchuck Hollow Spring	NM[6]	NM	NM	NM	NM	87	27	28	22	56	38	39	NM	NM	NM	226	44	31	12	41	NM	NM	38
B	Railroad Spring[1]	NM	NM	NM	NM	386	351	193	247	80	63	102	435	100	306	199	525	214	172	0	0	0	0	0
C	Crystal Spring Brook-above Bonnie View Spg.	73	1005	777	879	899	655	122	120	46	77	78	430	105	220	101	1644	97	80	30	16	NM	NM	NM
D	Bonnie View side ditch[2]	19	39	24	56	49	49	29	20	10	8	10	55	26	44	15	45	35	68	5	0	NM	NM	NM
E	Pine Hill H_2O Supply (meter)	0	NM	118	118	0	118	114	114	112	112	113	NM	113	113.5	113.4	119	113.4	112	80	102.5	NM	NM	NM
F	Pine Hill H_2O Supply overflow	48	11	10	10.5	102	7.5	0.7	.25 est.	0	0	0.7	9.5	NM	3	2.8	17.7	13.5	2.3	0	0			
G																								
H	Crystal Spring Brook-above Cathedral Glen Brook	127	1,456	1,072	1,104	1,121	990	197	297	149	184	230	542	235	372	459	1,913	322	280	45	69	NM	NM	NM
I	Cathedral Glen Brook-above CSB	242	3,499	3,730	2,531	2,889	2,317	730	843	286	653	1,070	597	335	1,154	464	7,882	920	540	42	372	NM	NM	NM
J	Black ABS Pipe-above Silo A	NM	NM	19	19.7	18	18	9.9	5.1	2.2	2.2	1.7	11.5	5.6	9.4	12	20.6	9.9	5	1	0	NM	NM	NM
K	Silo A	120	212	150	175	178	125	104	98	87	86	87	139	109	113	106	167	93.5	93	69.5	73	69.3	70.8	79.7
L	Crystal Spring Brook-below Silo A	435	4,941	4,618	4,857	4,307	3,157	1,391	1,074	799	1,296	1,304	1,880	600	1,299	827	9,401	1,312	785	182	853	NM	NM	NM
M	Silo B 4" Pipe	NM	NM	NM	NM	NM	NM	96	94	51	121	113	150	133	161	176	189	187	185	27.5	159	NM	NM	165
N	Silo B Overflow	29	25	28	24	26	25	25	26	25	25	26	28.5	25	26.5	NA	NA	NA	NA	NA	NA	NM	NM	NA
O	Silo B (M + N)	NM	NM	NM	NM	NM	NM	121	120	76	146	139	178.5	158	187.5	176	189	187	185	27.5	159	NM	NM	165
P	Station Rd. ditch-above Depot Spg.	35	101	55	226	287	164	89	26	0	50	11	226	0	67	49	311	0	4	0	0	NM	NM	NM
Q	Station Rd. ditch-below Depot Spg.	107	433	167	402	372	426	220	245	90	193	176	472	123	406	387	813	223	170	28	147	NM	NM	NM
R	Depot Spring Total[3,4]	101	357	140	200	111	287	156	246	115	168	192	275	148	365	338	502	223	166	28	147	NM	NM	NM
S	Crystal Spring Brook-below Depot Spg.	780	5,565	4,316	4,939	4,570	4,158	1,677	1,172	1,048	1,467	1,882	2,744	1,088	1,528	1,373	9,039	1,336	1,022	280	738	NM	NM	NM
T	Bailey Brook-above Crystal Spring Brook[5]	NM	NM	NM	NM	925	509	127	60	22	87	104	446	41	71	84	1699	110	141	0	24	NM	NM	NM
U	Crystal Spring Brook-above Birch Creek	NM	NM	NM	6,437	6,032	5,045	1,866	1,116	846	1,473	1,835	2,827	851	1,699	1,445	12,156	1,460	946	188	601	NM	NM	1080
V	Birch Creek-above Crystal Spring Brook	NM	NM	NM	11,209	10,421	6,463	4,347	2,528	1,085	2,501	2,286	7,128	2,481	3,470	3,822	12,257	3,046	2,101	614	591	NM	NM	1435
W	Birch Creek-below Crystal Spring Brook	NM	NM	NM	15,984	17,343	9,884	6,362	3,978	1,917	4,385	4,833	9,502	3,874	4,980	5,505	25,096	4,453	3,214	696	1,225	NM	NM	2205
X	Wildacres #1 Spring	1	10.7	1.7	10	10.6	5.8	3.3	2.9	1	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Y	Wildacres #2 Spring	5.6	15	0.6	5.5	7.1	4.6	2.5	1.3	0.9	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Z	Wildacres #3 Spring	8.4	17.5	6.8	17.5	5.8	5.3	10.3	11.5	4.8	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
AA	Davenport Spring	3.2	10.1	5.6	12.4	12.5	6.7	2	1.8	1.1	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
BB	Highmount Spring	3.8	11.5	10	23	18.7	10.2	2.4	1.8	0.5	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
CC	Leach Spring	3.4	4.4	6.1	13	5.1	6.9	11.1	6.3	5.6	6.8	6.1	12.2	2.5	4.9	NM	5.6	4	12	0	0	NM	NM	NM
DD	Birch Creek at USGS Big Indian Gauging Station[7]	5,835	41,741	19,300	25,134	26,481	13,914	6,284	4,488	2,154	3,725	2,873	12,567	5,386	8,527	9,874	31,418	7,630	6,732	987	1,885	1,212	2,289	5,386
EE	Esopus Creek at USGS Allaben Gauging Station[7]	50,718	235,187	76,301	107,719	132,854	80,789	33,662	24,686	11,220	22,890	29,623	72,710	22,890	38,151	55,206	121,633	66,307	25,583	4,937	11,221	7,630	8,303	23,788

Notes:
1 Railroad Spring drains into Cathedral Glen Brook, upstream from its confluence with Crystal Spring Brook
2 Bonnie View Side Ditch = Water from Bonnie View Spring that does not enter piping to Bonnie View Spring collection system.
3 Depot Spring flow = Station Rd ditch flow below DepotSpring, minus Station Rd. ditch flow above Depot Spring, plus Silo B overflow
4 Silo B overflow to reservoir disconnected in March 2001. For March 2001 and subsequent dates, total Depot Spring flow = Station Rd Ditch below Depot Spring, minus Station Rd. Ditch above Depot Spring
5 Bailey Brook = Name given to unnamed stream in Woodchuck Hollow.
6 NM = Not Measured
7 Esopus Creek and Birch Creek flow values for September 2000 through December 2001 are "Provisional Data Subject To Revision" by the USGS

TABLE 1B
AVERAGE FLOWS
SPRING AND STREAM FLOW MEASUREMENTS (GPM)

BELLEAYRE RESORT
Alpha Project No. 00109

	STREAM OR SPRING (see Figure 2 for locations)	AVERAGE FLOW TO DATE
A	Woodchuck Hollow Spring	53
B	Railroad Spring[1]	198
C	Crystal Spring Brook-above Bonnie View Spg.	373
D	Bonnie View side ditch[2]	30
E	Pine Hill H_20 Supply (meter)	99
F	Pine Hill H_20 Supply overflow	5
G		
H	Crystal Spring Brook-above Cathedral Glen Brook	558
I	Cathedral Glen Brook-above CSB	1555
J	Black ABS Pipe-above Silo A	9
K	Silo A	113
L	Crystal Spring Brook-below Silo A	2266
M		
N		
O	Silo B	148
P	Station Rd. ditch-above Station Rd. Spg.	85
Q	Station Rd. ditch-below Station Rd. Spg.	280
R	Depot Spring Total[3,4]	213
S	Crystal Spring Brook-below Station Rd. Spg.	2536
T	Bailey Brook-above Crystal Spring Brook[5]	273
U	Crystal Spring Brook-above Birch Creek	2661
V	Birch Creek-above Crystal Spring Brook	4321
W	Birch Creek-below Crystal Spring Brook	6969
X	Wildacres #1 Spring	5
Y	Wildacres #2 Spring	5
Z	Wildacres #3 Spring	10
AA	Davenport Spring	6
BB	Highmount Spring	9
CC	Leach Spring	6
DD	Birch Creek at USGS Big Indian Gauging Station	10688
EE	Esopus Creek at USGS Allaben Gauging Station	54957

Notes:

1 Railroad Spring drains into Cathedral Glen Brook, upstream from its confluence with Crystal Spring Brook.
2 Bonnie View Side Ditch = Water from Bonnie View Spring that does not enter piping to Bonnie View Spring collection system.
3 Depot Spring flow = Station Rd ditch flow below Spring, minus Station Rd. ditch flow above Spring, plus Silo B overflow.
4 Silo B overflow to reservoir disconnected in March 2001. For March 2001 and subsequent dates, total Depot Spring flow = Station Rd Ditch below Spring, minus Station Rd. Ditch above Depot Spring.
5 Bailey Brook = Name given to unnamed stream in Woodchuck Hollow.

Exhibit E

Installation, Development and Testing of Well R2

INSTALLATION, DEVELOPMENT AND TESTING OF WELL R2

Big Indian Plateau
Belleayre Resort at Catskill Park
Pine Hill, New York

Prepared for:

Crossroads Ventures LLC
72 Andrews Lane Road
P.O. Box 267
Mount Tremper, New York 12457

January 2002

ALPHA GEOSCIENCE

ALPHA
GEOSCIENCE
Geology
Hydrology
Remediation
Water Supply

Installation, Development and Testing of Well R2
Big Indian Plateau
Belleayre Resort at Catskill Park
Pine Hill, New York

Prepared for:

Crossroads Ventures LLC
72 Andrews Lane Road
P.O. Box 267
Mount Tremper, New York 12457

Prepared by:

Alpha Geoscience
679 Plank Road
Clifton Park, New York 12065

January 2002

TABLE OF CONTENTS

FIGURES

Table of Contents (cont.)

TABLES

APPENDICES

1.0 INTRODUCTION

1.1 Objective

This report, prepared by Alpha Geoscience (Alpha), presents the results of the installation, development and testing of well R2 for the proposed Belleayre Resort Big Indian Plateau facility. This report was prepared per the request of Crossroads Ventures LLC. All aspects of the distribution, water treatment and pumping systems installation will be addressed under separate cover by Delaware Engineering, Inc. (Delaware), who is providing engineering services for this project.

1.2 Background

Well R2 was installed to provide a primary source of potable water for the Big Indian Plateau facility. Delaware has projected an average daily demand of 64 gallons per minute (gpm) for the facility. Crossroads plans to use well R2 as a permanent source of potable water after obtaining approval from the New York State Department of Health (NYSDOH) and the New York State Department of Environmental Conservation (NYSDEC).

Crossroads' Silo A spring source located on Bonnie View Road, Pine Hill, New York, will provide a backup source of water. A description of the Silo A spring source and a request to use Silo A for potable water supply will be addressed by Alpha under separate cover.

Three wells (R1, R2 and R3) have been installed on Crossroads' property located on Friendship Manor Road, Pine Hill, New York (Figure 1). Wells R2 and R3 were installed during the most recent investigation, and R1 was installed during a previous investigation. The relative locations of the three wells on the property are shown on Figure 2. The approximate distances from well R2 to wells R1 and R3 are 265 feet and 110 feet, respectively. The distance from well R2 to Birch Creek is approximately 70 feet. An Army Corps of Engineers classified wetland is located to the south, west and east of well R2.

Crossroads' personnel provided information on the location of private water supplies and on-site septic systems in this area. All residential or commercial properties that use their own well to provide water are located more than 1,500 feet from well R2, except a single residential well located approximately 500 feet to the north east. Based on local inquiry, there are no known on-site septic systems within 1,500 feet of well R2.

2.0 SCOPE OF WORK

The scope of services provided for the installation, development and testing of well R2 was described in Alpha's September 28, 2001 letter to Mr. Dean Palen of the Ulster County Department of Health (UCDOH). The following tasks were performed as described in the letter.

- Grout a 8-inch diameter casing to a minimum depth of 15 feet into bedrock;
- Install a 7 7/8-inch diameter boring (open hole) through the 8-inch casing and sample the bedrock deposits that were penetrated;
- Describe material encountered in the subsurface; prepare drilling logs to document the subsurface conditions and prepare well completion logs to document well construction;
- Utilize air from the drilling rig to develop the well and to perform blow tests to estimate yield at selected intervals within the borehole;
- Collect and analyze water quality samples during blow testing and well development;
- Perform step rate and constant rate pumping tests to evaluate well yield and the response of the aquifer and wells to pumping;
- Collect water quality samples for analysis by a New York State Department of Health (NYSDOH) approved laboratory for parameters defined in the New York State Sanitary Code - Part 5 for community water systems;

- Analyze the test data and project the potential long term yield and drawdown.

Well R3 was also installed and developed during this investigation. Blow testing results showed that the yield of well R3 was approximately 15 gallons per minute (gpm). Crossroads chose not to perform pumping tests and water quality analysis on well R3 because of its low yield. Wells R1 and R3 were used as monitoring locations during well R2 testing. Crossroads does not plan to use wells R1 and R3 as potable water supply sources at this time.

3.0 METHODS

3.1 Well Completion

3.1.1 Drilling and Well Installation

Drilling activities associated with the installation of wells R2 and R3 began on November 6, 2001. Wells R2 and R3 were installed with an Ingersol Rand, Model T4W air rotary drilling rig owned and operated by Titan Drilling Corporation, of Arkville, New York (Titan). Drilling began with the installation of a 12-inch diameter temporary steel casing in the unconsolidated deposits and advancing a 12-inch diameter boring 15-feet or more into bedrock. An 8-inch diameter, steel casing was installed inside the 12-inch casing and advance into bedrock. The annular space between the 8-inch and 12-inch casing and borehole was filled with neat cement to create a sanitary seal. The neat cement was placed with a tremie pipe from the bottom up, and the temporary 12-inch casing was removed. The neat cement was given 24 hours to cure before drilling activities continued.

Drilling continued into bedrock (open hole) using a 7 7/8-inch diameter pneumatic hammer. The subsurface materials removed from the borehole were collected at approximately 10 foot intervals and described by Alpha personnel. Alpha personnel were on-site to collect and describe bedrock drill cuttings after the 8-inch casings were installed and grouted. The description of subsurface materials included color, texture, composition, the depth that fractures were encountered and water production as determined by blow testing. Descriptions of subsurface materials and well components were documented by preparing drilling and well completion logs, respectively. Drilling and well completion logs are presented in Appendices A and B, respectively.

3.1.2 Blow Testing and Well Development

Blow tests were performed at selected intervals within the borings to estimate yield. Blow testing was performed by circulating air from the drilling rig to displace water from the borehole. The yield measured during blow testing was recorded on the drilling logs (Appendix A). The results of the blow testing were used to determine the final drilling depth.

Wells R2 and R3 were developed to improve the hydraulic connection with the bedrock aquifer. Titan performed well development by circulating air from the drilling rig to displace water and sediment from the well. Well development was performed at depths where water-bearing fractures were encountered during drilling and when the borings were completed.

3.1.3 Well Disinfection

Well R2 was disinfected by Titan and Crossroads personnel by adding chlorine (sodium hypochlorite) to the well. The chlorine was added to the well after Titan installed a temporary submersible pump, monitoring equipment and discharge pipe for the pumping tests.

3.2 Pumping Tests

Step rate and constant rate tests were performed at well R2. The step rate test was conducted to provide a benchmark for future evaluation of well performance in the event of apparent loss of yield and to select a pumping rate for the constant rate test. The constant rate test was performed to evaluate well yield, aquifer response to pumping and water quality. Alpha personnel were on-site to collect data at the beginning of the step rate test and at the beginning and end of the constant rate test. Field data was collected by Titan and Crossroads personnel when Alpha personnel were not on site.

A submersible pump supplied by Titan was used for the step rate and constant rate tests. Water was routed from the well head using 4-inch diameter plastic pipe. A gate valve and pipe orifice system were used to regulate and measure flow rates. The accuracy of the pipe orifice system was checked by measuring the time to fill a 32 gallon drum. The pump discharge was piped to the Birch Creek at a location downstream and approximately 140 feet from well R2.

Titan installed two plastic tubes in the pumping wells to accommodate manual water level measurements and a transducer for automated water level and temperature measurements. Field personnel used an electronic water level meter for the manual measurements and an In-situ data logger and transducer system for automated measurements.

The water levels were also monitored at wells R1, R3 and residential wells during constant rate testing. A residential water supply well (Residential Well 1) is located on the north side of NYS Route 28 and approximately 500 feet northeast of well R2. Two residential wells owned by a Crossroads employee, Residential Well 2 and Residential Well 3, were also monitored. These wells are located approximately 2000 feet east and 2500 feet east, respectively, from well R2. Well R1 is a bedrock well with a total depth of 225 feet. Titan's records show that Residential Well 1 has a total depth of 50 feet and was completed in unconsolidated deposits. Residential Well 2 is reported to be a shallow well with a total depth of approximately 8 feet and is completed in unconsolidated deposits. Residential Well 3 has a reported total depth of approximately 145 feet and is completed in bedrock.

Precipitation measurements were also collected during the constant rate test. An all weather rain gauge was installed at the property where Residential Well 2 is located.

3.2.1 Step Rate Test

The step rate test was performed at well R2 on November 20, 2001. This test involved measuring the water level changes in R2 in response to consecutive pumping rates of approximately 60 gpm, 82 gpm, 106 gpm and 127 to 124 gpm. Graphs of elapsed time and drawdown data, in linear and semi-log format, are presented in Appendix C. Table 1 presents well R2 elapsed time and drawdown data collected during the step rate test with the data logger system.

3.2.2 Constant Rate Test and Recovery

The constant rate test involved pumping the well at an average rate of 82 gpm for 72 hours and 50 minutes, beginning on November 26, 2001 at 9:30 am and ending on November 29, 2001 at 10:20 am. Flow rates measured by field personnel using a 32 gallon drum and stop watch showed that the pumping rate was 83.1 gpm near the beginning of the test and was 80.6 gpm near the end of the test. Graphs of elapsed time and drawdown data for wells R1, R2 and R3 are presented in Appendix D. Water level and water temperature measurements collected in well R2 are presented in Table 2.

Water level monitoring was also performed after the pumping phase of the test to record recovery rates. Water level recovery data collected at well R-2 is presented in Table 3. Graphs of time after pump shut down and residual drawdown for wells R1, R2 and R3 are presented in Appendix E.

3.3 Water Quality Testing

Samples were collected from the pump discharge for field analysis of specific conductance, pH, oxidation/reduction (redox) potential, hardness, temperature and turbidity. Samples were collected from the well discharge to evaluate water quality changes during the test.

Water quality samples were collected on November 29, 2001 for laboratory analysis of parameters defined in New York State's Sanitary Code - Part 5. The samples were collected after approximately 71 hours of pumping. The analyses were conducted by Phoenix Environmental Laboratories, Inc. of Manchester, Connecticut (Phoenix), a NYSDOH - certified laboratory.

3.4 Ground Water/Surface Water Evaluation

Hydraulic connection between well R2, Birch Creek and adjacent wetland areas was evaluated during the constant rate test. The evaluation was based on the comparison of water level and water quality monitoring data. Well Point (WP-1), which has a total depth of 8.5 feet and is located approximately 77 feet north of well R2, was installed to provide a monitoring location in the unconsolidated deposits near Birch Creek. Two stream level monitoring gauges, US-1 and DS-1, were installed on Birch Creek approximately 220 feet northwest and 80 feet north of well R2, respectively. A water level monitoring gauge (P-1) was installed approximately 295 feet east of well R2 at a pond located within a wetland area.

Field water quality data was collected from well R2 and Birch Creek. The water quality data collected included temperature, pH, conductivity, hardness, redox, and turbidity. Temperature data was collected at well R2 using an automated probe installed down the well in a stilling tube. All other well R2 water quality data was collected at the pipe orifice discharge point. All Birch Creek water quality data was collected at a sample point between stream gauges US-1 and DS-1.

4.0 RESULTS

4.1 Borehole Stratigraphy

The drilling contractor generally described two types of unconsolidated deposits at drilling locations R2 and R3 (see drilling logs in Appendix A). The deposits near the surface were coarse-grained and consisted mostly of sand, gravel and cobbles. Fine-grained deposits consisting mostly of clay and sand were encountered below the coarse-grained deposits and on top of bedrock. The surficial deposits are identified as recent deposits consisting of fine sand to gravel that are generally found in flood plain areas (Cadwell et. al, 1986). The total depth of the unconsolidated deposits at the R2 and R3 locations was 38 feet and 57 feet, respectively.

The bedrock encountered at borings R2 and R3 consisted of two rock types, sandstone and shale. The sandstone was generally medium grey and red grey in color. The shale was generally medium grey and red brown in color. The bedrock in this area is identified as part of the Lower Walton Formation that consists of shale, sandstone and conglomerate (Fisher et. al., 1970).

4.2 Aquifer Testing

4.2.1 Conditions

Weather condition prior to and during the constant rate test were drier than normal. The NYSDEC issued a drought watch for southeastern New York, including Ulster County, on November 5, 2001. The NYSDEC reported that the precipitation deficits for the months of October and November was greater than 6-inches for the Catskill Region. A drought warning was declared for Ulster County by the NYSDEC on December 3, 2001. The State drought index for the Catskill Region, which consists of a composite of all hydrological conditions, showed a warning condition was reached by the end of November 2001. Conditions for performing a pumping test were good because it provided an opportunity to evaluate well performance during dry conditions with limited recharge from precipitation.

4.2.2 Step Rate Test

The results of the step rate test (Table 1 and Appendix C) show that well R2 was able to sustain pumping rates as high as 124 gpm for 100 minutes. A total drawdown of 171.536 feet was measured at the end of the step test. There was approximately 56 feet of available drawdown at the end of pumping based on a pump setting of 252 feet below grade. The data collected during step rate testing were analyzed to select a pumping rate for the constant rate test. The analysis included drawing a best fit line to the time and drawdown data set for each step using a semi-log graph. The best fit line was extrapolated beyond the test period of each step. The extrapolated best fit line was then used to project the drawdown that would occur if the pumping continued for a period of 3 days with no recharge and no hydrogeologic boundaries intercepted. This analysis showed that this well could potentially sustain a rate of at least 82 gpm during a 3 day test without dropping the water level below the top of the pump.

4.2.3 Pretest Data Analysis

Data collected prior to the constant rate test was used to evaluate pretest water level trends and the potential influence of precipitation and barometric pressure. The pretest data were analyzed to evaluate if the constant rate data set should be corrected for antecedent or background trends before analysis. The graph in Appendix F presents water level and barometric pressure data collected prior to the constant rate test. This data was collected with automated equipment including In-situ water level and barometric pressure data loggers.

The data show that the water level in well R2 was relatively stable before pumping began. Water levels declined 0.028 feet in the 4 hour period from 3:55 to 7:55 am November 26, 2001.

Comparison of the pretest water level and barometric pressure data shows that these data sets did not consistently follow the same trend during this period. It is possible that barometric pressure does influence the well R2 water level, but the hydraulic influence of other factors are masking its effect during this pretest period. The evaluation of the pretest data did not show trends that would require that the constant rate test data be corrected prior to analysis.

4.2.4 Constant Rate Test

A total drawdown of 108.979 feet was measured at well R2 during the constant rate test. There was approximately 119 feet of available drawdown at the end of the test based on a pump setting of 252 feet below grade. The semi-log graph (Appendix D) shows that the drawdown data for well R2 falls on a straight line for the final 2,800 minutes of pumping. The drawdown produced by pumping well R2 beyond 72 hours is expected to fall on an extrapolation of this straight line unless the bedrock aquifer receives recharge or a hydrogeologic (aquifer) boundary is encountered.

The total drawdown measured at wells R1 and R3 was 36.369 feet and 40.462 feet, respectively. The semi-log graphs (Appendix D) show that the water levels in wells R1 and R3 followed a straight line starting at approximately 400 minutes after pumping began. The drawdown at wells R1 and R3 from pumping well R2 beyond 72 hours is expected to follow an extrapolation of straight line in the semi-log graphs. The amount of drawdown at these wells will be affected by recharge and can be affected by hydrogeologic boundary(s), if present.

The water level data collected at Residential Well 1 are presented in Table 4. The water level in this well declined a total of 1.61 feet during the constant rate test. Water levels in this well declined from November 26 to 29, 2001 then rose on November 30, 2001, mostly likely in response to precipitation or a reduction in water usage by the owners. Rainfall measurements using a rain gauge showed that the area did not receive any rainfall from the beginning of pumping through November 28, 2001. A total of 0.13 inches of rainfall was measured at 9:00 am on November 29, 2001. A total of 0.04

inches of rainfall was measured at 9:00 am on November 30, 2001 and 0.73 inches at 10:00 am on December 1, 2001. The decline in water level during the constant rate test is most likely attributed to dry conditions and/or water use by the owners. Measurements collected on November 27, 28, and 29 showed that there was little or no change in water level between the 9:00 and 16:00 readings. These water level readings indicate that Residential Well 1 is not hydraulically influenced by pumping at R2. The influence of well R2 pumping would be expected to produce a consistent decline in water level within the residential well.

Water level data collected at Residential wells 2 and 3 are presented in Tables 5 and 6, respectively. The water level data show that these wells were also not hydraulically influenced by well R2 pumping. The water level in Residential well 2 declined 0.13 feet during the pumping period of the test. This small change in water level is consistent with a response to dry conditions with little or no recharge. Data collected on November 30, 2001 and December 1, 2001 show that water level rose in well 2, most likely in response to recharge by precipitation. The artesian conditions at Residential well 3 consistently produced flowing water through a well overflow pipe. The rate of overflow, estimated visually, was consistent throughout the test pumping and recovery periods.

4.2.5 Recovery

Water level recovery was monitored in wells R1, R2 and R3 after the cessation of pumping on November 29, 2001. Recovery to 87% of pretest water levels was measured at well R2 approximately 1300 minutes after pumping stopped. Recovery to 87% of pretest water levels was measure at wells R1 and R3 approximately 3775 minutes and 4040 minutes, respectively, after shutting off the pump.

The data for wells R1, R2 and R3 show that water levels experienced significant rebound, but did not return to pretest levels in three days of recovery monitoring. The recovery data show that the bedrock aquifer will require recharge to sustain a 82 gpm pumping rate over extended pumping periods. Recharge to bedrock aquifers, as with all ground water sources, is necessary to maintain water levels. Less recharge will be necessary to sustain the 64 gpm rate proposed for the facility.

4.3 Water Quality

Review of the field water quality data for well R2 (Table 7) shows that most field parameters were relatively stable throughout the pumping period. Conductivity values did increase during the first two days of pumping then were stable on the final day. Turbidity levels generally decreased during the test with the highest turbidity value recorded on the first day of pumping and the lowest value recorded on the final day. A sulfur odor was detected at the well R2 discharge by field personnel. The sulfur odor persisted throughout the test with no variation in strength based on olfactory observations. The presence of sulfur at low levels in the water may require treatment to address taste and odor; however, it does not preclude use as a potable supply.

The results of the laboratory analysis (Appendix G) show that none of the NYSDOH Part 5 maximum contaminant levels (MCLs) were exceeded. Sodium was detected at a concentration of 47.1 milligrams per liter (mg/l); however, there is no established MCL for sodium. NYSDOH - Part 5 (1998) states that water containing more than 20 mg/l of sodium should not be used for drinking by people on severely restricted sodium diets. The laboratory reported value for the Langelier index was -0.52, which shows that the water has moderately aggressive corrosive characteristics. Corrosive water may require treatment for buffering; however, it does not preclude use as a potable water supply.

4.4 Ground Water/ Surface Water Evaluation

Water level data collected at well point WP-1, stream gauges US-1 and DS-1, and pond gauge P-1 during the constant rate test are presented in Tables 8, 9, 10 and 11, respectively. Field water quality data collected at well R2 and Birch Creek are presented in Tables 7 and 12, respectively.

The water level and water quality data collected during the constant rate test show that pumping at well R2 did not impact Birch Creek or the wetland pond. Water levels at WP-1 declined a total of 0.08 feet during the pumping of well R2. This decline at WP-1 is attributed to the dry conditions that existed during the pumping portion of the test. The rise in water level recorded after pump shut down is attributed to rainfall that the site received during the recovery portion of the test. Water levels at stream gauges US-1 and DS-1 showed little or no change with levels dropping only 0.01 feet and 0.0 feet, respectively, during the pumping portion of the test. Water levels rose in these gauges to above pre-pumping levels on December 1, 2001 as a result of precipitation. The water levels measured at pond gauge P-1 rose throughout the pumping portion of the test.

Comparison of pretest water levels at Birch Creek, well point 1 and wells R1, R2 and R3 were also used to assess hydraulic connection. The pretest water level elevations in these wells was more than 15 feet below the water level elevation in Birch Creek and Well Point WP-1. Similar pretest water level elevations at the wells, well point and Birch Creek would be expected if the bedrock aquifer and Birch Creek were hydraulically connected. The comparison of field water quality data showed that the quality of water at well R2 and Birch Creek was distinctly different throughout the test. This difference is illustrated by the measured values of pH, conductivity and temperature, which were significantly different at the start of the test and throughout pumping. Comparison of pH values shows that the pH of Birch Creek and well R2 throughout the test were 7.0 and 8.2, respectively. Conductivity values measured at well R2 were consistently higher than Birch Creek conductivity values. Conductivity values measured at well R2 and Birch Creek prior to shut down on November 29, 2001 were 384 us and 112.3 us, respectively. Temperature values measured at well R2 were consistently higher than those measured in Birch Creek. Temperature values measured at well R2 and Birch Creek on November 29, 2001, near the time of pump shut down, were 8.9 °C and 7.0 °C, respectively.

The site hydrogeologic data provides an explanation of why well R2 and Birch Creek did not show any sign of hydraulic connection during testing. The description of the unconsolidated deposits encountered during drilling identifies fine-grained, clay and sand material on top of bedrock. The presence of this fine-grained deposit beneath Birch Creek limits the hydraulic connection with the underlying bedrock aquifer. It is also apparent that all of the water-bearing fractures encountered in the bedrock during drilling were found at depths of 182 feet or more below the surface. The location of these fractures show that the water bearing zone in the bedrock aquifer are separated from Birch Creek by several feet of bedrock with little or no water-bearing potential.

4.5 Long Term Drawdown and Yield Projection

Data collected during the constant rate test were used to project long term drawdown and yield. The semi-log graph of well R2 elapsed time and drawdown data were used for the projection. The analysis included drawing a best fit line to the data collected during the final 548 minutes of pumping. The best fit line was extrapolated and used to project drawdown as a result of pumping well R2 for 180 days at a rate of approximately 82 gpm. The semi-log graph presenting the long term projection is found in Appendix H. A total drawdown of 195 feet was projected at well R2. There will be approximately 33 feet of available drawdown at the end of the 180 day pumping period assuming a pump setting of 252 feet.

The projection of drawdown at a rate of approximately 82 gpm is based on the assumptions that the bedrock aquifer receives no recharge from precipitation or snow melt and that no hydrogeologic (aquifer) boundaries are encountered. The assumption of no recharge is conservative, since the bedrock aquifer system is expected to receive some recharge from precipitation within a six month period. A negative boundary, such as when drawdown from pumping reaches the edge or outer limit of the bedrock aquifer, is a less conservative assumption that can occur in settings similar to the R2 site area. If a negative boundary is encountered, then well R2 can be expected to drawdown at a greater rate. If future pumping occurs during drier conditions than those experienced prior to and during the constant rate test, well R2 can also be expected to drawdown at a greater rate. The actual amount of drawdown from the long term operation of well R2 is expected to be significantly less than the drawdown projected herein. Long term pumping of well R2 at the average daily demand of 64 gpm is expected to produce significantly less drawdown than the 82 gpm pumping rate used in this projection.

5.0 SUMMARY AND CONCLUSIONS

- Well R2 was installed to a total depth of 274 feet and both shale and sandstone were encountered during drilling.
- Water-bearing fractures were found in the shale and sandstone below 180 feet. A blow yield test performed at 274 feet yielded a total of 107 gpm.
- A step rate pumping test performed at well R2 showed that the well is capable of a short term yield of 124 gpm.
- A 72.8 hour constant rate test was performed at well R2 at a pumping rate of approximately 82 gpm. Total drawdowns of 36.369 feet, 108.979 feet and 40.462 feet were measured at wells R1, R2 and R3, respectively.
- Water levels in wells R1, R2 and R3 declined throughout the constant rate test. Drawdown data for each of these wells followed a straight line trend on the semi-log graphs for most of the pumping period.
- There was approximately 119 feet of available drawdown at well R2 at the end of the constant rate test.
- The results of the well R2 laboratory water quality analyses show that none of the NYSDOH - Part 5 MCLs were exceeded.
- A sulfur odor was detected at the point of discharge throughout the step rate and constant rate test. The presence of low levels of sulfur in the water may require treatment for taste and odor; however it does preclude use as a potable water supply.
- Evaluation of site hydrogeologic conditions, water level and field water quality data showed that well R2 is not hydraulically connected to Birch Creek or the wetland pond.

- Water level in well R2 recovered to 87% of pretest water levels approximately 1300 minutes after pump shut down. Water levels in wells R1 and R3 recovered to within 87% of pretest water levels in approximately 3775 minutes and 4040 minutes after shut down, respectively. The measured water level recovery shows the effect of drought conditions and the lack of recharge. Water levels will recover faster during recharge events and normal (non-drought) conditions.
- A projection based on 180 days of continuous pumping of well R2 at 82 gpm, without the positive effects of recharge or negative effects of a limited aquifer, produced a total drawdown of 195 feet. This projection indicated that at the end of the 180 day pumping period there will be approximately 33 feet of available drawdown at well R2.
- Long term pumping of well R2 at the average daily demand of 64 gpm is expected to produce significantly less drawdown than the 180 day projection at 82 gpm shown in this report.
- The review and analysis of data collected during the constant rate test shows that well R2 is able to sustain a long term, continuous pumping rate of 82 gpm. The ability of well R2 to sustain a pumping rate of 82 gpm will depend on the availability of recharge, as with all ground water resources, and hydrogeologic boundaries. The amount of recharge necessary to sustain the proposed facility demand of 64 gpm will be less than the 82 gpm projection.

F:\projects\2001\01121-01140\01135-Belleayre Well\Rosenthal\Well R2 report.wpd

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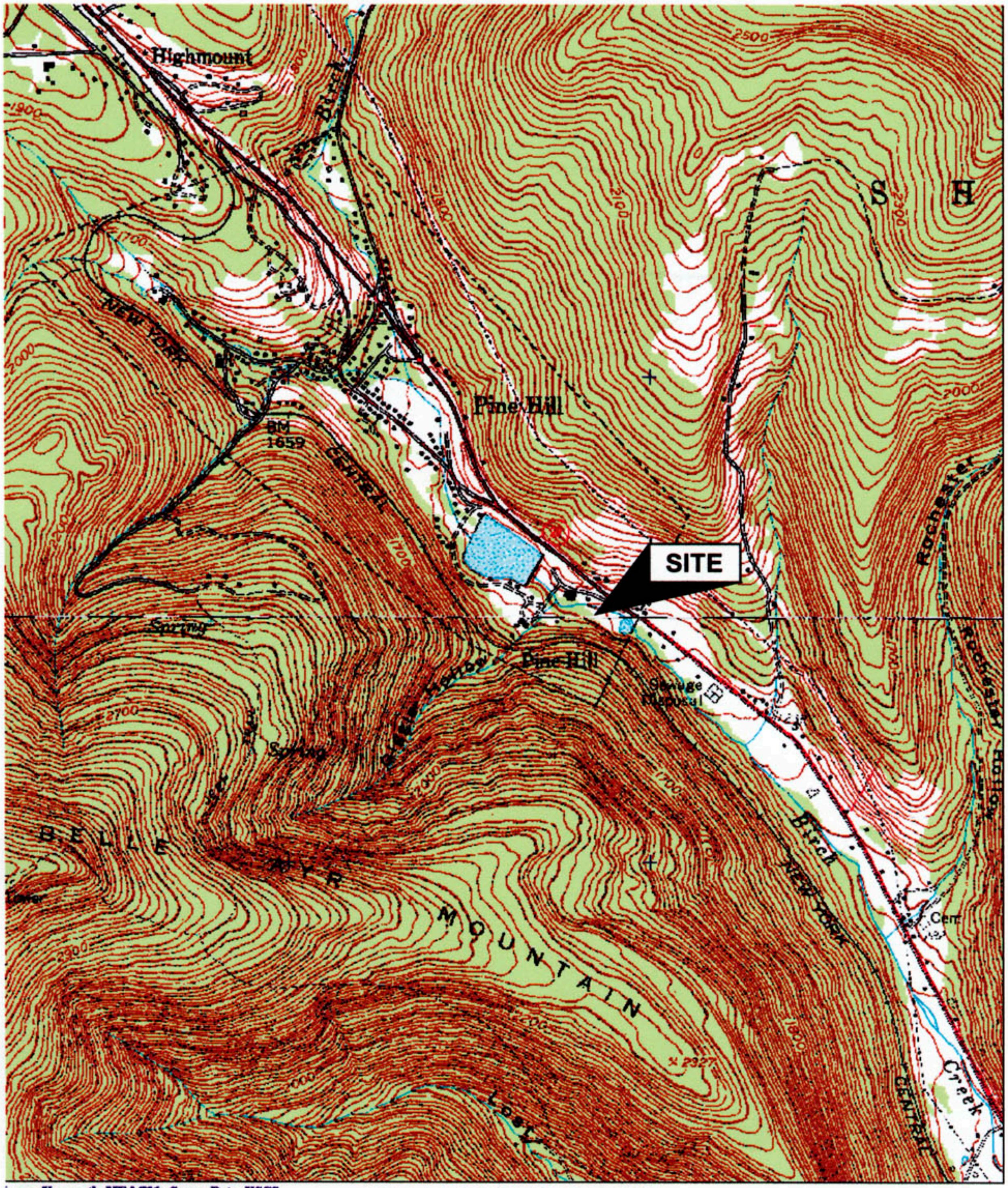
New York State Sanitary Code (1998), Subpart 5-1, Public Water Systems

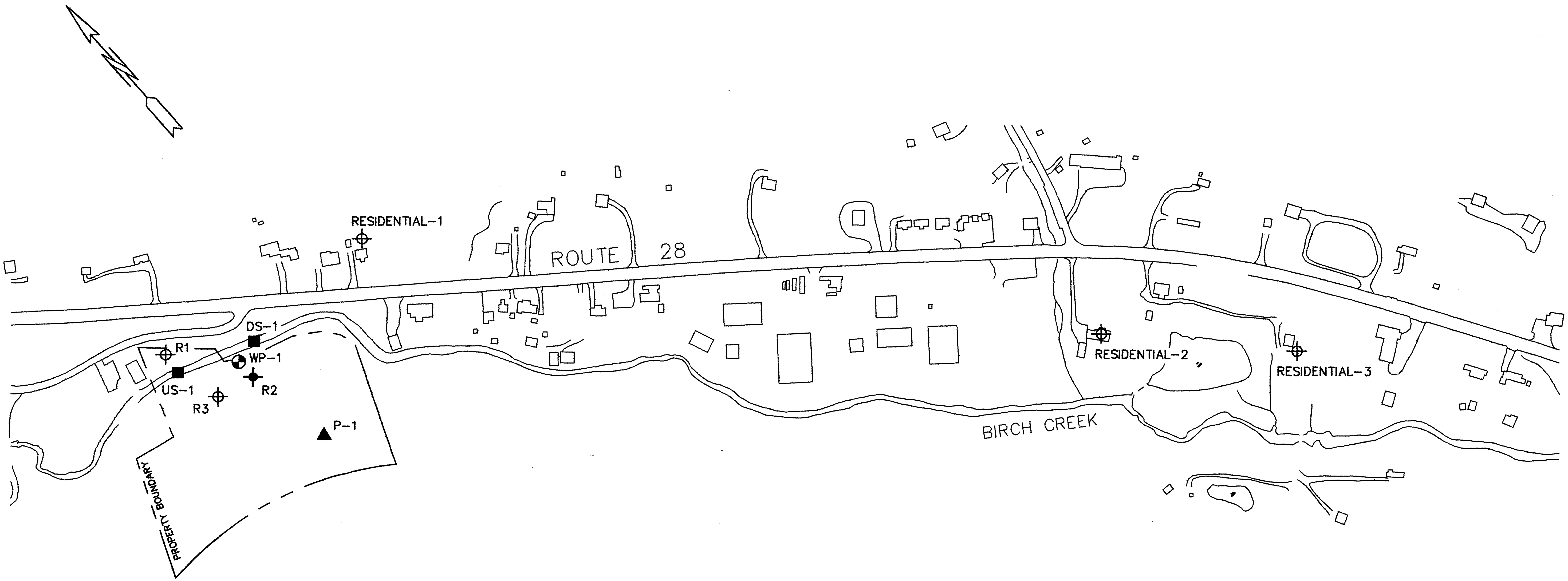
FIGURES



Lorme Yarmouth, ME 04096 Source Data: USGS

693 ft Scale: 1 : 24,000 Detail: 13-1 Datum: WGS84

West Kill and Shandaken Quadrangle New York State Department of Transportation 7.5 Minute Series	ALPHA GEOSCIENCE **FIGURE 1** **SITE LOCATION MAP** **Well R2 Installation and Testing** **Crossroads Ventures LLC** **Alpha Project No. 01135**



LEGEND

- PUMPING WELL R2 LOCATION
- OBSERVATION WELL LOCATION
- STREAM GAUGE LOCATION
- WELL POINT LOCATION
- POND GAUGE LOCATION

0 300 600

SCALE IN FEET

ALPHA GEOSCIENCE

FIGURE 2

WELL, WELL POINT, & GAUGE LOCATIONS

WELL R2 INSTALLATION & TESTING

CROSSROADS VENTURES LLC

ALPHA PROJECT NO. 01135

BELLE-R2-2.DWG

TABLES

TABLE 1
CROSSROADS VENTURES LLC
Step Rate Test at Well R2
Well R2 Data

Elapsed Time (minutes)	Drawdown (feet)	Remarks	Elapsed Time (minutes)	Drawdown (feet)	Remarks
0.07	0.201	Step 1, average pumping rate = 66 gpm	0.7813	13.198	
0.075	0.407		0.828	13.752	
0.08	0.623		0.8763	14.411	
0.0848	0.762		0.928	15.037	
0.09	0.912		0.983	15.691	
0.095	1.028		1.0413	16.366	
0.1	1.106		1.103	17.036	
0.1058	1.184		1.168	17.679	
0.112	1.311		1.238	18.365	
0.1185	1.422		1.3113	19.035	
0.1255	1.517		1.3897	19.711	
0.1328	1.639		1.473	20.42	
0.1407	1.761		1.5613	21.106	
0.149	1.878		1.6547	21.871	
0.1578	2.016		1.753	22.59	
0.167	2.168		1.858	23.355	
0.177	2.356		1.968	24.103	
0.1875	2.512		2.0847	24.878	
0.1985	2.739		2.2097	25.637	
0.2102	3.011		2.3412	26.396	
0.2227	3.282		2.4813	27.105	
0.2358	3.482		2.6297	27.87	
0.2498	3.764		2.7863	28.584	
0.2647	4.153		2.953	29.299	
0.2803	4.397		3.1297	29.941	
0.297	4.808		3.3163	30.606	
0.3147	5.185		3.5147	31.249	
0.3333	5.562		3.7247	31.864	
0.3532	5.917		3.9463	32.451	
0.3742	6.444		4.1813	33.011	
0.3963	6.815		4.4295	33.56	
0.4198	7.292		4.693	34.069	
0.4447	7.78		4.973	34.679	
0.4697	8.246		5.2697	35.483	
0.4963	8.722		5.583	36.203	
0.5247	9.215		5.9147	36.913	
0.5547	9.758		6.2663	37.267	
0.5863	10.251		6.6397	37.45	
0.6213	10.822		7.0347	37.677	
0.6578	11.398		7.453	37.954	
0.6963	11.986		7.8963	38.559	
0.738	12.595		8.3663	39.152	

Elapsed Time (minutes)	Drawdown (feet)	Remarks	Elapsed Time (minutes)	Drawdown (feet)	Remarks
8.8647	39.634		52.7763	46.42	
9.3913	40.067		53.7763	46.47	
9.9497	40.421		54.7763	46.543	
10.5413	40.687		55.7763	46.559	
11.168	41.236		56.7763	46.615	
11.8313	41.696		57.7763	46.659	
12.5347	42.001		58.7763	46.715	
13.2797	42.306		59.7763	46.748	
14.0697	42.545		60.7763	46.809	
14.9063	42.838		61.7763	46.837	
15.7913	43.054		62.7763	46.881	
16.7297	43.282		63.7763	46.914	
17.723	43.481		64.7763	46.986	
18.7763	43.664		65.7763	47.02	
19.7763	43.842		66.7763	47.059	
20.7763	43.975		67.7763	47.142	
21.7763	44.13		68.7763	47.142	
22.7763	44.279		69.7763	47.186	
23.7763	44.357		70.7763	47.247	
24.7763	44.507		71.7763	47.264	
25.7763	44.612		72.7763	47.292	
26.7763	44.718		73.7763	47.353	
27.7763	44.812		74.7763	47.358	
28.7763	44.912		75.7763	47.408	
29.7763	44.979		76.7763	47.464	
30.7763	45.073		77.7763	47.464	
31.7763	45.162		78.7763	47.525	
32.7763	45.25		79.7763	47.569	
33.7763	45.344		80.7763	47.58	
34.7763	45.428		81.7763	47.636	
35.7763	45.511		82.7763	47.652	
36.7763	45.589		83.7763	47.674	
37.7763	45.639		84.7763	47.719	
38.7763	45.728		85.7763	47.746	
39.7763	45.794		86.7763	47.78	
40.7763	45.85		87.7763	47.78	
41.7763	45.933		88.7763	47.824	
42.7763	45.96		89.7763	47.73	
43.7763	46.049		90.7763	47.619	
44.7763	46.066		91.7763	47.508	
45.7763	46.132		92.7763	47.425	
46.7763	46.199		93.7763	47.336	
47.7763	46.204		94.7763	47.281	
48.7763	46.254		95.7763	47.27	
49.7763	46.282		96.7763	47.292	
50.7763	46.337		97.7763	47.292	
51.7763	46.376		98.7763	47.314	

Elapsed Time (minutes)	Drawdown (feet)	Remarks	Elapsed Time (minutes)	Drawdown (feet)	Remarks
99.7763	47.331		146.7763	73.671	
100.7763	51.953	Step 2, begins at	147.7763	73.732	
101.7763	57.604	100 minutes	148.7763	73.667	
102.7763	61.294	average	149.7763	73.672	
103.7763	63.764	pumping rate=	150.7763	73.866	
104.7763	65.403	82 gpm	151.7763	74.004	
105.7763	66.982		152.7763	74.104	
106.7763	68.023		153.7763	74.237	
107.7763	68.754		154.7763	74.381	
108.7763	69.297		155.7763	74.586	
109.7763	69.707		156.7763	74.735	
110.7763	70		157.7763	74.829	
111.7763	70.333		158.7763	74.946	
112.7763	70.443		159.7763	75.018	
113.7763	70.582		160.7763	75.068	
114.7763	70.659		161.7763	75.14	
115.7763	71.058		162.7763	75.228	
116.7763	71.517		163.7763	75.25	
117.7763	71.921		164.7763	75.328	
118.7763	71.794		165.7763	75.322	
119.7763	71.877		166.7763	75.4	
120.7763	71.966		167.7763	75.488	
121.7763	71.977		168.7763	75.527	
122.7763	71.955		169.7763	75.522	
123.7763	71.932		170.7763	75.61	
124.7763	71.955		171.7763	75.655	
125.7763	72.254		172.7763	75.682	
126.7763	72.697		173.7763	75.693	
127.7763	72.94		174.7763	75.765	
128.7763	73.107		175.7763	75.837	
129.7763	73.212		176.7763	75.848	
130.7763	73.235		177.7763	75.915	
131.7763	73.317		178.7763	75.981	
132.7763	73.417		179.7763	76.003	
133.7763	73.356		180.7763	76.037	
134.7763	73.372		181.7763	76.086	
135.7763	73.439		182.7763	76.086	
136.7763	73.466		183.7763	76.142	
137.7763	73.417		184.7763	76.153	
138.7763	73.334		185.7763	76.203	
139.7763	73.428		186.7763	76.247	
140.7763	73.473		187.7763	76.269	
141.7763	73.527		188.7763	76.33	
142.7763	73.599		189.7763	76.363	
143.7763	73.599		190.7763	76.457	
144.7763	73.638		191.7763	76.446	
145.7763	73.672		192.7763	76.491	

Elapsed Time (minutes)	Drawdown (feet)	Remarks	Elapsed Time (minutes)	Drawdown (feet)	Remarks
193.7763	76.54		241.7763	112.147	
194.7763	76.568		242.7763	112.274	
195.7763	76.596		243.7763	112.363	
196.7763	76.657		244.7763	112.418	
197.7763	76.679		245.7763	112.34	
198.7763	76.723		246.7763	112.174	
199.7763	76.712		247.7763	112.263	
200.7763	82.199	Step 3, begins	248.7763	112.368	
201.7763	88.083	at 200 minutes	249.7763	112.462	
202.7763	92.035	average	250.7763	112.976	
203.7763	95.283	pumping rate=	251.7763	113.303	
204.7763	97.901	106 gpm	252.7763	113.546	
205.7763	99.854		253.7763	113.707	
206.7763	101.22		254.7763	113.828	
207.7763	102.321		255.7763	113.878	
208.7763	103.201		256.7763	113.911	
209.7763	104.069		257.7763	113.972	
210.7763	104.711		258.7763	113.967	
211.7763	105.137		259.7763	113.939	
212.7763	105.541		260.7763	113.85	
213.7763	106.04		261.7763	113.911	
214.7763	106.388		262.7763	114.044	
215.7763	106.504		263.7763	113.767	
216.7763	106.515		264.7763	113.585	
217.7763	107.074		265.7763	113.436	
218.7763	107.605		266.7763	113.369	
219.7763	108.037		267.7763	113.353	
220.7763	108.313		268.7763	113.325	
221.7763	108.601		269.7763	113.342	
222.7763	108.8		270.7763	113.397	
223.7763	108.911		271.7763	113.458	
224.7763	109.032		272.7763	113.972	
225.7763	109.176		273.7763	114.387	
226.7763	109.696		274.7763	114.68	
227.7763	110.078		275.7763	114.852	
228.7763	110.344		276.7763	115.04	
229.7763	110.548		277.7763	115.167	
230.7763	110.714		278.7763	115.194	
231.7763	110.847		279.7763	115.338	
232.7763	110.952		280.7763	115.382	
233.7763	111.068		281.7763	115.427	
234.7763	111.168		282.7763	115.515	
235.7763	111.267		283.7763	115.609	
236.7763	111.428		284.7763	115.742	
237.7763	111.616		285.7763	115.792	
238.7763	111.804		286.7763	115.897	
239.7763	111.937		287.7763	115.98	
240.7763	112.042		288.7763	116.052	

Elapsed Time (minutes)	Drawdown (feet)	Remarks	Elapsed Time (minutes)	Drawdown (feet)	Remarks
289.7763	116.124		336.7763	171.409	
290.7763	116.218		337.7763	171.392	
291.7763	116.273		338.7763	171.425	
292.7763	116.317		339.7763	171.365	
293.7763	116.317		340.7763	171.464	
294.7763	116.345		341.7763	171.453	
295.7763	116.439		342.7763	171.492	
296.7763	116.466		343.7763	171.536	
297.7763	116.549				
298.7763	116.566				
299.7763	116.616				
300.7763	116.677	Step 4, begins at			
301.7763	125.746	300 minutes			
302.7763	135.016	rate= 127 to 124 gpm			
303.7763	141.604				
304.7763	145.434				
305.7763	148.993				
306.7763	153.572				
307.7763	157.384				
308.7763	160.163				
309.7763	162.135				
310.7763	163.554				
311.7763	164.863				
312.7763	165.929				
313.7763	166.818				
314.7763	167.602				
315.7763	168.248				
316.7763	168.795				
317.7763	169.347				
318.7763	169.839				
319.7763	170.198				
320.7763	170.601				
321.7763	170.96				
322.7763	171.176				
323.7763	171.408				
324.7763	171.375				
325.7763	171.297				
326.7763	171.336				
327.7763	171.541				
328.7763	171.292				
329.7763	171.127				
330.7763	171.298				
331.7763	171.331				
332.7763	171.237				
333.7763	171.397				
334.7763	171.47				
335.7763	171.481				

TABLE 2
CROSSROADS VENTURES LLC
Constant Rate Test at Well R2
Well R2 Data

Elapsed Time (minutes)	Drawdown (feet)	Temperature (° Fahrenheit)	Elapsed Time (minutes)	Drawdown (feet)	Temperature (° Fahrenheit)
0.055	0.262	48.24	0.6578	16.116	48.06
0.06	3.376	48.24	0.6963	16.782	48.06
0.065	3.559	48.24	0.738	17.397	48.06
0.07	3.382	48.24	0.7813	18.584	48.03
0.075	3.104	48.24	0.828	19.011	48.03
0.08	3.076	48.24	0.8763	20.292	48.03
0.0848	3.038	48.24	0.928	21.185	48.01
0.09	2.999	48.24	0.983	22.255	48.01
0.095	2.938	48.24	1.0413	23.254	48.01
0.1	2.843	48.24	1.103	24.29	47.99
0.1058	2.838	48.24	1.168	25.133	47.99
0.112	2.849	48.24	1.238	26.209	47.99
0.1185	2.833	48.26	1.3113	27.073	47.96
0.1255	2.872	48.26	1.3897	27.961	47.96
0.1328	2.972	48.26	1.473	28.958	47.94
0.1407	3.083	48.26	1.5613	30.106	47.94
0.149	3.244	48.26	1.6547	31.276	47.94
0.1578	3.505	48.26	1.753	32.39	47.92
0.167	3.772	48.12	1.858	33.46	47.92
0.177	4.016	48.12	1.968	34.529	47.9
0.1875	4.299	48.12	2.0847	35.638	47.9
0.1985	4.599	48.12	2.2097	36.841	47.9
0.2102	4.91	48.12	2.3412	37.573	47.87
0.2227	5.236	48.1	2.4813	37.961	47.87
0.2358	5.525	48.1	2.6297	38.647	47.85
0.2498	5.947	48.1	2.7863	39.917	47.85
0.2647	6.163	48.1	2.953	41.053	47.85
0.2803	7.634	48.1	3.1297	42.1	47.83
0.297	7.101	48.1	3.3163	42.982	47.83
0.3147	7.401	48.1	3.5147	44.09	47.8
0.3333	8.089	48.1	3.7247	45.32	47.8
0.3532	8.61	48.1	3.9463	46.517	47.8
0.3742	9.203	48.08	4.1813	47.575	47.78
0.3963	9.769	48.08	4.4295	48.733	47.78
0.4198	10.363	48.08	4.693	49.791	47.76
0.4447	11.034	48.08	4.973	50.916	47.76
0.4697	11.639	48.08	5.2697	51.996	47.74
0.4963	12.338	48.08	5.583	52.983	47.74
0.5247	13.137	48.08	5.9147	53.908	47.74
0.5547	13.908	48.08	6.2663	54.711	47.71
0.5863	14.612	48.06	6.6397	55.73	47.71
0.6213	15.633	48.06	7.0347	56.916	47.71

Elapsed Time (minutes)	Drawdown (feet)	Temperature (° Fahrenheit)	Elapsed Time (minutes)	Drawdown (feet)	Temperature (° Fahrenheit)
7.453	57.608	47.69	112.1197	74.928	48.01
7.8963	58.4	47.69	118.768	75.233	48.03
8.3663	59.043	47.69	125.8097	75.515	48.03
8.8647	59.73	47.69	133.268	76.079	48.01
9.3913	60.506	47.69	141.168	76.49	48.03
9.9497	61.292	47.69	149.5363	76.817	48.03
10.5413	61.924	47.69	158.4013	77.16	48.03
11.168	62.511	47.69	167.7913	77.658	48.03
11.8313	62.999	47.69	177.738	77.968	48.03
12.5347	63.458	47.69	188.2747	77.935	48.03
13.2797	63.897	47.71	198.2747	79.092	48.03
14.0697	64.212	47.71	208.2747	79.33	48.03
14.9063	64.534	47.71	218.2747	79.629	48.03
15.7913	64.739	47.74	228.2747	79.834	48.03
16.7297	65.155	47.74	238.2747	80.117	48.03
17.723	65.603	47.74	248.2747	77.427	48.08
18.7763	65.925	47.76	258.2747	81.009	48.06
19.8913	66.169	47.76	268.2747	79.17	48.06
21.073	66.469	47.78	278.2747	81.579	48.06
22.3247	66.707	47.78	288.2747	81.739	48.03
23.6497	66.941	47.8	298.2747	81.955	48.03
25.0547	67.129	47.8	308.2747	82.299	48.06
26.543	67.429	47.83	318.2747	82.686	48.03
28.118	67.667	47.83	328.2747	83.007	48.03
29.7863	67.95	47.85	338.2747	82.271	48.06
31.5547	68.266	47.85	348.2747	84.054	48.06
33.428	68.449	47.87	358.2747	84.258	48.06
35.4112	69.092	47.87	368.2747	84.308	48.06
37.513	69.48	47.9	378.2747	84.574	48.06
39.7397	69.724	47.9	388.2747	84.905	48.03
42.098	70.051	47.92	398.2747	85.139	48.06
44.5963	70.14	47.92	408.2747	87.06	48.06
47.243	70.406	47.94	418.2747	87.652	48.06
50.0463	70.65	47.94	428.2747	85.157	48.1
53.0147	70.462	47.94	438.2747	84.813	48.08
56.1597	70.734	47.96	448.2747	85.039	48.06
59.4913	71.238	47.96	458.2747	85.255	48.06
63.0197	71.781	47.99	468.2747	85.427	48.06
66.758	72.152	47.99	478.2747	85.476	48.06
70.718	72.485	47.99	488.2747	81.061	48.12
74.9113	72.784	47.99	498.2747	80.811	48.1
79.3547	73.077	47.99	508.2747	81.84	48.08
84.0613	73.432	48.01	518.2747	85.266	48.06
89.0463	73.842	48.01	528.2747	86.196	48.06
94.3263	74.025	48.01	538.2747	86.373	48.06
99.9197	74.28	48.01	548.2747	85.958	48.06
105.8447	74.667	48.01	558.2747	85.781	48.06

Elapsed Time (minutes)	Drawdown (feet)	Temperature (° Fahrenheit)	Elapsed Time (minutes)	Drawdown (feet)	Temperature (° Fahrenheit)
568.2747	85.654	48.06	1038.2747	91.416	48.06
578.2747	85.554	48.06	1048.2747	91.51	48.06
588.2747	85.725	48.06	1058.2747	91.25	48.08
598.2747	85.892	48.06	1068.2747	91.344	48.08
608.2747	86.041	48.06	1078.2747	95.008	48.08
618.2747	86.19	48.06	1088.2747	98.732	48.06
628.2747	86.362	48.06	1098.2747	97.631	48.06
638.2747	86.611	48.06	1108.2747	96.972	48.06
648.2747	86.75	48.06	1118.2747	95.612	48.08
658.2747	86.329	48.06	1128.2747	93.51	48.12
668.2747	86.047	48.06	1138.2747	93.371	48.1
678.2747	86.119	48.06	1148.2747	93.586	48.08
688.2747	86.246	48.06	1158.2747	93.52	48.08
698.2747	87.453	48.06	1168.2747	93.569	48.08
708.2747	87.663	48.06	1178.2747	93.602	48.06
718.2747	87.707	48.06	1188.2747	93.563	48.06
728.2747	87.713	48.06	1198.2747	93.625	48.08
738.2747	87.757	48.06	1208.2747	93.685	48.06
748.2747	87.934	48.06	1218.2747	93.696	48.06
758.2747	88.039	48.06	1228.2747	93.801	48.06
768.2747	88.061	48.06	1238.2747	93.862	48.06
778.2747	88.017	48.06	1248.2747	93.857	48.06
788.2747	88.233	48.06	1258.2747	93.951	48.06
798.2747	88.333	48.06	1268.2747	93.823	48.06
808.2747	88.432	48.06	1278.2747	93.663	48.08
818.2747	88.764	48.06	1288.2747	95.683	48.06
828.2747	88.853	48.06	1298.2747	95.074	48.06
838.2747	88.953	48.08	1308.2747	97.111	48.06
848.2747	89.025	48.06	1318.2747	96.878	48.06
858.2747	89.025	48.06	1328.2747	97.592	48.06
868.2747	89.152	48.06	1338.2747	97.598	48.06
878.2747	89.628	48.06	1348.2747	97.625	48.06
888.2747	89.805	48.06	1358.2747	97.603	48.06
898.2747	89.849	48.06	1368.2747	97.642	48.06
908.2747	89.994	48.08	1378.2747	97.675	48.06
918.2747	90.132	48.06	1388.2747	97.708	48.06
928.2747	89.816	48.06	1398.2747	97.669	48.06
938.2747	90.408	48.06	1408.2747	97.582	48.08
948.2747	90.436	48.06	1418.2747	97.609	48.06
958.2747	90.514	48.06	1428.2747	97.636	48.06
968.2747	90.436	48.06	1438.2747	97.747	48.06
978.2747	90.564	48.08	1448.2747	97.786	48.06
988.2747	90.642	48.08	1458.2747	97.836	48.06
998.2747	90.956	48.06	1468.2747	97.88	48.06
1008.2747	91.133	48.06	1478.2747	97.908	48.08
1018.2747	91.25	48.06	1488.2747	98.129	48.06
1028.2747	91.25	48.06	1498.2747	98.295	48.06

Elapsed Time (minutes)	Drawdown (feet)	Temperature (° Fahrenheit)	Elapsed Time (minutes)	Drawdown (feet)	Temperature (° Fahrenheit)
1508.2747	98.328	48.06	1988.2747	101.483	48.08
1518.2747	98.798	48.06	1998.2747	101.544	48.08
1528.2747	98.682	48.06	2008.2747	101.571	48.08
1538.2747	98.715	48.06	2018.2747	101.621	48.08
1548.2747	98.815	48.06	2028.2747	101.328	48.08
1558.2747	98.887	48.06	2038.2747	101.3	48.08
1568.2747	99.424	48.06	2048.2747	101.355	48.08
1578.2747	99.44	48.06	2058.2747	101.223	48.08
1588.2747	99.452	48.08	2068.2747	101.217	48.08
1598.2747	99.556	48.06	2078.2747	101.317	48.08
1608.2747	99.656	48.06	2088.2747	101.367	48.08
1618.2747	99.701	48.08	2098.2747	101.394	48.08
1628.2747	99.673	48.06	2108.2747	101.394	48.08
1638.2747	99.772	48.06	2118.2747	101.333	48.08
1648.2747	99.839	48.08	2128.2747	101.361	48.08
1658.2747	99.834	48.08	2138.2747	101.372	48.08
1668.2747	99.884	48.08	2148.2747	101.372	48.08
1678.2747	99.85	48.08	2158.2747	101.411	48.08
1688.2747	99.873	48.08	2168.2747	100.492	48.08
1698.2747	99.878	48.08	2178.2747	99.165	48.1
1708.2747	99.961	48.08	2188.2747	99.182	48.1
1718.2747	100.686	48.08	2198.2747	102.296	48.08
1728.2747	100.093	48.06	2208.2747	101.593	48.08
1738.2747	100.514	48.06	2218.2747	101.007	48.08
1748.2747	100.492	48.08	2228.2747	100.763	48.08
1758.2747	100.481	48.08	2238.2747	100.714	48.08
1768.2747	100.509	48.08	2248.2747	100.691	48.08
1778.2747	100.548	48.08	2258.2747	100.608	48.08
1788.2747	100.525	48.08	2268.2747	100.559	48.08
1798.2747	100.525	48.08	2278.2747	100.514	48.08
1808.2747	100.642	48.08	2288.2747	100.503	48.08
1818.2747	100.68	48.08	2298.2747	100.52	48.08
1828.2747	100.747	48.08	2308.2747	100.514	48.08
1838.2747	100.758	48.08	2318.2747	101.156	48.08
1848.2747	100.824	48.08	2328.2747	103.098	48.08
1858.2747	100.874	48.08	2338.2747	102.75	48.08
1868.2747	100.869	48.08	2348.2747	102.65	48.08
1878.2747	100.918	48.08	2358.2747	102.584	48.08
1888.2747	100.924	48.08	2368.2747	102.457	48.08
1898.2747	101.04	48.08	2378.2747	102.329	48.08
1908.2747	101.051	48.08	2388.2747	102.152	48.08
1918.2747	101.007	48.08	2398.2747	102.014	48.08
1928.2747	101.145	48.08	2408.2747	102.008	48.08
1938.2747	101.172	48.06	2418.2747	101.87	48.08
1948.2747	101.25	48.08	2428.2747	101.936	48.08
1958.2747	101.328	48.08	2438.2747	102.888	48.08
1968.2747	101.372	48.08	2448.2747	102.694	48.08
1978.2747	101.4	48.08	2458.2747	102.545	48.08

Elapsed Time (minutes)	Drawdown (feet)	Temperature (° Fahrenheit)	Elapsed Time (minutes)	Drawdown (feet)	Temperature (° Fahrenheit)
2468.2747	102.606	48.08	2938.2747	104.825	48.1
2478.2747	102.584	48.08	2948.2747	104.51	48.1
2488.2747	102.628	48.08	2958.2747	104.387	48.08
2498.2747	102.54	48.08	2968.2747	103.934	48.1
2508.2747	102.573	48.08	2978.2747	106.617	48.08
2518.2747	102.6	48.08	2988.2747	105.964	48.08
2528.2747	102.628	48.08	2998.2747	103.99	48.1
2538.2747	102.54	48.08	3008.2747	103.851	48.1
2548.2747	102.495	48.08	3018.2747	105.975	48.08
2558.2747	102.556	48.08	3028.2747	106.18	48.08
2568.2747	102.556	48.08	3038.2747	106.274	48.08
2578.2747	102.589	48.08	3048.2747	105.942	48.08
2588.2747	102.634	48.08	3058.2747	105.201	48.08
2598.2747	102.628	48.08	3068.2747	105.107	48.08
2608.2747	102.694	48.08	3078.2747	105.107	48.08
2618.2747	102.717	48.08	3088.2747	105.09	48.08
2628.2747	102.755	48.08	3098.2747	105.118	48.08
2638.2747	102.772	48.08	3108.2747	104.836	48.08
2648.2747	102.805	48.08	3118.2747	104.636	48.08
2658.2747	102.877	48.08	3128.2747	104.04	48.1
2668.2747	102.849	48.08	3138.2747	103.458	48.08
2678.2747	103.873	48.08	3148.2747	105.256	48.08
2688.2747	104.044	48.08	3158.2747	105.3	48.08
2698.2747	103.961	48.08	3168.2747	103.32	48.1
2708.2747	104.039	48.08	3178.2747	106.13	48.08
2718.2747	103.253	48.08	3188.2747	106.174	48.08
2728.2747	101.224	48.12	3198.2747	106.23	48.08
2738.2747	102.535	48.1	3208.2747	106.208	48.08
2748.2747	103.452	48.08	3218.2747	106.274	48.08
2758.2747	103.336	48.08	3228.2747	105.87	48.08
2768.2747	103.386	48.08	3238.2747	105.643	48.08
2778.2747	103.358	48.08	3248.2747	105.007	48.08
2788.2747	103.397	48.08	3258.2747	105.505	48.08
2798.2747	104.493	48.08	3268.2747	106.396	48.08
2808.2747	105.522	48.08	3278.2747	106.147	48.08
2818.2747	105.914	48.08	3288.2747	106.13	48.08
2828.2747	105.826	48.08	3298.2747	106.252	48.08
2838.2747	105.926	48.08	3308.2747	106.269	48.08
2848.2747	105.959	48.08	3318.2747	106.224	48.08
2858.2747	105.992	48.08	3328.2747	106.313	48.08
2868.2747	106.003	48.08	3338.2747	106.064	48.08
2878.2747	105.959	48.08	3348.2747	104.764	48.08
2888.2747	105.195	48.08	3358.2747	104.786	48.08
2898.2747	105.096	48.08	3368.2747	104.637	48.1
2908.2747	103.259	48.1	3378.2747	104.487	48.08
2918.2747	104.443	48.1	3388.2747	104.526	48.08
2928.2747	104.688	48.12	3398.2747	104.797	48.08

Elapsed Time (minutes)	Drawdown (feet)	Temperature (° Fahrenheit)	Elapsed Time (minutes)	Drawdown (feet)	Temperature (° Fahrenheit)
3408.2747	105.472	48.08	3878.2747	106.932	48.08
3418.2747	105.228	48.08	3888.2747	106.988	48.08
3428.2747	105.14	48.08	3898.2747	106.949	48.08
3438.2747	105.228	48.08	3908.2747	106.91	48.08
3448.2747	105.881	48.08	3918.2747	106.916	48.08
3458.2747	106.313	48.08	3928.2747	106.927	48.08
3468.2747	106.141	48.08	3938.2747	106.888	48.08
3478.2747	105.903	48.08	3948.2747	106.932	48.08
3488.2747	105.688	48.08	3958.2747	106.938	48.08
3498.2747	104.172	48.1	3968.2747	106.938	48.08
3508.2747	104.095	48.1	3978.2747	106.938	48.08
3518.2747	105.007	48.08	3988.2747	106.927	48.08
3528.2747	106.556	48.08	3998.2747	107.546	48.08
3538.2747	106.65	48.08	4008.2747	107.674	48.08
3548.2747	106.595	48.08	4018.2747	107.607	48.08
3558.2747	106.589	48.08	4028.2747	107.685	48.08
3568.2747	106.683	48.08	4038.2747	107.652	48.08
3578.2747	106.695	48.08	4048.2747	107.602	48.08
3588.2747	106.722	48.08	4058.2747	107.574	48.08
3598.2747	106.783	48.08	4068.2747	107.613	48.08
3608.2747	106.777	48.08	4078.2747	107.624	48.08
3618.2747	106.783	48.08	4088.2747	107.679	48.08
3628.2747	106.838	48.08	4098.2747	107.69	48.08
3638.2747	106.844	48.08	4108.2747	107.773	48.08
3648.2747	106.86	48.08	4118.2747	107.74	48.08
3658.2747	106.86	48.08	4128.2747	107.729	48.08
3668.2747	106.855	48.08	4138.2747	107.712	48.08
3678.2747	106.822	48.08	4148.2747	107.685	48.08
3688.2747	106.866	48.08	4158.2747	107.751	48.08
3698.2747	106.899	48.08	4168.2747	108.736	48.08
3708.2747	106.955	48.08	4178.2747	109.228	48.08
3718.2747	106.938	48.08	4188.2747	109.256	48.08
3728.2747	106.966	48.08	4198.2747	109.317	48.08
3738.2747	106.921	48.08	4208.2747	109.107	48.08
3748.2747	106.982	48.08	4218.2747	109.084	48.08
3758.2747	107.071	48.08	4228.2747	108.946	48.08
3768.2747	106.982	48.08	4238.2747	109.007	48.08
3778.2747	107.026	48.08	4248.2747	108.99	48.08
3788.2747	106.966	48.08	4258.2747	108.985	48.08
3798.2747	106.86	48.08	4268.2747	108.99	48.08
3808.2747	106.877	48.08	4278.2747	108.979	48.08
3818.2747	106.888	48.08	4288.2747	109.024	48.08
3828.2747	106.943	48.08	4298.2747	108.858	48.08
3838.2747	106.844	48.08	4308.2747	108.946	48.08
3848.2747	106.877	48.08	4318.2747	108.918	48.08
3858.2747	106.927	48.08	4328.2747	108.952	48.08
3868.2747	106.96	48.08	4338.2747	108.929	48.08
			4348.2747	108.979	48.08

TABLE 3
CROSSROADS VENTURES LLC
Constant Rate Test at Well R2
Well R2 Recovery Data

Time After Pumping Stopped (minutes)	Residual Drawdown (feet)	Time After Pumping Stopped (minutes)	Residual Drawdown (feet)	Time After Pumping Stopped (minutes)	Residual Drawdown (feet)
0.0048	109.053	0.4198	97.904	4.4295	42.117
0.0098	109.042	0.4445	97.118	4.6928	41.375
0.015	108.993	0.4695	96.339	4.9728	40.715
0.0198	109.026	0.4963	95.487	5.2697	40.172
0.025	108.993	0.5247	94.607	5.583	39.695
0.03	109.054	0.5547	93.689	5.9145	39.296
0.035	109.01	0.5862	92.742	6.2663	38.959
0.0398	108.999	0.6213	91.68	6.6395	38.676
0.045	108.971	0.6578	90.645	7.0345	38.432
0.0648	108.612	0.6963	89.628	7.453	38.261
0.07	108.706	0.738	88.443	7.8962	38.15
0.075	108.495	0.7813	87.303	8.3663	38.056
0.0798	108.269	0.8278	86.074	8.8645	37.946
0.0848	108.103	0.8762	84.774	9.3913	37.835
0.09	107.937	0.9278	83.446	9.9497	37.725
0.095	107.794	0.9828	82.045	10.5413	37.603
0.1	107.661	1.0412	80.6	11.168	37.488
0.1057	107.506	1.103	79.1	11.8312	37.277
0.1118	107.356	1.1678	77.544	12.5347	36.989
0.1185	107.207	1.238	75.916	13.2795	36.796
0.1255	107.047	1.3113	74.266	14.0695	36.635
0.1327	106.881	1.3895	72.588	14.9062	36.481
0.1405	106.693	1.4728	70.833	15.7913	36.337
0.1488	106.477	1.5613	69.077	16.7295	36.194
0.1578	106.239	1.6547	67.311	17.723	36.051
0.167	106.005	1.753	65.538	18.7762	35.908
0.1768	105.728	1.858	63.727	19.8913	35.759
0.1875	105.413	1.9678	61.932	21.073	35.616
0.1985	105.07	2.0845	60.154	22.3247	35.469
0.21	104.721	2.2097	58.359	23.6497	35.31
0.2225	104.311	2.3412	56.598	25.0545	35.157
0.2358	103.874	2.4812	54.879	26.5428	35
0.2498	103.426	2.6297	53.195	28.1178	34.841
0.2647	102.944	2.7863	51.578	29.7863	34.676
0.2803	102.435	2.953	50.059	31.5545	34.511
0.297	101.888	3.1297	48.768	33.428	34.351
0.3145	101.307	3.3162	47.416	35.4112	34.18
0.3333	100.704	3.5145	46.135	37.513	34.01
0.3532	100.056	3.7245	44.966	39.7397	33.838
0.374	99.376	3.9463	43.863	42.098	33.666
0.3963	98.662	4.1812	42.871	44.5963	33.489

Time After Pumping Stopped (minutes)	Residual Drawdown (feet)	Time After Pumping Stopped (minutes)	Residual Drawdown (feet)	Time After Pumping Stopped (minutes)	Residual Drawdown (feet)
47.2428	33.306	408.2745	23.339	868.2747	17.973
50.0463	33.123	418.2745	23.183	878.2747	17.873
53.0147	32.939	428.2745	23.027	888.2747	17.779
56.1595	32.75	438.2745	22.877	898.2747	17.679
59.4913	32.562	448.2745	22.728	908.2747	17.584
63.0195	32.367	458.2745	22.589	918.2747	17.494
66.758	32.166	468.2745	22.445	928.2747	17.395
70.7178	31.966	478.2745	22.301	938.2747	17.3
74.9113	31.765	488.2745	22.162	948.2747	17.212
79.3545	31.552	498.2745	22.028	958.2747	17.117
84.0613	31.346	508.2745	21.895	968.2747	17.023
89.0462	31.122	518.2745	21.762	978.2747	16.934
94.3262	30.905	528.2745	21.634	988.2747	16.845
99.9197	30.681	538.2745	21.507	998.2747	16.751
105.8447	30.453	548.2747	21.385	1008.2747	16.662
112.1197	30.213	558.2747	21.263	1018.2747	16.574
118.7678	29.968	568.2747	21.141	1028.2747	16.485
125.8095	29.722	578.2747	21.019	1038.2747	16.402
133.2678	29.471	588.2747	20.903	1048.2747	16.313
141.1678	29.22	598.2747	20.786	1058.2747	16.23
149.5363	28.957	608.2747	20.675	1068.2747	16.146
158.4012	28.688	618.2747	20.57	1078.2747	16.063
167.7912	28.409	628.2747	20.459	1088.2747	15.98
177.738	28.13	638.2747	20.348	1098.2745	15.902
188.2745	27.84	648.2747	20.237	1108.2745	15.819
198.2745	27.578	658.2747	20.126	1118.2745	15.736
208.2745	27.321	668.2747	20.021	1128.2745	15.664
218.2745	27.076	678.2747	19.91	1138.2745	15.592
228.2745	26.826	688.2747	19.799	1148.2745	15.519
238.2745	26.593	698.2747	19.694	1158.2745	15.447
248.2745	26.36	708.2747	19.588	1168.2745	15.375
258.2745	26.143	718.2747	19.483	1178.2745	15.303
268.2745	25.916	728.2747	19.377	1188.2745	15.231
278.2745	25.71	738.2747	19.271	1198.2745	15.159
288.2745	25.499	748.2747	19.172	1208.2745	15.092
298.2745	25.294	758.2747	19.071	1218.2745	15.026
308.2745	25.099	768.2747	18.966	1228.2745	14.959
318.2745	24.905	778.2747	18.866	1238.2745	14.898
328.2745	24.716	788.2747	18.761	1248.2745	14.826
338.2745	24.528	798.2747	18.661	1258.2745	14.765
348.2745	24.356	808.2747	18.562	1268.2745	14.704
358.2745	24.178	818.2747	18.461	1278.2745	14.648
368.2745	24	828.2747	18.367	1288.2745	14.587
378.2745	23.833	838.2747	18.262	1298.2745	14.532
388.2745	23.667	848.2747	18.167	1375	13.56
398.2745	23.499	858.2747	18.067	2860	7.29
				5699	3.18

TABLE 4
CROSSROADS VENTURES, INC.
Water Level Data
Residential Well 1

Date	Time	Depth To Water (feet)	Remarks
11/26/2001	8:55	22.9	Well R2 pump on at 9:30
11/26/2001	16:00	23.15	
11/27/2001	9:00	23.84	
11/27/2001	16:00	23.85	
11/28/2001	9:00	24.31	
11/28/2001	16:00	24.31	
11/29/2001	9:00	24.52	
11/29/2001	16:00	24.51	Well R2 pump off at 10:20
11/30/2001	9:00	23.91	
12/1/2001	9:00	23.11	

Note: All measurements by Crossroads' personnel.

TABLE 5
CROSSROADS VENTURES, INC.
Water Level Data
Residential Well 2

Date	Time	Depth To Water (feet)	Remarks
11/26/2001	12:30	1.75	Well R2 pump on at 9:30
11/26/2001	16:00	1.75	
11/27/2001	9:00	1.79	
11/27/2001	16:00	1.79	
11/28/2001	9:00	1.88	
11/28/2001	16:00	1.88	
11/29/2001	9:00	1.88	Well R2 pump off at 10:20
11/29/2001	16:00	1.88	
11/30/2001	9:00	1.83	
12/1/2001	9:00	1.83	

Note: All measurements by Crossroads' personnel.

TABLE 6
CROSSROADS VENTURES, INC.
Water Level Data
Residential Well 3

Date	Time	Observations	Remarks
11/26/2001	12:30	Flowing	Well R2 pump on at 9:30 Water continuously flowing through overflow pipe
11/26/2001	16:00	Flowing	
11/27/2001	9:00	Flowing	
11/27/2001	16:00	Flowing	
11/28/2001	9:00	Flowing	
11/28/2001	16:00	Flowing	
11/29/2001	9:00	Flowing	Well R2 Pump off at 10:20
11/29/2001	16:00	Flowing	
11/30/2001	9:00	Flowing	
12/1/2001	9:00	Flowing	

Note: All observations made by Crossroads personnel.
The overflow rate was constant throughout the monitoring period.

TABLE 7
CROSSROADS VENTURES, INC.
Field Water Quality Analysis
Well R2

Date	Time	pH	Conductivity (us)	Turbidity (NTU)	ORP (MV)	Hardness (ppm)	Remarks
11/26/2001	11:10	8.2	196.8	-	-88	-	Pump on at 9:30
11/26/2001	16:00	8.2	179.2	5.16	-9	0	Sulfur odor
11/27/2001	9:00	8.2	317.0	1.63	-96	0	Sulfur odor
11/27/2001	16:00	8.2	337	1.31	-75	50	Sulfur odor
11/28/2001	9:00	8.2	391	1.72	-93	50	Sulfur odor
11/28/2001	16:00	8.2	398	1.32	-71	50	Sulfur odor
11/29/2001	9:00	8.2	384	0.84	-66	50	Pump off at 10:20

Note: All samples collected at pipe orifice outlet.

TABLE 8
CROSSROADS VENTURES, INC.
Water Level Data
Well Point WP-1

Date	Time	Depth To Water (feet)	Remarks
11/26/2001	8:20	10.04	Well R2 pump on at 9:30
11/26/2001	16:00	10.04	
11/27/2001	9:00	10.04	
11/27/2001	16:00	10.04	
11/28/2001	9:00	10.08	
11/28/2001	16:00	10.08	
11/29/2001	9:58	10.12	Well R2 pump off at 10:20
11/30/2001	9:00	10.10	
12/1/2001	9:00	9.80	
12/3/2001	9:17	9.32	

TABLE 9
CROSSROADS VENTURES, INC.
Water Level Data
Stream Gauge US-1

Date	Time	Depth To Water (feet)	Remarks
11/26/2001	8:18	2.37	Well R2 pump on at 9:30
11/26/2001	16:00	2.41	
11/27/2001	9:00	2.38	
11/27/2001	16:00	2.38	
11/28/2001	9:00	2.40	
11/28/2001	16:00	2.40	
11/29/2001	10:02	2.38	Well R2 pump off at 10:20
11/30/2001	9:00	2.37	
12/1/2001	9:00	2.20	
12/3/2001	9:13	2.24	

TABLE 10
CROSSROADS VENTURES, INC.
Water Level Data
Stream Gauge DS-1

Date	Time	Depth To Water (feet)	Remarks
11/26/2001	8:22	2.41	Well R2 pump on at 9:30
11/26/2001	16:00	2.44	
11/27/2001	9:00	2.43	
11/27/2001	16:00	2.40	
11/28/2001	9:00	2.41	
11/28/2001	16:00	2.41	
11/29/2001	10:00	2.41	Well R2 pump off at 10:20
11/30/2001	9:00	2.36	
12/1/2001	9:00	2.21	
12/3/2001	9:23	2.41	

TABLE 11
CROSSROADS VENTURES, INC.
Water Level Data
Pond Gauge P-1

Date	Time	Depth To Water (feet)	Remarks
11/26/2001	8:29	1.02	Well R2 Pump on at 9:30
11/26/2001	16:00	0.92	
11/27/2001	9:00	0.90	
11/27/2001	16:00	0.90	
11/28/2001	9:00	0.89	
11/28/2001	16:00	0.89	
11/29/2001	8:20	0.99	Well R2 Pump off at 10:20
12/3/2001	9:27	1.04	

TABLE 12
CROSSROADS VENTURES, INC.
Field Water Quality Analysis
Birch Creek

Date	Time	pH	Conductivity (us)	Turbidity (NTU)	ORP (MV)	Hardness (ppm)	Temperature (°C)	Remarks
11/26/2001	11:05	7.0	112.8	1.06	-46	-	7.4	Well R2 pump on at 9:30
11/26/2001	16:00	7.0	100.5	0.94	2	25	7.0	
11/27/2001	9:00	7.0	106	1.17	-23	25	7.0	
11/27/2001	16:00	7.0	104	1.2	-22	25	7.0	
11/28/2001	9:00	7.0	103.5	1.12	-24	25	7.0	
11/28/2001	16:00	7.0	102.1	1.2	-25	25	7.0	
11/29/2001	9:00	7.0	112.3	1.41	-22	0 to 25	7.0	Well R2 pump off at 10:20

APPENDIX A

Drilling Logs

Alpha Geoscience 1071 Troy-Schenectady Rd Latham, New York 12203	**DRILLING LOG**	**Boring ID: R-2** Page 1 of 5

Project Number/Name: 01135/ Belleayre Wells — Location: Friendship Manor Rd, Pine Hill, NY

Drilling Contractor/Personnel: Titan Drilling Corp, Troy Johnson

Geologist/Inspector: MD Palleschi — Start/ 11/6/01 Finish Date:11/9/01

Drilling Equip/Method: IR T4W — Size/Type of Bit:12" Roller, 7 7/8" Hammer

Sampling Method:Grab (s) — Well Installed? Yes, See Log

Elevation/Ground Surface:

Depth to Ground Water from Ground Surface (Date): 24.70' on 11/9/01

REMARKS: Well R-2 is the second well installed at Rosenthal parcel.

Depth (Ft)	Sample No.	DESCRIPTION	REMARKS
1	S-1	Brown coarse to fine sand, some fine gravel, trace (+) clayey silt, organics	samples S-1, S-2 and S-3 collected by driller
5			
9 10	S-2	Red brown clay and silt, trace medium (-) to fine (+) sand	8" casing grouted to 60 feet
20			Driller describes unconsolidated deposits as 0-10' = gravel and sand 10-38' = sandy clay
30			Driller describes bedrock as weathered/fractured from 38' to 42', solid below 42'
38		38'	Driller notes bedrock at 38'
39 40	S-3	Medium grey sandstone	

Proportions Used: Trace=0-10% Little=10-20% Some=20-35% And-35-50%

Alpha Geoscience
1071 Troy-Schenectady Rd
Latham, New York 12110

DRILLING LOG

Boring ID. R-2

Project Number/Name: 01135/Belleayre Wells

Location: Friendship Manor Road, Pine Hill, NY

Depth (Ft)	Sample No.	DESCRIPTION	REMARKS
			Driller describes bedrock from 40' to 60' as red grey sandstone
50			
60			drilling tools chatter at 62'
62–62.5	S-4	Medium grey sandstone	
70–70.5	S-5	Red brown shale, rare grey sandstone	
80–80.5	S-6	Red grey sandstone, rare red brown shale	
90–90.5	S-7	Medium grey sandstone	
100			

Proportions Used: Trace=0-10% Little=10-20% Some=20-35% And-35-50%

Alpha Geoscience
1071 Troy-Schenectady Rd
Latham, New York 12110

DRILLING LOG

Boring ID. R-2

Project Number/Name: 01135/Belleayre Wells

Location: Friendship Manor Road, Pine Hill, NY

Depth (Ft)	Sample No.	DESCRIPTION	REMARKS
100.5	S-8	Medium grey sandstone, rare red brown shale	
110 - 110.5	S-9	Medium grey sandstone	
120 - 120.5	S-10	Red brown shale, rare medium grey sandstone	
130 - 130.5	S-11	Red brown shale	
140 - 140.5	S-12	Red brown shale	
150 - 150.5	S-13	Red grey sandstone	
160			

Proportions Used: Trace=0-10% Little=10-20% Some=20-35% And-35-50%

Alpha Geoscience
1071 Troy-Schenectady Rd
Latham, New York 12110

DRILLING LOG

Boring ID. R-2

Project Number/Name: 01135/Belleayre Wells

Location: Friendship Manor Road, Pine Hill, NY

Depth (Ft)	Sample No.	DESCRIPTION	REMARKS
160.5	S-14	Red grey sandstone, rare red brown shale	
170 170.5	S-15	Medium grey sandstone rare red grey sandstone	
180 180.5	S-16	Red brown shale, rare red grey and medium grey sandstone	182' fracture
190 190.5	S-17	Red grey sandstone	186' fracture, with substantial water production 190' sulfur odor Blow test at 199' yields 66 gpm
200 200.5	S-18	Red grey sandstone, rare red brown shale	
210 210.5	S-19	Medium grey sandstone	
220			

Proportions Used: Trace=0-10% Little=10-20% Some=20-35% And-35-50%

Alpha Geoscience
1071 Troy-Schenectady Rd
Latham, New York 12110

DRILLING LOG

Boring ID. R-2

Project Number/Name: 01135/Belleayre Wells

Location: Friendship Manor Road, Pine Hill, NY

Depth (Ft)	Sample No.	DESCRIPTION	REMARKS
220.5	S-20	Medium grey sandstone	
230 - 230.5	S-21	Medium grey and red grey sandstone, rare red brown shale	
			238' - 240' soft or fractured zone
240 - 240.5	S-22	Medium grey sandstone	
248.5 - 249	S-23	Red brown shale	
250			
260 - 260.5	S-24	Red grey sandstone and rare red brown shale	soft or fractured zone
			265' - 267' Blow test at 274' yields 107 gpm
270 - 270.5	S-25	Red brown shale and red grey sandstone	
273.5 - 274	S-26	Red brown shale and red grey sandstone	
		End of boring at 274'	

Proportions Used: Trace=0-10% Little=10-20% Some=20-35% And-35-50%

Alpha Geoscience 1071 Troy-Schenectady Rd Latham, New York 12203	**DRILLING LOG**	**Boring ID: R-3** Page 1 of 7

Project Number/Name: 01135/ Belleayre Wells — Location: Friendship Manor Rd, Pine Hill, NY

Drilling Contractor/Personnel: Titan Drilling Corp, Troy Johnson

Geologist/Inspector: MD Palleschi — Start/ 11/9/01 Finish Date:11/14/01

Drilling Equip/Method: IR T4W — Size/Type of Bit:12" Roller, 7 7/8" Hammer

Sampling Method:Grab (s) — Well Installed? Yes, See Log

Elevation/Ground Surface:

Depth to Ground Water from Ground Surface (Date): 24.20' on 11/14/01

REMARKS: Well R-3 is the third well installed at Rosenthal parcel.

Depth (Ft)	Sample No.	DESCRIPTION	REMARKS
			Driller collects samples from 0' to 72' 8" casing grouted to 72'
9 10	S-1	Brown coarse (-) to fine (+) sand, some (+) silt and clay	Driller describes samples from 57' to 70' as red sandstone 70' to 72' red shale
20	S-2	Brown coarse to fine sand, some (+) medium (-) to fine (+) gravel, little silt and clay	
30			Driller describes unconsolidated deposits as: 0-20' = gravel and boulders 20-25' = boulders with little gravel 35-57' = sandy clay
40			

Proportions Used: Trace=0-10% Little=10-20% Some=20-35% And-35-50%

Alpha Geoscience
1071 Troy-Schenectady Rd
Latham, New York 12110

DRILLING LOG

Boring ID. R-3

Project Number/Name: 01135/Belleayre Wells

Location: Friendship Manor Road, Pine Hill, NY

Depth (Ft)	Sample No.	DESCRIPTION	REMARKS
50			
57'		- - - - - - - - - - 57'	Driller notes bedrock at 57'
60			
70			
72–72.5	S-3	Red brown shale	
80–80.5	S-4	Red brown and red grey shale, red grey sandstone	
90–90.5	S-5	Red grey sandstone	
100			

Proportions Used: Trace=0-10% Little=10-20% Some=20-35% And-35-50%

Alpha Geoscience
1071 Troy-Schenectady Rd
Latham, New York 12110

DRILLING LOG

Boring ID. R-3

Project Number/Name: 01135/Belleayre Wells

Location: Friendship Manor Road, Pine Hill, NY

Depth (Ft)	Sample No.	DESCRIPTION	REMARKS
100 - 100.5	S-6	Medium grey and red grey sandstone	
110 - 110.5	S-7	Medium grey and red grey sandstone	
120 - 120.5	S-8	Red grey sandstone and red brown shale	
130 - 130.5	S-9	Red brown shale and red grey sandstone	
140 - 140.5	S-10	Red brown shale, and rare green grey shale	
150 - 150.5	S-11	Red grey sandstone	
160			

Proportions Used: Trace=0-10% Little=10-20% Some=20-35% And-35-50%

Alpha Geoscience
1071 Troy-Schenectady Rd
Latham, New York 12110

DRILLING LOG

Boring ID. R-3

Project Number/Name: 01135/Belleayre Wells

Location: Friendship Manor Road, Pine Hill, NY

Depth (Ft)	Sample No.	DESCRIPTION	REMARKS
160.5	S-12	Red grey and medium grey sandstone	
170 – 170.5	S-13	Red grey and medium grey sandstone, red brown and medium grey shale	
180 – 180.5	S-14	Red brown shale	
190 – 190.5	S-15	Red grey sandstone	
200 – 200.5	S-16	Medium grey and red grey sandstone	
210 – 210.5	S-17	Medium grey sandstone, rare red brown sandstone	
220			

Proportions Used: Trace=0-10% Little=10-20% Some=20-35% And-35-50%

ALPHA GEOSCIENCE

Alpha Geoscience
1071 Troy-Schenectady Rd
Latham, New York 12110

DRILLING LOG

Boring ID. R-3

Project Number/Name: 01135/Belleayre Wells

Location: Friendship Manor Road, Pine Hill, NY

Depth (Ft)	Sample No.	DESCRIPTION	REMARKS
220.5	S-18	Medium grey sandstone	
230 – 230.5	S-19	Medium grey and red grey sandstone, rare red brown shale	
240 – 240.5	S-20	Medium grey sandstone	Driller notes at 242' soft zone or fracture some water production
250 – 250.5	S-21	Red grey sandstone and red brown shale	
260 – 260.5	S-22	Medium grey and red grey sandstone and red brown shale	
270 – 270.5	S-23	Red brown shale and red grey sandstone	Estimated well yield at 274' 8 to 10 gpm End of drill on 11/13/01 at 274'
280			

Proportions Used: Trace=0-10% Little=10-20% Some=20-35% And-35-50%

Alpha Geoscience
1071 Troy-Schenectady Rd
Latham, New York 12110

DRILLING LOG

Boring ID. R-3

Project Number/Name: 01135/Belleayre Wells
Location: Friendship Manor Road, Pine Hill, NY

Depth (Ft)	Sample No.	DESCRIPTION	REMARKS
280.5	S-24	Red brown shale	
290 290.5	S-25	Red brown shale, occasional red grey sandstone	
300 300.5	S-26	Red grey sandstone and red brown shale	
310 310.5	S-27	Red grey sandstone, occasional red brown shale	
320 320.5	S-28	Red grey sandstone and red brown shale	
330 330.5	S-29	Red grey sandstone and red brown shale	
340			

Proportions Used: Trace=0-10% Little=10-20% Some=20-35% And-35-50%

ALPHA GEOSCIENCE Alpha Geoscience 1071 Troy-Schenectady Rd Latham, New York 12110	**DRILLING LOG**	**Boring ID. R-3** Page 7 of 7

Project Number/Name: 01135/Belleayre Wells   Location: Friendship Manor Road, Pine Hill, NY

Depth (Ft)	Sample No.	DESCRIPTION	REMARKS
340 340.5	S-30	Red grey sandstone, occasional red brown shale	
348.5 349 350	S-31	Medium grey and red grey sandstone, occasional red brown shale	Blow test at 349' yields 15 gpm
		End of boring at 349'	

Proportions Used: Trace=0-10% Little=10-20% Some=20-35% And-35-50%

APPENDIX B

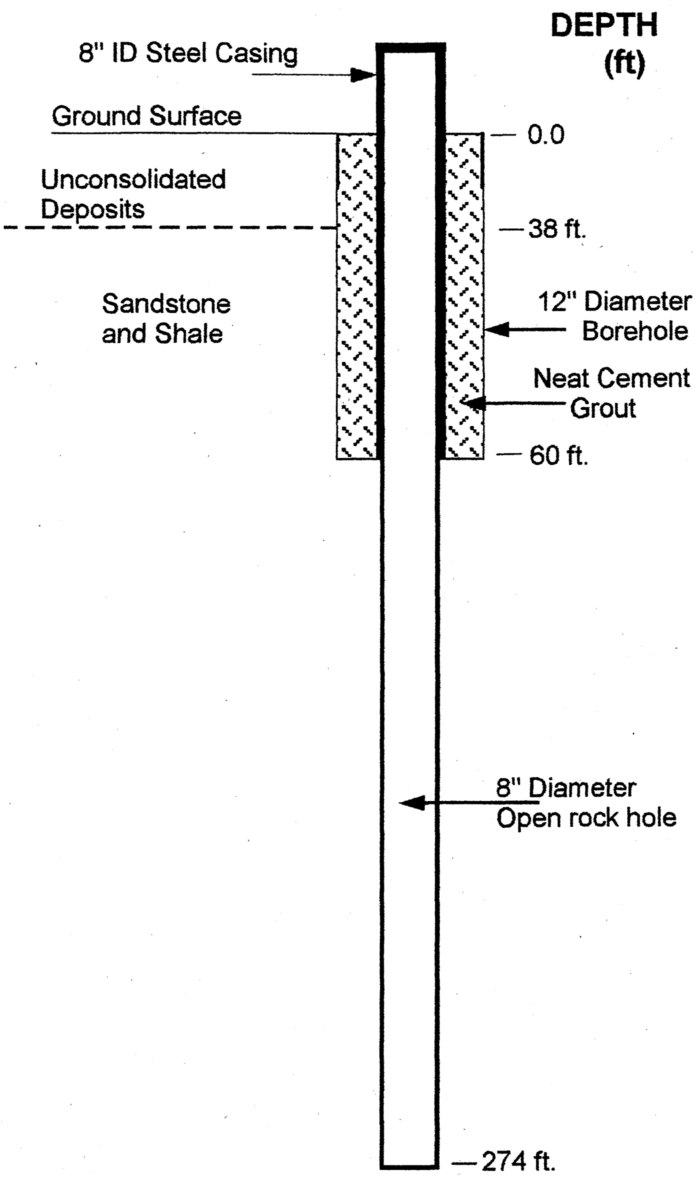
Well Completion Logs

MONITORING WELL COMPLETION LOG

ALPHA GEOSCIENCE
1071 Troy-Schenectady Road
Latham, NY 12110
(518) 783-1805

Well R-2
Project Belleayre Wells
Project No. 01135
Client Crossroads Ventures LLC
Date Drilled 11/6/01 - 11/9/01
Date Developed 11/9/01

WELL CONSTRUCTION DETAILS



Not to Scale

INSPECTION NOTES

Inspector Michael Palleschi
Drilling Contractor Titan Drilling Corporation
Type of Well Water Supply
Static Water Level 24.70' Date 11/9/01
Measuring Point Grade
Total Well Depth 274 feet

Casing

Material Steel Diameter 8" ID
Length 62.5' Interval 0 - 60'

Seal

Type Neat Cement Interval 0' - 60'

Open Rock Hole

Diameter 8" Interval 60' - 274'

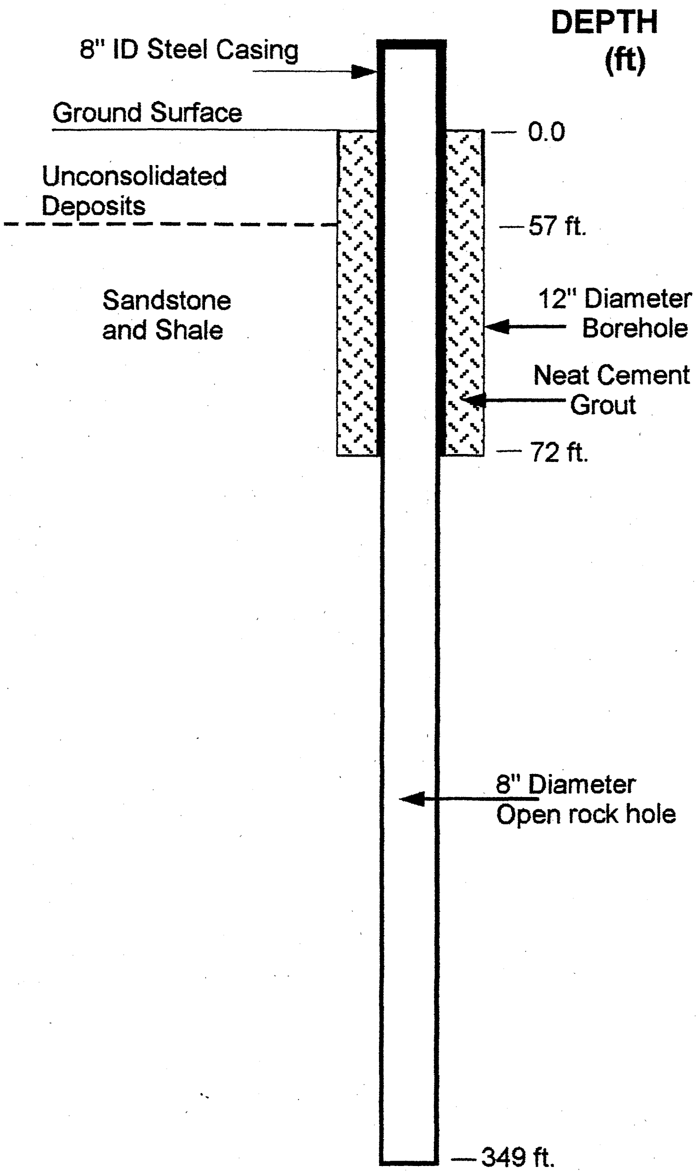
8" casing has steel drive shoe
8" bolt on cap installed

MONITORING WELL COMPLETION LOG

ALPHA GEOSCIENCE
1071 Troy-Schenectady Road
Latham, NY 12110
(518) 783-1805

Well: R-3
Project: Belleayre Wells
Project No.: 01135
Client: Crossroads Ventures LLC
Date Drilled: 11/9/01 - 11/14/01
Date Developed: 11/14/01

WELL CONSTRUCTION DETAILS



Not to Scale

INSPECTION NOTES

Inspector: Michael Palleschi
Drilling Contractor: Titan Drilling Corporation
Type of Well: Water Supply
Static Water Level: 24.20' Date: 11/14/01
Measuring Point: Grade
Total Well Depth: 349 feet

Casing

Material: Steel Diameter: 8" ID
Length: 74.2' Interval: 0 - 72'

Seal

Type: Neat Cement Interval: 0' - 72'

Open Rock Hole

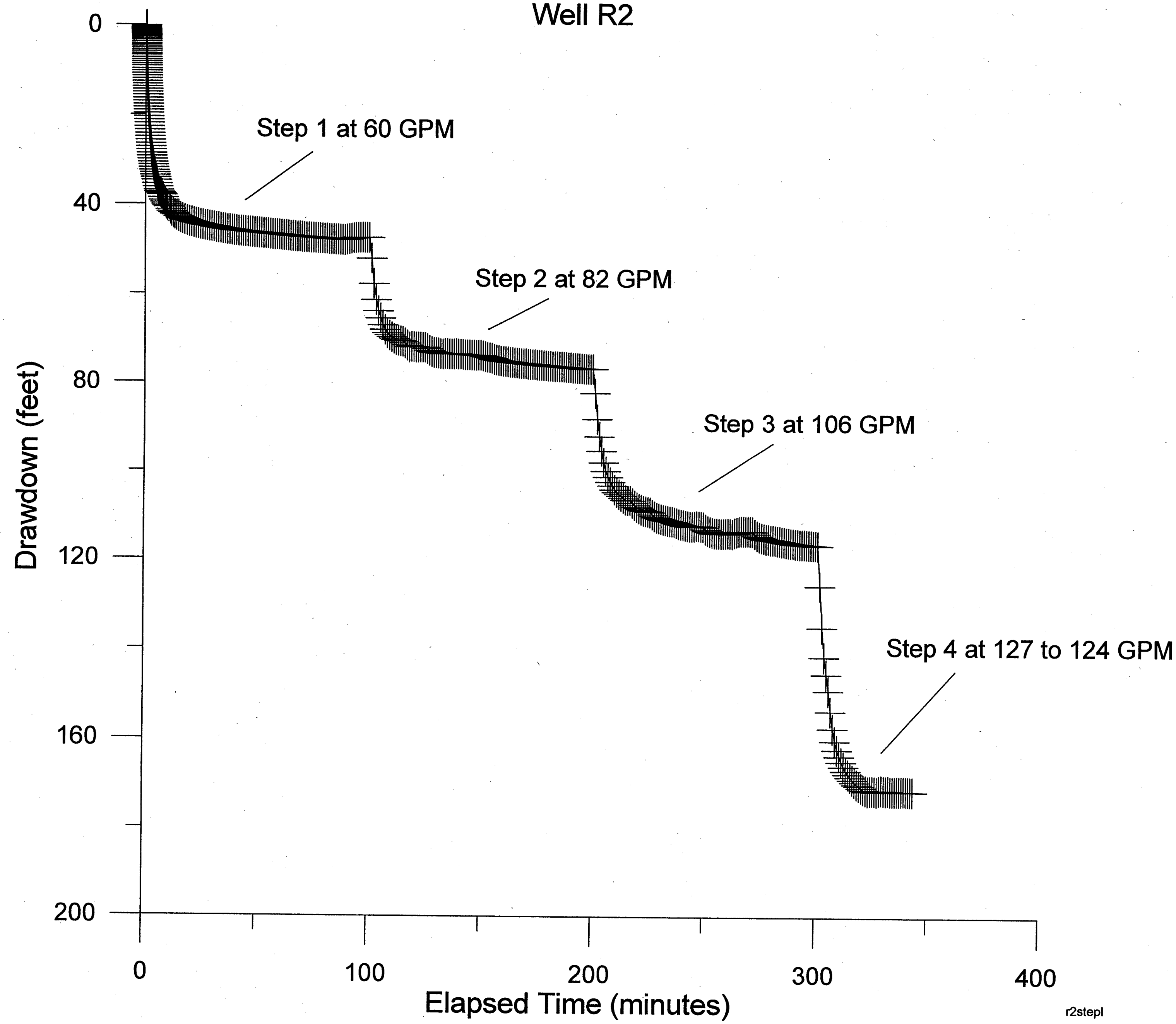
Diameter: 8" Interval: 72' - 349'

8" casing has steel drive shoe
8" bolt on cap installed

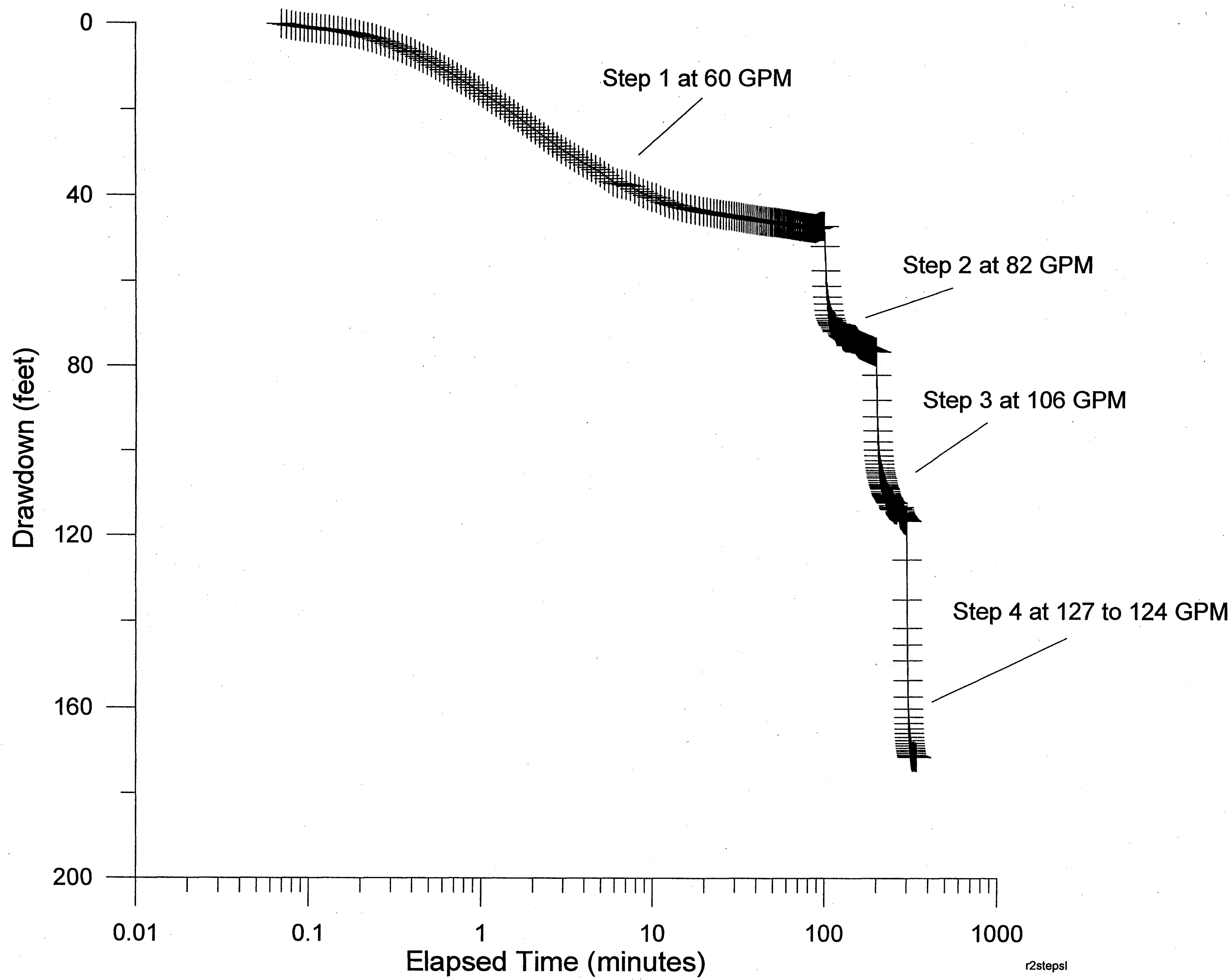
APPENDIX C

Step Rate Test Graphs

CROSSROADS VENTURES LLC
Step Rate Test
Well R2

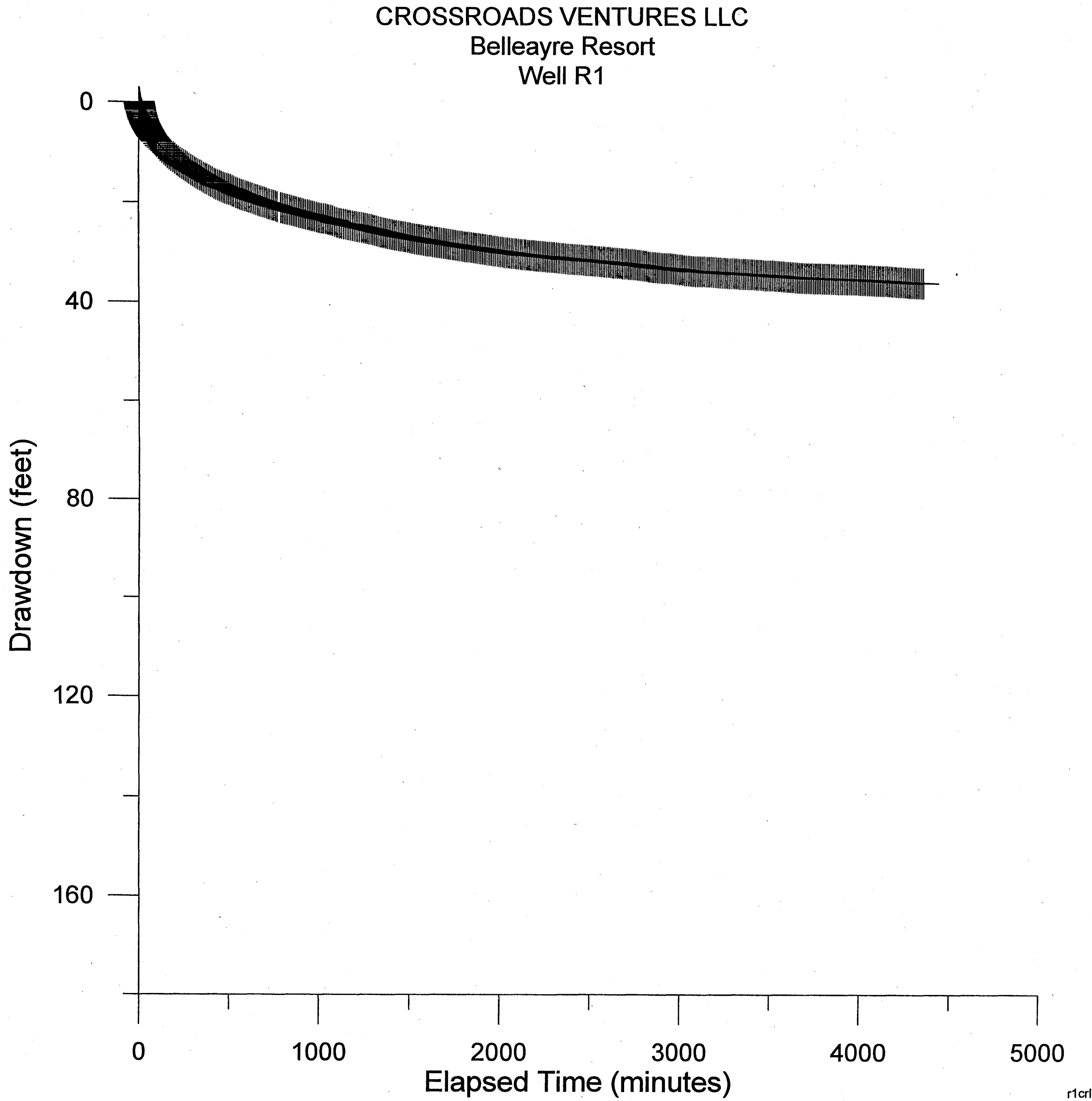


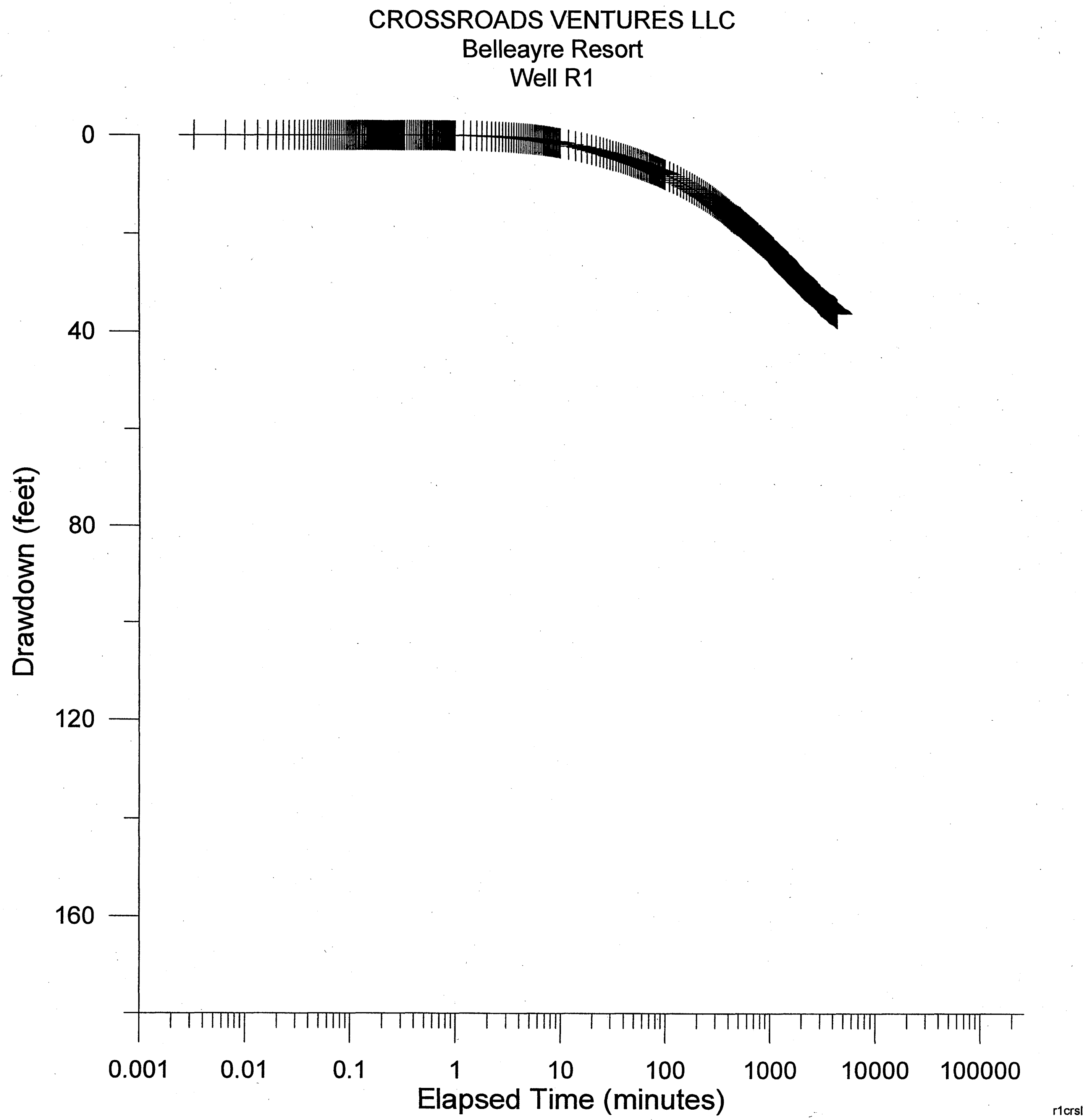
CROSSROADS VENTURES LLC
Step Rate Test
Well R2

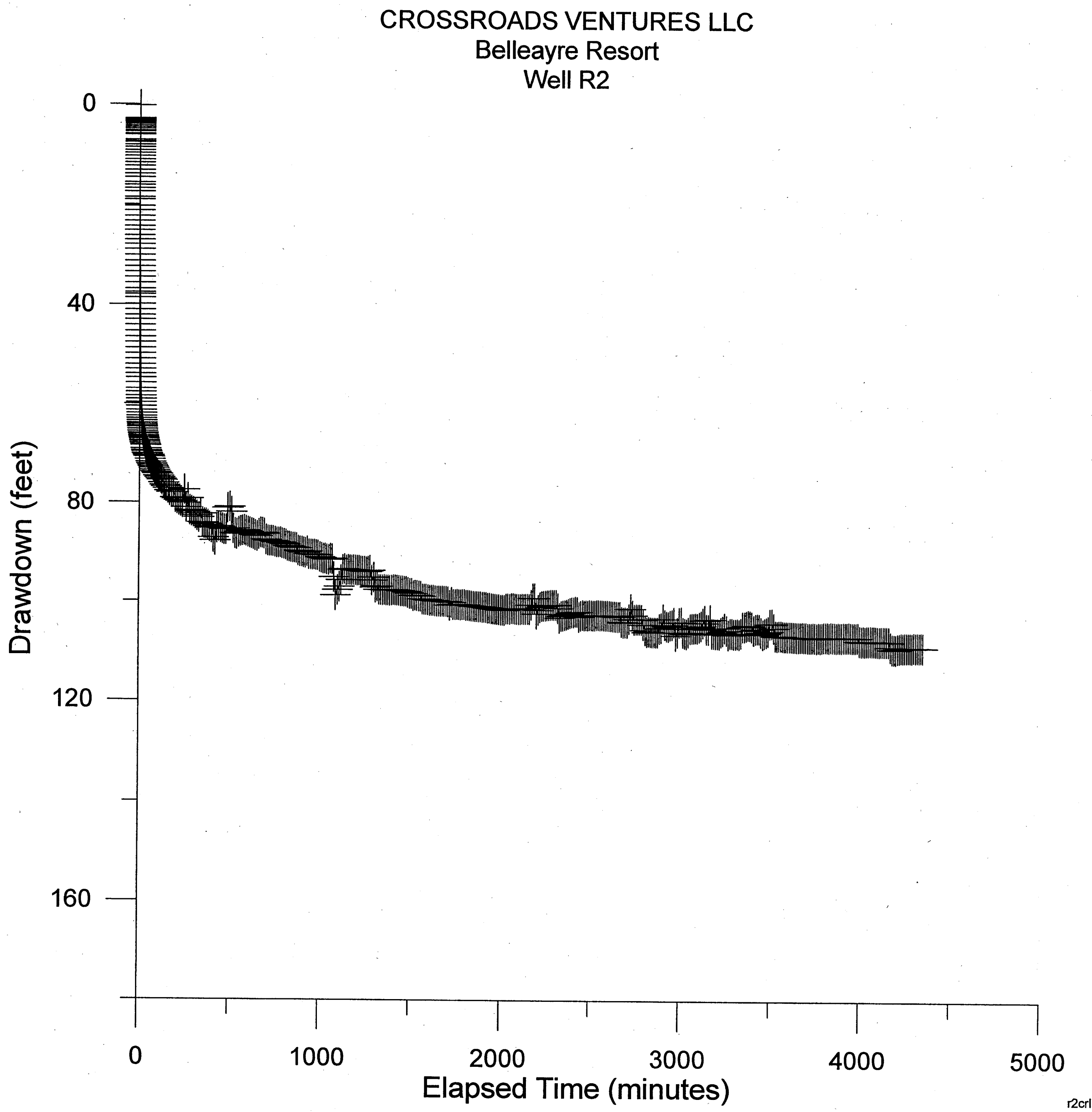


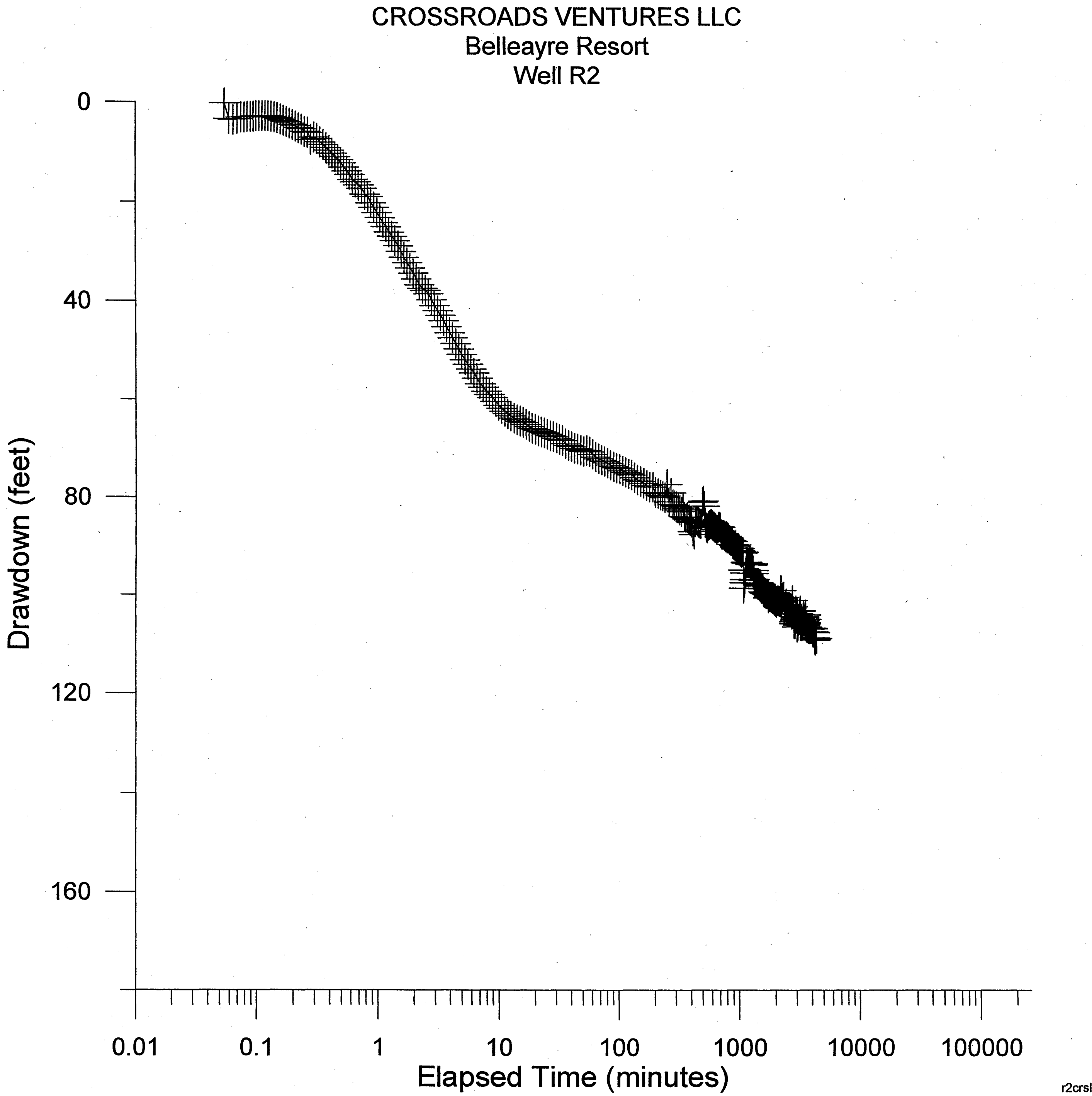
APPENDIX D

Constant Rate Test Graphs

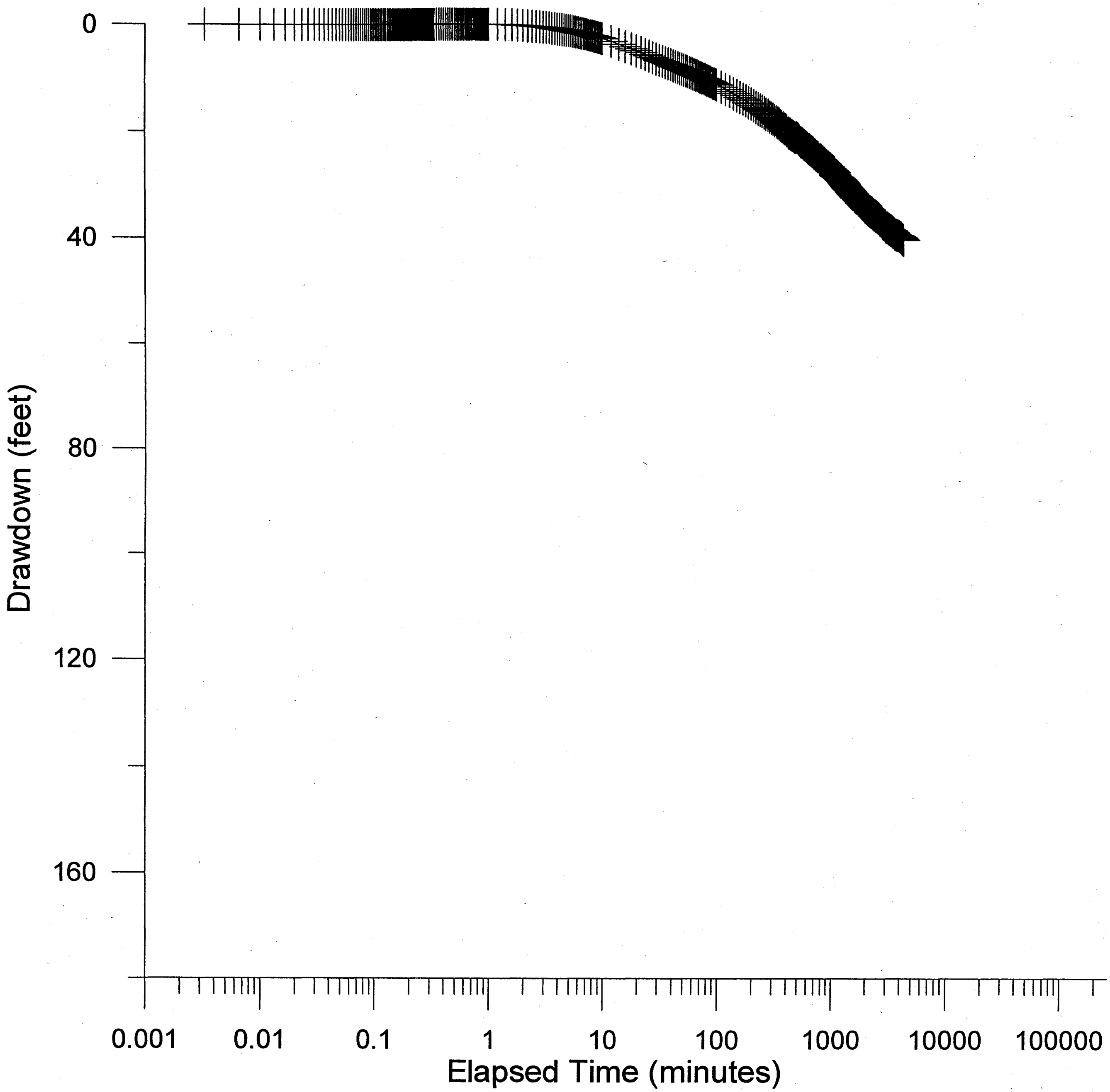

CROSSROADS VENTURES LLC
Belleayre Resort
Well R1
0
40
80
120
160
Drawdown (feet)
0
1000
2000
3000
4000
5000
Elapsed Time (minutes)
r1crl


CROSSROADS VENTURES LLC
Belleayre Resort
Well R1
Drawdown (feet)
0
40
80
120
160
0.001
0.01
0.1
1
10
100
1000
10000
100000
Elapsed Time (minutes)
r1crsl

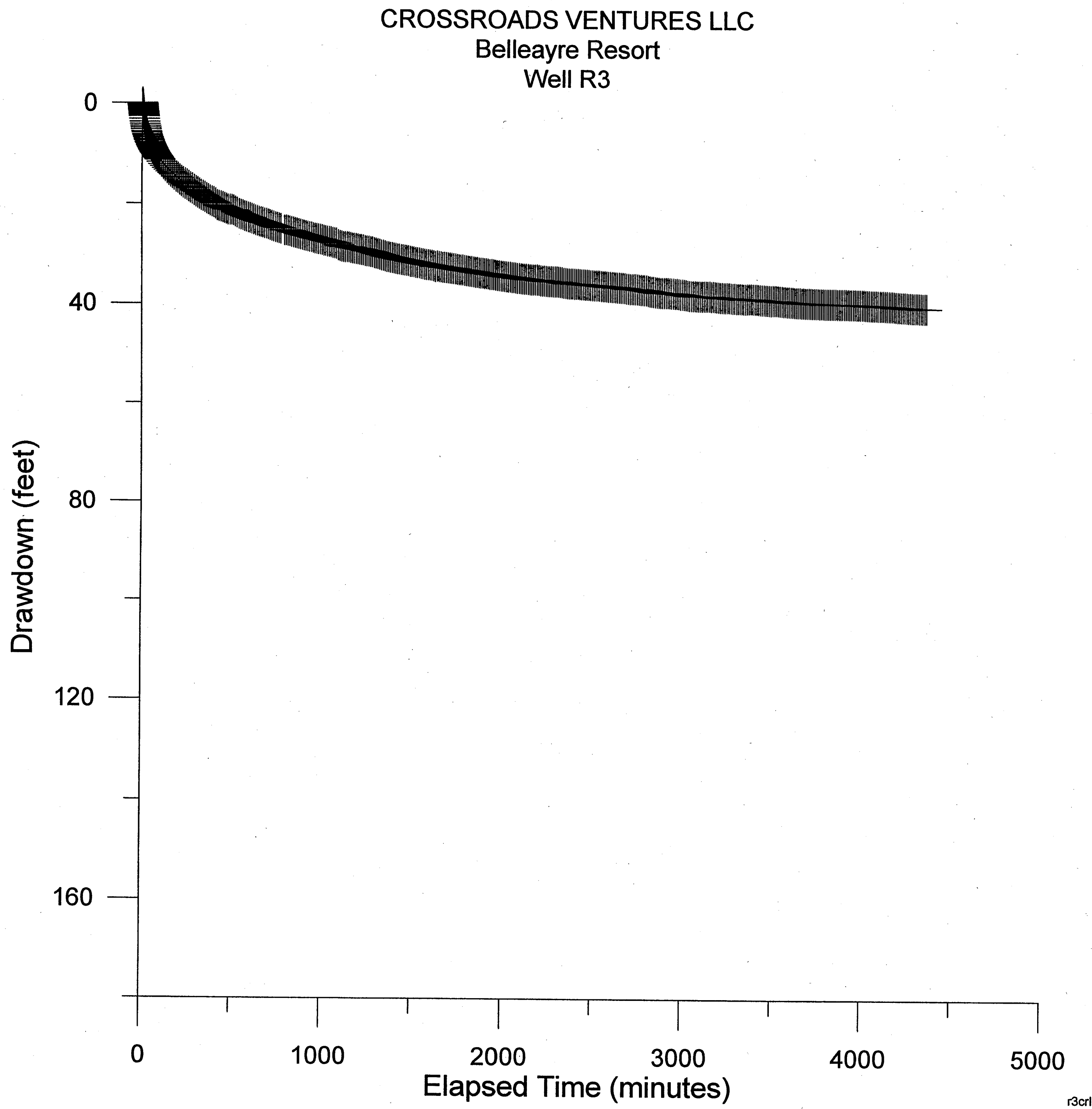

CROSSROADS VENTURES LLC
Belleayre Resort
Well R2
0
40
80
120
160
Drawdown (feet)
0
1000
2000
3000
4000
5000
Elapsed Time (minutes)
r2crl


CROSSROADS VENTURES LLC
Belleayre Resort
Well R2
Drawdown (feet)
0
40
80
120
160
0.01
0.1
1
10
100
1000
10000
100000
Elapsed Time (minutes)
r2crsl

CROSSROADS VENTURES LLC
Belleayre Resort
Well R3

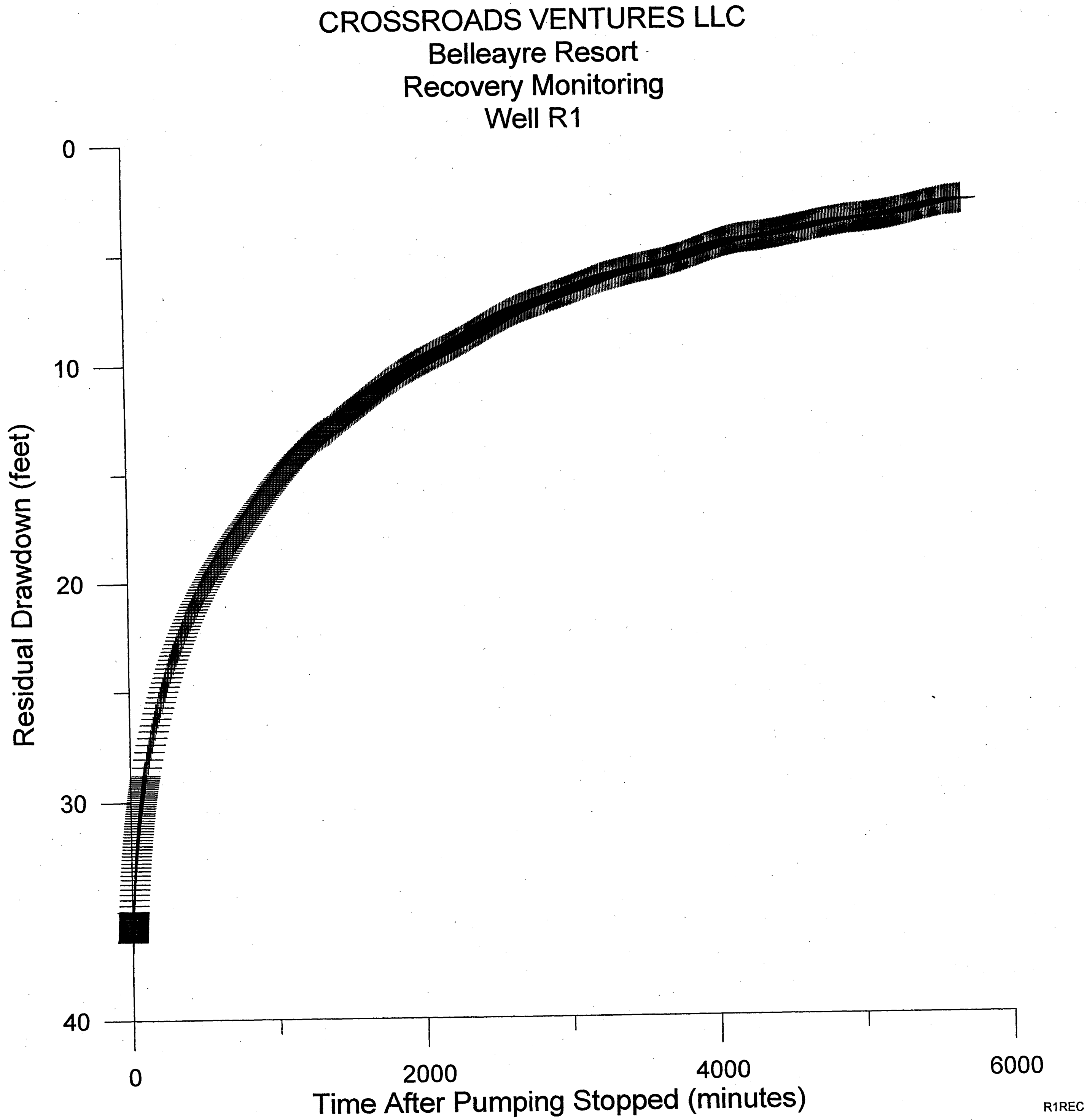


r3crsl

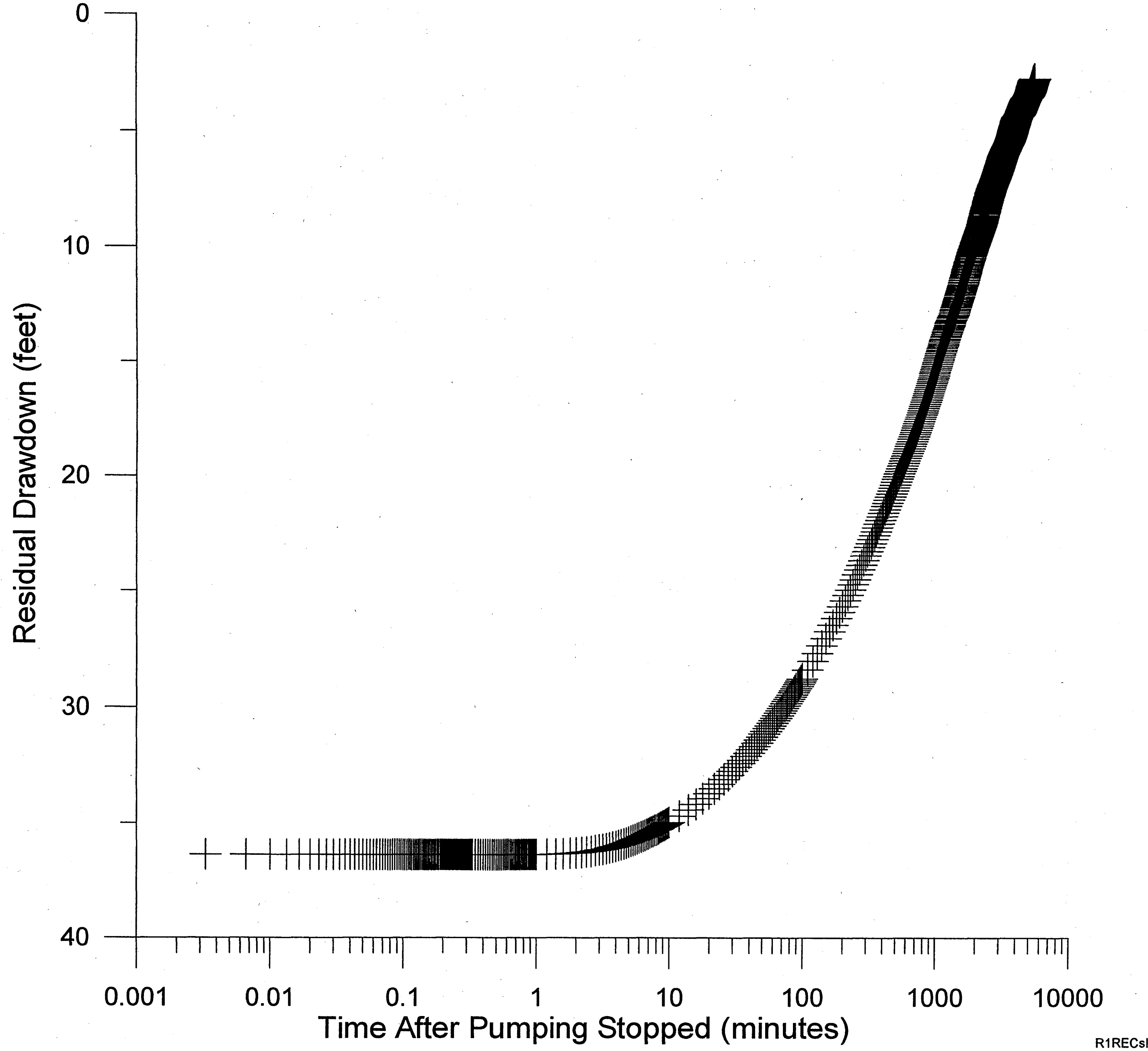

CROSSROADS VENTURES LLC
Belleayre Resort
Well R3
Drawdown (feet)
0
40
80
120
160
Elapsed Time (minutes)
0
1000
2000
3000
4000
5000
r3crl

APPENDIX E

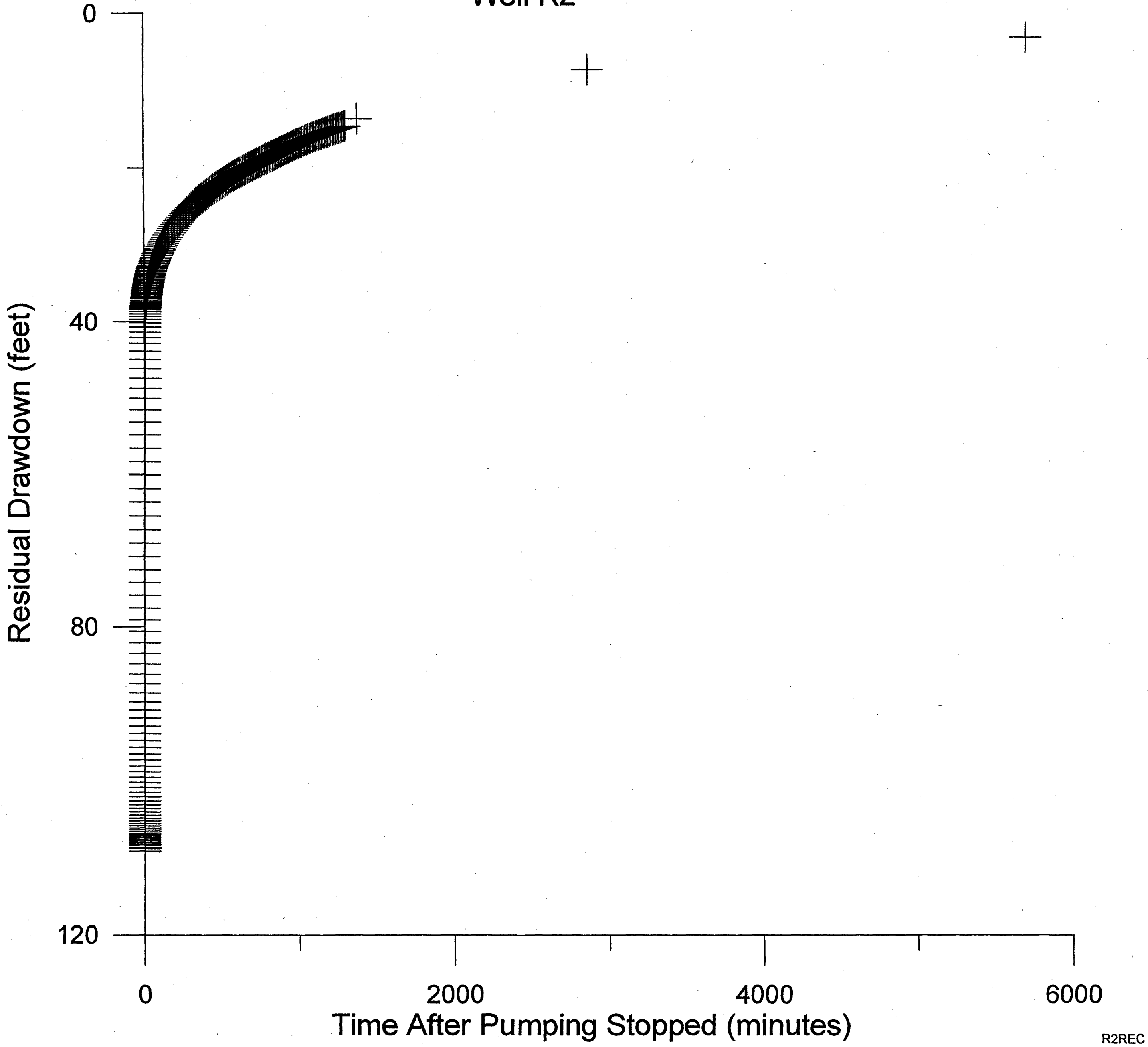
Recovery Graphs

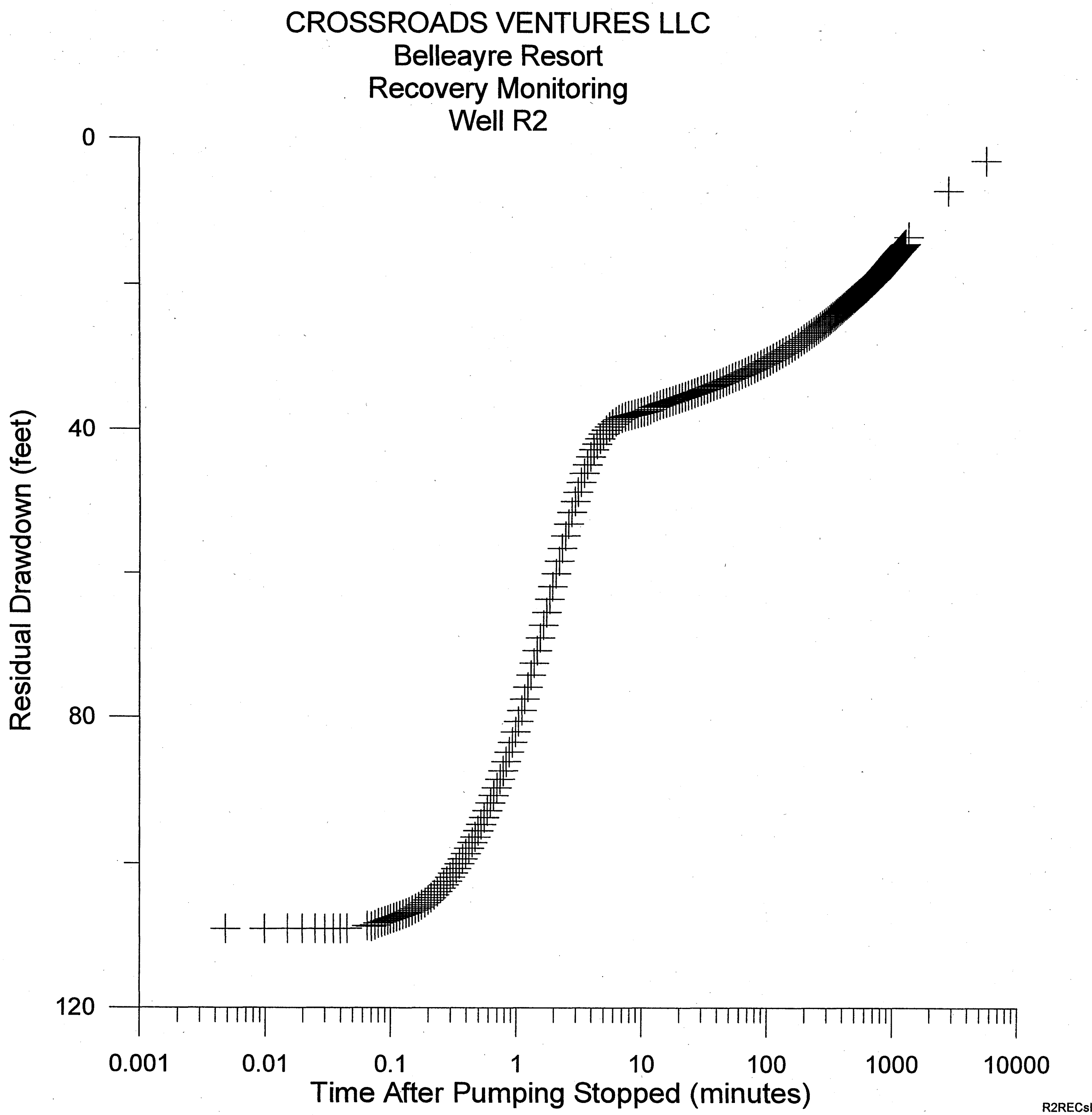

CROSSROADS VENTURES LLC
Belleayre Resort
Recovery Monitoring
Well R1
Residual Drawdown (feet)
0
10
20
30
40
0
2000
4000
6000
Time After Pumping Stopped (minutes)
R1REC

CROSSROADS VENTURES LLC
Belleayre Resort
Recovery Monitoring
Well R1

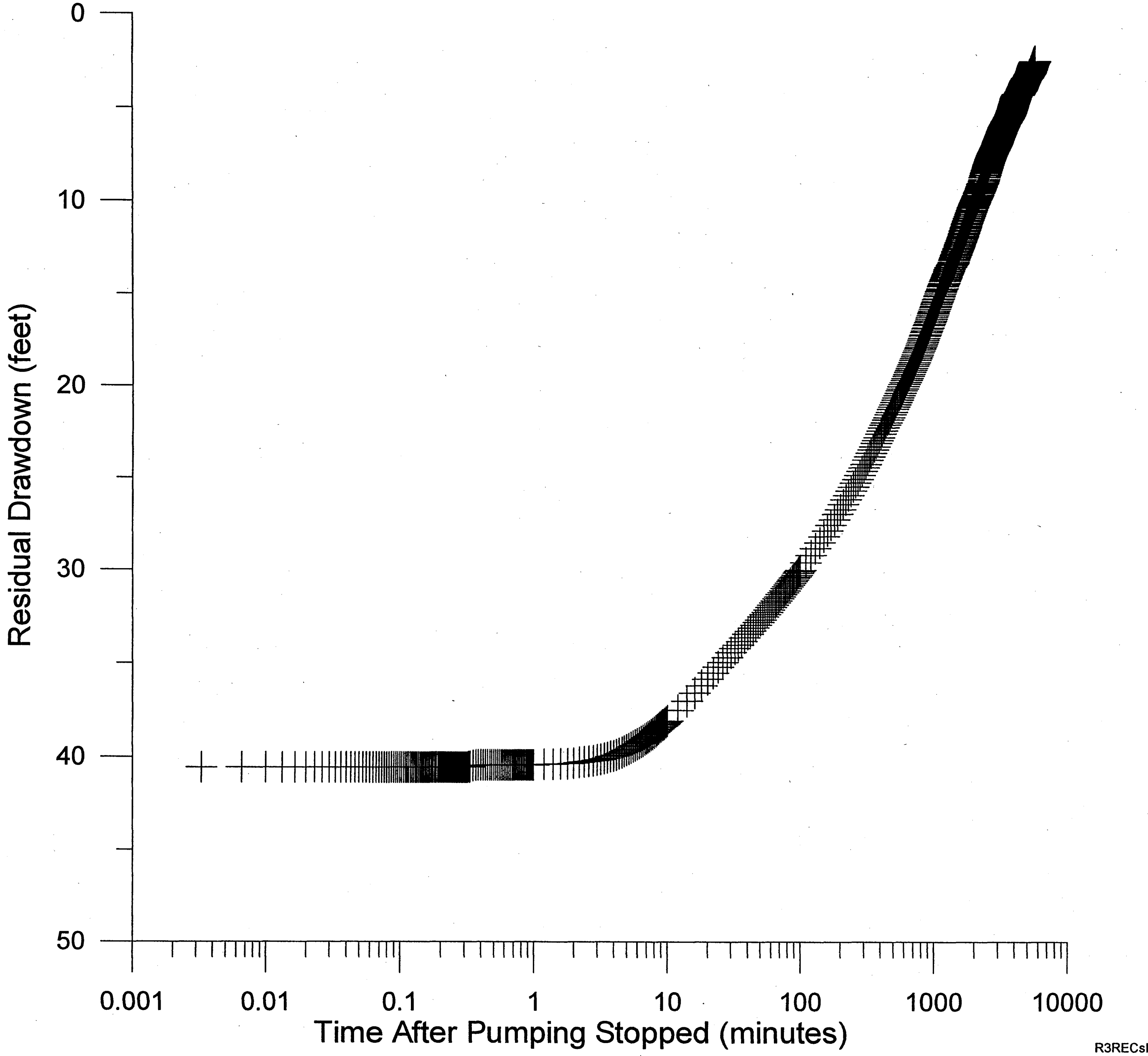


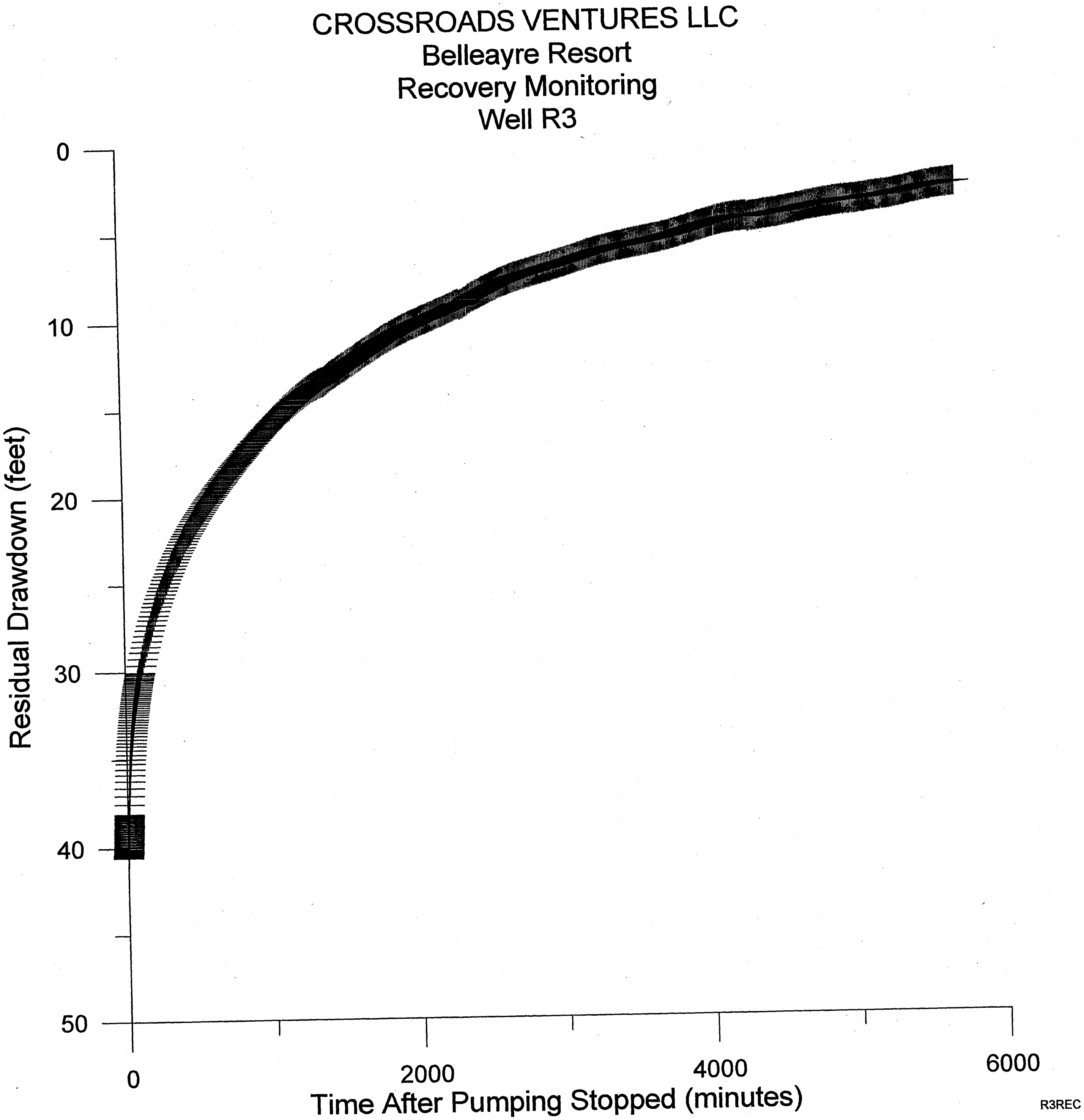
CROSSROADS VENTURES LLC
Belleayre Resort
Recovery Monitoring
Well R2




CROSSROADS VENTURES LLC
Belleayre Resort
Recovery Monitoring
Well R2
Residual Drawdown (feet)
0
40
80
120
0.001
0.01
0.1
1
10
100
1000
10000
Time After Pumping Stopped (minutes)
R2RECsl

CROSSROADS VENTURES LLC
Belleayre Resort
Recovery Monitoring
Well R3

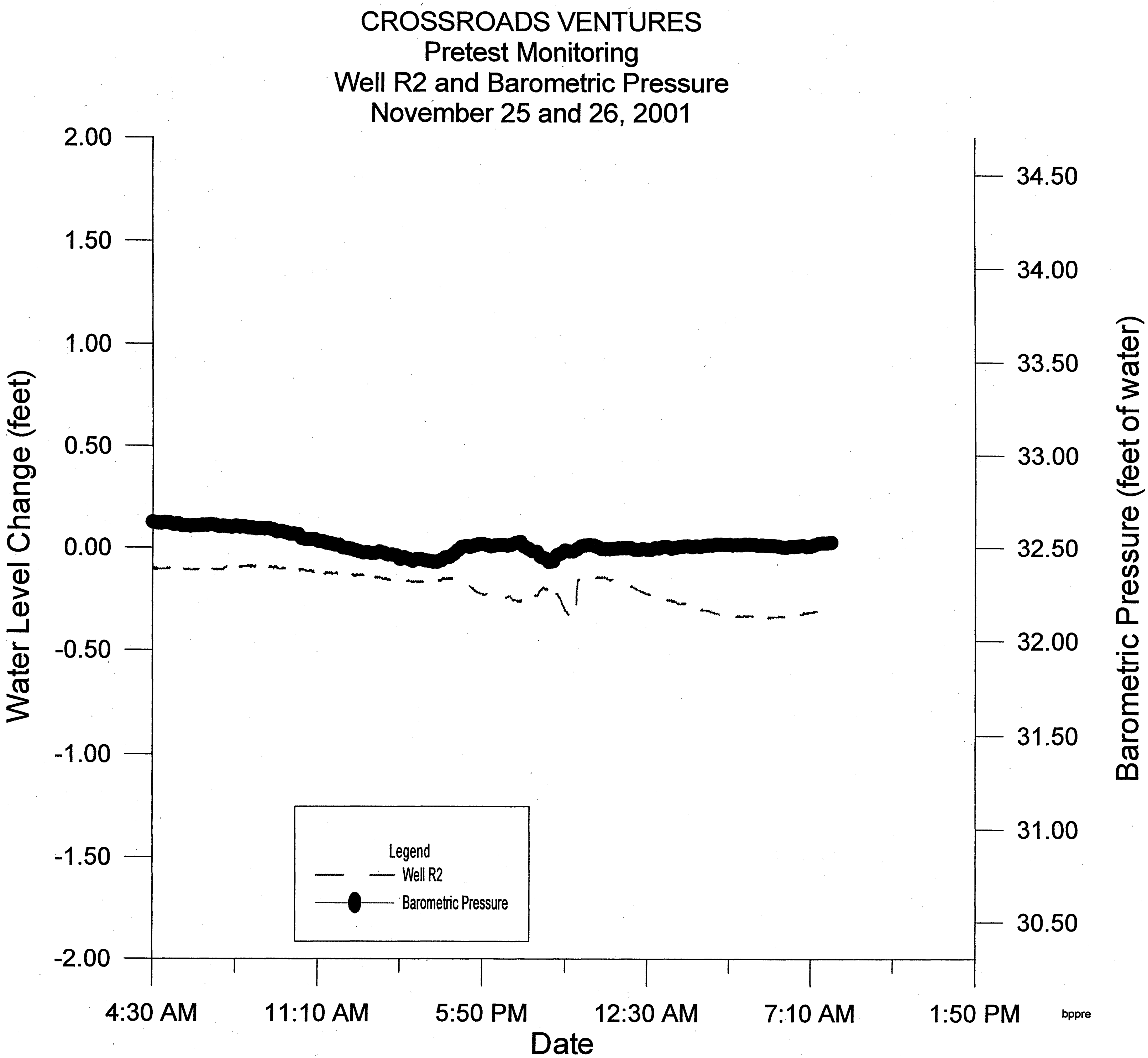




CROSSROADS VENTURES LLC
Belleayre Resort
Recovery Monitoring
Well R3
Residual Drawdown (feet)
0
10
20
30
40
50
0
2000
4000
6000
Time After Pumping Stopped (minutes)
R3REC

APPENDIX F

Pretest Data Graphs



CROSSROADS VENTURES
Pretest Monitoring
Well R2 and Barometric Pressure
November 25 and 26, 2001
2.00
1.50
1.00
0.50
0.00
-0.50
-1.00
-1.50
-2.00
Water Level Change (feet)
34.50
34.00
33.50
33.00
32.50
32.00
31.50
31.00
30.50
Barometric Pressure (feet of water)
Legend
Well R2
Barometric Pressure
4:30 AM
11:10 AM
5:50 PM
12:30 AM
7:10 AM
1:50 PM
Date
bppre

APPENDIX G

Laboratory Results

PHOENIX

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06040
Tel. (860) 645-1102 Fax (860) 645-0823

ACCREDITED IN ACCORDANCE WITH nelac

Analysis Report

December 21, 2001

FOR: Attn: Mr. Thomas Johnson
Alpha GeoScience
1071 Troy-Schenectady
Latham, NY 12110

Sample Information		Custody Information		Date	Time
Matrix:	WATER	Collected by:		11/29/01	9:15
Location Code:	ALPHAGEO	Received by:	SW	11/30/01	10:05
Project Code:		Analyzed by:	see "By" below		
P.O.#:	01135				

Laboratory Data

SDG I.D.: GAD78454

Client ID: CROSSROADS-BELLEAYRE WELL R2

Phoenix I.D.: AD78454

Parameter	Result	RL	Units	Date	Time	By	Reference
Silver	BDL	0.002	mg/L	12/05/01		EK	6010/200.7
Arsenic	0.016	0.003	mg/L	12/03/01		RS	200.9
Barium	0.196	0.002	mg/L	12/05/01		EK	6010/E200.7
Beryllium	BDL	0.001	mg/L	12/05/01		EK	6010/E200.7
Calcium	17.7	0.01	mg/L	12/05/01		EK	200.7/6010
Cadmium	BDL	0.001	mg/L	12/05/01		EK	6010/E200.7
Chromium	BDL	0.001	mg/L	12/05/01		EK	6010/E200.7
Copper	BDL	0.001	mg/L	12/05/01		EK	6010/E200.7
Iron	0.022	0.002	mg/L	12/05/01		EK	6010/E200.7
Hardness (CaCO3)	60.6	0.10	mg/L	12/06/01		RS	S2340B
Mercury	BDL	0.0002	mg/L	12/03/01		R/P	E245.1
Magnesium	3.99	0.01	mg/L	12/05/01		EK	200.7/6010
Manganese	0.100	0.002	mg/L	12/05/01		EK	6010/E200.7
Sodium	47.1	0.10	mg/L	12/05/01		EK	6010/E200.7
Nickel	BDL	0.002	mg/L	12/05/01		EK	6010/E200.7
Lead	BDL	0.001	mg/L	12/03/01		RS	200.9
Antimony	BDL	0.003	mg/L	12/04/01		RS	E200.9
Selenium	BDL	0.002	mg/L	12/05/01		RS	E200.9
Thallium	BDL	0.001	mg/L	12/03/01		RS	E200.9
Zinc - LDL	BDL	0.002	mg/L	12/05/01		EK	6010/E200.7
Alkalinity (CaCO3)	82	20	mg/L	12/03/01		CL	SM2320B
Chloride	66	3.0	mg/L	11/30/01		ESG	300.0
Color, True	BDL	1	P.C.U.	11/30/01	23:26	CD	EPA 110.2
Fluoride	0.16	0.10	mg/L	12/06/01		ESG	SM4500F C

Parameter	Result	RL	Units	Date	Time	By	Reference
Langelier Index	-0.52		pH units	12/10/01		CF	SM203
Nitrite as Nitrogen	BDL	0.01	mg/L	11/30/01	17:34	ESG	300.0
Nitrate as Nitrogen	0.24	0.10	mg/L	11/30/01	17:34	ESG	300.0
Odor	3	1	T.O.N.	11/30/01	23:26	CD	S207/140.1
pH	8.17	0.10	pH Units	11/30/01	20:30	CD	E150.1
Sulfate	4.2	3.0	mg/L	11/30/01		ESG	300.0
Total Cyanide (Drinking water)	BDL	0.01	mg/L	12/04/01		PJ	335.4
Tot. Diss. Solids	200	5.0	mg/L	12/03/01		CF	SM2540C
Turbidity	0.66	0.05	NTU	11/30/01	20:30	CD	S214A/E180.1
E. Coli	0	0	/100 mls.	11/30/01	11:50	RM	1103.1/9223B
Total Coliform	0	0	/100 mls.	11/30/01	11:50	RM	SM 9222B
Extraction	Completed			11/30/01		PL	
Mercury Digestion	Completed			12/03/01		TR	E245.1
Extraction of DW Pesticides	Completed			11/30/01		PL	508
Extraction of DW Herbicides	Completed			12/03/01		TH/	
Synthetic Organic Compounds							
Alachlor (Lasso)	<0.1	0.1	ug/L	12/04/01		OL	EPA525
Aldrin	<0.1	0.1	ug/L	12/04/01		OL	EPA525
Atrazine	<0.1	0.1	ug/L	12/04/01		OL	EPA525
Benzo(a)pyrene	<0.02	0.02	ug/L	12/04/01		OL	EPA525
Butachlor	<0.1	0.1	ug/L	12/04/01		OL	EPA525
Di (2-ethylhexyl) adipate	<0.6	0.6	ug/L	12/04/01		OL	EPA525
Di (2-ethylhexyl)phthalate	<0.6	0.6	ug/L	12/04/01		OL	EPA525
Dieldrin	<0.04	0.04	ug/L	12/04/01		OL	EPA525
Endrin	<0.01	0.01	ug/L	12/04/01		OL	EPA525
Heptachlor	<0.04	0.04	ug/L	12/04/01		OL	EPA525
Heptachlor epoxide	<0.02	0.02	ug/L	12/04/01		OL	EPA525
Hexachlorobenzene	<0.1	0.1	ug/L	12/04/01		OL	EPA525
Hexachlorocyclopentadiene	<0.1	0.1	ug/L	12/04/01		OL	EPA525
Lindane (gamma-BHC)	<0.02	0.02	ug/L	12/04/01		OL	EPA525
Methoxychlor	<0.1	0.1	ug/L	12/04/01		OL	EPA525
Metolachlor (Dual)	<0.1	0.1	ug/L	12/04/01		OL	EPA525
Metribuzin (Sencor)	<0.1	0.1	ug/L	12/04/01		OL	EPA525
Propachlor	<0.1	0.1	ug/L	12/04/01		OL	EPA525
Simazine	<0.07	0.07	ug/L	12/04/01		OL	EPA525
Carbamates HPLC							
3 Hydroxycarbofuran	<1.0	1.0	ug/L	12/04/01		OL	EPA 531
Aldicarb	<0.5	0.5	ug/L	12/04/01		OL	EPA 531
Aldicarb Sulfone	<0.4	0.4	ug/L	12/04/01		OL	EPA 531
Aldicarb Sulfoxide	<0.5	0.5	ug/L	12/04/01		OL	EPA 531
Carbaryl	<1.0	1.0	ug/L	12/04/01		OL	EPA 531
Carbofuran	<0.9	0.9	ug/L	12/04/01		OL	EPA 531
Methomyl	<0.5	0.5	ug/L	12/04/01		OL	EPA 531

Parameter	Result	RL	Units	Date	Time	By	Reference
Oxamyl	<1.0	1.0	ug/L	12/04/01		OL	EPA 531
EDB and DBCP Analysis							
1,2-Dibromo-3-Chloropropane (DBCP)	ND	0.02	ug/L	12/04/01		CN	504.1
1,2-Dibromoethane (EDB)	ND	0.02	ug/L	12/04/01		CN	504.1
Organophosphorus Pesticides							
Alachlor	ND	0.44	ug/L	12/04/01		CN	E507
Atrazine	ND	0.22	ug/L	12/04/01		CN	E507
Butachlor	ND	0.1	ug/L	12/04/01		CN	E507
Metolachlor	ND	0.1	ug/L	12/04/01		CN	E507
Metribuzin	ND	2.00	ug/L	12/04/01		CN	E507
Simazine	ND	0.15	ug/L	12/04/01		CN	E507
Pesticides/PCB's							
Aldrin	ND	0.05	ug/L	12/05/01		KCA	EPA508
Chlordane	ND	0.5	ug/L	12/05/01		KCA	EPA508
Dieldrin	ND	0.1	ug/L	12/05/01		KCA	EPA508
Endrin	ND	0.1	ug/L	12/05/01		KCA	EPA508
Heptachlor	ND	0.1	ug/L	12/05/01		KCA	EPA508
Heptachlor Epoxide	ND	0.05	ug/L	12/05/01		KCA	EPA508
Lindane	ND	0.05	ug/L	12/05/01		KCA	EPA508
Methoxychlor	ND	0.5	ug/L	12/05/01		KCA	EPA508
PCB-1016	ND	0.5	ug/L	12/05/01		KCA	EPA508
PCB-1221	ND	0.5	ug/L	12/05/01		KCA	EPA508
PCB-1232	ND	0.5	ug/L	12/05/01		KCA	EPA508
PCB-1242	ND	0.5	ug/L	12/05/01		KCA	EPA508
PCB-1248	ND	0.5	ug/L	12/05/01		KCA	EPA508
PCB-1254	ND	0.5	ug/L	12/05/01		KCA	EPA508
PCB-1260	ND	0.5	ug/L	12/05/01		KCA	EPA508
Propachlor	ND	0.5	ug/L	12/05/01		KCA	EPA508
Toxaphene	ND	1.0	ug/L	12/05/01		KCA	EPA508
Herbicides							
2,4,5-T	ND	0.2	ug/L	12/04/01		JH	EPA 515.1
2,4,5-TP	ND	0.2	ug/L	12/04/01		JH	EPA 515.1
2,4-D	ND	1.0	ug/L	12/04/01		JH	EPA 515.1
Dalapon	ND	5.0	ug/L	12/04/01		JH	EPA 515.1
Dicamba	ND	0.5	ug/L	12/04/01		JH	EPA 515.1
Dinoseb	ND	0.5	ug/L	12/04/01		JH	EPA 515.1
Pentachlorophenol	ND	0.2	ug/L	12/04/01		JH	EPA 515.1
Picloram	ND	0.5	ug/L	12/04/01		JH	EPA 515.1
Volatiles							
1,1,1,2-Tetrachloroethane	ND	0.5	ug/L	12/01/01		RM	524.2
1,1,1-Trichloroethane	ND	0.5	ug/L	12/01/01		RM	524.2
1,1,2,2-Tetrachloroethane	ND	0.5	ug/L	12/01/01		RM	524.2
1,1,2-Trichloroethane	ND	0.5	ug/L	12/01/01		RM	524.2

Client ID: CROSSROADS-BELLEAYRE WELL R2 | Phoenix I.D.: AD78454

Parameter	Result	RL	Units	Date	Time	By	Reference
1,1-Dichloroethane	ND	0.5	ug/L	12/01/01		RM	524.2
1,1-Dichloroethene	ND	0.5	ug/L	12/01/01		RM	524.2
1,1-Dichloropropene	ND	0.5	ug/L	12/01/01		RM	524.2
1,2,3-Trichlorobenzene	ND	0.5	ug/L	12/01/01		RM	524.2
1,2,3-Trichloropropane	ND	0.5	ug/L	12/01/01		RM	524.2
1,2,4-Trichlorobenzene	ND	0.5	ug/L	12/01/01		RM	524.2
1,2,4-Trimethylbenzene	ND	0.5	ug/L	12/01/01		RM	524.2
1,2-Dibromo-3-chloropropane	ND	0.5	ug/L	12/01/01		RM	524.2
1,2-Dibromoethane	ND	0.5	ug/L	12/01/01		RM	524.2
1,2-Dichlorobenzene	ND	0.5	ug/L	12/01/01		RM	524.2
1,2-Dichloroethane	ND	0.5	ug/L	12/01/01		RM	524.2
1,2-Dichloropropane	ND	0.5	ug/L	12/01/01		RM	524.2
1,3,5-Trimethylbenzene	ND	0.5	ug/L	12/01/01		RM	524.2
1,3-Dichlorobenzene	ND	0.5	ug/L	12/01/01		RM	524.2
1,3-Dichloropropane	ND	0.5	ug/L	12/01/01		RM	524.2
1,4-Dichlorobenzene	ND	0.5	ug/L	12/01/01		RM	524.2
2,2-Dichloropropane	ND	0.5	ug/L	12/01/01		RM	524.2
2-Butanone	ND	0.5	ug/L	12/01/01		RM	524.2
2-Chlorotoluene	ND	0.5	ug/L	12/01/01		RM	524.2
4-Chlorotoluene	ND	0.5	ug/L	12/01/01		RM	524.2
4-Isopropyltoluene	ND	0.5	ug/L	12/01/01		RM	524.2
Benzene	ND	0.5	ug/L	12/01/01		RM	524.2
Bromobenzene	ND	0.5	ug/L	12/01/01		RM	524.2
Bromochloromethane	ND	0.5	ug/L	12/01/01		RM	524.2
Bromodichloromethane	ND	0.5	ug/L	12/01/01		RM	524.2
Bromoform	ND	0.5	ug/L	12/01/01		RM	524.2
Bromomethane	ND	0.5	ug/L	12/01/01		RM	524.2
Carbon Tetrachloride	ND	0.5	ug/L	12/01/01		RM	524.2
Chlorobenzene	ND	0.5	ug/L	12/01/01		RM	524.2
Chloroethane	ND	0.5	ug/L	12/01/01		RM	524.2
Chloroform	ND	0.5	ug/L	12/01/01		RM	524.2
Chloromethane	ND	0.5	ug/L	12/01/01		RM	524.2
cis-1,2-Dichloroethene	ND	0.5	ug/L	12/01/01		RM	524.2
cis-1,3-Dichloropropene	ND	0.5	ug/L	12/01/01		RM	524.2
Dibromochloromethane	ND	0.5	ug/L	12/01/01		RM	524.2
Dibromomethane	ND	0.5	ug/L	12/01/01		RM	524.2
Dichlorodifluoromethane	ND	0.5	ug/L	12/01/01		RM	524.2
Ethylbenzene	ND	0.5	ug/L	12/01/01		RM	524.2
Hexachlorobutadiene	ND	0.5	ug/L	12/01/01		RM	524.2
Isopropylbenzene	ND	0.5	ug/L	12/01/01		RM	524.2
Methyl Tert Butyl Ether	ND	1.0	ug/L	12/01/01		RM	524.2
Methylene Chloride	ND	0.5	ug/L	12/01/01		RM	524.2
n-Butylbenzene	ND	0.5	ug/L	12/01/01		RM	524.2
Naphthalene	ND	0.5	ug/L	12/01/01		RM	524.2

Client ID: **CROSSROADS-BELLEAYRE WELL R2** Phoenix I.D.: **AD78454**

Parameter	Result	RL	Units	Date	Time	By	Reference
o-Xylene	ND	0.5	ug/L	12/01/01		RM	524.2
p- and m- Xylene	ND	0.5	ug/L	12/01/01		RM	524.2
Propylbenzene	ND	0.5	ug/L	12/01/01		RM	524.2
sec-Butylbenzene	ND	0.5	ug/L	12/01/01		RM	524.2
Styrene	ND	0.5	ug/L	12/01/01		RM	524.2
tert-Butylbenzene	ND	0.5	ug/L	12/01/01		RM	524.2
Tetrachloroethylene	ND	0.5	ug/L	12/01/01		RM	524.2
Toluene	ND	0.5	ug/L	12/01/01		RM	524.2
Total Trihalomethanes (TTHM)	ND	0.5	ug/L	12/01/01		RM	524.2
trans-1,2-Dichloroethene	ND	0.5	ug/L	12/01/01		RM	524.2
trans-1,3-Dichloropropene	ND	0.5	ug/L	12/01/01		RM	524.2
Trichloroethylene	ND	0.5	ug/L	12/01/01		RM	524.2
Trichlorofluoromethane	ND	0.5	ug/L	12/01/01		RM	524.2
Vinyl Chloride	ND	0.5	ug/L	12/01/01		RM	524.2
%4-Bromofluorobenzene (Surrogate)	90		%	12/01/01		RM	524.2

Comments: **ND=Not detected BDL = Below Detection Limit RL=Reporting Limit**

The 525.2, 531.1 were analyzed by NY state certified lab #11398.

If there are any questions regarding this data, please call Phoenix Client Services at extension 200.

Phyllis Shiller

Phyllis Shiller, Laboratory Director
December 21, 2001

APPENDIX H

Drawdown and Yield Projection

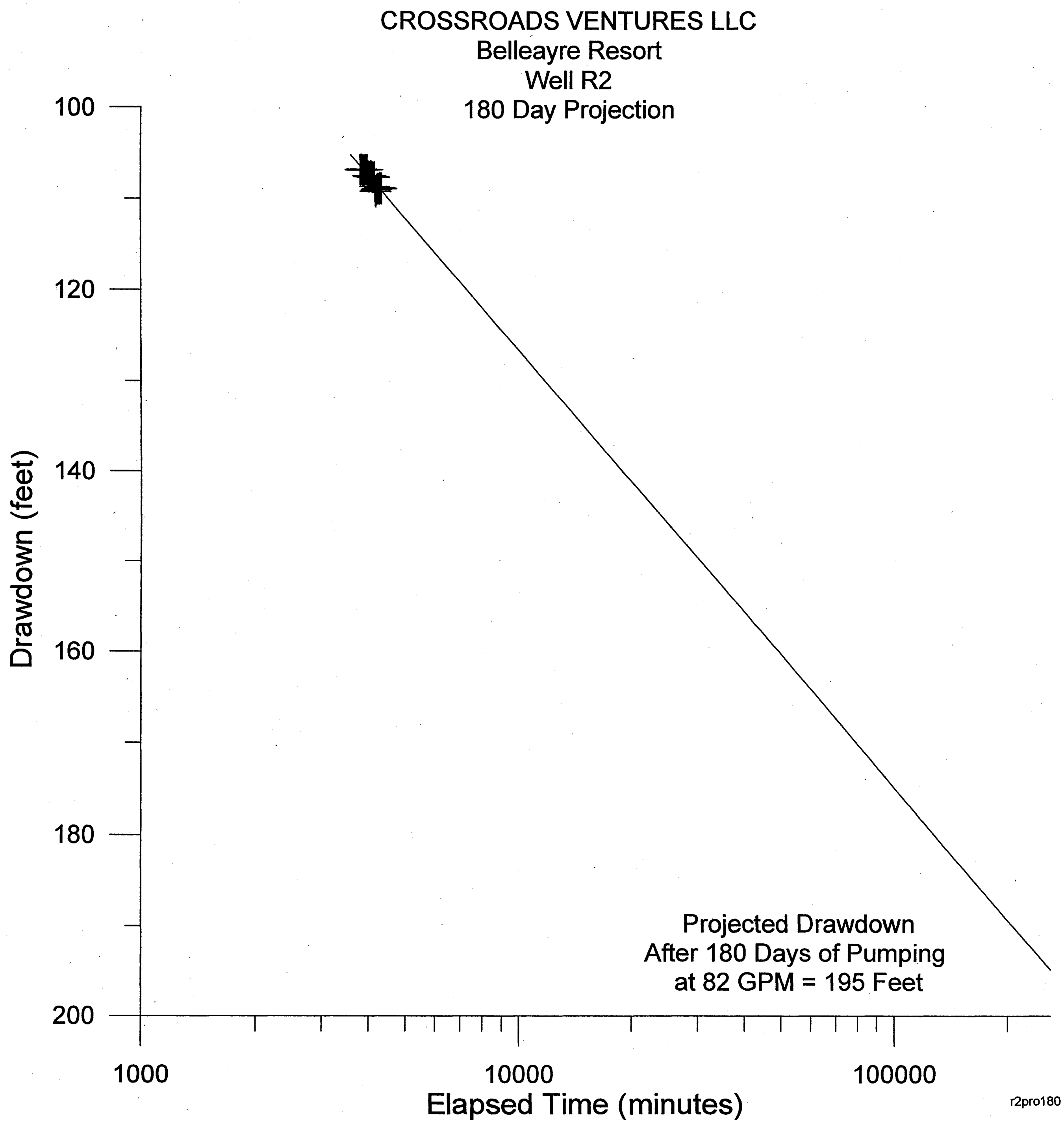

CROSSROADS VENTURES LLC
Belleayre Resort
Well R2
180 Day Projection
Drawdown (feet)
100
120
140
160
180
200
Elapsed Time (minutes)
1000
10000
100000
Projected Drawdown
After 180 Days of Pumping
at 82 GPM = 195 Feet
r2pro180

Exhibit F

Simultaneous Testing Report

SIMULTANEOUS TESTING OF WELLS R1 AND R2

Big Indian Plateau
Belleayre Resort at Catskill Park
Pine Hill, New York

Prepared for:

Crossroads Ventures LLC
72 Andrews Lane Road
P.O. Box 267
Mount Tremper, New York 12457

November 2002

ALPHA GEOSCIENCE

ALPHA GEOSCIENCE
Geology
Hydrology
Remediation
Water Supply

Simultaneous Testing of R1 and R2

Big Indian Plateau
Belleayre Resort at Catskill Park
Pine Hill, New York

Prepared for:

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72 Andrews Lane Road
P.O. Box 267
Mount Tremper, New York 12457

Prepared by:

Alpha Geoscience
679 Plank Road
Clifton Park, New York 12065

November 2002

TABLE OF CONTENTS

APPENDICES

EXECUTIVE SUMMARY

A simultaneous pumping test was performed at wells R1 and R2 for the proposed Belleayre Resort Big Indian Plateau facility. Wells R1 and R2 were installed to provide primary sources of irrigation and potable water, respectively. The objective of the pumping test was to evaluate the combined well yield, aquifer response to pumping both wells at the same time, and water quality. The simultaneous pumping test involved pumping wells R1 and R2 at average rates of 57 gpm and 71 gpm, respectively for 72 hours beginning on September 17, 2002. Total drawdowns of 67.78 feet and 115.0 feet were measured at wells R1 and R2, respectively, during the constant rate test. Water level and water quality data show that pumping of the two wells did not impact Birch Creek. Long term pumping projections, based on 180 days of continuous pumping of well R1 at 57 gpm and well R2 at 71 gpm, without the positive effects of recharge or negative effects of a limited aquifer; produced total drawdowns of 125 feet and 163 feet, respectively. These projections indicate that at the end of 180 days there will be available drawdown of approximately 56 feet and 71 feet, respectively, at wells R1 and R2.

Water quality analysis show that well R2 can provide a potable water source with minimal treatment for disinfection and odor. The well R2 laboratory water quality analyses show that odor was the only parameter where the NYSDOH- Part 5 MCL was exceeded. A sulfur odor was detected at well R2 throughout the simultaneous pumping test. The presence of sulfur does not preclude the use of the well as a potable water supply.

The review and analysis of data collected during the simultaneous, constant rate test demonstrate that well R1 is capable of sustaining a long term, irrigation pond replenishment rate of 57 gpm and well R2 is capable of sustaining a long term, average daily, potable demand of 64 gpm without adversely impacting neighboring water supplies and surface water bodies.

1.0 INTRODUCTION

1.1 Objective

This report presents the results of a simultaneous pumping test of wells R1 and R2 for the proposed Belleayre Resort Big Indian Plateau facility in the Town of Shandaken, New York. The primary objective of this testing was to evaluate the combined well yield, aquifer response to pumping and water quality. The data analysis and report preparation was completed by Alpha Geoscience (Alpha) at the request of Crossroads Ventures LLC (Crossroads).

1.2 Background

Three wells (R1, R2 and R3) were installed in 2000 and 2001 on Crossroads' property located on Friendship Manor Road, Pine Hill, New York (Figure 1). The relative locations of the three wells on the property are shown on Figure 2. The approximate distances from well R1 to wells R2 and R3 are 265 feet and 195 feet, respectively. The distances from wells R1 and R2 to Birch Creek are approximately 50 feet and 70 feet, respectively.

Well R1 was installed to provide a primary source of water for the Big Indian Plateau facility's irrigation ponds. It is anticipated that well R1 will be used to supply the 57 gpm projected average replenishment rate for the ponds. Well R2 was installed to provide a primary source of potable water for the Big Indian Plateau facility. It is anticipated that well R2 will be used to supply the facility's average daily demand of 64 gallons per minute (gpm). Crossroads does not plan to use well R3 as a source of water at this time. The results of individual testing of wells R1 and R2 are presented in Alpha's November 2002 and January 2002 reports, respectively.

Crossroads' personnel provided information on the location of private water supplies and septic systems in this area. All residential or commercial properties that use their own well to provide water are located more than 1,500 feet from wells R1 and R2, except a single residential well located approximately 675 feet to the northeast. Based on local inquiry, there are no known septic systems within 1,500 feet of wells R1 and R2.

2.0 SCOPE OF WORK

The scope of services provided for the simultaneous testing of wells R1 and R2 was described in Alpha's August 27, 2002 letter to Mr. Dean Palen of the Ulster County Department of Health (UCDOH). The August 27, 2002 scope of services letter is presented in Appendix A. The following tasks were performed as described in the letter.

- Conducted a 72-hour constant rate, simultaneous pumping test at wells R1 and R2;
- Collected water quality samples at well R2 for analysis by a New York State Department of Health (NYSDOH) approved laboratory for parameters defined in the New York State Sanitary Code - Part 5 for community water systems;
- Analyzed pumping test data to project long term yield and potential pumping impacts.

3.0 METHODS

3.1 Test Setup

The 72-hour constant rate test was conducted using submersible pumps supplied by Titan Drilling Corporation of Arkville, New York (Titan). Water was routed from the well heads using 4-inch diameter plastic pipe and discharged to Birch Creek at locations approximately 200 feet and 150 feet, respectively, from wells R1 and R2. Ball valve and pipe orifice systems were used to regulate and measure flow rates. The accuracy of the pipe orifice systems was checked by measuring the time to fill a 32 gallon drum.

Titan installed two plastic tubes in wells R1 and R2 to accommodate a probe for manual water level measurements and a transducer for automated water level and temperature measurements. Field personnel used an electronic water level meter for the manual measurements and an In-situ data logger and transducer system for automated measurements. Field data were collected by Alpha, Titan and Crossroads personnel.

Water levels were also monitored at well R3, four residential wells, the Pine Hill Water Company Well PH-1, and the Station Road Well during the constant rate test. One of the monitored residential water supply wells (Residential Well 1) is located on the north side of NYS Route 28 and approximately 675 feet east of well R1. Residential Well 2 and Residential Well 3, which are owned by a Crossroads' employee, were also monitored. These wells are located approximately 2760 feet east and 3300 feet east, respectively, from well R1. The fourth monitored residential well (Residential Well 4) is located approximately 1500 feet east of well R1. Well PH-1 and Station Road Well are located approximately 7,400 feet and 6,000 feet, respectively from well R1.

Wells R1, R2 and R3 are bedrock wells with a total depths of 224 feet, 274 feet and 349 feet, respectively. Titan's records show that Residential Well 1 has a total depth of 50 feet and was completed in unconsolidated deposits. Residential Well 2 is reported to be a shallow well with a total depth of approximately 8 feet and is completed in unconsolidated deposits. Residential Well 3 has a reported total depth of approximately 145 feet and is completed in bedrock. Residential Well 4 is most likely a bedrock well given its total depth measurement of 155 feet. It could not be determined if the measurement was the total well depth or the depth to the submersible pump. Residential well 4 is no longer in use because the residence has been connected to the Pine Hill Water Company's water supply system.

Precipitation measurements were collected during the constant rate test. An all weather rain gauge was installed at the property where Residential Well 2 is located.

3.2 Constant Rate Test and Recovery

The constant rate test involved pumping wells R1 and R2 at average rates of 57 gpm and 71 gpm, respectively, for 72 hours beginning on September 17, 2002 at 9:30 am and ending on September 20, 2002 at 9:30 am. Graphs of elapsed time and drawdown data for wells R1 and R2 are presented in Appendix B. Water level and water temperature measurements collected in wells R1 and R2 are presented in Tables 1 and 2, respectively. Pipe orifice flow rate measurements and measurements based on the time to fill a 32 gallon drum for wells R1 and R2 are presented in Tables 3 and 4, respectively.

Water level monitoring was also performed after the pumping phase of the test to record recovery rates. Water level recovery data collected at wells R1 and R2 are presented in Tables 5 and 6, respectively. Graphs of time after pump shut down and residual drawdown for wells R1 and R2 are presented in Appendix C.

3.3 Water Quality Testing

Samples were collected from the pump discharge for wells R1 and R2 for field analysis of conductivity, pH, temperature and turbidity. Samples were collected periodically to evaluate water quality changes during the progression of the test.

Water quality samples were collected at well R2 on September 20, 2002 for laboratory analysis of parameters defined in New York State's Sanitary Code - Part 5. The samples were collected after approximately 71 hours of pumping. Water quality samples were previously collected at well R2 on November 29, 2001 for analysis of the Part 5 parameters. The laboratory results from that previous sampling event are presented in Alpha's January 2002 report. The sampling and analysis were repeated at well R2 in September 2002 in order to evaluate water quality after a greater quantity of water was pumped from the bedrock aquifer as a result of simultaneous pumping of wells R1 and R2. All laboratory analyses were conducted by Phoenix Environmental Laboratories, Inc. of Manchester, Connecticut (Phoenix). Phoenix is a NYSDOH - certified laboratory.

3.4 Ground Water/Surface Water Evaluation

The hydraulic connection between the pumping wells, Birch Creek and adjacent wetland area was evaluated during the constant rate test through a comparison of water level and water quality monitoring data. Well Points (WP-1 and WP-2), which have total depths of 10.2 feet and 7.9 feet, respectively, were utilized to monitor the unconsolidated deposits near Birch Creek. The connection to Birch Creek was evaluated by monitoring two stream level monitoring gauges, SG-1 and SG-2, which were installed in Birch Creek approximately 55 feet south and 140 feet southeast of well R1, respectively. Impacts to a wetland area were evaluated using a water level monitoring gauge (P-1), which was installed approximately 275 feet southeast of well R2 at a pond located within the wetland area.

Field water quality data were collected from well R1, well R2 and Birch Creek. The water quality data included temperature, pH, conductivity, and turbidity. Temperature data was collected at wells R1 and R2 using automated probes installed down the wells in a stilling tube. All other well water quality data was collected at the pipe orifice discharge point. All Birch Creek water quality data, except temperature, was collected at a sample point between stream gauges SG-1 and SG-2. A data logger installed at the stream gauge SG-1 location was used to collect Birch Creek temperature data.

4.0 RESULTS

4.1 Aquifer Testing

4.1.1 Conditions

Weather conditions prior to and during the constant rate test were drier than normal. The NYSDEC reported that southeastern New York, including Ulster County, had reached a drought watch status as of September 1, 2002. The NYSDEC reported that the precipitation deficit for the three months of June - August was generally 2 to 4 inches for the Catskill Region. The nine month precipitation deficit for the Catskill region was 6 to 8 inches. The drought conditions provided a good opportunity to evaluate well performance during dry conditions with limited recharge from precipitation.

The site did not received rainfall during the pumping portion of the constant rate test. A total of 0.85 inches of rainfall was recorded prior to pumping from 10:00 pm on September 15, 2002 to 8:00 am on September 17, 2002. A total of 0.82 inches of rainfall was recorded after pumping was stopped from 9:00 pm on September 21, 2002 to 12:00 pm on September 22, 2002

4.1.2 Pretest Data Analysis

Data collected prior and during the constant rate test were used to evaluate natural water level trends and the influences of barometric pressure on the drawdown patterns observed during the test. If significant trends were observed prior to the test, then they could be used to separate those natural drawdowns from that caused solely by pumping. This data were collected with an electronic water level meter and automated, In-situ water level and barometric pressure data loggers.

The data show that water levels in wells R1 and R2 were relatively stable before pumping began. Pretest monitoring showed that water levels in wells R1 and R2 changed 0.001 feet and 0.031 feet, respectively, in the 4 hour pretest period from 4:08 am to 8:08 am on September 17. Pretest barometric pressure data show that barometric pressure was relatively stable prior to the pumping test. The change in barometric pressure throughout the constant rate test was relatively small compared to the amount of water level change (drawdown) due to pumping. The evaluation of the pretest data did not show trends that would require that the constant rate test data be adjusted prior to analysis.

4.1.3 Constant Rate Test

Total drawdowns of 67.78 feet and 115.0 feet were measured at wells R1 and R2, respectively, during the constant rate test. There were approximately 113 feet of available drawdown in well R1 at the end of the test based on a pump setting of 210 feet below grade, and there were approximately 119 feet of available drawdown in well R2 at the end of the test based on a pump setting of 260 feet below grade. The semi-log graphs (Appendix B) show that the drawdown data for wells R1 and R2 fall on a straight line for the final 3,800 minutes of pumping. The drawdown produced by pumping wells R1 and R2 beyond 72 hours is expected to fall on the extension of these straight lines unless the bedrock aquifer receives recharge, a hydrogeologic (aquifer) boundary is encountered, the wells are pumped intermittently, or the wells are pumped at rates that are different than the test rates.

Less drawdown can be expected when the aquifer receives recharge from precipitation and if a positive hydraulic boundary, such as a recharge source like a lake or stream, is reached by the pumping drawdown. If a negative boundary, such as the edge or outer limit of the bedrock aquifer, is encountered, then wells R1 and R2 can be expected to be drawn down at a greater rate. More drawdown can be expected if the wells are pumped at higher rates and less drawdown is expected at lower pumping rates.

The total drawdown measured at well R3 was 54.99 feet. Water level data collected at well R3 are presented in Table 7, and the water level data collected at Residential Well 1 are presented in Table 8. The water level data did not conclusively show that Residential Well 1 was hydraulically influenced by the simultaneous pumping of wells R1 and R2. The water level in Residential Well 1 followed a repeating rising and falling trend typical of a well that is pumped for short periods. The water level change caused by pumping to supply the residence may be masking some drawdown due to the pumping of wells R1 and R2. This drawdown effect, if present, is small and is not expected to limit the ability of Residential Well 1 to provide a residential water supply.

Water level data collected at Residential wells 2 and 3, Pine Hill Water Company well PH-1 and the Station Road Well are presented in Tables 9, 10, 11 and 12, respectively. The water level data show that the pumping of wells R1 and R2 did not hydraulically influence these wells. The water level in Residential well 2 was stable throughout the pumping and recovery periods of the test. The artesian conditions at Residential well 3 consistently produced flowing water through a well overflow pipe when this well was not in use. The rate of overflow, estimated visually, was consistent throughout the test pumping and recovery periods. The measured water levels in well PH-1 and the Station Road well showed little variation and no discernable decline during the period when wells R1 and R2 were pumping.

Water level data collected at Residential well 4 are presented in Table 13. The water level data indicate that Residential well 4 is hydraulically influenced by the pumping of wells R1 and R2 because the water level in this well declined when R1 and R2 were pumping and rose when the pumps were shut off. A total water level decline of 18.95 feet was recorded at this well during the constant rate test. The long term impact of this hydraulic influence is not addressed herein because Residential well 4 is not used as a water source.

4.1.4 Recovery

Water level recovery was monitored in wells R1 and R2 after the cessation of pumping on September 20, 2002. Recovery to 91% of pretest water levels was measured at well R1 approximately 4318 minutes after pumping stopped. Recovery to 95% of pretest water levels was measured at well R2 approximately 4318 minutes after shutting off the pump. The data for wells R1 and R2 show that water levels experienced significant rebound, but did not return to pretest levels in three days of recovery monitoring. The measured water level recovery in these wells is consistent with the observed period of dry weather conditions when the bedrock aquifer received little or no recharge prior to and during the pumping test. The recovery data show that the bedrock aquifer will require recharge to sustain the combined pumping of wells R1 and R2 over periods that extend beyond 180 days. The bedrock aquifer at the site typically receives some recharge within a period of six months or less. The site area was actually experiencing a drought and was under a drought watch at the time of the test. Despite the observed drought conditions, the water level monitoring showed that the bedrock aquifer received recharge soon after the simultaneous test was completed. A total of 7.31 inches of rainfall was recorded during the period of September 20, 2002 to October 17, 2002. Water level data collected on October 17, 2002 show that the water levels in wells R1 and R2 rose 1.57 feet and 1.72 feet, respectively, above the pretest levels. The area usually experiences more rainfall and associated recharge than was experienced during the test and the period of time leading up to the test.

4.2 Water Quality

Review of the field water quality data for well R1 (Table 14) and well R2 (Table 15) shows that pH was relatively stable throughout the pumping period with values of 7.4 to 7.6 and 8.2 to 8.4, respectively. Turbidity values measured during the constant rate test were generally higher at well R1. Turbidity measurements of 1.71 to 6.56 Nephelometric turbidity units (NTUs) were recorded at well R1 during the pumping test. Turbidity readings at well R2 dropped significantly after the first measurement on September 17, 2002. The temperature of the well discharges (Tables 1 and 2) was stable throughout the test with values in a range of 47.75 to 48.18 °F and 48.16 to 48.37 °F for wells R1 and R2, respectively. Conductivity was generally higher at well R2 with values in a range of 203 to 259 micromhos (us) and 120 to 146 us at wells R2 and R1, respectively.

A sulfur odor, which is the dissolved gas, hydrogen sulfide, was detected at the well R2 discharge by the field personnel. The sulfur odor persisted throughout the test with no variation in strength based on olfactory observations. A sulfur odor was also detected at the well R2 discharge during previous (November, 2001) testing. Frimpter (1985) states that about 24 percent of the wells tapping shale in Ulster County yield some hydrogen sulfide. The presence of sulfur at low levels in the water may require treatment to address taste and odor; however, it does not preclude use as a potable supply. The results of the laboratory analysis (Appendix D) show that well R2 can provide a potable water source with minimal treatment for disinfection and odor. The laboratory result for odor was a Threshold Odor Number (TON) of 4. The NYSDOH Maximum Contaminant Level (MCL) for odor is a TON of 3. The odor detected in the samples is most likely related to hydrogen sulfide that was present at 0.1 milligrams per liter (mg/l). Sodium was detected at a concentration of 55.0 mg/l; however, there is no established MCL for sodium. The laboratory reported value for the Langelier Index was - 0.46, which shows that the water has moderately aggressive corrosive characteristics.

Corrosive water may require treatment or buffering; however, it does not preclude use as a potable water supply.

Comparison of the November 2001 and September 2002 laboratory results for well R2 show that water quality was similar on these two sampling dates. The result for odor did increase from 3 TON in November 2001 to 4 TON in September 2002. The September 2002 result exceeded the NYSDOH MCL for odor of 3 TON.

4.3 Ground Water/Surface Water Evaluation

Water level data collected at well points WP-1 and WP-2, from stream gauges SG-1 and SG-2, and at pond gauge P-1 during the constant test are presented in Tables 16, 17, 18, 19 and 20, respectively. Field water quality data collected at well R1 and well R2 are presented in Tables 14 and 15, respectively. Field water quality data for Birch Creek are presented in Tables 21 and 22.

The water level and water quality data collected during the constant rate test show that pumping at wells R1 and R2 did not impact Birch Creek or the wetland pond. Water levels at WP-1, WP-2, SG-1, SG-2 and P-1 did not show a discernable trend during R1 and R2 pumping.

The pretest water levels at Birch Creek, WP-1, WP-2 and bedrock wells R1, R2 and R3 were used to evaluate the hydraulic connection between surface water and the bedrock aquifer. The pretest water level elevations in the bedrock wells were more than 15 feet lower than the water level elevation in Birch Creek and Well Points WP-1 and WP-2. Pretest water level elevations at the bedrock wells, well points and Birch Creek would be expected to be similar if the bedrock aquifer and Birch Creek were hydraulically connected.

The comparison of field water quality data showed that the quality of water at wells R1 and R2 (Table 14 and 15) and Birch Creek (Tables 21 and 22) was distinctly different throughout the test. Similar water quality would be expected if the Birch Creek and the bedrock wells were hydraulically connected. A comparison of pH, conductivity and turbidity results show that the average values for these parameters were higher for the samples collected at wells R1 and R2 than those from Birch Creek. The temperature values were considerably lower for wells R1 and R2 than the creek. Temperature values for Birch Creek were recorded within a range of 53.19 to 62.85 °F throughout the monitoring period. The temperature measurements at wells R1 and R2 (Tables 1 and 2) were relatively stable at approximately 48°F.

4.4 Long Term Drawdown and Yield Projections

Data collected during the constant rate test were used to project long-term drawdown and yield. The semi-log graphs of wells R1 and R2 elapsed time and drawdown data were used for the projections. The analysis included drawing a best fit line to the data collected during the final 1440 minutes of pumping. The best fit line was extrapolated and used to project drawdown as a result of pumping wells R1 and R2 simultaneously for 180 days at rates of approximately 57 gpm and 71 gpm, respectively. The semi-log graphs presenting the long-term projections are found in Appendix E. Total drawdowns of 125 feet and 163 feet were projected at wells R1 and R2, respectively. There will be approximately 56 feet of available drawdown at well R1 at the end of the 180 day pumping period assuming a permanent pump setting of 210 feet. There will be approximately 71 feet of available drawdown at well R2 at the end of the 180 day pumping period assuming a permanent pump setting of 260 feet.

The projection of drawdown at wells R1 and R2 at pumping rates of 57 gpm and 71 gpm, respectively, is based on the assumptions that the bedrock aquifer receives no recharge from precipitation or snow melt and that no hydrogeologic (aquifer) boundaries are encountered. The assumption of no recharge is conservative, since the bedrock aquifer system is expected to receive some recharge from precipitation within a six month period. Less drawdown can be expected when the aquifer receives recharge from precipitation and if a positive hydraulic boundary, such as a recharge source like a lake or stream, is encountered. A negative boundary, such as when drawdown from pumping reaches the edge or outer limit of the bedrock aquifer, is a less conservative assumption that can occur in settings similar to the R1 and R2 site area. If a negative boundary is encountered, then wells R1 and R2 can be expected to be drawn down at a greater rate. If future pumping occurs during a drier condition than that experienced prior to and during the constant rate test, then wells R1 and R2 can also be expected to be drawn down at a greater rate More drawdown can be expected if the wells are pumped at higher rates and less drawdown is expected at lower pumping rates.

5.0 SUMMARY AND CONCLUSIONS

- The 72-hour, simultaneous constant rate test resulted in a total drawdown of 67.78 feet at well R1 and left approximately 113 feet of available water above the pump intake.
- The 72-hour, simultaneous constant rate test resulted in a total drawdown of 115 feet at well R2 and left approximately 119 feet of available water above the pump intake.
- Water level data collected during the constant rate test indicate that the pumping of wells R1 and R2 hydraulically influenced Residential Well 4. Residential Well 4 is not being used as a water supply.
- Water level data collected during the constant rate test indicate that Pine Hill Water Company well PH-1, the Station Road well, Residential Well 2 and Residential Well 3 were not hydraulically influenced by pumping of wells R1 and R2.
- The well R2 laboratory water quality analyses show that odor was the only parameter where the NYSDOH - Part 5 MCL was exceeded. The Langelier Index result showed that the water has moderately aggressive corrosive characteristics. Both odor and corrosive characteristics require only minor water treatment.
- A sulfur odor was detected at the well R2 point of discharge throughout the constant rate test. The laboratory result for hydrogen sulfide was 0.1 mg/l. The presence of low levels of hydrogen sulfide in the water may require treatment for taste and odor; however, it does not preclude use as a potable water supply.
- Evaluation of site hydrogeologic conditions, water level and field water quality data showed that wells R1 and R2 are not hydraulically connected to Birch Creek or the wetland pond.

- A projection, based on 180 days of continuous pumping of well R1 at 57 gpm and well R2 at 71 gpm without the positive effects of recharge or negative effects of a limited aquifer, produced a total drawdown of 125 feet at well R1. This projection indicated that at the end of the 180 day pumping period there will be approximately 56 feet of available drawdown at well R1.
- A projection based on 180 days of continuous pumping of well R1 at 57 gpm and well R2 at 71 gpm, without the positive effects of recharge or negative effects of a limited aquifer, produced a total drawdown of 163 feet at well R2. This projection indicated that at the end of 180 days there will be approximately 71 feet of available drawdown at well R2.
- The review and analysis of data collected during the simultaneous, constant rate test demonstrate that well R1 is capable of sustaining a long term, irrigation pond replenishment rate of 57 gpm and well R2 is capable of sustaining a long term, average daily demand of 64 gpm without adversely impacting neighboring water supplies and surface water bodies.

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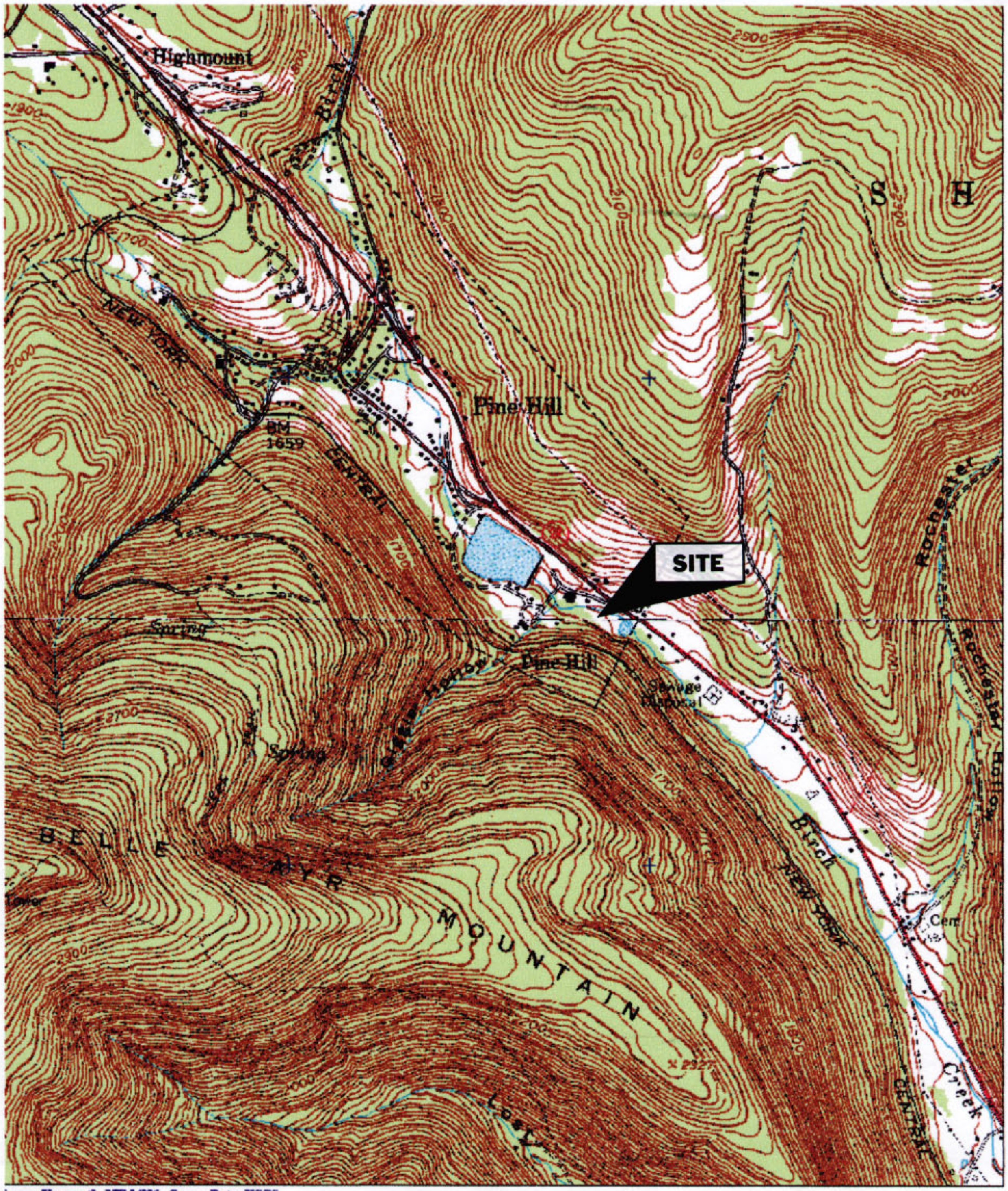
Alpha Geoscience, January 2002. Installation, Development and Testing of Well R2.

Frimpter, M. H. 1985, Ground - Water Resources of Orange and Ulster Counties, New York. United States Geological Survey Water - Supply Paper 1985

FIGURES



Lorme Yarmouth, ME 04096 Source Data: USGS   693 ft Scale: 1 : 24,000 Detail: 13-1 Datum: WGS84

West Kill and Shandaken Quadrangle
New York State
Department of Transportation
7.5 Minute Series

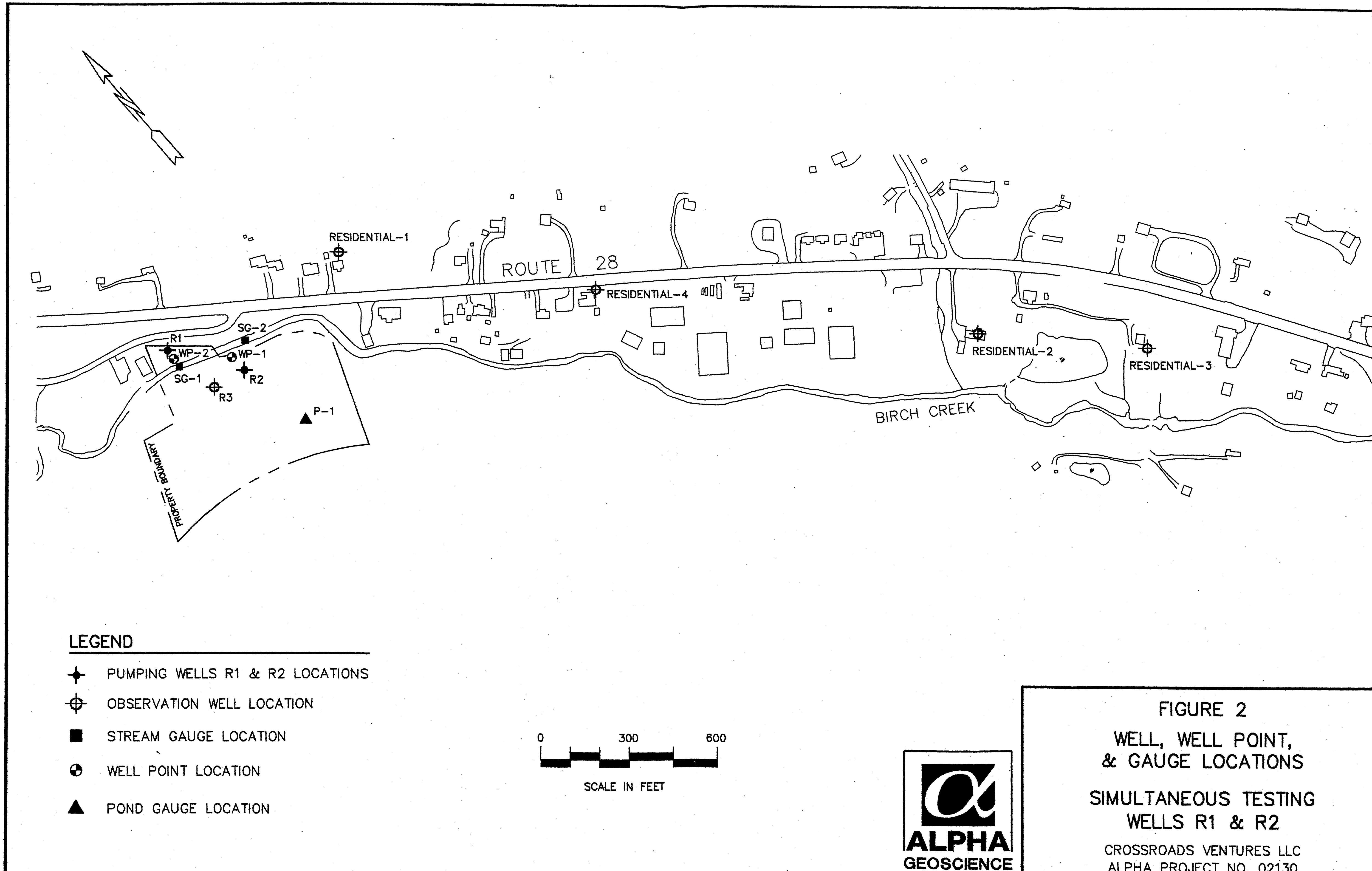
ALPHA GEOSCIENCE

FIGURE 1
SITE LOCATION MAP

Simultaneous Testing of Wells R1 and R2

Crossroads Ventures LLC

Alpha Project No. 02130



ALPHA GEOSCIENCE

FIGURE 2

WELL, WELL POINT, & GAUGE LOCATIONS

SIMULTANEOUS TESTING WELLS R1 & R2

CROSSROADS VENTURES LLC

ALPHA PROJECT NO. 02130

02130-03.DWG

TABLES

TABLE 1
CROSSROADS VENTURES LLC
Simultaneous Testing of Wells R1 and R2
Well R1 Data

Elapsed Time (minutes)	Drawdown (feet)	Temperature (° Fahrenheit)	Elapsed Time (minutes)	Drawdown (feet)	Temperature (° Fahrenheit)
0.06	0.481	48.3	0.738	4.928	48.18
0.0648	0.469	48.3	0.7813	5.021	48.18
0.07	0.52	48.32	0.8278	5.109	48.18
0.075	0.589	48.32	0.8762	5.203	48.18
0.0798	0.683	48.32	0.9278	5.309	48.18
0.0848	0.777	48.32	0.9828	5.397	48.18
0.09	0.902	48.32	1.0412	5.61	48.18
0.095	1.027	48.32	1.103	5.76	48.18
0.1	1.146	48.32	1.1678	5.935	48.18
0.1057	1.302	48.32	1.238	6.098	48.18
0.1118	1.415	48.32	1.3113	6.255	48.18
0.1185	1.547	48.32	1.3895	6.38	48.18
0.1255	1.64	48.32	1.4728	6.536	48.18
0.1327	1.759	48.32	1.5613	6.686	48.18
0.1405	1.866	48.32	1.6547	6.824	48.18
0.1488	1.947	48.32	1.753	6.967	48.16
0.1578	2.035	48.32	1.858	7.117	48.16
0.167	2.169	48.23	1.9678	7.274	48.16
0.1768	2.294	48.23	2.0845	7.418	48.16
0.1875	2.394	48.23	2.2097	7.556	48.16
0.1985	2.506	48.21	2.3412	7.712	48.16
0.21	2.638	48.23	2.4812	7.868	48.16
0.2225	2.775	48.21	2.6297	8.019	48.16
0.2358	2.888	48.21	2.7863	8.181	48.16
0.2498	2.994	48.21	2.953	8.319	48.16
0.2647	3.132	48.21	3.1297	8.494	48.16
0.2803	3.238	48.21	3.3162	8.67	48.16
0.297	3.351	48.21	3.5145	8.826	48.16
0.3145	3.445	48.21	3.7245	9.001	48.16
0.3333	3.583	48.21	3.9463	9.183	48.16
0.3532	3.808	48.21	4.1812	9.346	48.16
0.374	3.858	48.21	4.4295	9.521	48.16
0.3963	3.996	48.21	4.6928	9.709	48.16
0.4198	4.165	48.21	4.9728	9.884	48.16
0.4445	4.328	48.21	5.2697	10.065	48.16
0.4695	4.459	48.21	5.583	10.259	48.16
0.4963	4.508	48.18	5.9145	10.447	48.16
0.5247	4.572	48.21	6.2663	10.629	48.16
0.5547	4.672	48.21	6.6395	10.816	48.16
0.5862	4.678	48.21	7.0345	11.017	48.16
0.6213	4.721	48.18	7.453	11.23	48.18
0.6578	4.785	48.21	7.8962	11.424	48.18
0.6963	4.852	48.18	8.3663	11.643	48.18

Elapsed Time (minutes)	Drawdown (feet)	Temperature (° Fahrenheit)	Elapsed Time (minutes)	Drawdown (feet)	Temperature (° Fahrenheit)
8.8645	11.837	48.18	133.2678	25.877	48.34
9.3913	12.031	48.18	141.1678	26.358	48.34
9.9497	12.275	48.18	149.5363	26.79	48.34
10.5413	12.483	48.21	158.4012	27.203	48.34
11.168	12.708	48.21	167.7912	27.641	48.37
11.8312	12.902	48.21	177.738	28.092	48.37
12.5347	13.14	48.21	188.2745	28.523	48.37
13.2795	13.378	48.23	198.2745	28.929	48.34
14.0695	13.616	48.23	208.2745	29.349	48.37
14.9062	13.842	48.23	218.2745	29.855	48.34
15.7913	14.092	48.23	228.2745	30.124	48.37
16.7295	14.349	48.25	238.2745	30.499	48.34
17.723	14.612	48.25	248.2745	30.869	48.37
18.7762	14.869	48.25	258.2745	31.219	48.37
19.8913	15.125	48.25	268.2745	31.569	48.37
21.073	15.383	48.28	278.2745	31.875	48.37
22.3247	15.639	48.28	288.2745	32.207	48.37
23.6497	15.927	48.28	298.2745	32.513	48.37
25.0545	16.172	48.3	308.2745	32.813	48.37
26.5428	16.447	48.3	318.2745	33.219	48.34
28.1178	16.741	48.3	328.2745	33.694	48.34
29.7863	17.01	48.3	338.2745	34.038	48.34
31.5545	17.292	48.3	348.2745	34.345	48.34
33.428	17.574	48.32	358.2745	34.614	48.34
35.4112	17.856	48.32	368.2745	34.921	48.37
37.513	18.169	48.32	378.2745	35.189	48.34
39.7397	18.469	48.32	388.2745	35.47	48.34
42.098	18.764	48.34	398.2745	35.733	48.34
44.5963	19.07	48.34	408.2745	35.983	48.34
47.2428	19.383	48.34	418.2745	36.252	48.34
50.0463	19.69	48.34	428.2745	36.484	48.37
53.0147	20.015	48.34	438.2745	36.746	48.34
56.1595	20.334	48.34	448.2745	36.971	48.34
59.4913	20.653	48.34	458.2745	37.215	48.34
63.0195	20.966	48.34	468.2745	37.459	48.34
66.758	21.31	48.34	478.2745	37.696	48.34
70.7178	21.642	48.34	488.2745	37.934	48.34
74.9113	21.992	48.34	498.2745	38.172	48.37
79.3545	22.336	48.34	508.2745	38.39	48.34
84.0613	22.686	48.34	518.2745	38.609	48.34
89.0462	23.131	48.34	528.2745	38.835	48.37
94.3262	23.512	48.34	538.2745	39.047	48.34
99.9197	23.895	48.37	548.2747	39.266	48.34
105.8447	24.276	48.37	558.2747	39.478	48.34
112.1197	24.663	48.34	568.2747	39.703	48.34
118.7678	25.063	48.34	578.2747	39.91	48.34
125.8095	25.458	48.34	588.2747	40.11	48.34

Table 1

Elapsed Time (minutes)	Drawdown (feet)	Temperature (° Fahrenheit)	Elapsed Time (minutes)	Drawdown (feet)	Temperature (° Fahrenheit)
598.2747	40.329	48.34	1068.2747	47.762	48.34
608.2747	40.523	48.37	1078.2747	47.88	48.34
618.2747	40.722	48.34	1088.2747	48.205	48.34
628.2747	40.93	48.37	1098.2745	48.205	48.34
638.2747	41.129	48.34	1108.2745	48.343	48.34
648.2747	41.304	48.34	1118.2745	48.455	48.34
658.2747	41.485	48.34	1128.2745	48.587	48.34
668.2747	41.673	48.34	1138.2745	48.699	48.34
678.2747	41.904	48.34	1148.2745	48.818	48.34
688.2747	42.129	48.34	1158.2745	48.937	48.34
698.2747	42.31	48.34	1168.2745	49.055	48.34
708.2747	42.485	48.34	1178.2745	49.187	48.34
718.2747	42.661	48.34	1188.2745	49.287	48.34
728.2747	42.842	48.34	1198.2745	49.387	48.34
738.2747	43.004	48.34	1208.2745	49.505	48.34
748.2747	43.192	48.34	1218.2745	49.624	48.34
758.2747	43.354	48.34	1228.2745	49.755	48.34
768.2747	43.511	48.34	1238.2745	49.874	48.34
778.2747	43.68	48.34	1248.2745	49.968	48.34
788.2747	43.842	48.34	1258.2745	50.074	48.34
798.2747	44.005	48.34	1268.2745	50.205	48.34
808.2747	44.18	48.34	1278.2745	50.306	48.34
818.2747	44.336	48.34	1288.2745	50.418	48.34
828.2747	44.492	48.34	1298.2745	50.524	48.34
838.2747	44.649	48.34	1308.2745	50.656	48.34
848.2747	44.805	48.34	1318.2745	50.762	48.34
858.2747	44.961	48.34	1328.2745	50.856	48.34
868.2747	45.124	48.34	1338.2745	50.968	48.34
878.2747	45.267	48.34	1348.2745	51.068	48.34
888.2747	45.411	48.34	1358.2745	51.181	48.34
898.2747	45.555	48.34	1368.2745	51.293	48.34
908.2747	45.686	48.34	1378.2745	51.387	48.34
918.2747	45.849	48.34	1388.2745	51.506	48.34
928.2747	45.955	48.34	1398.2745	51.574	48.34
938.2747	46.099	48.34	1408.2745	51.687	48.34
948.2747	46.23	48.34	1418.2745	51.799	48.34
958.2747	46.374	48.34	1428.2745	51.893	48.34
968.2747	46.505	48.34	1438.2745	51.981	48.34
978.2747	46.668	48.34	1448.2745	52.112	48.34
988.2747	46.805	48.34	1458.2745	52.199	48.34
998.2747	46.924	48.34	1468.2745	52.293	48.34
1008.2747	47.036	48.34	1478.2745	52.387	48.34
1018.2747	47.174	48.34	1488.2745	52.493	48.34
1028.2747	47.28	48.34	1498.2745	52.587	48.34
1038.2747	47.405	48.34	1508.2745	52.662	48.34
1048.2747	47.543	48.34	1518.2745	52.768	48.34
1058.2747	47.655	48.34	1528.2745	52.843	48.34

Elapsed Time (minutes)	Drawdown (feet)	Temperature (° Fahrenheit)	Elapsed Time (minutes)	Drawdown (feet)	Temperature (° Fahrenheit)
1538.2745	52.937	48.34	2008.2745	56.711	48.32
1548.2745	53.012	48.34	2018.2745	56.723	48.32
1558.2745	53.093	48.34	2028.2745	56.711	48.32
1568.2745	53.168	48.34	2038.2745	56.717	48.32
1578.2745	53.274	48.34	2048.2745	56.711	48.32
1588.2745	53.368	48.34	2058.2745	56.704	48.32
1598.2745	53.474	48.34	2068.2745	56.698	48.32
1608.2745	53.543	48.34	2078.2745	56.717	48.32
1618.2745	53.624	48.34	2088.2745	56.723	48.32
1628.2745	53.712	48.34	2098.2745	56.711	48.32
1638.2745	53.799	48.34	2108.2745	56.704	48.3
1648.2745	53.874	48.34	2118.2745	56.722	48.3
1658.2745	53.949	48.34	2128.2745	56.729	48.3
1668.2745	54.037	48.34	2138.2745	56.729	48.3
1678.2745	54.099	48.34	2148.2745	56.729	48.3
1688.2745	54.18	48.34	2158.2745	56.722	48.3
1698.2745	54.262	48.34	2168.2745	56.729	48.3
1708.2745	54.33	48.34	2178.2745	56.716	48.3
1718.2745	54.398	48.32	2188.2747	56.704	48.3
1728.2745	54.468	48.34	2198.2747	56.734	48.28
1738.2745	54.549	48.34	2208.2747	56.734	48.28
1748.2745	54.624	48.34	2218.2747	56.753	48.28
1758.2745	54.687	48.34	2228.2747	56.772	48.28
1768.2745	54.743	48.34	2238.2747	56.772	48.28
1778.2745	54.837	48.34	2248.2747	56.803	48.28
1788.2745	54.898	48.32	2258.2747	56.847	48.28
1798.2745	54.968	48.34	2268.2747	56.859	48.28
1808.2745	55.074	48.34	2278.2747	56.878	48.28
1818.2745	55.273	48.32	2288.2747	56.928	48.28
1828.2745	55.386	48.32	2298.2747	57.103	48.28
1838.2745	55.467	48.32	2308.2747	57.334	48.28
1848.2745	55.555	48.32	2318.2747	57.278	48.28
1858.2745	55.636	48.32	2328.2747	57.159	48.28
1868.2745	55.711	48.32	2338.2747	57.065	48.25
1878.2745	55.78	48.32	2348.2747	56.99	48.25
1888.2745	55.848	48.32	2358.2747	57.052	48.25
1898.2745	55.923	48.32	2368.2747	57.221	48.25
1908.2745	56.011	48.32	2378.2747	57.502	48.25
1918.2745	56.067	48.32	2388.2747	57.715	48.25
1928.2745	56.142	48.32	2398.2747	57.901	48.23
1938.2745	56.223	48.32	2408.2747	58.064	48.23
1948.2745	56.305	48.32	2418.2747	58.208	48.25
1958.2745	56.361	48.32	2428.2747	58.321	48.25
1968.2745	56.442	48.32	2438.2747	58.414	48.25
1978.2745	56.517	48.32	2448.2747	58.508	48.25
1988.2745	56.573	48.32	2458.2747	58.596	48.25
1998.2745	56.642	48.32	2468.2747	58.664	48.25

Elapsed Time (minutes)	Drawdown (feet)	Temperature (° Fahrenheit)	Elapsed Time (minutes)	Drawdown (feet)	Temperature (° Fahrenheit)
2478.2747	58.739	48.25	2948.2747	62.189	48.28
2488.2747	58.846	48.25	2958.2747	62.227	48.28
2498.2747	58.946	48.25	2968.2747	62.277	48.28
2508.2747	59.014	48.25	2978.2747	62.327	48.28
2518.2747	59.096	48.25	2988.2747	62.377	48.28
2528.2747	59.202	48.25	2998.2747	62.433	48.28
2538.2747	59.264	48.25	3008.2747	62.489	48.28
2548.2747	59.346	48.25	3018.2747	62.552	48.28
2558.2747	59.42	48.25	3028.2747	62.595	48.28
2568.2747	59.508	48.25	3038.2747	62.633	48.28
2578.2747	59.583	48.25	3048.2747	62.72	48.28
2588.2747	59.658	48.25	3058.2747	62.764	48.28
2598.2747	59.733	48.25	3068.2747	62.802	48.28
2608.2747	59.802	48.25	3078.2747	62.852	48.28
2618.2747	59.883	48.25	3088.2747	62.889	48.28
2628.2747	59.964	48.25	3098.2747	62.939	48.28
2638.2747	60.027	48.25	3108.2747	62.945	48.28
2648.2747	60.115	48.28	3118.2747	63.008	48.28
2658.2747	60.177	48.25	3128.2747	63.083	48.28
2668.2747	60.277	48.28	3138.2747	63.12	48.28
2678.2747	60.345	48.25	3148.2747	63.183	48.28
2688.2747	60.402	48.28	3158.2747	63.233	48.28
2698.2747	60.496	48.28	3168.2747	63.277	48.28
2708.2747	60.589	48.25	3178.2747	63.32	48.28
2718.2747	60.652	48.28	3188.2747	63.364	48.28
2728.2747	60.733	48.28	3198.2747	63.395	48.28
2738.2747	60.808	48.28	3208.2747	63.439	48.28
2748.2747	60.865	48.28	3218.2747	63.47	48.28
2758.2747	60.958	48.28	3228.2747	63.551	48.28
2768.2747	61.021	48.28	3238.2747	63.651	48.28
2778.2747	61.102	48.28	3248.2747	63.714	48.28
2788.2747	61.196	48.28	3258.2747	63.802	48.3
2798.2747	61.265	48.28	3268.2747	63.858	48.3
2808.2747	61.333	48.28	3278.2747	63.958	48.3
2818.2747	61.408	48.28	3288.2747	64.02	48.28
2828.2747	61.471	48.28	3298.2747	64.083	48.3
2838.2747	61.527	48.28	3308.2747	64.127	48.3
2848.2747	61.627	48.28	3318.2747	64.152	48.3
2858.2747	61.696	48.28	3328.2747	64.202	48.3
2868.2747	61.739	48.28	3338.2747	64.233	48.3
2878.2747	61.808	48.28	3348.2747	64.277	48.3
2888.2747	61.864	48.28	3358.2747	64.308	48.3
2898.2747	61.946	48.28	3368.2747	64.333	48.3
2908.2747	61.983	48.28	3378.2747	64.414	48.3
2918.2747	62.046	48.28	3388.2747	64.427	48.3
2928.2747	62.102	48.28	3398.2747	64.477	48.3
2938.2747	62.146	48.28	3408.2747	64.502	48.3

Elapsed Time (minutes)	Drawdown (feet)	Temperature (° Fahrenheit)	Elapsed Time (minutes)	Drawdown (feet)	Temperature (° Fahrenheit)
3418.2747	64.558	48.3	3888.2747	66.195	48.3
3428.2747	64.602	48.3	3898.2747	66.246	48.32
3438.2747	64.614	48.3	3908.2747	66.277	48.32
3448.2747	64.664	48.3	3918.2747	66.302	48.32
3458.2747	64.714	48.3	3928.2747	66.296	48.32
3468.2747	64.764	48.3	3938.2747	66.339	48.32
3478.2747	64.821	48.3	3948.2747	66.383	48.32
3488.2747	64.852	48.3	3958.2747	66.407	48.3
3498.2747	64.883	48.3	3968.2747	66.426	48.3
3508.2747	64.908	48.3	3978.2747	66.471	48.32
3518.2747	64.952	48.3	3988.2747	66.471	48.32
3528.2747	65.008	48.3	3998.2747	66.502	48.32
3538.2747	65.027	48.3	4008.2747	66.533	48.32
3548.2747	65.083	48.3	4018.2747	66.558	48.32
3558.2747	65.127	48.3	4028.2747	66.589	48.32
3568.2747	65.164	48.3	4038.2747	66.614	48.32
3578.2747	65.208	48.3	4048.2747	66.646	48.32
3588.2747	65.233	48.3	4058.2747	66.671	48.32
3598.2747	65.283	48.3	4068.2747	66.683	48.32
3608.2747	65.308	48.3	4078.2747	66.733	48.32
3618.2747	65.37	48.3	4088.2747	66.739	48.32
3628.2747	65.395	48.3	4098.2747	66.764	48.32
3638.2747	65.434	48.32	4108.2747	66.789	48.32
3648.2747	65.483	48.3	4118.2747	66.814	48.32
3658.2747	65.52	48.3	4128.2747	66.852	48.32
3668.2747	65.545	48.3	4138.2747	66.883	48.32
3678.2747	65.589	48.3	4148.2747	66.902	48.32
3688.2747	65.633	48.3	4158.2747	66.952	48.32
3698.2747	65.683	48.3	4168.2747	66.995	48.32
3708.2747	65.695	48.3	4178.2747	67.027	48.32
3718.2747	65.751	48.3	4188.2747	67.052	48.32
3728.2747	65.764	48.3	4198.2747	67.07	48.32
3738.2747	65.808	48.3	4208.2747	67.127	48.32
3748.2747	65.82	48.3	4218.2747	67.164	48.32
3758.2747	65.858	48.3	4228.2747	67.22	48.32
3768.2747	65.895	48.3	4238.2747	67.27	48.32
3778.2747	65.901	48.3	4248.2747	67.314	48.32
3788.2747	65.951	48.3	4258.2747	67.364	48.32
3798.2747	66.001	48.3	4268.2747	67.395	48.32
3808.2747	66.021	48.32	4278.2747	67.426	48.32
3818.2747	66.04	48.32	4288.2747	67.451	48.32
3828.2747	66.071	48.32	4298.2747	67.495	48.32
3838.2747	66.096	48.32	4308	67.7	
3848.2747	66.108	48.32	4315	67.78	
3858.2747	66.158	48.32	4319	67.78	
3868.2747	66.17	48.3			
3878.2747	66.202	48.32			

TABLE 2
CROSSROADS VENTURES LLC
Simultaneous Testing of Wells R1 and R2
Well R2 Data

Elapsed Time (minutes)	Drawdown (feet)	Temperature (° Fahrenheit)	Elapsed Time (minutes)	Drawdown (feet)	Temperature (° Fahrenheit)
0.0648	0.037	48.21	0.7813	15.242	48.02
0.07	0.253	48.21	0.8278	15.993	48.02
0.075	0.364	48.21	0.8762	16.708	48.02
0.0798	0.574	48.21	0.9278	17.459	48.02
0.0848	0.838	48.21	0.9828	18.27	48
0.09	1.011	48.21	1.0412	19.132	48
0.095	1.073	48.21	1.103	20.087	48
0.1	1.134	48.21	1.1678	20.93	48
0.1057	1.473	48.21	1.238	21.766	47.98
0.1118	1.596	48.21	1.3113	22.659	47.98
0.1185	1.633	48.21	1.3895	23.495	47.96
0.1255	1.861	48.21	1.4728	24.431	47.96
0.1327	2.058	48.21	1.5613	25.347	47.93
0.1405	2.268	48.21	1.6547	26.295	47.93
0.1488	2.459	48.21	1.753	27.279	47.93
0.1578	2.607	48.21	1.858	28.092	47.93
0.167	2.914	48.09	1.9678	28.977	47.91
0.1768	3.185	48.09	2.0845	29.95	47.91
0.1875	3.315	48.09	2.2097	30.89	47.89
0.1985	3.746	48.09	2.3412	31.795	47.89
0.21	3.929	48.07	2.4812	32.833	47.86
0.2225	4.225	48.07	2.6297	34.07	47.86
0.2358	4.459	48.07	2.7863	34.889	47.86
0.2498	4.81	48.07	2.953	35.977	47.84
0.2647	5.106	48.07	3.1297	36.167	47.84
0.2803	5.352	48.07	3.3162	36.572	47.82
0.297	5.716	48.07	3.5145	37.458	47.82
0.3145	6.079	48.07	3.7245	38.658	47.82
0.3333	6.474	48.07	3.9463	39.795	47.8
0.3532	6.856	48.07	4.1812	40.952	47.8
0.374	7.231	48.07	4.4295	41.96	47.8
0.3963	7.718	48.07	4.6928	43.055	47.8
0.4198	8.086	48.05	4.9728	44.008	47.77
0.4445	8.507	48.07	5.2697	44.967	47.77
0.4695	9.01	48.05	5.583	45.822	47.77
0.4963	10.057	48.05	5.9145	46.566	47.77
0.5247	10.218	48.05	6.2663	47.408	47.75
0.5547	10.92	48.05	6.6395	48.017	47.75
0.5862	11.751	48.05	7.0345	48.626	47.75
0.6213	12.398	48.05	7.453	49.339	47.75
0.6578	12.872	48.05	7.8962	50.028	47.75
0.6963	13.685	48.05	8.3663	50.729	47.75
0.738	14.535	48.05	8.8645	51.516	47.75

Elapsed Time (minutes)	Drawdown (feet)	Temperature (° Fahrenheit)	Elapsed Time (minutes)	Drawdown (feet)	Temperature (° Fahrenheit)
9.3913	52.071	47.77	167.7912	71.518	48.14
9.9497	52.513	47.77	177.738	72.022	48.14
10.5413	53.079	47.77	188.2745	72.44	48.14
11.168	53.534	47.77	198.2745	72.864	48.14
11.8312	53.99	47.8	208.2745	73.232	48.14
12.5347	54.402	47.8	218.2745	73.644	48.14
13.2795	54.901	47.82	228.2745	74.792	48.14
14.0695	55.473	47.82	238.2745	75.376	48.14
14.9062	55.88	47.84	248.2745	75.806	48.14
15.7913	56.292	47.84	258.2745	76.138	48.14
16.7295	56.73	47.86	268.2745	76.451	48.14
17.723	57.166	47.86	278.2745	76.74	48.14
18.7762	57.487	47.89	288.2745	77.121	48.14
19.8913	57.831	47.89	298.2745	77.495	48.14
21.073	58.103	47.91	308.2745	77.692	48.14
22.3247	58.424	47.93	318.2745	78.03	48.14
23.6497	58.842	47.93	328.2745	78.238	48.14
25.0545	59.114	47.96	338.2745	78.545	48.14
26.5428	59.415	47.96	348.2745	78.828	48.14
28.1178	59.613	47.98	358.2745	79.129	48.14
29.7863	59.938	47.98	368.2745	79.393	48.14
31.5545	60.241	48	378.2745	79.682	48.14
33.428	60.537	48.02	388.2745	79.915	48.14
35.4112	60.955	48.02	398.2745	80.179	48.14
37.513	61.533	48.02	408.2745	80.481	48.16
39.7397	62.007	48.05	418.2745	80.715	48.16
42.098	62.345	48.05	428.2745	80.954	48.16
44.5963	62.659	48.05	438.2745	81.181	48.16
47.2428	62.881	48.07	448.2745	81.347	48.16
50.0463	63.238	48.07	458.2745	82.09	48.16
53.0147	63.68	48.07	468.2745	82.575	48.16
56.1595	63.841	48.09	478.2745	82.729	48.16
59.4913	64.24	48.09	488.2745	82.962	48.16
63.0195	64.535	48.09	498.2745	83.165	48.16
66.758	64.849	48.09	508.2745	83.429	48.16
70.7178	65.236	48.09	518.2745	83.607	48.16
74.9113	65.962	48.12	528.2745	83.859	48.16
79.3545	66.331	48.12	538.2745	84.018	48.16
84.0613	66.681	48.12	548.2747	84.227	48.16
89.0462	66.989	48.12	558.2747	84.903	48.16
94.3262	67.425	48.12	568.2747	85.259	48.16
99.9197	67.708	48.12	578.2747	85.652	48.16
105.8447	68.205	48.12	588.2747	85.768	48.16
112.1197	68.672	48.12	598.2747	86.094	48.16
118.7678	69.103	48.14	608.2747	86.155	48.16
125.8095	69.521	48.14	618.2747	86.407	48.16
133.2678	69.921	48.14	628.2747	86.597	48.16
141.1678	70.326	48.14	638.2747	86.61	48.16
149.5363	70.732	48.14	648.2747	86.935	48.16
158.4012	71.094	48.14	658.2747	87.156	48.16

Elapsed Time (minutes)	Drawdown (feet)	Temperature (° Fahrenheit)	Elapsed Time (minutes)	Drawdown (feet)	Temperature (° Fahrenheit)
668.2747	87.187	48.16	1168.2745	95.29	48.16
678.2747	87.42	48.16	1178.2745	95.375	48.16
688.2747	87.653	48.16	1188.2745	95.553	48.16
698.2747	87.727	48.16	1198.2745	95.578	48.16
708.2747	87.966	48.16	1208.2745	95.701	48.16
718.2747	88.077	48.16	1218.2745	96.23	48.18
728.2747	88.353	48.16	1228.2745	96.45	48.16
738.2747	88.445	48.16	1238.2745	96.474	48.16
748.2747	88.672	48.16	1248.2745	96.646	48.16
758.2747	88.795	48.16	1258.2745	96.744	48.16
768.2747	88.961	48.16	1268.2745	96.83	48.16
778.2747	89.047	48.16	1278.2745	96.94	48.16
788.2747	89.262	48.16	1288.2745	96.99	48.16
798.2747	89.685	48.16	1298.2745	97.069	48.16
808.2747	90.183	48.16	1308.2745	97.247	48.16
818.2747	90.312	48.16	1318.2745	97.389	48.16
828.2747	90.465	48.16	1328.2745	97.462	48.16
838.2747	90.655	48.16	1338.2745	97.616	48.16
848.2747	90.839	48.16	1348.2745	97.677	48.16
858.2747	90.993	48.16	1358.2745	97.677	48.16
868.2747	91.159	48.16	1368.2745	97.818	48.16
878.2747	91.281	48.16	1378.2745	97.953	48.16
888.2747	91.459	48.16	1388.2745	98.113	48.16
898.2747	91.607	48.16	1398.2745	98.242	48.16
908.2747	91.852	48.16	1408.2745	98.223	48.16
918.2747	91.865	48.16	1418.2745	98.45	48.16
928.2747	91.92	48.16	1428.2745	98.469	48.16
938.2747	92.165	48.16	1438.2745	98.579	48.16
948.2747	92.233	48.16	1448.2745	98.671	48.16
958.2747	92.38	48.16	1458.2745	98.757	48.16
968.2747	92.595	48.16	1468.2745	98.88	48.16
978.2747	92.607	48.16	1478.2745	98.917	48.16
988.2747	92.816	48.16	1488.2745	99.144	48.16
998.2747	92.994	48.16	1498.2745	99.101	48.16
1008.2747	93.037	48.16	1508.2745	99.175	48.18
1018.2747	93.154	48.16	1518.2745	99.297	48.16
1028.2747	93.381	48.16	1528.2745	99.457	48.16
1038.2747	93.43	48.16	1538.2745	99.395	48.16
1048.2747	93.485	48.16	1548.2745	99.309	48.16
1058.2747	93.663	48.16	1558.2745	99.561	48.16
1068.2747	93.737	48.16	1568.2745	99.72	48.16
1078.2747	93.902	48.16	1578.2745	100.734	48.18
1088.2747	94.031	48.16	1588.2745	101.035	48.18
1098.2745	94.185	48.16	1598.2745	101.077	48.16
1108.2745	94.504	48.16	1608.2745	101.144	48.16
1118.2745	94.553	48.16	1618.2745	101.254	48.16
1128.2745	94.67	48.16	1628.2745	101.31	48.16
1138.2745	94.823	48.16	1638.2745	101.402	48.16
1148.2745	94.884	48.16	1648.2745	101.518	48.16
1158.2745	95.013	48.16	1658.2745	101.488	48.16

Elapsed Time (minutes)	Drawdown (feet)	Temperature (° Fahrenheit)	Elapsed Time (minutes)	Drawdown (feet)	Temperature (° Fahrenheit)
1668.2745	101.61	48.16	2168.2745	105.206	48.16
1678.2745	101.696	48.16	2178.2745	105.304	48.16
1688.2745	101.734	48.18	2188.2747	105.323	48.18
1698.2745	101.886	48.16	2198.2747	105.366	48.18
1708.2745	101.997	48.16	2208.2747	105.402	48.16
1718.2745	101.96	48.16	2218.2747	105.482	48.16
1728.2745	102.083	48.16	2228.2747	105.402	48.16
1738.2745	102.107	48.16	2238.2747	105.457	48.16
1748.2745	102.12	48.16	2248.2747	105.575	48.18
1758.2745	102.273	48.16	2258.2747	105.549	48.16
1768.2745	102.377	48.16	2268.2747	105.647	48.16
1778.2745	102.353	48.16	2278.2747	105.727	48.16
1788.2745	102.463	48.16	2288.2747	105.789	48.16
1798.2745	102.512	48.16	2298.2747	105.862	48.16
1808.2745	102.543	48.16	2308.2747	105.9	48.18
1818.2745	102.617	48.16	2318.2747	105.974	48.18
1828.2745	102.727	48.16	2328.2747	105.96	48.16
1838.2745	102.887	48.16	2338.2747	105.937	48.18
1848.2745	102.801	48.16	2348.2747	106.046	48.16
1858.2745	103.207	48.18	2358.2747	105.985	48.16
1868.2745	103.384	48.16	2368.2747	106.095	48.16
1878.2745	103.396	48.16	2378.2747	106.132	48.16
1888.2745	103.457	48.16	2388.2747	106.255	48.16
1898.2745	103.641	48.16	2398.2747	106.207	48.18
1908.2745	103.788	48.16	2408.2747	106.311	48.18
1918.2745	103.997	48.16	2418.2747	106.378	48.18
1928.2745	103.985	48.16	2428.2747	106.408	48.16
1938.2745	103.997	48.16	2438.2747	106.452	48.18
1948.2745	104.034	48.16	2448.2747	106.526	48.18
1958.2745	104.114	48.16	2458.2747	106.641	48.16
1968.2745	104.2	48.16	2468.2747	106.629	48.16
1978.2745	104.261	48.16	2478.2747	106.782	48.16
1988.2745	104.341	48.16	2488.2747	106.85	48.16
1998.2745	104.336	48.18	2498.2747	106.802	48.18
2008.2745	104.385	48.18	2508.2747	106.948	48.16
2018.2745	104.457	48.16	2518.2747	106.98	48.18
2028.2745	104.445	48.16	2528.2747	107.041	48.18
2038.2745	104.512	48.16	2538.2747	107.028	48.16
2048.2745	104.531	48.16	2548.2747	107.046	48.16
2058.2745	104.647	48.16	2558.2747	107.127	48.18
2068.2745	104.69	48.16	2568.2747	107.262	48.18
2078.2745	104.661	48.18	2578.2747	107.212	48.16
2088.2745	104.923	48.16	2588.2747	107.279	48.16
2098.2745	104.911	48.16	2598.2747	107.328	48.16
2108.2745	104.985	48.16	2608.2747	107.44	48.18
2118.2745	105.071	48.16	2618.2747	107.47	48.18
2128.2745	105.017	48.18	2628.2747	107.495	48.18
2138.2745	105.157	48.16	2638.2747	107.513	48.18
2148.2745	105.083	48.16	2648.2747	107.666	48.16
2158.2745	105.218	48.16	2658.2747	107.574	48.16

Elapsed Time (minutes)	Drawdown (feet)	Temperature (° Fahrenheit)	Elapsed Time (minutes)	Drawdown (feet)	Temperature (° Fahrenheit)
2668.2747	107.721	48.16	3168.2747	110.685	48.18
2678.2747	107.702	48.16	3178.2747	110.685	48.18
2688.2747	107.808	48.18	3188.2747	110.653	48.16
2698.2747	107.887	48.18	3198.2747	110.616	48.16
2708.2747	107.992	48.18	3208.2747	110.801	48.18
2718.2747	108.015	48.16	3218.2747	110.777	48.18
2728.2747	108.04	48.16	3228.2747	110.801	48.18
2738.2747	108.133	48.18	3238.2747	110.869	48.18
2748.2747	108.065	48.18	3248.2747	110.953	48.16
2758.2747	108.256	48.18	3258.2747	111.021	48.16
2768.2747	108.219	48.18	3268.2747	111.12	48.18
2778.2747	108.955	48.18	3278.2747	111.206	48.18
2788.2747	109.145	48.18	3288.2747	111.157	48.18
2798.2747	109.176	48.18	3298.2747	111.218	48.18
2808.2747	109.28	48.18	3308.2747	111.243	48.18
2818.2747	109.328	48.16	3318.2747	111.261	48.18
2828.2747	109.403	48.18	3328.2747	111.291	48.16
2838.2747	109.323	48.18	3338.2747	111.304	48.18
2848.2747	109.476	48.18	3348.2747	111.445	48.18
2858.2747	109.543	48.16	3358.2747	111.384	48.18
2868.2747	109.445	48.16	3368.2747	111.426	48.16
2878.2747	109.506	48.16	3378.2747	111.47	48.18
2888.2747	109.653	48.16	3388.2747	111.482	48.18
2898.2747	109.69	48.16	3398.2747	111.525	48.18
2908.2747	109.672	48.18	3408.2747	111.5	48.18
2918.2747	109.678	48.16	3418.2747	111.58	48.18
2928.2747	109.722	48.18	3428.2747	111.641	48.18
2938.2747	109.672	48.16	3438.2747	111.653	48.16
2948.2747	109.727	48.16	3448.2747	111.665	48.16
2958.2747	109.8	48.16	3458.2747	111.684	48.18
2968.2747	109.751	48.16	3468.2747	111.727	48.18
2978.2747	109.788	48.16	3478.2747	111.905	48.18
2988.2747	109.82	48.18	3488.2747	111.874	48.18
2998.2747	109.868	48.16	3498.2747	111.936	48.18
3008.2747	109.924	48.18	3508.2747	111.917	48.18
3018.2747	109.924	48.18	3518.2747	111.991	48.18
3028.2747	110.083	48.18	3528.2747	111.868	48.18
3038.2747	110.027	48.16	3538.2747	111.973	48.18
3048.2747	110.194	48.18	3548.2747	112.095	48.18
3058.2747	110.206	48.18	3558.2747	112.12	48.18
3068.2747	110.194	48.18	3568.2747	112.12	48.18
3078.2747	110.242	48.16	3578.2747	112.132	48.18
3088.2747	110.304	48.18	3588.2747	112.126	48.18
3098.2747	110.353	48.18	3598.2747	112.212	48.18
3108.2747	110.211	48.16	3608.2747	112.291	48.18
3118.2747	110.384	48.18	3618.2747	112.328	48.18
3128.2747	110.366	48.18	3628.2747	112.408	48.18
3138.2747	110.433	48.18	3638.2747	112.316	48.18
3148.2747	110.451	48.18	3648.2747	112.39	48.18
3158.2747	110.507	48.18	3658.2747	112.475	48.18

Elapsed Time (minutes)	Drawdown (feet)	Temperature (° Fahrenheit)	Elapsed Time (minutes)	Drawdown (feet)	Temperature (° Fahrenheit)
3668.2747	112.488	48.18	4168.2747	113.647	48.18
3678.2747	112.524	48.18	4178.2747	113.641	48.18
3688.2747	112.531	48.18	4188.2747	113.567	48.18
3698.2747	112.524	48.18	4198.2747	113.739	48.18
3708.2747	112.616	48.18	4208.2747	113.69	48.18
3718.2747	112.758	48.18	4218.2747	113.769	48.18
3728.2747	112.555	48.18	4228.2747	114.511	48.18
3738.2747	112.659	48.18	4238.2747	114.561	48.18
3748.2747	112.666	48.18	4248.2747	114.622	48.18
3758.2747	112.647	48.18	4258.2747	114.585	48.18
3768.2747	112.696	48.18	4268.2747	114.732	48.18
3778.2747	112.702	48.18	4278.2747	114.72	48.18
3788.2747	112.745	48.18	4288.2747	114.702	48.18
3798.2747	112.788	48.18	4288	114.73	
3808.2747	112.8	48.18	4318	115	
3818.2747	112.733	48.18			
3828.2747	112.77	48.18			
3838.2747	112.807	48.18			
3848.2747	112.899	48.18			
3858.2747	112.948	48.18			
3868.2747	112.929	48.18			
3878.2747	112.905	48.18			
3888.2747	112.923	48.18			
3898.2747	112.905	48.18			
3908.2747	112.997	48.18			
3918.2747	112.978	48.18			
3928.2747	113.04	48.18			
3938.2747	113.027	48.18			
3948.2747	113.144	48.18			
3958.2747	113.113	48.18			
3968.2747	113.254	48.18			
3978.2747	113.217	48.18			
3988.2747	113.303	48.18			
3998.2747	113.352	48.18			
4008.2747	113.352	48.18			
4018.2747	113.352	48.18			
4028.2747	113.34	48.18			
4038.2747	113.309	48.18			
4048.2747	113.377	48.18			
4058.2747	113.365	48.18			
4068.2747	113.365	48.18			
4078.2747	113.395	48.18			
4088.2747	113.408	48.18			
4098.2747	113.34	48.18			
4108.2747	113.475	48.18			
4118.2747	113.475	48.18			
4128.2747	113.493	48.18			
4138.2747	113.5	48.18			
4148.2747	113.555	48.18			
4158.2747	113.671	48.18			

TABLE 3
CROSSROADS VENTURES, INC.
Simultaneous Testing of Wells R1 and R2
Well R1 Pumping Rate Data

Date	Time	Pipe Orifice (inches)	Pumping Rate (gpm)	Remarks
9/17/2002	9:31	14.5	57.5	
9/17/2002	9:37	14.5	57.5	
9/17/2002	9:41	14.25	57.0	Drum Measurement = 58.5 gpm
9/17/2002	9:47	14.25	57.0	
9/17/2002	9:52	14.25	57.0	Drum Measurement = 56.3 gpm
9/17/2002	10:11	14.0	56.5	
9/17/2002	10:15	14.0	56.5	
9/17/2002	10:21	14.0	56.5	
9/17/2002	10:31	14.0	56.5	
9/17/2002	10:32	14.0	56.5	Drum Measurement = 57.1 gpm
9/17/2002	10:41	14.0	56.5	
9/17/2002	11:01	14.25	57.0	
9/17/2002	11:11	14.0	56.5	
9/17/2002	11:13	14.25	57.0	
9/17/2002	11:39	14.0	56.5	Drum Measurement = 57.6 gpm
9/17/2002	12:40	14.25	57.0	
9/17/2002	13:40	14.25	57.0	
9/17/2002	14:40	14.25	57.0	
9/17/2002	15:40	14.5	57.5	
9/17/2002	16:40	14.5	57.5	
9/17/2002	17:40	14.5	57.5	
9/17/2002	18:40	14.5	57.5	
9/17/2002	19:40	14.5	57.5	
9/17/2002	21:42	14.5	57.5	
9/17/2002	22:40	14.5	57.5	
9/18/2002	1:37	14.5	57.5	
9/18/2002	3:37	14.5	57.5	
9/18/2002	5:39	14.5	57.5	
9/18/2002	7:40	14.5	57.5	
9/18/2002	8:43	14.5	57.5	
9/18/2002	9:40	14.5	57.5	
9/18/2002	10:41	14.5	57.5	
9/18/2002	11:40	14.25	57.0	
9/18/2002	12:40	14.25	57.0	
9/18/2002	13:40	14.25	57.0	
9/18/2002	14:40	14.25	57.0	
9/18/2002	15:40	14.5	57.5	
9/18/2002	16:40	14.5	57.5	
9/18/2002	17:38	14.5	57.5	
9/18/2002	18:39	14.5	57.5	
9/18/2002	19:39	14.5	57.5	
9/18/2002	20:40	14.5	57.5	
9/18/2002	21:39	14.5	57.5	

Date	Time	Pipe Orifice (inches)	Pumping Rate (gpm)	Remarks
9/18/2002	22:39	14.5	57.5	
9/18/2002	23:39	14.5	57.5	
9/19/2002	0:40	14.5	57.5	
9/19/2002	1:39	14.5	57.5	
9/19/2002	2:39	14.25	57.0	
9/19/2002	3:39	14.5	57.5	
9/19/2002	4:39	14.25	57.0	
9/19/2002	5:39	14.25	57.0	
9/19/2002	6:38	14.25	57.0	
9/19/2002	7:40	14.25	57.0	
9/19/2002	8:40	14.25	57.0	
9/19/2002	9:40	14.25	57.0	
9/19/2002	10:40	14.25	57.0	
9/19/2002	11:40	14.25	57.0	
9/19/2002	12:40	14.25	57.0	
9/19/2002	13:40	14.25	57.0	
9/19/2002	14:42	14.25	57.0	
9/19/2002	15:43	14.25	57.0	
9/19/2002	16:38	14.25	57.0	
9/19/2002	17:38	14.25	57.0	
9/19/2002	18:39	14.25	57.0	
9/19/2002	19:40	14.25	57.0	
9/19/2002	20:39	14.25	57.0	
9/19/2002	21:40	14.25	57.0	
9/19/2002	22:39	14.25	57.0	
9/19/2002	23:40	14.25	57.0	
9/20/2002	12:40	14.25	57.0	
9/20/2002	1:41	14.25	57.0	
9/20/2002	2:40	14.25	57.0	
9/20/2002	3:42	14.25	57.0	
9/20/2002	4:39	14.25	57.0	
9/20/2002	5:40	14.25	57.0	
9/20/2002	6:38	14.25	57.0	
9/20/2002	7:40	14.25	57.0	
9/20/2002	8:40	14.25	57.0	
9/20/2002	9:25	14.25	57.0	Drum Measurement = 58.3 gpm

TABLE 4
CROSSROADS VENTURES, INC.
Simultaneous Testing of Wells R1 and R2
Well R2 Pumping Rate Data

Date	Time	Pipe Orifice (inches)	Pumping Rate (gpm)	Remarks
9/17/2002	9:35	21.5	70.0	Drum Measurement = 72 gpm
9/17/2002	9:40	21.5	70.0	
9/17/2002	9:41	21.5	70.0	
9/17/2002	9:55	21.5	70.0	
9/17/2002	10:30	21.5	70.0	
9/17/2002	10:50	21.5	70.0	Drum Measurement = 72.3 gpm
9/17/2002	12:14	21.5	70.0	
9/17/2002	12:43	21.5	70.0	
9/17/2002	13:13	21.25	69.6	
9/17/2002	13:44	21.75	70.4	
9/17/2002	14:14	21.75	70.4	
9/17/2002	14:44	21.5	70.0	
9/17/2002	15:14	21.5	70.0	
9/17/2002	16:13	21.5	70.0	
9/17/2002	17:13	21.5	70.0	
9/17/2002	18:43	21.5	70.0	
9/17/2002	19:46	21.5	70.0	
9/17/2002	20:46	21.5	70.0	
9/17/2002	21:47	21.5	70.0	
9/17/2002	22:43	21.5	70.0	
9/18/2002	1:42	21.5	70.0	
9/18/2002	3:42	21.5	70.0	
9/18/2002	5:42	21.5	70.0	
9/18/2002	7:44	21.5	70.0	
9/18/2002	8:45	21.25	69.6	
9/18/2002	9:42	21.25	69.6	
9/18/2002	10:45	21.25	69.6	
9/18/2002	11:43	21.25	69.6	
9/18/2002	12:43	21.5	70.0	
9/18/2002	13:42	21.5	70.0	
9/18/2002	14:43	21.5	70.0	
9/18/2002	15:42	21.5	70.0	
9/18/2002	16:42	21.5	70.0	
9/18/2002	17:51	21.5	70.0	
9/18/2002	18:46	21.25	69.6	
9/18/2002	19:50	21.5	70.0	
9/18/2002	20:44	21.5	70.0	
9/18/2002	21:44	21.5	70.0	
9/18/2002	22:42	21.5	70.0	
9/18/2002	23:42	21.5	70.0	
9/19/2002	0:44	21.5	70.0	
9/19/2002	1:43	21.5	70.0	
9/19/2002	2:43	21.25	69.6	

Date	Time	Pipe Orifice (inches)	Pumping Rate (gpm)	Remarks
9/19/2002	3:43	21.25	69.6	
9/19/2002	4:42	21.25	69.6	
9/19/2002	5:43	21.25	69.6	
9/19/2002	6:42	21.00	69.2	
9/19/2002	7:43	21.00	69.2	
9/19/2002	8:43	21.5	70.0	
9/19/2002	9:42	21.5	70.0	
9/19/2002	10:42	21.5	70.0	
9/19/2002	11:42	21.5	70.0	
9/19/2002	12:43	21.25	69.6	
9/19/2002	13:42	21.25	69.6	
9/19/2002	14:44	21.25	69.6	
9/19/2002	15:40	21.25	69.6	
9/19/2002	16:42	21.00	69.2	
9/19/2002	17:42	21.00	69.2	
9/19/2002	18:42	21.00	69.2	
9/19/2002	19:42	21.00	69.2	
9/19/2002	20:41	21.00	69.2	
9/19/2002	21:41	21.00	69.2	
9/19/2002	22:42	21.00	69.2	
9/19/2002	23:43	20.75	68.8	
9/20/2002	12:41	20.75	68.8	
9/20/2002	1:42	20.75	68.8	
9/20/2002	2:43	20.75	68.8	
9/20/2002	3:43	20.75	68.8	
9/20/2002	4:41	20.75	68.8	
9/20/2002	5:42	20.75	68.8	
9/20/2002	6:41	20.75	68.8	
9/20/2002	7:43	21.25	69.6	
9/20/2002	8:43	21.25	69.6	Drum Measurement = 71.9 gpm

TABLE 5
CROSSROADS VENTURES, INC.
Simultaneous Testing at Wells R1 and R2
Well R1 Recovery Data

Time After Pumping Stopped (minutes)	Residual Drawdown (feet)	Time After Pumping Stopped (minutes)	Residual Drawdown (feet)
0.005	67.51	0.3742	62.373
0.01	67.498	0.3963	62.136
0.015	67.479	0.4198	61.892
0.02	67.479	0.4447	61.655
0.025	67.492	0.4697	61.399
0.03	67.48	0.4963	61.155
0.035	67.455	0.5247	60.911
0.04	67.461	0.5547	60.661
0.045	67.455	0.5863	60.405
0.05	67.461	0.6213	60.148
0.055	65.999	0.6578	59.879
0.06	65.737	0.6963	59.617
0.065	66.493	0.738	59.342
0.07	66.949	0.7813	59.086
0.075	67.155	0.828	58.817
0.08	67.137	0.8763	58.561
0.0848	67.043	0.928	58.292
0.09	66.906	0.983	58.036
0.095	66.743	1.0413	57.78
0.1	66.619	1.103	57.523
0.1058	66.475	1.168	57.274
0.112	66.344	1.238	57.024
0.1185	66.206	1.3113	56.811
0.1255	66.081	1.3897	56.749
0.1328	65.944	1.473	56.724
0.1407	65.813	1.5613	56.693
0.149	65.656	1.6547	56.636
0.1578	65.5	1.753	56.549
0.167	65.374	1.858	56.468
0.177	65.211	1.968	56.393
0.1875	65.029	2.0847	56.299
0.1985	64.842	2.2097	56.186
0.2102	64.636	2.3412	56.086
0.2227	64.436	2.4813	55.98
0.2358	64.223	2.6297	55.85
0.2498	64.005	2.7863	55.731
0.2647	63.774	2.953	55.6
0.2803	63.542	3.1297	55.487
0.297	63.304	3.3163	55.393
0.3147	63.079	3.5147	55.312
0.3333	62.842	3.7247	55.219
0.3532	62.611	3.9463	55.113

Time After Pumping Stopped (minutes)	Residual Drawdown (feet)	Time After Pumping Stopped (minutes)	Residual Drawdown (feet)
4.1813	54.988	63.0197	45.314
4.4295	54.837	66.758	44.964
4.693	54.687	70.718	44.601
4.973	54.55	74.9113	44.245
5.2697	54.425	79.3547	43.889
5.583	54.294	84.0613	43.526
5.9147	54.175	89.0463	43.163
6.2663	54.05	94.3263	42.807
6.6397	53.925	99.9197	42.438
7.0347	53.8	105.8447	42.082
7.453	53.675	112.1197	41.713
7.8963	53.549	118.768	41.345
8.3663	53.412	125.8097	40.976
8.8647	53.274	133.268	40.601
9.3913	53.137	141.168	40.219
9.9497	53.017	149.5363	39.825
10.5413	52.867	158.4013	39.425
11.168	52.711	167.7913	39.019
11.8313	52.555	177.738	38.606
12.5347	52.405	188.2747	38.187
13.2797	52.23	198.2747	37.8
14.0697	52.054	208.2747	37.424
14.9063	51.91	218.2747	37.062
15.7913	51.723	228.2747	36.705
16.7297	51.541	238.2747	36.355
17.723	51.354	248.2747	36.018
18.7763	51.154	258.2747	35.687
19.8913	50.947	268.2747	35.361
21.073	50.697	278.2747	35.043
22.3247	50.472	288.2747	34.73
23.6497	50.252	298.2747	34.424
25.0547	49.996	308.2747	34.124
26.543	49.752	318.2747	33.83
28.118	49.489	328.2747	33.548
29.7863	49.226	338.2747	33.267
31.5547	48.963	348.2747	32.992
33.428	48.687	358.2747	32.717
35.4112	48.418	368.2747	32.454
37.513	48.143	378.2747	32.191
39.7397	47.861	388.2747	31.935
42.098	47.573	398.2747	31.685
44.5963	47.26	408.2747	31.441
47.243	46.935	418.2747	31.191
50.0463	46.616	428.2747	30.959
53.0147	46.29	438.2747	30.721
56.1597	45.977	448.2747	30.49
59.4913	45.658	458.2747	30.259

Time After Pumping Stopped (minutes)	Residual Drawdown (feet)	Time After Pumping Stopped (minutes)	Residual Drawdown (feet)
468.2747	30.034	938.2747	22.402
478.2747	29.815	948.2747	22.283
488.2747	29.596	958.2747	22.152
498.2747	29.383	968.2747	22.033
508.2747	29.17	978.2747	21.908
518.2747	28.964	988.2747	21.789
528.2747	28.758	998.2747	21.664
538.2747	28.557	1008.2747	21.545
548.2747	28.357	1018.2747	21.426
558.2747	28.163	1028.2747	21.314
568.2747	27.97	1038.2747	21.195
578.2747	27.782	1048.2747	21.076
588.2747	27.601	1058.2747	20.963
598.2747	27.419	1068.2747	20.845
608.2747	27.244	1078.2747	20.738
618.2747	27.069	1088.2747	20.619
628.2747	26.894	1098.2747	20.513
638.2747	26.719	1108.2747	20.4
648.2747	26.556	1118.2747	20.288
658.2747	26.387	1128.2747	20.175
668.2747	26.224	1138.2747	20.069
678.2747	26.062	1148.2747	19.962
688.2747	25.905	1158.2747	19.856
698.2747	25.743	1168.2747	19.75
708.2747	25.586	1178.2747	19.65
718.2747	25.43	1188.2747	19.543
728.2747	25.28	1198.2747	19.443
738.2747	25.13	1208.2747	19.343
748.2747	24.98	1218.2747	19.249
758.2747	24.829	1228.2747	19.143
768.2747	24.686	1238.2747	19.049
778.2747	24.542	1248.2747	18.949
788.2747	24.398	1258.2747	18.855
798.2747	24.26	1268.2747	18.761
808.2747	24.123	1278.2747	18.667
818.2747	23.985	1288.2747	18.574
828.2747	23.841	1298.2747	18.486
838.2747	23.71	1308.2747	18.398
848.2747	23.572	1318.2747	18.311
858.2747	23.435	1328.2747	18.229
868.2747	23.303	1338.2747	18.148
878.2747	23.172	1348.2747	18.067
888.2747	23.047	1358.2747	17.985
898.2747	22.915	1368.2747	17.904
908.2747	22.79	1378.2747	17.823
918.2747	22.665	1388.2747	17.748
928.2747	22.534	1398.2747	17.673

Time After Pumping Stopped (minutes)	Residual Drawdown (feet)	Time After Pumping Stopped (minutes)	Residual Drawdown (feet)
1408.2747	17.597	1878.2747	14.481
1418.2747	17.522	1888.2747	14.406
1428.2747	17.441	1898.2747	14.35
1438.2747	17.366	1908.2747	14.275
1448.2747	17.291	1918.2747	14.212
1458.2747	17.216	1928.2747	14.15
1468.2747	17.141	1938.2747	14.087
1478.2747	17.059	1948.2747	14.018
1488.2747	16.991	1958.2747	13.962
1498.2747	16.909	1968.2747	13.899
1508.2747	16.84	1978.2747	13.837
1518.2747	16.772	1988.2747	13.781
1528.2747	16.703	1998.2747	13.718
1538.2747	16.634	2008.2747	13.662
1548.2747	16.565	2018.2747	13.599
1558.2747	16.49	2028.2747	13.549
1568.2747	16.415	2038.2747	13.493
1578.2747	16.346	2048.2747	13.436
1588.2747	16.265	2058.2747	13.38
1598.2747	16.196	2068.2747	13.324
1608.2747	16.127	2078.2747	13.274
1618.2747	16.058	2088.2747	13.217
1628.2747	15.983	2098.2747	13.174
1638.2747	15.914	2108.2747	13.117
1648.2747	15.846	2118.2747	13.061
1658.2747	15.777	2128.2747	13.017
1668.2747	15.702	2138.2747	12.961
1678.2747	15.633	2148.2747	12.917
1688.2747	15.57	2158.2747	12.861
1698.2747	15.514	2168.2747	12.811
1708.2747	15.464	2178.2747	12.767
1718.2747	15.414	2188.2747	12.717
1728.2747	15.37	2198.2747	12.673
1738.2747	15.326	2208.2747	12.623
1748.2747	15.289	2218.2747	12.573
1758.2747	15.245	2228.2747	12.523
1768.2747	15.195	2238.2747	12.479
1778.2747	15.138	2248.2747	12.435
1788.2747	15.076	2258.2747	12.385
1798.2747	15.02	2268.2747	12.341
1808.2747	14.951	2278.2747	12.291
1818.2747	14.888	2288.2747	12.247
1828.2747	14.819	2298.2747	12.197
1838.2747	14.75	2308.2747	12.154
1848.2747	14.675	2318.2747	12.103
1858.2747	14.613	2328.2747	12.06
1868.2747	14.544	2338.2747	12.01

Time After Pumping Stopped (minutes)	Residual Drawdown (feet)	Time After Pumping Stopped (minutes)	Residual Drawdown (feet)
2348.2747	11.966	2818.2747	9.819
2358.2747	11.916	2828.2747	9.788
2368.2747	11.872	2838.2747	9.757
2378.2747	11.823	2848.2747	9.725
2388.2747	11.778	2858.2747	9.688
2398.2747	11.728	2868.2747	9.656
2408.2747	11.684	2878.2747	9.625
2418.2747	11.634	2888.2747	9.6
2428.2747	11.59	2898.2747	9.575
2438.2747	11.54	2908.2747	9.538
2448.2747	11.49	2918.2747	9.525
2458.2747	11.446	2928.2747	9.488
2468.2747	11.396	2938.2747	9.462
2478.2747	11.346	2948.2747	9.419
2488.2747	11.296	2958.2747	9.387
2498.2747	11.246	2968.2747	9.356
2508.2747	11.202	2978.2747	9.331
2518.2747	11.152	2988.2747	9.306
2528.2747	11.102	2998.2747	9.268
2538.2747	11.046	3008.2747	9.25
2548.2747	11.002	3018.2747	9.218
2558.2747	10.952	3028.2747	9.181
2568.2747	10.902	3038.2747	9.168
2578.2747	10.852	3048.2747	9.137
2588.2747	10.802	3058.2747	9.106
2598.2747	10.758	3068.2747	9.081
2608.2747	10.708	3078.2747	9.037
2618.2747	10.664	3088.2747	9.013
2628.2747	10.601	3098.2747	8.981
2638.2747	10.551	3108.2747	8.943
2648.2747	10.508	3118.2747	8.912
2658.2747	10.464	3128.2747	8.881
2668.2747	10.414	3138.2747	8.83
2678.2747	10.364	3148.2747	8.799
2688.2747	10.314	3158.2747	8.761
2698.2747	10.27	3168.2747	8.73
2708.2747	10.226	3178.2747	8.693
2718.2747	10.182	3188.2747	8.661
2728.2747	10.138	3198.2747	8.63
2738.2747	10.107	3208.2747	8.599
2748.2747	10.063	3218.2747	8.568
2758.2747	10.032	3228.2747	8.53
2768.2747	9.994	3238.2747	8.492
2778.2747	9.957	3248.2747	8.461
2788.2747	9.919	3258.2747	8.424
2798.2747	9.882	3268.2747	8.386
2808.2747	9.844	3278.2747	8.355

Time After Pumping Stopped (minutes)	Residual Drawdown (feet)	Time After Pumping Stopped (minutes)	Residual Drawdown (feet)
3288.2747	8.33	3758.2747	7.098
3298.2747	8.292	3768.2747	7.084
3308.2747	8.261	3778.2747	7.053
3318.2747	8.223	3788.2747	7.04
3328.2747	8.198	3798.2747	7.015
3338.2747	8.161	3808.2747	6.991
3348.2747	8.123	3818.2747	6.965
3358.2747	8.093	3828.2747	6.94
3368.2747	8.061	3838.2747	6.915
3378.2747	8.029	3848.2747	6.891
3388.2747	7.998	3858.2747	6.871
3398.2747	7.967	3868.2747	6.847
3408.2747	7.935	3878.2747	6.822
3418.2747	7.91	3888.2747	6.796
3428.2747	7.879	3898.2747	6.766
3438.2747	7.848	3908.2747	6.746
3448.2747	7.823	3918.2747	6.715
3458.2747	7.791	3928.2747	6.691
3468.2747	7.76	3938.2747	6.665
3478.2747	7.735	3948.2747	6.64
3488.2747	7.71	3958.2747	6.609
3498.2747	7.685	3968.2747	6.583
3508.2747	7.66	3978.2747	6.558
3518.2747	7.635	3988.2747	6.533
3528.2747	7.61	3998.2747	6.509
3538.2747	7.586	4008.2747	6.484
3548.2747	7.561	4018.2747	6.458
3558.2747	7.536	4028.2747	6.434
3568.2747	7.51	4038.2747	6.415
3578.2747	7.486	4048.2747	6.383
3588.2747	7.46	4058.2747	6.352
3598.2747	7.442	4068.2747	6.334
3608.2747	7.416	4078.2747	6.308
3618.2747	7.392	4088.2747	6.284
3628.2747	7.373	4098.2747	6.264
3638.2747	7.347	4108.2747	6.239
3648.2747	7.323	4118.2747	6.221
3658.2747	7.303	4128.2747	6.195
3668.2747	7.278	4138.2747	6.171
3678.2747	7.259	4148.2747	6.151
3688.2747	7.241	4158.2747	6.127
3698.2747	7.222	4168.2747	6.108
3708.2747	7.197	4178.2747	6.089
3718.2747	7.172	4188.2747	6.07
3728.2747	7.153	4198.2747	6.051
3738.2747	7.14	4208.2747	6.033
3748.2747	7.115	4218.2747	6.014

Time After Pumping Stopped (minutes)	Residual Drawdown (feet)	Time After Pumping Stopped (minutes)	Residual Drawdown (feet)
4228.2747	6.001	4698.2747	5.232
4238.2747	5.976	4708.2747	5.213
4248.2747	5.951	4718.2747	5.194
4258.2747	5.926	4728.2747	5.169
4268.2747	5.914	4738.2747	5.151
4278.2747	5.907	4748.2747	5.132
4288.2747	5.926	4758.2747	5.112
4298.2747	5.914	4768.2747	5.095
4308.2747	5.901	4778.2747	5.075
4318.2747	5.92	4788.2747	5.056
4328.2747	5.895	4798.2747	5.032
4338.2747	5.901	4808.2747	5.012
4348.2747	5.889	4818.2747	4.993
4358.2747	5.796	4828.2747	4.975
4368.2747	5.782	4838.2747	4.956
4378.2747	5.763	4848.2747	4.937
4388.2747	5.757	4858.2747	4.918
4398.2747	5.738	4868.2747	4.901
4408.2747	5.726	4878.2747	4.888
4418.2747	5.713	4888.2747	4.869
4428.2747	5.701	4898.2747	4.85
4438.2747	5.682	4908.2747	4.838
4448.2747	5.67	4918.2747	4.824
4458.2747	5.657	4928.2747	4.812
4468.2747	5.638	4938.2747	4.799
4478.2747	5.619	4948.2747	4.788
4488.2747	5.607	4958.2747	4.775
4498.2747	5.588	4968.2747	4.762
4508.2747	5.576	4978.2747	4.749
4518.2747	5.563	4988.2747	4.743
4528.2747	5.544	4998.2747	4.731
4538.2747	5.526	5008.2747	4.718
4548.2747	5.514	5018.2747	4.706
4558.2747	5.495	5028.2747	4.693
4568.2747	5.482	5038.2747	4.681
4578.2747	5.457	5048.2747	4.668
4588.2747	5.444	5058.2747	4.662
4598.2747	5.426	5068.2747	4.649
4608.2747	5.413	5078.2747	4.637
4618.2747	5.389	5088.2747	4.63
4628.2747	5.37	5098.2747	4.618
4638.2747	5.35	5108.2747	4.605
4648.2747	5.332	5118.2747	4.599
4658.2747	5.306	5128.2747	4.587
4668.2747	5.294	5138.2747	4.581
4678.2747	5.269	5148.2747	4.568
4688.2747	5.25	5158.2747	4.555

Time After Pumping Stopped (minutes)	Residual Drawdown (feet)	Time After Pumping Stopped (minutes)	Residual Drawdown (feet)
5168.2747	4.543	5638.2747	3.854
5178.2747	4.537	5648.2747	3.849
5188.2747	4.524	5658.2747	3.835
5198.2747	4.518	5668.2747	3.83
5208.2747	4.5	5678.2747	3.81
5218.2747	4.486	5688.2747	3.811
5228.2747	4.486	5698.2747	3.792
5238.2747	4.468	5708.2747	3.786
5248.2747	4.455	5718.2747	3.779
5258.2747	4.449	5728.2747	3.767
5268.2747	4.436	5738.2747	3.76
5278.2747	4.424	5748.2747	3.748
5288.2747	4.411	5758.2747	3.742
5298.2747	4.399	5768.2747	3.729
5308.2747	4.386	5778.2747	3.723
5318.2747	4.368	5788.2747	3.71
5328.2747	4.349	5798.2747	3.71
5338.2747	4.336	5808.2747	3.698
5348.2747	4.324	5818.2747	3.691
5358.2747	4.305	5828.2747	3.679
5368.2747	4.292	5838.2747	3.673
5378.2747	4.275	5848.2747	3.666
5388.2747	4.261	5858.2747	3.654
5398.2747	4.242	5868.2747	3.648
5408.2747	4.23	5878.2747	3.635
5418.2747	4.211	5888.2747	3.629
5428.2747	4.192	5898.2747	3.623
5438.2747	4.173	5908.2747	3.616
5448.2747	4.161	5918.2747	3.61
5458.2747	4.142	5928.2747	3.598
5468.2747	4.123	5938.2747	3.592
5478.2747	4.111	5948.2747	3.579
5488.2747	4.092	5958.2747	3.573
5498.2747	4.073	5968.2747	3.566
5508.2747	4.061	5978.2747	3.554
5518.2747	4.048	5988.2747	3.548
5528.2747	4.029	5998.2747	3.535
5538.2747	4.012	6008.2747	3.529
5548.2747	3.992	6018.2747	3.516
5558.2747	3.979	6028.2747	3.51
5568.2747	3.961	6038.2747	3.498
5578.2747	3.948	6048.2747	3.491
5588.2747	3.929	6058.2747	3.473
5598.2747	3.917	6068.2747	3.466
5608.2747	3.898	6078.2747	3.46
5618.2747	3.886	6088.2747	3.46
5628.2747	3.867	6098.2747	3.466

Table 5

Time After Pumping Stopped (minutes)	Residual Drawdown (feet)	Time After Pumping Stopped (minutes)	Residual Drawdown (feet)
6108.2747	3.485	6578.2747	3.166
6118.2747	3.497	6588.2747	3.153
6128.2747	3.51	6598.2747	3.147
6138.2747	3.529	6608.2747	3.141
6148.2747	3.547	6618.2747	3.134
6158.2747	3.56	6628.2747	3.129
6168.2747	3.566	6638.2747	3.122
6178.2747	3.573	6648.2747	3.11
6188.2747	3.567	6658.2747	3.109
6198.2747	3.56	6668.2747	3.104
6208.2747	3.554	6678.2747	3.097
6218.2747	3.541	6688.2747	3.091
6228.2747	3.529	6698.2747	3.084
6238.2747	3.51	6708.2747	3.078
6248.2747	3.497	6718.2747	3.066
6258.2747	3.485	6728.2747	3.059
6268.2747	3.472	6738.2747	3.053
6278.2747	3.46	6748.2747	3.04
6288.2747	3.447	6758.2747	3.028
6298.2747	3.429	6768.2747	3.023
6308.2747	3.422	6778.2747	3.009
6318.2747	3.404	6788.2747	3.004
6328.2747	3.398	6798.2747	2.99
6338.2747	3.378	6808.2747	2.984
6348.2747	3.372	6818.2747	2.965
6358.2747	3.353	6828.2747	2.953
6368.2747	3.347	6838.2747	2.947
6378.2747	3.336	6848.2747	2.929
6388.2747	3.322	6858.2747	2.915
6398.2747	3.31	6868.2747	2.909
6408.2747	3.303	6878.2747	2.89
6418.2747	3.291	6888.2747	2.885
6428.2747	3.278	6898.2747	2.871
6438.2747	3.272	6908.2747	2.853
6448.2747	3.26	6918.2747	2.846
6458.2747	3.253	6928.2747	2.828
6468.2747	3.241	6938.2747	2.815
6478.2747	3.228	6948.2747	2.803
6488.2747	3.228	6958.2747	2.79
6498.2747	3.222	6968.2747	2.784
6508.2747	3.209	6978.2747	2.772
6518.2747	3.203	6988.2747	2.759
6528.2747	3.197	6998.2747	2.746
6538.2747	3.191	7008.2747	2.735
6548.2747	3.178	7018.2747	2.722
6558.2747	3.178	7028.2747	2.71
6568.2747	3.166	7038.2747	2.696

Time After Pumping Stopped (minutes)	Residual Drawdown (feet)	Time After Pumping Stopped (minutes)	Residual Drawdown (feet)
7048.2747	2.684		
7058.2747	2.678		
7068.2747	2.665		
7078.2747	2.653		
7088.2747	2.646		
7098.2747	2.641		
7108.2747	2.627		
7118.2747	2.621		
7128.2747	2.615		
7138.2747	2.602		
7148.2747	2.596		
7158.2747	2.59		
7168.2747	2.578		
7178.2747	2.571		
7188.2747	2.566		
7198.2747	2.558		
7208.2747	2.546		
7218.2747	2.541		
7228.2747	2.533		
7238.2747	2.527		
7248.2747	2.521		

TABLE 6
CROSSROADS VENTURES, INC.
Simulltaneous Testing of Wells R1 and R2
Well R2 Recovery Data

Time After Pumping Stopped (minutes)	Residual Drawdown (feet)	Time After Pumping Stopped (minutes)	Residual Drawdown (feet)
0.005	114.686	0.3963	103.927
0.01	114.662	0.4198	103.246
0.015	114.657	0.4447	102.546
0.02	114.644	0.4697	101.865
0.025	114.681	0.4963	101.129
0.03	114.59	0.5247	100.356
0.035	114.67	0.5547	99.552
0.04	114.768	0.5863	98.699
0.045	114.566	0.6213	97.791
0.05	110.714	0.6578	96.846
0.055	111.413	0.6963	95.888
0.06	114.823	0.738	94.87
0.065	114.106	0.7813	93.839
0.07	114.044	0.828	92.734
0.075	113.88	0.8763	91.623
0.08	113.72	0.928	90.456
0.0848	113.543	0.983	89.253
0.09	113.371	1.0413	88.105
0.095	113.193	1.103	87.117
0.1	113.015	1.168	85.876
0.1058	112.825	1.238	84.538
0.112	112.598	1.3113	83.181
0.1185	112.365	1.3897	81.805
0.1255	112.175	1.473	80.436
0.1328	111.936	1.5613	79.029
0.1407	111.684	1.6547	77.58
0.149	111.421	1.753	76.13
0.1578	111.145	1.858	74.663
0.167	110.891	1.968	73.22
0.177	110.578	2.0847	71.782
0.1875	110.246	2.2097	70.346
0.1985	109.89	2.3412	68.945
0.2102	109.516	2.4813	67.576
0.2227	109.118	2.6297	66.244
0.2358	108.707	2.7863	64.948
0.2498	108.265	2.953	63.709
0.2647	107.805	3.1297	62.518
0.2803	107.333	3.3163	61.413
0.297	106.83	3.5147	60.375
0.3147	106.296	3.7247	59.424
0.3333	105.75	3.9463	58.552
0.3532	105.16	4.1813	57.768
0.3742	104.559	4.4295	57.08

Time After Pumping Stopped (minutes)	Residual Drawdown (feet)	Time After Pumping Stopped (minutes)	Residual Drawdown (feet)
4.693	56.467	89.0463	43.702
4.973	55.932	94.3263	43.37
5.2697	55.472	99.9197	43.032
5.583	55.073	105.8447	42.692
5.9147	54.728	112.1197	42.348
6.2663	54.427	118.768	41.997
6.6397	54.157	125.8097	41.634
7.0347	53.917	133.268	41.271
7.453	53.696	141.168	40.908
7.8963	53.492	149.5363	40.526
8.3663	53.289	158.4013	40.138
8.8647	53.098	167.7913	39.738
9.3913	52.906	177.738	39.331
9.9497	52.716	188.2747	38.919
10.5413	52.531	198.2747	38.55
11.168	52.352	208.2747	38.187
11.8313	52.167	218.2747	37.824
12.5347	51.983	228.2747	37.472
13.2797	51.798	238.2747	37.133
14.0697	51.607	248.2747	36.795
14.9063	51.422	258.2747	36.51
15.7913	51.232	268.2747	36.203
16.7297	51.034	278.2747	35.901
17.723	50.837	288.2747	35.537
18.7763	50.64	298.2747	35.229
19.8913	50.436	308.2747	34.94
21.073	50.227	318.2747	34.663
22.3247	50.018	328.2747	34.38
23.6497	49.801	338.2747	34.11
25.0547	49.592	348.2747	33.831
26.543	49.364	358.2747	33.567
28.118	49.136	368.2747	33.296
29.7863	48.913	378.2747	33.044
31.5547	48.68	388.2747	32.791
33.428	48.47	398.2747	32.539
35.4112	48.224	408.2747	32.299
37.513	47.976	418.2747	32.058
39.7397	47.718	428.2747	31.818
42.098	47.46	438.2747	31.584
44.5963	47.206	448.2747	31.358
47.243	46.942	458.2747	31.129
50.0463	46.67	468.2747	30.907
53.0147	46.4	478.2747	30.685
56.1597	46.117	488.2747	30.47
59.4913	45.833	498.2747	30.261
63.0197	45.55	508.2747	30.045
66.758	45.253	518.2747	29.841
70.718	44.952	528.2747	29.639
74.9113	44.65	538.2747	29.436
79.3547	44.343	548.2747	29.245
84.0613	44.022	558.2747	29.047

Time After Pumping Stopped (minutes)	Residual Drawdown (feet)	Time After Pumping Stopped (minutes)	Residual Drawdown (feet)
568.2747	28.862	1088.2747	21.406
578.2747	28.672	1098.2747	21.288
588.2747	28.487	1108.2747	21.172
598.2747	28.308	1118.2747	21.068
608.2747	28.13	1128.2747	20.951
618.2747	27.951	1138.2747	20.84
628.2747	27.785	1148.2747	20.723
638.2747	27.613	1158.2747	20.618
648.2747	27.445	1168.2747	20.514
658.2747	27.281	1178.2747	20.403
668.2747	27.119	1188.2747	20.304
678.2747	26.953	1198.2747	20.192
688.2747	26.793	1208.2747	20.095
698.2747	26.639	1218.2747	19.984
708.2747	26.479	1228.2747	19.892
718.2747	26.319	1238.2747	19.793
728.2747	26.171	1248.2747	19.687
738.2747	26.017	1258.2747	19.59
748.2747	25.87	1268.2747	19.496
758.2747	25.716	1278.2747	19.399
768.2747	25.574	1288.2747	19.307
778.2747	25.426	1298.2747	19.208
788.2747	25.285	1308.2747	19.122
798.2747	25.143	1318.2747	19.028
808.2747	25.002	1328.2747	18.942
818.2747	24.86	1338.2747	18.862
828.2747	24.725	1348.2747	18.776
838.2747	24.583	1358.2747	18.696
848.2747	24.448	1368.2747	18.616
858.2747	24.312	1378.2747	18.536
868.2747	24.177	1388.2747	18.456
878.2747	24.041	1398.2747	18.376
888.2747	23.906	1408.2747	18.303
898.2747	23.777	1418.2747	18.223
908.2747	23.647	1428.2747	18.143
918.2747	23.518	1438.2747	18.062
928.2747	23.389	1448.2747	17.983
938.2747	23.253	1458.2747	17.903
948.2747	23.124	1468.2747	17.829
958.2747	22.995	1478.2747	17.749
968.2747	22.872	1488.2747	17.674
978.2747	22.742	1498.2747	17.594
988.2747	22.619	1508.2747	17.52
998.2747	22.496	1518.2747	17.446
1008.2747	22.373	1528.2747	17.372
1018.2747	22.25	1538.2747	17.298
1028.2747	22.127	1548.2747	17.224
1038.2747	22.004	1558.2747	17.15
1048.2747	21.88	1568.2747	17.07
1058.2747	21.764	1578.2747	16.995
1068.2747	21.647	1588.2747	16.923
1078.2747	21.523	1598.2747	16.849

Time After Pumping Stopped (minutes)	Residual Drawdown (feet)	Time After Pumping Stopped (minutes)	Residual Drawdown (feet)
1608.2747	16.775	2128.2747	13.531
1618.2747	16.701	2138.2747	13.475
1628.2747	16.627	2148.2747	13.426
1638.2747	16.553	2158.2747	13.377
1648.2747	16.485	2168.2747	13.321
1658.2747	16.411	2178.2747	13.272
1668.2747	16.338	2188.2747	13.221
1678.2747	16.264	2198.2747	13.173
1688.2747	16.202	2208.2747	13.118
1698.2747	16.153	2218.2747	13.075
1708.2747	16.122	2228.2747	13.024
1718.2747	16.085	2238.2747	12.976
1728.2747	16.054	2248.2747	12.921
1738.2747	16.023	2258.2747	12.878
1748.2747	15.993	2268.2747	12.829
1758.2747	15.956	2278.2747	12.779
1768.2747	15.894	2288.2747	12.73
1778.2747	15.826	2298.2747	12.681
1788.2747	15.759	2308.2747	12.638
1798.2747	15.679	2318.2747	12.588
1808.2747	15.599	2328.2747	12.533
1818.2747	15.525	2338.2747	12.484
1828.2747	15.451	2348.2747	12.434
1838.2747	15.377	2358.2747	12.385
1848.2747	15.303	2368.2747	12.336
1858.2747	15.229	2378.2747	12.287
1868.2747	15.149	2388.2747	12.237
1878.2747	15.075	2398.2747	12.188
1888.2747	15.001	2408.2747	12.139
1898.2747	14.927	2418.2747	12.083
1908.2747	14.86	2428.2747	12.034
1918.2747	14.792	2438.2747	11.985
1928.2747	14.718	2448.2747	11.935
1938.2747	14.65	2458.2747	11.886
1948.2747	14.582	2468.2747	11.831
1958.2747	14.515	2478.2747	11.781
1968.2747	14.453	2488.2747	11.732
1978.2747	14.393	2498.2747	11.677
1988.2747	14.337	2508.2747	11.628
1998.2747	14.27	2518.2747	11.578
2008.2747	14.214	2528.2747	11.523
2018.2747	14.147	2538.2747	11.474
2028.2747	14.09	2548.2747	11.418
2038.2747	14.029	2558.2747	11.369
2048.2747	13.974	2568.2747	11.312
2058.2747	13.912	2578.2747	11.258
2068.2747	13.857	2588.2747	11.215
2078.2747	13.802	2598.2747	11.159
2088.2747	13.746	2608.2747	11.109
2098.2747	13.691	2618.2747	11.067
2108.2747	13.635	2628.2747	10.993
2118.2747	13.586	2638.2747	10.944

Time After Pumping Stopped (minutes)	Residual Drawdown (feet)	Time After Pumping Stopped (minutes)	Residual Drawdown (feet)
2648.2747	10.893	3168.2747	9.058
2658.2747	10.85	3178.2747	9.021
2668.2747	10.801	3188.2747	8.99
2678.2747	10.751	3198.2747	8.953
2688.2747	10.702	3208.2747	8.916
2698.2747	10.653	3218.2747	8.879
2708.2747	10.61	3228.2747	8.842
2718.2747	10.567	3238.2747	8.805
2728.2747	10.524	3248.2747	8.768
2738.2747	10.48	3258.2747	8.731
2748.2747	10.443	3268.2747	8.694
2758.2747	10.4	3278.2747	8.657
2768.2747	10.37	3288.2747	8.626
2778.2747	10.333	3298.2747	8.589
2788.2747	10.29	3308.2747	8.552
2798.2747	10.259	3318.2747	8.515
2808.2747	10.222	3328.2747	8.485
2818.2747	10.191	3338.2747	8.448
2828.2747	10.154	3348.2747	8.417
2838.2747	10.123	3358.2747	8.38
2848.2747	10.092	3368.2747	8.349
2858.2747	10.055	3378.2747	8.312
2868.2747	10.025	3388.2747	8.275
2878.2747	9.989	3398.2747	8.244
2888.2747	9.951	3408.2747	8.22
2898.2747	9.92	3418.2747	8.197
2908.2747	9.897	3428.2747	8.164
2918.2747	9.858	3438.2747	8.127
2928.2747	9.834	3448.2747	8.097
2938.2747	9.803	3458.2747	8.072
2948.2747	9.766	3468.2747	8.041
2958.2747	9.741	3478.2747	8.01
2968.2747	9.711	3488.2747	7.986
2978.2747	9.68	3498.2747	7.955
2988.2747	9.643	3508.2747	7.924
2998.2747	9.618	3518.2747	7.899
3008.2747	9.587	3528.2747	7.875
3018.2747	9.556	3538.2747	7.85
3028.2747	9.526	3548.2747	7.826
3038.2747	9.495	3558.2747	7.801
3048.2747	9.464	3568.2747	7.776
3058.2747	9.433	3578.2747	7.745
3068.2747	9.396	3588.2747	7.727
3078.2747	9.366	3598.2747	7.702
3088.2747	9.335	3608.2747	7.678
3098.2747	9.304	3618.2747	7.653
3108.2747	9.267	3628.2747	7.628
3118.2747	9.23	3638.2747	7.604
3128.2747	9.193	3648.2747	7.579
3138.2747	9.162	3658.2747	7.561
3148.2747	9.125	3668.2747	7.536
3158.2747	9.095	3678.2747	7.511

Time After Pumping Stopped (minutes)	Residual Drawdown (feet)	Time After Pumping Stopped (minutes)	Residual Drawdown (feet)
3688.2747	7.493	4208.2747	6.224
3698.2747	7.474	4218.2747	6.205
3708.2747	7.45	4228.2747	6.187
3718.2747	7.431	4238.2747	6.168
3728.2747	7.413	4248.2747	6.15
3738.2747	7.388	4258.2747	6.131
3748.2747	7.364	4268.2747	6.113
3758.2747	7.345	4278.2747	6.101
3768.2747	7.327	4288.2747	6.088
3778.2747	7.303	4298.2747	6.064
3788.2747	7.283	4308.2747	6.045
3798.2747	7.259	4318.2747	6.033
3808.2747	7.234	4328.2747	6.021
3818.2747	7.203	4338.2747	6.008
3828.2747	7.179	4348.2747	5.996
3838.2747	7.155	4358.2747	5.984
3848.2747	7.129	4368.2747	5.971
3858.2747	7.105	4378.2747	5.954
3868.2747	7.08	4388.2747	5.934
3878.2747	7.049	4398.2747	5.928
3888.2747	7.025	4408.2747	5.91
3898.2747	6.994	4418.2747	5.897
3908.2747	6.971	4428.2747	5.885
3918.2747	6.938	4438.2747	5.873
3928.2747	6.914	4448.2747	5.854
3938.2747	6.889	4458.2747	5.836
3948.2747	6.858	4468.2747	5.823
3958.2747	6.828	4478.2747	5.799
3968.2747	6.797	4488.2747	5.786
3978.2747	6.766	4498.2747	5.769
3988.2747	6.747	4508.2747	5.756
3998.2747	6.717	4518.2747	5.743
4008.2747	6.686	4528.2747	5.725
4018.2747	6.661	4538.2747	5.7
4028.2747	6.643	4548.2747	5.688
4038.2747	6.612	4558.2747	5.657
4048.2747	6.587	4568.2747	5.645
4058.2747	6.557	4578.2747	5.626
4068.2747	6.532	4588.2747	5.608
4078.2747	6.501	4598.2747	5.589
4088.2747	6.476	4608.2747	5.571
4098.2747	6.458	4618.2747	5.552
4108.2747	6.427	4628.2747	5.534
4118.2747	6.402	4638.2747	5.509
4128.2747	6.384	4648.2747	5.491
4138.2747	6.359	4658.2747	5.472
4148.2747	6.335	4668.2747	5.448
4158.2747	6.31	4678.2747	5.423
4168.2747	6.285	4688.2747	5.404
4178.2747	6.273	4698.2747	5.386
4188.2747	6.248	4708.2747	5.367
4198.2747	6.236	4718.2747	5.343

Time After Pumping Stopped (minutes)	Residual Drawdown (feet)	Time After Pumping Stopped (minutes)	Residual Drawdown (feet)
4728.2747	5.318	5248.2747	4.579
4738.2747	5.3	5258.2747	4.567
4748.2747	5.281	5268.2747	4.554
4758.2747	5.263	5278.2747	4.542
4768.2747	5.238	5288.2747	4.531
4778.2747	5.22	5298.2747	4.511
4788.2747	5.195	5308.2747	4.499
4798.2747	5.176	5318.2747	4.486
4808.2747	5.152	5328.2747	4.468
4818.2747	5.133	5338.2747	4.449
4828.2747	5.115	5348.2747	4.437
4838.2747	5.09	5358.2747	4.419
4848.2747	5.072	5368.2747	4.4
4858.2747	5.053	5378.2747	4.382
4868.2747	5.035	5388.2747	4.363
4878.2747	5.022	5398.2747	4.352
4888.2747	5.004	5408.2747	4.332
4898.2747	4.992	5418.2747	4.32
4908.2747	4.979	5428.2747	4.302
4918.2747	4.961	5438.2747	4.277
4928.2747	4.949	5448.2747	4.258
4938.2747	4.936	5458.2747	4.24
4948.2747	4.924	5468.2747	4.222
4958.2747	4.912	5478.2747	4.203
4968.2747	4.899	5488.2747	4.185
4978.2747	4.887	5498.2747	4.166
4988.2747	4.875	5508.2747	4.154
4998.2747	4.862	5518.2747	4.135
5008.2747	4.85	5528.2747	4.117
5018.2747	4.838	5538.2747	4.098
5028.2747	4.825	5548.2747	4.08
5038.2747	4.813	5558.2747	4.069
5048.2747	4.801	5568.2747	4.049
5058.2747	4.795	5578.2747	4.031
5068.2747	4.782	5588.2747	4.012
5078.2747	4.77	5598.2747	4
5088.2747	4.758	5608.2747	3.983
5098.2747	4.745	5618.2747	3.969
5108.2747	4.739	5628.2747	3.957
5118.2747	4.727	5638.2747	3.944
5128.2747	4.721	5648.2747	3.932
5138.2747	4.708	5658.2747	3.926
5148.2747	4.696	5668.2747	3.907
5158.2747	4.684	5678.2747	3.901
5168.2747	4.671	5688.2747	3.889
5178.2747	4.665	5698.2747	3.889
5188.2747	4.653	5708.2747	3.877
5198.2747	4.64	5718.2747	3.858
5208.2747	4.628	5728.2747	3.858
5218.2747	4.617	5738.2747	3.846
5228.2747	4.604	5748.2747	3.833
5238.2747	4.591	5758.2747	3.827

Time After Pumping Stopped (minutes)	Residual Drawdown (feet)	Time After Pumping Stopped (minutes)	Residual Drawdown (feet)
5768.2747	3.815	6288.2747	3.551
5778.2747	3.809	6298.2747	3.527
5788.2747	3.796	6308.2747	3.514
5798.2747	3.79	6318.2747	3.501
5808.2747	3.784	6328.2747	3.482
5818.2747	3.778	6338.2747	3.47
5828.2747	3.772	6348.2747	3.451
5838.2747	3.759	6358.2747	3.44
5848.2747	3.753	6368.2747	3.422
5858.2747	3.741	6378.2747	3.414
5868.2747	3.735	6388.2747	3.402
5878.2747	3.722	6398.2747	3.39
5888.2747	3.722	6408.2747	3.377
5898.2747	3.71	6418.2747	3.365
5908.2747	3.704	6428.2747	3.354
5918.2747	3.698	6438.2747	3.348
5928.2747	3.685	6448.2747	3.336
5938.2747	3.679	6458.2747	3.323
5948.2747	3.673	6468.2747	3.316
5958.2747	3.661	6478.2747	3.297
5968.2747	3.649	6488.2747	3.291
5978.2747	3.636	6498.2747	3.286
5988.2747	3.63	6508.2747	3.28
5998.2747	3.618	6518.2747	3.274
6008.2747	3.612	6528.2747	3.262
6018.2747	3.605	6538.2747	3.262
6028.2747	3.593	6548.2747	3.248
6038.2747	3.581	6558.2747	3.236
6048.2747	3.568	6568.2747	3.236
6058.2747	3.556	6578.2747	3.223
6068.2747	3.545	6588.2747	3.217
6078.2747	3.551	6598.2747	3.211
6088.2747	3.568	6608.2747	3.205
6098.2747	3.587	6618.2747	3.199
6108.2747	3.619	6628.2747	3.193
6118.2747	3.636	6638.2747	3.186
6128.2747	3.668	6648.2747	3.18
6138.2747	3.699	6658.2747	3.174
6148.2747	3.724	6668.2747	3.168
6158.2747	3.741	6678.2747	3.162
6168.2747	3.742	6688.2747	3.156
6178.2747	3.735	6698.2747	3.143
6188.2747	3.722	6708.2747	3.137
6198.2747	3.71	6718.2747	3.125
6208.2747	3.692	6728.2747	3.112
6218.2747	3.673	6738.2747	3.106
6228.2747	3.655	6748.2747	3.106
6238.2747	3.63	6758.2747	3.094
6248.2747	3.612	6768.2747	3.082
6258.2747	3.593	6778.2747	3.069
6268.2747	3.575	6788.2747	3.057
6278.2747	3.564	6798.2747	3.046

Time After Pumping Stopped (minutes)	Residual Drawdown (feet)	Time After Pumping Stopped (minutes)	Residual Drawdown (feet)
6808.2747	3.032		
6818.2747	3.026		
6828.2747	3.014		
6838.2747	2.995		
6848.2747	2.983		
6858.2747	2.971		
6868.2747	2.958		
6878.2747	2.94		
6888.2747	2.928		
6898.2747	2.915		
6908.2747	2.903		
6918.2747	2.891		
6928.2747	2.872		
6938.2747	2.86		
6948.2747	2.848		
6958.2747	2.835		
6968.2747	2.823		
6978.2747	2.804		
6988.2747	2.792		
6998.2747	2.78		
7008.2747	2.767		
7018.2747	2.755		
7028.2747	2.743		
7038.2747	2.724		
7048.2747	2.718		
7058.2747	2.706		
7068.2747	2.694		
7078.2747	2.687		
7088.2747	2.681		
7098.2747	2.675		
7108.2747	2.669		
7118.2747	2.657		
7128.2747	2.65		
7138.2747	2.638		
7148.2747	2.632		
7158.2747	2.62		
7168.2747	2.613		
7178.2747	2.607		
7188.2747	2.601		
7198.2747	2.589		
7208.2747	2.583		
7218.2747	2.576		
7228.2747	2.564		
7238.2747	2.558		
7248.2747	2.552		

TABLE 7
CROSSROADS VENTURES, INC.
Simultaneous Testing of Wells R1 and R2
Well R3

Date	Time	Depth to Water (feet)	Remarks
9/17/2002	8:02	27.79	R1 and R2 pumps on at 9:30
9/17/2002	10:41	39.39	
9/17/2002	13:22	48.75	
9/17/2002	18:08	57.2	
9/18/2002	7:46	69.42	
9/18/2002	14:29	72.97	
9/19/2002	10:20	77.77	
9/19/2002	15:24	79.75	
9/20/2002	9:04	82.78	
9/20/2002	10:28	73.93	R1 and R2 pumps off at 9:30
9/20/2002	16:30	58.95	
9/21/2002	10:12	44.85	
9/21/2002	17:31	42.06	
9/22/2002	11:57	37.2	
9/23/2002	8:12	33.73	
9/23/2002	16:35	32.98	
9/24/2002	13:00	31.37	
9/25/2002	9:54	30.36	

TABLE 8
CROSSROADS VENTURES, INC.
Simultaneous Testing of Wells R1 and R2
Residential Well 1

Date	Time	Depth to Water (feet)	Remarks
9/17/2002	8:32	23.00	R1 and R2 pumps on at 9:30
9/17/2002	13:50	24.05	in use
9/17/2002	18:01	23.45	
9/18/2002	8:20	24.25	in use
9/18/2002	14:14	24.50	in use
9/19/2002	9:54	23.50	
9/19/2002	15:41	23.20	
9/20/2002	8:00	24.10	in use, R1 and R2 pumps off at 9:30
9/20/2002	16:31	23.45	not in use
9/21/2002	10:05	23.20	not in use
9/21/2002	17:00	23.22	not in use
9/22/2002	11:52	23.00	in use
9/22/2002	18:41	23.10	not in use
9/23/2002	8:06	23.40	not in use
9/23/2002	16:20	23.20	not in use
9/24/2002	11:14	23.10	not in use
9/24/2002	17:18	23.30	not in use
9/25/2002	9:51	23.32	not in use

TABLE 9
CROSSROADS VENTURES, INC.
Simultaneous Testing of Wells R1 and R2
Residential Well 2

Date	Time	Depth to Water (feet)	Remarks
9/17/2002	8:00	2.3	R1 and R2 pumps on at 9:30
9/17/2002	14:10	2.25	
9/17/2002	19:10	2.25	
9/18/2002	18:30	2.35	in use
9/18/2002	16:00	2.30	
9/19/2002	8:15	2.3	
9/19/2002	16:10	2.25	
9/20/2002	7:00	2.30	R1 and R2 pumps off at 9:30
9/20/2002	19:30	2.32	
9/21/2002	7:00	2.3	
9/22/2002	8:00	2.3	
9/23/2002	7:00	2.28	
9/24/2002	7:00	2.3	
9/25/2002	8:00	2.31	

TABLE 10
CROSSROADS VENTURES, INC.
Simultaneous Testing of Wells R1 and R2
Residential Well R3

Date	Time	Depth to Water (feet)	Remarks
9/17/2002	8:00	0.3	R1 and R2 pumps on at 9:30
9/17/2002	14:00	0	in use
9/17/2002	19:00	0.3	
9/18/2002	7:30	0.3	
9/18/2002	15:30	0.3	
9/19/2002	8:00	0.3	
9/19/2002	16:00	0.3	
9/20/2002	7:45	0.3	R1 and R2 pumps off at 9:30
9/21/2002	8:00	0.3	
9/22/2002	10:00	0	in use
9/23/2002	8:30	0.3	
9/24/2002	8:00	0.3	
9/25/2002	8:00	0.3	

TABLE 11
CROSSROADS VENTURES, INC.
Simultaneous Testing of Wells R1 and R2
Pine Hill Water Company Well PH-1

Date	Time	Depth to Water (feet)	Remarks
9/17/2002	8:40	9.00	R1 and R2 pumps on at 9:30
9/17/2002	13:36	9.00	
9/17/2002	17:49	8.95	
9/18/2002	7:09	8.95	
9/18/2002	15:23	8.96	
9/19/2002	11:10	9.05	
9/19/2002	16:30	9.00	
9/20/2002	8:15	8.98	R1 and R2 pumps off at 9:30
9/20/2002	17:00	9.00	
9/21/2002	10:30	9.00	
9/21/2002	18:00	9.02	
9/22/2002	12:35	9.02	
9/23/2002	8:30	9.02	
9/23/2002	17:00	9.00	
9/24/2002	9:00	9.00	
9/24/2002	18:00	9.01	
9/25/2002	10:01	9.10	

TABLE 12
CROSSROADS VENTURES, INC.
Simultaneous Testing of Wells R1 and R2
Station Road Well

Date	Time	Depth to Water (feet)	Remarks
9/17/2002	8:45	38.17	R1 and R2 pumps on at 9:30
9/17/2002	13:32	38.15	
9/17/2002	17:45	38.10	
9/18/2002	7:04	38.10	
9/18/2002	15:32	38.15	
9/19/2002	11:20	38.27	
9/19/2002	16:35	38.20	
9/20/2002	8:30	38.17	R1 and R2 pumps off at 9:30
9/20/2002	17:15	38.19	
9/21/2002	10:40	38.20	
9/21/2002	18:05	38.17	
9/22/2002	12:40	38.19	
9/23/2002	8:40	38.17	
9/23/2002	17:07	38.17	
9/24/2002	9:10	38.19	
9/24/2002	18:08	38.17	
9/25/2002	10:08	38.20	

TABLE 13
CROSSROADS VENTURES, INC.
Simultaneous Testing of Wells R1 and R2
Residential Well 4

Date	Time	Depth to Water (feet)	Remarks
9/17/2002	8:30	13.17	R1 and R2 pumps on at 9:30
9/17/2002	13:57	17.10	
9/17/2002	17:58	19.47	
9/18/2002	8:15	24.75	
9/18/2002	14:10	26.20	
9/18/2002	21:54	27.70	
9/19/2002	9:50	29.50	
9/19/2002	13:29	30.00	
9/19/2002	15:39	30.50	
9/19/2002	20:04	30.98	
9/20/2002	8:44	32.12	R1 and R2 pumps off at 9:30
9/20/2002	10:39	31.00	
9/20/2002	12:06	29.30	
9/20/2002	16:25	26.05	
9/21/2002	10:02	20.28	
9/21/2002	14:10	19.75	
9/21/2002	17:25	19.15	
9/22/2002	11:50	16.95	
9/22/2002	18:38	16.40	
9/23/2002	8:04	15.60	
9/23/2002	13:24	15.40	
9/23/2002	16:25	15.25	
9/24/2002	11:10	14.62	
9/25/2002	9:48	14.20	

TABLE 14
CROSSROADS VENTURES, INC.
Field Water Quality Analysis
Well R1

Date	Time	pH	Conductivit (us)	Turbidity (NTU)	Remarks
9/17/2002	10:05	7.4	138	3.86	R1 and R2 pumps on at 9:30
9/17/2002	18:45	7.4	143	1.71	
9/18/2002	7:30	7.4	146	4.90	
9/18/2002	14:56	7.4	125	6.56	
9/19/2002	10:30	7.4	130	5.20	
9/19/2002	17:25	7.4	120	5.30	
9/20/2002	8:30	7.6	130	3.41	

Note: All samples collected at pipe orifice outlet.

TABLE 15
CROSSROADS VENTURES, INC.
Field Water Quality Analysis
Well R2

Date	Time	pH	Conductivity (us)	Turbidity (NTU)	Remarks
9/17/2002	10:15	8.2	203	10.85	R1 and R2 pumps on at 9:30
9/17/2002	18:15	8.2	210	2.01	
9/18/2002	7:35	8.4	233.0	1.10	
9/18/2002	14:40	8.4	204	0.78	
9/19/2002	10:06	8.4	220	1.20	
9/19/2002	17:00	8.4	210	1.40	
9/20/2002	8:40	8.2	259	1.30	

Note: All samples collected at pipe orifice outlet.

TABLE 16
CROSSROADS VENTURES, INC.
Simultaneous Testing of Wells R1 and R2
Well Point WP-1

Date	Time	Depth to Water (feet)	Remarks
9/17/2002	7:53	10.32	R1 and R2 pumps on at 9:30
9/17/2002	10:42	10.29	
9/17/2002	13:09	10.27	
9/17/2002	18:07	10.30	
9/18/2002	7:26	10.30	
9/18/2002	14:27	10.32	
9/19/2002	9:59	10.30	
9/19/2002	15:06	10.33	
9/20/2002	8:55	10.40	R1 and R2 pumps off at 9:30
9/20/2002	10:26	10.44	
9/21/2002	10:12	10.47	
9/22/2002	12:07	10.40	
9/23/2002	8:46	10.42	
9/24/2002	11:30	10.40	
9/25/2002	9:50	10.35	

TABLE 17
CROSSROADS VENTURES, INC.
Simultaneous Testing of Wells R1 and R2
Well Point WP-2

Date	Time	Depth to Water (feet)	Remarks
9/17/2002	7:45	6.96	R1 and R2 pumps on at 9:30
9/17/2002	10:35	6.98	
9/17/2002	13:03	6.98	
9/17/2002	18:24	7.04	
9/18/2002	7:25	6.95	
9/18/2002	14:21	6.98	
9/19/2002	10:01	7.00	
9/19/2002	15:00	7.00	
9/20/2002	8:49	6.98	R1 and R2 pumps off at 9:30
9/20/2002	10:21	6.97	
9/21/2002	10:07	7.01	
9/22/2002	12:11	6.88	
9/23/2002	8:21	6.97	
9/24/2002	10:00	6.98	
9/25/2002	9:40	6.98	

TABLE 18
CROSSROADS VENTURES, INC.
Simultaneous Testing of Wells R1 and R2
Stream Gauge SG-1

Date	Time	Depth to Water (feet)	Remarks
9/17/2002	7:48	2.71	R1 and R2 pumps on at 9:30
9/17/2002	10:36	2.72	
9/17/2002	13:05	2.73	
9/17/2002	18:25	2.74	
9/18/2002	7:27	2.75	
9/18/2002	14:23	2.74	
9/19/2002	9:59	2.75	
9/19/2002	15:02	2.75	
9/20/2002	8:51	2.71	R1 and R2 pumps off at 9:30
9/20/2002	10:22	2.73	
9/21/2002	10:08	2.75	
9/22/2002	12:13	2.68	
9/23/2002	8:23	2.72	
9/24/2002	10:32	2.71	
9/25/2002	9:42	2.71	

TABLE 19
CROSSROADS VENTURES, INC.
Simultaneous Testing of Wells R1 and R2
Stream Gauge SG-2

Date	Time	Depth to Water (feet)	Remarks
9/17/2002	7:51	3.03	R1 and R2 pumps on at 9:30
9/17/2002	10:39	3.03	
9/17/2002	13:07	3.02	
9/17/2002	18:23	3.02	
9/18/2002	7:30	3.02	
9/18/2002	14:25	3.02	
9/19/2002	10:03	3.02	
9/19/2002	15:04	3.03	
9/20/2002	8:53	3.02	R1 and R2 pumps off at 9:30
9/20/2002	10:24	3.03	
9/21/2002	10:09	3.02	
9/22/2002	12:09	2.95	
9/23/2002	8:19	3.00	
9/24/2002	10:30	3.00	
9/25/2002	10:06	3.00	

TABLE 20
CROSSROADS VENTURES, INC.
Simultaneous Testing of Wells R1 and R2
Pond Gauge P-1

Date	Time	Depth to Water (feet)	Remarks
9/17/2002	8:04	2.29	R1 and R2 pumps on at 9:30
9/17/2002	10:45	2.30	
9/17/2002	13:18	2.30	
9/17/2002	18:10	2.30	
9/18/2002	7:42	2.30	
9/18/2002	14:33	2.31	
9/19/2002	10:15	2.31	
9/19/2002	15:20	2.30	
9/20/2002	9:01	2.30	R1 and R2 pumps off at 9:30
9/20/2002	10:31	2.30	
9/21/2002	10:18	2.30	
9/22/2002	12:00	2.25	
9/23/2002	8:19	2.90	
9/24/2002	11:20	2.30	
9/25/2002	9:57	2.29	

TABLE 21
CROSSROADS VENTURES, INC.
Field Water Quality Analysis
Birch Creek

Date	Time	pH	Conductivity (us)	Turbidity (NTU)	Remarks
9/17/2002	10:25	7.4	142	0.95	R1 and R2 pumps on at 9:30
9/17/2002	18:30	7.4	154	0.71	
9/18/2002	7:58	7.4	109	0.57	
9/18/2002	14:50	7.4	124	0.56	
9/19/2002	10:22	7.4	145	0.7	
9/19/2002	17:10	7.4	135	0.58	
9/20/2002	8:45	7.2	102	0.48	R1 and R2 pumps off at 9:30
9/20/2002	10:10	7.2	98	0.76	

TABLE 22
CROSSROADS VENTURES, INC.
Simultaneous Testing of Wells R1 and R2
Birch Creek Temperature Data

Date	Time	Temperature (°Fahrenheit)	Date	Time	Temperature (°Fahrenheit)
9/10/2002	14:49	62.85	9/17/2002	18:49	60.11
9/10/2002	18:49	62.85	9/17/2002	22:49	57.35
9/10/2002	22:49	60.8	9/18/2002	2:49	55.97
9/11/2002	2:49	59.42	9/18/2002	6:49	55.28
9/11/2002	6:49	58.04	9/18/2002	10:49	55.97
9/11/2002	10:49	58.73	9/18/2002	14:49	59.42
9/11/2002	14:49	58.04	9/18/2002	18:49	59.42
9/11/2002	18:49	57.35	9/18/2002	22:49	57.35
9/11/2002	22:49	55.97	9/19/2002	2:49	56.66
9/12/2002	2:49	54.58	9/19/2002	6:49	55.28
9/12/2002	6:49	53.19	9/19/2002	10:49	55.97
9/12/2002	10:49	53.89	9/19/2002	14:49	60.11
9/12/2002	14:49	58.04	9/19/2002	18:49	60.8
9/12/2002	18:49	58.04	9/19/2002	22:49	58.73
9/12/2002	22:49	55.28	9/20/2002	2:49	58.04
9/13/2002	2:49	53.89	9/20/2002	6:49	58.04
9/13/2002	6:49	53.19	9/20/2002	10:49	58.04
9/13/2002	10:49	54.58	9/20/2002	14:49	61.48
9/13/2002	14:49	58.73	9/20/2002	18:49	61.48
9/13/2002	18:49	58.73	9/20/2002	22:49	60.11
9/13/2002	22:49	56.66	9/21/2002	2:49	59.42
9/14/2002	2:49	55.28	9/21/2002	6:49	59.42
9/14/2002	6:49	54.58	9/21/2002	10:49	60.11
9/14/2002	10:49	55.97	9/21/2002	14:49	61.48
9/14/2002	14:49	59.42	9/21/2002	18:49	61.48
9/14/2002	18:49	60.11	9/21/2002	22:49	60.8
9/14/2002	22:49	58.73	9/22/2002	2:49	60.11
9/15/2002	2:49	58.73	9/22/2002	6:49	60.11
9/15/2002	6:49	58.73	9/22/2002	10:49	60.11
9/15/2002	10:49	58.73	9/22/2002	14:49	61.48
9/15/2002	14:49	60.11	9/22/2002	18:49	60.8
9/15/2002	18:49	60.11	9/22/2002	22:49	60.11
9/15/2002	22:49	59.42	9/23/2002	2:49	59.42
9/16/2002	2:49	58.73	9/23/2002	6:49	58.73
9/16/2002	6:49	58.73	9/23/2002	10:49	58.73
9/16/2002	10:49	59.42	9/23/2002	14:49	60.8
9/16/2002	14:49	61.48	9/23/2002	18:49	59.42
9/16/2002	18:49	60.11	9/23/2002	22:49	57.35
9/16/2002	22:49	58.04	9/24/2002	2:49	55.28
9/17/2002	2:49	57.35	9/24/2002	6:49	54.58
9/17/2002	6:49	55.97	9/24/2002	10:49	55.28
9/17/2002	10:49	57.35	9/24/2002	14:49	58.73
9/17/2002	14:49	60.8	9/24/2002	18:49	58.04

Date	Time	Temperature (°Fahrenheit)	Date	Time	Temperature (°Fahrenheit)
9/24/2002	22:49	55.97			
9/25/2002	2:49	54.58			
9/25/2002	6:49	53.89			
9/25/2002	10:49	54.58			

APPENDIX A

UCDOH Work Scope Letter

ALPHA
GEOSCIENCE
Geology
Hydrology
Remediation
Water Supply

August 27, 2002

Mr. Dean Palen
Ulster County Department of Health
300 Flatbush Avenue
Kingston, New York 12401-2740

Re: Additional Well Testing
Belleayre Resort

Dear Mr. Palen:

Crossroads Ventures LLC (Crossroads) is continuing the evaluation of water sources for their proposed Big Indian Plateau facility. Wells R1 and R2 will be tested as sources of irrigation and potable water, respectively. The primary objectives of this testing are to evaluate the yield of the irrigation well (R1) and to evaluate the yields of both wells (R1 and R2) during times in which both wells are pumping simultaneously. The yield of well R1 will be evaluated during a step rate pumping test and a 72-hour constant rate test. The combined yield of wells R1 and R2 will be evaluated by a simultaneous, 72-hour, constant rate pumping test. Alpha Geoscience (Alpha) has prepared this work scope per the request of Crossroads to conduct pumping tests, water quality testing, data analysis and reporting. The proposed work scope is presented herein for Ulster County Department of Health (DOH) approval.

Previous Work

Wells R1 and R2 were installed, developed and tested by pumping. The pumping tests included a 24-hour constant rate test at well R1 and a 72-hour constant rate test with Part 5 water quality analysis for well R2. The drilling logs, well completion logs, well yield results, and water quality test results were presented in the Belleayre Resort Draft Environmental Impact Statement (DEIS) dated January 2002. The locations of wells R1, R2 and other monitoring locations used during previous well testing are presented in Figure 1.

Step Rate Testing

A step rate pumping test will be performed at well R1 to provide a benchmark for future evaluation of well performance and to select a pumping rate for the constant rate test at well R1. The test will involve a minimum of three , 100 minute consecutive pumping periods at rates to be determined in the field.

679 Plank Road ▪ Clifton Park, New York 12065 ▪ (518) 348-6995 ▪ FAX (518) 348-6966

The test pump and discharge system will be installed by Crossroads' well installation and testing contractor, Titan Drilling Corporation (Titan). The pump discharge will be routed to Birch Creek downstream of the well R1 area. A pipe orifice will be used to measure flow rate. A data logger monitoring system will be installed by Alpha for automated water level data collection. Alpha personnel will be present for the entire step rate test to collect data and document test procedures.

Constant Rate Testing

A 72-hour, constant rate pumping test will be performed at well R1. This test will be performed to evaluate well yield, aquifer response to pumping and water quality. The test will also provide data to evaluate the potential impact of well R1 pumping on the Birch Creek and existing water supplies in this area. It is anticipated that the test will be performed at a rate that exceeds the 50 gallons per minute (gpm) projected average replenishment rate for the irrigation ponds.

The discharge system used for the step rate test will also be used for the constant rate test to measure flow rate and route water to Birch Creek. Data logger monitoring systems will be installed by Alpha for automated water level measurement at wells R1 and R2. A transducer will be installed at the site to monitor barometric pressure. Water level data will be collected prior to testing, throughout the pumping period and during the recovery period after pumping stops. Alpha personnel will be on-site to also collect data at the beginning and end of the test. Water level and pumping rate data will be collected by Titan and Crossroads personnel throughout the testing and during the period when Alpha personnel are not on site.

Staff gauges will be installed in Birch Creek and in a wetland at the edge of the site. A well point with a total depth of approximately 10 feet will be installed between well R1 and Birch Creek to provide a monitoring location within the unconsolidated deposits. Well R3, which is not currently considered a source of potable or irrigation water, will also be monitored. The three residential wells (Residential - 1, 2 and 3) located near the site and monitored during previously conducted pumping tests will be monitored. Pine Hill Water Company well PH-1 and the Station Road well will be monitored.

Simultaneous Testing

Wells R1 and R2 will be pumped simultaneously during a 72-hour constant rate test. The test will be performed to evaluate the aquifer response and potential impacts to water levels during conditions when both wells R1 and R2 are being used. It is anticipated that well R1 will be pumped at a rate that exceeds the 50 gpm projected average replenishment rate for the irrigation ponds and that well R2 will be pumped at a rate that is greater than the 64 gpm projected average daily demand for potable water.

A separate discharge system including piping and orifice will be used to measure the pumping rate and route water from well R2 to Birch Creek. A well point will be installed between well R2 and Birch Creek to provide a monitoring location in the unconsolidated deposits in this area. The same monitoring locations used for the individual, constant rate test at well R1 will be monitored during the simultaneous test. Alpha personnel will be on-site to collect data at the beginning and end of the simultaneous test. Water level and pumping rate data will also be collected by Crossroads and Titan personnel throughout the test.

Water Quality Testing

Water quality testing of well discharge and the Birch Creek will be conducted in the field during the constant rate testing of well R1 and R2. The field testing will include the measurement of turbidity, conductivity, pH and temperature. These results will be used to evaluate general water quality and to assess if wells R1 and R2 are hydraulically connected to Birch Creek.

Samples will also be collected from well R2 at the end of the simultaneous test and submitted to a New York State Department of Health (NYSDOH)-certified laboratory for Part 5 analysis (assuming radiological and SOC exemptions).

Data Analysis and Reporting

Water level data collected from the step test, constant rate test and simultaneous test will be graphed to project long term drawdown at the test pumping rates. Water level data, water quality data, and observations made during on-site testing will be used to describe the potential impact from pumping.

A letter report will be prepared and submitted to the UCDOH and NYSDOH Central Office that describes objectives and methods and presents data, interpretations and conclusions. The report will also include final laboratory water quality testing results.

Schedule

Crossroads plans to begin the constant rate and simultaneous tests on or about September 3, 2002 and September 10, 2002, respectively. We would like to conduct this testing as soon as possible in order to evaluate long term well yield and the potential impacts of pumping under the current dry conditions.

Please call me, or Steve Trader if you have any questions regarding the proposed well testing, data analysis and reporting. We will contact your office on August 29, 2002 to discuss any questions or comments you may have regarding the proposed scope of work.

Sincerely,
Alpha Geoscience

Michael D. Palleschi
Senior Hydrogeologist

MDP/dw
attachment
cc: C. Costello, UCDOH
M. Holt, NYSDOH
A. Ciesluk, Jr., NYSDEC
D. Gitter, Crossroads
M.B. Bianconi, Delaware Engineering
K. Franke, L.A. Group
T. Johnson, Titan

F:\projects\2002\02121-02140\02130-Belleayre Pumping Test\addl testing prop.wpd

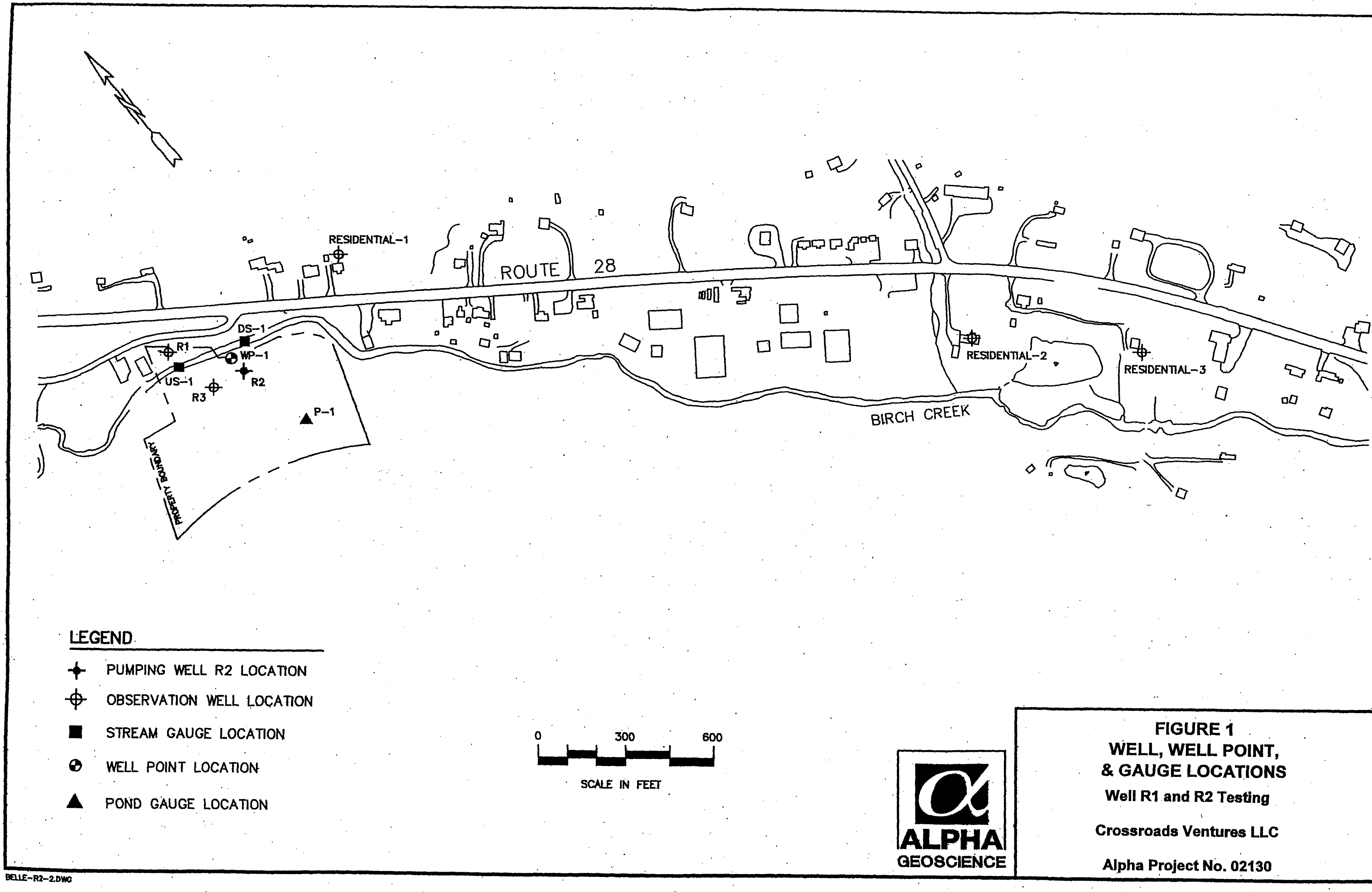


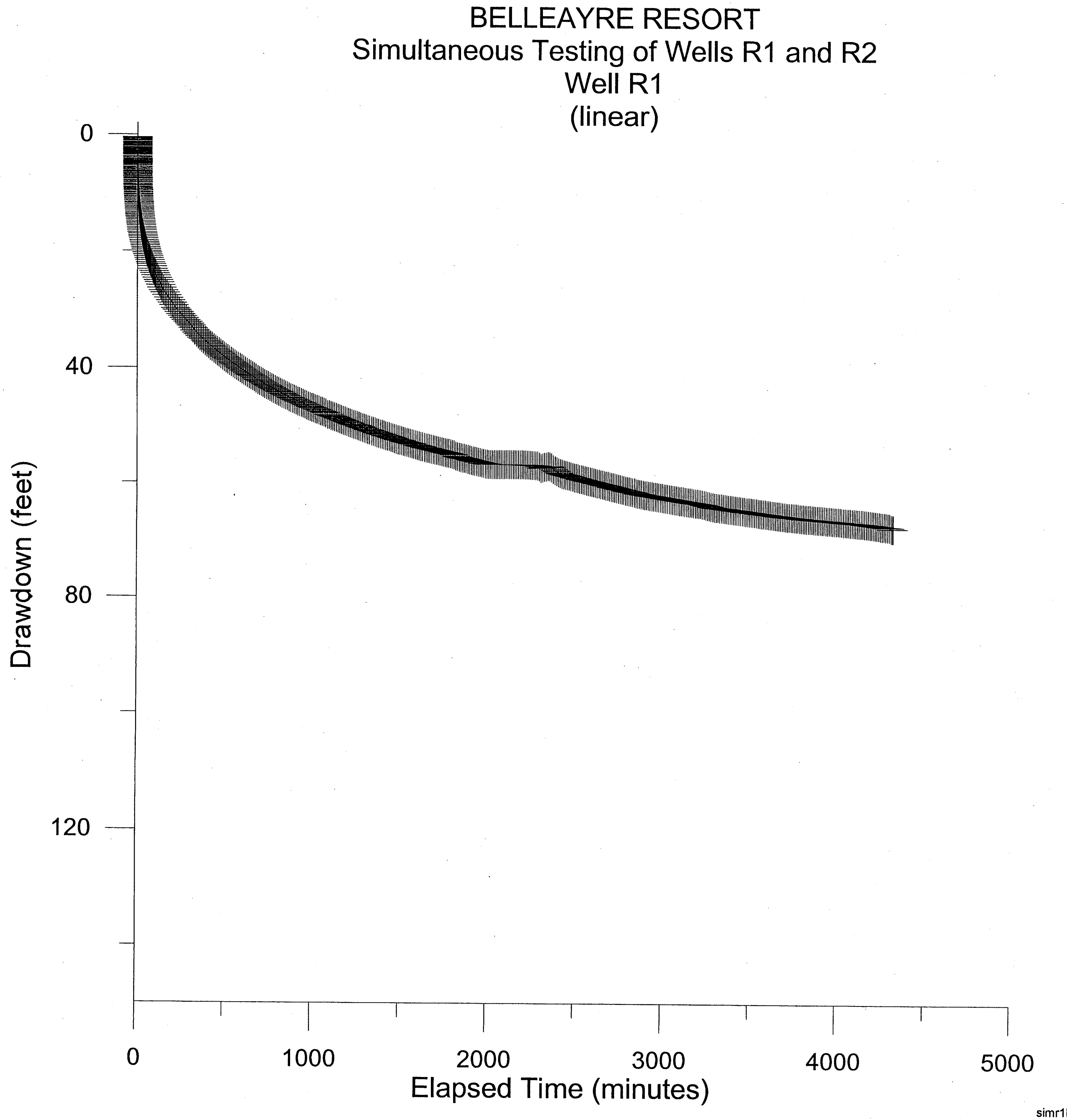
FIGURE 1
WELL, WELL POINT, & GAUGE LOCATIONS
Well R1 and R2 Testing

Crossroads Ventures LLC

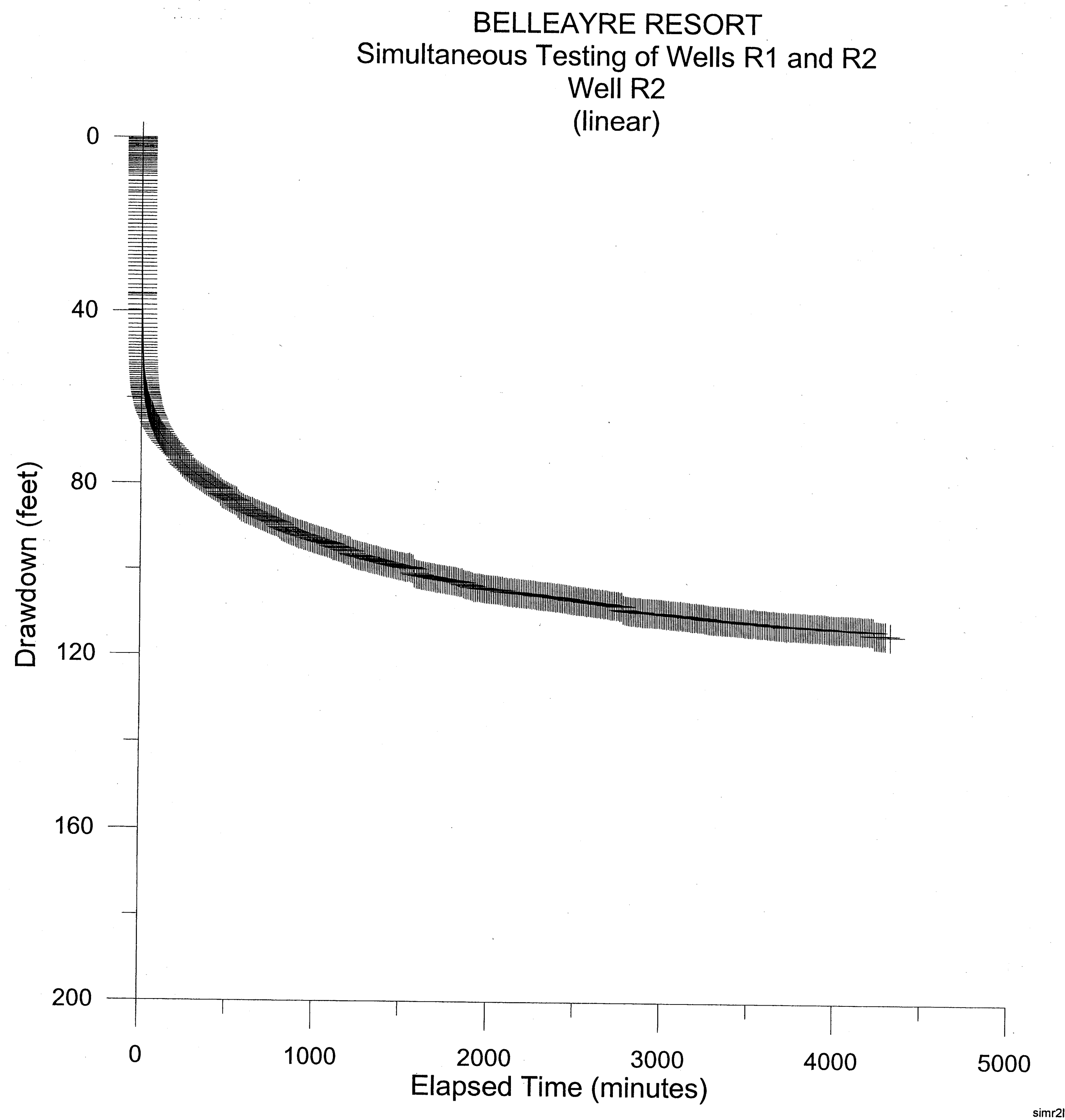
Alpha Project No. 02130

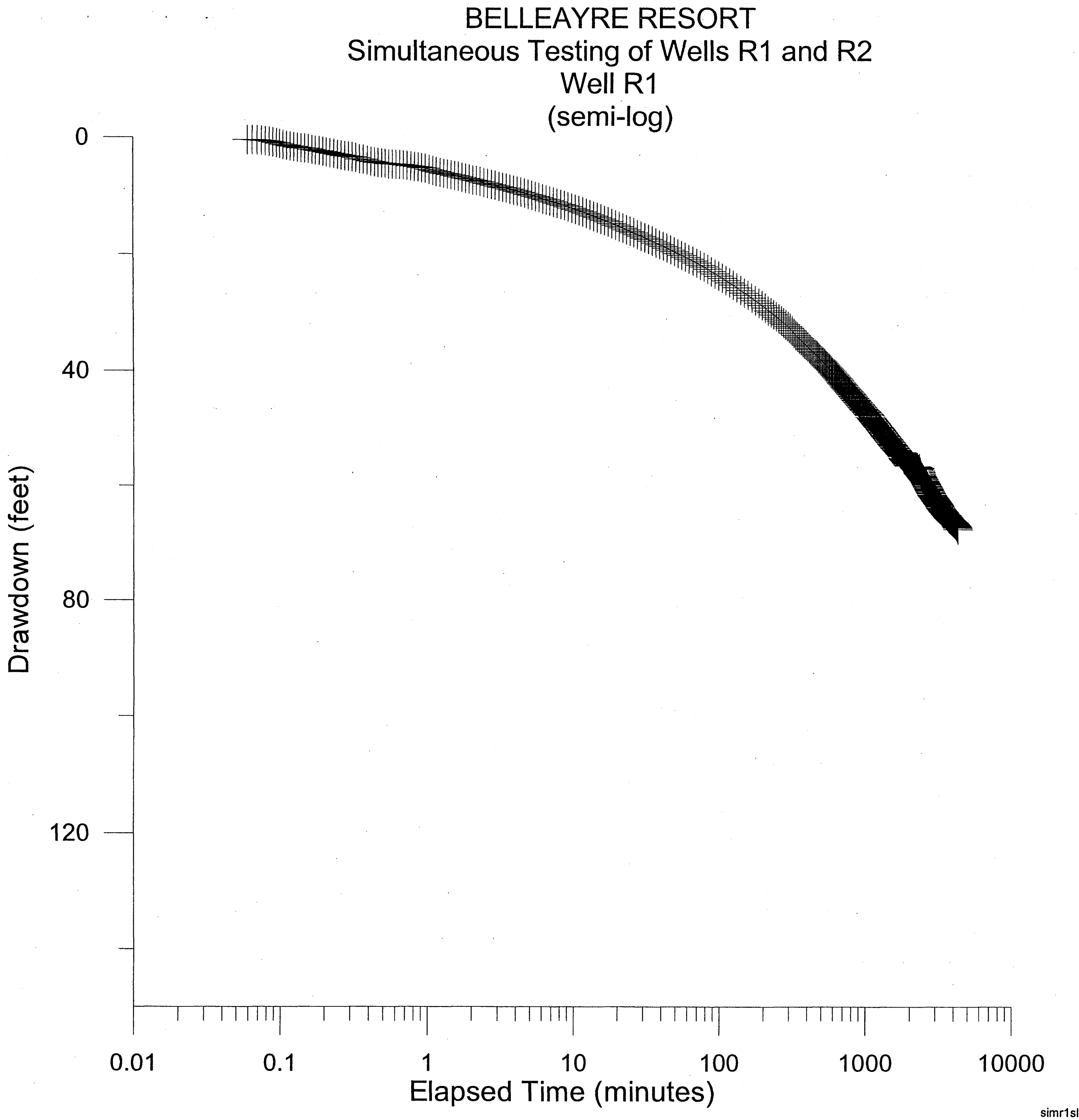
APPENDIX B

Constant Rate Test Graphs

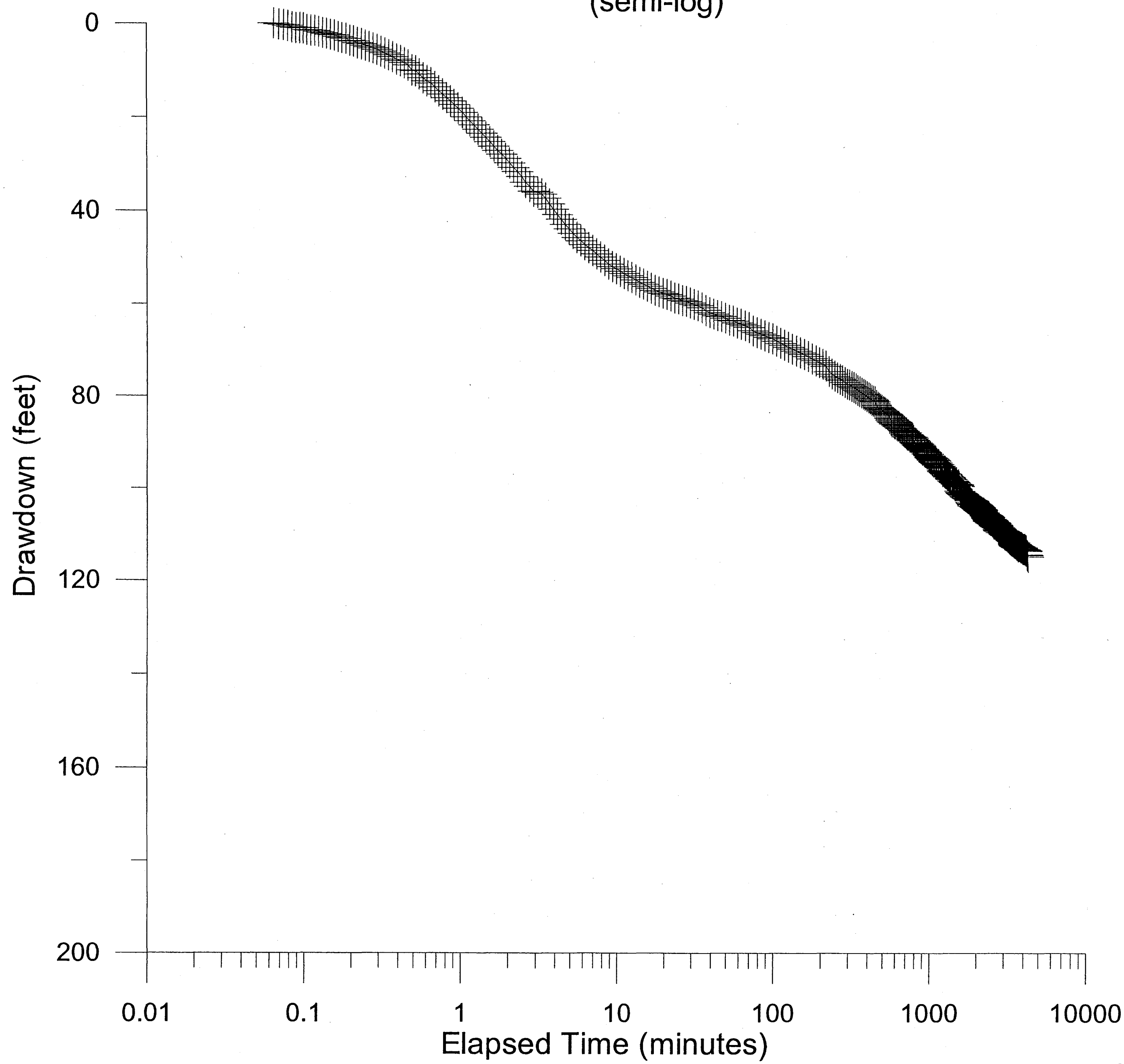


BELLEAYRE RESORT
Simultaneous Testing of Wells R1 and R2
Well R1
(linear)
Drawdown (feet)
0
40
80
120
Elapsed Time (minutes)
0
1000
2000
3000
4000
5000
simr1l


BELLEAYRE RESORT
Simultaneous Testing of Wells R1 and R2
Well R2
(linear)
Drawdown (feet)
0
40
80
120
160
200
0
1000
2000
3000
4000
5000
Elapsed Time (minutes)
simr2l


BELLEAYRE RESORT
Simultaneous Testing of Wells R1 and R2
Well R1
(semi-log)
0
40
80
120
Drawdown (feet)
0.01
0.1
1
10
100
1000
10000
Elapsed Time (minutes)
simr1sl

BELLEAYRE RESORT
Simultaneous Testing of Wells R1 and R2
Well R2
(semi-log)

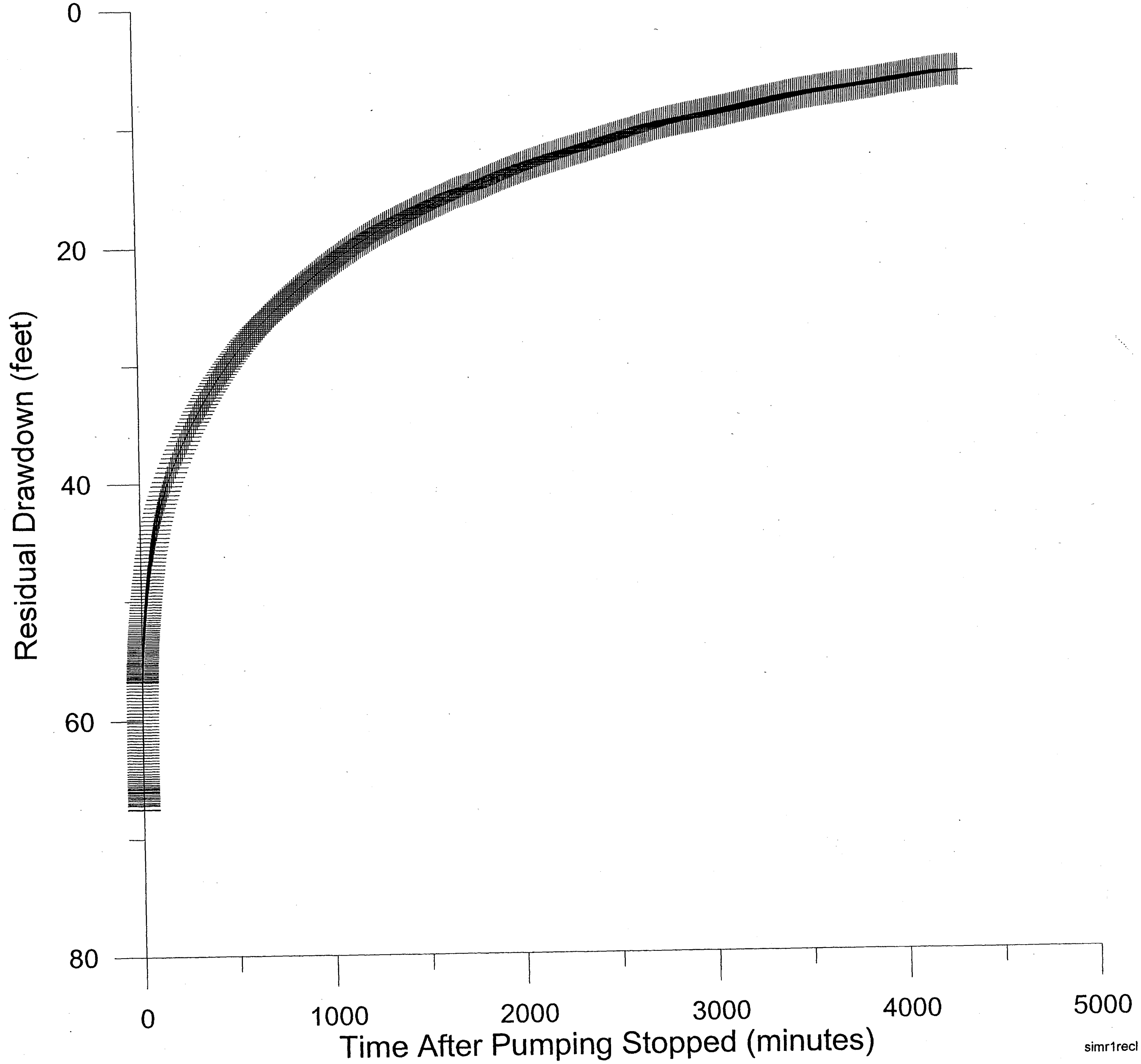


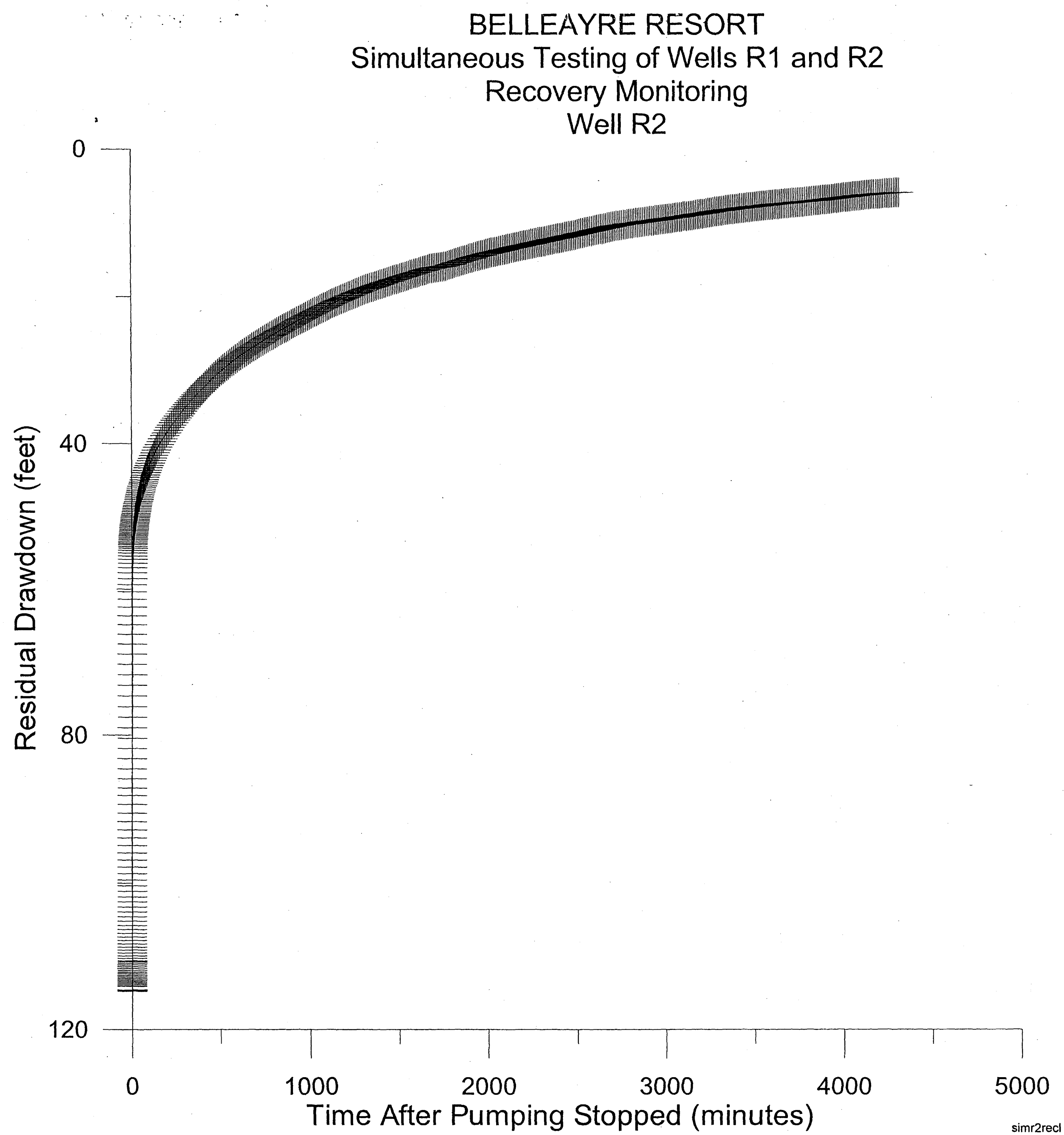
simr2sl

APPENDIX C

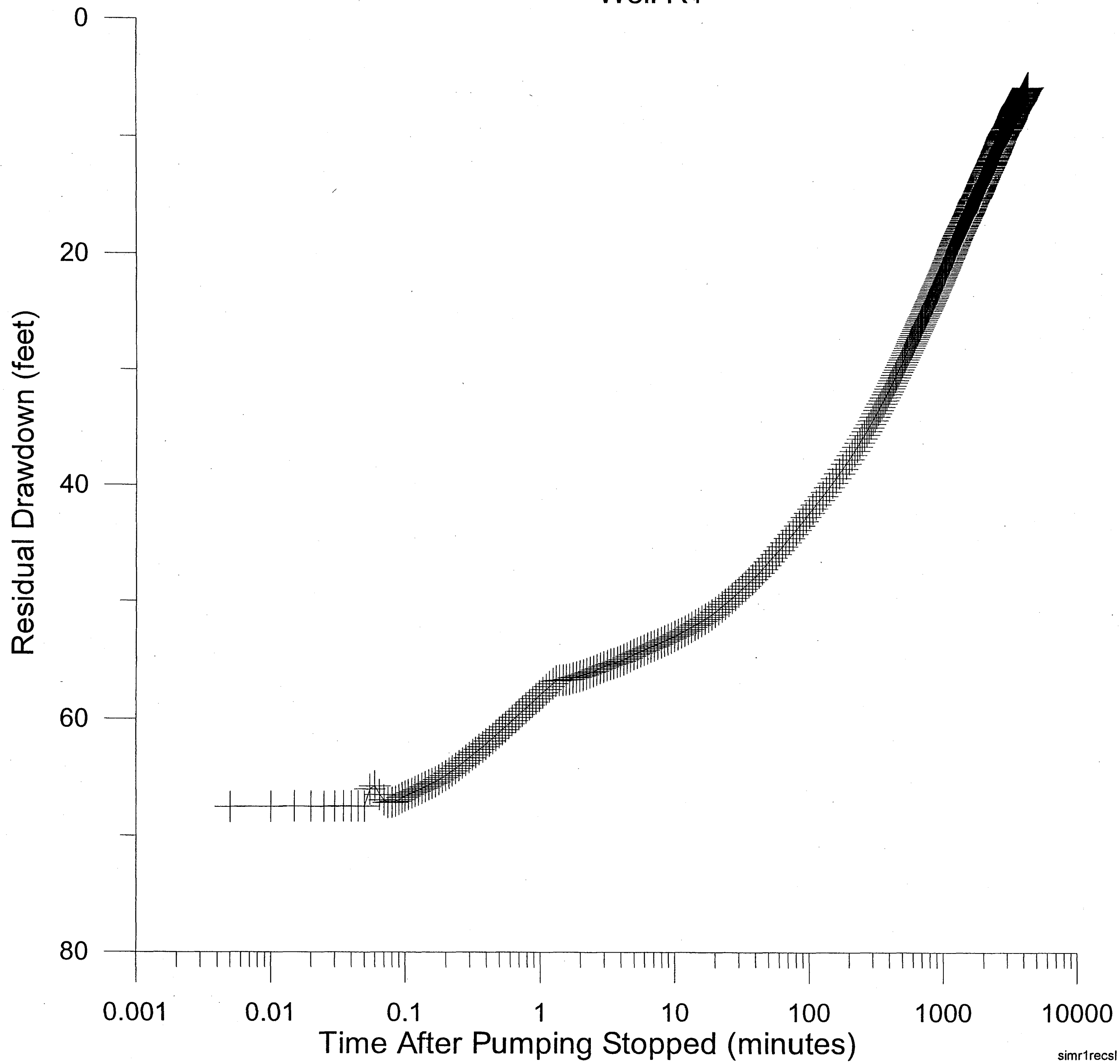
Recovery Graphs

BELLEAYRE RESORT
Simultaneous Testing of Wells R1 and R2
Recovery Monitoring
Well R1

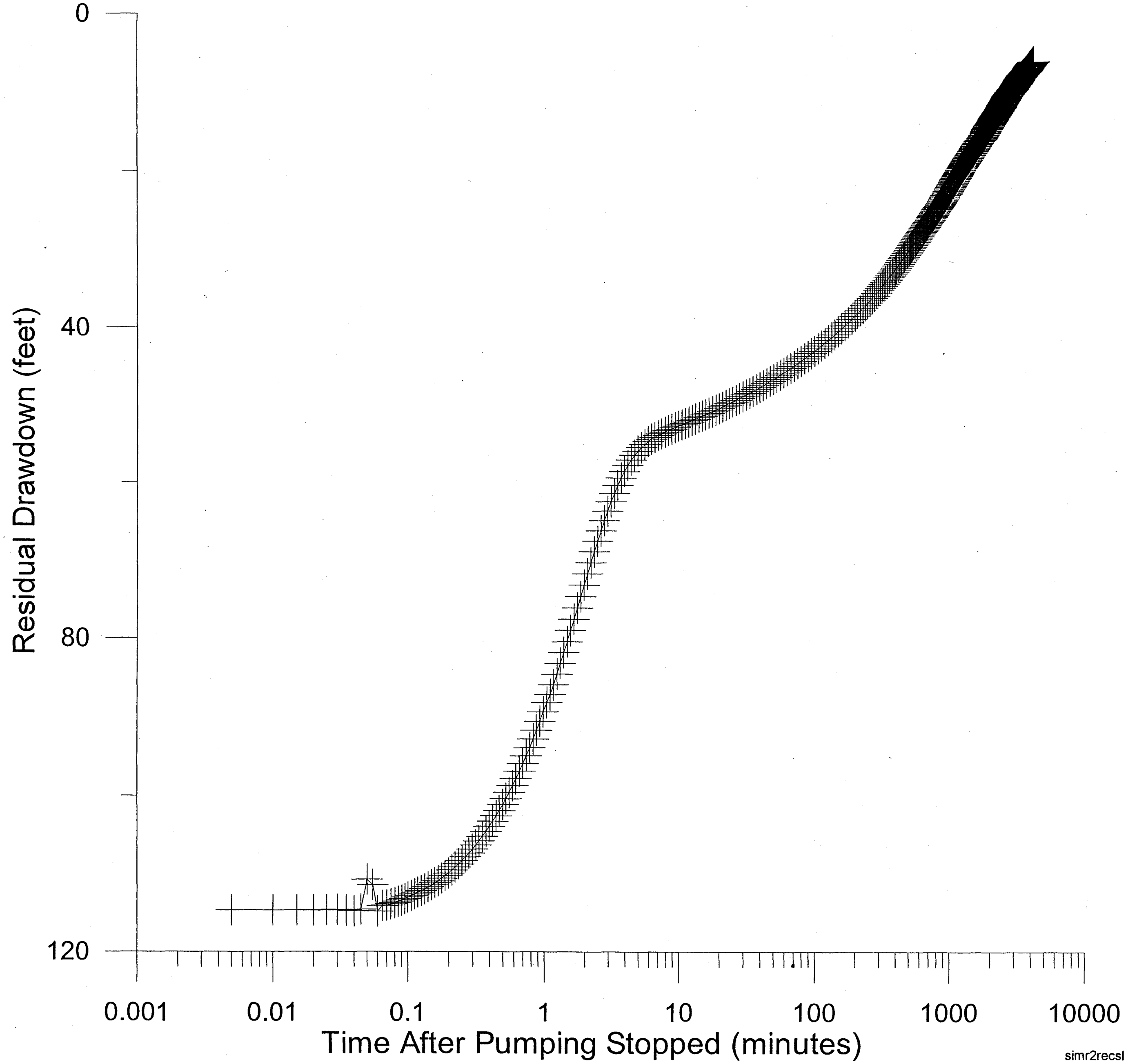



BELLEAYRE RESORT
Simultaneous Testing of Wells R1 and R2
Recovery Monitoring
Well R2
Residual Drawdown (feet)
0
40
80
120
0
1000
2000
3000
4000
5000
Time After Pumping Stopped (minutes)
simr2recl

BELLEAYRE RESORT
Simultaneous Testing of Wells R1 and R2
Recovery Monitoring
Well R1



BELLEAYRE RESORT
Simultaneous Testing of Wells R1 and R2
Recovery Monitoring
Well R2



APPENDIX D

Laboratory Results

PHOENIX

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06040
Tel. (860) 645-1102 Fax (860) 645-0823

ACCREDITED IN ACCORDANCE WITH nelac

Analysis Report

October 14, 2002

FOR: Attn: Mr. Thomas Johnson
Alpha GeoScience
679 Plank Road
Clifton Park, NY 12065

RECEIVED OCT 17 2002

Sample Information		Custody Information		Date	Time
Matrix:	WATER	Collected by:	MR	09/20/02	8:30
Location Code:	ALPHAGEO	Received by:	KJB	09/21/02	9:00
Project Code:		Analyzed by:	see "By" below		
P.O.#:	02130				

Laboratory Data

SDG I.D.: GAE37761

Client ID: BELLEAYRE PUMPING WELL R2

Phoenix I.D.: AE37761

Parameter	Result	RL	Units	Date	Time	By	Reference
Silver	BDL	0.002	mg/L	09/24/02		EK	6010/200.7
Arsenic	0.015	0.003	mg/L	09/24/02		R/D	200.9
Barium	0.215	0.002	mg/L	09/24/02		EK	6010/E200.7
Beryllium	BDL	0.001	mg/L	09/24/02		EK	6010/E200.7
Calcium	17.5	0.010	mg/L	09/24/02		EK	200.7/6010
Cadmium	BDL	0.001	mg/L	09/24/02		EK	6010/E200.7
Chromium	0.001	0.001	mg/L	09/24/02		EK	6010/E200.7
Copper	0.002	0.001	mg/L	09/24/02		EK	6010/E200.7
Iron	0.024	0.002	mg/L	09/24/02		EK	6010/E200.7
Hardness (CaCO3)	59.1	0.10	mg/L	09/25/02		EK	S2340B
Mercury	BDL	0.0002	mg/L	09/23/02		R/D	E245.1
Magnesium	3.75	0.01	mg/L	09/24/02		EK	200.7/6010
Manganese	0.119	0.002	mg/L	09/24/02		EK	6010/E200.7
Sodium	55.0	1.0	mg/L	09/25/02		EK	6010/E200.7
Nickel	BDL	0.002	mg/L	09/24/02		EK	6010/E200.7
Lead	BDL	0.001	mg/L	09/25/02		R/D	200.9
Antimony	BDL	0.003	mg/L	09/24/02		R/D	E200.9
Selenium	BDL	0.002	mg/L	09/25/02		R/D	E200.9
Thallium	BDL	0.001	mg/L	09/24/02		R/D	E200.9
Zinc	0.005	0.002	mg/L	09/24/02		EK	200.7/6010
Alkalinity (CaCO3)	82	20	mg/L	09/26/02		EG	SM2320B
Chloride	65	3.0	mg/L	09/21/02		E/G	300.0
Color, True	BDL	1	P.C.U.	09/21/02	11:41	EG	EPA 110.2
Fluoride	BDL	0.10	mg/L	09/30/02		EG	SM4500F C

Parameter	Result	RL	Units	Date	Time	By	Reference
Hydrogen Sulfide	0.1	0.1	mg/L	09/23/02		P/P	SM4500SH
Langelier Index	-0.46		pH units	09/30/02		CF	SM203
Nitrite as Nitrogen	BDL	0.01	mg/L	09/21/02	11:23	E/G	300.0
Nitrate as Nitrogen	0.09	0.05	mg/L	09/21/02	11:23	E/G	300.0
Odor	4	1	T.O.N.	09/21/02	11:41	EG	S207/140.1
pH	8.25	0.10	pH Units	09/21/02	11:41	EG	E150.1/SW9045
Sulfate	3.7	3.0	mg/L	09/21/02		E/G	300.0
Total Cyanide (Drinking water)	BDL	0.01	mg/L	09/30/02		PJ	335.4
Tot. Diss. Solids	270	5.0	mg/L	09/25/02		CF	SM2540C
Turbidity	0.63	0.05	NTU	09/21/02	11:41	EG	S214A/E180.1
Extraction	Completed			09/23/02		S/D	
Mercury Digestion	Completed			09/23/02		DD	E245.1
Extraction of DW Pesticides	Completed			09/23/02		S/D	508
Extraction of DW Herbicides	Completed			09/23/02		PL	
Total Metal Digestion	Completed			09/23/02		G	E200.2
Escherichia Coli (E Coli)	Negative	0	/100 mls.	09/23/02		OL	SM9222
Radon Test	1,788	90	pCi/l	09/25/02		BP	
Standard Plate Count	2	0	CFU/Ml	09/23/02		OL	SM 9215B
Total Coliforms	Negative	0	/100 mls.	09/23/02		OL	9222B/9221b
Synthetic Organic Compounds							
Alachlor (Lasso)	<0.1	0.1	ug/L	09/25/02		OL	EPA525
Aldrin	<0.1	0.1	ug/L	09/25/02		OL	EPA525
Atrazine	<0.1	0.1	ug/L	09/25/02		OL	EPA525
Benzo(a)pyrene	<0.02	0.02	ug/L	09/25/02		OL	EPA525
Butachlor	<0.1	0.1	ug/L	09/25/02		OL	EPA525
Di (2-ethylhexyl) adipate	<0.6	0.6	ug/L	09/25/02		OL	EPA525
Di (2-ethylhexyl)phthalate	<0.6	0.6	ug/L	09/25/02		OL	EPA525
Dieldrin	<0.04	0.04	ug/L	09/25/02		OL	EPA525
Endrin	<0.01	0.01	ug/L	09/25/02		OL	EPA525
Heptachlor	<0.04	0.04	ug/L	09/25/02		OL	EPA525
Heptachlor epoxide	<0.02	0.02	ug/L	09/25/02		OL	EPA525
Hexachlorobenzene	<0.1	0.1	ug/L	09/25/02		OL	EPA525
Hexachlorocyclopentadiene	<0.1	0.1	ug/L	09/25/02		OL	EPA525
Lindane (gamma-BHC)	<0.02	0.02	ug/L	09/25/02		OL	EPA525
Methoxychlor	<0.1	0.1	ug/L	09/25/02		OL	EPA525
Metolachlor (Dual)	<0.1	0.1	ug/L	09/25/02		OL	EPA525
Metribuzin (Sencor)	<0.1	0.1	ug/L	09/25/02		OL	EPA525
Propachlor	<0.1	0.1	ug/L	09/25/02		OL	EPA525
Simazine	<0.07	0.07	ug/L	09/25/02		OL	EPA525
Carbamates HPLC							
3 Hydroxycarbofuran	<1.0	1.0	ug/L	09/25/02		OL	EPA 531
Aldicarb	<0.5	0.5	ug/L	09/25/02		OL	EPA 531
Aldicarb Sulfone	<0.4	0.4	ug/L	09/25/02		OL	EPA 531

Parameter	Result	RL	Units	Date	Time	By	Reference
Aldicarb Sulfoxide	<0.5	0.5	ug/L	09/25/02		OL	EPA 531
Carbaryl	<1.0	1.0	ug/L	09/25/02		OL	EPA 531
Carbofuran	<0.9	0.9	ug/L	09/25/02		OL	EPA 531
Methomyl	<0.5	0.5	ug/L	09/25/02		OL	EPA 531
Oxamyl	<1.0	1.0	ug/L	09/25/02		OL	EPA 531
Asbestos in Water							
Asbestos fibers (>0.5u and <10u)	**	0.1	MFL	10/11/02		OL	EPA600/4-84
Asbestos fibers (>10u)	**	0.1	MFL	10/11/02		OL	EPA600/4-84
EDB and DBCP Analysis							
1,2-Dibromo-3-Chloropropane (DBCP)	ND	0.02	ug/L	09/25/02		CN	504.1
1,2-Dibromoethane (EDB)	ND	0.02	ug/L	09/25/02		CN	504.1
Organophosphorus Pesticides							
Alachlor	ND	0.44	ug/L	09/25/02		KCA	E507
Atrazine	ND	0.22	ug/L	09/25/02		KCA	E507
Butachlor	ND	0.1	ug/L	09/25/02		KCA	E507
Metolachlor	ND	0.1	ug/L	09/25/02		KCA	E507
Metribuzin	ND	2.00	ug/L	09/25/02		KCA	E507
Simazine	ND	0.15	ug/L	09/25/02		KCA	E507
Pesticides/PCB's							
Aldrin	ND	0.05	ug/L	09/25/02		KCA	EPA508
Chlordane	ND	0.5	ug/L	09/25/02		KCA	EPA508
Dieldrin	ND	0.1	ug/L	09/25/02		KCA	EPA508
Endrin	ND	0.1	ug/L	09/25/02		KCA	EPA508
Heptachlor	ND	0.1	ug/L	09/25/02		KCA	EPA508
Heptachlor Epoxide	ND	0.05	ug/L	09/25/02		KCA	EPA508
Lindane	ND	0.05	ug/L	09/25/02		KCA	EPA508
Methoxychlor	ND	0.5	ug/L	09/25/02		KCA	EPA508
PCB-1016	ND	0.5	ug/L	09/25/02		KCA	EPA508
PCB-1221	ND	0.5	ug/L	09/25/02		KCA	EPA508
PCB-1232	ND	0.5	ug/L	09/25/02		KCA	EPA508
PCB-1242	ND	0.5	ug/L	09/25/02		KCA	EPA508
PCB-1248	ND	0.5	ug/L	09/25/02		KCA	EPA508
PCB-1254	ND	0.5	ug/L	09/25/02		KCA	EPA508
PCB-1260	ND	0.5	ug/L	09/25/02		KCA	EPA508
Propachlor	ND	0.5	ug/L	09/25/02		KCA	EPA508
Toxaphene	ND	1.0	ug/L	09/25/02		KCA	EPA508
Herbicides							
2,4,5-T	ND	0.2	ug/L	09/25/02		KCA	EPA 515.1
2,4,5-TP	ND	0.2	ug/L	09/25/02		KCA	EPA 515.1
2,4-D	ND	1.0	ug/L	09/25/02		KCA	EPA 515.1
Dalapon	ND	5.0	ug/L	09/25/02		KCA	EPA 515.1
Dicamba	ND	0.5	ug/L	09/25/02		KCA	EPA 515.1
Dinoseb	ND	0.5	ug/L	09/25/02		KCA	EPA 515.1

Client ID: BELLEAYRE PUMPING WELL R2 Phoenix I.D.: AE37761

Parameter	Result	RL	Units	Date	Time	By	Reference
Pentachlorophenol	ND	0.2	ug/L	09/25/02		KCA	EPA 515.1
Picloram	ND	0.5	ug/L	09/25/02		KCA	EPA 515.1
Volatiles							
1,1,1,2-Tetrachloroethane	ND	0.5	ug/L	09/23/02		RM	524.2
1,1,1-Trichloroethane	ND	0.5	ug/L	09/23/02		RM	524.2
1,1,2,2-Tetrachloroethane	ND	0.5	ug/L	09/23/02		RM	524.2
1,1,2-Trichloroethane	ND	0.5	ug/L	09/23/02		RM	524.2
1,1-Dichloroethane	ND	0.5	ug/L	09/23/02		RM	524.2
1,1-Dichloroethene	ND	0.5	ug/L	09/23/02		RM	524.2
1,1-Dichloropropene	ND	0.5	ug/L	09/23/02		RM	524.2
1,2,3-Trichlorobenzene	ND	0.5	ug/L	09/23/02		RM	524.2
1,2,3-Trichloropropane	ND	0.5	ug/L	09/23/02		RM	524.2
1,2,4-Trichlorobenzene	ND	0.5	ug/L	09/23/02		RM	524.2
1,2,4-Trimethylbenzene	ND	0.5	ug/L	09/23/02		RM	524.2
1,2-Dibromo-3-chloropropane	ND	0.5	ug/L	09/23/02		RM	524.2
1,2-Dibromoethane	ND	0.5	ug/L	09/23/02		RM	524.2
1,2-Dichlorobenzene	ND	0.5	ug/L	09/23/02		RM	524.2
1,2-Dichloroethane	ND	0.5	ug/L	09/23/02		RM	524.2
1,2-Dichloropropane	ND	0.5	ug/L	09/23/02		RM	524.2
1,3,5-Trimethylbenzene	ND	0.5	ug/L	09/23/02		RM	524.2
1,3-Dichlorobenzene	ND	0.5	ug/L	09/23/02		RM	524.2
1,3-Dichloropropane	ND	0.5	ug/L	09/23/02		RM	524.2
1,4-Dichlorobenzene	ND	0.5	ug/L	09/23/02		RM	524.2
2,2-Dichloropropane	ND	0.5	ug/L	09/23/02		RM	524.2
2-Butanone	ND	0.5	ug/L	09/23/02		RM	524.2
2-Chlorotoluene	ND	0.5	ug/L	09/23/02		RM	524.2
4-Chlorotoluene	ND	0.5	ug/L	09/23/02		RM	524.2
4-Isopropyltoluene	ND	0.5	ug/L	09/23/02		RM	524.2
Benzene	ND	0.5	ug/L	09/23/02		RM	524.2
Bromobenzene	ND	0.5	ug/L	09/23/02		RM	524.2
Bromochloromethane	ND	0.5	ug/L	09/23/02		RM	524.2
Bromodichloromethane	ND	0.5	ug/L	09/23/02		RM	524.2
Bromoform	ND	0.5	ug/L	09/23/02		RM	524.2
Bromomethane	ND	0.5	ug/L	09/23/02		RM	524.2
Carbon Tetrachloride	ND	0.5	ug/L	09/23/02		RM	524.2
Chlorobenzene	ND	0.5	ug/L	09/23/02		RM	524.2
Chloroethane	ND	0.5	ug/L	09/23/02		RM	524.2
Chloroform	ND	0.5	ug/L	09/23/02		RM	524.2
Chloromethane	ND	0.5	ug/L	09/23/02		RM	524.2
cis-1,2-Dichloroethene	ND	0.5	ug/L	09/23/02		RM	524.2
cis-1,3-Dichloropropene	ND	0.5	ug/L	09/23/02		RM	524.2
Dibromochloromethane	ND	0.5	ug/L	09/23/02		RM	524.2
Dibromomethane	ND	0.5	ug/L	09/23/02		RM	524.2
Dichlorodifluoromethane	ND	0.5	ug/L	09/23/02		RM	524.2

Parameter	Result	RL	Units	Date	Time	By	Reference
Ethylbenzene	ND	0.5	ug/L	09/23/02		RM	524.2
Hexachlorobutadiene	ND	0.5	ug/L	09/23/02		RM	524.2
Isopropylbenzene	ND	0.5	ug/L	09/23/02		RM	524.2
Methyl Tert Butyl Ether	ND	1.0	ug/L	09/23/02		RM	524.2
Methylene Chloride	ND	0.5	ug/L	09/23/02		RM	524.2
n-Butylbenzene	ND	0.5	ug/L	09/23/02		RM	524.2
Naphthalene	ND	0.5	ug/L	09/23/02		RM	524.2
o-Xylene	ND	0.5	ug/L	09/23/02		RM	524.2
p- and m- Xylene	ND	0.5	ug/L	09/23/02		RM	524.2
Propylbenzene	ND	0.5	ug/L	09/23/02		RM	524.2
sec-Butylbenzene	ND	0.5	ug/L	09/23/02		RM	524.2
Styrene	ND	0.5	ug/L	09/23/02		RM	524.2
tert-Butylbenzene	ND	0.5	ug/L	09/23/02		RM	524.2
Tetrachloroethylene	ND	0.5	ug/L	09/23/02		RM	524.2
Toluene	ND	0.5	ug/L	09/23/02		RM	524.2
Total Trihalomethanes (TTHM)	ND	0.5	ug/L	09/23/02		RM	524.2
trans-1,2-Dichloroethene	ND	0.5	ug/L	09/23/02		RM	524.2
trans-1,3-Dichloropropene	ND	0.5	ug/L	09/23/02		RM	524.2
Trichloroethylene	ND	0.5	ug/L	09/23/02		RM	524.2
Trichlorofluoromethane	ND	0.5	ug/L	09/23/02		RM	524.2
Vinyl Chloride	ND	0.5	ug/L	09/23/02		RM	524.2
QA/QC Surrogates							
%4-Bromofluorobenzene (Surrogate)	81		%	09/23/02		RM	524.2

Comments: ND=Not detected BDL = Below Detection Limit RL=Reporting Limit

The 531.1 & 525.2 were analyzed by NY state lab #11398.
Please refer to attachment for Asbestos results.

If there are any questions regarding this data, please call Phoenix Client Services at extension 200.

Phyllis Shiller, Laboratory Director
October 14, 2002

PHOENIX
Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06040
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report
October 14, 2002

FOR: Attn: Mr. Thomas Johnson
Alpha GeoScience
679 Plank Road
Clifton Park, NY 12065

Sample Information		Custody Information		Date	Time
Matrix:	WATER	Collected by:	MR	09/20/02	8:30
Location Code:	ALPHAGEO	Received by:	KJB	09/21/02	9:00
Project Code:		Analyzed by:	see "By" below		
P.O.#:	02130				

Laboratory Data

SDG I.D.: GAE37761

Client ID: BELLEAYRE PUMPING TRIP BLANK

Phoenix I.D.: AE37762

Parameter	Result	RL	Units	Date	Time	By	Reference
Volatiles							
1,1,1,2-Tetrachloroethane	ND	0.5	ug/L	09/23/02		RM	524.2
1,1,1-Trichloroethane	ND	0.5	ug/L	09/23/02		RM	524.2
1,1,2,2-Tetrachloroethane	ND	0.5	ug/L	09/23/02		RM	524.2
1,1,2-Trichloroethane	ND	0.5	ug/L	09/23/02		RM	524.2
1,1-Dichloroethane	ND	0.5	ug/L	09/23/02		RM	524.2
1,1-Dichloroethene	ND	0.5	ug/L	09/23/02		RM	524.2
1,1-Dichloropropene	ND	0.5	ug/L	09/23/02		RM	524.2
1,2,3-Trichlorobenzene	ND	0.5	ug/L	09/23/02		RM	524.2
1,2,3-Trichloropropane	ND	0.5	ug/L	09/23/02		RM	524.2
1,2,4-Trichlorobenzene	ND	0.5	ug/L	09/23/02		RM	524.2
1,2,4-Trimethylbenzene	ND	0.5	ug/L	09/23/02		RM	524.2
1,2-Dibromo-3-chloropropane	ND	0.5	ug/L	09/23/02		RM	524.2
1,2-Dibromoethane	ND	0.5	ug/L	09/23/02		RM	524.2
1,2-Dichlorobenzene	ND	0.5	ug/L	09/23/02		RM	524.2
1,2-Dichloroethane	ND	0.5	ug/L	09/23/02		RM	524.2
1,2-Dichloropropane	ND	0.5	ug/L	09/23/02		RM	524.2
1,3,5-Trimethylbenzene	ND	0.5	ug/L	09/23/02		RM	524.2
1,3-Dichlorobenzene	ND	0.5	ug/L	09/23/02		RM	524.2
1,3-Dichloropropane	ND	0.5	ug/L	09/23/02		RM	524.2
1,4-Dichlorobenzene	ND	0.5	ug/L	09/23/02		RM	524.2
2,2-Dichloropropane	ND	0.5	ug/L	09/23/02		RM	524.2
2-Butanone	ND	0.5	ug/L	09/23/02		RM	524.2
2-Chlorotoluene	ND	0.5	ug/L	09/23/02		RM	524.2

Client ID: BELLEAYRE PUMPING TRIP BLANK Phoenix I.D.: AE37762

Parameter	Result	RL	Units	Date	Time	By	Reference
4-Chlorotoluene	ND	0.5	ug/L	09/23/02		RM	524.2
4-Isopropyltoluene	ND	0.5	ug/L	09/23/02		RM	524.2
Benzene	ND	0.5	ug/L	09/23/02		RM	524.2
Bromobenzene	ND	0.5	ug/L	09/23/02		RM	524.2
Bromochloromethane	ND	0.5	ug/L	09/23/02		RM	524.2
Bromodichloromethane	ND	0.5	ug/L	09/23/02		RM	524.2
Bromoform	ND	0.5	ug/L	09/23/02		RM	524.2
Bromomethane	ND	0.5	ug/L	09/23/02		RM	524.2
Carbon Tetrachloride	ND	0.5	ug/L	09/23/02		RM	524.2
Chlorobenzene	ND	0.5	ug/L	09/23/02		RM	524.2
Chloroethane	ND	0.5	ug/L	09/23/02		RM	524.2
Chloroform	ND	0.5	ug/L	09/23/02		RM	524.2
Chloromethane	ND	0.5	ug/L	09/23/02		RM	524.2
cis-1,2-Dichloroethene	ND	0.5	ug/L	09/23/02		RM	524.2
cis-1,3-Dichloropropene	ND	0.5	ug/L	09/23/02		RM	524.2
Dibromochloromethane	ND	0.5	ug/L	09/23/02		RM	524.2
Dibromomethane	ND	0.5	ug/L	09/23/02		RM	524.2
Dichlorodifluoromethane	ND	0.5	ug/L	09/23/02		RM	524.2
Ethylbenzene	ND	0.5	ug/L	09/23/02		RM	524.2
Hexachlorobutadiene	ND	0.5	ug/L	09/23/02		RM	524.2
Isopropylbenzene	ND	0.5	ug/L	09/23/02		RM	524.2
Methyl Tert Butyl Ether	ND	1.0	ug/L	09/23/02		RM	524.2
Methylene Chloride	ND	0.5	ug/L	09/23/02		RM	524.2
n-Butylbenzene	ND	0.5	ug/L	09/23/02		RM	524.2
Naphthalene	ND	0.5	ug/L	09/23/02		RM	524.2
o-Xylene	ND	0.5	ug/L	09/23/02		RM	524.2
p- and m- Xylene	ND	0.5	ug/L	09/23/02		RM	524.2
Propylbenzene	ND	0.5	ug/L	09/23/02		RM	524.2
sec-Butylbenzene	ND	0.5	ug/L	09/23/02		RM	524.2
Styrene	ND	0.5	ug/L	09/23/02		RM	524.2
tert-Butylbenzene	ND	0.5	ug/L	09/23/02		RM	524.2
Tetrachloroethylene	ND	0.5	ug/L	09/23/02		RM	524.2
Toluene	ND	0.5	ug/L	09/23/02		RM	524.2
Total Trihalomethanes (TTHM)	ND	0.5	ug/L	09/23/02		RM	524.2
trans-1,2-Dichloroethene	ND	0.5	ug/L	09/23/02		RM	524.2
trans-1,3-Dichloropropene	ND	0.5	ug/L	09/23/02		RM	524.2
Trichloroethylene	ND	0.5	ug/L	09/23/02		RM	524.2
Trichlorofluoromethane	ND	0.5	ug/L	09/23/02		RM	524.2
Vinyl Chloride	ND	0.5	ug/L	09/23/02		RM	524.2
QA/QC Surrogates							
%4-Bromofluorobenzene (Surrogate)	83		%	09/23/02		RM	524.2

Comments: **ND=Not detected BDL = Below Detection Limit RL=Reporting Limit**

TRIP BLANK INCLUDED.

If there are any questions regarding this data, please call Phoenix Client Services at extension 200.

Phyllis Shiller, Laboratory Director
October 14, 2002

PHOENIX

ACCREDITED IN ACCORDANCE WITH nelac

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06040
Tel. (860) 645-1102 Fax (860) 645-0823

QA/QC Report

October 14, 2002

QA/QC Data

SDG I.D.: GAE37761

Parameter	Blank	LCS Rec %	MS Rec %	RPD
QA/QC Batch Sample No: AE34246 (AE37761)				
Selenium	BDL	103	92	1.5
Thallium	BDL	92	106	NC
QA/QC Batch Sample No: AE34247 (AE37761)				
Mercury	BDL	97	115	4.0
QA/QC Batch Sample No: AE37173 (AE37761)				
ICP Metals				
Aluminum	ND	112	109	
Antimony	ND	102	96	
Arsenic	ND	97	98	
Barium	ND	102	106	
Beryllium	ND	100	101	
Boron	ND	101	NR	
Cadmium	ND	97	114	
Calcium	ND	100	NR	1.1
Chromium	ND	100	102	
Cobalt	ND	100	105	
Copper	ND	99	102	
Iron	ND	103	105	
Lead	ND	102	105	
Magnesium	ND	100	NR	0.5
Manganese	ND	100	103	
Molybdenum	ND	102	NR	
Nickel	ND	96	101	
Phosphorus	ND	101	NR	
Potassium	ND	96	NR	0.6
Selenium	ND	97	99	
Silver	ND	96	104	
Sodium	ND	99	NR	1.1
Thallium	ND	99	100	
Tin	ND	99	NR	
Vanadium	ND	101	104	
Zinc	ND	96	100	1.9
QA/QC Batch Sample No: AE37594 (AE37761)				
Lead	BDL	102	101	NC
QA/QC Batch Sample No: AE37731 (AE37761)				
Alkalinity (CaCO3)	BDL	97	NR	NC

QA/QC Data

SDG I.D.: GAE37761

Parameter	Blank	LCS Rec %	MS Rec %	RPD %
QA/QC Batch Sample No: AE37761 (AE37761, AE37762)				
Arsenic	BDL	100	100	0.0
Tot. Diss. Solids	BDL	105	NR	5.3
QA/QC Batch Sample No: AE37798 (AE37761)				
Antimony	BDL	94	101	NC
QA/QC Batch Sample No: AE37928 (AE37761)				
Total Cyanide (Drinking water)	BDL	76.2	53 ***	NC
QA/QC Batch Sample No: AE39196 (AE37761)				
Fluoride	BDL	93.0	101	4.5

If there are any questions regarding this data, please call Phoenix Client Services at extension 200.

LCS - Laboratory Control Sample
MS - Matrix Spike
RPD - Relative Percent Difference Between Sample and Sample Duplicate

Phyllis Shiller, Laboratory Director
October 14, 2002

PHOENIX

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06040
Tel. (860) 645-1102 Fax (860) 645-0823

ACCREDITED IN ACCORDANCE WITH nelac

QA/QC Report

October 14, 2002

QA/QC Data

SDG I.D.: GAE37761

Parameter	Blank	LCS %	MS Rec %	MS Dup Rec %	RPD
QA/QC Batch Sample No: AE37761 (AE37761, AE37762)					
EDB and DBCP Analysis					
1,2-Dibromo-3-Chloropropane (DBCP)	ND	105	103	101	2.0
1,2-Dibromoethane (EDB)	ND	111	106	103	2.9
Drinking Water Volatiles					
1,1,1,2-Tetrachloroethane	ND				
1,1,1-Trichloroethane	ND				
1,1,2,2-Tetrachloroethane	ND				
1,1,2-Trichloroethane	ND				
1,1-Dichlorethene	ND		90	88	2.2
1,1-Dichloroethane	ND				
1,1-Dichloropropene	ND				
1,2,3-Trichlorobenzene	ND				
1,2,3-Trichloropropane	ND				
1,2,3-Trimethylbenzene	ND				
1,2,4-Trichlorobenzene	ND				
1,2,4-Trimethylbenzene	ND				
1,2-Dibomoethane (EDB)	ND				
1,2-Dibromo-3-chloropropane	ND				
1,2-Dichlorobenzene	ND				
1,2-Dichloroethane	ND				
1,2-Dichloropropane	ND				
1,3,5-Trimethylbenzene	ND				
1,3-Dichlorobenzene	ND				
1,3-Dichloropropane	ND				
1,4-Dichlorobenzene	ND				
2,2-Dichloropropane	ND				
2-Chlorotoluene	ND				
4-Chlorotoluene	ND				
4-Isopropyltoluene	ND				
Benzene	ND		93	90	3.3
Bromobenzene	ND				
Bromochloromethane	ND				
Bromodichloromethane	ND				
Bromoform	ND				
Bromomethane	ND				
Carbon Tetrachloride	ND				
Chlorobenzene	ND		97	100	3.0
Chloroethane	ND				

QA/QC Data

SDG I.D.: GAE37761

Parameter	Blank	LCS %	MS Rec %	MS Dup Rec %	RPD %
Chloroform	ND				
Chloromethane	ND				
cis-1,2-Dichloroethene	ND				
cis-1,3-Dichloropropene	ND				
Dibromochloromethane	ND				
Dibromomethane	ND				
Dichlorodifluoromethane	ND				
Ethylbenzene	ND				
Hexachlorobutadiene	ND				
Isopropylbenzene	ND				
Methyl t Butyl Ether (MTBE)	ND				
Methylene Chloride	ND				
n-Butylbenzene	ND				
Napthalene	ND				
o-Xylene	ND				
p- and m- Xylene	ND				
Propylbenzene	ND				
sec-Butylbenzene	ND				
Styrene	ND				
tert-Butylbenzene	ND				
Tetrachloroethylene	ND				
Toluene	ND		106	100	5.8
Total Trihalomethanes (TTHM)	ND				
trans-1,2-Dichloroethene	ND				
trans-1,3-Dichloropropene	ND				
Trichloroethylene	ND		105	90	15.4
Trichlorofluoromethane	ND				
Vinyl Chloride	ND				
%4-Bromofluorobenzene (Surrogate)	80		85	86	1.2

Comment: LFB was analyzed with this batch instead of MS/MSD

If there are any questions regarding this data, please call Phoenix Client Services at extension 200.

MS - Matrix Spike
MS Dup - Matrix Spike Duplicate
RPD - Relative Percent Difference
LCS - Laboratory Control Sample

Phyllis Shiller, Laboratory Director
October 14, 2002

Eastern Analytical Services, Inc.

Phone (914) 592-8380
4 Westchester Plaza
Elmsford, New York 10523-1610
http://www.EASInc.com
Fax (914) 592-8956

October 01, 2002

Ms. Bobbi Parlato
Phoenix Environmental Laboratories, Inc.
587 East Middle Turnpike
P.O. Box 409
Manchester, CT 06040

Dear Ms. Parlato:

Enclosed please find the laboratory results for the 1 water samples received by Eastern Analytical Services, Inc. September 24, 2002. The analysis was performed on a JEOL CXII TEM equipped with a Kevex EDS in accordance with EPA-600/4-83-043 and NYS Item 198.2.

Thank you for allowing EAS, Inc. to provide Phoenix Environmental Laboratories, Inc. with professional analytical services. If you have any questions or require additional information or assistance, please feel free to contact me at the number above or e-mail Lab@EASInc.com.

Sincerely,

EASTERN ANALYTICAL SERVICES, INC.

Paul Stascavage
Laboratory Director

PS:om

Enclosures

Faxed October 01, 2002
860-645-0823

Eastern Analytical Services, Inc.

Water Sample Report

Date Collected: 09/20/2002
Collected By: Not Given
Date Received: 09/24/2002
Date Analyzed: 09/30/2002
Analyzed By: Moses Peram
Signature: [signature]
Analyte: Asbestos Fibers
Analytical Method EPA-600/4-83-043/NYS 198.2
NVLAP Lab No: 101646-0
NYS Lab Number: 10851

Client: Phoenix Environmental Laboratories, Inc.
587 East Middle Turnpike
P.O. Box 409
Manchester, CT 06040

Sample ID# / Lab ID#	Sample Location	Sample Notes	Vol. (mls)	Concentration - 19k ≥ 0.5 μm < 10.0 μm	Vol. (mls)	Concentration - 10k ≥ 10.0 μ
AE37761 993147	Not Given	Not Given	200.	BDL< 4.00E-01 MFL	200.	BDL< 1.00E-01 MFL

MFL = Million Fibers per Liter
Liability Limited to Cost of Analysis
Results Applicable to Those Items Tested
This Report Must Not be Used by the Client to Claim Product Endorsement by NVLAP or Any Agency of the US Government
AIHA Accreditation No. 418 Rhode Island DOH No. AAL-072T3 Massachusetts DOL No. A A 000072 Connecticut DOH No. PH-0622 Maine DEP No. LA-024 Vermont DOH No. AAS-2095

Eastern Analytical Services, Inc.

Water Sample Report

Date Received:	09/24/2002	**Analytical Method:**	EPA-600/4-83-043	**Filter Type:**	0.1µ MCE
Date Collected:	09/20/2002	**Instrument:**	JEOL 100CXII	**Filter Manufacturer:**	Advantec
Date Analyzed:	09/30/2002	**Accelerating Voltage:**	100 kV	**Filter Lot No:**	B49AMZ
Analyzed By:	Moses Peram	**Magnification:**	19 kX	**Effective Filtration Area:**	960 mm²
Client:	Phoenix Environmental	**No of Grid Openings:**	1	**Filter Loading:**	Heavy
Sample No:	AE37761	**Grid Opening Area:**	0.012 mm²	**Volume:**	200. milliliters
Lab No:	993147	**Area Analyzed:**	0.012 mm²	**Minimum Detection Limit**	4.00E-01 MFL

Grid Opening	Structure No.	Structure Type	No. of Fibers	Length	Width	SAED	Negative ID	EDS	Spectra File Name
1J2	1	Fiber	1	2.20	0.25	Non-Asbestos		Non-Asbestos	993147G1GOJ201

Total Number of Asbestos Structures ≥ 0.5µm < 10.0 µm:	0	**Total Number of Asbestos Structures ≥ 10.0 µm:**	0
Associated Concentration:	BDL< 4.00E-01 MF	**Associated Concentration:**	BDL< 1.00E-01 MF

Eastern Analytical Services, Inc.

Water Sample Report

Date Received:	09/24/2002	**Analytical Method:**	EPA-600/4-83-043	**Filter Type:**	0.1µ MCE
Date Collected:	09/20/2002	**Instrument:**	JEOL 100CXII	**Filter Manufacturer:**	Advantec
Date Analyzed:	09/30/2002	**Accelerating Voltage:**	100 kV	**Filter Lot No:**	B49AMZ
Analyzed By:	Moses Peram	**Magnification:**	10 kX	**Effective Filtration Area:**	960 mm^2
Client:	Phoenix Environmental	**No of Grid Openings:**	4	**Filter Loading:**	Heavy
Sample No:	AE37761	**Grid Opening Area:**	0.012 mm^2	**Volume:**	200. milliliters
Lab No:	993147	**Area Analyzed:**	0.048 mm^2	**Minimum Detection Limit**	1.00E-01 MFL

Grid Opening	Structure No.	Structure Type	No. of Fibers	Length	Width	SAED	Negative ID	EDS	Spectra File Name
1X3	0	No Structure							
2I6	0	No Structure							
3Q2	0	No Structure							

Total Number of Asbestos Structures ≥ 0.5µm < 10.0 µm:	0	**Total Number of Asbestos Structures ≥ 10.0 µm:**	0
Associated Concentration:	BDL< 4.00E-01 MF	**Associated Concentration:**	BDL< 1.00E-01 MF

Eastern Analytical Services, Inc.
Chain of Custody Form

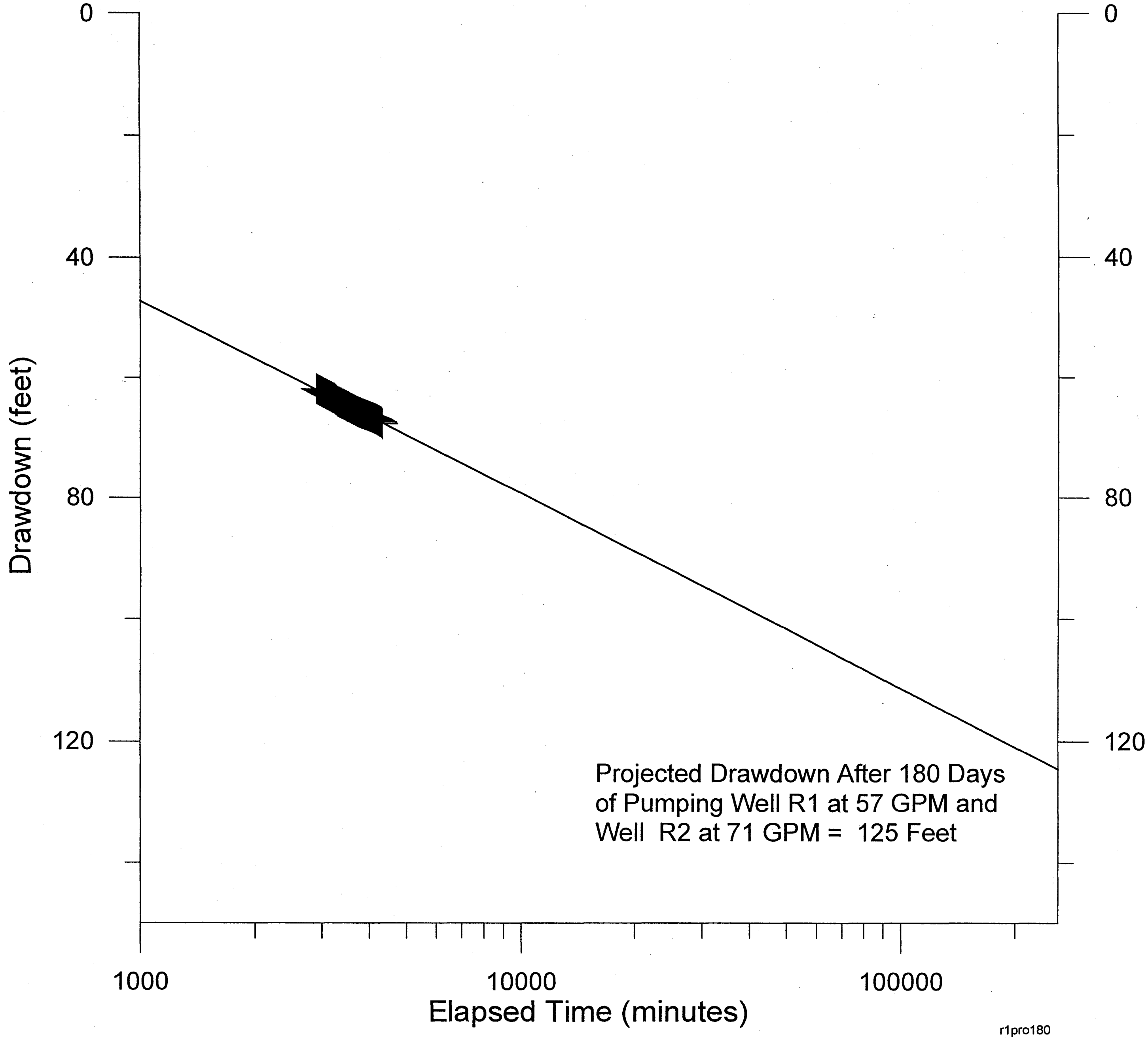
EAS Client	Phoenix Environmental Laboratories, Inc. 587 East Middle Turnpike P.O. Box 409 Manchester, CT 06040	Batch No.	0206612
		Turn-Around:	5 Day
		Shipped Via:	Airborne
Analyte:	Asb H2O	State of Origin:	CT
No. of Samples Received:	1	Sample Disposition:	Standard x Return
No. of Samples Analyzed:	1		
Client Project Number/Name:			
Lab ID Numbers	993147		

		Signature		
Collected By:	Not Given		Date: 09/20/2002	
Received By:	Kevin Stascavage Eleonora Skulsky	[signature] [signature]	Date: 09/24/2002	Time: 0942
Logged In By:	Damien Warner	[signature]	Date: 09/24/2002	
Prepped By:	Damien Warner	[signature]	Date: 09/24-27/2002	
Analyzed By :	Moses Peram	[signature]	Date: 09/30/2002	Time: 0950
Re-Analyzed By:			Date:	
Checked By:	Ernest Sanchez	[signature]	Date: 10/01/2002	
Faxed By:	Ernest Sanchez	[signature]	Date: 10/01/2002	Time: 0807
Logged Out By:			Date:	

APPENDIX E

Drawdown and Yield Projection

BELLEAYRE RESORT
Simultaneous Testing of Wells R1 and R2
Well R1
180 Day Projection



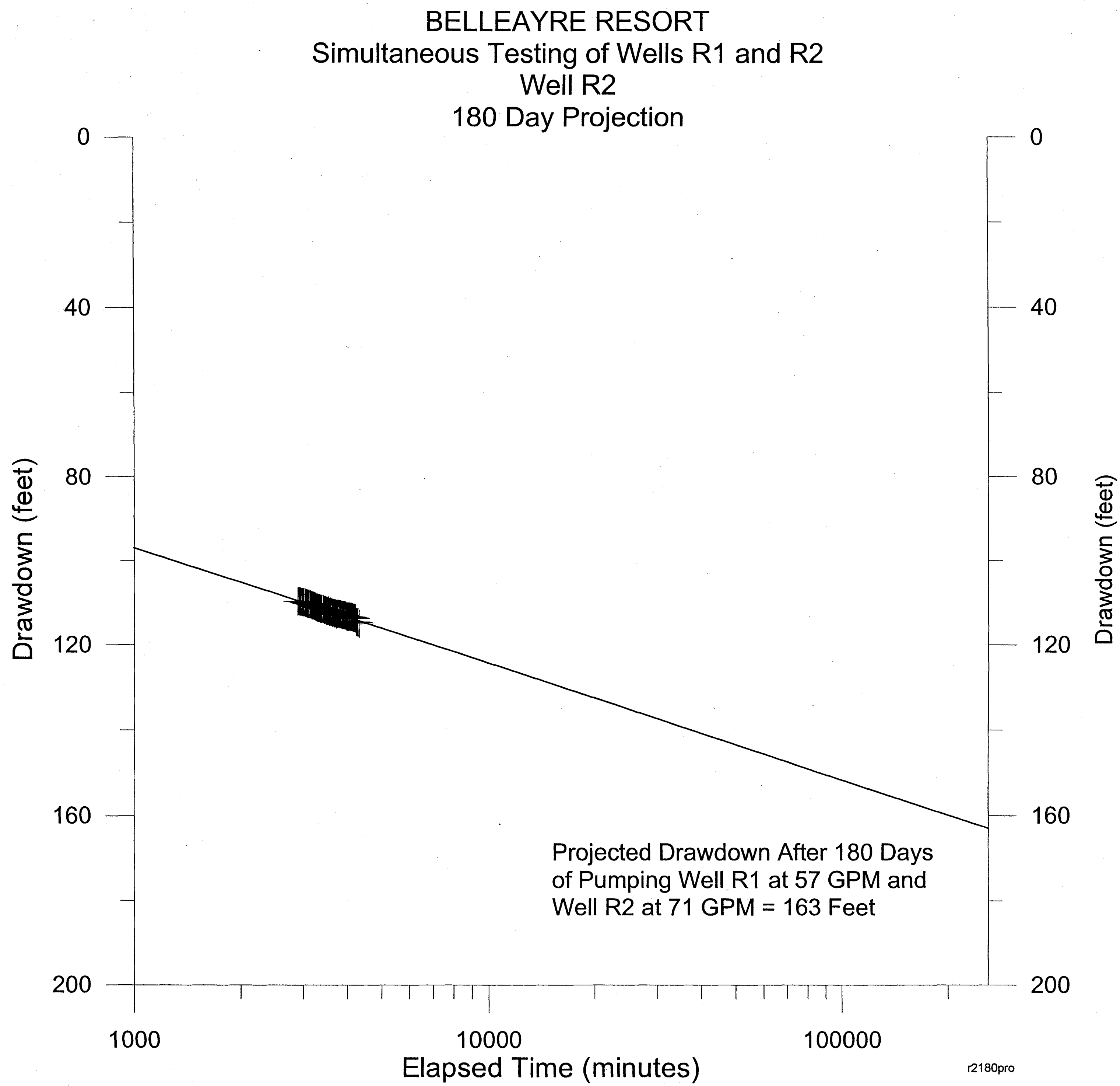

BELLEAYRE RESORT
Simultaneous Testing of Wells R1 and R2
Well R2
180 Day Projection
Drawdown (feet)
0
40
80
120
160
200
Projected Drawdown After 180 Days
of Pumping Well R1 at 57 GPM and
Well R2 at 71 GPM = 163 Feet
1000
10000
100000
Elapsed Time (minutes)
r2180pro

Exhibit G

Surface and Groundwater Assessment

SURFACE WATER AND GROUND WATER ASSESSMENT

Big Indian Plateau
Belleayre Resort at Catskill Park
Pine Hill, New York

Prepared for:

Crossroads Ventures LLC
P O Box 267
Mt. Tremper, New York 12457

December 2, 2002

ALPHA
GEOSCIENCE

ALPHA GEOSCIENCE

Geology

Hydrology

Remediation

Water Supply

Surface Water and Ground Water Assessment

Big Indian Plateau
Belleayre Resort at Catskill Park
Pine Hill, New York

Prepared for:

Crossroads Ventures LLC
P O Box 267
Mt. Tremper, New York 12457

Prepared by:

Alpha Geoscience
679 Plank Road
Clifton Park, New York 12065

December 2, 2002

TABLE OF CONTENTS

TABLES

FIGURES

Exhibits

Exhibit A	Water Budget Analysis
Exhibit B	Water Quality Field Testing
Exhibit C	Water Quality Analytical Results

1.0 INTRODUCTION

This report contains an assessment of the anticipated backup potable water supply for the proposed Big Indian Plateau development, an assessment of the local surface water and ground water resources associated with the development site, and an assessment of possible impacts of the Big Indian Plateau development on those local surface water and ground water resources. The Big Indian Plateau development is a portion of the Belleayre Resort at Catskill Park (the Resort), which is proposed by Crossroads Ventures, LLC (the Applicant).

The Resort consists of three components identified as Big Indian Plateau, Wildacres Resort and Highmount Estates. The Big Indian Plateau portion of the development is shown on Figure 1. Big Indian Plateau will include the Big Indian Country Club, an 18-hole championship golf course with associated lodging units and recreational facilities; Big Indian Resort and Spa, a 150 room hotel; and Belleayre Highlands, a development of lodging units in a quadplex configuration. The Belleayre Highlands complex will lie on that portion of Belleayre Mountain that is directly upslope from the hamlet of Pine Hill and within the surface drainage area of the tributaries of Birch Creek that flow through Pine Hill. The combined Big Indian Plateau facilities will also require 91,854 gallons per day (gpd) of potable water.

The Applicant initially intended to use springs alone to meet the potable demand of Big Indian Plateau. It was determined that the demand could be met collectively, or individually, by Silo A Spring, Silo B Spring, and Woodchuck Hollow Spring. Concerns regarding potential impacts to existing water supplies and the impact to base flow of Crystal Spring Brook, however, led the Applicant to focus instead on wells as the primary source to meet the Big Indian Plateau potable demand.

A bedrock well, identified as Rosenthal #2, was installed near the base of the Giggle Hollow valley as a potential source of ground water for Big Indian Plateau. A 72-hr pumping test was performed on the Rosenthal #2 well, and the results indicate that the well is fully capable of meeting the potable demand as the primary source. A full report on the Rosenthal #2 well construction, drilling, and pumping test results has been prepared and is included as Exhibit E within the "Big Indian Plateau Water Supply Treatment and Distribution" section of the DEIS.

In order to receive a permit to use a water source as a potable supply, the source must meet the requirements of the "Ten States Standards." These standards require the potable water supply be "equal or exceed the average day demand with the largest producing well out of service." If the largest producing well, Rosenthal #2, is out of service, then the average day demand for potable water must be supplied from a backup source. It was determined that the spring identified as Silo A spring qualified under the Ten States Standards as the appropriate backup water supply for the project.

The water resource demands and the associated development in the Birch Creek Watershed has raised the possibility that the Pine Hill water supply (the Pine Hill Water Company) may be affected and that the water quality of the streams may be adversely impacted. The assessment presented in this report was prepared to address these water resource concerns.

1.1 Objectives

The general objectives of this investigation were to assess the existing quantity, occurrence and quality of both surface water and ground water in the project area and to evaluate the potential impacts on those resources by Big Indian Plateau. The specific objectives were to:

- determine if Silo A Spring has a sufficient yield to meet the potable needs of Big Indian Plateau,
- determine whether the use of spring water will affect the quality and quantity of water available to the Pine Hill water supply

- estimate the impact to the base flow of the local stream, which is Crystal Spring Brook, during dry periods and drought as the result of the use of Silo A Spring by Big Indian Plateau,
- quantify potential changes in ground water recharge and surface water runoff (water balance) at Big Indian Plateau as the result of site development, and
- develop a database of pre-development (existing condition) ground water and surface water quality to serve as a baseline for detection of potential project impacts during, and after, development of Big Indian Plateau.

1.2 Scope of Investigation

The project objectives were addressed through a scope of investigation that included several data collection, data analysis and impact assessment tasks. These tasks consisted of:

- monitoring of stream and spring flows,
- assessing sufficiency of Silo A Spring yield to meet potable demands as a backup water supply
- evaluating the impact of Silo A Spring use on stream base flow,
- conducting a water budget analysis,
- defining the recharge area for the springs,
- monitoring spring and stream water quality, and
- assessing the potential impacts of the Big Indian Plateau Development on ground water and surface water.

The purpose of each of these tasks is defined within this section of the report, and the detailed methods are described in subsequent sections along with the results.

1.2.1 Stream and Spring Flow Monitoring

The major springs and related surface water flows were measured monthly from January 2000 through December 2001. The monthly measurements provide seasonal data necessary to estimate low flow conditions during dry season and drought periods. The monthly measurements also provide the seasonal fluctuation in stream and spring flows that naturally occur under existing conditions.

1.2.2 Assessment of Silo A Spring Flow to Meet Potable Requirements

The Silo A Spring flow measurements were used to determine if Silo A Spring has sufficient yield to serve as the backup potable water supply for Big Indian Plateau. This assessment was conducted by correlating the monthly spring flow data with the precipitation data to predict low flows during normal seasonal dry periods (summer) and drought conditions. These results were sufficient to determine whether there would be periods when Silo A Spring would not be sufficient to meet the potable needs of the project.

1.2.3 Silo A Spring Use Impacts on Stream Flow

The spring and stream flow monitoring results were compared to determine the seasonal contribution of the Silo A Spring to Crystal Spring Brook. The seasonal variation in that contribution was also correlated with rainfall data to determine the relative significance of Silo A Spring in the maintenance of stream base flow.

The spring flow and stream flow data were also used to estimate if, and how often in the past Crystal Spring Brook may have dropped below flow rates necessary to sustain aquatic life under existing conditions. This analysis was conducted by correlating the Crystal Spring Brook discharge rates with daily flow measurements of Esopus Creek that were conducted by the U.S. Geological Survey

(Gauge #01362200). Crystal Spring Brook and Esopus Creek are within the Ashokan Reservoir watershed.

1.2.4 Water Budget Analysis

A water budget analysis (water balance) is a predictive model used to determine the relative contribution of precipitation to evapotranspiration (evaporation from plants and the ground surface), runoff to streams and infiltration to ground water. The water budget analysis was conducted for the Big Indian Plateau development site to assess the existing balance and evaluate the degree to which that balance will change after the golf course and facilities are constructed. The results were used to assess impacts of Big Indian Plateau to the springs and streams.

1.2.5 Delineate Recharge Basins for Springs

This task involved delineating the areas upslope from the springs that represent the recharge areas for the springs of interest. The objective of this task was to determine which springs, if any, are downgradient from the development and to identify those springs which have the greatest potential to be impacted.

1.2.6 Monitoring of Spring and Stream Water Quality

Water quality of the springs and related streams in the area were measured in the field monthly from October 2000 through October 2001. Samples were also collected and submitted to a laboratory for an expanded list of quality parameters at selected spring and stream locations in October and November 2000. Quarterly sampling of the expanded list was conducted in 2001. The primary purpose of this monitoring was to develop a baseline database of current water quality conditions in response to concerns raised by the New York State Department of Environmental Conservation (NYSDEC) and New York City Department of Environmental Protection (NYCDEP) regarding potential surface water impacts during development and operation. This baseline will provide the data necessary to identify changes in water quality if they occur in the future.

1.2.7 Assessment of Potential Impacts

This is a summary task involving the prediction of potential impacts by the Big Indian Plateau development. This assessment of potential impacts is based on a review of the results of the data collection and analysis tasks.

2.0 ASSESSMENT OF SPRING YIELDS AND STREAM FLOWS

2.1 Methods

Monthly flow measurements of springs and streams were made in the field at 18 locations in the Crystal Spring Brook drainage basin and at two locations in Birch Creek, above and below its confluence with Crystal Spring Brook (spring yields were also measured monthly at six spring locations on the Wildacres Resort site, which is in Pepacton Reservoir watershed). Figure 2 shows the approximate locations for all the springs and stream flow measurement sites.

Spring yields were determined by measuring the flow from the spring box/reservoir discharge pipes with a 5-gallon bucket or 18-gallon tub. Stream discharges were determined by first measuring stream flow velocities with a propeller-type current meter that displays direct readouts of mean velocity. The discharges were then calculated from velocity by using the velocity-area method ($Q=VA$) where Q = discharge, V = the measured velocity, and A = the cross sectional area of the stream. The stream cross sections were determined at each station during each monthly flow measurement.

The stream flow measurements by Alpha were compared with USGS stream flow data obtained for a stream gauging station that the USGS operates in Birch Creek at Big Indian (Gauge #013621955), approximately two miles downstream from the Birch Creek (below Crystal Spring Brook) location (W, Figure 2) of this study. The stream flow values from the USGS gauging station in Birch Creek should be larger in general than the flows measured in this study since they are further downstream. The U.S.G.S. data serve as a check on the quality of stream flow data obtained in this study.

2.2 Results

2.2.1 Spring Flow Data

The results of the monthly spring yield measurements and stream discharge calculations for all locations are presented in Table 1A, and the average flows, to date, for each location are presented in Table 1B. The ID numbers listed for each location are keyed to Figure 2.

Tables 1A and 1B include the total spring yield for Depot Spring, which could not be determined directly in the field. Silo B Spring yield represents a portion of the total Depot Spring yield. The Depot Spring total yield was determined by measuring the flow in Station Road ditch below the spring discharge point, subtracting any flow in the ditch that was present above the spring discharge point, and adding the overflow from Silo B.

The springs around Wildacres proved to be inadequate to meet the potable demand for Wildacres Resort and were highly variable in their discharge rates. For this reason, and because of the reported low production rates of on-site test wells, alternative water supplies for Wildacres were examined. The search for alternative water supply wells and springs led to the identification of the Village of Fleischmanns water supply as viable alternatives with adequate capacity. Yield measurements at five of the six springs on the Wildacres Resort Site were discontinued when it was determined that

Wildacres could potentially meet its water demands through the purchase of water from the Village of Fleischmanns.

Silo A Spring was identified as a possible source of potable water for the Big Indian Plateau portion of the Resort. An analysis was made of the relative wet period and dry period contribution that Silo A Spring makes to the local stream, which is Crystal Spring Brook. The Crystal Spring Brook (above Birch Creek) flow measurements are compared to the flow contributions from Silo A Spring in Table 2. The data indicate that Silo A Spring contributes a greater fraction of the total Crystal Spring Brook flow during the dry season months (0.113) than it does during wet periods (0.023).

2.2.2 Climatological Data

Climatological data indicate that the Crystal Spring Brook drainage basin receives more annual precipitation on average than the rest of the upper Esopus Creek drainage basin. Significant variations in the amount of total precipitation occur throughout the Catskills due to orographic effects. Precipitation at the Slide Mountain Station (NOAA Station ID 307799) is likely to be more similar to the project area than any other station since it is the closest, is at a comparable elevation and is in a similar physiographic setting.

Table 3 presents the daily precipitation data from the Slide Mountain Station since January 2000, when stream and spring flow measurements began in the project area. The Slide Mountain monthly precipitation data is shown in Figure 3 plotted against the normal monthly precipitation for the Slide Mountain Station. "Normal" precipitation is based on 30 years of precipitation data from the station. The precipitation data from the Slide Mountain Station indicate that total precipitation for the year 2000 was just slightly above normal, with only three months receiving significantly greater precipitation than normal.

Total precipitation during 2001 through December 18 was 17.37 inches below normal. The NYSDEC issued a drought watch for Ulster County on November 5, 2001. By the end of November, the Catskills Region was in a drought emergency condition based on NYSDEC's evaluation of stream flows and ground water levels alone. Evaluation of the state drought index, which consists of a composite of all hydrological conditions, led the NYSDEC to issue a drought warning for Ulster County on December 3, 2001. The NYCDEP issued a drought watch on December 27, 2001 for the City's Water Supply System. A drought watch is declared by the NYCDEP when there is less than a 50 percent chance that either the Delaware System or the Catskill System reservoirs will be full by June 1.

2.2.3 Relationship of Spring and Stream Flow Data to the Climatological Data

The project area has a higher annual rainfall than the rest of the upper Esopus Creek drainage basin. These high local precipitation totals result in the spring flows that maintain Crystal Spring Brook during the dry season. Precipitation is plotted with spring flows and with Crystal Spring Brook discharge in Figures 4 and 5, respectively.

Crystal Spring Brook flows into Birch Creek, which joins Esopus Creek in Big Indian, New York. Esopus Creek flow data were obtained from the daily mean flows recorded at the USGS stream gauging station at Allaben (Table 4). The monthly ratios of the relative flow contribution of Crystal Spring Brook (above Birch Creek) to Esopus Creek at Allaben, New York were calculated (Table 5). The data show that the Crystal Spring Brook flow is a slightly greater percentage of the Esopus Creek flow during the drier, autumn months (0.055, Figure 6) than during the wetter periods (0.047). The major springs in the Crystal Spring Brook drainage basin help sustain the dry season flow in Crystal Spring Brook and add a higher proportion to the dry season flow in the Esopus Creek at Allaben.

A portion of the yields from springs to Crystal Spring Brook may be the result of snow-making at the Belleayre Mountain Ski Center. These effects were not analyzed, although snow-making activities must be considered part of the current background conditions. The Ski Center uses water from the NYSDEC's Pine Hill Lake (water from Birch Creek) and a small pond formed from the damming of Cathedral Glen Brook. The increased snow-melt from the Ski Center in the springtime most likely elevates the stream flows in Cathedral Glen Brook, Crystal Spring Brook, Birch Creek and Esopus Creek over what they would be without snow-making. Discharge rates at Railroad Spring and Bonnie View Spring are likewise interpreted to be greater in response to the increased snow-melt from the Ski Center; although, it is not known by how much. Railroad Spring and Bonnie View Spring are the only springs measured in the Crystal Spring Brook drainage basin that receive recharge from the Ski Center lands.

3.0 ASSESSMENT OF THE SPRING FLOW REQUIRED TO MEET POTABLE DEMANDS

3.1 Methods

The assessment of available potable water from Silo A Spring was based on monthly and daily mean flow data from the Esopus Creek at Allaben, on historical precipitation data from the Slide Mountain weather station, on the water budget analysis, and on the spring and stream flow measurements made in the Crystal Spring Brook drainage basin since January, 2000. Comparisons were made between the measured Silo A Spring flows and the corresponding recorded flows at the Esopus Creek USGS gauging station in order to develop a method of estimating historical Silo A Spring flows during droughts. An analysis was subsequently performed to determine the extent to which the Silo A Springs could meet potable demand during dry season and drought conditions. The worsening drought conditions from July 2001 through December 2001 afforded the opportunity to collect data during a period approaching "worst-case" conditions.

3.2 Results

The water budget analysis, included as Exhibit A, indicates that the dry season for the project area typically begins in June or July and ends in November. As discussed previously, the springs of the Crystal Spring Brook drainage area contribute a higher percentage of the Crystal Spring Brook flow during the dry season than during the wetter periods of the year. This relationship also holds true with respect to the Esopus Creek flow.

Table 6 shows the ratio of Silo A discharge versus the Esopus Creek flow. During the dry season and drought months of 2001, the highest ratio of the Silo A discharge to the Esopus Creek flow was 0.014, which occurred with the August 30, 2001 monthly measurement. The August 30, 2001 discharge measurements at Silo A, Crystal Spring Brook (Above Birch Creek), Birch Creek, and Esopus Creek were the lowest discharge measurements made at those locations during the two-year monitoring period (Table 1A). Spring yield at Silo A remained at approximately 70 gpm from August, 2001 through November, 2001, despite the fact that drought conditions worsened from July, 2001 into December, 2001.

The average potable daily demand for Big Indian Plateau is 64 gpm (0.14 cfs), which correlates to an Esopus Creek flow of 4,571 gpm (10.19 cfs), using the 0.014 dry season ratio (64 gpm/0.014 = 4,571 gpm). An Esopus Creek discharge value at Allaben of 4,571 gpm (10.19 cfs) represents a threshold indicator discharge value below which there may not be enough discharge from Silo A spring to meet the potable demand for Big Indian Plateau. A review of the Esopus Creek historical discharge data through November, 2001 indicates that monthly, mean, daily discharge dropped below the threshold flow rate indicator of 10.19 cfs (4571 gpm) for 12 months out of the 458 months since measurements began in 1963. These low flows are indicative of severe drought conditions that historically occurred during the months of July through November.

The Ten States Standards require the potable water supply to "equal or exceed the average day demand with the largest producing well out of service." This condition can be met for Big Indian Plateau by using the Rosenthal #2 well as a primary water supply (see separate Rosenthal #2 Well Report) and Silo A as a backup water supply. Silo A spring yielded approximately 70 gpm throughout the entire drought of 2001.

4.0 SPRING USE IMPACTS ON STREAM FLOW

4.1 Method

An analysis was conducted to determine whether flows in Crystal Spring Brook would remain acceptable for the viability of trout and other aquatic life forms despite the potential withdrawal of Silo A Spring water by the Big Indian Plateau portion of the Resort when the primary water supply is out of service. The Tennant Method indicates that for a stream to sustain good survival conditions for most aquatic life forms, a flow of greater than 30% of the mean average flow must be maintained. A basin-to-basin analysis between the Crystal Spring Brook drainage basin and the Esopus Creek drainage basin was performed to determine the average Crystal Spring Brook discharge. Comparisons of spring and stream flows with historical Esopus Creek flows were made to assess the frequency of past low flow periods. The worsening drought conditions from July 2001 through December 2001 afforded the opportunity to assess flows during conditions approaching a "worst-case" scenario.

4.2 Results

The Esopus Creek discharge data (Table 4) indicate that the Esopus Creek drainage basin, which contains the Crystal Spring Brook drainage area, has an average flow of 2.3 cfs per square mile for the reach above Shandaken. This data is for the period up until October 1988 when the station was moved to Allaben. The Allaben readings from October 1988 through November 2001 yielded an average flow of 2.39 cfs per square mile. The two values provide a weighted average of 2.33 cfs per square mile (Table 4).

The Crystal Spring Brook drainage basin, which includes Silo A Spring, covers approximately 2.54 square miles. If it is assumed that the Crystal Spring Brook drainage system is typical of the rest of the Esopus Creek drainage area, then the average flow should be approximately 5.92 cfs, or 2,657 gpm. The average Crystal Spring Brook (above Birch Creek) flow to date, based on 18 monthly measurements during the last two years, is 2661 gpm, or 5.93 cfs. The flow measurements of Crystal Spring Brook made for this project supports the use of the basin-to-basin comparison in determining a historical average flow for Crystal Spring Brook (2657 gpm). The Tennant threshold for Crystal Spring Brook (above Birch Creek) is 797 gpm (30% of 2657 gpm).

The Esopus Creek data (Table 4) indicates that the monthly average daily discharge in the Esopus Creek has fallen below the Tennant threshold 109 times since 1963, and seven times during the past two years. By comparison, Crystal Spring Brook (above Birch Creek) discharge measurements have fallen below the Tennant threshold of 797 gpm (30% x 2657gpm) twice during the past 2 years, both times during the 2001 drought (August 30 and October 1). No measurement of Crystal Spring Brook flow was made during November, 2001. Flow data from the USGS gauging stations at Esopus Creek and Birch Creek (at Big Indian), and precipitation data from Slide Mt., indicate that the Crystal Spring Brook flow during November was also likely below the Tennant threshold. Drought conditions in the past, and in the future, naturally cause the flow in Crystal Spring Brook to fall below the Tennant threshold flow. It should be noted that 10% of the mean average flow is considered a minimum instantaneous flow to sustain short-term survival for aquatic life.

Silo A spring discharge during the 2001 drought, fell to approximately 70 gpm and remained there for several months as drought conditions worsened. This shows that the potable demand of Big Indian Plateau (64 gpm) can be met during typical drought conditions, such as the 2001 drought, by Silo A spring. The discharge from Silo A during the dry seasons of the past two years ranged from

4.7% to 37% of the total stream flow measured in Crystal Spring Brook. The use of Silo A spring to meet the potable demand for extended periods of time during drought conditions could cause the flow in Crystal Spring Brook to fall further below the Tennant threshold. Demand should continue to be met by the primary water supply well, Rosenthal #2, during drought conditions.

5.0 WATER BUDGET ANALYSIS

5.1 Methods

The methods for the water budget analysis are contained in Exhibit A.

5.2 Results

The results (Exhibit A) indicate that infiltration to the ground water system for the project area under existing conditions is approximately 0.94 gpm per acre. The results of the water budget analysis for the future, post-development conditions indicate that infiltration to the ground water system in the project area will be approximately 1.03 gpm per acre. This small increase (0.09 gpm per acre) amounts to a 110 gpm change for the whole 1232 acre site. Although this estimated increase in percolation to the ground water is a beneficial characteristic, this change is relatively small when compared to the normal seasonal and yearly climate fluctuations.

6.0 SPRING RECHARGE AREAS

6.1 Method

The recharge areas for the major springs in the Crystal Spring Brook drainage basin were interpreted based on physiographic features. These recharge areas are outlined in Figure 7. The larger brooks, ridge crests, and divides were used to define the recharge areas. Each recharge area covers the area upgradient from a particular spring or springs and extends along the mountain side to the nearest divide or large ravine with a brook.

6.2 Results

The recharge areas for Railroad Spring and Bonnie View Spring are considered to be the same. The recharge areas for Silo A, Depot Spring, and Woodchuck Hollow Spring also share a common recharge area, although separate from the Railroad and Bonnie View Spring recharge area. Woodchuck Hollow Spring recharge area is separated out on Figure 7; however, it is interpreted that some of the ground water within the Woodchuck Hollow Spring recharge area continues downgradient and contributes to Silo A and/or Depot Spring.

A fracture trace analysis was conducted in the recharge basins to assess whether fractures could be carrying water across the topographically defined recharge basin boundaries. A map of topographic linear features was constructed (Figure 8) by identifying natural linear features from 7.5 minute topographic maps. The natural linear features represent potential fractures along joints and bedding planes in the rock. There did not appear to be any significant cross basin fractures that would transfer water between basins.

The Big Indian Plateau is not expected to have an influence on the recharge to any of the major springs within the Crystal Spring Brook drainage basin. All of the major springs are cross-gradient to the development and receive water from areas on Belleayre Mountain that lie west of the substantial ravine of Woodchuck Hollow.

7.0 WATER QUALITY

7.1 Methods

The water quality monitoring objectives were met through a combination of routine field testing and periodic sampling for laboratory analysis.

7.1.1 Field Testing

Routine water quality field parameters were measured on a monthly basis from October 2000 through October 2001, at the same time as the ongoing monthly stream flow and spring flow measurements. The field parameters were measured at each of the stream and spring flow locations, and included temperature, specific conductivity, pH, oxidation-reduction potential (ORP), turbidity, and dissolved oxygen. Additional locations for water quality field testing were added along Birch Creek (at Covered Bridge, and below the treatment plant) and at Rose Mountain Brook to check the potential surface water quality effects from Pine Hill Lake and the NYCDEP waste water treatment plant discharge. The treatment plant discharges to Rose Mountain Brook, which discharges to Birch Creek. Water quality parameters were measured in Rose Mountain Brook above and below the treatment plant outfall. A sampling location was added along Lost Clove Brook to obtain water quality data from the stream that receives the south-directed drainage from the site. Figure 9 shows the location of all water quality field testing locations.

7.1.2 Water Temperatures

Surface water and spring water temperatures have been monitored in response to concerns raised over the possibility that site development has the potential to increase or decrease the surface water and/or ground water temperatures to the detriment of trout viability. Monthly, manual, water temperature measurements were made with a thermometer during each round of field testing at all of the testing locations to determine the seasonal variability of the water temperatures in the streams and springs.

Temperature data loggers were submerged in the water at two spring and four stream locations. The temperature loggers were programmed to record temperature measurements every four to six hours. The spring locations included Railroad Spring and Silo B. The four stream locations included Crystal Spring Brook above Birch Creek, Birch Creek below Crystal Spring Brook, Birch Creek at

Covered Bridge, and Birch Creek below the treatment plant outfall. Data loggers at three locations (Crystal Spring Brook above Birch Creek, Birch Creek below Crystal Spring Brook, and Birch Creek at Covered Bridge) were lost during a flooding event on December 17, 2000. These three locations have only one measurement per month during December 2000 and January 2001. The temperature data logger in Birch Creek below the treatment plant outfall was removed on February 1, 2001 to prevent loss from possible spring flooding. Manual temperature measurements were made at all four stream locations on a weekly basis during February, March, and April of 2001 while the data loggers were removed. The temperature loggers were reinstalled at the initial four locations on April 26, 2001 and programmed to resume recording stream temperatures at four-hour intervals.

7.1.3 Analytical Testing

Analytical water quality sampling for laboratory analysis was performed in October and November of 2000 at four spring and nine stream locations. Figure 10 shows all of the water quality analytical sampling locations. These first two months of analytical sampling served to create a baseline of seasonal water quality effects. Four of the stream locations were sampled quarterly during 2001 to detect any seasonal changes that exist under current background conditions, prior to site development. The quarterly sampling events were completed in October 2001.

7.2 Results

Summary tables of the results of field testing and analytical sampling to date are contained in Exhibits B and C, respectively. Manual temperature data are presented in Table 6, and the monthly mean temperatures for the two springs and four stream locations that were monitored are presented in Table 8. The monthly mean temperatures were calculated using the data from the programmable temperature data loggers as well as the available manual measurements.

The data collected to date indicate that all water quality parameters are within typical ranges for surface and ground water. The October and November 2000 baseline chloride and sodium levels at Railroad Spring, Pine Hill Water Supply overflow (pre-treatment) and Crystal Spring Brook (above Cathedral Glen Brook) were higher than at the remaining 10 analytical sampling locations. This is most likely due to the use of de-icing salts at Belleayre Mountain Ski Center, which is within the recharge area for Railroad and Bonnie View Springs (Figure 7). Specific conductivity was generally higher at these locations during the non-winter months (Exhibit B). Specific conductivity at most locations increased with the onset of winter and the use of road salts, and decreased again in April. The sewer treatment plant outfall had the highest specific conductivity readings among all locations over the monitoring period

8.0 SUMMARY OF RESULTS AND POTENTIAL PROJECT IMPACTS

The Big Indian Plateau portion of Belleayre Resort at Catskill Park will reportedly require an average daily potable water demand of 64 gpm (91,854 gpd). The primary source of potable water supply will be from a well identified as Rosenthal #2. Silo A Spring is anticipated to be the backup potable water supply for the Rosenthal #2 well.

The total flow from Silo A Spring should be able to meet the potable demand for the Big Indian Plateau portion of the Resort, even during drought conditions. Severe drought months during which there may not be enough discharge from Silo A spring to meet the potable demand have occurred 12 times out of a total of 458 months on record (3% of all months), based on the historical flow data from Esopus Creek. Drought conditions typically last one to two months and have occurred during at least three years of each decade since 1964, except for the 1970s. No drought conditions are reflected in the Esopus Creek flow data recorded during the 1970s.

Although Big Indian Plateau could meet its average daily potable water demand (64 gpm) during drought periods using Silo A as a backup water supply, the use of Silo A Spring should be curtailed once the flow within Crystal Spring Brook falls below 861 gpm. The Tennant threshold of 797 gpm for Crystal Spring Brook might not be met if Silo A Spring is utilized during these low flows. The Rosenthal #2 well primary water source should continue to be used during drought conditions.

The water budget analysis indicates that the development of the Big Indian Plateau portion of the Resort would result in a very small net increase in infiltration of approximately 0.09 gpm per acre to the ground water system. This increase indicates that the development of Big Indian Plateau will not negatively impact the quantity of available water resources in the project area.

The development of Big Indian Plateau and the rest of the Resort will not have an impact on the Pine Hill water supply (Bonnie View Springs). The development is not in the recharge area of the Bonnie View Springs. The primary potable water supply will be obtained from the Rosenthal #2 well, which lies downgradient of the Bonnie View system and recharge basin. The backup potable water supply, Silo A, is within a recharge basin that is independent of the Bonnie View Springs and recharge basin.

Potable water obtained from Silo A Spring comes from the recharge area shown on Figure 7. The water, once treated after being used to meet potable needs, would be discharged to the fill absorption beds (beyond the spring recharge areas), enter the ground water system, and eventually contribute directly to the flow in the Crystal Spring Brook or Birch Creek systems.

Surface and ground water quality were monitored in the area's streams and springs. The monitoring consisted of monthly field testing and quarterly analytical sampling. The results establish a baseline set of data that reflects the seasonal changes in water quality that currently exist at the site. This baseline information provides the data necessary for making comparisons with similar data collected as the project is developed.

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TABLES

TABLE 1A
2000-2001 MONTHLY
SPRING AND STREAM FLOW MEASUREMENTS
Gallons Per Minute

Belleayre Resort
Alpha Project No. 00109

Stream/Spring	2000											
	18-Jan	2-Mar	27-Mar	20-Apr	22-May	26-Jun	26-Jul	29-Aug	28-Sep	26-Oct	28-Nov	27-Dec
Woodchuck Hollow Spring	NM[6]	NM	NM	NM	NM	87	27	28	22	56	38	39
Railroad Spring[1]	NM	NM	NM	NM	386	351	193	247	80	63	102	435
Crystal Spring Brook-above Bonnie View Spg.	73	1005	777	879	899	655	122	120	46	77	78	430
Bonnie View side ditch[2]	19	39	24	56	49	49	29	20	10	8	10	55
Pine Hill $H_2$0 Supply (meter)	0	NM	118	118	0	118	114	114	112	112	113	NM
Pine Hill $H_2$0 Supply overflow	48	11	10	10.5	102	7.5	0.7	.25 est.	0	0	0.7	9.5
Crystal Spring Brook-above Cathedral Glen Brook	127	1,456	1,072	1,104	1,121	990	197	297	149	184	230	542
Cathedral Glen Brook-above CSB	242	3,499	3,730	2,531	2,889	2,317	730	843	286	653	1,070	597
Black ABS Pipe-above Silo A	NM	NM	19	19.7	18	18	9.9	5.1	2.2	2.2	1.7	11.5
Silo A	120	212	150	175	178	125	104	98	87	86	87	139
Crystal Spring Brook-below Silo A	435	4,941	4,618	4,857	4,307	3,157	1,391	1,074	799	1,296	1,304	1,880
Silo B 4" Pipe	NM	NM	NM	NM	NM	NM	96	94	51	121	113	150
Silo B Overflow	29	25	28	24	26	25	25	26	25	25	26	28.5
Silo B (M + N)	NM	NM	NM	NM	NM	NM	121	120	76	146	139	178.5
Station Rd. ditch-above Depot Spg.	35	101	55	226	287	164	89	26	0	50	11	226
Station Rd. ditch-below Depot Spg.	107	433	167	402	372	426	220	245	90	193	176	472
Depot Spring Total[3,4]	101	357	140	200	111	287	156	246	115	168	192	275
Crystal Spring Brook-below Depot Spg.	780	5,565	4,316	4,939	4,570	4,158	1,677	1,172	1,048	1,467	1,882	2,744
Bailey Brook-above Crystal Spring Brook[5]	NM	NM	NM	NM	925	509	127	60	22	87	104	446
Crystal Spring Brook-above Birch Creek	NM	NM	NM	6,437	6,032	5,045	1,866	1,116	846	1,473	1,835	2,827
Birch Creek-above Crystal Spring Brook	NM	NM	NM	11,209	10,421	6,463	4,347	2,528	1,085	2,501	2,286	7,128
Birch Creek-below Crystal Spring Brook	NM	NM	NM	15,984	17,343	9,884	6,362	3,978	1,917	4,385	4,833	9,502
Wildacres #1 Spring	1	10.7	1.7	10	10.6	5.8	3.3	2.9	1	NM	NM	NM
Wildacres #2 Spring	5.6	15	0.6	5.5	7.1	4.6	2.5	1.3	0.9	NM	NM	NM
Wildacres #3 Spring	8.4	17.5	6.8	17.5	5.8	5.3	10.3	11.5	4.8	NM	NM	NM
Davenport Spring	3.2	10.1	5.6	12.4	12.5	6.7	2	1.8	1.1	NM	NM	NM
Highmount Spring	3.8	11.5	10	23	18.7	10.2	2.4	1.8	0.5	NM	NM	NM
Leach Spring	3.4	4.4	6.1	13	5.1	6.9	11.1	6.3	5.6	6.8	6.1	12.2
Birch Creek at USGS Big Indian Gauging Station[7]	5,835	41,741	19,300	25,134	26,481	13,914	6,284	4,488	2,154	3,725	2,873	12,567
Esopus Creek at USGS Allaben Gauging Station[7]	50,718	235,187	76,301	107,719	132,854	80,789	33,662	24,686	11,220	22,890	29,623	72,710

Stream/Spring	2001											
	30-Jan	28-Feb	29-Mar	25-Apr	30-May	29-Jun	30-Aug	1-Oct	13-Nov	29-Nov	14-Dec
Woodchuck Hollow Spring	NM	NM	NM	226	44	31	12	41	NM	NM	38
Railroad Spring[1]	100	306	199	525	214	172	0	0	0	0	0
Crystal Spring Brook-above Bonnie View Spg.	105	220	101	1644	97	80	30	16	NM	NM	NM
Bonnie View side ditch[2]	26	44	15	45	35	68	5	0	NM	NM	NM
Pine Hill $H_2$0 Supply (meter)	113	113.5	113.4	119	113.4	112	80	102.5	NM	95	100
Pine Hill $H_2$0 Supply overflow	NM	3	2.8	17.7	13.5	2.3	0	0	NM	NM	NM
Crystal Spring Brook-above Cathedral Glen Brook	235	372	459	1,913	322	280	45	69	NM	NM	NM
Cathedral Glen Brook-above CSB	335	1,154	464	7,882	920	540	42	372	NM	NM	NM
Black ABS Pipe-above Silo A	5.6	9.4	12	20.6	9.9	5	1	0	NM	NM	NM
Silo A	109	113	106	167	93.5	93	69.5	73	69.3	70.8	70.8
Crystal Spring Brook-below Silo A	600	1,299	827	9,401	1,312	785	182	853	NM	NM	NM
Silo B 4" Pipe	133	161	176	189	187	185	27.5	159	NM	NM	165
Silo B Overflow	25	26.5	0	0	0	0	0	0	NM	NM	0
Silo B (M + N)	158	187.5	176	189	187	185	27.5	159	NM	NM	165
Station Rd. ditch-above Depot Spg.	0	67	49	311	0	4	0	0	NM	NM	NM
Station Rd. ditch-below Depot Spg.	123	406	387	813	223	170	28	147	NM	NM	NM
Depot Spring Total[3,4]	148	365	338	502	223	166	28	147	NM	NM	NM
Crystal Spring Brook-below Depot Spg.	1,088	1,528	1,373	9,039	1,336	1,022	280	738	NM	NM	NM
Bailey Brook-above Crystal Spring Brook[5]	41	71	84	1699	110	51	0	24	NM	NM	NM
Crystal Spring Brook-above Birch Creek	851	1,699	1,445	12,156	1,460	946	188	601	NM	NM	1080
Birch Creek-above Crystal Spring Brook	2,481	3,470	3,822	12,257	3,046	2,101	614	591	NM	NM	1435
Birch Creek-below Crystal Spring Brook	3,874	4,980	5,505	25,096	4,453	3,214	696	1,225	NM	NM	2205
Wildacres #1 Spring	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Wildacres #2 Spring	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Wildacres #3 Spring	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Davenport Spring	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Highmount Spring	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Leach Spring	2.5	4.9	NM	5.6	4	12	0	0	NM	NM	NM
Birch Creek at USGS Big Indian Gauging Station[7]	5,386	8,527	9,874	31,418	7,630	6,732	987	1,885	1,212	2,289	5,386
Esopus Creek at USGS Allaben Gauging Station[7]	22,890	38,151	55,206	121,633	66,307	25,583	4,937	11,221	7,630	8,303	23,788

Railroad Spring drains into Cathedral Glen Brook, upstream from its confluence with Crystal Spring Brook
Bonnie View Side Ditch = Water from Bonnie View Spring that does not enter piping to Bonnie View Spring collection system.
Depot Spring flow = Station Rd ditch flow below DepotSpring, minus Station Rd. ditch flow above Depot Spring, plus Silo B overflow
Silo B overflow to reservoir disconnected in March 2001. For March 2001 and subsequent dates, total Depot Spring flow =
Station Rd Ditch below Depot Spring, minus Station Rd. Ditch above Depot Spring
Bailey Brook = Name given to unnamed stream in Woodchuck Hollow.
NM = Not Measured
Esopus Creek and Birch Creek flow values for September 2000 through December 2001 are "Provisional Data Subject To Revision" by the USGS

TABLE 1B
AVERAGE FLOWS
SPRING AND STREAM FLOW MEASUREMENTS (GPM)

BELLEAYRE RESORT
Alpha Project No. 00109

	STREAM OR SPRING (see Figure 2 for locations)	**AVERAGE FLOW TO DATE**
A	Woodchuck Hollow Spring	53
B	Railroad Spring[1]	198
C	Crystal Spring Brook-above Bonnie View Spg.	373
D	Bonnie View side ditch[2]	30
E	Pine Hill H_20 Supply (meter)	99
F	Pine Hill H_20 Supply overflow	5
G		
H	Crystal Spring Brook-above Cathedral Glen Brook	558
I	Cathedral Glen Brook-above CSB	1555
J	Black ABS Pipe-above Silo A	9
K	Silo A	113
L	Crystal Spring Brook-below Silo A	2266
M		
N		
O	Silo B	148
P	Station Rd. ditch-above Station Rd. Spg.	85
Q	Station Rd. ditch-below Station Rd. Spg.	280
R	Depot Spring Total[3,4]	213
S	Crystal Spring Brook-below Station Rd. Spg.	2536
T	Bailey Brook-above Crystal Spring Brook[5]	273
U	Crystal Spring Brook-above Birch Creek	2661
V	Birch Creek-above Crystal Spring Brook	4321
W	Birch Creek-below Crystal Spring Brook	6969
X	Wildacres #1 Spring	5
Y	Wildacres #2 Spring	5
Z	Wildacres #3 Spring	10
AA	Davenport Spring	6
BB	Highmount Spring	9
CC	Leach Spring	6
DD	Birch Creek at USGS Big Indian Gauging Station	10688
EE	Esopus Creek at USGS Allaben Gauging Station	54957

Notes:

1 Railroad Spring drains into Cathedral Glen Brook, upstream from its confluence with Crystal Spring Brook.
2 Bonnie View Side Ditch = Water from Bonnie View Spring that does not enter piping to Bonnie View Spring collection system.
3 Depot Spring flow = Station Rd ditch flow below Spring, minus Station Rd. ditch flow above Spring, plus Silo B overflow.
4 Silo B overflow to reservoir disconnected in March 2001. For March 2001 and subsequent dates, total Depot Spring flow = Station Rd Ditch below Spring, minus Station Rd. Ditch above Depot Spring.
5 Bailey Brook = Name given to unnamed stream in Woodchuck Hollow.

TABLE 2
Monthly Silo A Spring Flow Measurements and Ratio of Relative Contribution to Crystal Spring Brook (Above Birch Creek)

Belleayre Resort
Alpha Project No. 00109

	4/20/2000		5/22/2000		6/26/2000		7/26/2000		8/29/2000		9/28/2000		10/26/2000		11/28/2000		12/27/2000	
	Flow	Ratio	Flow	Ratio	Flow	Ratio	Flow	Ratio	Flow	Ratio	Flow	Ratio	Flow	Ratio	Flow	Ratio	Flow	Ratio
Silo A	175	0.027	178	0.030	125	0.025	104	0.056	98	0.088	87	0.103	86	0.058	87	0.047	139	0.020
Crystal Spring Brook flow (gpm)	6,437		6,032		5,045		1,866		1,116		846		1,473		1,835		2,827	

	1/30/2001		2/28/2001		3/29/2001		4/25/2001		5/30/2001		6/29/2001		8/30/2001		10/1/2001		12/14/2001		Average Ratio	
	Flow	Ratio	Flow	Ratio	Flow	Ratio	Flow	Ratio	Flow	Ratio	Flow	Ratio	Flow	Ratio	Flow	Ratio	Flow	Ratio		
Silo A	109	0.128	113	0.067	106	0.073	167	0.014	93.5	0.064	93	0.098	69.5	0.370	73	0.121	79.7	0.074	0.081	n=18
Crystal Spring Brook flow (gpm)	851		1,699		1,445		12,156		1,460		946		188		601		1,080			

Average Ratio During Dry Season Months =0.113 (July 2000 through November 2000, and August 2001 through December 2001)
Average Ratio During Wet Season Months =0.023 (April 2000 through June 2000, December 2000, and April 2001)

TABLE 3
Slide Mountain Precipitation: January 2000 through December 2000

Belleayre Resort
Alpha Project No. 00109

STATION: SLIDE MOUNTAIN STATE: NY ID: 307799
LATITUDE: 42.02 deg LONGITUDE: -74.42 deg ELEVATION: 2649 ft

Day of Month	2000											
	January-00	February-00	March-00	April-00	May-00	June-00	July-00	August-00	September-00	October-00	November-00	December-00
1	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.08	0.00	0.00	0.00	0.01
2	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.06	0.52	0.00	0.00	0.00
3	0.01	0.00	0.09	0.00	0.00	0.50	0.00	0.07	0.06	0.00	0.00	0.01
4	0.02	0.10	0.00	1.18	0.00	0.00	0.50	0.06	0.05	0.02	0.00	0.00
5	0.41	0.00	0.00	0.28	0.04	0.10	0.00	0.00	0.03	0.18	0.01	0.00
6	0.00	0.01	0.00	0.00	0.06	0.42	0.00	0.00	0.00	1.18	0.01	0.01
7	0.00	0.00	0.00	0.00	0.00	3.43	0.00	0.54	0.00	0.00	0.00	0.00
8	0.03	0.02	0.02	ND	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.07
9	0.00	0.00	0.00	0.87	0.02	0.00	0.00	0.16	0.00	0.03	0.00	0.04
10	0.03	0.00	0.60	0.09	0.29	0.00	0.03	0.02	0.60	0.00	0.64	0.00
11	0.76	0.12	0.00	0.00	0.67	0.00	0.00	0.00	0.00	0.02	0.22	0.02
12	0.04	0.01	1.59	0.13	0.28	1.28	0.00	1.76	0.03	0.00	0.05	0.20
13	0.27	0.00	0.04	0.00	0.38	ND	0.00	0.13	2.05	0.00	0.00	0.00
14	0.18	1.06	0.00	0.00	0.53	0.33	0.00	0.01	0.00	0.00	0.02	0.65
15	0.00	0.33	0.03	0.00	0.00	0.02	2.06	0.59	0.17	0.00	0.69	0.01
16	0.00	0.07	0.00	0.00	0.00	0.00	3.85	0.40	0.01	0.00	0.01	0.00
17	0.05	0.02	0.76	0.00	0.00	0.03	0.04	0.00	0.00	0.19	0.00	3.42
18	0.00	0.00	0.03	0.66	0.17	ND	0.00	0.00	0.00	0.44	0.00	1.98
19	0.00	0.75	0.00	0.02	0.47	0.42	0.00	0.01	0.00	0.63	0.00	0.00
20	0.06	0.01	0.00	0.00	0.70	0.00	0.00	0.00	0.16	0.00	0.00	0.20
21	0.15	0.06	0.00	0.28	0.21	0.00	0.00	0.00	0.00	0.00	0.14	0.00
22	0.00	0.00	0.00	0.97	0.05	0.70	0.12	0.00	0.01	0.00	0.00	0.00
23	0.00	0.00	0.00	0.43	0.29	ND	0.00	0.00	0.00	0.00	0.00	0.04
24	0.00	0.00	0.00	0.10	0.97	0.02	0.00	0.98	0.12	0.00	0.00	0.00
25	0.00	0.04	0.00	0.00	0.23	0.00	0.00	0.00	0.00	0.00	0.00	0.01
26	1.04	0.50	0.07	0.00	0.26	0.66	0.00	0.00	0.10	0.00	0.24	0.00
27	0.02	0.00	0.00	0.05	0.00	0.07	0.77	0.00	0.32	0.00	0.40	0.01
28	0.00	0.48	1.50	0.00	0.00	0.07	0.09	0.00	0.00	0.00	0.00	0.01
29	0.00	0.02	0.01	0.00	0.01	0.01	0.10	0.21	0.01	0.00	0.01	0.02
30	0.00		0.11	0.06	0.00	0.17	0.64	0.02	0.00	0.00	0.21	0.08
31	0.93		0.01		0.00		0.22	0.01		0.00		1.25
Monthly Total	4.01	3.62	4.87	5.12	5.75	8.23	8.42	5.11	4.24	2.69	2.65	8.04
30-yr Avg	4.51	4.36	5.07	5.29	5.75	5.1	4.7	4.91	4.72	4.72	6	5.11

Total Precipitation Year 2000 = 62.75"
30-yr Avg. Total Yearly Precip. = 60.24"

ND = No Data
All measurements recorded in inches

TABLE 3 (cont.)
Slide Mountain Precipitation: January 2001 through December 2001

Belleayre Resort
Alpha Project No. 00109

STATION: SLIDE MOUNTAIN STATE: NY ID: 307799
LATITUDE: 42.02 deg LONGITUDE: -74.42 deg ELEVATION: 2649 ft

Day of Month	2001											
	January-01	February-01	March-01	April-01	May-01	June-01	July-01	August-01	September-01	October-01	November-01	December-01
1	0.02	0.05	0.01	0.01	0.00	0.00	0.92	0.00	0.50	0.00	0.02	1.75
2	0.00	0.00	0.11	0.08	0.00	1.35	0.17	0.00	0.00	0.00	0.00	0.00
3	0.00	0.09	0.05	0.00	0.00	0.53	0.00	0.00	0.00	0.00	0.04	0.00
4	0.00	0.00	0.01	0.00	0.00	0.04	0.01	0.85	0.00	0.00	0.00	0.00
5	0.03	0.22	0.39	0.00	0.00	0.00	0.38	0.61	0.39	0.00	0.06	0.00
6	0.22	0.45	0.77	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.15	0.00
7	0.00	0.10	0.15	0.22	0.00	0.00	0.00	0.00	0.00	0.17	0.00	0.02
8	0.00	0.00	0.00	0.23	0.00	0.00	0.20	0.00	0.00	0.03	0.00	0.00
9	0.15	0.13	0.20	0.00	0.00	0.00	0.14	0.00	0.00	0.00	0.00	0.35
10	0.04	0.20	0.46	0.21	0.00	0.00	0.00	0.21	0.00	0.00	0.00	0.00
11	0.00	0.00	0.00	0.00	0.00	0.03	0.11	0.08	0.66	0.00	0.00	0.00
12	ND	0.00	0.06	0.00	0.00	0.47	0.00	0.72	0.00	0.00	0.00	0.00
13	0.00	0.00	0.59	0.00	0.01	0.00	0.01	0.33	0.00	0.00	0.00	0.08
14	0.00	0.00	0.25	0.00	0.00	0.00	0.00	0.02	1.15	0.00	0.00	0.03
15	0.00	0.44	0.01	0.00	0.00	0.00	0.00	0.01	0.00	0.64	0.00	0.48
16	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17	0.00	0.09	0.15	0.00	0.00	3.24	0.04	ND	0.00	0.13	0.00	0.01
18	0.03	0.01	0.27	0.00	0.12	0.01	0.08	0.22	0.00	0.03	0.00	0.72
19	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	
20	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.03	0.00	0.16	
21	0.17	0.00	0.00	0.04	0.00	0.79	0.00	0.14	2.05	0.02	0.02	
22	0.00	0.01	2.06	0.08	0.18	0.00	0.00	0.00	0.00	0.00	0.00	
23	0.00	0.15	0.08	0.00	0.99	0.02	0.00	0.00	0.00	0.05	0.00	
24	0.00	0.01	0.02	0.00	0.32	0.63	0.00	0.01	0.00	0.20	0.00	
25	0.01	0.34	0.22	0.00	0.00	0.00	0.00	0.00	2.26	0.12	0.08	
26	0.00	0.22	0.00	0.00	0.01	0.00	0.50	0.00	0.02	0.00	0.43	
27	0.02	0.00	0.01	0.00	0.90	0.00	0.19	0.00	0.00	0.01	0.00	
28	0.02	0.01	0.00	0.00	0.13	0.00	0.00	0.00	0.12	0.01	0.00	
29	0.00		0.00	0.00	0.20	0.00	0.00	0.16	0.11	0.00	0.09	
30	0.01		1.92	0.00	0.07	0.00	0.00	0.00	0.01	0.00	0.02	
31	0.70		0.50		0.04		0.00	0.00		0.00		
Monthly Total	1.69	2.52	8.29	0.87	2.97	7.11	2.75	3.40	7.30	1.46	1.07	3.44
30-yr Avg	4.51	4.36	5.07	5.29	5.75	5.1	4.7	4.91	4.72	4.72	6	5.11

Total Precipitation Year 2001 (through December 18, 2001) = 42.87"
30-yr Avg. Total Yearly Precip. = 60.24"

ND = No Data
All measurements recorded in inches

TABLE 4
Monthly and Annual Average Discharges on Esopus Creek at Gauge 01362198

Belleayre Resort
Alpha Project No. 00109

Updated 12/20/01

bold = less than tennant method of 30% of grand mean

SHANDAKEN STATION

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1963										**11.64**	191.42	185
1964	201.1	98.66	369.48	222.7	75.97	**25.73**	**10.8**	**6.25**	**4.21**	**4.18**	**5.69**	49.4
1965	57.97	138.7	74	230.37	98.81	**19.37**	**8.94**	**15.16**	**24.83**	73.48	**38.17**	78.5
1966	56.94	77.68	326.71	142.57	117	62.27	**17**	**7.55**	**13.63**	**26.55**	126.37	86.9
1967	130.55	111.61	118.65	338.37	176	52.23	**36.9**	**19.17**	**10.86**	43.06	120.67	196
1968	70.1	67.97	369.06	224.05	260	172	67.8	**18.52**	**11.99**	**11.36**	116.3	140
1969	91.42	73.11	109.16	427.2	167	90.17	195	86.26	**17.53**	**13.97**	189.23	135
1970	54.16	250.82	69.9	577.53	154	40.33	**27.6**	**21.87**	**23.13**	146.45	123.27	80.6
1971	62.77	133.54	222.61	420.57	254	40.37	**15.7**	43.35	114.37	60.48	81.3	299
1972	163.03	79.31	282.48	378.23	215	350	208	**33.81**	**12.19**	**29.05**	346.27	329
1973	188.67	219.59	244.33	306.41	327	369	126	**35.33**	**16.76**	**19.53**	55.1	509
1974	180.48	152.5	193.42	370.3	215	87.47	53.9	**34.03**	92.5	82.61	136.83	297
1975	179.23	200.14	257.65	266.13	218	119	82.3	47.26	80.93	166.48	153.4	122
1976	289.84	330	185.81	155.6	198	66.9	46.6	**34.9**	**18.63**	170.68	97.33	125
1977	29.39	63.32	552.9	330.47	216	54.9	**17**	**13.35**	96.86	369.74	313.57	233
1978	358.32	90.07	208.32	436.43	388	104	50.5	**28.9**	**18.6**	**34.52**	49.13	104
1979	358.13	84.68	531.16	233.57	205	84.6	**21.1**	**18.81**	113.2	204.55	234.83	105
1980	79.87	33.59	460.06	350.23	129	45.5	61.6	**11.61**	**6.01**	**9.28**	**30.4**	92.1
1981	19.42	358.21	95.29	137.5	232	51.1	64.9	**18.81**	**20.59**	70.39	88.1	72.6
1982	82.39	141.61	148.77	354.03	78.39	188	58.8	**14.17**	**14.88**	**12.07**	52.43	101
1983	133.84	229.79	399.39	524.1	202	101	**17.9**	**12.25**	**9.92**	**7.49**	56.93	316
1984	89.77	356.17	126.55	600.03	322	128	**25.2**	**18.65**	**14.61**	**10.3**	**22.01**	108
1985	47.32	80.89	146.65	127.07	92.71	46.27	**33.7**	**24.71**	68.36	86.32	197.5	150
1986	108.16	95.64	411.42	173.5	215	141	52.5	82.2	**15.06**	**20.16**	179	166
1987	60.16	**29.61**	301.23	683.5	67.3	**33.4**	54	50.9	213.23	207.97	145.8	112
1988	41.77	138.4	196.13	154.83	235	60.3	**37.3**	**25.1**	**17.33**			
mean (cfs)	125.39	145.424	256.05	326.61	194.327	101.316	55.642	28.9168	42.0084	75.692	126.04	167.684

grand mean (cfs)	137.1
30% grand mean (cfs)	41.1
Drainage Area (mi^2)	59.5
cfs/mi^2	2.30

Gauge move to Allaben beginning with October, 1988

ALLABEN STATION

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1988										**28.16**	239.7	63.13
1989	**40.65**	71.68	122.1	218.87	511.06	161.9	47.16	**20.35**	53.58	187.51	169	52.16
1990	135.58	279.4	223.06	214.47	301.68	61.6	**35**	78.35	**32.33**	113.45	232.1	257.2
1991	142.48	160.4	279.29	199.07	113.16	**24.87**	**11.81**	**11.99**	**9.28**	54.7	126.1	127
1992	132.71	56.31	243.19	286.43	132.19	199.7	47.87	49.94	**39.33**	**44.54**	205.8	146.8
1993	300.52	49.71	188.87	826.97	101.29	**27.6**	**10.43**	**6.639**	**12.31**	**22.69**	181.9	197
1994	104.58	117.9	252.81	656.97	109.06	53.03	**37.55**	69.45	68.8	69.48	75	192.7
1995	245.23	75.14	229.58	123.2	73.355	71.53	**19.55**	**11.94**	**10.08**	256.89	295.5	84.23
1996	557.06	193.59	184.58	369.37	282.35	126.1	211.8	51.74	72.67	311.61	274.4	485.7
1997	152.26	173	208.87	318.43	219.1	49.8	**18.39**	**14.43**	**33.97**	**18.52**	230.7	107.3
1998	368	119.8	404.42	291.1	399.68	274.4	118.3	**20.03**	**11.46**	**19.8**	**25.1**	**39.3**
1999	365	208	246	194	116	48.6	74.5	**17.3**	198	127	208	136
2000	75.8	194	417	331	217	315	128	102	**37.5**	**39.4**	48.8	252
2001	61.3	109	127	518.4	68.3	110.8	**29.9**	**10.5**	**20.2**	**15.4**	**14.7**	
mean (cfs)	206.24	139.072	240.52	349.87	203.402	117.302	60.789	35.743	46.1162	93.511	166.2	164.655

grand mean (cfs)	152.0
30% grand mean (cfs)	45.6
Drainage Area (mi^2)	63.7
cfs/mi^2	2.39

Weighted Average of Two Stations:

$$\frac{(2.3\text{cfs} \times 25\text{yrs}) + (2.39\text{cfs} \times 13\text{yrs})}{38 \text{ years}} = 2.33 \text{ cfs/mi}^2$$

TABLE 5
Ratio of Relative Contribution of Crystal Spring Brook (Above Birch Creek) to Esopus Creek

Belleayre Resort
Alpha Project No. 00109

	Units	4/20/00	5/22/00	6/26/00	7/26/00	8/29/00	9/28/00	10/26/00	11/28/00	12/27/00
Crystal Spring Brook above Birch Creek	gallons/minute	6437	6032	5045	1866	1116	846	1473	1835	2827
Crystal Spring Brook above Birch Creek	cubic feet/sec	14.34	13.44	11.24	4.16	2.49	1.89	3.28	4.09	6.30
Esopus Creek	cubic feet/sec	240	296	180	75	55	25	51	66	141
Ratio of Crystal Spring Brook Flow (cfs) to Esopus Creek Flow (cfs)		0.060	0.045	0.062	0.055	0.045	0.075	0.064	0.062	0.045

	Units	1/30/01	2/28/01	3/29/01	4/25/01	5/30/01	6/29/01	8/30/01	10/1/01	12/14/01
Crystal Spring Brook above Birch Creek	gallons/minute	851	1699	1445	12156	1460	946	188	601	1080
Crystal Spring Brook above Birch Creek	cubic feet/sec	1.90	3.79	3.22	27.09	3.25	2.11	0.42	1.34	2.41
Esopus Creek	cubic feet/sec	50	102	134	271	148	57	11	25	53
Ratio of Crystal Spring Brook Flow (cfs) to Esopus Creek Flow (cfs)		0.038	0.037	0.024	0.100	0.022	0.037	0.038	0.054	0.045

DRY SEASON AVERAGE RATIO= **0.055** (July 2000 through November 2000, and August 2001 through December 2001)

NON-DRY SEASON AVERAGE RATIO = **0.047** (April 2000 through June 2000, and December 2000 through June 2001)

NM = Not Measured
NA = Not Available

TABLE 6
Monthly Silo A Spring Flow Measurements and
Ratio of Relative Contribution to Esopus Creek Flow

Belleayre Resort
Alpha Project No. 00109

	1/18/2000		3/2/2000		3/27/2000		4/20/2000		5/22/2000		6/26/2000	
	Flow	Ratio	Flow	Ratio	Flow	Ratio	Flow	Ratio	Flow	Ratio	Flow	Ratio
Silo A	120	0.002	212	0.001	150	0.002	175	0.002	178	0.001	125	0.002
Esopus Creek	50,718		235,187		76,301		107,719		132,854		80,789	

	7/26/2000		8/29/2000		9/28/2000		10/26/2000		11/28/2000		12/27/2000	
	Flow	Ratio	Flow	Ratio	Flow	Ratio	Flow	Ratio	Flow	Ratio	Flow	Ratio
Silo A	104	0.003	98	0.004	87	0.008	86	0.004	87	0.003	139	0.002
Esopus Creek	33,662		24,686		11,220		22,890		29,623		72,710	

	1/30/2001		2/28/2001		3/29/2001		4/25/2001		5/30/2001	
	Flow	Ratio	Flow	Ratio	Flow	Ratio	Flow	Ratio	Flow	Ratio
Silo A	109	0.005	113	0.003	106	0.002	167	0.001	93.5	0.001
Esopus Creek	22,890		38,151		55,206		121,633		66,307	

	6/29/2001		8/30/2001		10/1/2001		11/13/2001		12/14/2001		Average Ratio	
	Flow	Ratio	Flow	Ratio	Flow	Ratio	Flow	Ratio	Flow	Ratio		
Silo A	93	0.004	69.5	0.014	73	0.007	69.3	0.009	79.7	0.003	0.004	n=22
Esopus Creek	25,583		4,937		11,221		7,630		23,788			

Average Ratio During Wet Periods = .0016 (April 2000 through June 2000, December 2000, and April 2001)
Average Ratio During Dry Season Months = .0061 (July 2000 through November 2000, and August 2001 through December 2001)
Average Ratio During Drought Months = 0.01 (August, through November, 2001)

Table 7
Surface Water Temperatures
Manual Readings

Belleayre Resort at Catskill Park
Alpha Project No. 00151-Task 2

LOCATION	10/26/00	11/28/00	12/27/00	1/31/01	2/9/01	2/16/01	2/23/01	2/28/01	3/9/01	3/16/01	3/23/01	3/29/01
CSB Above Birch Cr.	52	40	35	39.2	37.4	39.2	37.4	36.5	36.5	35.6	37.4	35
Birch Cr. Below CSB	54	40	34	37.4	33.8	35.6	33.8	34.7	36.5	35.6	37.4	37
Birch at Covered Bridge	52	42	34	37.4	35.6	35.6	35.6	36.5	36.5	35.6	37.4	34
Birch Cr. at Frisenda	52	41	35	39.2	35.6	37.4	35.6	35.6	37.4	35.6	38.3	36

LOCATION	4/6/01	4/16/01	4/25/01	5/30/01	6/28/01	7/31/01	8/30/01	9/27/01	10/31/01	11/28/01
CSB Above Birch Cr.	43.7	42.8	42	49	56	56	59	53	46	NM
Birch Cr. Below CSB	43.7	42.8	43	49	58	59	60	53	47	NM
Birch at Covered Bridge	43.7	42.8	42	53	63	68	64	55	49	44.6
Birch Cr. at Frisenda	42.8	42.8	46	46	52	62	63	52	50	NM

Notes: CSB = Crystal Spring Brook
All temperatures given in degrees Fahrenheit
NM = Not Measured

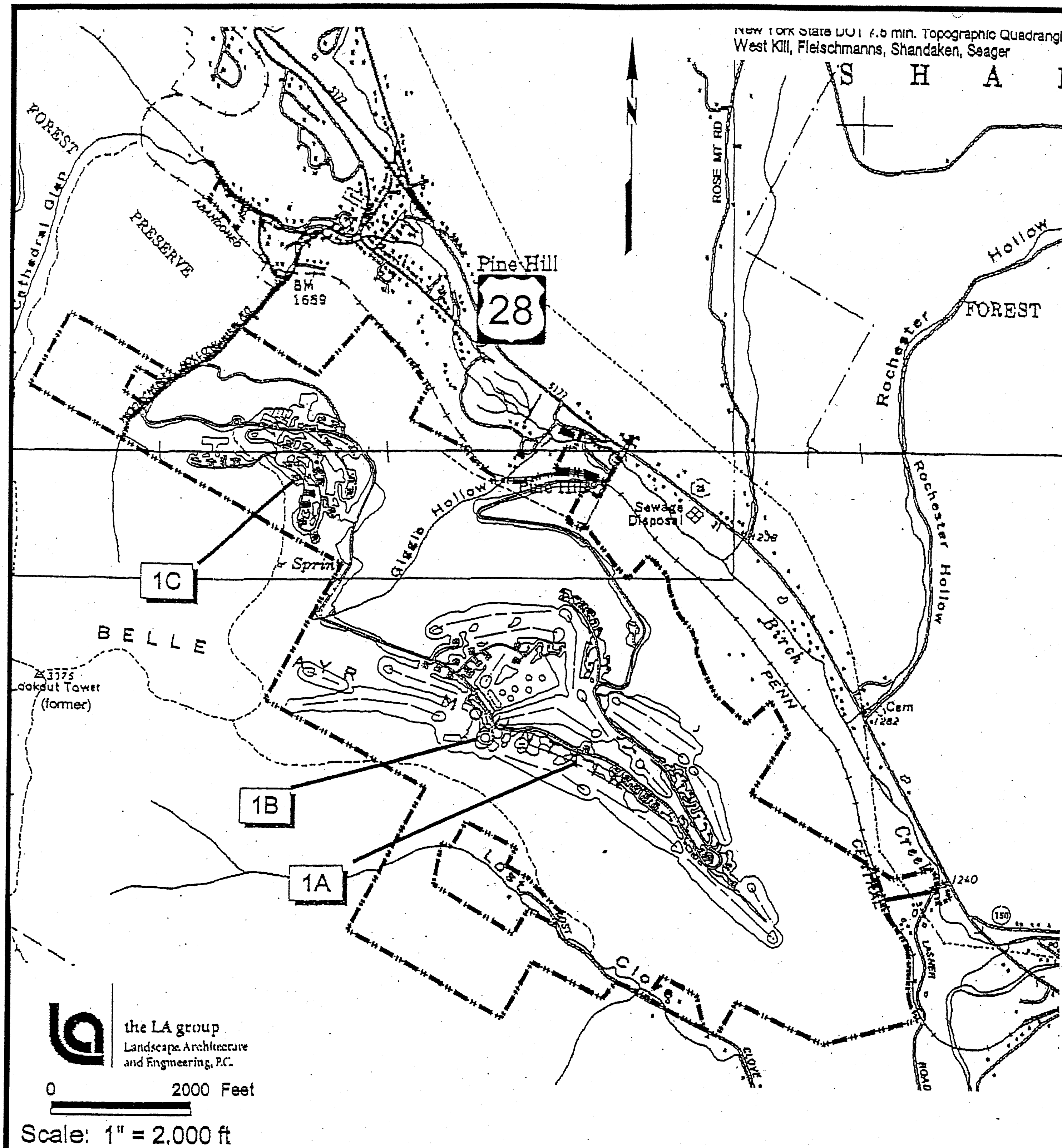
Table 8
Monthly Mean Water Temperatures

Belleayre Resort
Alpha Project No. 00151-Task 2

	September	October	November	December	January	February	March	April	May	June	July	August	September	October	November
Railroad Spring	44.80	45.06	44.65	44.68	44.42	44.22	44.37	44.37	*46.00*	*46.00*	45.64	59.85	53.16	46.81	42.02
Silo B	43.92	44.04	43.93	44.07	43.92	43.92	43.92	43.92	*45.00*	*46.00*	45.27	45.56	45.85	45.58	45.34
CSB Above Birch Creek	--	43.05	40.97	*35.0*	*39.2*	**37.63**	**36.13**	**42.83**	*49.00*	*56.00*	55.60	60.03	54.50	47.87	42.58^{P}
Birch Creek Below CSB	46.81	46.82	40.75	*34.0*	*37.4*	**34.48**	**36.63**	**43.17**	*49.00*	*58.00*	*59.00*	*60.00*	*53.00*	*47.00*	--
Birch Creek at Covered Bridge	51.64	48.68	40.99	*34.0*	*37.4*	**35.83**	**35.88**	**42.83**	51.17	54.89	60.38	60.26	55.64	49.88	45.25^{P}
Birch Creek Below Treatment Plant	50.84	48.84	41.12	33.78	34.01	36.05^{M}	**36.83**	**43.87**	51.53	55.31	60.66	63.92	57.67	49.90	44.06^{P}

Notes:
M - Includes manual and data logger readings in a weighted average.
CSB - Crystal Spring Brook
Bold - Average based on weekly manual readings.
Italics - Average represents one manual measurement.
P - Represents a partial month of data logger readings

FIGURES



LEGEND

1A Big Indian Country Club and Golf Course
1B Big Indian Resort & Spa
1C Belleayre Highlands

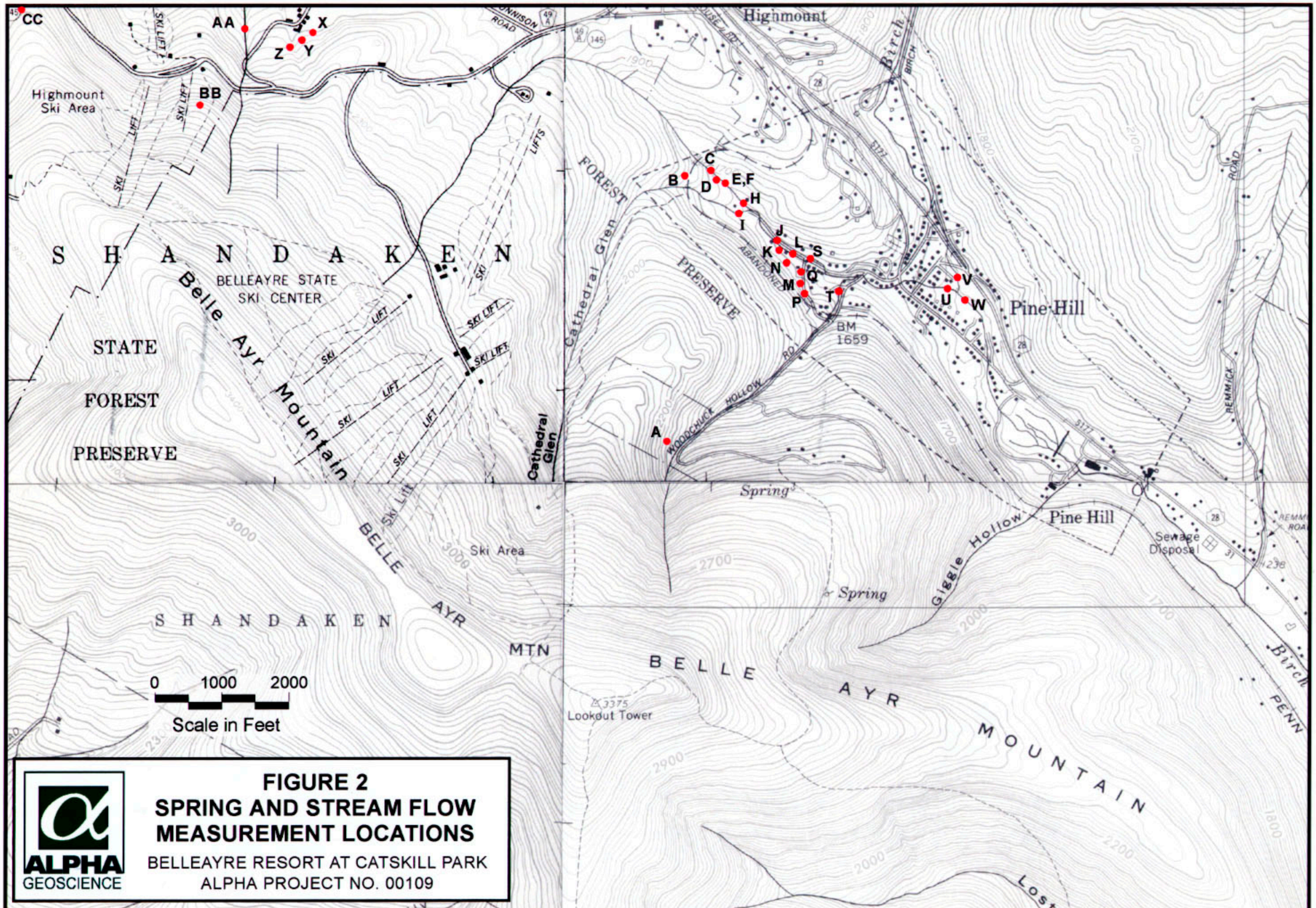
Map adapted from The LA Group, P.C

ALPHA GEOSCIENCE

FIGURE 1
Big Indian Plateau Location Map

Belleayre Resort at Catskill Park
Pine Hill, New York

Alpha Project No. 00163



ALPHA GEOSCIENCE

FIGURE 2
SPRING AND STREAM FLOW MEASUREMENT LOCATIONS
BELLEAYRE RESORT AT CATSKILL PARK
ALPHA PROJECT NO. 00109

LEGEND

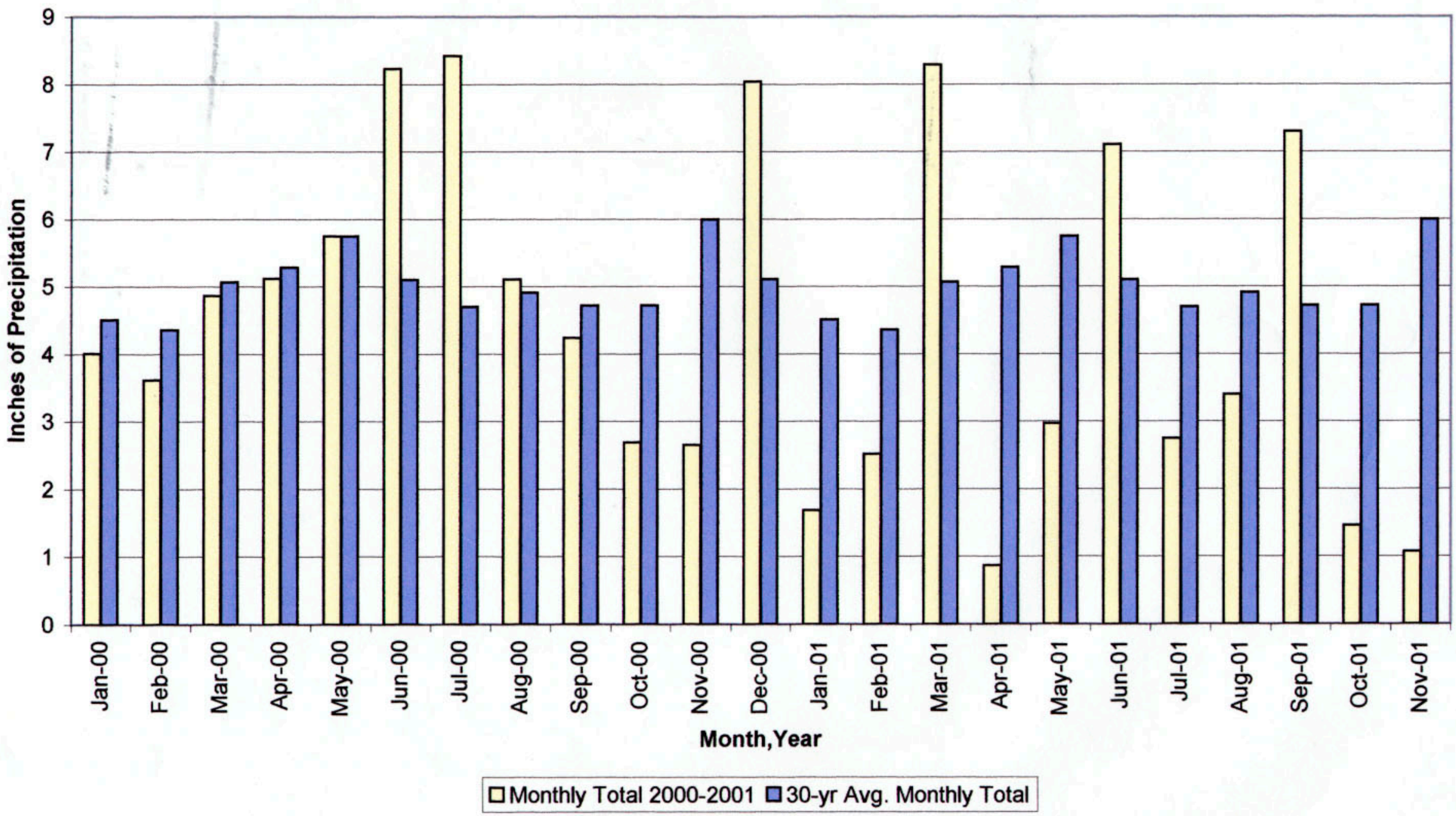
● B LOCATION OF SPRING OR STREAM FLOW MEASUREMENT, WITH IDENTIFICATION

Note: IDs. correspond to Table 1A and 1B

Map References:
The following NYSDOT Quadrangle 7.5 Minute Series Maps: Fleischmanns, Seager, Shandaken, and West Kill.

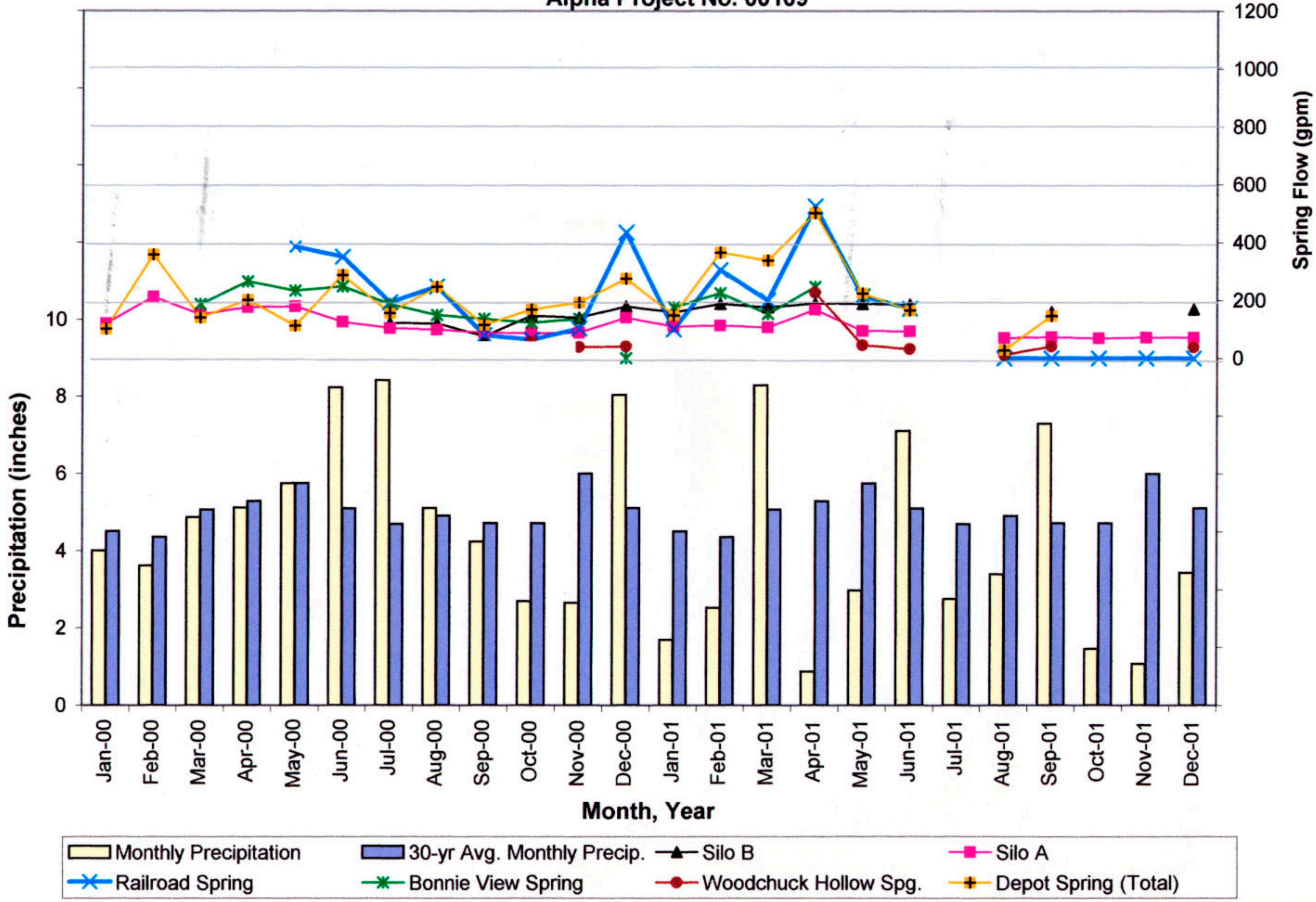
FIGURE 3
Precipitation at Slide Mountain Station, NY ID 307799
January 2000 through November 2001

Belleayre Resort
Alpha Project No. 00109



C:\00109\precip data\Precip Graph

FIGURE 4
Precipitation vs Spring Flow
January 2000 through November 2001
Belleayre Resort
Alpha Project No. 00109



00109\Precip vs Flows(2)\Graph Precip vs Spring Flows

FIGURE 5
Precipitation vs Crystal Spring Brook Flow
January 2000 through November 2001
Belleayre Resort
Alpha Project No. 00109

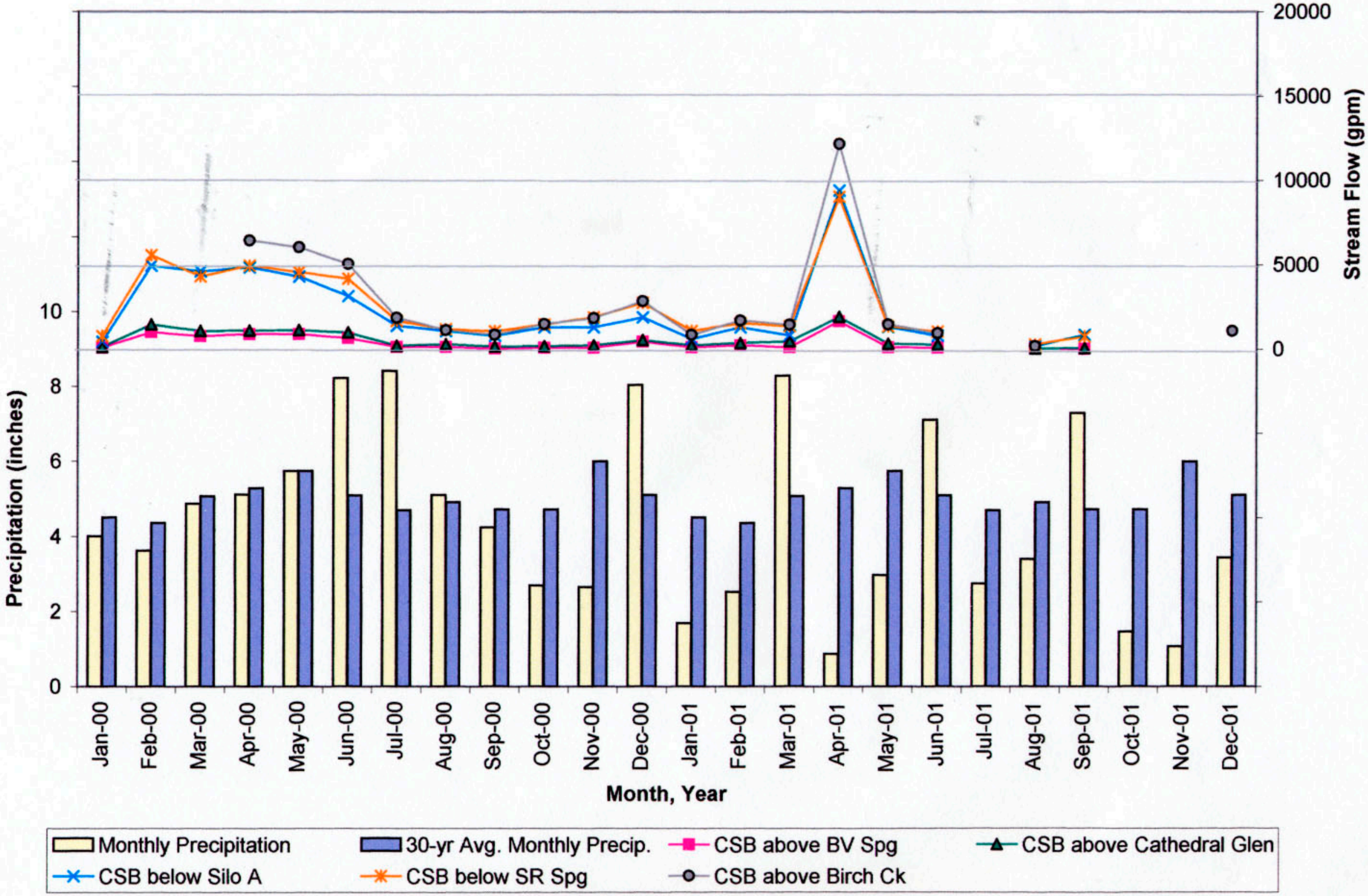
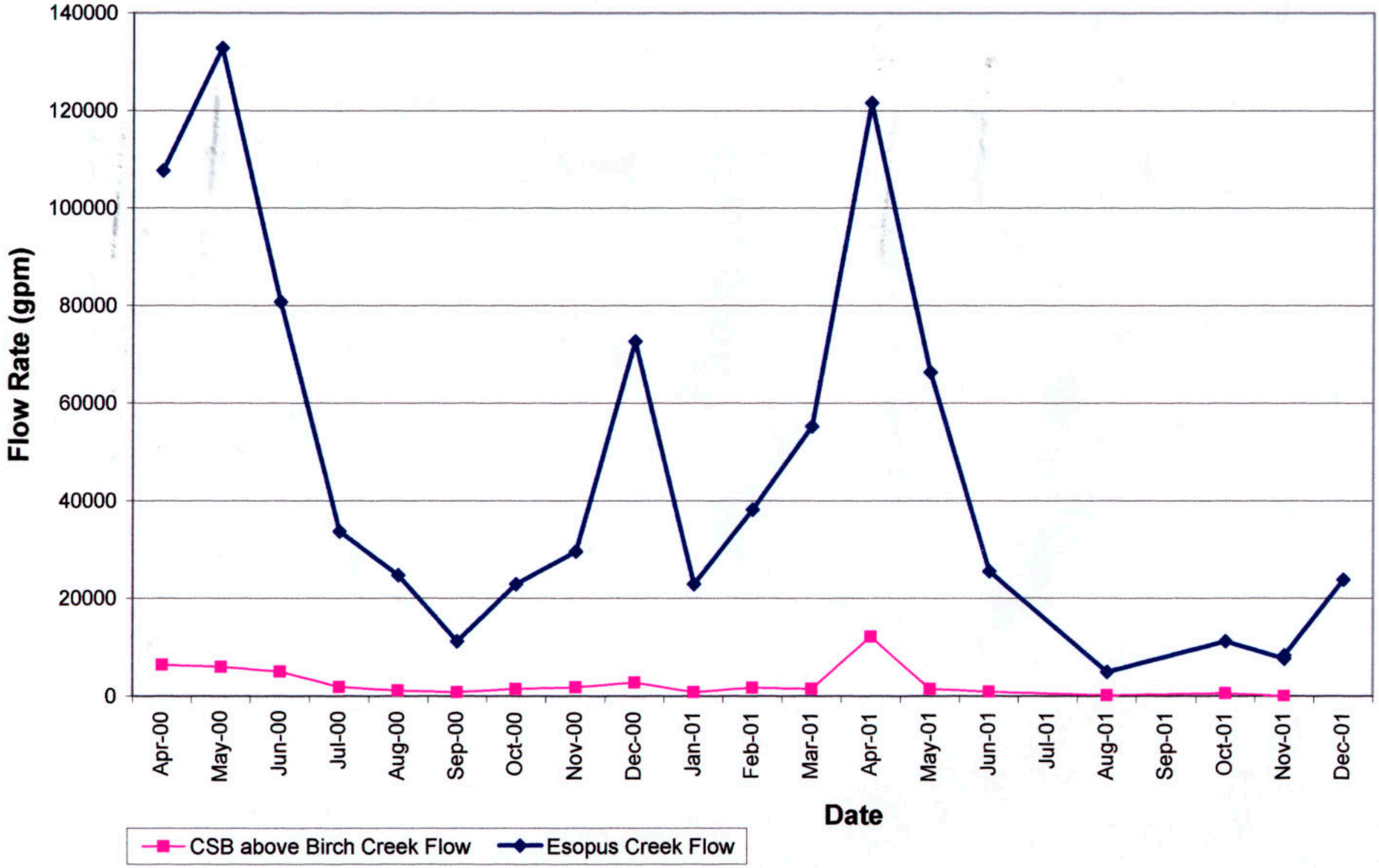


FIGURE 6
CSB Flow vs. Esopus Creek Flow

Belleayre Resort
Alpha Project No. 00109



00109/Flow Contribution Ratios/CSB Esopus ratio vs Esopus

00109-02.CNV

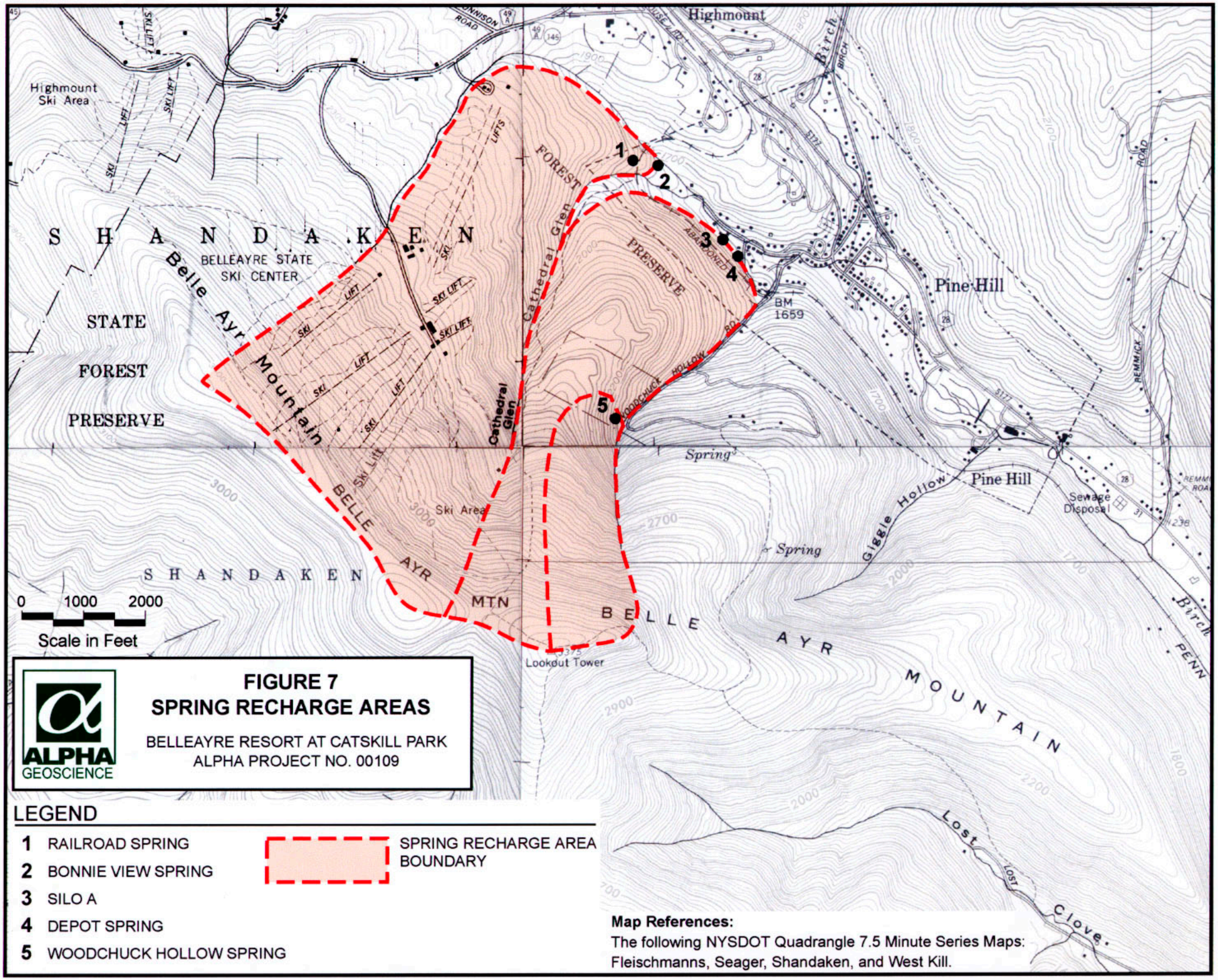


FIGURE 7
SPRING RECHARGE AREAS

BELLEAYRE RESORT AT CATSKILL PARK
ALPHA PROJECT NO. 00109

ALPHA GEOSCIENCE

LEGEND

1 RAILROAD SPRING
2 BONNIE VIEW SPRING
3 SILO A
4 DEPOT SPRING
5 WOODCHUCK HOLLOW SPRING

SPRING RECHARGE AREA BOUNDARY

Map References:
The following NYSDOT Quadrangle 7.5 Minute Series Maps: Fleischmanns, Seager, Shandaken, and West Kill.

00109-02.CNV

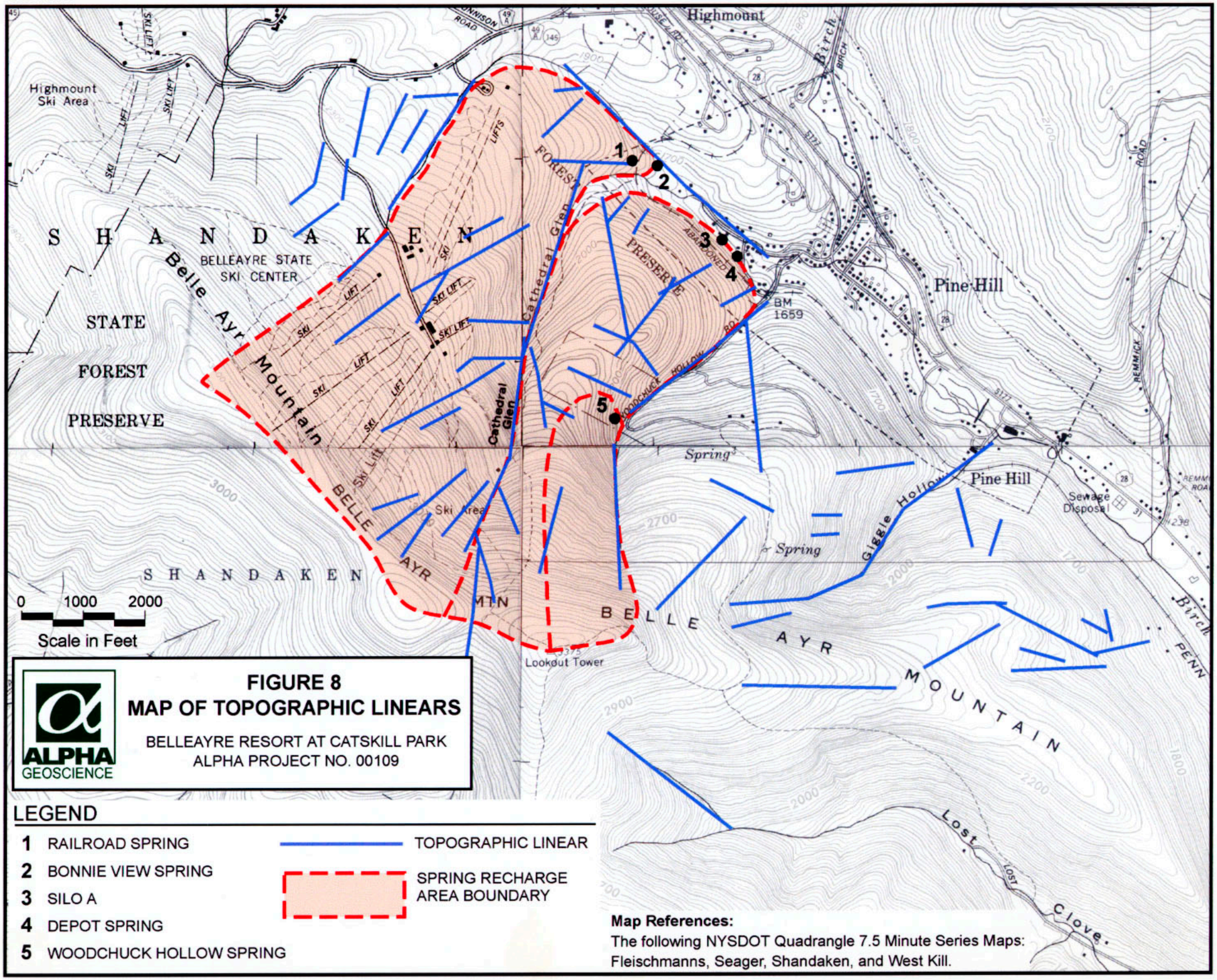


FIGURE 8
MAP OF TOPOGRAPHIC LINEARS

BELLEAYRE RESORT AT CATSKILL PARK
ALPHA PROJECT NO. 00109

LEGEND

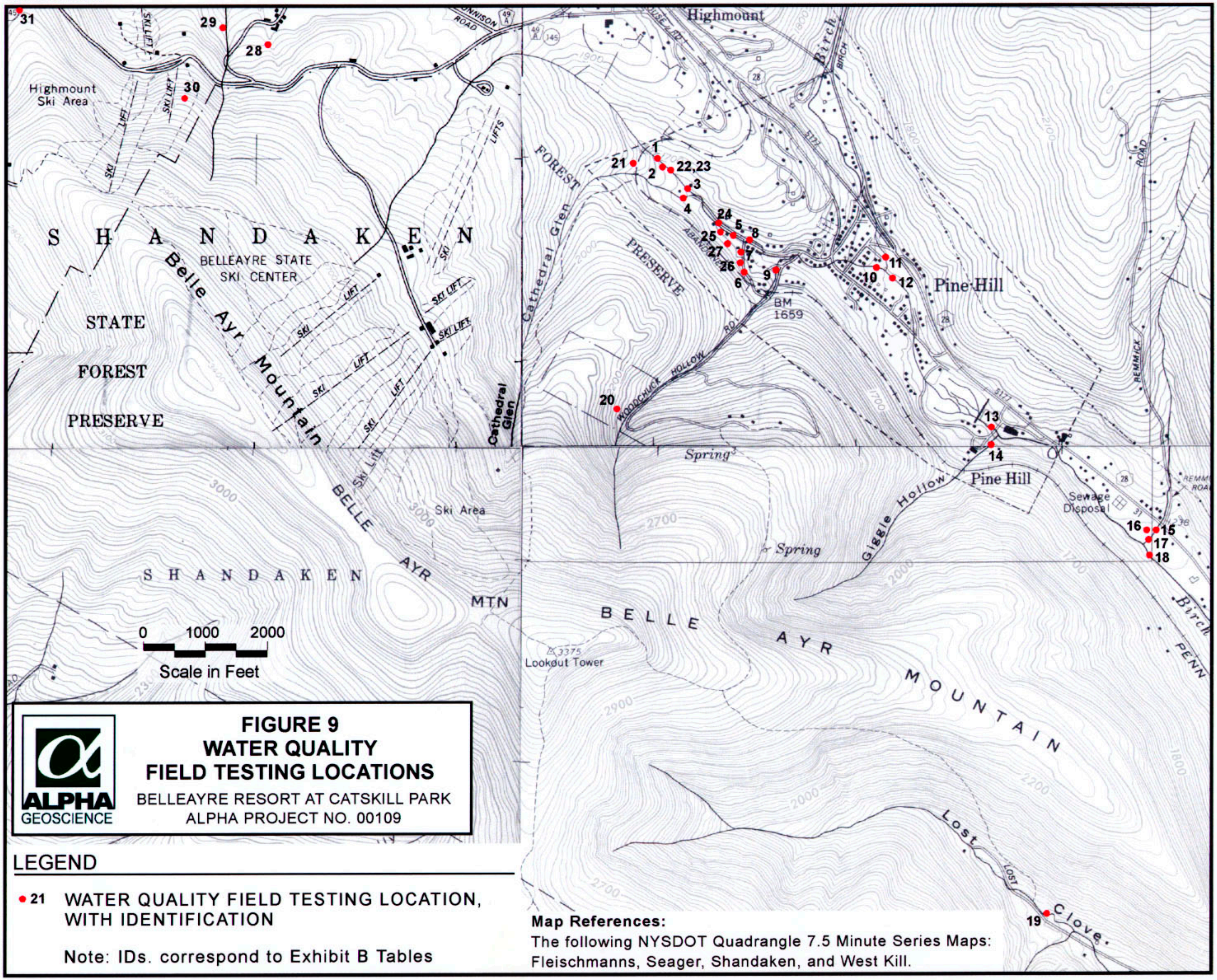
1 RAILROAD SPRING
2 BONNIE VIEW SPRING
3 SILO A
4 DEPOT SPRING
5 WOODCHUCK HOLLOW SPRING

TOPOGRAPHIC LINEAR

SPRING RECHARGE AREA BOUNDARY

Map References:
The following NYSDOT Quadrangle 7.5 Minute Series Maps: Fleischmanns, Seager, Shandaken, and West Kill.

FILE: 00109-03.CNV



ALPHA GEOSCIENCE

FIGURE 9
WATER QUALITY
FIELD TESTING LOCATIONS
BELLEAYRE RESORT AT CATSKILL PARK
ALPHA PROJECT NO. 00109

LEGEND

● 21 WATER QUALITY FIELD TESTING LOCATION, WITH IDENTIFICATION

Note: IDs. correspond to Exhibit B Tables

Map References:
The following NYSDOT Quadrangle 7.5 Minute Series Maps: Fleischmanns, Seager, Shandaken, and West Kill.

FILE: 00109-03.CNV

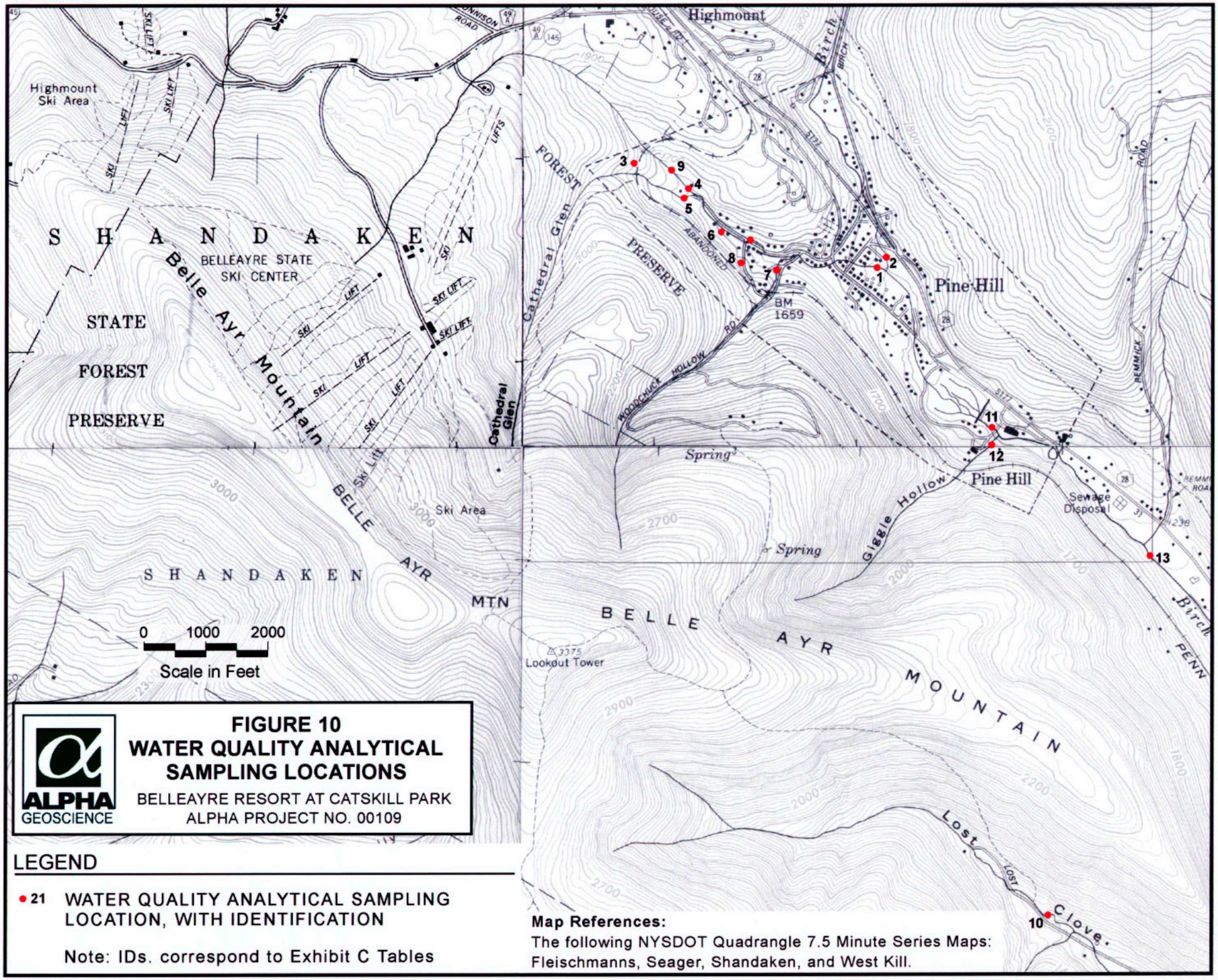


FIGURE 10
WATER QUALITY ANALYTICAL SAMPLING LOCATIONS

ALPHA GEOSCIENCE

BELLEAYRE RESORT AT CATSKILL PARK
ALPHA PROJECT NO. 00109

LEGEND

• 21 WATER QUALITY ANALYTICAL SAMPLING LOCATION, WITH IDENTIFICATION

Note: IDs. correspond to Exhibit C Tables

Map References:
The following NYSDOT Quadrangle 7.5 Minute Series Maps: Fleischmanns, Seager, Shandaken, and West Kill.

EXHIBIT A

Water Budget Analysis

of
Exhibit G，Surface and Groundwater Assessment

for
Big Indian Plateau Water Supply

WATER BUDGET ANALYSIS

Big Indian Plateau
Belleayre Resort at Catskill Park
Pine Hill, New York

Prepared for:

Crossroads Ventures LLC
P O Box 267
Mr. Tremper, New York 12457

December 2, 2002

ALPHA GEOSCIENCE

ALPHA GEOSCIENCE
Geology
Hydrology
Remediation
Water Supply

Water Budget Analysis

Big Indian Plateau
Belleayre Resort at Catskill Park
Pine Hill, New York

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December 2, 2002

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TABLE OF CONTENTS

EXHIBITS

Exhibit A1: Soil Map Unit Areas-Existing Conditions

Exhibit A2: Development Areas-Future Conditions

Exhibit A3: Soil Map Unit Areas-Future Conditions

PLATES

Plate 1 Existing Soils Map

Plate 2 Post-Development Areas and Soils

1.0 INTRODUCTION

This report presents the findings of a water budget analysis that was completed for the Big Indian Plateau portion of the proposed Belleayre Resort at Catskill Park. The work was performed for Crossroads Ventures, L.L.C as part of their assessment of potential environment impacts associated with development of this portion of the overall project site. The portion of the project area is shown on Figure 1 and contains the proposed Big Indian Country Club and Golf Course, Belleayre Highlands, and the Big Indian Resort & Spa. The area covered by the water budget analysis is approximately 1232 acres. The western tip of the site, which consists of that portion of the site west of Woodchuck Hollow Road, was not included since that area will not be developed and is hydrogeologically separated from the main part of the site.

The purpose of the water budget analysis was to estimate the amount of infiltration to the ground water system under existing conditions and under post-development conditions at Big Indian Plateau (project area). This was accomplished by first evaluating the amount of infiltration to the ground water system under existing conditions and then estimating the change in total infiltration that will be brought about as the result of the post-development conditions. The water budget provides a mechanism of estimating infiltration by balancing the amount of precipitation with runoff, percolation to the subsurface and evapotranspiration (evaporation of the ground surface and transpiration by plants). This balance is dependent on those factors such as vegetation cover, soil type and land use which will change when development occurs. The change in pre-development (existing) and post-development infiltration rates was estimated to assess impacts by factoring in modifications to the land by development.

2.0 METHODS

2.1 Existing Conditions

The areas that were analyzed for the existing conditions water budget correspond to the mapped soil areas within the project area provided in the DEIS Section 3.6 and Appendix 12, "Soil Test Results". Plate 1 shows the existing soil types and the mapped units throughout the entire Big Indian Plateau project area. Each of the mapped units were numbered for identification purposes and they are listed in Exhibit A1 with their corresponding soil type and calculated area. The areas of all the mapped units of the same soil type were then summed to arrive at a total area within the project area (Exhibit A1).

Water budget analyses were then completed for each soil type based on climatic data from the Slide Mountain Station and specific soil properties from the DEIS Appendix 12, "Soil Test Results", and the Soil Survey of Greene County, New York (USDA, 1993). The Slide Mt. weather station is the closest weather station to the project area with a thirty-year record of temperature and precipitation. Precipitation at the Slide Mountain station is likely to be more similar to the project area than any other NOAA station due to its proximity, comparable elevation and its similar physiographic setting. It is located 8.7 miles south-southeast of Pine Hill and at an elevation of 2649 feet AMSL. The vast majority of the Big Indian Plateau project area is situated above 2000 feet AMSL.

Information on physical properties of the soils was obtained from neighboring Greene County soil survey because the Ulster County soil survey is out of date. The soil type classifications presented in the DEIS Appendix 12 represent the modern classifications of the soils within the water budget area, therefore, the physical properties of the soil types can be obtained from any of the modern published soil surveys (See DEIS Section 3.6, "Soils" for more information).

The water budget analysis for each soil type within the project area and supporting information are summarized in Tables 1 through Table 11. Some soil types were lumped together for the water budget analysis based on their similar soil properties (e.g., VeC, VeD, and VeF).

2.2 Post-Development Conditions

The areas that were analyzed for the future (post-development) conditions are shown on Plate 2. The entire area to be developed was subdivided into three areas: Area I, Area II, and Area III (Plate 2). Area I consists of the non-wooded Big Indian Country Club golf course and driving range, and the Big Indian Resort & Spa grounds. Area II consists primarily of the non-wooded portions of the Belleayre Highlands, including the roads, buildings and tennis courts. Area III contains the Big Indian

Plateau access road corridor, the maintenance area, the club membership lodging units around the golf course, and the parking area off Lasher Road. The total area for each of development Areas I, II, and III was calculated, as was the total area of roads (asphalt) and buildings within each development area (Exhibit A2).

The future, undeveloped area outside of and not included in Areas I, II, and III comprises the majority of the land within the project area. This area also includes the larger, wooded portions between development Areas I, II, and III. The total area of each soil type outside of the development areas were determined for the post development phase. Some of the numbered, soil map units are expected to be truncated or divided by the proposed development of Areas I, II, and III. The numbering scheme used for the existing conditions soil map units is retained in Plate 2, but modified with additional, identifying numbers where necessary to reflect subdivisions of a particular map unit (e.g., 78 HvD becomes 78 HvD-1, 78 HvD-2, and 78 HvD-3). Some of the soil map units are not expected to have any changes in total area and are indicated by a hatch stippled pattern on Plate 2. The areas of all of the future conditions soil map units are included in Exhibit A3.

The water budget analyses for the future conditions soil types outside of Areas I, II, and III are the same as they were for the existing conditions (Tables 1 through13). Water budget analyses for post-development conditions within each of Areas I, II, and III are summarized in Table 13 through Table 15 and were completed based on climatic data and estimated soil properties. Several other key assumptions for the future, post-development water budget analyses are represented by the following bullets.

- The treated waste water from the proposed fill absorption beds is included as additional infiltration to Areas I, II and III. Delaware Engineering, P.C. (2001) indicates that 16 fill absorption beds are planned for Area I, four fill absorption beds are planned for Area II, and one fill absorption bed is planned for Area III.

- All of the precipitation on the buildings within Area I, excepting the hotel and clubhouse, is assumed to runoff the buildings and onto the soil where it becomes additional precipitation to

Area I. Seventy five percent of the precipitation on the roads and parking lots within Area I is assumed to leave the area as run off and is lost to the system; however, 25% of the precipitation on the Area I asphalt is assumed to stay within Area I and is factored in as additional precipitation to Area I.

- The Big Indian Resort & Spa, namely the hotel and clubhouse, will be constructed as multiple, landscaped, terraces. For water budget purposes, the hotel and clubhouse are included in the portion of Area I that is exclusive of roads and buildings. It is assumed that the roof terraces will act more like typical soil cover within Area I, rather than as typical buildings.

- The top soil that will be used in construction of the Big Indian Country Club golf course and driving range is assumed to be a sandy loam that will have an average thickness of eight inches. The average solum thickness (depth to root base) for these areas is expected to be approximately 12 inches once the course has fully developed.

- Treated waste water from four proposed fill absorption beds that are planned for the undeveloped lands outside Areas I, II, and III (Delaware, 2001) is included as additional infiltration to the affected soil type areas, as appropriate.

- The effects of the three proposed ponds east of the Big Indian Resort & Spa are also included in the water budget analysis. These ponds are assumed to have a silty clay bottom and are assumed to be full throughout the year.

- Irrigation water for the golf course is assumed to primarily originate from the irrigation water supply well R1, which is located outside of, and down gradient of, the project area. This well taps a bedrock aquifer in the Pine Hill valley (Birch Creek valley) and has a total depth of 224 feet. In order to maintain a conservative approach in estimating the potential change in infiltration to the ground water system, the positive effects of irrigation water surcharge on the golf course area (Area I) were not included in the water budget analyses for the post-development conditions (Table 13). The application of irrigation water throughout the golf course, would theoretically meet the soil moisture demand of the grass within the golf course area (Area I); therefore, it is assumed that the irrigation water will be completely removed from the system through evapotranspiration. However, the addition of irrigation water will actually increase the amount of infiltration to the ground water system by negating the soil moisture deficit that normally occurs during the summer months when the golf course would be in full operation. The irrigation water, in reality, will act as a precipitation surcharge with a resulting increase in infiltration throughout the golf course areas. This precipitation surcharge was not included in the water budget analyses for the future conditions.

- Downward infiltration from the irrigation ponds was assumed to be non-existent due to the fact that the bottom of the irrigation pond will likely be covered with a geotextile or a clay liner.

3.0 RESULTS

3.1 Existing Conditions

The water budget analysis performed for the existing conditions indicates that the infiltration rate for the entire area covered by the water budget analysis (1232 acres) is approximately 1153 gallons per minute (gpm), which is equivalent to 0.94 gpm per acre. Table 16 summarizes the annual infiltration by soil type under existing conditions.

3.2 Post-Development Conditions

Table 17 summarizes the annual infiltration estimated for Areas I, II, and III, the ponds, and for each soil type within the future, undeveloped project area. The water budget analysis for the future, post-development conditions indicates that the infiltration rate for the entire area will be approximately 1263 gpm, which is equivalent to 1.03 gpm per acre. This increase (0.09 gpm per acre) with respect to existing conditions, represents a gain of 110 gpm to the ground water system over the entire 1232-acre site. Although the estimated increase in percolation to ground water is a positive characteristic, this change is relatively small when compared to the normal seasonal and yearly climate fluctuations.

The infiltration rate is estimated to be 0.98 gpm per acre without the water-recycling characteristics of the 25 proposed absorption fields that accompany the development.

4.0 CONCLUSIONS

A water budget analysis was completed for the Big Indian Plateau portion of the proposed Belleayre Resort at Catskill Park. The purpose of the water budget analysis was to estimate the amount of infiltration to the ground water system under existing conditions and after peak development of Big Indian Plateau. The results indicate that infiltration to the ground water system for the project area under existing conditions is approximately 0.94 gpm per acre. The results of the water budget completed under future, post-development conditions indicate that infiltration to the ground water system in the project area will be approximately 1.03 gpm per acre. This change indicates that there is an increase in infiltration to the ground water. This equates to a gain of approximately 110 gpm recharge to the ground water system, from the entire 1232-acre site. Infiltration to the ground water system in the project area will be approximately 0.98 gpm per acre without the water-recycling nature of the fill absorption beds. Golf course irrigation, which was considered but not incorporated into the water budget calculations, will have a net effect of an increase in infiltration to the ground water system, resulting in more ground water resources for the study area. The Big Indian Plateau development will not negatively impact the quantity of available water resources in the project area.

E:\projects\2002\02121-02140\02138-BIP Water Budget\Big Indian Plateau Water Budget-revised.wpd

REFERENCES

Broad, William A., 1993, Soil Survey of Greene County, New York, United States Department pf Agriculture, Soil Conservation Service in cooperation with the Cornell University Agricultural Experiment Station, 349 p.

Delaware Engineering, P.C., February 15, 2001, Draft Conceptual Design Report, Belleayre Ridge Wastewater Treatment and Disposal, 15 p.

TABLES

TABLE 1
WATER BUDGET DATA

Big Indian Plateau
Analysis for Soil Types EkC, EkD
Alpha Project No. 02138

	Precip.	PET	Runoff Coeff. (CR)	Runoff (RO) CR x Precip.	Infiltration (INF)	INF-PET	Σ Neg (INF-PET)	Soil Moisture Storage (ST)	Δ ST	AET	PERC
January	4.51	0.00	0.40	1.80	2.71	2.71	0.00	5.32	0.00	0.00	2.71
February	4.36	0.00	0.40	1.74	2.62	2.62	0.00	5.32	0.00	0.00	2.62
March	5.07	0.00	0.40	2.03	3.04	3.04	0.00	5.32	0.00	0.00	3.04
April	5.29	1.01	0.40	2.12	3.17	2.16	0.00	5.32	0.00	1.01	2.16
May	5.75	2.65	0.40	2.30	3.45	0.80	0.00	5.32	0.00	2.65	0.80
June	5.10	3.81	0.40	2.04	3.06	-0.75	-0.75	4.61	-0.71	3.77	0.00
July	4.70	4.61	0.40	1.88	2.82	-1.79	-2.54	3.23	-1.38	4.20	0.00
August	4.91	3.93	0.40	1.96	2.95	-0.98	-3.52	2.64	-0.59	3.54	0.00
September	4.72	2.81	0.40	1.89	2.83	0.02	0.00	2.66	0.02	2.81	0.00
October	4.72	1.43	0.40	1.89	2.83	1.40	0.00	4.06	1.40	1.43	0.00
November	6.00	0.25	0.40	2.40	3.60	3.35	0.00	5.32	1.26	0.25	2.09
December	5.11	0.00	0.40	2.04	3.07	3.07	0.00	5.32	0.00	0.00	3.07

Average Annual Precipitation: 60.24

Note(s):

Total Runoff :	24.10
Total AET:	19.66
Total Percolation:	16.49
	60.24

02138\Existing Water Budget Data-Revised\EkC,EkD

TABLE 2
WATER BUDGET DATA

Big Indian Plateau
Analysis for Soil Type HrF
Alpha Project No. 00163

	Direct HaC Precip.	Add'l HaC Precip due to Runoff from Rock Outcrop	Total Precip. To Halcott (HaC)	PET	Runoff Coeff. (CR)	Runoff (RO) CR x Precip.	Infiltration (INF)	INF-PET	Σ Neg (INF-PET)	Soil Moisture Storage (ST)	Δ ST	AET	PERC
January	4.51	2.25	6.76	0.00	0.40	2.71	4.06	4.06	0.00	1.43	0.00	0.00	4.06
February	4.36	2.18	6.54	0.00	0.40	2.62	3.92	3.92	0.00	1.43	0.00	0.00	3.92
March	5.07	2.53	7.60	0.00	0.40	3.04	4.56	4.56	0.00	1.43	0.00	0.00	4.56
April	5.29	2.64	7.93	1.01	0.40	3.17	4.76	3.75	0.00	1.43	0.00	1.01	3.75
May	5.75	2.87	8.62	2.65	0.40	3.45	5.17	2.52	0.00	1.43	0.00	2.65	2.52
June	5.10	2.55	7.65	3.81	0.40	3.06	4.59	0.78	0.00	1.43	0.00	3.81	0.78
July	4.70	2.35	7.05	4.61	0.40	2.82	4.23	-0.38	-0.38	0.98	-0.45	4.68	0.00
August	4.91	2.45	7.36	3.93	0.40	2.95	4.42	0.49	0.00	1.43	0.45	3.93	0.04
September	4.72	2.36	7.08	2.81	0.40	2.83	4.25	1.44	0.00	1.43	0.00	2.81	1.44
October	4.72	2.36	7.08	1.43	0.40	2.83	4.25	2.82	0.00	1.43	0.00	1.43	2.82
November	6.00	3.00	9.00	0.25	0.40	3.60	5.40	5.15	0.00	1.43	0.00	0.25	5.15
December	5.11	2.55	7.66	0.00	0.40	3.07	4.60	4.60	0.00	1.43	0.00	0.00	4.60

Average Annual Precipitation: 60.24 inches plus run-on from Rock Outcrop (30.12 inches) = 90.36 inches

Runoff :	36.14
Total AET:	20.57
Total Percolation:	33.65
PERC+AET+RUNOFF=	90.36

Note(s):
Total HrF area = 8,662,219 sq ft. , assumed to be 67% Halcott (HaC) and 33% Rock Outcrop.
HaC area = 5,774,812.7 sq ft
Rock Outcrop area = 2,887,406.3 sq ft (assume zero percolation)
Monthly rainfall on Rock Outcrop area assumed to runoff directly to Halcott (HaC) area as additional precipitation to Halcott area

TABLE 3
WATER BUDGET DATA

Big Indian Plateau
Analysis for Soil Type HvD
Alpha Project No. 02138

	Precip.	PET	Runoff Coeff. (CR)	Runoff (RO) CR x Precip.	Infiltration (INF)	INF-PET	Σ Neg (INF-PET)	Soil Moisture Storage (ST)	Δ ST	AET	PERC
January	4.51	0.00	0.40	1.80	2.71	2.71	0.00	1.90	0.00	0.00	2.71
February	4.36	0.00	0.40	1.74	2.62	2.62	0.00	1.90	0.00	0.00	2.62
March	5.07	0.00	0.40	2.03	3.04	3.04	0.00	1.90	0.00	0.00	3.04
April	5.29	1.01	0.40	2.12	3.17	2.16	0.00	1.90	0.00	1.01	2.16
May	5.75	2.65	0.40	2.30	3.45	0.80	0.00	1.90	0.00	2.65	0.80
June	5.10	3.81	0.40	2.04	3.06	-0.75	-0.75	1.22	-0.68	3.74	0.00
July	4.70	4.61	0.40	1.88	2.82	-1.79	-2.54	0.45	-0.77	3.59	0.00
August	4.91	3.93	0.40	1.96	2.95	-0.98	-3.52	0.25	-0.20	3.15	0.00
September	4.72	2.81	0.40	1.89	2.83	0.02	0.00	0.27	0.02	2.81	0.00
October	4.72	1.43	0.40	1.89	2.83	1.40	0.00	1.67	1.40	1.43	0.00
November	6.00	0.25	0.40	2.40	3.60	3.35	0.00	1.90	0.23	0.25	3.12
December	5.11	0.00	0.40	2.04	3.07	3.07	0.00	1.90	0.00	0.00	3.07

Average Annual Precipitation: 60.24

Note(s):

Total Runoff :	24.10
Total AET:	18.63
Total Percolation:	17.52
	60.24

f:\..\00163\Task1\Existing Water Budget Data-Revised\HvD

TABLE 4
WATER BUDGET DATA

Big Indian Plateau
Analysis for Soil Type LeB
Alpha Project No. 02138

	Precip.	PET	Runoff Coeff. (CR)	Runoff (RO) CR x Precip.	Infiltration (INF)	INF-PET	Σ Neg (INF-PET)	Soil Moisture Storage (ST)	Δ ST	AET	PERC
January	4.51	0.00	0.30	1.35	3.16	3.16	0.00	3.20	0.00	0.00	3.16
February	4.36	0.00	0.30	1.31	3.05	3.05	0.00	3.20	0.00	0.00	3.05
March	5.07	0.00	0.30	1.52	3.55	3.55	0.00	3.20	0.00	0.00	3.55
April	5.29	1.01	0.30	1.59	3.70	2.69	0.00	3.20	0.00	1.01	2.69
May	5.75	2.65	0.30	1.73	4.03	1.38	0.00	3.20	0.00	2.65	1.38
June	5.10	3.81	0.30	1.53	3.57	-0.24	-0.24	2.89	-0.24	3.81	0.00
July	4.70	4.61	0.30	1.41	3.29	-1.32	-1.56	1.85	-0.87	4.16	0.00
August	4.91	3.93	0.30	1.47	3.44	-0.49	-2.05	1.56	-0.20	3.64	0.00
September	4.72	2.81	0.30	1.42	3.30	0.49	0.00	2.05	0.49	2.81	0.00
October	4.72	1.43	0.30	1.42	3.30	1.87	0.00	3.20	0.82	1.43	1.05
November	6.00	0.25	0.30	1.80	4.20	3.95	0.00	3.20	0.00	0.25	3.95
December	5.11	0.00	0.30	1.53	3.58	3.58	0.00	3.20	0.00	0.00	3.58

Average Annual Precipitation: 60.24

Note(s):

Total Runoff :	18.07
Total AET:	19.76
Total Percolation:	22.41
	60.24

TABLE 5
WATER BUDGET DATA

Big Indian Plateau
Analysis for Soil Types LeC, LeD
Alpha Project No. 02138

	Precip.	PET	Runoff Coeff. (CR)	Runoff (RO) CR x Precip.	Infiltration (INF)	INF-PET	Σ Neg (INF-PET)	Soil Moisture Storage (ST)	Δ ST	AET	PERC
January	4.51	0.00	0.40	1.80	2.71	2.71	0.00	3.20	0.00	0.00	2.71
February	4.36	0.00	0.40	1.74	2.62	2.62	0.00	3.20	0.00	0.00	2.62
March	5.07	0.00	0.40	2.03	3.04	3.04	0.00	3.20	0.00	0.00	3.04
April	5.29	1.01	0.40	2.12	3.17	2.16	0.00	3.20	0.00	1.01	2.16
May	5.75	2.65	0.40	2.30	3.45	0.80	0.00	3.20	0.00	2.65	0.80
June	5.10	3.81	0.40	2.04	3.06	-0.75	-0.75	2.48	-0.72	3.78	0.00
July	4.70	4.61	0.40	1.88	2.82	-1.79	-2.54	1.34	-1.14	3.96	0.00
August	4.91	3.93	0.40	1.96	2.95	-0.98	-3.52	0.98	-0.36	3.31	0.00
September	4.72	2.81	0.40	1.89	2.83	0.02	0.00	1.00	0.02	2.81	0.00
October	4.72	1.43	0.40	1.89	2.83	1.40	0.00	2.40	1.40	1.43	0.00
November	6.00	0.25	0.40	2.40	3.60	3.35	0.00	3.20	0.80	0.25	2.55
December	5.11	0.00	0.40	2.04	3.07	3.07	0.00	3.20	0.00	0.00	3.07

Average Annual Precipitation: 60.24

Note(s):

Total Runoff :	24.10
Total AET:	19.20
Total Percolation:	16.94
	60.24

02138\Existing Water Budget Data-Revised\LeC,LeD

TABLE 6
WATER BUDGET DATA

Big Indian Plateau
Analysis for Soil Type LeF
Alpha Project No. 00163

	Precip.	PET	Runoff Coeff. (CR)	Runoff (RO) CR x Precip.	Infiltration (INF)	INF-PET	Σ Neg (INF-PET)	Soil Moisture Storage (ST)	Δ ST	AET	PERC
January	4.51	0.00	0.40	1.80	2.71	2.71	0.00	3.60	0.00	0.00	2.71
February	4.36	0.00	0.40	1.74	2.62	2.62	0.00	3.60	0.00	0.00	2.62
March	5.07	0.00	0.40	2.03	3.04	3.04	0.00	3.60	0.00	0.00	3.04
April	5.29	1.01	0.40	2.12	3.17	2.16	0.00	3.60	0.00	1.01	2.16
May	5.75	2.65	0.40	2.30	3.45	0.80	0.00	3.60	0.00	2.65	0.80
June	5.10	3.81	0.40	2.04	3.06	-0.75	-0.75	2.91	-0.69	3.75	0.00
July	4.70	4.61	0.40	1.88	2.82	-1.79	-2.54	1.69	-1.22	4.04	0.00
August	4.91	3.93	0.40	1.96	2.95	-0.98	-3.52	1.30	-0.39	3.34	0.00
September	4.72	2.81	0.40	1.89	2.83	0.02	0.00	1.32	0.02	2.81	0.00
October	4.72	1.43	0.40	1.89	2.83	1.40	0.00	2.72	1.40	1.43	0.00
November	6.00	0.25	0.40	2.40	3.60	3.35	0.00	3.60	0.88	0.25	2.47
December	5.11	0.00	0.40	2.04	3.07	3.07	0.00	3.60	0.00	0.00	3.07

Average Annual Precipitation: 60.24

Note(s):

Total Runoff :	24.10
Total AET:	19.28
Total Percolation:	16.87
	60.24

TABLE 7
WATER BUDGET DATA

Big Indian Plateau
Analysis for Soil Type TkB
Alpha Project No. 00163

	Precip.	PET	Runoff Coeff. (CR)	Runoff (RO) CR x Precip.	Infiltration (INF)	INF-PET	Σ Neg (INF-PET)	Soil Moisture Storage (ST)	Δ ST	AET	PERC
January	4.51	0.00	0.30	1.35	3.16	3.16	0.00	2.88	0.00	0.00	3.16
February	4.36	0.00	0.30	1.31	3.05	3.05	0.00	2.88	0.00	0.00	3.05
March	5.07	0.00	0.30	1.52	3.55	3.55	0.00	2.88	0.00	0.00	3.55
April	5.29	1.01	0.30	1.59	3.70	2.69	0.00	2.88	0.00	1.01	2.69
May	5.75	2.65	0.30	1.73	4.03	1.38	0.00	2.88	0.00	2.65	1.38
June	5.10	3.81	0.30	1.53	3.57	-0.24	-0.24	2.68	-0.20	3.77	0.00
July	4.70	4.61	0.30	1.41	3.29	-1.32	-1.56	1.61	-1.07	4.36	0.00
August	4.91	3.93	0.30	1.47	3.44	-0.49	-2.05	1.34	-0.27	3.71	0.00
September	4.72	2.81	0.30	1.42	3.30	0.49	0.00	1.83	0.49	2.81	0.00
October	4.72	1.43	0.30	1.42	3.30	1.87	0.00	2.88	1.05	1.43	0.82
November	6.00	0.25	0.30	1.80	4.20	3.95	0.00	2.88	0.00	0.25	3.95
December	5.11	0.00	0.30	1.53	3.58	3.58	0.00	2.88	0.00	0.00	3.58

Average Annual Precipitation: 60.24

Note(s):

Total Runoff :	18.07
Total AET:	19.99
Total Percolation:	22.18
	60.24

f:\..|00163\Existing Water Budget Data-Revised\TkB

TABLE 8
WATER BUDGET DATA

Big Indian Plateau
Analysis for Soil Type TkC
Alpha Project No. 00163

	Precip.	PET	Runoff Coeff. (CR)	Runoff (RO) CR x Precip.	Infiltration (INF)	INF-PET	Σ Neg (INF-PET)	Soil Moisture Storage (ST)	Δ ST	AET	PERC
January	4.51	0.00	0.40	1.80	2.71	2.71	0.00	2.88	0.00	0.00	2.71
February	4.36	0.00	0.40	1.74	2.62	2.62	0.00	2.88	0.00	0.00	2.62
March	5.07	0.00	0.40	2.03	3.04	3.04	0.00	2.88	0.00	0.00	3.04
April	5.29	1.01	0.40	2.12	3.17	2.16	0.00	2.88	0.00	1.01	2.16
May	5.75	2.65	0.40	2.30	3.45	0.80	0.00	2.88	0.00	2.65	0.80
June	5.10	3.81	0.40	2.04	3.06	-0.75	-0.75	2.17	-0.71	3.77	0.00
July	4.70	4.61	0.40	1.88	2.82	-1.79	-2.54	1.10	-1.07	3.89	0.00
August	4.91	3.93	0.40	1.96	2.95	-0.98	-3.52	0.79	-0.31	3.26	0.00
September	4.72	2.81	0.40	1.89	2.83	0.02	0.00	0.81	0.02	2.81	0.00
October	4.72	1.43	0.40	1.89	2.83	1.40	0.00	2.21	1.40	1.43	0.00
November	6.00	0.25	0.40	2.40	3.60	3.35	0.00	2.88	0.67	0.25	2.68
December	5.11	0.00	0.40	2.04	3.07	3.07	0.00	2.88	0.00	0.00	3.07

Average Annual Precipitation: 60.24

Note(s):

Total Runoff :	24.10
Total AET:	19.07
Total Percolation:	17.08
	60.24

f:\..\00163\Existing Water Budget Data-Revised\TkC

TABLE 9
WATER BUDGET DATA

Big Indian Plateau
Analysis for Soil Types VeC, VeD, VeF
Alpha Project No. 00163

	Precip.	PET	Runoff Coeff. (CR)	Runoff (RO) CR x Precip.	Infiltration (INF)	INF-PET	Σ Neg (INF-PET)	Soil Moisture Storage (ST)	Δ ST	AET	PERC
January	4.51	0.00	0.40	1.80	2.71	2.71	0.00	3.50	0.00	0.00	2.71
February	4.36	0.00	0.40	1.74	2.62	2.62	0.00	3.50	0.00	0.00	2.62
March	5.07	0.00	0.40	2.03	3.04	3.04	0.00	3.50	0.00	0.00	3.04
April	5.29	1.01	0.40	2.12	3.17	2.16	0.00	3.50	0.00	1.01	2.16
May	5.75	2.65	0.40	2.30	3.45	0.80	0.00	3.50	0.00	2.65	0.80
June	5.10	3.81	0.40	2.04	3.06	-0.75	-0.75	2.78	-0.72	3.78	0.00
July	4.70	4.61	0.40	1.88	2.82	-1.79	-2.54	1.57	-1.21	4.03	0.00
August	4.91	3.93	0.40	1.96	2.95	-0.98	-3.52	0.79	-0.78	3.73	0.00
September	4.72	2.81	0.40	1.89	2.83	0.02	0.00	0.81	0.02	2.81	0.00
October	4.72	1.43	0.40	1.89	2.83	1.40	0.00	2.21	1.40	1.43	0.00
November	6.00	0.25	0.40	2.40	3.60	3.35	0.00	3.50	1.29	0.25	2.06
December	5.11	0.00	0.40	2.04	3.07	3.07	0.00	3.50	0.00	0.00	3.07

Average Annual Precipitation: 60.24

Note(s):

Total Runoff :	24.10
Total AET:	19.69
Total Percolation:	16.46
	60.24

f:\..\00163\Existing Water Budget Data-Revised\VeC, VeD, VeF

TABLE 10
WATER BUDGET DATA

Big Indian Plateau
Analysis for Soil Types VhD, VhF
Alpha Project No. 00163

	Precip.	PET	Runoff Coeff. (CR)	Runoff (RO) CR x Precip.	Infiltration (INF)	INF-PET	Σ Neg (INF-PET)	Soil Moisture Storage (ST)	Δ ST	AET	PERC
January	4.51	0.00	0.40	1.80	2.71	2.71	0.00	2.16	0.00	0.00	2.71
February	4.36	0.00	0.40	1.74	2.62	2.62	0.00	2.16	0.00	0.00	2.62
March	5.07	0.00	0.40	2.03	3.04	3.04	0.00	2.16	0.00	0.00	3.04
April	5.29	1.01	0.40	2.12	3.17	2.16	0.00	2.16	0.00	1.01	2.16
May	5.75	2.65	0.40	2.30	3.45	0.80	0.00	2.16	0.00	2.65	0.80
June	5.10	3.81	0.40	2.04	3.06	-0.75	-0.75	1.48	-0.68	3.74	0.00
July	4.70	4.61	0.40	1.88	2.82	-1.79	-2.54	0.63	-0.85	3.67	0.00
August	4.91	3.93	0.40	1.96	2.95	-0.98	-3.52	0.38	-0.25	3.20	0.00
September	4.72	2.81	0.40	1.89	2.83	0.02	0.00	0.40	0.02	2.81	0.00
October	4.72	1.43	0.40	1.89	2.83	1.40	0.00	1.80	1.40	1.43	0.00
November	6.00	0.25	0.40	2.40	3.60	3.35	0.00	2.16	0.36	0.25	2.99
December	5.11	0.00	0.40	2.04	3.07	3.07	0.00	2.16	0.00	0.00	3.07

Average Annual Precipitation: 60.24

Note(s):

Total Runoff :	24.10
Total AET:	18.76
Total Percolation:	17.39
	60.24

f:\..\00163\Existing Water Budget Data-RevisedVhD,VhF

TABLE 11
WATER BUDGET DATA

Big Indian Plateau
Analysis for Soil Type VyB
Alpha Project No. 00163

	Precip.	PET	Runoff Coeff. (CR)	Runoff (RO) CR x Precip.	Infiltration (INF)	INF-PET	Σ Neg (INF-PET)	Soil Moisture Storage (ST)	Δ ST	AET	PERC
January	4.51	0.00	0.30	1.35	3.16	3.16	0.00	2.40	0.00	0.00	3.16
February	4.36	0.00	0.30	1.31	3.05	3.05	0.00	2.40	0.00	0.00	3.05
March	5.07	0.00	0.30	1.52	3.55	3.55	0.00	2.40	0.00	0.00	3.55
April	5.29	1.01	0.30	1.59	3.70	2.69	0.00	2.40	0.00	1.01	2.69
May	5.75	2.65	0.30	1.73	4.03	1.38	0.00	2.40	0.00	2.65	1.38
June	5.10	3.81	0.30	1.53	3.57	-0.24	-0.24	2.16	-0.24	3.81	0.00
July	4.70	4.61	0.30	1.41	3.29	-1.32	-1.56	1.16	-1.00	4.29	0.00
August	4.91	3.93	0.30	1.47	3.44	-0.49	-2.05	0.94	-0.22	3.66	0.00
September	4.72	2.81	0.30	1.42	3.30	0.49	0.00	1.43	0.49	2.81	0.00
October	4.72	1.43	0.30	1.42	3.30	1.87	0.00	2.40	0.97	1.43	0.90
November	6.00	0.25	0.30	1.80	4.20	3.95	0.00	2.40	0.00	0.25	3.95
December	5.11	0.00	0.30	1.53	3.58	3.58	0.00	2.40	0.00	0.00	3.58

Average Annual Precipitation: 60.24

Note(s):

Total Runoff :	18.07
Total AET:	19.91
Total Percolation:	22.26
	60.24

f:\..\00163\Existing Water Budget Data-Revised\VyB

TABLE 12
WATER BUDGET DATA

Big Indian Plateau
Analysis for Soil Types VyC, VyD
Alpha Project No. 00163

	Precip.	PET	Runoff Coeff. (CR)	Runoff (RO) CR x Precip.	Infiltration (INF)	INF-PET	Σ Neg (INF-PET)	Soil Moisture Storage (ST)	Δ ST	AET	PERC
January	4.51	0.00	0.40	1.80	2.71	2.71	0.00	2.40	0.00	0.00	2.71
February	4.36	0.00	0.40	1.74	2.62	2.62	0.00	2.40	0.00	0.00	2.62
March	5.07	0.00	0.40	2.03	3.04	3.04	0.00	2.40	0.00	0.00	3.04
April	5.29	1.01	0.40	2.12	3.17	2.16	0.00	2.40	0.00	1.01	2.16
May	5.75	2.65	0.40	2.30	3.45	0.80	0.00	2.40	0.00	2.65	0.80
June	5.10	3.81	0.40	2.04	3.06	-0.75	-0.75	1.69	-0.71	3.77	0.00
July	4.70	4.61	0.40	1.88	2.82	-1.79	-2.54	0.75	-0.94	3.76	0.00
August	4.91	3.93	0.40	1.96	2.95	-0.98	-3.52	0.49	-0.26	3.21	0.00
September	4.72	2.81	0.40	1.89	2.83	0.02	0.00	0.51	0.02	2.81	0.00
October	4.72	1.43	0.40	1.89	2.83	1.40	0.00	1.91	1.40	1.43	0.00
November	6.00	0.25	0.40	2.40	3.60	3.35	0.00	2.40	0.49	0.25	2.86
December	5.11	0.00	0.40	2.04	3.07	3.07	0.00	2.40	0.00	0.00	3.07

Average Annual Precipitation: 60.24

Note(s):

Total Runoff :	24.10
Total AET:	18.89
Total Percolation:	17.26
	60.24

f:\..\00163\Existing Water Budget Data-Revised\VyC,VyD

TABLE 13
WATER BUDGET DATA: FUTURE CONDITIONS

Analysis for Soil Type Area I: Golf Course, Driving Range, Hotel
Big Indian Plateau
Alpha Project No. 00163

	Direct Area I Precip.	Add'l Area I Precip due to Runoff from Buildings	Add'l Area I Precip due to Runoff from Asphalt	Total Precip. To Area I	PET	Runoff Coeff. (CR)	Runoff (RO) CR x Precip.	Infiltration (INF)	INF-PET	Σ Neg (INF-PET)	Soil Moisture Storage (ST)	Δ ST	AET	PERC
January	4.51	0.016	0.009	4.54	0.00	0.26	1.18	3.36	3.36	0.00	2.40	0.00	0.00	3.36
February	4.36	0.015	0.009	4.38	0.00	0.26	1.14	3.24	3.24	0.00	2.40	0.00	0.00	3.24
March	5.07	0.018	0.011	5.10	0.00	0.26	1.33	3.77	3.77	0.00	2.40	0.00	0.00	3.77
April	5.29	0.019	0.011	5.32	1.01	0.26	1.38	3.94	2.93	0.00	2.40	0.00	1.01	2.93
May	5.75	0.020	0.012	5.78	2.65	0.26	1.50	4.28	1.63	0.00	2.40	0.00	2.65	1.63
June	5.10	0.018	0.011	5.13	3.81	0.26	1.33	3.80	-0.01	-0.01	2.34	-0.06	3.86	0.00
July	4.70	0.017	0.010	4.73	4.61	0.26	1.23	3.50	-1.11	-1.12	1.42	-0.92	4.42	0.00
August	4.91	0.017	0.010	4.94	3.93	0.26	1.28	3.65	-0.28	-1.40	1.26	-0.16	3.81	0.00
September	4.72	0.017	0.010	4.75	2.81	0.26	1.23	3.51	0.70	0.00	1.96	0.70	2.81	0.00
October	4.72	0.017	0.010	4.75	1.43	0.26	1.23	3.51	2.08	0.00	2.40	0.44	1.43	1.64
November	6.00	0.021	0.012	6.03	0.25	0.26	1.57	4.46	4.21	0.00	2.40	0.00	0.25	4.21
December	5.11	0.018	0.011	5.14	0.00	0.26	1.34	3.80	3.80	0.00	2.40	0.00	0.00	3.80

Average Annual Precipitation: 60.24 inches plus run-on from Buildings(0.214 inches) and asphalt (.125 inches) = 60.58 inches

Runoff :	15.75
Total AET:	20.24
Total Percolation:	24.59
PERC+AET+RUNOFF=	60.58

Note(s):
Total Area I = 7,357,284 sq. ft. (excluding buildings and roads)
Building Area = 26136 sq ft (roofs)
Asphalt Area = 60984 sq ft
Monthly rainfall on Buildings (100%) and asphalt (25%) is assumed to runoff directly to Area I as additional precipitation to Area I
(75% of asphalt runoff considered lost to system)

TABLE 14
WATER BUDGET DATA: FUTURE CONDITIONS

Analysis for Soil Type Area II: Belleayre Highlands Development
Big Indian Plateau
Alpha Project No. 00163

	Precip.	PET	Runoff Coeff. (CR)	Runoff (RO) CR x Precip.	Infiltration (INF)	INF-PET	Σ Neg (INF-PET)	Soil Moisture Storage (ST)	Δ ST	AET	PERC
January	4.51	0.00	0.34	1.53	2.98	2.98	0.00	2.52	0.00	0.00	2.98
February	4.36	0.00	0.34	1.48	2.88	2.88	0.00	2.52	0.00	0.00	2.88
March	5.07	0.00	0.34	1.72	3.35	3.35	0.00	2.52	0.00	0.00	3.35
April	5.29	1.01	0.34	1.80	3.49	2.48	0.00	2.52	0.00	1.01	2.48
May	5.75	2.65	0.34	1.96	3.80	1.15	0.00	2.52	0.00	2.65	1.15
June	5.10	3.81	0.34	1.73	3.37	-0.44	-0.44	2.10	-0.42	3.79	0.00
July	4.70	4.61	0.34	1.60	3.10	-1.51	-1.95	1.08	-1.02	4.12	0.00
August	4.91	3.93	0.34	1.67	3.24	-0.69	-2.64	0.81	-0.27	3.51	0.00
September	4.72	2.81	0.34	1.60	3.12	0.31	0.00	1.12	0.31	2.81	0.00
October	4.72	1.43	0.34	1.60	3.12	1.69	0.00	2.52	1.40	1.43	0.29
November	6.00	0.25	0.34	2.04	3.96	3.71	0.00	2.52	0.00	0.25	3.71
December	5.11	0.00	0.34	1.74	3.37	3.37	0.00	2.52	0.00	0.00	3.37

Average Annual Precipitation: 60.24

Note(s):

Total Runoff :	20.48
Total AET:	19.57
Total Percolation:	20.19
	60.24

c:\..\00163\Task1\Future Water Budget Data\AREA II

TABLE 15
WATER BUDGET DATA: FUTURE CONDITIONS

Analysis for Soil Type Area III: Big Indian Plateau Development
Big Indian Plateau
Alpha Project No. 00163

	Precip.	PET	Runoff Coeff. (CR)	Runoff (RO) CR x Precip.	Infiltration (INF)	INF-PET	Σ Neg (INF-PET)	Soil Moisture Storage (ST)	Δ ST	AET	PERC
January	4.51	0.00	0.41	1.85	2.66	2.66	0.00	2.52	0.00	0.00	2.66
February	4.36	0.00	0.41	1.79	2.57	2.57	0.00	2.52	0.00	0.00	2.57
March	5.07	0.00	0.41	2.08	2.99	2.99	0.00	2.52	0.00	0.00	2.99
April	5.29	1.01	0.41	2.17	3.12	2.11	0.00	2.52	0.00	1.01	2.11
May	5.75	2.65	0.41	2.36	3.39	0.74	0.00	2.52	0.00	2.65	0.74
June	5.10	3.81	0.41	2.09	3.01	-0.80	-0.80	1.79	-0.73	3.74	0.00
July	4.70	4.61	0.41	1.93	2.77	-1.84	-2.64	0.81	-0.98	3.75	0.00
August	4.91	3.93	0.41	2.01	2.90	-1.03	-3.67	0.53	-0.28	3.18	0.00
September	4.72	2.81	0.41	1.94	2.78	-0.03	-3.70	0.51	-0.02	2.80	0.00
October	4.72	1.43	0.41	1.94	2.78	1.35	0.00	1.86	1.35	1.43	0.00
November	6.00	0.25	0.41	2.46	3.54	3.29	0.00	2.52	0.66	0.25	2.63
December	5.11	0.00	0.41	2.10	3.01	3.01	0.00	2.52	0.00	0.00	3.01

Average Annual Precipitation: 60.24

Note(s):

Total Runoff :	24.70
Total AET:	18.82
Total Percolation:	16.72
	60.24

TABLE 16
Water Contributions by Soil Type
Existing Conditions

Big Indian Plateau
Alpha Project No. 02138

Soil Type	% of Project Area	Acreage	Percolation Rate (in/yr)	Total Perc. Rate (gpm)	gpm/acre
EkC, EkD	0.004	4.6	16.49	3.9	0.85
HrF (rock outcrop)	0.054	66.4	---	---	---
HrF (HaC)	0.108	132.5	33.65	230.3	1.74
HvD	0.033	40.9	17.52	37.0	0.91
LeB	0.004	4.4	22.41	5.1	1.16
LeC, LeD	0.055	67.1	16.94	58.7	0.88
LeF	0.204	251.5	16.87	219.2	0.87
TkB	0.016	20.0	22.18	22.9	1.15
TkC	0.004	5.0	17.08	4.5	0.88
VeC, VeD, VeF	0.149	183.7	16.46	156.2	0.85
VhD, VhF	0.284	349.6	17.39	314.1	0.90
VyB	0.021	25.5	22.26	29.3	1.15
VyC, VyD	0.065	80.5	17.26	71.8	0.89
	1.000	1231.8		1153.0	

Percolation rate for Total Project Area = 0.94 gpm/acre

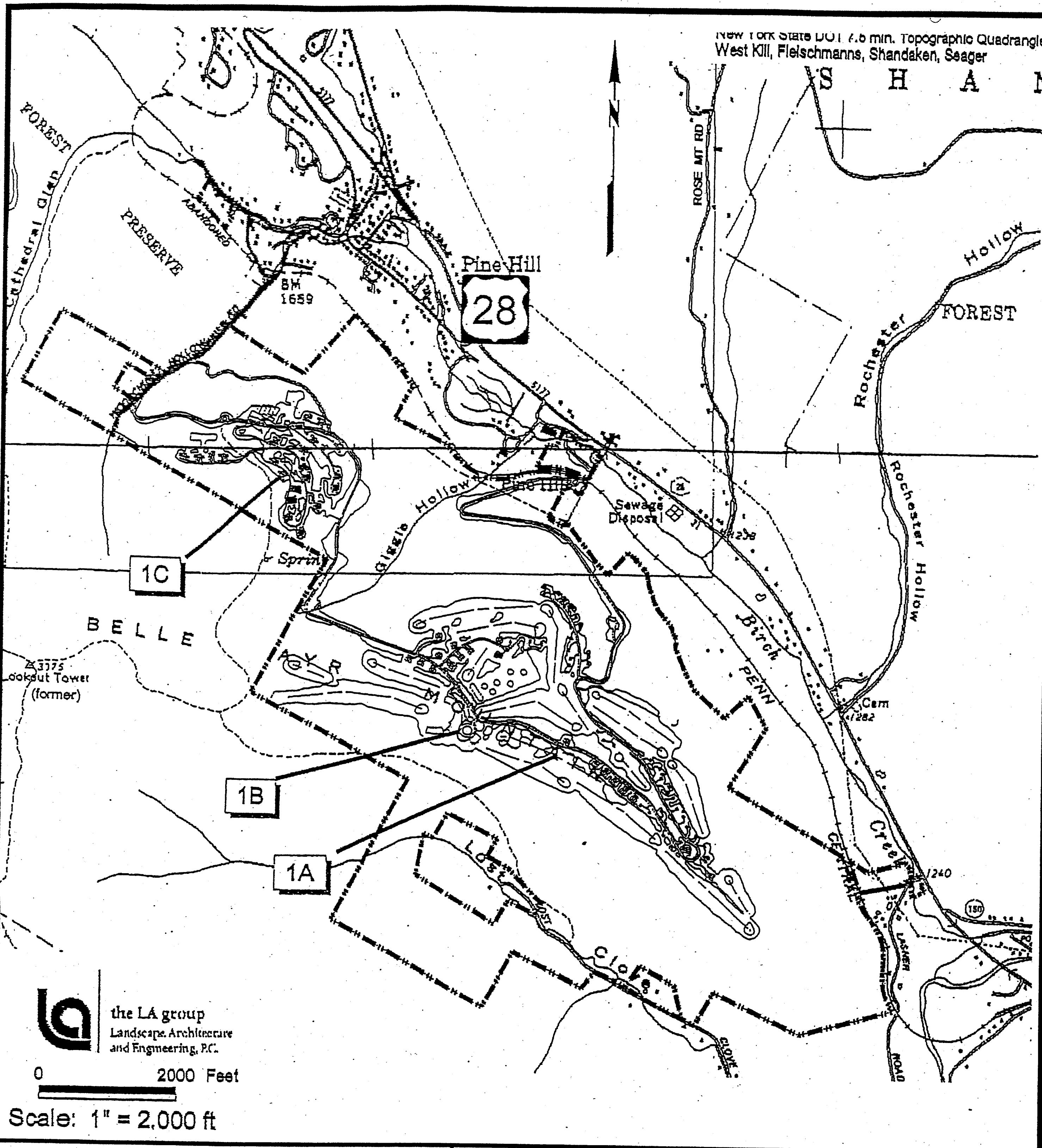
TABLE 17
Water Contributions by Soil Type
Future Conditions

Big Indian Plateau
Alpha Project No. 02138

Soil Type	% of Project Area	Acreage	Percolation Rate (in/yr)	Total Perc. Rate (gpm)	Treated Waste-water (gpm)	Total Perc Rate Plus Treated Wastewater (gpm)	gpm/acre	REMARKS
EkC, EkD	0.003	3.4	16.49	2.9		2.9	0.85	
HrF (rock outcrop)	0.044	54.1	---	---	---	---	---	
HrF (HaC)	0.088	108.2	33.65	188.1	---	188.4	1.74	
HvD	0.019	23.5	17.52	21.3	5.4	26.7	1.13	2 1/3 absorption beds in HvD
LeB	0.000	0.0	22.41	0.0	---	0.0	0.00	
LeC, LeD	0.014	16.7	16.94	14.6	---	14.6	0.87	
LeF	0.198	243.9	16.87	212.6	---	212.6	0.87	
TkB	0.015	18.0	22.18	20.6	---	20.6	1.14	
TkC	0.004	5.1	17.08	4.5	---	4.5	0.89	
VeC, VeD, VeF	0.137	168.1	16.46	142.9	---	142.9	0.85	
VhD, VhF	0.216	265.8	17.39	238.8	0.7	239.5	0.90	1 absorption bed in VhF
VyB	0.001	1.5	22.26	1.7	---	1.7	1.13	
VyC, VyD	0.018	21.7	17.26	19.3	1.5	20.8	0.96	2/3 absorption beds in VyC
Area I	0.135	166.5	24.59	211.5	41.7	253.2	1.52	16 absorption beds-Area I
Area II	0.061	75.0	20.19	78.2	9.6	87.8	1.17	4 absorption beds-Area II
Area III	0.044	54.2	16.72	46.8	0.1	46.9	0.87	1 absorption bed-Area III
buildings (Area I)	0.000	0.6	---	---	---	---	---	
asphalt (Area I)	0.001	1.4	---	---	---	---	---	
ponds	0.003	3.8	0	0.0	---	0.0	0.0	assume no infiltration beneath ponds
	1.000	1231.5		1203.9		1263.2		

Future Percolation rate for Total Project Area , with absorption fields = 1.03 gpm/acre
Future Percolation rate for Total Project Area , without absorption fields = 0.98 gpm/acre

FIGURE 1



Scale: 1" = 2,000 ft

LEGEND

1A Big Indian Country Club and Golf Course
1B Big Indian Resort & Spa
1C Belleayre Highlands

Map adapted from The LA Group, P.C

ALPHA GEOSCIENCE

FIGURE 1
Big Indian Plateau Location Map

Belleayre Resort at Catskill Park
Pine Hill, New York

Alpha Project No. 00163

EXHIBIT A1

Soil Map Unit Areas- Existing Conditions

of
Exhibit A, Water Budget Analysis

of
Exhibit G, Surface and Groundwater Assessment

for
Big Indian Plateau Water Supply

EXHIBIT A1

Soil Map Unit Areas-Existing Conditions
Big Indian Plateau Water Budget
Alpha Project No. 02138

Area ID	Soil Type	Total Area (ft2)
115	EkC	35,089
Total	**EkC**	**35,089**

Area ID	Soil Type	Total Area (ft2)
63	EkD	121,491
66	EkD	42,444
Total	**EkB**	**163,935**

Area ID	Soil Type	Total Area (ft2)
8	HrF	313026
9	HrF	832,643
10	HrF	10,181
39	HrF	2,813,010
40	HrF	270,285
41	HrF	850,855
42	HrF	796,032
43	HrF	263,363
44	HrF	149,075
45	HrF	645,980
46	HrF	833,590
47	HrF	670,050
48	HrF	59,093
49	HrF	155,036
Total	**HrF**	**8,662,219**

Area ID	Soil Type	Total Area (ft2)
74	HvD	40,990
75	HvD	123,856
76	HvD	201,996
78	HvD	160,135
79	HvD	77,418
80	HvD	1,174,228
Total	**HvD**	**1,778,623**

Area ID	Soil Type	Total Area (ft2)
68	LeB	131,292
83	LeB	28,984
85	LeB	31,042
Total	**LeB**	**191,318**

Area ID	Soil Type	Total Area (ft2)
67	LeC	273,119
103	LeC	162,472
104	LeC	106,329
106	LeC	298,352
108	LeC	41,348
117	LeC	2,789
121	LeC	186,165
Total	**LeC**	**1,070,574**

Area ID	Soil Type	Total Area (ft2)
7	LeD	914,862
81	LeD	103,618
116	LeD	139,849
119	LeD	377,442
122	LeD	314,757
Total	**LeD**	**1,850,528**

Area ID	Soil Type	Total Area (ft2)
24	LeF	872,126
25	LeF	122,169
26	LeF	1,350,184
27	LeF	1,770,285
28	LeF	16,942
29	LeF	2,295,035
30	LeF	1,174,601
31	LeF	3,353,129
Total	**LeF**	**10,954,471**

Area ID	Soil Type	Total Area (ft2)
36	TkB	159,207
37	TkB	97,452
38	TkB	613,494
Total	**TkB**	**870,153**

Area ID	Soil Type	Total Area (ft2)
32	TkC	56,897
33	TkC	69,452
34	TkC	82,806
35	TkC	10,996
Total	**TkC**	**220,151**

Area ID	Soil Type	Total Area (ft2)
72	VeC	17,785
73	VeC	303,306
Total	**VeC**	**321,091**

Area ID	Soil Type	Total Area (ft2)
62	VeD	413,936
64	VeD	297,858
65	VeD	64,291
Total	**VeD**	**776,085**

Area ID	Soil Type	Total Area (ft2)
69	VeF	5,852,186
70	VeF	178,378
71	VeF	877,904
Total	**VeF**	**6,908,468**

EXHIBIT A1

Soil Map Unit Areas-Existing Conditions
Big Indian Plateau Water Budget
Alpha Project No. 02138

Area ID	Soil Type	Total Area (ft2)
50	VhD	85,343
51	VhD	245,762
52	VhD	11,740
53	VhD	149,545
54	VhD	491,430
55	VhD	87,575
56	VhD	874,544
57	VhD	108,318
58	VhD	127,398
59	VhD	103,513
60	VhD	160,231
61	VhD	193,021
77	VhD	203,425
113	VhD	741,172
114	VhD	791,586
Total	**VhD**	**4,374,603**

Area ID	Soil Type	Total Area (ft2)
11	VhF	1,363,575
12	VhF	426,446
13	VhF	1,680
14	VhF	334,698
15	VhF	284,736
16	VhF	61,153
17	VhF	217,432
18	VhF	125,461
19	VhF	4,860,762
20	VhF	1,623,344
21	VhF	200,409
22	VhF	675,787
23	VhF	677,936
Total	**VhF**	**10,853,419**

Area ID	Soil Type	Total Area (ft2)
82	VyB	55,628
84	VyB	119,049
86	VyB	40,886
87	VyB	40,374
88	VyB	78,455
89	VyB	48,693
90	VyB	81,977
91	VyB	642,737
Total	**VyB**	**1,107,799**

Area ID	Soil Type	Total Area (ft2)
92	VyC	115,527
93	VyC	55,352
94	VyC	42,529
95	VyC	33,937
96	VyC	82,367
97	VyC	32,951
98	VyC	212,928
99	VyC	96,515
100	VyC	114,116
101	VyC	13,139
102	VyC	102,671
105	VyC	234,120
107	VyC	244,164
109	VyC	79,892
110	VyC	62,602
111	VyC	103,994
112	VyC	68,152
118	VyC	17,260
Total	**VyC**	**1,712,216**

Area ID	Soil Type	Total Area (ft2)
1	VyD	62,884
2	VyD	205,193
3	VyD	70,487
4	VyD	216,063
5	VyD	792,005
6	VyD	346,700
120	VyD	100,441
Total	**VyD**	**1,793,773**

Total of all Soil Map Unit Areas = 53,644,515 sq ft (1231.5 acres)

EXHIBIT A2

Development Areas-Future Conditions

of
Exhibit A, Water Budget Analysis

of
Exhibit G, Surface and Groundwater Assessment

for
Big Indian Plateau Water Supply

EXHIBIT A2

Development Areas-Future Conditions
Big Indian Plateau Water Budget
Alpha Project No. 02138

Area ID	Acreage	
Area I Golf & Hotel	**166.5**	
Area I Buildings	**0.6**	
Area I Roads/Parking	**1.4**	
Area II	**75**	
Buildings		5
Roads/Parking/Tennis		12.4
Non-Wooded (grassy)		57.6
Area III	**54.2**	
Buildings		2.3
Roads/Parking		13.5
Non-Wooded (grassy)		38.4
Ponds	**3.8**	
Total Development Area=	**301.5**	

EXHIBIT A3

Soil Map Unit Areas - Future Conditions

of
Exhibit A, Water Budget Analysis

of
Exhibit G, Surface and Groundwater Assessment

for
Big Indian Plateau Water Supply

EXHIBIT A3

Soil Map Unit Areas-Future Conditions
Big Indian Plateau Water Budget
Alpha Project No. 02138

italics =change from existing conditions

Area ID	Soil Type	Total Area (ft^2)
115	*EkC*	*34,035*
Total	**EkC**	**34,035**

Area ID	Soil Type	Total Area (ft^2)
63	*EkD-1*	*28,192*
	EkD-2	*5,715*
	EkD-3	*41,347*
66	*EkD-1*	*30,731*
	EkD-2	*6,359*
Total	**EkD**	**112,344**

Area ID	Soil Type	Total Area (ft^2)
8	HrF	313,026
9	*HrF-1*	*181,166*
	HrF-2	*80,516*
	HrF-3	*7,187*
	HrF-4	*28,954*
	HrF-5	*29,847*
	HrF-6	*1,416*
	HrF-7	*14,671*
	HrF-8	*31,899*
	HrF-9	*46,043*
	HrF-10	*409*
10	HrF	10,181
39	HrF	2,813,010
40	*HrF*	*210,765*
41	*HrF*	*826,218*
42	*HrF-1*	*950*
	HrF-2	*18,317*
43	HrF	263,363
44	HrF	149,075
45	HrF	645,980
46	*HrF-1*	*129,757*
	HrF-2	*2,988*
	HrF-3	*521,627*
47	*HrF-1*	*430,803*
	HrF-2	*100,279*
48	HrF	59,093
49	HrF	155,036
Total	**HrF**	**7,072,576**

Area ID	Soil Type	Total Area (ft^2)
74	*HvD*	*14,723*
75	HvD	123,856
76	HvD	201,996
78	*HvD-1*	*4,134*
	HvD-2	*69,818*
	HvD-3	*1,472*
79	*HvD*	*0*
80	*HvD-2*	*19,419*
	HvD-3	*10,550*
	HvD-4	*344*
	HvD-5	*800*
	HvD-6	*2,762*
	HvD-7	*43,708*
	HvD-8	*6,177*
	HvD-9	*35,850*
	HvD-10	*55,182*
	HvD-11	*15,407*
	HvD-12	*3,354*
	HvD-13	*405,857*
	HvD-14	*2,012*
	HvD-15	*4,247*
	HvD-16	*248*
Total	**HvD**	**1,021,916**

Area ID	Soil Type	Total Area (ft^2)
68	*LeB*	*0*
83	*LeB*	*0*
85	*LeB*	*0*
Total	**LeB**	**0**

Area ID	Soil Type	Total Area (ft^2)
67	*LeC*	*0*
103	*LeC*	*3,284*
104	*LeC*	*183*
106	*LeC*	*105,228*
108	*LeC*	*0*
117	*LeC*	*0*
121	*LeC*	*0*
Total	**LeC**	**108,695**

EXHIBIT A3

Soil Map Unit Areas-Future Conditions
Belleayre Resort Water Budget
Alpha Project No. 00163

italics =change from existing conditions

Area ID	Soil Type	Total Area (ft^2)
7	*LeD-1*	*1,024*
	LeD-2	*8,795*
	LeD-3	*407,438*
81	*LeD-1*	*19,632*
	LeD-2	*45,198*
116	*LeD-1*	*90,932*
	LeD-2	*5,400*
119	*LeD-1*	*3,507*
	LeD-2	*12,388*
122	*LeD-1*	*4,674*
	LeD-2	*18,683*
Total	**LeD**	**617,671**

Area ID	Soil Type	Total Area (ft^2)
24	*LeF-1*	*1,773*
	LeF-2	*13,220*
	LeF-3	*806,909*
25	LeF	122,169
26	*LeF-1*	*441,363*
	LeF-2	*595,400*
	LeF-3	*33,093*
	LeF-4	*510*
27	LeF	1,770,285
28	LeF	16,942
29	LeF	2,295,035
30	LeF	1,174,601
31	LeF	3,353,129
Total	**LeF**	**10,624,429**

Area ID	Soil Type	Total Area (ft^2)
36	*TkB*	*91,340*
37	*TkB-1*	*29,523*
	TkB-2	*50,932*
38	TkB	613,494
Total	**TkB**	**785,289**

Area ID	Soil Type	Total Area (ft^2)
32	TkC	56,897
33	TkC	69,452
34	TkC	82,806
35	TkC	10,996
Total	**TkC**	**220,151**

Area ID	Soil Type	Total Area (ft^2)
72	VeC	17,785
73	VeC	303,306
Total	**VeC**	**321,091**

Area ID	Soil Type	Total Area (ft^2)
62	*VeD*	*413,132*
64	VeD	297,858
65	VeD	64,291
Total	**VeD**	**775,281**

Area ID	Soil Type	Total Area (ft^2)
69	*VeF-1*	*1,423,785*
	VeF-2	*3,178,734*
	VeF-3	*576,164*
	VeF-4	9,518
	VeF-5	57,159
70	*VeF-1*	*59,546*
	VeF-2	*37,638*
	VeF-3	*2,892*
71	VeF	877,904
Total	**VeF**	**6,223,340**

Area ID	Soil Type	Total Area (ft^2)
50	VhD	85,343
51	VhD	245,762
52	VhD	11,740
53	VhD	149,545
54	*VhD-1*	*328,375*
	VhD-2	*3,006*
	VhD-3	*49,117*
55	*VhD-1*	*39,596*
56	*VhD-1*	*21,750*
	VhD-2	*2,256*
	VhD-3	*3,311*
	VhD-4	*4,086*
	VhD-5	*145,408*
	VhD-6	*101,499*
	VhD-7	*3,694*
57	VhD	108,318
58	*VhD-1*	*0*
59	*VhD*	*0*
60	VhD	160,231
61	*VhD*	*167,980*
77	*VhD*	*989*
	VhD	*82,259*
	VhD	*1,721*
113	*VhD-1*	*188,627*
	VhD-2	*54,905*
	VhD-3	*68,694*
114	*VhD-1*	*30,727*
	VhD-2	*47,537*
	VhD-3	*7,693*
	VhD-4	*453*
Total	**VhD**	**2,114,622**

EXHIBIT A3

Soil Map Unit Areas-Future Conditions
Belleayre Resort Water Budget
Alpha Project No. 00163

italics =change from existing conditions

Area ID	Soil Type	Total Area (ft²)
11	*VhF-1*	*805,119*
	VhF-2	*37,309*
	VhF-3	*321,338*
12	*VhF*	*378,497*
13	VhF	1,680
14	*VhF*	*330,192*
15	*VhF*	*261,695*
16	VhF	61,153
17	*VhF*	*192,153*
18	*VhF*	*16,156*
19	*VhF-1*	*621,343*
	VhF-2	*3,207,623*
	VhF-3	*58,793*
20	*VhF*	*1,616,913*
21	VhF	200,409
22	VhF	675,787
23	VhF	677,936
Total	**VhF**	**9,464,096**

Area ID	Soil Type	Total Area (ft²)
82	*VyB*	*55,230*
84	*VyB*	*523*
86	*VyB*	*1,796*
87	*VyB*	*8,168*
88	*VyB*	*0*
89	*VyB*	*0*
90	*VyB*	*0*
91	*VyB*	*984*
Total	**VyB**	**66,701**

Area ID	Soil Type	Total Area (ft²)
1	*VyD*	*59,207*
2	VyD	205,193
3	*VyD*	*0*
4	*VyD*	*70,127*
5	*VyD-1*	*7,884*
	VyD-2	*8,917*
	VyD-3	*21,118*
	VyD-4	*14,959*
	VyD-5	*9,348*
	VyD-6	*17,437*
	VyD-7	*3,607*
	VyD-8	*444*
	VyD-9	*25,243*
6	*VyD-1*	*4,861*
	VyD-2	*5,301*
	VyD-3	*3,406*
	VyD-4	*806*
120	*VyD*	*0*
Total	**VyD**	**457,858**

Area ID	Soil Type	Total Area (ft²)
92	*VyC-1*	*13,721*
	VyC-2	*479*
	VyC-3	*196*
93	VyC	55,352
94	*VyC-1*	*806*
	VyC-2	*1,712*
	VyC-3	*4,901*
	VyC-4	*152*
95	*VyC*	*0*
96	*VyC-1*	*148*
	VyC-2	*3,736*
	VyC-3	*7,736*
97	*VyC*	*0*
98	*VyC-1*	*97,391*
	VyC-2	*10,041*
	VyC-3	*9,082*
	VyC-4	*227*
99	VyC	96,515
100	*VyC*	*27,552*
101	VyC	13,139
102	VyC	102,671
105	*VyC-1*	*12,423*
	VyC-2	*17,973*
	VyC-3	*161*
107	*VyC*	*2,165*
109	*VyC-1*	*1,947*
	VyC-2	*3,084*
110	*VyC*	*0*
111	*VyC*	*0*
112	*VyC*	*0*
118	*VyC*	*6,646*
Total	**VyC**	**489,956**

Total of all Soil Map Unit Areas = 40,510,051 ft² (930 Acres)

PLATES

LEGEND

SOIL DELINEATION WITH SYMBOL AND ID NUMBER

N

GRAPHIC SCALE

500 0 250 500 1000 2000

(IN FEET)
1 inch = 500 ft.

PLATE 1
EXISTING CONDITIONS
SOIL MAP UNIT AREAS

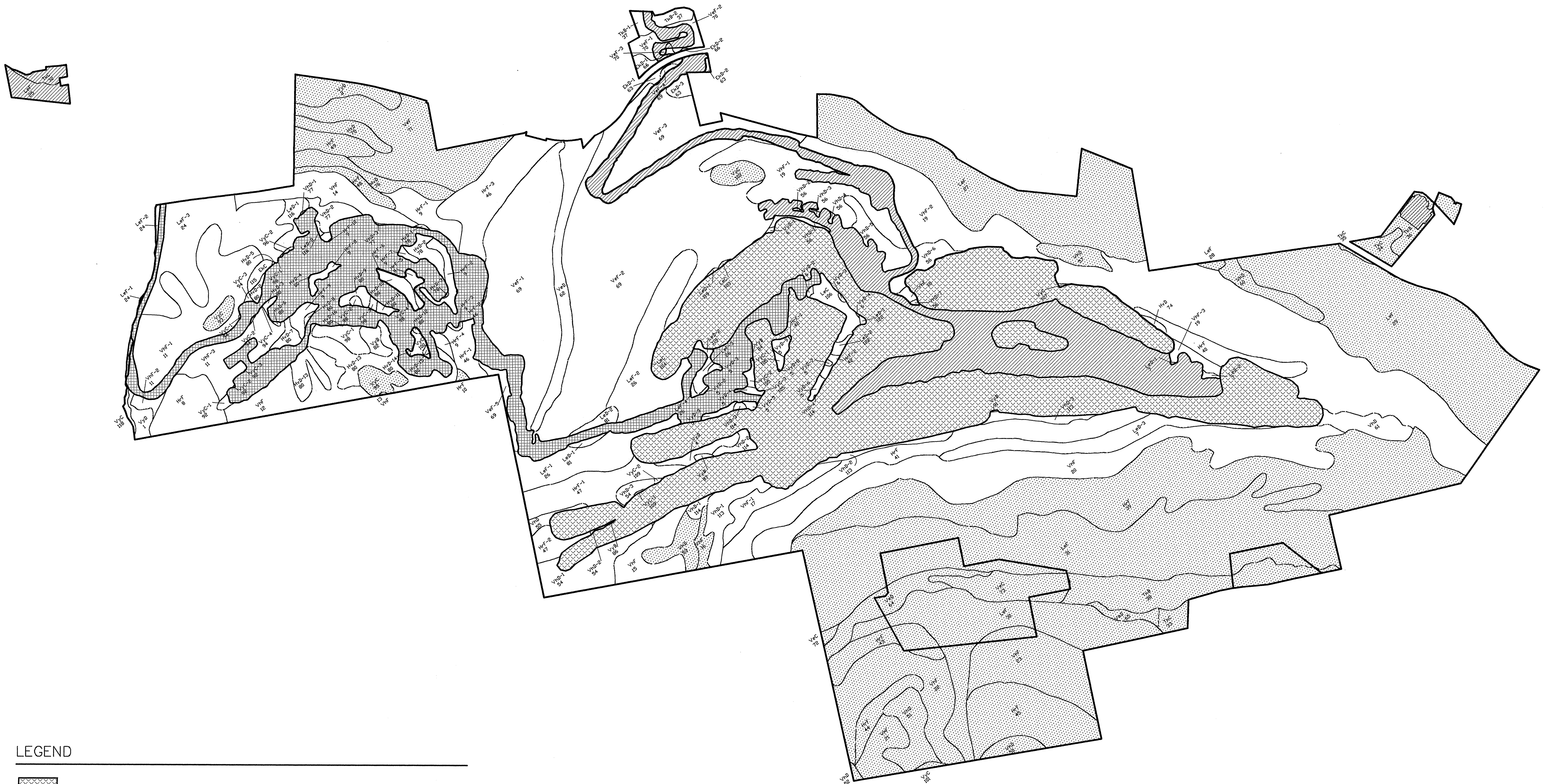
BIG INDIAN PLATEAU
PINE HILL, NEW YORK

ALPHA GEOSCIENCE

PROJECT NO. 02138

BASE MAP REFERENCES:
BASE MAP AND SOIL OUTLINES PROVIDED BY THE LA GROUP.

BELLAYRE02-B.DWG



N

GRAPHIC SCALE

500 0 250 500 1000 2000

(IN FEET)
1 inch = 500 ft.

LEGEND

- DEVELOPED AREA I: BIG INDIAN COUNTRY CLUB GOLF COURSE, DRIVING RANGE, AND WINNISOOK LODGE GROUNDS (EXCLUDING POND AREAS)
- DEVELOPED AREA II: NON-WOODED BELLEAYRE HIGHLANDS AND ACCESS ROAD CORRIDOR (INCLUDING BUILDINGS, ROADS, AND TENNIS COURTS)
- DEVELOPED AREA III: BELLEAYRE RIDGE ACCESS ROAD CORRIDOR, MAINTENANCE AREA, AND HOUSING DEVELOPMENT AROUND GOLF COURSE (INCLUDING BUILDINGS AND ROADS)
- SOIL MAP UNITS THAT WILL NOT BE CHANGED BY DEVELOPMENT
- SOIL DELINEATION WITH SYMBOL AND ID NUMBERS

BELLAYRE 01-B.DWG

PLATE 2
POST-DEVELOPMENT CONDITIONS AREA IDENTIFICATION MAP

BIG INDIAN PLATEAU
PINE HILL, NEW YORK

ALPHA GEOSCIENCE
PROJECT NO. 02138

BASE MAP REFERENCES:

BASE MAP AND SOIL OUTLINES PROVIDED BY THE LA GROUP.

DEVELOPED AREAS I, II, AND III OUTLINED BY ALPHA GEOSCIENCE AND BASED ON MASTER PLAN MAP PROVIDED BY THE LA GROUP.

EXHIBIT B

Water Quality Field Testing

of
Exhibit G, Surface and Groundwater Assessment

for
Big Indian Plateau Water Supply

SURFACE WATER DATA FORM

ALPHA GEOSCIENCE
1071 Troy-Schenectady Road
Latham, New York 12110

Project Name: Belleayre Water Quality
Project No. 00151 - Task 2
Date: October 26&27, 2000
Field Personnel: Steve Trader & Kevin Phelan
Measuring Devices: Thermometer, HYDAC S.C., Hanna D.O., Digi-sense pH/ORP, LaMotte Turbidity

ID #	Location	Date	Time	Temp (°F)	Spec. Cond. (mS)	pH	ORP (mV)	Turbidity (NTUs)	D.O. (ppm)
1	CSB -above Bonnie View Spg.	10/26/2000	10:48	50	159.3	6.52	37	0.76	8.5
2	Bonnie View side ditch	10/26/2000	10:58	50	182.2	6.71	26	2.22	7.5
3	CSB-above Cathedral Glen Brook	10/26/2000	9:43	51	153.6	6.60	31	1.05	8.2
4	Cathedral Glen Brook-above CSB	10/26/2000	11:35	50	97.7	6.62	31	0.44	8.4
5	CSB-below Crystal Spg.	10/26/2000	13:00	52	93.3	NM	NM	0.35	8.4
6	Station Rd. ditch-above Station Rd. Spg	10/26/2000	13:50	48	39.4	6.24	51	0.44	8.0
7	Station Rd. ditch-below Station Rd. Spg	10/26/2000	14:02	49	57.6	6.58	46	1.36	9.8
8	CSB-below Station Rd. Spg.	10/26/2000	14:25	50	106.3	6.68	39	2.36	8.4
9	Bailey Brook (in Woodchuck Hollow)	10/26/2000	9:40	48	57.6	6.67	26	0.31	8.9
10	CSB-above Birch Creek	10/26/2000	15:22	52	98.5	6.76	NM	0.38	8.6
11	Birch Creek-above CSB	10/26/2000	15:10	54	87.0	6.49	NM	1.40	8.1
12	Birch Creek-below CSB	10/26/2000	15:40	54	66.5	6.61	NM	0.68	8.3
13	Birch Creek-Covered Bridge	10/27/2000	12:20	52	83.9	6.92	13	0.69	8.1
14	Giggle Hollow	10/27/2000	12:28	48	59.5	6.79	29	0.27	8.1
15	Rose Mt.Creek-above sewer outfall	10/27/2000	13:15	55	NM	6.82	21	NM	NM
16	Sewer Plant Outfall	10/27/2000	13:16	58	NM	NM	NM	NM	NM
17	Rose Mt.Creek-below sewer outfall	10/27/2000	13:05	55	114.5	6.95	5	0.45	8.2
18	Birch Creek - below Rose Mt. Creek	10/27/2000	12:55	52	85.1	6.84	19	1.23	10.6
19	Lost Clove	10/26/2000	16:35	51	144.2	6.61	45	0.23	8.3
20	Woodchuck Hollow Spring	10/26/2000	9:10	47	47.6	6.29	51	0.22	8.8
21	Railroad Spring	10/26/2000	10:07	48	173.5	6.20	69	0.25	8.1
22	Pine Hill H20 Supply Overflow	10/27/2000	--	NM	NM	NM	NM	NM	NM
23	Pine Hill H20 Supply	10/27/2000	11:13	46	144.5	6.44	59	0.57	8.3
24	Black ABS Pipe-above Crystal Spring	10/26/2000	13:30	50	69.8	6.66	30	0.13	8.1
25	Silo A	10/26/2000	13:17	46	123.5	6.48	37	0:18	9.9
26	Station Road Silo B 4" Pipe	10/26/2000	10:48	45	53.6	6.45	59	0.38	8.4
27	Station Rd. Silo B Overflow	10/26/2000	13:40	46	65.8	6.58	48	0.31	9.9
28	Wildacres #3 Spring	10/27/2000	13:40	47	80.0	6.60	33	0.72	8.7
29	Davenport Spring	10/27/2000	13:50	49	105.0	6.74	30	0.08	8.4
30	Highmount Spring	10/27/2000	14:35	48	68.0	6.40	44	0.47	8.5
31	Leach Spring	10/27/2000	14:15	47	57.7	6.39	44	1.13	8.8

REMARKS:
CSB=Crystal Spring Brook
All pH/ORP measurements recorded on 10-27-00
NM = Not Measured
Number I.D.s refer to Figure 9

SURFACE WATER DATA FORM

ALPHA GEOSCIENCE
1071 Troy-Schenectady Road
Latham, New York 12110

Project Name: Belleayre Water Quality
Project No. 00151 - Task 2
Date: November 28, 2000
Field Personnel: Kevin Phelan, Steve Trader
Measuring Devices: Thermometer, HYDAC S.C., Hanna D.O., Digi-sense pH/ORP, LaMotte Turbidity

ID #	Location	Date	Time	Temp (°F)	Spec. Cond. (mS)	pH	ORP (mV)	Turbidity (NTUs)	D.O. (ppm)
1	CSB -above Bonnie View Spg.	11/28/2000	11:40	42	147.7	6.64	20	0.71	10.6
2	Bonnie View side ditch	11/28/2000	12:00	45	157.0	6.90	13	1.70	9.6
3	CSB-above Cathedral Glen Brook	11/28/2000	13:15	43	143.0	6.25	31	0.78	10.0
4	Cathedral Glen Brook-above CSB	11/28/2000	13:25	39	83.3	6.22	32	1.47	11.2
5	CSB-below Crystal Spg.	11/28/2000	14:05	40	93.5	6.35	32	1.66	10.4
6	Station Rd. ditch-above Station Rd. Spg	11/28/2000	14:20	43	59.8	6.37	24	0.67	8.1
7	Station Rd. ditch-below Station Rd. Spg	11/28/2000	16:00	44	58.9	6.54	27	0.58	9.6
8	CSB-below Station Rd. Spg.	11/28/2000	16:05	40	78.9	6.61	12	0.70	10.8
9	Bailey Brook (In Woodchuck Hollow)	11/28/2000	9:35	39	42.8	7.06	4	0.62	11.0
10	CSB-above Birch Creek	11/28/2000	8:40	40	111.0	7.05	4	0.97	11.0
11	Birch Creek-above CSB	11/28/2000	8:20	39	80.5	6.92	12	0.94	10.8
12	Birch Creek-below CSB	11/28/2000	8:50	40	95.4	7.04	5	0.77	11.0
13	Birch Creek-Covered Bridge	11/28/2000	14:50	42	96.6	6.67	9	0.67	10.4
14	Giggle Hollow	11/28/2000	14:40	42	40.4	6.40	23	0.45	10.4
15	Rose Mt.Creek-above sewer outfall	11/28/2000	15:20	41	102.8	6.57	14	0.60	9.1
16	Sewer Plant Outfall	11/28/2000	15:15	48	445.0	6.64	11	0.96	7.4
17	Rose Mt.Creek-below sewer outfall	11/28/2000	15:10	43	99.4	6.47	19	0.59	9.2
18	Birch Creek - below Rose Mt. Creek	11/28/2000	15:05	41	106.5	6.75	4	1.29	10.5
19	Lost Clove	11/28/2000	15:35	42	44.1	6.68	7	0.29	10.4
20	Woodchuck Hollow Spring	11/28/2000	9:20	41	36.2	6.75	21	0.59	10.8
21	Railroad Spring	11/28/2000	11:30	45	145.9	6.55	33	0.41	9.5
22	Pine Hill H20 Supply Overflow	11/28/2000	11:15	46	140.5	6.22	52	0.38	10.8
23	Pine Hill H20 Supply	11/28/2000	12:05	45	147.5	6.06	60	0.43	8.9
24	Black ABS Pipe-above Crystal Spring	11/28/2000	13:50	47	64.5	6.22	33	0.47	9.0
25	Silo A	11/28/2000	13:35	45	126.0	6.14	37	0.38	9.7
26	Station Road Silo B 4" Pipe	11/28/2000	14:25	45	50.1	6.42	38	0.50	9.8
27	Station Rd. Silo B Overflow	11/28/2000	13:55	45	50.2	6.15	37	0.50	9.3
28	Wildacres #3 Spring	11/28/2000	10:50	45	89.7	6.95	9	0.47	9.2
29	Davenport Spring	11/28/2000	10:40	47	108.7	6.42	41	0.56	9.8
30	Highmount Spring	11/28/2000	10:15	41	58.6	6.96	10	3.33	10.4
31	Leach Spring	11/28/2000	9:55	40	42.5	6.78	19	0.50	10.5

REMARKS:
CSB=Crystal Spring Brook
NM = Not Measured
Number I.D.s refer to Figure 9

SURFACE WATER DATA FORM

ALPHA GEOSCIENCE
1071 Troy-Schenectady Road
Latham, New York 12110

Project Name: Belleayre Water Quality
Project No. 00151 - Task 2
Date: December 27&28, 2000
Field Personnel: Kevin Phelan, Steve Trader
Measuring Devices: Thermometer, HYDAC S.C., Hanna D.O., Digi-sense pH/ORP, LaMotte Turbidity

ID #	Location	Date	Time	Temp (°F)	Spec. Cond. (mS)	pH	ORP (mV)	Turbidity (NTUs)	D.O. (ppm)
1	CSB -above Bonnie View Spg.	12/27/2000	9:10	35	123.4	6.48	14	4.00	11.7
2	Bonnie View side ditch	12/27/2000	9:05	44	109.1	5.91	47	1.24	11.6
3	CSB-above Cathedral Glen Brook	12/27/2000	9:40	37	117.5	6.36	21	1.51	11.7
4	Cathedral Glen Brook-above CSB	12/27/2000	9:45	37	105.2	6.60	5	2.03	11.9
5	CSB-below Crystal Spg.	12/27/2000	15:40	36	83.8	6.40 *	27 *	2.80	12.1
6	Station Rd. ditch-above Station Rd. Spg.	12/27/2000	10:15	43	40.1	6.18	32	0.33	10.3
7	Station Rd. ditch-below Station Rd. Spg.	12/27/2000	10:05	44	52.0	6.20	30	0.30	10.6
8	CSB-below Station Rd. Spg.	12/27/2000	10:30	38	84.4	6.28	25	1.07	11.5
9	Bailey Brook (in Woodchuck Hollow)	12/27/2000	10:45	37	51.3	6.37	20	1.10	11.6
10	CSB-above Birch Creek	12/27/2000	8:20	35	3.0	6.20	28	0.59	12.4
11	Birch Creek-above CSB	12/27/2000	8:10	34	60.5	6.07	36	0.57	12.2
12	Birch Creek-below CSB	12/27/2000	8:30	33	4.2	6.20	28	0.74	12.7
13	Birch Creek-Covered Bridge	12/27/2000	14:05	34	90.9	6.00 *	52 *	1.26	12.2
14	Giggle Hollow	12/27/2000	14:15	38	48.7	5.62 *	69 *	0.92	11.5
15	Rose Mt.Creek-above sewer outfall	12/27/2000	13:40	35	74.9	5.95 *	52 *	0.61	12.2
16	Sewer Plant Outfall	12/27/2000	13:35	40	362.0	6.80 *	7 *	0.13	10.8
17	Rose Mt.Creek-below sewer outfall	12/27/2000	13:30	35	64.7	6.63 *	14 *	1.30	12.5
18	Birch Creek - below Rose Mt. Creek	12/27/2000	13:15	35	75.6	6.43 *	28 *	37.60	12.4
19	Lost Clove	12/27/2000	7:40	35	32.8	5.82	52	1.17	12.2
20	Woodchuck Hollow Spring	12/28/2000	11:50	37	NM	5.85	58	NM	NM
21	Railroad Spring	12/27/2000	9:20	45	106.1	5.80 *	68 *	0.13	9.6
22	Pine Hill H20 Supply Overflow	12/27/2000	8:50	46	101.7	5.41	75	0.17	10.3
23	Pine Hill H20 Supply	12/27/2000	--	NM	NM	NM	NM	NM	NM
24	Black ABS Pipe-above Crystal Spring	12/27/2000	15:00	47	42.7	6.00 *	52 *	0.70	11.2
25	Silo A	12/27/2000	14:55	46	74.1	6.42 *	30 *	1.10	10.5
26	Station Road Silo B 4" Pipe	12/27/2000	10:20	45	37.5	5.68	60	0.13	10.2
27	Station Rd. Silo B Overflow	12/27/2000	15:15	44	10.9	6.08 *	48 *	0.16	11.1
28	Wildacres #3 Spring	12/27/2000	12:20	44	70.1	6.05	37	0.06	8.2
29	Davenport Spring	12/27/2000	11:55	43	43.7	6.03	37	0.06	8.2
30	Highmount Spring	12/27/2000	11:30	39	44.1	6.49	14	3.32	10.7
31	Leach Spring	12/27/2000	11:10	37	34.6	6.12	34	0.04	10.8

REMARKS:

Birch Creek at Frisenda residence is reddish brown and very turbid; source of turbidity and color is somewhere between the Covered Bridge

CSB=Crystal Spring Brook

NM = Not measured

Number I.D.s refer to Figure 9

* = pH/ORP at the indicated locations was measured on 12/28/00

SURFACE WATER DATA FORM

ALPHA GEOSCIENCE
1071 Troy-Schenectady Road
Latham, New York 12110

Project Name: Belleayre Water Quality
Project No. 00151 - Task 2
Date: January 31, 2001
Field Personnel: Kevin Phelan, Steve Trader
Measuring Devices: Thermometer, HYDAC S.C., Hanna D.O., Hydac pH, Orion mV, DRT Turbidity

ID #	Location	Date	Time	Temp (°F)	Spec. Cond. (mS)	pH	ORP (mV)	Turbidity (NTUs)	D.O. (ppm)
1	CSB -above Bonnie View Spg.	1/31/2001	11:05	39.2	93.6	6.87	79.8	0.79	11.6
2	Bonnie View side ditch	1/31/2001	10:55	46.4	139.1	6.79	91.8	1.88	10.6
3	CSB-above Cathedral Glen Brook	1/31/2001	7:35	39.2	145.2	7.28	103.9	0.53	10.8
4	Cathedral Glen Brook-above CSB	1/31/2001	7:20	37.4	151.9	7.43	201.3	1.14	11.7
5	CSB-below Crystal Spg.	1/31/2001	8:40	39.2	140.3	6.40	197.3	0.48	11.4
6	Station Rd. ditch-above Station Rd. Spg	1/31/2001	--	-NO FLOW-					
7	Station Rd. ditch-below Station Rd. Spg	1/31/2001	9:00	43.7	67.0	6.06	188.8	0.71	10.3
8	CSB-below Station Rd. Spg.	1/31/2001	11:30	41	141.3	6.41	125.3	6.15	11.6
9	Bailey Brook (in Woodchuck Hollow)	2/1/2001	12:50	35.6	13.2	NM	NM	NM	11.8
10	CSB-above Birch Creek	1/31/2001	15:15	39.2	187.5	6.46	NM	3.41	11.3
11	Birch Creek-above CSB	1/31/2001	15:35	37.4	321.0	7.50	NM	2.14	11.9
12	Birch Creek-below CSB	1/31/2001	15:45	38.3	262.0	7.62	NM	2.91	11.0
13	Birch Creek-Covered Bridge	1/31/2001	14:30	37.4	231.0	6.74	NM	7.20	11.7
14	Giggle Hollow	1/31/2001	14:45	39.2	63.0	6.64	NM	NM	10.7
15	Rose Mt.Creek-above sewer outfall	1/31/2001	14:15	39.2	188.4	6.71	204.0	2.24	11.9
16	Sewer Plant Outfall	1/31/2001	14:10	42.8	794.0	6.54	240.1	0.18	9.0
17	Rose Mt.Creek-below sewer outfall	1/31/2001	14:00	39.2	158.9	6.62	192.0	2.43	12.2
18	Birch Creek - below Rose Mt. Creek	1/31/2001	13:40	39.2	47.0	6.79	186.7	25.70	11.9
19	Lost Clove	1/31/2001	12:50	39.2	44.3	6.44	122.2	1.26	12.0
20	Woodchuck Hollow Spring	1/31/2001	--	NM	NM	NM	NM	NM	NM
21	Railroad Spring	1/31/2001	10:40	46.4	150.0	6.53	57.1	0.15	10.1
22	Pine Hill H20 Supply Overflow	1/31/2001	10:10	46.4	162.2	6.27	74.3	0.13	9.9
23	Pine Hill H20 Supply	1/31/2001	10:30	41	158.9	6.62	NM	NM	NM
24	Black ABS Pipe-above Crystal Spring	1/31/2001	8:05	45.5	67.2	6.67	151.1	0.12	9.7
25	Silo A	1/31/2001	7:55	46.4	149.8	6.65	105.6	0.10	10.8
26	Station Road Silo B 4" Pipe	1/31/2001	9:25	46.4	52.6	6.42	213.6	0.14	10.2
27	Station Rd. Silo B Overflow	1/31/2001	8:20	44.6	67.1	6.79	188.0	0.05	10.1
28	Wildacres #3 Spring	1/31/2001	--	NM	NM	NM	NM	NM	NM
29	Davenport Spring	1/31/2001	--	NM	NM	NM	NM	NM	NM
30	Highmount Spring	1/31/2001	--	NM	NM	NM	NM	NM	NM
31	Leach Spring	2/1/2001	14:55	35.6	58.6	NM	NM	NM	11.4

REMARKS:

CSB=Crystal Spring Brook

NM = Not measured

2/01/01 measurements: Spec. Cond. at Birch Creek-above CSB and at Birch Creek-Covered Bridge; D.O. at Railroad Spring and at CSB-Above Bonnie View Spring

Number I.D.s refer to Figure 9

SURFACE WATER DATA FORM

ALPHA GEOSCIENCE
1071 Troy-Schenectady Road
Latham, New York 12110

Project Name: Belleayre Water Quality
Project No. 00151 - Task 2
Date: February 28, 2001
Field Personnel: Kevin Phelan
Measuring Devices: Thermometer, HYDAC S.C., Hanna D.O., Digi-sense pH/ORP, LaMotte Turbidity

ID #	Location	Date	Time	Temp (°F)	Spec. Cond. (mS)	pH	ORP (mV)	Turbidity (NTUs)	D.O. (ppm)
1	CSB -above Bonnie View Spg.	2/28/2001	9:48	35.6	382.0	6.31	016	0.36	10.7
2	Bonnie View side ditch	2/28/2001	9:45	42.8	198.4	6.43	014	0.61	10.4
3	CSB-above Cathedral Glen Brook	2/28/2001	10:02	37.4	216.0	6.81	-008	0.78	10.1
4	Cathedral Glen Brook-above CSB	2/28/2001	10:05	35.6	128.5	7.04	-021	0.72	12.3
5	CSB-below Crystal Spg.	2/28/2001	10:40	36.5	28.2	6.59	001	0.48	11.3
6	Station Rd. ditch-above Station Rd. Spg	2/28/2001	10:50	41.9	56.7	7.03	-021	0.6	10.2
7	Station Rd. ditch-below Station Rd. Spg	2/28/2001	11:02	41.9	59.2	6.89	-012	1.08	10.1
8	CSB-below Station Rd. Spg.	2/28/2001	11:12	38.3	138.3	6.82	-009	0.52	11.5
9	Bailey Brook (in Woodchuck Hollow)	2/28/2001	11:45	37.4	66.7	7.19	-031	0.44	11.2
10	CSB-above Birch Creek	2/28/2001	16:35	36.5	101.6	6.98	-018	0.49	9.1
11	Birch Creek-above CSB	2/28/2001	16:45	34.7	84.2	6.95	-016	0.44	9.8
12	Birch Creek-below CSB	2/28/2001	16:50	33.8	24.5	6.93	-015	0.73	9.8
13	Birch Creek-Covered Bridge	2/28/2001	12:00	36.5	162.4	6.86	-011	0.73	11.9
14	Giggle Hollow	2/28/2001	12:05	36.5	37.1	6.87	-012	0.17	11.6
15	Rose Mt.Creek-above sewer outfall	2/28/2001	13:25	35.6	42.4	7.05	-021	0.32	12.8
16	Sewer Plant Outfall	2/28/2001	13:20	41.9	79.2	6.78	-007	1.58	10.1
17	Rose Mt.Creek-below sewer outfall	2/28/2001	13:10	34.7	32.4	6.99	-018	0.30	12.3
18	Birch Creek - below Rose Mt. Creek	2/28/2001	13:05	35.6	40.0	6.87	-012	5.49	12.6
19	Lost Clove	2/28/2001	8:00	35.6	45.5	6.98	069	0.50	12.3
20	Woodchuck Hollow Spring	2/28/2001	--	NM	NM	NM	NM	NM	NM
21	Railroad Spring	2/28/2001	9:30	44.6	191.9	6.97	-014	0.14	9.3
22	Pine Hill H20 Supply Overflow	2/28/2001	9:05	44.6	207.0	6.12	055	0.17	9.0
23	Pine Hill H20 Supply	2/28/2001	11:30	NM	NM	6.87	NM	NM	NM
24	Black ABS Pipe-above Crystal Spring	2/28/2001	10:20	46.4	65.7	6.71	-002	0.05	9.4
25	Silo A	2/28/2001	10:15	46.4	149.8	6.61	000	0.07	9.6
26	Station Road Silo B 4" Pipe	2/28/2001	10:55	44.6	57.8	6.64	000	0.21	9.8
27	Station Rd. Silo B Overflow	2/28/2001	10:25	42.8	60.1	6.64	000	0.11	9.9
28	Wildacres #3 Spring	2/28/2001	16:10	43.7	70.2	6.95	-016	0.2	7.9
29	Davenport Spring	2/28/2001	15:20	42.8	137.1	6.47	006	0.39	9.1
30	Highmount Spring	2/28/2001	--	NM	NM	NM	NM	NM	NM
31	Leach Spring	2/28/2001	14:55	38.3	15.2	6.92	-013	0.40	9.9

REMARKS:

CSB=Crystal Spring Brook

NM = Not measured

Number I.D.s refer to Figure 9

SURFACE WATER DATA FORM

ALPHA GEOSCIENCE
1071 Troy-Schenectady Road
Latham, New York 12110

Project Name: Belleayre Water Quality
Project No. 00151 - Task 2
Date: March 29, 2001
Field Personnel: Kevin Phelan
Measuring Devices: Thermometer, HYDAC S.C., Hanna D.O., Digi-sense pH/ORP, LaMotte Turbidity

ID #	Location	Date	Time	Temp (°F)	Spec. Cond. (mS)	pH	ORP (mV)	Turbidity (NTUs)	D.O. (ppm)
1	CSB -above Bonnie View Spg.	3/29/2001	9:50	37	226.0	6.39	012	0.03	9.3
2	Bonnie View side ditch	3/29/2001	9:55	45	144.5	6.20	020	1.25	10.9
3	CSB-above Cathedral Glen Brook	3/29/2001	10:17	40	110.4	6.22	019	0.55	10.5
4	Cathedral Glen Brook-above CSB	3/29/2001	10:12	37	103.5	6.31	014	0.68	11.5
5	CSB-below Crystal Spg.	3/29/2001	10:58	39	99.8	6.25	018	0.52	10.8
6	Station Rd. ditch-above Station Rd. Spg	3/29/2001	11:17	43	50	5.83	041	1.11	9.7
7	Station Rd. ditch-below Station Rd. Spg.	3/29/2001	11:10	44	55.0	6.55	001	0.39	10.0
8	CSB-below Station Rd. Spg.	3/29/2001	14:10	41	95.8	6.14	037	0.71	10.0
9	Bailey Brook (in Woodchuck Hollow)	3/29/2001	14:30	37	77.7	NM	NM	3.26	8.9
10	CSB-above Birch Creek	3/29/2001	8:58	35	157.2	6.65	-000	0.40	11.8
11	Birch Creek-above CSB	3/29/2001	8:50	37	144.5	6.74	-004	0.27	10.7
12	Birch Creek-below CSB	3/29/2001	8:45	34	161.1	6.72	-003	0.53	11.5
13	Birch Creek-Covered Bridge	3/29/2001	8:10	34	157.3	5.92	037	0.94	12.1
14	Giggle Hollow	3/29/2001	8:20	37	58.8	6.27	017	0.17	10.6
15	Rose Mt.Creek-above sewer outfall	3/29/2001	15:10	38	139.7	6.78	002	0.42	10.9
16	Sewer Plant Outfall	3/29/2001	15:05	44	708.0	6.60	011	0.15	10.6
17	Rose Mt.Creek-below sewer outfall	3/29/2001	15:00	38	138.0	6.61	011	0.59	11.2
18	Birch Creek - below Rose Mt. Creek	3/29/2001	14:55	36	160.1	6.68	008	4.17	11.3
19	Lost Clove	3/29/2001	7:40	38	41.0	6.05	034	0.30	11.6
20	Woodchuck Hollow Spring	3/29/2001	--	NM	NM	NM	NM	NM	NM
21	Railroad Spring	3/29/2001	9:35	45	234.0	6.12	028	0.17	8.8
22	Pine Hill H20 Supply Overflow	3/29/2001	10:00	44	145.5	5.92	040	0.01	8.6
23	Pine Hill H20 Supply	3/29/2001	--	NM	NM	NM	NM	NM	NM
24	Black ABS Pipe-above Crystal Spring	3/29/2001	10:50	46	31.0	6.22	019	0.01	9.3
25	Silo A	3/29/2001	10:45	45	93.7	6.22	020	0.03	9.5
26	Station Road Silo B 4" Pipe	3/29/2001	11:15	45	50.4	6.09	039	0.12	9.4
27	Station Rd. Silo B Overflow	3/29/2001	--	NM	NM	NM	NM	NM	NM
28	Wildacres #3 Spring	3/29/2001	13:30	43	99.5	6.14	038	0.02	8.6
29	Davenport Spring	3/29/2001	13:15	41	262	6.02	044	0.12	9.7
30	Highmount Spring	3/29/2001	--	NM	NM	NM	NM	NM	NM
31	Leach Spring	3/29/2001	11:45	36	38.4	6.44	007	0.04	10.5

REMARKS:

CSB=Crystal Spring Brook

NM = Not measured

Number I.D.s refer to Figure 9

SURFACE WATER DATA FORM

ALPHA GEOSCIENCE
1071 Troy-Schenectady Road
Latham, New York 12110

Project Name: Belleayre Water Quality
Project No. 00151 - Task 2
Date: April 25, 2001
Field Personnel: Kevin Phelan
Measuring Devices: Thermometer, HYDAC S.C., Hanna D.O., Digi-sense ORP, LaMotte Turbidity, Hach pH

ID #	Location	Date	Time	Temp (°F)	Spec. Cond. (mS)	pH	ORP (mV)	Turbidity (NTUs)	D.O. (ppm)
1	CSB -above Bonnie View Spg.	4/25/2001	10:22	43	165.7	6.8	-000	3.01	10.2
2	Bonnie View side ditch	4/25/2001	10:17	45	127.9	6.8	006	2.97	10.0
3	CSB-above Cathedral Glen Brook	4/25/2001	9:47	43	127.2	6.8	+000	2.66	10.0
4	Cathedral Glen Brook-above CSB	4/25/2001	9:42	41	49.2	6.7	-001	5.34	10.8
5	CSB-below Crystal Spg.	4/25/2001	10:58	42	64.4	6.8	019	4.78	10.2
6	Station Rd. ditch-above Station Rd. Spg	4/25/2001	14:20	45	51.7	6.8	NM	0.47	10.1
7	Station Rd. ditch-below Station Rd. Spg.	4/25/2001	13:55	45	103.5	6.8	NM	0.31	9.8
8	CSB-below Station Rd. Spg.	4/25/2001	14:10	44	75.5	6.8	NM	4.13	9.8
9	Bailey Brook (in Woodchuck Hollow)	4/25/2001	11:46	43	30.4	6.8	-001	1.04	11.8
10	CSB-above Birch Creek	4/25/2001	9:07	42	62.6	6.9	-016	3.36	10.8
11	Birch Creek-above CSB	4/25/2001	9:00	42	59.7	6.9	002	1.54	10.3
12	Birch Creek-below CSB	4/25/2001	9:12	43	59.4	6.8	010	1.52	10.4
13	Birch Creek-Covered Bridge	4/25/2001	8:00	42	78.8	6.7	-014	1.79	11.9
14	Giggle Hollow	4/25/2001	7:50	42	32.9	6.8	-011	0.48	11.0
15	Rose Mt.Creek-above sewer outfall	4/25/2001	18:15	46	52.3	6.8	NM	0.91	NM
16	Sewer Plant Outfall	4/25/2001	18:10	50	255.0	7.0	NM	0.25	NM
17	Rose Mt.Creek-below sewer outfall	4/25/2001	18:05	47	52.5	6.7	NM	0.64	NM
18	Birch Creek - below Rose Mt. Creek	4/25/2001	17:55	46	78.7	6.8	NM	3.21	NM
19	Lost Clove	4/25/2001	18:30	45	43.2	6.9	NM	0.43	NM
20	Woodchuck Hollow Spring	4/25/2001	11:15	44	20.9	6.9	002	0.29	9.4
21	Railroad Spring	4/25/2001	10:05	45	113.8	6.7	013	0.12	9.2
22	Pine Hill H20 Supply Overflow	4/25/2001	13:30	45	166.5	6.7	NM	0.15	9.2
23	Pine Hill H20 Supply	4/25/2001	13:10	45	176.1	7.0	007	0.09	9.2
24	Black ABS Pipe-above Crystal Spring	4/25/2001	10:45	47	40.6	6.7	025	0.21	9.6
25	Silo A	4/25/2001	10:40	45	66.1	6.8	011	0.57	9.6
26	Station Road Silo B 4" Pipe	4/25/2001	14:05	45	121.5	6.8	NM	0.29	9.9
27	Station Rd. Silo B Overflow	4/25/2001	NM	NM	NM	NM	NM	NM	NM
28	Wildacres #3 Spring	4/25/2001	16:40	43	29.5	6.7	NM	0.39	NM
29	Davenport Spring	4/25/2001	16:15	40	61.3	NM	NM	0.21	NM
30	Highmount Spring	4/25/2001	NM	NM	NM	NM	NM	NM	NM
31	Leach Spring	4/25/2001	15:00	43	197.2	6.8	NM	0.13	NM

REMARKS:

CSB=Crystal Spring Brook

NM = Not measured

Number I.D.s refer to Figure 9

SURFACE WATER DATA FORM

ALPHA GEOSCIENCE
1071 Troy-Schenectady Road
Latham, New York 12110

Project Name: Belleayre Water Quality
Project No. 00151 - Task 2
Date: May 30, 2001
Field Personnel: Kevin Phelan
Measuring Devices: Thermometer, HYDAC SPC., Hanna D.O., LaMotte Turbidity, Hach pH

ID #	Location	Date	Time	Temp (°F)	Spec. Cond. (mS)	pH	ORP (mV)	Turbidity (NTUs)	D.O. (ppm)
1	CSB -above Bonnie View Spg.	5/30/2001	10:15	46	164.5	6.8	NM	0.55	8.8
2	Bonnie View side ditch	5/30/2001	10:10	46	179.8	6.3	NM	2.36	8.6
3	CSB-above Cathedral Glen Brook	5/30/2001	10:45	48	168.9	6.7	NM	0.72	11.1
4	Cathedral Glen Brook-above CSB	5/30/2001	10:40	49	110.7	6.7	NM	0.55	8.8
5	CSB-below Crystal Spg.	5/30/2001	11:40	48	137	6.7	NM	0.63	8.6
6	Station Rd. ditch-above Station Rd. Spg	5/30/2001	11:30	No	Flow	NM	NM	NM	NM
7	Station Rd. ditch-below Station Rd. Spg.	5/30/2001	11:20	45	55.5	6.3	NM	0.84	8.7
8	CSB-below Station Rd. Spg.	5/30/2001	11:30	48	133.6	6.7	NM	2.17	8.4
9	Bailey Brook (in Woodchuck Hollow)	5/30/2001	9:15	48	119.9	6.7	NM	0.63	8.3
10	CSB-above Birch Creek	5/30/2001	12:55	49	237	6.8	NM	0.60	9.8
11	Birch Creek-above CSB	5/30/2001	12:45	50	90	6.9	NM	0.69	9.8
12	Birch Creek-below CSB	5/30/2001	13:05	49	190	6.8	NM	0.65	9.5
13	Birch Creek-Covered Bridge	5/30/2001	15:25	53	98.6	6.8	NM	1.20	9.6
14	Giggle Hollow	5/30/2001	15:15	46	37.5	6.7	NM	0.24	10.3
15	Rose Mt.Creek-above sewer outfall	5/30/2001	14:50	50	88.9	6.7	NM	0.75	9.2
16	Sewer Plant Outfall	5/30/2001	14:45	51	417	6.8	NM	0.83	4.8
17	Rose Mt.Creek-below sewer outfall	5/30/2001	14:35	50	85	6.7	NM	0.61	9.3
18	Birch Creek - below Rose Mt. Creek	5/30/2001	14:30	52	104.7	6.8	NM	1.47	9.2
19	Lost Clove	5/30/2001	15:50	50	30.9	6.5	NM	0.30	9.6
20	Woodchuck Hollow Spring	5/30/2001	8:50	47	39.9	6.2	NM	0.35	8.7
21	Railroad Spring	5/30/2001	9:50	46	195.8	6.2	NM	0.15	8.4
22	Pine Hill H20 Supply Overflow	5/30/2001	10:00	46	181.6	6.2	NM	0.01	8.3
23	Pine Hill H20 Supply	5/30/2001	9:40	48	252	6.8	NM	0.2	NM
24	Black ABS Pipe-above Crystal Spring	5/30/2001	11:10	47	200	6.2	NM	0.25	9.5
25	Silo A	5/30/2001	11:00	45	273	6.2	NM	0.05	9.0
26	Station Road Silo B 4" Pipe	5/30/2001	11:50	45	60.0	6.2	NM	0.42	10.5
27	Station Rd. Silo B Overflow	5/30/2001	NM	NM	NM	NM	NM	NM	NM
28	Wildacres #3 Spring	5/30/2001	14:10	45	81.7	6.2	NM	0.09	9.8
29	Davenport Spring	5/30/2001	14:00	43	132.7	6.3	NM	0.11	9.7
30	Highmount Spring	5/30/2001	NM	NM	NM	NM	NM	NM	NM
31	Leach Spring	5/30/2001	13:20	46	38.3	6.4	NM	0.26	9.8

REMARKS:

CSB=Crystal Spring Brook

NM = Not measured

Number I.D.s refer to Figure 9

SURFACE WATER DATA FORM

ALPHA GEOSCIENCE
1071 Troy-Schenectady Road
Latham, New York 12110

Project Name: Belleayre Water Quality
Project No. 00151 - Task 2
Date: June 28, 2001
Field Personnel: Kevin Phelan
Measuring Devices: Thermometer, HYDAC SPC., Hanna D.O., LaMotte Turbidity, Hach pH

ID #	Location	Date	Time	Temp (°F)	Spec. Cond. (mS)	pH	ORP (mV)	Turbidity (NTUs)	D.O. (ppm)
1	CSB -above Bonnie View Spg.	6/28/2001	8:30	53	177.7	6.9	NM	1.38	8.2
2	Bonnie View side ditch	6/28/2001	8:25	47	182.3	6.3	NM	1.91	8.9
3	CSB-above Cathedral Glen Brook	6/28/2001	8:50	51	175.5	6.8	NM	0.51	8.6
4	Cathedral Glen Brook-above CSB	6/28/2001	8:45	57	130.2	6.9	NM	0.47	6.9
5	CSB-below Crystal Spg.	6/28/2001	9:15	55	147.0	6.8	NM	0.56	8.4
6	Station Rd. ditch-above Station Rd. Spg	6/28/2001	9:25	53	55.4	6.7	NM	0.28	8.9
7	Station Rd. ditch-below Station Rd. Spg	6/28/2001	9:20	46	50.1	6.1	NM	0.24	9.9
8	CSB-below Station Rd. Spg.	6/28/2001	9:35	55	143.1	6.8	NM	0.39	8.6
9	Bailey Brook (in Woodchuck Hollow)	6/28/2001	9:45	55	72.8	6.8	NM	0.64	8.4
10	CSB-above Birch Creek	6/28/2001	10:00	56	135.3	6.9	NM	0.32	8.7
11	Birch Creek-above CSB	6/28/2001	10:05	58	87.9	6.7	NM	0.53	9.0
12	Birch Creek-below CSB	6/28/2001	10:10	58	102.6	6.9	NM	0.49	8.9
13	Birch Creek-Covered Bridge	6/28/2001	10:30	63	118.8	6.9	NM	0.90	8.5
14	Giggle Hollow	6/28/2001	10:40	51	40.7	6.3	NM	0.06	9.4
15	Rose Mt.Creek-above sewer outfall	6/28/2001	11:10	60	122.6	6.8	NM	1.03	8.1
16	Sewer Plant Outfall	6/28/2001	11:05	63	453	6.8	NM	0.29	4.1
17	Rose Mt.Creek-below sewer outfall	6/28/2001	11:00	61	111.6	6.8	NM	0.54	8.4
18	Birch Creek - below Rose Mt. Creek	6/28/2001	10:55	62	117.2	7.0	NM	1.77	8.6
19	Lost Clove	6/28/2001	13:10	56	59.2	6.6	NM	0.15	9.6
20	Woodchuck Hollow Spring	6/28/2001	7:40	52	28.3	6.5	NM	0.30	7.8
21	Railroad Spring	6/28/2001	8:10	46	200	6.0	NM	0.02	8.7
22	Pine Hill H20 Supply Overflow	6/28/2001	8:15	47	196	6.1	NM	0.05	7.8
23	Pine Hill H20 Supply	6/28/2001	NM	NM	NM	NM	NM	NM	NM
24	Black ABS Pipe-above Crystal Spring	6/28/2001	9:10	49	46.2	6.0	NM	0.03	8.5
25	Silo A	6/28/2001	9:00	45	139.0	6.1	NM	0.47	8.5
26	Station Road Silo B 4" Pipe	6/28/2001	9:30	46	43.1	5.9	NM	0.20	8.5
27	Station Rd. Silo B Overflow	6/28/2001	NM	NM	NM	NM	NM	NM	NM
28	Wildacres #3 Spring	6/28/2001	12:35	46	120.6	6.2	NM	0.04	9.8
29	Davenport Spring	6/28/2001	12:20	46	123.7	6.0	NM	0.25	8.9
30	Highmount Spring	6/28/2001	NM	NM	NM	NM	NM	NM	NM
31	Leach Spring	6/28/2001	11:30	50	33.9	6.3	NM	0.38	9.4

REMARKS:

CSB=Crystal Spring Brook

NM = Not measured

Number I.D.s refer to Figure 9

SURFACE WATER DATA FORM

ALPHA GEOSCIENCE
1071 Troy-Schenectady Road
Latham, New York 12110

Project Name: Belleayre Water Quality
Project No. 00151 - Task 2
Date: July 31, 2001
Field Personnel: Kevin Phelan
Measuring Devices: Thermometer, HYDAC SPC., Hanna D.O., LaMotte Turbidity, Hach pH

ID #	Location	Date	Time	Temp (°F)	Spec. Cond. (mS)	pH	ORP (mV)	Turbidity (NTUs)	D.O. (ppm)
1	CSB -above Bonnie View Spg.	7/31/2001	8:40	52	167.1	6.9	NM	0.29	9.0
2	Bonnie View side ditch	7/31/2001	8:35	47	199	6.7	NM	1.51	9.4
3	CSB-above Cathedral Glen Brook	7/31/2001	8:50	50	184.3	6.9	NM	0.14	9.0
4	Cathedral Glen Brook-above CSB	7/31/2001	8:55	57	164.7	6.9	NM	0.40	9.4
5	CSB-below Crystal Spg.	7/31/2001	9:20	52	178.2	6.7	NM	0.26	9.1
6	Station Rd. ditch-above Station Rd. Spg	7/31/2001	10:08	DRY					
7	Station Rd. ditch-below Station Rd. Spg	7/31/2001	10:05	46	86.1	6.7	NM	0.38	10.7
8	CSB-below Station Rd. Spg.	7/31/2001	10:20	53	168.6	6.9	NM	0.22	10.0
9	Bailey Brook (in Woodchuck Hollow)	7/31/2001	10:25	56	105.8	7.0	NM	0.59	8.6
10	CSB-above Birch Creek	7/31/2001	10:50	56	162.4	7.1	NM	0.38	10.0
11	Birch Creek-above CSB	7/31/2001	10:58	59	130.5	7.0	NM	0.54	9.9
12	Birch Creek-below CSB	7/31/2001	10:45	59	106.6	7.0	NM	0.36	9.9
13	Birch Creek-Covered Bridge	7/31/2001	13:25	68	118.7	7.2	NM	1.22	10.3
14	Giggle Hollow	7/31/2001	13:17	54	34.3	6.9	NM	0.20	6.6
15	Rose Mt.Creek-above sewer outfall	7/31/2001	12:42	68	337	6.9	NM	0.34	10.1
16	Sewer Plant Outfall	7/31/2001	12:37	66	394	6.8	NM	1.92	4.7
17	Rose Mt.Creek-below sewer outfall	7/31/2001	12:30	67	438	7.0	NM	0.30	7.4
18	Birch Creek - below Rose Mt. Creek	7/31/2001	12:50	68	145.3	7.2	NM	2.35	10.5
19	Lost Clove	7/31/2001	14:20	56	40.2	6.7	NM	0.35	6.1
20	Woodchuck Hollow Spring	7/31/2001	7:50	54	33.4	6.0	NM	0.15	7.8
21	Railroad Spring	7/31/2001	8:15	47	200	6.1	NM	0.59	9.1
22	Pine Hill H20 Supply Overflow	7/31/2001	9:35	47	199	6.1	NM	0.32	10.8
23	Pine Hill H20 Supply	7/31/2001	9:40	48	250	6.9	NM	0.05	10.3
24	Black ABS Pipe-above Crystal Spring	7/31/2001	9:10	51	53.9	6.4	NM	0.29	9.6
25	Silo A	7/31/2001	9:05	46	152.6	6.2	NM	0.12	9.6
26	Station Road Silo B 4" Pipe	7/31/2001	10:10	46	68.2	6.2	NM	0.35	9.9
27	Station Rd. Silo B Overflow	7/31/2001	NM	NM	NM	NM	NM	NM	NM
28	Wildacres #3 Spring	7/31/2001	12:15	46	87.7	6.4	NM	0.38	7.7
29	Davenport Spring	7/31/2001	11:55	48	124.4	6.6	NM	0.09	9.6
30	Highmount Spring	7/31/2001	NM	NM	NM	NM	NM	NM	NM
31	Leach Spring	7/31/2001	11:25	58	47.8	6.8	NM	0.11	7.0

REMARKS:

CSB=Crystal Spring Brook

NM = Not measured

Number I.D.s refer to Figure 9

SURFACE WATER DATA FORM

ALPHA GEOSCIENCE
1071 Troy-Schenectady Road
Latham, New York 12110

Project Name: Belleayre Water Quality
Project No. 00151 - Task 2
Date: August 30, 2001
Field Personnel: Kevin Phelan
Measuring Devices: Thermometer, HYDAC SPC., Hanna D.O., LaMotte Turbidity, Hach pH

ID #	Location	Date	Time	Temp (°F)	Spec. Cond. (mS)	pH	ORP (mV)	Turbidity (NTUs)	D.O. (ppm)
1	CSB -above Bonnie View Spg.	8/30/2001	9:45	52	129.4	6.9	NM	0.26	9.0
2	Bonnie View side ditch	8/30/2001	9:40	51	190.5	6.8	NM	1.98	9.3
3	CSB-above Cathedral Glen Brook	8/30/2001	9:20	52	173.2	6.8	NM	0.27	7.4
4	Cathedral Glen Brook-above CSB	8/30/2001	9:25	58	154.3	7.0	NM	0.28	8.6
5	CSB-below Crystal Spg.	8/30/2001	10:30	52	127.9	6.8	NM	0.23	9.4
6	Station Rd. ditch-above Station Rd. Spg	8/30/2001	10:45	DRY					
7	Station Rd. ditch-below Station Rd. Spg.	8/30/2001	10:40	46	88.6	6.7	NM	0.96	11.7
8	CSB-below Station Rd. Spg.	8/30/2001	10:35	53	152.2	6.8	NM	0.22	11.8
9	Bailey Brook (in Woodchuck Hollow)	8/30/2001	9:05	57	110.3	7.0	NM	0.86	6.2
10	CSB-above Birch Creek	8/30/2001	13:25	59	147.9	7.1	NM	0.29	10.3
11	Birch Creek-above CSB	8/30/2001	13:20	61	105.7	7.0	NM	0.67	10.5
12	Birch Creek-below CSB	8/30/2001	13:30	60	122.9	7.1	NM	0.36	10.6
13	Birch Creek-Covered Bridge	8/30/2001	12:55	64	157.0	7.2	NM	1.86	10.0
14	Giggle Hollow	8/30/2001	13:05	57	55.1	6.5	NM	1.47	8.3
15	Rose Mt.Creek-above sewer outfall	8/30/2001	14:15	67	522	7.0	NM	0.37	14.0
16	Sewer Plant Outfall	8/30/2001	14:10	66	537	6.6	NM	0.34	5.9
17	Rose Mt.Creek-below sewer outfall	8/30/2001	14:00	67	493	7.0	NM	6.23	7.5
18	Birch Creek - below Rose Mt. Creek	8/30/2001	13:50	63	172.1	7.1	NM	1.60	10.0
19	Lost Clove	8/30/2001	7:45	DRY					
	Lost Clove Tributary (19)	8/30/2001	7:50	56	53.3	6.7	NM	0.40	8.1
20	Woodchuck Hollow Spring	8/30/2001	8:45	57	35.0	6.4	NM	0.42	7.1
21	Railroad Spring	8/30/2001	DRY						
22	Pine Hill H20 Supply Overflow	8/30/2001	DRY						
23	Pine Hill H20 Supply	8/30/2001	9:55	49	192.3	6.9	NM	0.31	9.9
24	Black ABS Pipe-above Crystal Spring	8/30/2001	10:25	56	51.2	6.7	NM	0.25	10.9
25	Silo A	8/30/2001	10:15	46	122.2	6.4	NM	0.06	9.3
26	Station Road Silo B 4" Pipe	8/30/2001	10:45	46	71.9	6.2	NM	0.38	11.5
27	Station Rd. Silo B Overflow	8/30/2001	NM	NM	NM	NM	NM	NM	NM
28	Wildacres #3 Spring	8/30/2001	11:55	49	99.2	6.8	NM	0.12	12.0
29	Davenport Spring	8/30/2001	11:40	53	120.0	6.7	NM	0.15	10.5
30	Highmount Spring	8/30/2001	NM	NM	NM	NM	NM	NM	NM
31	Leach Spring	8/30/2001	11:15	62	49.2	7.0	NM	0.30	9.3

REMARKS:

CSB=Crystal Spring Brook

NM = Not measured

Number I.D.s refer to Figure 9

SURFACE WATER DATA FORM

ALPHA GEOSCIENCE
1071 Troy-Schenectady Road
Latham, New York 12110

Project Name: Belleayre Water Quality
Project No. 00151 - Task 2
Date: September 27, 2001
Field Personnel: Kevin Phelan
Measuring Devices: Thermometer, HYDAC SPC., Hanna D.O., LaMotte Turbidity, Hach pH

ID #	Location	Date	Time	Temp (°F)	Spec. Cond. (mS)	pH	ORP (mV)	Turbidity (NTUs)	D.O. (ppm)
1	CSB -above Bonnie View Spg.	9/27/2001	11:50	50	217	7.0	NM	0.63	8.2
2	Bonnie View side ditch	9/27/2001	11:42	50	200	6.8	NM	3.78	8.3
3	CSB-above Cathedral Glen Brook	9/27/2001	11:05	50	219	6.8	NM	0.81	9.2
4	Cathedral Glen Brook-above CSB	9/27/2001	10:55	53	91.6	6.7	NM	54.2	8.8
5	CSB-below Crystal Spg.	9/27/2001	12:12	52	119	6.8	NM	36.0	8.4
6	Station Rd. ditch-above Station Rd. Spg	9/27/2001	12:30	DRY					
7	Station Rd. ditch-below Station Rd. Spg	9/27/2001	12:28	46	65.5	6.5	NM	1.75	9.3
8	CSB-below Station Rd. Spg.	9/27/2001	12:25	52	125.2	6.8	NM	32.5	8.5
9	Bailey Brook (in Woodchuck Hollow)	9/27/2001	10:50	51	110.6	6.8	NM	1.04	9.7
10	CSB-above Birch Creek	9/27/2001	13:55	53	114.1	6.9	NM	9.71	8.4
11	Birch Creek-above CSB	9/27/2001	14:00	53	141.4	6.9	NM	0.76	8.2
12	Birch Creek-below CSB	9/27/2001	13:45	53	127.5	6.8	NM	5.21	8.7
13	Birch Creek-Covered Bridge	9/27/2001	13:30	55	136.8	7.1	NM	0.22	7.4
14	Giggle Hollow	9/27/2001	13:20	49	45.4	6.7	NM	4.23	8.6
15	Rose Mt.Creek-above sewer outfall	9/27/2001	10:15	58	382	6.8	NM	1.16	5.7
16	Sewer Plant Outfall	9/27/2001	10:10	61	411	6.6	NM	0.44	5.0
17	Rose Mt.Creek-below sewer outfall	9/27/2001	9:55	59	356	6.9	NM	4.49	6.8
18	Birch Creek - below Rose Mt. Creek	9/27/2001	9:50	52	237	7.1	NM	3.21	9.5
19	Lost Clove	9/27/2001	9:30	51	48.4	6.6	NM	2.31	10.4
20	Woodchuck Hollow Spring	9/27/2001	10:30	50	38.8	6.4	NM	0.21	8.5
21	Railroad Spring	9/27/2001	11:35	DRY					
22	Pine Hill H20 Supply Overflow	9/27/2001	11:20	47	199	5.9	NM	0.40	9.8
23	Pine Hill H20 Supply	9/27/2001	11:25	48	271	7.0	NM	0.12	8.9
24	Black ABS Pipe-above Crystal Spring	9/27/2001	DRY						
25	Silo A	9/27/2001	12:05	47	206	6.0	NM	0.17	8.7
26	Station Road Silo B 4" Pipe	9/27/2001	12:30	46	53.6	6.4	NM	1.95	10.8
27	Station Rd. Silo B Overflow	9/27/2001	NM	NM	NM	NM	NM	NM	NM
28	Wildacres #3 Spring	9/27/2001	15:15	50	99.7	6.5	NM	0.28	8.8
29	Davenport Spring	9/27/2001	14:55	49	151.7	6.8	NM	0.24	10.3
30	Highmount Spring	9/27/2001	NM	NM	NM	NM	NM	NM	NM
31	Leach Spring	9/27/2001	14:25	55	60.4	7.4	NM	0.30	5.4

REMARKS:
Elevated turbidity at ID #4, 5, 8, 10, and 12 apear to be derived from the active draining of the Belleayre Mountain Ski Area backup snowmaking pond.

CSB=Crystal Spring Brook

NM = Not measured

SURFACE WATER DATA FORM

ALPHA GEOSCIENCE
1071 Troy-Schenectady Road
Latham, New York 12110

Project Name: Belleayre Water Quality
Project No. 00151 - Task 2
Date: October 30, 2001
Field Personnel: Kevin Phelan
Measuring Devices: Thermometer, HYDAC SPC., Hanna D.O., LaMotte Turbidity, Hach pH

ID #	Location	Date	Time	Temp (°F)	Spec. Cond. (mS)	pH	ORP (mV)	Turbidity (NTUs)	D.O. (ppm)
1	CSB -above Bonnie View Spg.	10/30/2001	11:30	46	88.2	6.8	NM	0.45	8.9
2	Bonnie View side ditch	10/30/2001	11:25	NM	NM	NM	NM	NM	NM
3	CSB-above Cathedral Glen Brook	10/30/2001	11:50	47	208	6.8	NM	0.33	9.7
4	Cathedral Glen Brook-above CSB	10/30/2001	11:40	45	105.0	6.7	NM	0.58	10.5
5	CSB-below Crystal Spg.	10/30/2001	11:55	46	144.1	6.6	NM	0.78	10.4
6	Station Rd. ditch-above Station Rd. Spg	10/30/2001	11:05	DRY					
7	Station Rd. ditch-below Station Rd. Spg	10/30/2001	11:15	46	64.7	6.5	NM	4.53	10.3
8	CSB-below Station Rd. Spg.	10/30/2001	12:05	45	126.0	6.8	NM	0.57	10.6
9	Bailey Brook (in Woodchuck Hollow)	10/30/2001	10:45	44	109.7	6.8	NM	0.28	10.2
10	CSB-above Birch Creek	10/30/2001	13:50	46	121.5	6.9	NM	0.34	10.4
11	Birch Creek-above CSB	10/30/2001	13:50	47	120.2	6.7	NM	0.23	9.9
12	Birch Creek-below CSB	10/30/2001	13:45	47	118.1	6.9	NM	0.32	9.6
13	Birch Creek-Covered Bridge	10/30/2001	14:25	49	123.2	6.8	NM	0.52	9.4
14	Giggle Hollow	10/30/2001	14:15	43	39.2	6.7	NM	0.17	10.6
15	Rose Mt.Creek-above sewer outfall	10/30/2001	12:45	56	404	6.8	NM	0.64	7.1
16	Sewer Plant Outfall	10/30/2001	12:40	55	424	6.5	NM	0.61	5.6
17	Rose Mt.Creek-below sewer outfall	10/30/2001	12:35	56	387	6.7	NM	0.72	6.3
18	Birch Creek - below Rose Mt. Creek	10/30/2001	12:30	50	153.2	6.9	NM	1.43	10.0
19	Lost Clove	10/30/2001	14:45	48	46.3	6.7	NM	0.10	9.3
20	Woodchuck Hollow Spring	10/30/2001	10:55	44	33.7	6.3	NM	0.10	10.5
21	Railroad Spring	10/30/2001	11:20	DRY					
22	Pine Hill H20 Supply Overflow	10/30/2001	13:35	46	210	6.0	NM	0.07	9.9
23	Pine Hill H20 Supply	10/30/2001	11:12	46	270	6.9	NM	0.02	9.7
24	Black ABS Pipe-above Crystal Spring	10/30/2001	11:50	DRY					
25	Silo A	10/30/2001	11:55	46	182.5	6.2	NM	0.15	9.8
26	Station Road Silo B 4" Pipe	10/30/2001	11:10	45	55.7	6.6	NM	0.42	10.3
27	Station Rd. Silo B Overflow	10/30/2001	NM	NM	NM	NM	NM	NM	NM
28	Wildacres #3 Spring	10/30/2001	10:20	46	103.0	6.5	NM	0.15	10.4
29	Davenport Spring	10/30/2001	10:08	47	183.6	6.6	NM	0.10	9.7
30	Highmount Spring	10/30/2001	NM	NM	NM	NM	NM	NM	NM
31	Leach Spring	10/30/2001	9:45	46	40.7	6.8	NM	0.19	10.2

REMARKS:

CSB=Crystal Spring Brook

NM = Not measured

EXHIBIT C

Water Quality Analytical Results

of
Exhibit G,　Surface and Groundwater Assessment

for
Big Indian Plateau Water Supply

Summary of Water Quality Analytical Results
Streams and Springs
October 27, 2000
Belleayre Resort

Alpha Project No. 00151

Compound	Units	1	2	3	4	5	6	7	8	9	10	11	12	13
		CSB[1] above Birch Creek	Birch Creek above CSB	Railroad Spring	CSB above Cathedral Glen Brook	Cathedral Glen Brook above CSB	Silo A	Bailey[2] Brook	Silo B 4" Pipe	Pine Hill H_2O Supply Overflow	Lost Clove Brook	Birch Creek at Covered Bridge	Giggle Hollow Brook	Birch Cr. Below Treatment Plant
		10/27/2000	10/27/2000	10/27/2000	10/27/2000	10/27/2000	10/27/2000	10/27/2000	10/27/2000	10/27/2000	10/27/2000	10/27/2000	10/27/2000	10/27/2000
E. Coli	/100 mls	4	0	0	0	0	0	4	0	0	0	2	0	1
Total Coliform	/100 mls	12	0	2	1	1	0	>60	0	25	1	2	1	1
B.O.D./5 Day	mg/L	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Chloride	mg/L	13	8.6	29	25	13	17	6.9	5.4	28	3.8	12	4	12
Nitrite as Nitrogen	mg/L	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01
Nitrate as Nitrogen	mg/L	0.31	0.14	0.47	0.3	0.36	0.4	0.14	0.37	0.47	0.19	0.21	0.4	0.28
Iron	mg/L	0.092	0.022	0.014	0.027	0.023	0.036	0.013	0.011	0.006	0.008	0.031	0.01	0.037
Sodium	mg/L	4.72	3.11	12	10.3	4.29	6.97	2.2	0.74	11	0.45	4.79	0.36	5.48
Total Phosphorous	mg/L	0.034	0.028	0.035	0.033	0.022	0.031	0.033	0.025	0.043	0.02	0.028	0.034	0.043
Total Dissolved Solids	mg/L	34	27	72	68	32	51	22	23	75	6.5	45	14	44
Total Suspended Solids	mg/L	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Pesticides 8081	µg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

General Notes:
Analyses performed by Phoenix Environmental Laboratories, Inc.
ND = Not Detected
Number I.D.s refer to Figure 10

Notes:
1 CSB = Crystal Spring Brook
2 **Bailey Brook** is the name given here to the stream that runs down Woodchuck Hollow.

Summary of Water Quality Analytical Results
Streams and Springs
November 29, 2000
Belleayre Resort

Alpha Project No. 00151

Compound	Units	1	2	3	4	5	6	7	8	9	10	11	12	13
		CSB[1] above Birch Creek	Birch Creek above CSB	Railroad Spring	CSB above Cathedral Glen Brook	Cathedral Glen Brook above CSB	Silo A	Bailey[2] Brook	Silo B 4" Pipe	Pine Hill H_2O Supply Overflow	Lost Clove Brook	Birch Creek at Covered Bridge	Giggle Hollow Brook	Birch Cr. Below Treatment Plant
		11/29/2000	11/29/2000	11/29/2000	11/29/2000	11/29/2000	11/29/2000	11/29/2000	11/29/2000	11/29/2000	11/29/2000	11/29/2000	11/29/2000	11/29/2000
E. Coli	/100 mls	10	0	0	0	2	0	2	0	0	0	0	0	2
Total Coliform	/100 mls	10	>60	0	30	2	1	4	0	0	0	5	0	3
B.O.D./5 Day	mg/L	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Chloride	mg/L	9.8	6.3	22	20	8.7	14	5.5	<3	22	<3	8.5	<3	8.7
Nitrite as Nitrogen	mg/L	0.07	0.07	0.06	0.12	0.06	0.07	0.06	0.07	0.05	0.08	0.06	0.07	0.08
Nitrate as Nitrogen	mg/L	0.43	0.31	0.47	0.33	0.49	0.45	0.39	0.38	0.52	0.38	0.31	0.49	0.45
Iron	mg/L	0.016	0.01	0.007	0.01	0.031	0.008	0.037	0.008	0.007	0.006	0.031	0.012	0.03
Sodium	mg/L	4.5	3.4	11	10.1	3.8	6.7	2.2	0.8	11	0.5	4.5	0.4	5.3
Total Phosphorous	mg/L	0.041	0.039	0.037	0.04	0.039	0.047	0.032	0.05	0.048	0.035	0.047	0.047	0.039
Total Dissolved Solids	mg/L	43	29	71	54	38	57	33	20	68	26	59	65	48
Total Suspended Solids	mg/L	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Pesticides 8081	µg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

General Notes:
Analyses performed by Phoenix Environmental Laboratories, Inc.
ND = Not Detected
Number I.D.s refer to Figure 10

Notes:
1 CSB = Crystal Spring Brook
2 **Bailey Brook** is the name given here to the stream that runs down Woodchuck Hollow.

Summary of Water Quality Analytical Results
Streams and Springs
January 31, 2001
Belleayre Resort

Alpha Project No. 00151

Compound	Units	1	10	11	13
		CSB above Birch Creek	Lost Clove Brook	Birch Creek Covered Bridge	Birch Cr. Below Treatment Plant
		1/31/2001	1/31/2001	1/31/2001	1/31/2001
E. Coli	/100 mls	Pos.	Pos.	0	Pos.
Total Coliform	/100 mls	Pos.	Pos.	Pos.	Pos.
B.O.D./5 Day	mg/L	<2	<2	<2	<2
Chloride	mg/L	25	<3	49	42
Nitrite as Nitrogen	mg/L	<0.01	<0.01	<0.01	<0.01
Nitrate as Nitrogen	mg/L	0.47	0.38	0.4	0.8
Iron	mg/L	0.042	0.012	0.091	0.468
Sodium	mg/L	8	0.6	18	16
Total Phosphorous	mg/L	0.02	0.01	0.01	0.03
Total Dissolved Solids	mg/L	55	13	88	90
Total Suspended Solids	mg/L	<5	<5	<5	13
Pesticides 8081	µg/L	ND	ND	ND	ND

General Notes:

CSB = Crystal Spring Brook
Pos. = Positive
ND = Not Detected
Analyses performed by Phoenix Environmental Laboratories, Inc.
Number I.D.s refer to Figure 10

Summary of Water Quality Analytical Results
Streams and Springs
April 25, 2001
Belleayre Resort

Alpha Project No. 00151

Compound	Units	1	10	11	13
		CSB above Birch Creek	Lost Clove Brook	Birch Creek Covered Bridge	Birch Cr. Below Treatment Plant
		4/25/2001	4/25/2001	4/25/2001	4/25/2001
E. Coli	/100 mls	pos	neg	neg	neg
Total Coliform	/100 mls	pos	pos	pos	pos
B.O.D./5 Day	mg/L	<2.0	<2.0	<2.0	<2.0
Chloride	mg/L	7.2	<3.0	6.5	5.8
Nitrite as Nitrogen	mg/L	<0.01	<0.01	<0.01	<0.01
Nitrate as Nitrogen	mg/L	0.54	0.64	0.49	0.5
Iron	mg/L	0.092	<0.002	0.042	0.034
Sodium	mg/L	3.14	0.44	3.21	2.76
Total Phosphorous	mg/L	0.031	0.031	0.027	0.032
Total Dissolved Solids	mg/L	40	27	33	37
Total Suspended Solids	mg/L	<5.0	<5.0	<5.0	<5.0
Pesticides 8081	µg/L	ND	ND	ND	ND

General Notes:

CSB = Crystal Spring Brook
ND = Not Detected
Analyses performed by Phoenix Environmental Laboratories, Inc.
Number I.D.s refer to Figure 10
pos = positive
neg = negative

Summary of Water Quality Analytical Results
Streams and Springs
July 31, 2001
Belleayre Resort

Alpha Project No. 00151

Compound	Units	1	10	11	13
		CSB above Birch Creek	Lost Clove Brook	Birch Creek Covered Bridge	Birch Cr. Below Treatment Plant
		7/31/2001	7/31/2001	7/31/2001	7/31/2001
E. Coli	/100 mls	20	<10	40	30
Total Coliform	/100 mls	70	<10	40	50
B.O.D./5 Day	mg/L	<2.0	<2.0	<2.0	<2.0
Chloride	mg/L	24	<3.0	16	16
Nitrite as Nitrogen	mg/L	<0.01	<0.01	<0.01	<0.01
Nitrate as Nitrogen	mg/L	0.42	0.4	0.24	0.66
Iron	mg/L	0.003	<0.002	0.074	0.041
Sodium	mg/L	11.1	1.23	8.53	10.4
Total Phosphorous	mg/L	<0.01	<0.01	<0.01	<0.01
Total Dissolved Solids	mg/L	88	26	53	75
Total Suspended Solids	mg/L	<5.0	<5.0	<5.0	<5.0
Pesticides 8081	µg/L	ND	ND	ND	ND

General Notes:

CSB = Crystal Spring Brook
ND = Not Detected
Analyses performed by Phoenix Environmental Laboratories, Inc.
Number I.D.s refer to Figure 10

Summary of Water Quality Analytical Results
Streams and Springs
October 30, 2001
Belleayre Resort

Alpha Project No. 00151

Compound	Units	1	10	11	13
		CSB above Birch Creek	Lost Clove Brook	Birch Creek Covered Bridge	Birch Cr. Below Treatment Plant
		10/30/2001	10/30/2001	10/30/2001	10/30/2001
E. Coli	/100 mls	1	0	1	0
Total Coliform	/100 mls	2	2	1	15
B.O.D./5 Day	mg/L	<2.0	<2.0	<2.0	<2.0
Chloride	mg/L	18	<3.0	19	20
Nitrite as Nitrogen	mg/L	<0.01	<0.01	<0.01	<0.01
Nitrate as Nitrogen	mg/L	0.29	0.19	0.15	0.68
Iron	mg/L	0.007	0.005	0.028	0.026
Sodium	mg/L	7.7	1.02	9.23	10.8
Total Phosphorous	mg/L	0.03	0.02	0.02	0.03
Total Dissolved Solids	mg/L	64	99	92	86
Total Suspended Solids	mg/L	6	8	6	<5.0
Pesticides 8081	µg/L	NT	NT	NT	NT

General Notes:

CSB = Crystal Spring Brook
ND = Not Detected
Analyses performed by Phoenix Environmental Laboratories, Inc.
Number I.D.s refer to Figure 10
NT = Not Tested

Exhibit H

R1 24-Hour Pump Test Data

of
Big Indian Plateau Water Supply

Titan
DRILLING CORP.
ARKVILLE N. Y 12406 PHONE 914-586-4000

Rosenthal #1 Static Level; 170 ft

DATE: 10/16/00 JOB: Pine Hill C.R.V DATE:

PUMP: 10 hp PUMP SETTING: 189 ft

TIME	GPM	STATIC LEVEL	TIME	GPM	STATIC LEVEL
	0	28	8:39	112	65
7:55	115	41	8:44	112	66
7:56	115	44.5	8:49	112	67
7:57	115	47	8:55	112	67.5
7:58	115	48.5	9:25	112	71
7:59	115	50	9:55	112	73.5
8:00	115	51	10:25	112	75.5
8:01	115	52	10:55	112	77
8:02	115	53	11:25	112	79
8:03	115	53.5	11:55	111	80
8:04	115	54	12:25	111	81
8:05	115	55	12:55	110	81.5
8:06	115	55.5	1:25	108	82.5
8:07	115	56	2:25	108	84
8:08	115	56.5	3:25	107	86
8:09	112	57	4:25	107	88
8:14	112	59	5:30	107	89.5
8:19	112	60.5	6:30	107	91
8:24	112	62	7:30	107	92
8:29	112	62.5	8:30	107	93.5
8:34	112	64	9:30	107	94.5

Titan
DRILLING CORP.
ARKVILLE N. Y 12406 PHONE 914-586-4000

Rosenthal #1

DATE: 10/17/00 JOB: Pine Hill CRV DATE

PUMP: 10 hp PUMP SETTING: 189

TIME	GPM	STATIC LEVEL	TIME	GPM	STATIC LEVEL
10:30	107	96	8:06		71
11:30	107	96.5	8:07		70.5
12:30	107	97	8:08		70
1:30	107	97.5	8:09		69
2:30	107	98.5	8:10		68.5
3:30	107	99.5	8:15		62.5
4:30	104	100	8:20		58
5:30	104	101	8:25		54
6:30	104	101	8:30		50.5
7:30	104	101	8:35		47.5
7:55	104	101	8:40		44
7:56		84	8:45		43
7:57		86	8:50		42.5
7:58		77	8:55		41.5
7:59		76	9:00		40.5
8:00		75	9:30		40
8:01		74.5	10:00		39.5
8:02		73.5	10:30		39
8:03		73	11:00		38.5
8:04		72.5	11:30		38
8:05		72	12:00		37.5

Titan DRILLING CORP. ARKVILLE N. Y. 12406 PHONE 914-586-4000

DATE: 10/17/00 JOB: Rosenthal # 1 DATE:

PUMP: PUMP SETTING:

TIME	GPM	STATIC LEVEL	TIME	GPM	STATIC LEVEL
12:30		37			
1:30		35			
2:30		35.5			
3:30		35			
4:30		34.5			
24 HR	RECOVERY	READING 31 FT			

Exhibit I

Well R1 Report

STEP RATE AND CONSTANT RATE TESTING OF WELL R1

Big Indian Plateau
Belleayre Resort at Catskill Park
Pine Hill, New York

Prepared for:

Crossroads Ventures LLC
72 Andrews Lane Road
P.O. Box 267
Mount Tremper, New York 12457

November 2002

ALPHA GEOSCIENCE

ALPHA
GEOSCIENCE

Geology

Hydrology

Remediation

Water Supply

Step Rate and Constant Rate Testing
of Well R1

Big Indian Plateau
Belleayre Resort at Catskill Park
Pine Hill, New York

Prepared for:

Crossroads Ventures LLC
72 Andrews Lane Road
P.O. Box 267
Mount Tremper, New York 12457

Prepared by:

Alpha Geoscience
679 Plank Road
Clifton Park, New York 12065

November 2002

TABLE OF CONTENTS

APPENDICES

EXECUTIVE SUMMARY

Step rate and constant rate pumping tests were performed at well R1 for the proposed Belleayre Resort Big Indian Plateau facility. Well R1 was installed to provide a primary source of water for the facility's irrigation ponds. The objective of these pumping tests was to evaluate the drawdown characteristics (performance), water quality, and yield of well R1.

The step rate test was performed on August 26, 2002 and involved measuring the water level changes in well R1 in response to consecutive pumping rates of approximately 50 gpm, 70 gpm, 93 gpm and 114 gpm. A total drawdown of 46.04 feet was measured at the end of the step test. There were approximately 137 feet of available drawdown at the end of pumping based on a pump setting of 210 feet below grade.

The constant rate test involved pumping well R1 at an average rate of 77 gpm for 72 hours beginning on September 7, 2002. A total drawdown of 49.92 feet was measured at well R1 during the constant rate test. Water level and water quality data show that well R1 pumping did not impact Birch Creek. A long term pumping projection, based on 180 days of continuous pumping of well R1 at 77 gpm, without the positive effects of recharge or negative effects of a limited aquifer; produced a total drawdown of 79 feet. This projection indicates that at the end of 180 days there will be 103 feet of available drawdown at well R1 based on a pump setting of 210 feet.

The review and analysis of data collected during the constant rate test show that well R1 is capable of sustaining a long term, irrigation pond replenishment rate of 57 gpm without adversely impacting neighboring water supplies and surface water bodies.

1.0 INTRODUCTION

1.1 Objective

This report, prepared by Alpha Geoscience (Alpha), presents the results of step rate and constant rate pumping tests of well R1 for the proposed Belleayre Resort Big Indian Plateau facility. The primary objective of this testing was to evaluate the drawdown characteristics (performance), water quality, and yield of well R1. This report was prepared at the request of Crossroads Ventures LLC (Crossroads).

1.2 Background

Three wells (R1, R2 and R3) were installed in 2000 and 2001 on Crossroads' property located on Friendship Manor Road, Pine Hill, New York (Figure 1). The relative locations of the three wells on the property are shown on Figure 2. The approximate distances from well R1 to wells R2 and R3 are 265 feet and 195 feet, respectively. The distance from well R1 to Birch Creek is approximately 50 feet.

Well R1 was installed to provide a primary source of water for the Big Indian Plateau facility's irrigation ponds. It is anticipated that well R1 will be used to supply the 57 gpm projected average replenishment rate for the irrigation ponds. Well R2 will be used as a source of potable water for the Big Indian Plateau facility. Crossroads does not plan to use well R3 as a source of water at this time. The results of individual testing of well R2 are presented in Alpha's January 2002 report. The results of the simultaneous testing of wells R1 and R2 are addressed in Alpha's report "Simultaneous Testing of Wells R1 and R2".

Crossroads' personnel provided information on the location of private water supplies and on-site septic systems in this area. All residential or commercial properties that use their own well to provide water are located more than 1,500 feet from well R1, except a single residential well located approximately 675 feet to the northeast. Based on local inquiry, there are no known septic systems within 1,500 feet of well R1.

2.0 SCOPE OF WORK

The scope of services provided for the testing of well R1 was described in Alpha's August 27, 2002 letter to Mr. Dean Palen of the Ulster County Department of Health (UCDOH). Alpha's August 27, 2002 scope of services letter is presented in Appendix A. The following tasks were performed as described in the letter.

- Perform a step rate pumping test at well R1;
- Perform a 72-hour constant rate pumping test at well R1;
- Perform laboratory water quality analysis for selected parameters;
- Analyze pumping test data to project long term yield and potential pumping impacts.

3.0 METHODS

3.1 Pumping Tests

The step rate test was conducted to provide a benchmark for future evaluation of well performance in the event of apparent loss of yield and to select a pumping rate for the constant rate test. The constant rate test was performed to evaluate well yield, aquifer response to pumping and water quality. Field data were collected by Alpha, Crossroads, and the well drilling contractor Titan Drilling Corporation, of Arkville, New York (Titan).

The step rate and constant rate tests were conducted using a submersible pump supplied by Titan. Water was routed from the well head using 4-inch diameter plastic pipe and a ball valve and pipe orifice system were used to regulate and measure flow rates. The accuracy of the pipe orifice system was checked by measuring the time to fill a 32 gallon drum. The water was discharged from the piping system to Birch Creek at a location approximately 200 feet downstream from well R1.

Titan installed two plastic tubes in the pumping wells to accommodate a probe for manual water level measurements and a transducer for automated water level and temperature measurements. Field personnel used an electronic water level meter for the manual measurements and an In-situ data logger and transducer system for automated measurements.

Water levels were monitored at well R2, well R3, four residential wells, the Pine Hill Water Company Well PH-1, and the Station Road Well during constant rate testing. One of the monitored residential water supply wells (Residential Well 1) is located on the north side of NYS Route 28 and approximately 675 feet northeast of well R1. Residential Well 2 and Residential Well 3, which are owned by a Crossroads' employee, were also monitored. These wells are located approximately 2760 feet east and 3300 feet east, respectively, from well R1. The fourth monitored residential well (Residential Well 4) is located approximately 1500 feet east of well R1. Well PH-1 and Station Road Well are located approximately 7,400 feet and 6,000 feet, respectively from well R1.

Wells R1, R2 and R3 are bedrock wells with a total depths of 224 feet, 274 feet and 349 feet, respectively. Titan's records show that Residential Well 1 has a total depth of 50 feet and was completed in unconsolidated deposits. Residential Well 2 is reported to be a shallow well with a total depth of approximately 8 feet and is completed in unconsolidated deposits. Residential Well 3 has a reported total depth of approximately 145 feet and is completed in bedrock. Residential Well 4 is most likely a bedrock well given its total depth measurement of 155 feet. It could not be determined if the measurement at Residential Well 4 was the total well depth or the depth to the submersible pump. Residential Well 4 is no longer in use because the residence has been connected to the Pine Hill Water Company's water supply system.

Precipitation measurements were also collected during the constant rate test. An all weather rain gauge was installed at the property where Residential Well 2 is located.

3.1.1 Step Rate Test

The step rate test was performed at well R1 on August 26, 2002. This test involved measuring the water level changes in R1 in response to consecutive pumping rates of approximately 50 gpm, 70 gpm, 93 gpm and 114 gpm. Graphs of elapsed time and drawdown data, in linear and semi-log format, are presented in Appendix B. Table 1 presents elapsed time and drawdown data collected with the data logger system from well R1 during the step rate test.

3.1.2 Constant Rate Test and Recovery

The constant rate test involved pumping the well at an average rate of 77 gpm for 72 hours, beginning on September 7, 2002 at 10:30 am and ending on September 10, 2002 at 10:30 am. Graphs of elapsed time and drawdown data for wells R1 and R2 are presented in Appendix C. Water level and water temperature measurements collected in well R1 are presented in Table 2. Pumping rates of 76.3 to 79.3 gpm were measured by field personnel using a 32 gallon drum and stop watch (Table 3).

Water level monitoring was also performed after the pumping phase of the test to record recovery rates. Water level recovery data collected at well R1 is presented in Table 4. Graphs of time after pump shut down and residual drawdown for wells R1 and R2 are presented in Appendix D.

3.2 Water Quality Testing

Samples were collected from the pump discharge for field analysis of conductivity, pH, temperature and turbidity. The field analyses were conducted periodically to evaluate water quality changes during the progression of the test.

Water quality samples were collected on September 10, 2002 for laboratory analysis of parameters including calcium, iron, hardness, magnesium, manganese, sodium, alkalinity, chloride, conductivity, corrosivity, hydrogen sulfide, pH, total dissolved solids and turbidity. The samples were collected after approximately 71 hours of pumping. The analyses were conducted by Phoenix Environmental Laboratories, Inc. of Manchester, Connecticut (Phoenix), a NYSDOH - certified laboratory.

3.3 Ground Water/Surface Water Evaluation

The potential hydraulic connection between well R1, Birch Creek and the adjacent wetland area was evaluated during the constant rate test through a comparison of water level and water quality monitoring data. Well Points (WP-1 and WP-2), which have total depths of 10.2 feet and 7.9 feet, respectively, were utilized to monitor the unconsolidated deposits near Birch Creek. The connection to Birch Creek was evaluated by monitoring two stream level monitoring gauges, SG-1 and SG-2, which were installed on Birch Creek approximately 55 feet south and 140 feet southeast of well R1, respectively. Impacts on a wetland area were evaluated using a water level monitoring gauge (P-1) which was installed approximately 530 feet southeast of well R1 at a pond located within the wetland area.

Field water quality data were collected from well R1 and Birch Creek. The water quality data included temperature, pH, conductivity, and turbidity. Temperature data was collected at well R1 using an automated probe installed down the well in a stilling tube. All other well R1 water quality data was collected at the pipe orifice discharge point. All Birch Creek water quality data, except temperature, was collected at a sample point between stream gauges SG-1 and SG-2. A data logger installed at the stream gauge SG-1 location was used to collect Birch Creek temperature data.

4.0 RESULTS

4.1 Aquifer Testing

4.1.1 Conditions

Weather conditions prior to and during the constant rate test were drier than normal. The NYSDEC reported that southeastern New York, including Ulster County, had reached a drought watch status as of September 1, 2002. The NYSDEC reported that the precipitation deficit for the three months of June - August was generally 2 to 4 inches for the Catskill Region. The nine month precipitation deficit for the Catskill region was 6 to 8 inches. The drought conditions provided a good opportunity to evaluate well performance during dry conditions with limited recharge from precipitation.

The site did not receive any rainfall during the pumping portion of the constant rate test. A total of 0.94 inches of rainfall was recorded prior to pumping from September 2, 2002 to September 4, 2002. A total of 0.80 inches of rainfall was recorded after pumping on September 15 and 16, 2002.

4.1.2 Step Rate Test

The results of the step rate test (Table 1 and Appendix B) show that well R1 was able to sustain pumping rates as high as 114 gpm for 100 minutes. A total drawdown of 46.04 feet was measured at the end of the step test. There were approximately 137 feet of available drawdown at the end of pumping based on a pump setting of 210 feet below grade.

The data collected during step rate testing were also analyzed to select a pumping rate for the constant rate test. The analysis included drawing a best fit line to the time and drawdown data set for each step using a semi-log graph. The best fit line was extrapolated beyond the test period of each step. The extrapolated best fit line was then used to project the drawdown that would occur if the pumping continued for a period of 3 days with no recharge and without intercepting hydrogeologic boundaries. This analysis showed that this well could potentially sustain a rate of at least 77 gpm during a 3 day test without dropping the water level below the top of the pump.

4.1.3 Pretest Data Analysis

Data collected prior and during the constant rate test were used to evaluate natural water level trends and the influences of barometric pressure on the drawdown patterns observed during the test. If significant trends were observed prior to the test, then they could be used to separate those natural drawdowns from that caused solely by pumping. This data was collected with an electronic water level meter and automated equipment including In-situ water level and barometric pressure data loggers.

The data show that the water level in well R1 was relatively stable before pumping began. Pretest monitoring showed that water levels were slowly rising at rate of approximately 0.036 feet per hour in the six hour period prior to pumping. This rising water level trend ended when the water level dropped a total of 0.01 feet from 9:56 to 10:23 on September 7, 2002. Pretest barometric pressure data show that barometric pressure was relatively stable prior to the pumping test. Barometric pressure was also measured throughout the constant rate test. The change in barometric pressure was relatively small compared to the amount of water level change (drawdown) due to pumping. The evaluation of the pretest data did not show trends that would require that the constant rate test data be adjusted prior to analysis.

4.1.4 Constant Rate Test

A total drawdown of 49.92 feet was measured at well R1 during the constant rate test. There were approximately 132 feet of available drawdown at the end of the test based on a pump setting of 210 feet below grade. The semi-log graph (Appendix C) shows that the drawdown data for well R1 falls on a straight line for the final 3,800 minutes of pumping. The drawdown produced by pumping well R1 beyond 72 hours is expected to fall on the extension of this straight line unless the bedrock aquifer receives recharge or a hydrogeologic (aquifer) boundary is encountered, the well is pumped intermittently, or pumped at a rate that is different from the test rate.

Less drawdown can be expected when the aquifer receives recharge from precipitation and if a positive hydraulic boundary, such as a recharge source like a lake or stream, is reached by the pumping drawdown. If a negative boundary, such as the edge or outer limit of the bedrock aquifer, is encountered, then well R1 can be expected to be drawn down at a greater rate. More drawdown can be expected if the well is pumped at a higher rate and less drawdown is expected at rates lower than the test pumping rate.

The total drawdown measured at wells R2 and R3 was 34.69 feet and 34.32 feet, respectively. Water level data collected at well R3 are presented in Table 5. The semi-log graph for well R2 (Appendix C) shows that the water level in this well followed a straight line starting at approximately 600 minutes after pumping began. The drawdown at well R2 from pumping well R1 beyond 72 hours is expected to follow an extension of the straight line in the semi-log graph. The amount of drawdown at this well will be affected by recharge and can be affected by hydrogeologic boundary(s), if present.

The water level data collected at Residential Well 1 are presented in Table 6. The water level in this well declined a total of 1.75 feet during the constant rate test. The water level data indicate that Residential Well 1 is hydraulically influenced by well R1 pumping because the water level in this well declined when well R1 was pumping and then rose when the pump was shut off.

There are other factors that could also produce declining water levels in Residential Well 1. The pumping of this well to supply the residence at this location can be expected to lower the water level in this well. The water level in the well and the aquifer could also be declining during a dry period where recharge from precipitation is limited. The exact amount of water level decline due solely to well R1 pumping could not be distinguished from the water level decline produced by these other factors. The overall water level decline was relatively small, and therefore, the pumping of well R1 is not expected to limit the ability of Residential Well 1 to provide a residential water supply.

Water level data collected at Residential Wells 2 and 3, Pine Hill Water Company well PH-1 and the Station Road Well are presented in Tables 7, 8, 9 and 10, respectively. The water level data show that these wells were not hydraulically influenced by well R1 pumping. The water level in Residential Well 2 was stable throughout the pumping and recovery periods of the test. The artesian conditions at Residential Well 3 consistently produced flowing water through a well overflow pipe when this well was not in use. The rate of overflow, estimated visually, was consistent throughout the test pumping and recovery periods. The measured water levels in well PH-1 and the Station Road well showed little variation and no discernable decline during the period when well R1 was pumping.

Water level data collected at Residential Well 4 are presented in Table 11. The water level data indicate that Residential Well 4 is hydraulically influenced by well R1 pumping because the water level in this well declined when R1 was pumping and rose when the pump was shut off. The water level in Residential Well 4 declined only 9.91 feet during the constant rate test. The long term impact of this hydraulic influence is not addressed herein because Residential Well 4 is not used as a water source.

4.1.5 Recovery

Water level recovery was monitored in wells R1 and R2 after the cessation of pumping on September 10, 2002. Recovery to 93% of pretest water levels was measured at well R1 approximately 4318 minutes after pumping stopped. Recovery to 90% of pretest water levels was measured at well R2 approximately 4318 minutes after shutting off the pump. The data for wells R1 and R2 show that water levels experienced significant rebound, but did not return to pretest levels in three days of recovery monitoring. The measured water level recovery in wells R1 and R2 is consistent with the observed period of dry weather conditions when the bedrock aquifer received little or no recharge prior to and during the pumping test. The recovery data show that the bedrock aquifer will require recharge to sustain the continuous pumping of well R1 over extended periods. The bedrock aquifer at the site typically receives some recharge within a period of six months or less. The site area was actually experiencing a drought and was under a drought watch at the time of the test. The area usually experiences more rainfall and associated recharge. In fact, the water level monitoring showed that the bedrock aquifer received recharge soon after the constant rate test was completed. Water level data collected on October 17, 2002 show that the water level in wells R1 rose 1.10 feet above pretest levels. The bedrock aquifer apparently received recharge from the 8.16 inches of precipitation the site received from September 16, 2002 to October 17, 2002.

4.2 Water Quality

Review of the field water quality data for R1 (Table 12) shows that pH and conductivity were varied slightly throughout the pumping period with values of 7.4 to 7.9 and 137 to 192.2 micromhos (us), respectively. The highest turbidity value was recorded on the first day of pumping. Turbidity measurements of 1.08 to 8.70 Nephelometric Turbidity Units (NTUs) were measured during the pumping test. The temperature of the well discharge (Table 2) was stable throughout the test with values in a range of 48.21 to 48.37°F.

The results of the laboratory analysis for 13 parameters are presented in Appendix E. The laboratory reported value for the Langelier Index was -1.67 which shows that the water has moderately aggressive corrosive characteristics. Corrosive water may require treatment or buffering; however, it does not preclude use for irrigation purposes. The hydrogen sulfide result was below the laboratory detection limit.

4.3 Ground Water/Surface Water Evaluation

Water level data collected at well points WP-1, and WP-2, from stream gauges SG-1 and SG-2, and at pond gauge P-1 during the constant test are presented in Tables 13, 14, 15, 16 and 17, respectively. Field water quality data collected at well R1 and Birch Creek are presented in Tables 12 and 18, respectively.

The water level and water quality data collected during the constant rate test show that pumping at R1 did not impact Birch Creek or the wetland pond. Water levels at WP-1 (Table 13) declined a total of 0.23 feet during the pumping of well R1 and continued to decline after the pump was shut down. The data collected at WP-2 (Table 14) show an initial water level rise followed by stable water levels for the remainder of the pumping period. Water levels at stream gauges SG-1 (Table 15) and SG-2 (Table 16) showed small fluctuations during pumping, but the fluctuation did not correlate with the start or stop of well R1 pumping. The water levels measured at pond gauge P-1 rose slightly during the pumping portion of the test; therefore, there is no indication that the pond was influenced by well R1 pumping. The measured rise in the pond level is most likely a result of an increased surface water inflow to the pond.

The pretest water levels at Birch Creek, WP-1, WP-2 and bedrock wells R1, R2 and R3 were used to evaluate hydraulic connection between surface water and the bedrock aquifer. The pretest water level elevations in the bedrock wells were more than 14 feet below the water level elevation in Birch Creek and Well Points WP-1 and WP-2. Pretest water level elevations at the bedrock wells, well points and Birch Creek would be expected to be similar if the bedrock aquifer and Birch Creek were hydraulically connected.

The comparison of field water quality data showed that the quality of water at well R1 (Table 12) and Birch Creek (Tables 18 and 19) was distinctly different throughout the test. A comparison of pH, conductivity and turbidity results show that the average values for these parameters were higher for the samples collected at well R1 than those from Birch Creek. The temperature values were considerably lower for R1 than the creek. Temperature values for Birch Creek were recorded within a range of 54.58 to 63.54 °F throughout the monitoring period. The temperature measurements at well R1 (Table 2) were relatively stable at approximately 48°F. This contrast in water quality data shows that the pumping of well R2 did not impact Birch Creek.

4.4 Long Term Drawdown and Yield Projection

Data collected during the constant rate test were used to project long term drawdown and yield. The semi-log graph of well R1 elapsed time and drawdown data were used for the projection. The analysis included drawing a best fit line to the data collected during the final 1440 minutes of pumping. The best fit line was extrapolated and used to project drawdown as a result of pumping well R1 for 180 days at a rate of approximately 77 gpm. The semi-log graph presenting the long term projection is found in Appendix F. A total drawdown of 79 feet was projected at well R1. There will be approximately 103 feet of available drawdown at the end of the 180 day pumping period assuming a permanent pump setting of 210 feet.

The projection of drawdown at a rate of approximately 77 gpm is based on the assumptions that the bedrock aquifer receives no recharge from precipitation or snowmelt and that no hydrogeologic (aquifer) boundaries are encountered. The assumption of no recharge is conservative, since the bedrock aquifer system is expected to receive some recharge from precipitation within a six month period. Less drawdown can be expected when the aquifer receives recharge from precipitation and if a positive hydraulic boundary, such as a recharge source like a lake or stream, is encountered. A negative boundary, such as when drawdown from pumping reaches the edge or outer limit of the bedrock aquifer, is a less conservative assumption that can occur in settings similar to the R1 site area. If a negative boundary is encountered, then well R1 can be expected to draw down at a greater rate. If future pumping occurs during a drier condition than that experienced prior to and during the constant rate test, then well R1 can also be expected to draw down at a greater rate. The actual amount of drawdown from individual, long term withdrawal from well R1 is expected to be significantly less than the drawdown based on the 180 day projection undertaken for this report. Long term pumping of well R1 at the average pond replenishment rate of 57 gpm will produce significantly less drawdown than the 77 gpm pumping rate used for this projection.

A projection was also made to estimate the amount of drawdown at well R2 caused by long term pumping of well R1. The projection included the drawing of a best fit line to the final 1440 minutes of elapsed time and drawdown data collected at well R2. The best fit line was extrapolated and used to project drawdown at well R2 as a result of pumping well R1 for 180 days at a rate of approximately 77 gpm. The semi-log graph presenting the long term projection is found in Appendix F. A total drawdown of 66 feet was projected at well R2. This projection was based on the same assumptions described for the 180 day drawdown projection for well R1.

5.0 SUMMARY AND CONCLUSIONS

- A step rate pumping test performed at well R1 showed that this well is capable of a short term yield of at least 114 gpm.
- A 72-hour constant rate test performed at well R1 at a pumping rate of approximately 77 gpm resulted in a drawdown of 49.92 feet and left approximately 137 feet of available water above the pump intake.
- Water level data collected during the constant rate test indicate that Residential Wells 1 and 4 were hydraulically influenced by the pumping of well R1. The water level decline in Residential Well 1 was only 1.75 feet and is not expected to limit the ability of this well to provide a residential water supply. The water level in Residential Well 4 dropped only 9.91 feet and this well is not used as a water supply.
- Water level data collected during the constant rate test indicate that Pine Hill Water Company well PH-1, the Station Road well, Residential Well 2 and Residential Well 3 were not hydraulically influenced by well R1 pumping.
- The laboratory water quality analyses for hydrogen sulfide was below the detection limit and the Langelier Index result showed that the water has moderately aggressive corrosive characteristics. Well R1 water quality does not preclude use as a irrigation water supply.
- Evaluation of site hydrogeologic conditions, water level and field water quality data showed that well R1 is not hydraulically connected to Birch Creek or the wetland pond.
- A projection, based on 180 days of continuous pumping of well R1 at 77 gpm, without the positive effects of recharge or negative effects of a limited aquifer, produced a total drawdown of 79 feet at well R1. This projection indicated that at the end of the 180 day pumping period there will be approximately 103 feet of available drawdown at well R1.
- A projection based on 180 days of continuous pumping of well R1 at 77 gpm, without the positive effects of recharge or negative effects of a limited aquifer, produced a total drawdown of 66 feet at well R2. This projection indicated that at the end of 180 days there will be approximately 173 feet of available drawdown at well R2.

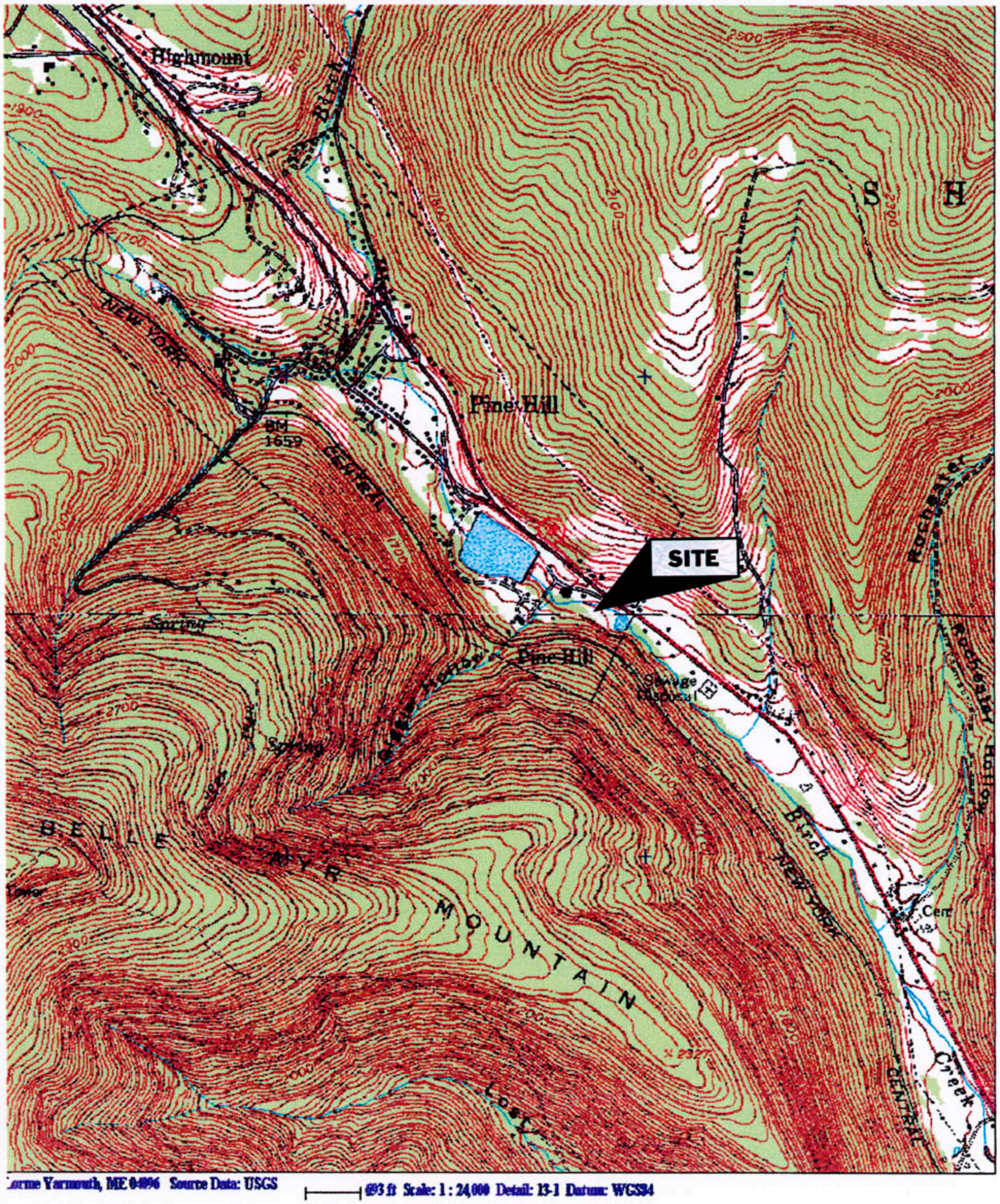
- Long term pumping of well R1 at the average irrigation pond replenishment rate of 57 gpm is expected to produce significantly less drawdown than the 180 day projection at 77 gpm shown in this report.
- The review and analysis of data collected during the constant rate test show that well R1 is capable of sustaining a long term, pond replenishment rate of 57 gpm without adversely impacting neighboring water supplies and surface water bodies.

F:\projects\2002\02121-02140\02130-Belleayre Pumping Test\Well R1 report.wpd

REFERENCES

Alpha Geoscience, January 2002. Installation, Development and Testing of Well R2.

FIGURES



West Kill and Shandaken Quadrangle
New York State
Department of Transportation
7.5 Minute Series

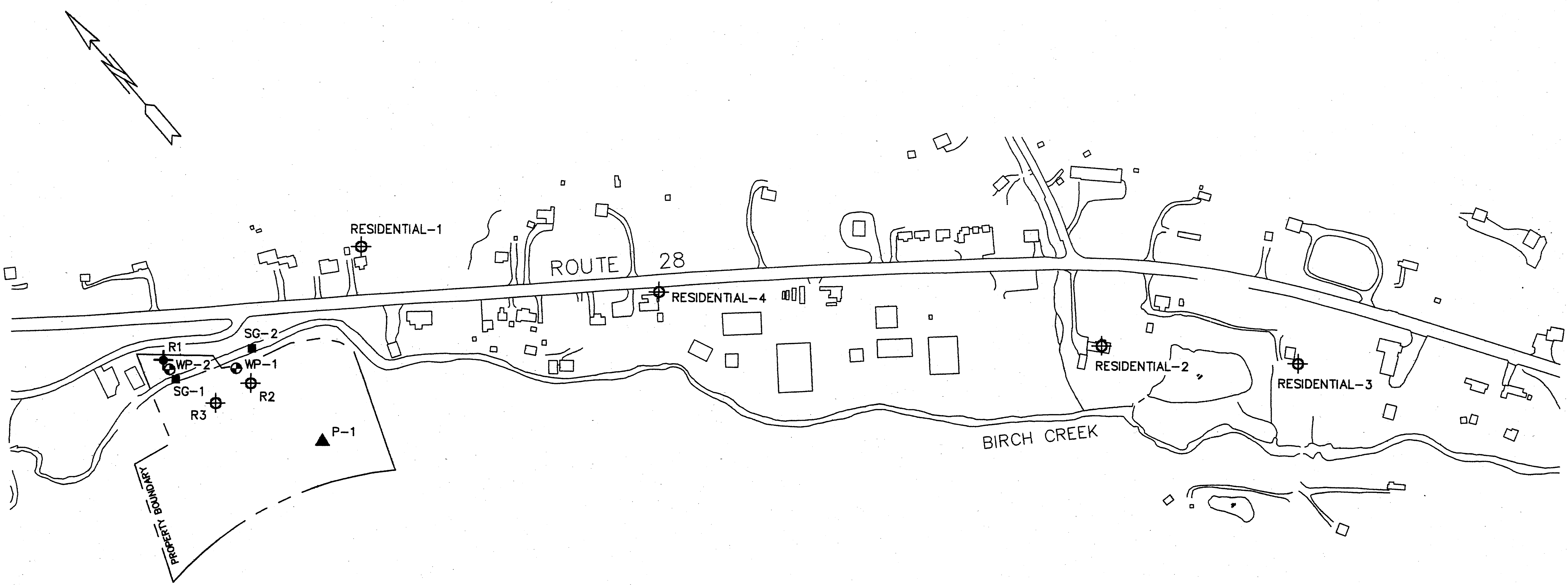
ALPHA
GEOSCIENCE

FIGURE 1
SITE LOCATION MAP

Well R1 Testing

Crossroads Ventures LLC

Alpha Project No. 02130



LEGEND

- PUMPING WELL R1 LOCATION
- OBSERVATION WELL LOCATION
- STREAM GAUGE LOCATION
- WELL POINT LOCATION
- POND GAUGE LOCATION

0 300 600

SCALE IN FEET

ALPHA GEOSCIENCE

FIGURE 2

WELL, WELL POINT, & GAUGE LOCATIONS

WELL R1 TESTING

CROSSROADS VENTURES LLC

ALPHA PROJECT NO. 02130

02130-02.DWG

TABLES

TABLE 1
CROSSROADS VENTURES LLC
Step Rate Test at Well R1
Well R1 Data

Elapsed Time (minutes)	Drawdown (feet)	Remarks	Elapsed Time (minutes)	Drawdown (feet)	Remarks
0.045	0.558	Step 1, average pumping rate = 50 gpm	0.6213	10.318	
0.05	0.72		0.6578	10.55	
0.0548	0.946		0.6963	10.769	
0.06	1.19		0.738	11.019	
0.0648	1.428		0.7813	11.243	
0.07	1.697		0.8278	11.5	
0.075	1.954		0.8762	11.725	
0.0798	2.173		0.9278	11.9	
0.0848	2.354		0.9828	12.038	
0.09	2.53		1.0412	12.138	
0.095	2.674		1.103	12.245	
0.1	2.799		1.1678	12.389	
0.1057	2.943		1.238	12.407	
0.1118	3.068		1.3113	12.119	
0.1185	3.193		1.3895	11.85	
0.1255	3.356		1.4728	11.744	
0.1327	3.512		1.5613	11.706	
0.1405	3.675		1.6547	11.763	
0.1488	3.894		1.753	11.819	
0.1578	4.132		1.858	11.581	
0.167	4.41		1.9678	10.937	
0.1768	4.698		2.0845	10.686	
0.1875	4.967		2.2097	10.561	
0.1985	5.236		2.3412	10.492	
0.21	5.518		2.4812	10.442	
0.2225	5.819		2.6297	10.436	
0.2358	6.075		2.7863	9.967	
0.2498	6.375		2.953	9.134	
0.2647	6.656		3.1297	8.759	
0.2803	6.932		3.3162	8.528	
0.297	7.201		3.5145	8.365	
0.3145	7.445		3.7245	8.246	
0.3333	7.733		3.9463	8.346	
0.3532	7.971		4.1812	8.428	
0.374	8.221		4.4295	8.453	
0.3963	8.49		4.6928	8.491	
0.4198	8.734		4.9728	8.51	
0.4445	8.947		5.2697	8.591	
0.4695	9.179		5.583	8.803	
0.4963	9.404		5.9145	8.892	
0.5247	9.611		6.2663	9.361	
0.5547	9.836		6.6395	9.742	
0.5862	10.08		7.0345	9.705	
			7.453	9.461	

Elapsed Time (minutes)	Drawdown (feet)	Remarks
7.8962	9.448	
8.3663	9.467	
8.8645	9.523	
9.3913	9.605	
9.9497	9.674	
10.5413	9.743	
11.168	9.843	
11.8312	9.943	
12.5347	10.044	
13.2795	10.132	
14.0695	10.232	
14.9062	10.332	
15.7913	10.445	
16.7295	10.589	
17.723	10.89	
18.7762	11.127	
19.7762	11.296	
20.7762	11.421	
21.7762	11.56	
22.7762	11.679	
23.7762	11.785	
24.7762	11.898	
25.7762	12.005	
26.7762	12.099	
27.7762	12.199	
28.7762	12.287	
29.7762	12.381	
30.7762	12.469	
31.7762	12.575	
32.7762	12.651	
33.7762	12.707	
34.7762	12.813	
35.7762	12.888	
36.7762	12.957	
37.7762	13.039	
38.7762	13.095	
39.7762	13.176	
40.7762	13.251	
41.7762	13.308	
42.7762	13.377	
43.7762	13.434	
44.7762	13.515	
45.7762	13.553	
46.7762	13.621	
47.7762	13.69	
48.7762	13.753	
49.7762	13.809	
50.7762	13.872	
51.7762	13.916	
52.7762	13.972	
53.7762	14.034	
54.7762	14.097	
55.7762	14.147	
56.7762	14.197	
57.7762	14.253	
58.7762	14.285	
59.7762	14.341	
60.7762	14.397	
61.7762	14.447	
62.7762	14.491	
63.7762	14.548	
64.7762	14.586	
65.7762	14.641	
66.7762	14.667	
67.7762	14.717	
68.7762	14.768	
69.7762	14.799	
70.7762	14.835	
71.7762	14.899	
72.7762	14.93	
73.7762	14.962	
74.7762	15.012	
75.7762	15.055	
76.7762	15.08	
77.7762	15.137	
78.7762	15.174	
79.7762	15.206	
80.7762	15.256	
81.7762	15.274	
82.7762	15.318	
83.7762	15.375	
84.7762	15.393	
85.7762	15.45	
86.7762	15.462	
87.7762	15.5	
88.7762	15.537	
89.7762	15.587	
90.7762	15.612	
91.7762	15.644	
92.7762	15.694	
93.7762	15.706	
94.7762	15.737	
95.7762	15.769	
96.7762	15.825	

Elapsed Time (minutes)	Drawdown (feet)	Remarks	Elapsed Time (minutes)	Drawdown (feet)	Remarks
97.7762	15.85		144.7762	23.037	
98.7762	15.888		145.7762	23.093	
99.7762	15.919		146.7762	23.156	
100.7762	17.946	Step 2, average	147.7762	23.194	
101.7762	18.521	pumping rate =	148.7762	23.225	
102.7762	18.853	70 gpm	149.7762	23.281	
103.7762	19.19		150.7762	23.306	
104.7762	19.503		151.7762	23.369	
105.7762	19.716		152.7762	23.419	
106.7762	19.916		153.7762	23.45	
107.7762	20.073		154.7762	23.494	
108.7762	20.21		155.7762	23.55	
109.7762	20.36		156.7762	23.588	
110.7762	20.567		157.7762	23.631	
111.7762	20.729		158.7762	23.669	
112.7762	20.842		159.7762	23.719	
113.7762	20.967		160.7762	23.75	
114.7762	21.061		161.7762	23.788	
115.7762	21.149		162.7762	23.819	
116.7762	21.268		163.7762	23.888	
117.7762	21.343		164.7762	23.894	
118.7762	21.443		165.7762	23.963	
119.7762	21.517		166.7762	23.994	
120.7762	21.592		167.7762	24	
121.7762	21.667		168.7762	24.057	
122.7762	21.742		169.7762	24.107	
123.7762	21.83		170.7762	24.138	
124.7762	21.899		171.7762	24.163	
125.7762	21.949		172.7762	24.219	
126.7762	22.049		173.7762	24.244	
127.7762	22.092		174.7762	24.282	
128.7762	22.161		175.7762	24.32	
129.7762	22.224		176.7762	24.345	
130.7762	22.299		177.7762	24.363	
131.7762	22.336		178.7762	24.42	
132.7762	22.405		179.7762	24.457	
133.7762	22.462		180.7762	24.463	
134.7762	22.499		181.7762	24.513	
135.7762	22.574		182.7762	24.532	
136.7762	22.618		183.7762	24.589	
137.7762	22.699		184.7762	24.595	
138.7762	22.731		185.7762	24.682	
139.7762	22.793		186.7762	24.689	
140.7762	22.837		187.7762	24.714	
141.7762	22.906		188.7762	24.751	
142.7762	22.956		189.7762	24.789	
143.7762	23.006		190.7762	24.82	

Elapsed Time (minutes)	Drawdown (feet)	Remarks	Elapsed Time (minutes)	Drawdown (feet)	Remarks
191.7762	24.839		238.7762	33.162	
192.7762	24.883		239.7762	33.212	
193.7762	24.901		240.7762	33.268	
194.7762	24.933		241.7762	33.318	
195.7762	24.964		242.7762	33.381	
196.7762	25.008		243.7762	33.443	
197.7762	25.039		244.7762	33.5	
198.7762	25.058		245.7762	33.543	
199.7762	25.095		246.7762	33.581	
200.7762	27.904	Step 3, average pumping rate = 93 gpm	247.7762	33.65	
201.7762	28.711		248.7762	33.681	
202.7762	29.123		249.7762	33.75	
203.7762	29.461		250.7762	33.794	
204.7762	29.698		251.7762	33.856	
205.7762	29.942		252.7762	33.894	
206.7762	30.161		253.7762	33.937	
207.7762	30.336		254.7762	33.987	
208.7762	30.499		255.7762	34.031	
209.7762	30.667		256.7762	34.081	
210.7762	30.805		257.7762	34.106	
211.7762	30.943		258.7762	34.169	
212.7762	31.093		259.7762	34.219	
213.7762	31.212		260.7762	34.275	
214.7762	31.318		261.7762	34.319	
215.7762	31.412		262.7762	34.363	
216.7762	31.518		263.7762	34.388	
217.7762	31.631		264.7762	34.444	
218.7762	31.699		265.7762	34.475	
219.7762	31.817		266.7762	34.525	
220.7762	31.892		267.7762	34.563	
221.7762	31.987		268.7762	34.607	
222.7762	32.061		269.7762	34.65	
223.7762	32.136		270.7762	34.7	
224.7762	32.224		271.7762	34.725	
225.7762	32.299		272.7762	34.757	
226.7762	32.375		273.7763	34.782	
227.7762	32.437		274.7763	34.844	
228.7762	32.524		275.7763	34.907	
229.7762	32.587		276.7763	34.925	
230.7762	32.662		277.7763	34.963	
231.7762	32.718		278.7763	34.994	
232.7762	32.787		279.7763	35.044	
233.7762	32.837		280.7763	35.076	
234.7762	32.918		281.7763	35.113	
235.7762	32.981		282.7763	35.157	
236.7762	33.049		283.7763	35.194	
237.7762	33.099		284.7763	35.201	

Elapsed Time (minutes)	Drawdown (feet)	Remarks	Elapsed Time (minutes)	Drawdown (feet)	Remarks
285.7763	35.251		332.7763	42.778	
286.7763	35.282		333.7763	42.847	
287.7763	35.332		334.7763	42.916	
288.7763	35.357		335.7763	42.984	
289.7763	35.42		336.7763	43.003	
290.7763	35.438		337.7763	43.085	
291.7763	35.482		338.7763	43.147	
292.7763	35.501		339.7763	43.216	
293.7763	35.557		340.7763	43.253	
294.7763	35.582		341.7763	43.322	
295.7763	35.601		342.7763	43.353	
296.7763	35.632		343.7763	43.435	
297.7763	35.663		344.7763	43.491	
298.7763	35.701		345.7763	43.547	
299.7763	35.738		346.7763	43.585	
300.7763	37.958	Step 4, average pumping rate = 114 gpm	347.7763	43.641	
301.7763	38.734		348.7763	43.71	
302.7763	39.165		349.7763	43.741	
303.7763	39.528		350.7763	43.778	
304.7763	39.802		351.7763	43.841	
305.7763	39.997		352.7763	43.879	
306.7763	40.234		353.7763	43.947	
307.7763	40.396		354.7763	43.985	
308.7763	40.565		355.7763	44.016	
309.7763	40.709		356.7763	44.085	
310.7763	40.846		357.7763	44.122	
311.7763	40.984		358.7763	44.197	
312.7763	41.078		359.7763	44.235	
313.7763	41.215		360.7763	44.291	
314.7763	41.334		361.7763	44.31	
315.7763	41.415		362.7763	44.397	
316.7763	41.553		363.7763	44.422	
317.7763	41.622		364.7763	44.472	
318.7763	41.684		365.7763	44.485	
319.7763	41.803		366.7763	44.547	
320.7763	41.909		367.7763	44.591	
321.7763	41.99		368.7763	44.635	
322.7763	42.053		369.7763	44.679	
323.7763	42.14		370.7763	44.735	
324.7763	42.215		371.7763	44.785	
325.7763	42.309		372.7763	44.816	
326.7763	42.372		373.7763	44.854	
327.7763	42.447		374.7763	44.904	
328.7763	42.503		375.7763	44.96	
329.7763	42.584		376.7763	44.979	
330.7763	42.653		377.7763	45.023	
331.7763	42.722		378.7763	45.085	

Elapsed Time (minutes)	Drawdown (feet)	Remarks
379.7763	45.11	
380.7763	45.148	
381.7763	45.166	
382.7763	45.204	
383.7763	45.254	
384.7763	45.298	
385.7763	45.323	
386.7763	45.373	
387.7763	45.423	
388.7763	45.466	
389.7763	45.51	
390.7763	45.535	
391.7763	45.541	
392.7763	45.61	
399	46.04	

TABLE 2
CROSSROADS VENTURES LLC
Constant Rate Test at Well R1
Well R1 Data

Elapsed Time (minutes)	Drawdown (feet)	Temperature (°Fahrenheit)	Elapsed Time (minutes)	Drawdown (feet)	Temperature (°Fahrenheit)
0.0548	0.489	48.37	0.6963	6.743	48.23
0.06	0.557	48.34	0.738	6.912	48.23
0.0648	0.676	48.37	0.7813	7.05	48.23
0.07	0.839	48.37	0.8278	7.175	48.23
0.075	0.977	48.37	0.8762	7.331	48.23
0.0798	1.152	48.37	0.9278	7.469	48.23
0.0848	1.328	48.37	0.9828	7.632	48.23
0.09	1.484	48.37	1.0412	7.801	48.23
0.095	1.54	48.37	1.103	7.957	48.23
0.1	1.691	48.37	1.1678	8.095	48.23
0.1057	1.835	48.37	1.238	8.258	48.23
0.1118	1.972	48.37	1.3113	8.427	48.23
0.1185	2.116	48.37	1.3895	8.57	48.23
0.1255	2.21	48.37	1.4728	8.733	48.23
0.1327	2.323	48.37	1.5613	8.883	48.23
0.1405	2.423	48.37	1.6547	9.051	48.21
0.1488	2.548	48.37	1.753	9.208	48.21
0.1578	2.686	48.37	1.858	9.358	48.21
0.167	2.883	48.28	1.9678	9.558	48.21
0.1768	3.052	48.28	2.0845	9.709	48.21
0.1875	3.233	48.28	2.2097	9.865	48.21
0.1985	3.408	48.28	2.3412	10.009	48.21
0.21	3.595	48.25	2.4812	10.197	48.21
0.2225	3.777	48.25	2.6297	10.36	48.21
0.2358	3.958	48.25	2.7863	10.541	48.21
0.2498	4.127	48.25	2.953	10.71	48.21
0.2647	4.328	48.25	3.1297	10.873	48.21
0.2803	4.478	48.25	3.3162	11.048	48.21
0.297	4.659	48.25	3.5145	11.229	48.21
0.3145	4.816	48.25	3.7245	11.386	48.21
0.3333	4.966	48.25	3.9463	11.58	48.21
0.3532	5.135	48.25	4.1812	11.749	48.21
0.374	5.273	48.25	4.4295	11.93	48.21
0.3963	5.423	48.25	4.6928	12.112	48.21
0.4198	5.561	48.25	4.9728	12.281	48.21
0.4445	5.711	48.25	5.2697	12.462	48.21
0.4695	5.842	48.25	5.583	12.637	48.21
0.4963	6.005	48.25	5.9145	12.8	48.21
0.5247	6.099	48.25	6.2663	13.007	48.21
0.5547	6.249	48.25	6.6395	13.163	48.21
0.5862	6.362	48.25	7.0345	13.388	48.21
0.6213	6.48	48.23	7.453	13.557	48.21
0.6578	6.624	48.23	7.8962	13.752	48.23

Elapsed Time (minutes)	Drawdown (feet)	Temperature (°Fahrenheit)	Elapsed Time (minutes)	Drawdown (feet)	Temperature (°Fahrenheit)
8.3663	13.94	48.23	133.2678	24.575	48.37
8.8645	14.121	48.23	141.1678	24.844	48.37
9.3913	14.297	48.23	149.5363	25.125	48.37
9.9497	14.503	48.23	158.4012	25.413	48.37
10.5413	14.697	48.23	167.7912	25.695	48.37
11.168	14.886	48.25	177.738	25.982	48.37
11.8312	15.067	48.25	188.2745	26.295	48.37
12.5347	15.236	48.25	198.2745	26.527	48.37
13.2795	15.443	48.25	208.2745	26.808	48.37
14.0695	15.638	48.28	218.2745	27.127	48.37
14.9062	15.838	48.28	228.2745	27.408	48.37
15.7913	16.013	48.28	238.2745	27.64	48.37
16.7295	16.232	48.28	248.2745	27.84	48.37
17.723	16.413	48.28	258.2745	28.084	48.37
18.7762	16.608	48.3	268.2745	28.303	48.37
19.8913	16.84	48.3	278.2745	28.522	48.37
21.073	17.034	48.3	288.2745	28.722	48.37
22.3247	17.235	48.32	298.2745	28.928	48.37
23.6497	17.441	48.32	308.2745	29.31	48.37
25.0545	17.642	48.32	318.2745	29.504	48.37
26.5428	17.861	48.32	328.2745	29.723	48.37
28.1178	18.073	48.32	338.2745	29.91	48.37
29.7863	18.261	48.32	348.2745	30.104	48.37
31.5545	18.455	48.32	358.2745	30.279	48.37
33.428	18.681	48.34	368.2745	30.448	48.37
35.4112	18.913	48.34	378.2745	30.629	48.37
37.513	19.106	48.34	388.2745	30.798	48.37
39.7397	19.35	48.34	398.2745	30.973	48.37
42.098	19.551	48.34	408.2745	31.149	48.37
44.5963	19.776	48.34	418.2745	31.305	48.37
47.2428	20.007	48.34	428.2745	31.436	48.37
50.0463	20.233	48.34	438.2745	31.574	48.37
53.0147	20.458	48.34	448.2745	31.761	48.37
56.1595	20.689	48.34	458.2745	31.912	48.37
59.4913	20.946	48.34	468.2745	32.005	48.37
63.0195	21.153	48.37	478.2745	32.149	48.37
66.758	21.378	48.37	488.2745	32.312	48.37
70.7178	21.635	48.37	498.2745	32.487	48.37
74.9113	21.885	48.37	508.2745	32.587	48.37
79.3545	22.11	48.37	518.2745	32.724	48.34
84.0613	22.348	48.37	528.2745	32.862	48.37
89.0462	22.761	48.37	538.2745	32.975	48.37
94.3262	22.98	48.37	548.2747	33.1	48.37
99.9197	23.243	48.37	558.2747	33.262	48.37
105.8447	23.48	48.37	568.2747	33.394	48.37
112.1197	23.774	48.37	578.2747	33.519	48.37
118.7678	24.024	48.37	588.2747	33.631	48.37
125.8095	24.293	48.37	598.2747	33.756	48.37

Elapsed Time (minutes)	Drawdown (feet)	Temperature (°Fahrenheit)	Elapsed Time (minutes)	Drawdown (feet)	Temperature (°Fahrenheit)
608.2747	33.831	48.37	1088.2747	38.302	48.37
618.2747	33.988	48.37	1098.2745	38.346	48.37
628.2747	34.107	48.37	1108.2745	38.42	48.34
638.2747	34.3	48.37	1118.2745	38.477	48.34
648.2747	34.344	48.37	1128.2745	38.571	48.37
658.2747	34.463	48.37	1138.2745	38.583	48.34
668.2747	34.551	48.37	1148.2745	38.627	48.37
678.2747	34.719	48.34	1158.2745	38.77	48.34
688.2747	34.844	48.34	1168.2745	38.84	48.37
698.2747	34.945	48.37	1178.2745	38.883	48.34
708.2747	35.038	48.37	1188.2745	38.914	48.34
718.2747	35.195	48.37	1198.2745	39.378	48.37
728.2747	35.245	48.37	1208.2745	39.177	48.34
738.2747	35.419	48.34	1218.2745	39.214	48.34
748.2747	35.495	48.37	1228.2745	39.283	48.34
758.2747	35.582	48.37	1238.2745	39.408	48.34
768.2747	35.732	48.37	1248.2745	39.452	48.34
778.2747	35.839	48.37	1258.2745	39.628	48.37
788.2747	35.939	48.37	1268.2745	39.927	48.34
798.2747	36.064	48.37	1278.2745	40.033	48.34
808.2747	36.158	48.37	1288.2745	40.133	48.34
818.2747	36.214	48.37	1298.2745	40.221	48.34
828.2747	36.376	48.37	1308.2745	40.234	48.34
838.2747	36.358	48.37	1318.2745	40.058	48.34
848.2747	36.502	48.37	1328.2745	40.127	48.34
858.2747	36.57	48.37	1338.2745	40.221	48.34
868.2747	36.583	48.37	1348.2745	40.352	48.34
878.2747	36.645	48.34	1358.2745	40.527	48.34
888.2747	36.739	48.37	1368.2745	40.54	48.34
898.2747	36.877	48.37	1378.2745	40.696	48.34
908.2747	36.996	48.37	1388.2745	40.752	48.34
918.2747	37.039	48.37	1398.2745	40.759	48.34
928.2747	37.157	48.34	1408.2745	40.896	48.34
938.2747	37.233	48.37	1418.2745	40.877	48.34
948.2747	37.302	48.37	1428.2745	40.909	48.34
958.2747	37.377	48.37	1438.2745	40.896	48.34
968.2747	37.471	48.37	1448.2745	41.046	48.34
978.2747	37.552	48.37	1458.2745	41.059	48.34
988.2747	37.54	48.37	1468.2745	41.121	48.34
998.2747	37.677	48.37	1478.2745	41.153	48.34
1008.2747	37.733	48.37	1488.2745	41.246	48.34
1018.2747	37.715	48.37	1498.2745	41.284	48.34
1028.2747	37.89	48.37	1508.2745	41.34	48.34
1038.2747	37.901	48.34	1518.2745	41.39	48.34
1048.2747	38.026	48.34	1528.2745	41.471	48.34
1058.2747	38.021	48.37	1538.2745	41.509	48.34
1068.2747	38.201	48.34	1548.2745	41.559	48.34
1078.2747	38.252	48.37	1558.2745	41.628	48.34

Elapsed Time (minutes)	Drawdown (feet)	Temperature (°Fahrenheit)	Elapsed Time (minutes)	Drawdown (feet)	Temperature (°Fahrenheit)
1568.2745	41.69	48.34	2048.2745	43.991	48.34
1578.2745	41.74	48.34	2058.2745	44.097	48.34
1588.2745	41.772	48.34	2068.2745	44.072	48.34
1598.2745	41.853	48.34	2078.2745	44.141	48.34
1608.2745	41.903	48.34	2088.2745	44.166	48.34
1618.2745	41.94	48.34	2098.2745	44.247	48.34
1628.2745	41.984	48.34	2108.2745	44.253	48.34
1638.2745	42.034	48.34	2118.2745	44.291	48.34
1648.2745	42.084	48.34	2128.2745	44.228	48.34
1658.2745	42.14	48.34	2138.2745	44.322	48.34
1668.2745	42.172	48.34	2148.2745	44.416	48.34
1678.2745	42.209	48.34	2158.2745	44.516	48.34
1688.2745	42.228	48.34	2168.2745	44.572	48.34
1698.2745	42.29	48.34	2178.2745	44.597	48.34
1708.2745	42.34	48.34	2188.2747	44.672	48.34
1718.2745	42.428	48.34	2198.2747	44.735	48.34
1728.2745	42.49	48.34	2208.2747	44.704	48.34
1738.2745	42.522	48.34	2218.2747	44.81	48.34
1748.2745	42.578	48.34	2228.2747	44.86	48.34
1758.2745	42.597	48.34	2238.2747	44.922	48.34
1768.2745	42.634	48.34	2248.2747	44.935	48.34
1778.2745	42.697	48.34	2258.2747	44.972	48.34
1788.2745	42.734	48.34	2268.2747	44.966	48.34
1798.2745	42.791	48.34	2278.2747	45.06	48.34
1808.2745	42.828	48.34	2288.2747	45.047	48.34
1818.2745	42.828	48.34	2298.2747	45.141	48.34
1828.2745	42.897	48.34	2308.2747	45.154	48.34
1838.2745	42.972	48.34	2318.2747	45.185	48.34
1848.2745	43.009	48.34	2328.2747	45.279	48.34
1858.2745	43.047	48.34	2338.2747	45.329	48.34
1868.2745	43.103	48.34	2348.2747	45.316	48.34
1878.2745	43.122	48.34	2358.2747	45.397	48.34
1888.2745	43.172	48.34	2368.2747	45.36	48.34
1898.2745	43.159	48.34	2378.2747	45.36	48.34
1908.2745	43.222	48.34	2388.2747	45.416	48.34
1918.2745	43.303	48.34	2398.2747	45.479	48.34
1928.2745	43.322	48.34	2408.2747	45.472	48.34
1938.2745	43.403	48.34	2418.2747	45.547	48.34
1948.2745	43.359	48.34	2428.2747	45.61	48.34
1958.2745	43.384	48.34	2438.2747	45.56	48.34
1968.2745	43.61	48.34	2448.2747	45.673	48.34
1978.2745	43.685	48.34	2458.2747	45.698	48.34
1988.2745	43.697	48.34	2468.2747	45.716	48.34
1998.2745	43.728	48.34	2478.2747	45.754	48.34
2008.2745	43.866	48.34	2488.2747	45.716	48.34
2018.2745	43.891	48.34	2498.2747	45.829	48.34
2028.2745	43.947	48.34	2508.2747	45.785	48.34
2038.2745	43.972	48.34	2518.2747	45.885	48.34

Elapsed Time (minutes)	Drawdown (feet)	Temperature (°Fahrenheit)	Elapsed Time (minutes)	Drawdown (feet)	Temperature (°Fahrenheit)
2528.2747	45.941	48.34	3008.2747	47.254	48.34
2538.2747	45.929	48.34	3018.2747	47.273	48.34
2548.2747	45.91	48.34	3028.2747	47.292	48.34
2558.2747	45.904	48.34	3038.2747	47.329	48.34
2568.2747	45.979	48.34	3048.2747	47.335	48.34
2578.2747	46.048	48.34	3058.2747	47.378	48.32
2588.2747	46.066	48.34	3068.2747	47.417	48.34
2598.2747	46.085	48.34	3078.2747	47.454	48.34
2608.2747	46.06	48.34	3088.2747	47.485	48.34
2618.2747	46.173	48.34	3098.2747	47.498	48.34
2628.2747	46.123	48.34	3108.2747	47.485	48.34
2638.2747	46.229	48.34	3118.2747	47.547	48.32
2648.2747	46.223	48.34	3128.2747	47.566	48.32
2658.2747	46.21	48.34	3138.2747	47.591	48.32
2668.2747	46.248	48.34	3148.2747	47.623	48.34
2678.2747	46.36	48.34	3158.2747	47.647	48.32
2688.2747	46.273	48.34	3168.2747	47.678	48.32
2698.2747	46.379	48.34	3178.2747	47.71	48.32
2708.2747	46.404	48.34	3188.2747	47.717	48.34
2718.2747	46.46	48.34	3198.2747	47.735	48.32
2728.2747	46.448	48.34	3208.2747	47.772	48.32
2738.2747	46.423	48.34	3218.2747	47.822	48.32
2748.2747	46.541	48.34	3228.2747	47.841	48.32
2758.2747	46.554	48.34	3238.2747	47.853	48.32
2768.2747	46.591	48.34	3248.2747	47.885	48.32
2778.2747	46.616	48.34	3258.2747	47.885	48.32
2788.2747	46.573	48.34	3268.2747	47.91	48.34
2798.2747	46.685	48.34	3278.2747	47.898	48.34
2808.2747	46.666	48.34	3288.2747	47.941	48.32
2818.2747	46.748	48.34	3298.2747	47.935	48.34
2828.2747	46.779	48.34	3308.2747	47.967	48.34
2838.2747	46.704	48.34	3318.2747	47.991	48.32
2848.2747	46.829	48.34	3328.2747	48.022	48.32
2858.2747	46.829	48.34	3338.2747	47.978	48.32
2868.2747	46.879	48.34	3348.2747	48.041	48.32
2878.2747	46.91	48.34	3358.2747	48.053	48.32
2888.2747	46.891	48.34	3368.2747	48.072	48.32
2898.2747	46.979	48.34	3378.2747	48.091	48.32
2908.2747	46.985	48.34	3388.2747	48.041	48.32
2918.2747	47.004	48.34	3398.2747	48.11	48.32
2928.2747	47.041	48.34	3408.2747	48.147	48.32
2938.2747	47.073	48.34	3418.2747	48.16	48.32
2948.2747	47.123	48.34	3428.2747	48.197	48.32
2958.2747	47.129	48.34	3438.2747	48.153	48.32
2968.2747	47.167	48.34	3448.2747	48.147	48.32
2978.2747	47.185	48.34	3458.2747	48.203	48.32
2988.2747	47.192	48.34	3468.2747	48.272	48.32
2998.2747	47.26	48.34	3478.2747	48.31	48.32

Elapsed Time (minutes)	Drawdown (feet)	Temperature (°Fahrenheit)	Elapsed Time (minutes)	Drawdown (feet)	Temperature (°Fahrenheit)
3488.2747	48.322	48.32	3968.2747	49.291	48.32
3498.2747	48.235	48.32	3978.2747	49.328	48.32
3508.2747	48.291	48.32	3988.2747	49.322	48.32
3518.2747	48.316	48.32	3998.2747	49.26	48.32
3528.2747	48.391	48.32	4008.2747	49.272	48.32
3538.2747	48.403	48.32	4018.2747	49.31	48.32
3548.2747	48.435	48.32	4028.2747	49.366	48.32
3558.2747	48.441	48.32	4038.2747	49.41	48.32
3568.2747	48.453	48.32	4048.2747	49.341	48.32
3578.2747	48.491	48.32	4058.2747	49.341	48.32
3588.2747	48.51	48.32	4068.2747	49.428	48.32
3598.2747	48.478	48.32	4078.2747	49.435	48.32
3608.2747	48.516	48.32	4088.2747	49.416	48.32
3618.2747	48.535	48.32	4098.2747	49.447	48.32
3628.2747	48.553	48.32	4108.2747	49.447	48.32
3638.2747	48.641	48.32	4118.2747	49.472	48.32
3648.2747	48.635	48.32	4128.2747	49.472	48.32
3658.2747	48.616	48.32	4138.2747	49.422	48.32
3668.2747	48.647	48.32	4148.2747	49.516	48.32
3678.2747	48.722	48.32	4158.2747	49.453	48.32
3688.2747	48.703	48.32	4168.2747	49.554	48.32
3698.2747	48.766	48.32	4178.2747	49.491	48.32
3708.2747	48.785	48.32	4188.2747	49.541	48.32
3718.2747	48.86	48.32	4198.2747	49.497	48.32
3728.2747	48.797	48.32	4208.2747	49.616	48.32
3738.2747	48.847	48.32	4218.2747	49.529	48.32
3748.2747	48.922	48.32	4228.2747	49.635	48.32
3758.2747	48.847	48.32	4238.2747	49.61	48.32
3768.2747	48.878	48.32	4248.2747	49.635	48.32
3778.2747	48.953	48.32	4258.2747	49.666	48.32
3788.2747	48.916	48.32	4268.2747	49.604	48.32
3798.2747	48.935	48.32	4278.2747	49.685	48.32
3808.2747	48.972	48.32	4288.2747	49.635	48.32
3818.2747	49.041	48.32	4298.2747	49.722	48.32
3828.2747	49.085	48.32	4301	49.87	
3838.2747	49.097	48.32	4315	49.85	
3848.2747	49.141	48.32	4319	49.92	
3858.2747	49.066	48.32			
3868.2747	49.147	48.32			
3878.2747	49.072	48.32			
3888.2747	49.116	48.32			
3898.2747	49.141	48.32			
3908.2747	49.228	48.32			
3918.2747	49.178	48.32			
3928.2747	49.235	48.32			
3938.2747	49.278	48.32			
3948.2747	49.291	48.32			
3958.2747	49.291	48.32			

TABLE 3
CROSSROADS VENTURES, INC.
Constant Rate Test at Well R1
Pumping Rate Data

Date	Time	Pipe Orifice (inches)	Pumping Rate (gpm)	Remarks
9/7/2002	10:33	25.75	76.7	Drum measurement = 79.3 gpm
	10:45	25.5	76.3	Drum measurement = 78.3 gpm
	11:00	25.25	75.9	Drum measurement = 78.3 gpm
	11:15	25.0	75.5	Drum measurement = 77.9 gpm
	11:33	25.0	75.5	Drum measurement = 76.3 gpm
	11:59	25.5	76.3	Drum measurement = 76.9 gpm
	12:30	25.5	76.3	
	1:00	25.5	76.3	
	1:30	25.25	75.9	
	2:00	25.25	75.9	
	2:30	25.75	76.7	
	3:30	25.25	75.9	
	4:30	25.75	76.7	
	5:30	25.5	76.3	
	6:30	25.5	76.3	
	7:30	25.5	76.3	
	8:30	25.5	76.3	
	9:30	25.5	76.3	
	10:30	25.5	76.3	
	11:30	25.5	76.3	
9/8/2002	12:30	25.5	76.3	
	1:30	25.5	76.3	
	2:30	25.5	76.3	
	3:30	25.5	76.3	
	4:30	25.5	76.3	
	6:30	25.5	76.3	
	7:30	25.5	76.3	
	8:30	25.5	76.3	
	9:44	25.75	76.7	
	10:30	25.6	76.4	
	11:30	25.6	76.4	
	12:30	25.6	76.4	
	1:30	25.6	76.4	
	2:30	25.6	76.4	
	3:30	25.6	76.4	
	4:30	25.6	76.4	
	5:30	25.6	76.4	
	6:30	25.6	76.4	
	7:30	25.75	76.7	
	8:30	25.6	76.4	
	9:30	25.75	76.7	
	10:30	25.8	76.8	
	11:30	25.5	76.3	

Date	Time	Pipe Orifice (inches)	Pumping Rate (gpm)	Remarks
9/9/2002	12:30	25.75	76.7	
	1:30	25.75	76.7	
	2:30	25.75	76.7	
	3:30	25.5	76.3	
	4:30	25.75	76.7	
	5:30	25.5	76.3	
	6:30	25.75	76.7	
	7:30	25.75	76.7	
	8:30	25.75	76.7	
	9:30	25.75	76.7	
	10:30	25.75	76.7	
	11:30	25.75	76.7	
	12:30	25.75	76.7	
	1:30	25.75	76.7	
	2:30	25.75	76.7	
	3:30	25.75	76.7	
	4:30	25.5	76.3	
	5:30	25.75	76.7	
	6:30	25.75	76.7	
	7:30	25.75	76.7	
	8:30	25.75	76.7	
	9:30	25.75	76.7	
	10:30	25.75	76.7	
	11:30	25.75	76.7	
9/10/2002	12:45	25.75	76.7	
	1:30	25.75	76.7	
	2:30	25.75	76.7	
	3:30	25.75	76.7	
	4:30	25.75	76.7	
	5:30	25.5	76.3	
	6:30	25.5	76.3	
	7:30	25.5	76.3	
	8:30	25.5	76.3	
	9:30	25.5	76.3	Drum measurement = 78.3 gpm
	10:25	25.5	76.3	

TABLE 4
CROSSROADS VENTURES, INC.
Constant Rate Test at Well R1
Well R1 Recovery Data

Time After Pumping Stopped (minutes)	Residual Drawdown (feet)	Time After Pumping Stopped (minutes)	Residual Drawdown (feet)
0.005	49.867	0.3742	45.177
0.01	49.842	0.3963	45.052
0.015	49.83	0.4198	44.927
0.02	49.824	0.4447	44.796
0.025	49.824	0.4697	44.665
0.03	49.605	0.4963	44.539
0.035	47.524	0.5247	44.408
0.04	47.086	0.5547	44.283
0.045	48.225	0.5863	44.152
0.05	48.95	0.6213	44.008
0.055	49.256	0.6578	43.871
0.06	49.218	0.6963	43.727
0.065	49.043	0.738	43.576
0.07	48.812	0.7813	43.438
0.075	48.612	0.828	43.282
0.08	48.431	0.8763	43.126
0.0848	48.281	0.928	42.976
0.09	48.156	0.983	42.819
0.095	48.056	1.0413	42.663
0.1	47.962	1.103	42.513
0.1058	47.862	1.168	42.357
0.112	47.756	1.238	42.194
0.1185	47.649	1.3113	42.044
0.1255	47.543	1.3897	41.875
0.1328	47.424	1.473	41.712
0.1407	47.293	1.5613	41.543
0.149	47.156	1.6547	41.374
0.1578	47.018	1.753	41.212
0.167	46.903	1.858	41.043
0.177	46.772	1.968	40.881
0.1875	46.634	2.0847	40.713
0.1985	46.497	2.2097	40.544
0.2102	46.372	2.3412	40.375
0.2227	46.247	2.4813	40.207
0.2358	46.122	2.6297	40.038
0.2498	45.997	2.7863	39.863
0.2647	45.878	2.953	39.689
0.2803	45.759	3.1297	39.52
0.297	45.646	3.3163	39.346
0.3147	45.527	3.5147	39.164
0.3333	45.415	3.7247	38.984
0.3532	45.302	3.9463	38.809

Time After Pumping Stopped (minutes)	Residual Drawdown (feet)	Time After Pumping Stopped (minutes)	Residual Drawdown (feet)
4.1813	38.628	63.0197	28.475
4.4295	38.446	66.758	28.224
4.693	38.259	70.718	27.979
4.973	38.078	74.9113	27.734
5.2697	37.891	79.3547	27.483
5.583	37.691	84.0613	27.232
5.9147	37.504	89.0463	26.981
6.2663	37.31	94.3263	26.724
6.6397	37.116	99.9197	26.467
7.0347	36.916	105.8447	26.205
7.453	36.723	112.1197	25.941
7.8963	36.517	118.768	25.672
8.3663	36.317	125.8097	25.409
8.8647	36.11	133.268	25.133
9.3913	35.91	141.168	24.864
9.9497	35.705	149.5363	24.583
10.5413	35.498	158.4013	24.301
11.168	35.292	167.7913	24.02
11.8313	35.08	177.738	23.732
12.5347	34.874	188.2747	23.444
13.2797	34.661	198.2747	23.175
14.0697	34.449	208.2747	22.925
14.9063	34.23	218.2747	22.681
15.7913	34.018	228.2747	22.443
16.7297	33.799	238.2747	22.218
17.723	33.58	248.2747	21.993
18.7763	33.368	258.2747	21.786
19.8913	33.143	268.2747	21.574
21.073	32.918	278.2747	21.373
22.3247	32.693	288.2747	21.179
23.6497	32.468	298.2747	20.986
25.0547	32.242	308.2747	20.792
26.543	32.017	318.2747	20.61
28.118	31.785	328.2747	20.429
29.7863	31.554	338.2747	20.26
31.5547	31.323	348.2747	20.085
33.428	31.097	358.2747	19.916
35.4112	30.859	368.2747	19.753
37.513	30.627	378.2747	19.59
39.7397	30.389	388.2747	19.434
42.098	30.157	398.2747	19.278
44.5963	29.919	408.2747	19.121
47.243	29.681	418.2747	18.971
50.0463	29.442	428.2747	18.827
53.0147	29.197	438.2747	18.677
56.1597	28.959	448.2747	18.533
59.4913	28.713	458.2747	18.395

Time After Pumping Stopped (minutes)	Residual Drawdown (feet)	Time After Pumping Stopped (minutes)	Residual Drawdown (feet)
468.2747	18.258	938.2747	13.646
478.2747	18.12	948.2747	13.577
488.2747	17.989	958.2747	13.496
498.2747	17.857	968.2747	13.427
508.2747	17.726	978.2747	13.352
518.2747	17.601	988.2747	13.277
528.2747	17.476	998.2747	13.208
538.2747	17.35	1008.2747	13.133
548.2747	17.225	1018.2747	13.07
558.2747	17.113	1028.2747	12.995
568.2747	16.994	1038.2747	12.926
578.2747	16.875	1048.2747	12.858
588.2747	16.762	1058.2747	12.782
598.2747	16.65	1068.2747	12.714
608.2747	16.543	1078.2747	12.639
618.2747	16.431	1088.2747	12.576
628.2747	16.331	1098.2747	12.507
638.2747	16.218	1108.2747	12.438
648.2747	16.118	1118.2747	12.369
658.2747	16.011	1128.2747	12.301
668.2747	15.911	1138.2747	12.232
678.2747	15.817	1148.2747	12.169
688.2747	15.717	1158.2747	12.1
698.2747	15.623	1168.2747	12.032
708.2747	15.523	1178.2747	11.969
718.2747	15.429	1188.2747	11.913
728.2747	15.336	1198.2747	11.844
738.2747	15.248	1208.2747	11.775
748.2747	15.16	1218.2747	11.712
758.2747	15.073	1228.2747	11.65
768.2747	14.985	1238.2747	11.587
778.2747	14.904	1248.2747	11.525
788.2747	14.816	1258.2747	11.462
798.2747	14.735	1268.2747	11.399
808.2747	14.654	1278.2747	11.343
818.2747	14.572	1288.2747	11.281
828.2747	14.491	1298.2747	11.224
838.2747	14.41	1308.2747	11.168
848.2747	14.334	1318.2747	11.112
858.2747	14.253	1328.2747	11.055
868.2747	14.178	1338.2747	10.999
878.2747	14.103	1348.2747	10.943
888.2747	14.022	1358.2747	10.886
898.2747	13.946	1368.2747	10.83
908.2747	13.871	1378.2747	10.78
918.2747	13.796	1388.2747	10.73
928.2747	13.721	1398.2747	10.673

Time After Pumping Stopped (minutes)	Residual Drawdown (feet)	Time After Pumping Stopped (minutes)	Residual Drawdown (feet)
1408.2747	10.623	1878.2747	8.627
1418.2747	10.573	1888.2747	8.589
1428.2747	10.517	1898.2747	8.552
1438.2747	10.467	1908.2747	8.514
1448.2747	10.417	1918.2747	8.483
1458.2747	10.373	1928.2747	8.439
1468.2747	10.317	1938.2747	8.402
1478.2747	10.273	1948.2747	8.37
1488.2747	10.223	1958.2747	8.333
1498.2747	10.179	1968.2747	8.295
1508.2747	10.129	1978.2747	8.258
1518.2747	10.085	1988.2747	8.22
1528.2747	10.035	1998.2747	8.189
1538.2747	9.991	2008.2747	8.151
1548.2747	9.947	2018.2747	8.114
1558.2747	9.91	2028.2747	8.082
1568.2747	9.866	2038.2747	8.045
1578.2747	9.822	2048.2747	8.007
1588.2747	9.779	2058.2747	7.982
1598.2747	9.741	2068.2747	7.945
1608.2747	9.697	2078.2747	7.913
1618.2747	9.653	2088.2747	7.876
1628.2747	9.616	2098.2747	7.845
1638.2747	9.578	2108.2747	7.813
1648.2747	9.534	2118.2747	7.782
1658.2747	9.491	2128.2747	7.751
1668.2747	9.453	2138.2747	7.719
1678.2747	9.416	2148.2747	7.688
1688.2747	9.372	2158.2747	7.657
1698.2747	9.328	2168.2747	7.625
1708.2747	9.29	2178.2747	7.6
1718.2747	9.247	2188.2747	7.569
1728.2747	9.209	2198.2747	7.538
1738.2747	9.165	2208.2747	7.513
1748.2747	9.128	2218.2747	7.481
1758.2747	9.09	2228.2747	7.456
1768.2747	9.046	2238.2747	7.431
1778.2747	9.015	2248.2747	7.4
1788.2747	8.971	2258.2747	7.369
1798.2747	8.934	2268.2747	7.344
1808.2747	8.896	2278.2747	7.319
1818.2747	8.852	2288.2747	7.287
1828.2747	8.815	2298.2747	7.262
1838.2747	8.777	2308.2747	7.231
1848.2747	8.733	2318.2747	7.206
1858.2747	8.702	2328.2747	7.181
1868.2747	8.671	2338.2747	7.156

Time After Pumping Stopped (minutes)	Residual Drawdown (feet)	Time After Pumping Stopped (minutes)	Residual Drawdown (feet)
2348.2747	7.131	2818.2747	5.91
2358.2747	7.106	2828.2747	5.879
2368.2747	7.081	2838.2747	5.867
2378.2747	7.05	2848.2747	5.842
2388.2747	7.025	2858.2747	5.817
2398.2747	7	2868.2747	5.791
2408.2747	6.975	2878.2747	5.779
2418.2747	6.949	2888.2747	5.754
2428.2747	6.924	2898.2747	5.735
2438.2747	6.906	2908.2747	5.71
2448.2747	6.874	2918.2747	5.691
2458.2747	6.849	2928.2747	5.666
2468.2747	6.824	2938.2747	5.648
2478.2747	6.799	2948.2747	5.629
2488.2747	6.774	2958.2747	5.604
2498.2747	6.749	2968.2747	5.579
2508.2747	6.718	2978.2747	5.554
2518.2747	6.693	2988.2747	5.529
2528.2747	6.662	2998.2747	5.51
2538.2747	6.643	3008.2747	5.485
2548.2747	6.611	3018.2747	5.466
2558.2747	6.586	3028.2747	5.441
2568.2747	6.555	3038.2747	5.416
2578.2747	6.536	3048.2747	5.397
2588.2747	6.511	3058.2747	5.378
2598.2747	6.48	3068.2747	5.36
2608.2747	6.455	3078.2747	5.341
2618.2747	6.424	3088.2747	5.322
2628.2747	6.405	3098.2747	5.297
2638.2747	6.374	3108.2747	5.278
2648.2747	6.349	3118.2747	5.259
2658.2747	6.317	3128.2747	5.234
2668.2747	6.286	3138.2747	5.216
2678.2747	6.261	3148.2747	5.197
2688.2747	6.236	3158.2747	5.172
2698.2747	6.211	3168.2747	5.159
2708.2747	6.18	3178.2747	5.134
2718.2747	6.155	3188.2747	5.115
2728.2747	6.13	3198.2747	5.103
2738.2747	6.104	3208.2747	5.084
2748.2747	6.073	3218.2747	5.065
2758.2747	6.048	3228.2747	5.04
2768.2747	6.023	3238.2747	5.04
2778.2747	5.998	3248.2747	5.009
2788.2747	5.979	3258.2747	4.99
2798.2747	5.954	3268.2747	4.971
2808.2747	5.935	3278.2747	4.946

Time After Pumping Stopped (minutes)	Residual Drawdown (feet)	Time After Pumping Stopped (minutes)	Residual Drawdown (feet)
3288.2747	4.928	3758.2747	4.151
3298.2747	4.915	3768.2747	4.133
3308.2747	4.896	3778.2747	4.12
3318.2747	4.871	3788.2747	4.114
3328.2747	4.859	3798.2747	4.095
3338.2747	4.84	3808.2747	4.083
3348.2747	4.815	3818.2747	4.07
3358.2747	4.802	3828.2747	4.064
3368.2747	4.777	3838.2747	4.045
3378.2747	4.765	3848.2747	4.039
3388.2747	4.74	3858.2747	4.02
3398.2747	4.727	3868.2747	4.007
3408.2747	4.715	3878.2747	3.995
3418.2747	4.69	3888.2747	3.982
3428.2747	4.671	3898.2747	3.964
3438.2747	4.652	3908.2747	3.957
3448.2747	4.64	3918.2747	3.945
3458.2747	4.621	3928.2747	3.926
3468.2747	4.602	3938.2747	3.907
3478.2747	4.583	3948.2747	3.901
3488.2747	4.565	3958.2747	3.889
3498.2747	4.552	3968.2747	3.87
3508.2747	4.527	3978.2747	3.864
3518.2747	4.515	3988.2747	3.845
3528.2747	4.496	3998.2747	3.832
3538.2747	4.471	4008.2747	3.82
3548.2747	4.458	4018.2747	3.807
3558.2747	4.439	4028.2747	3.795
3568.2747	4.427	4038.2747	3.782
3578.2747	4.414	4048.2747	3.77
3588.2747	4.396	4058.2747	3.757
3598.2747	4.377	4068.2747	3.738
3608.2747	4.364	4078.2747	3.726
3618.2747	4.346	4088.2747	3.713
3628.2747	4.333	4098.2747	3.694
3638.2747	4.32	4108.2747	3.688
3648.2747	4.302	4118.2747	3.669
3658.2747	4.283	4128.2747	3.657
3668.2747	4.277	4138.2747	3.638
3678.2747	4.258	4148.2747	3.626
3688.2747	4.245	4158.2747	3.613
3698.2747	4.227	4168.2747	3.601
3708.2747	4.214	4178.2747	3.582
3718.2747	4.202	4188.2747	3.563
3728.2747	4.183	4198.2747	3.551
3738.2747	4.17	4208.2747	3.532
3748.2747	4.158	4218.2747	3.519

Time After Pumping Stopped (minutes)	Residual Drawdown (feet)	Time After Pumping Stopped (minutes)	Residual Drawdown (feet)
4228.2747	3.507	4698.2747	2.931
4238.2747	3.494	4708.2747	2.918
4248.2747	3.482	4718.2747	2.912
4258.2747	3.475	4728.2747	2.899
4268.2747	3.463	4738.2747	2.893
4278.2747	3.444	4748.2747	2.887
4288.2747	3.432	4758.2747	2.881
4298.2747	3.413	4768.2747	2.874
4308.2747	3.4	4778.2747	2.868
4318.2747	3.381	4788.2747	2.862
4328.2747	3.375	4798.2747	2.849
4338.2747	3.356	4808.2747	2.843
4348.2747	3.35	4818.2747	2.831
4358.2747	3.344	4828.2747	2.824
4368.2747	3.338	4838.2747	2.812
4378.2747	3.319	4848.2747	2.806
4388.2747	3.306	4858.2747	2.793
4398.2747	3.294	4868.2747	2.787
4408.2747	3.281	4878.2747	2.774
4418.2747	3.269	4888.2747	2.768
4428.2747	3.256	4898.2747	2.762
4438.2747	3.238	4908.2747	2.749
4448.2747	3.225	4918.2747	2.743
4458.2747	3.206	4928.2747	2.737
4468.2747	3.187	4938.2747	2.724
4478.2747	3.181	4948.2747	2.718
4488.2747	3.169	4958.2747	2.712
4498.2747	3.15	4968.2747	2.705
4508.2747	3.144	4978.2747	2.693
4518.2747	3.125	4988.2747	2.687
4528.2747	3.112	4998.2747	2.674
4538.2747	3.106	5008.2747	2.662
4548.2747	3.094	5018.2747	2.655
4558.2747	3.081	5028.2747	2.643
4568.2747	3.075	5038.2747	2.637
4578.2747	3.068	5048.2747	2.63
4588.2747	3.05	5058.2747	2.624
4598.2747	3.043	5068.2747	2.618
4608.2747	3.031	5078.2747	2.605
4618.2747	3.018	5088.2747	2.599
4628.2747	3.006	5098.2747	2.593
4638.2747	2.993	5108.2747	2.586
4648.2747	2.981	5118.2747	2.58
4658.2747	2.975	5128.2747	2.568
4668.2747	2.956	5138.2747	2.561
4678.2747	2.95	5148.2747	2.555
4688.2747	2.937	5158.2747	2.543

Time After Pumping Stopped (minutes)	Residual Drawdown (feet)	Time After Pumping Stopped (minutes)	Residual Drawdown (feet)
5168.2747	2.536	5638.2747	2.23
5178.2747	2.524	5648.2747	2.23
5188.2747	2.518	5658.2747	2.223
5198.2747	2.511	5668.2747	2.223
5208.2747	2.499	5678.2747	2.217
5218.2747	2.493	5688.2747	3.882
5228.2747	2.48	5698.2747	7.677
5238.2747	2.474	5708.2747	4.526
5248.2747	2.468	5718.2747	3.882
5258.2747	2.461	5728.2747	3.549
5268.2747	2.449	5738.2747	3.329
5278.2747	2.442	5748.2747	3.178
5288.2747	2.436	5758.2747	3.058
5298.2747	2.43	5768.2747	2.964
5308.2747	2.424	5778.2747	2.882
5318.2747	2.417	5788.2747	2.825
5328.2747	2.411	5798.2747	2.769
5338.2747	2.399	5808.2747	2.725
5348.2747	2.392	5818.2747	2.681
5358.2747	2.386	5828.2747	2.65
5368.2747	2.374	5838.2747	2.612
5378.2747	2.374	5848.2747	2.581
5388.2747	2.367	5858.2747	2.549
5398.2747	2.355	5868.2747	2.524
5408.2747	2.349	5878.2747	2.493
5418.2747	2.349	5888.2747	2.468
5428.2747	2.342	5898.2747	2.442
5438.2747	2.336	5908.2747	2.417
5448.2747	2.33	5918.2747	2.392
5458.2747	2.324	5928.2747	2.361
5468.2747	2.324	5938.2747	2.349
5478.2747	2.311	5948.2747	2.324
5488.2747	2.311	5958.2747	2.375
5498.2747	2.305	5968.2747	2.324
5508.2747	2.298	5978.2747	2.299
5518.2747	2.286	5988.2747	2.274
5528.2747	2.286	5998.2747	2.262
5538.2747	2.28	6008.2747	2.243
5548.2747	2.28	6018.2747	2.223
5558.2747	2.273	6028.2747	2.205
5568.2747	2.273	6038.2747	2.192
5578.2747	2.267	6048.2747	2.173
5588.2747	2.261	6058.2747	2.161
5598.2747	2.248	6068.2747	2.148
5608.2747	2.242	6078.2747	2.129
5618.2747	2.236	6088.2747	2.117
5628.2747	2.236	6098.2747	2.104

Time After Pumping Stopped (minutes)	Residual Drawdown (feet)	Time After Pumping Stopped (minutes)	Residual Drawdown (feet)
6108.2747	2.093	6578.2747	1.716
6118.2747	2.079	6588.2747	1.704
6128.2747	2.073	6598.2747	1.698
6138.2747	2.061	6608.2747	1.691
6148.2747	2.048	6618.2747	1.679
6158.2747	2.042	6628.2747	1.672
6168.2747	2.029	6638.2747	1.666
6178.2747	2.023	6648.2747	1.66
6188.2747	2.011	6658.2747	1.654
6198.2747	2.004	6668.2747	1.647
6208.2747	1.999	6678.2747	1.636
6218.2747	1.992	6688.2747	1.635
6228.2747	1.985	6698.2747	1.622
6238.2747	1.974	6708.2747	1.616
6248.2747	1.967	6718.2747	1.61
6258.2747	1.96	6728.2747	1.604
6268.2747	1.948	6738.2747	1.597
6278.2747	1.942	6748.2747	1.585
6288.2747	1.935	6758.2747	1.579
6298.2747	1.929	6768.2747	1.579
6308.2747	1.917	6778.2747	1.572
6318.2747	1.917	6788.2747	1.566
6328.2747	1.904	6798.2747	1.56
6338.2747	1.904	6808.2747	1.56
6348.2747	1.892	6818.2747	1.554
6358.2747	1.885	6828.2747	1.541
6368.2747	1.879	6838.2747	1.541
6378.2747	1.873	6848.2747	1.535
6388.2747	1.867	6858.2747	1.541
6398.2747	1.86	6868.2747	1.528
6408.2747	1.848	6878.2747	1.522
6418.2747	1.849	6888.2747	1.516
6428.2747	1.835	6898.2747	1.51
6438.2747	1.823	6908.2747	1.51
6448.2747	1.816	6918.2747	1.503
6458.2747	1.804	6928.2747	1.504
6468.2747	1.799	6938.2747	1.497
6478.2747	1.791	6948.2747	1.498
6488.2747	1.785	6958.2747	1.497
6498.2747	1.773	6968.2747	1.485
6508.2747	1.766	6978.2747	1.485
6518.2747	1.76	6988.2747	1.485
6528.2747	1.754	6998.2747	1.485
6538.2747	1.748	7008.2747	1.478
6548.2747	1.735	7018.2747	1.478
6558.2747	1.729	7028.2747	1.472
6568.2747	1.723	7038.2747	1.466

Time After Pumping Stopped (minutes)	Residual Drawdown (feet)	Time After Pumping Stopped (minutes)	Residual Drawdown (feet)
7048.2747	1.466	7518.2747	1.134
7058.2747	1.461	7528.2747	1.128
7068.2747	1.453	7538.2747	1.122
7078.2747	1.453	7548.2747	1.115
7088.2747	1.453	7558.2747	1.11
7098.2747	1.447	7568.2747	1.103
7108.2747	1.441	7578.2747	1.103
7118.2747	1.441	7588.2747	1.097
7128.2747	1.441	7598.2747	1.09
7138.2747	1.441	7608.2747	1.09
7148.2747	1.435	7618.2747	1.084
7158.2747	1.435	7628.2747	1.078
7168.2747	1.435	7638.2747	1.071
7178.2747	1.441	7648.2747	1.071
7188.2747	1.435	7658.2747	1.065
7198.2747	1.428	7668.2747	1.059
7208.2747	1.422	7678.2747	1.053
7218.2747	1.416	7688.2747	1.053
7228.2747	1.41	7698.2747	1.053
7238.2747	1.403	7708.2747	1.047
7248.2747	1.391	7718.2747	1.046
7258.2747	1.384	7728.2747	1.046
7268.2747	1.378	7738.2747	1.04
7278.2747	1.366	7748.2747	1.04
7288.2747	1.353	7758.2747	1.04
7298.2747	1.353	7768.2747	1.034
7308.2747	1.341	7778.2747	1.04
7318.2747	1.334	7788.2747	1.034
7328.2747	1.322	7798.2747	1.035
7338.2747	1.316	7808.2747	1.035
7348.2747	1.303	7818.2747	1.035
7358.2747	1.291	7828.2747	1.034
7368.2747	1.284	7838.2747	1.028
7378.2747	1.272	7848.2747	1.028
7388.2747	1.266	7858.2747	1.028
7398.2747	1.253	7868.2747	1.022
7408.2747	1.247	7878.2747	1.022
7418.2747	1.24	7888.2747	1.022
7428.2747	1.228	7898.2747	1.015
7438.2747	1.222	7908.2747	1.015
7448.2747	1.209	7918.2747	1.003
7458.2747	1.197	7928.2747	1.003
7468.2747	1.184	7938.2747	1.004
7478.2747	1.172	7948.2747	0.996
7488.2747	1.165	7958.2747	0.99
7498.2747	1.153	7968.2747	0.99
7508.2747	1.147	7978.2747	0.978

Time After Pumping Stopped (minutes)	Residual Drawdown (feet)	Time After Pumping Stopped (minutes)	Residual Drawdown (feet)
7988.2747	0.978	8458.2747	8.051
7998.2747	0.971	8468.2747	3.556
8008.2747	0.959	8478.2747	2.336
8018.2747	0.953	8488.2747	1.923
8028.2747	0.946	8498.2747	1.697
8038.2747	0.935	8508.2747	1.558
8048.2747	0.927	8518.2747	1.463
8058.2747	0.921	8528.2747	1.387
8068.2747	0.909	8538.2747	1.33
8078.2747	0.902	8548.2747	1.286
8088.2747	0.891	8558.2747	1.248
8098.2747	0.885	8568.2747	1.216
8108.2747	0.871	8578.2747	1.191
8118.2747	0.865	8588.2747	1.185
8128.2747	0.852	8598.2747	1.198
8138.2747	0.847	8608.2747	1.179
8148.2747	0.84	8618.2747	1.154
8158.2747	0.827	8628.2747	1.134
8168.2747	0.821	8638.2747	1.104
8178.2747	0.821	8648.2747	1.071
8188.2747	0.815	8658.2747	1.04
8198.2747	0.809	8668.2747	1.021
8208.2747	0.796	8678.2747	1.028
8218.2747	0.796	8688.2747	1.097
8228.2747	0.796	8698.2747	0.996
8238.2747	0.79	8708.2747	0.984
8248.2747	0.79	8718.2747	0.971
8258.2747	0.783	8728.2747	0.959
8268.2747	0.783	8738.2747	0.946
8278.2747	0.783	8748.2747	0.934
8288.2747	0.777	8758.2747	0.922
8298.2747	0.777	8768.2747	0.909
8308.2747	0.771	8778.2747	0.896
8318.2747	0.771	8788.2747	0.903
8328.2747	0.765	8798.2747	0.903
8338.2747	0.765	8808.2747	0.916
8348.2747	0.758	8818.2747	0.928
8358.2747	0.765	8828.2747	0.94
8368.2747	0.765	8838.2747	0.959
8378.2747	0.758	8848.2747	0.972
8388.2747	0.759	8858.2747	0.996
8398.2747	0.758	8868.2747	1.009
8408.2747	0.758	8878.2747	1.015
8418.2747	0.758	8888.2747	1.015
8428.2747	0.758	8898.2747	1.016
8438.2747	0.758	8908.2747	1.009
8448.2747	0.766	8918.2747	1.003

Time After Pumping Stopped (minutes)	Residual Drawdown (feet)	Time After Pumping Stopped (minutes)	Residual Drawdown (feet)
8928.2747	0.99	9398.2747	0.765
8938.2747	0.99	9408.2747	0.758
8948.2747	0.978	9418.2747	0.759
8958.2747	0.971	9428.2747	0.753
8968.2747	0.96	9438.2747	0.746
8978.2747	0.953	9448.2747	0.741
8988.2747	0.94	9458.2747	0.728
8998.2747	0.934	9468.2747	0.727
9008.2747	0.927	9478.2747	0.715
9018.2747	0.915	9488.2747	0.708
9028.2747	0.916	9498.2747	0.703
9038.2747	0.902	9508.2747	0.696
9048.2747	0.896	9518.2747	0.69
9058.2747	0.89	9528.2747	0.677
9068.2747	0.884	9538.2747	0.671
9078.2747	0.877	9548.2747	0.658
9088.2747	0.871	9558.2747	0.658
9098.2747	0.865	9568.2747	0.652
9108.2747	0.866	9578.2747	0.646
9118.2747	0.859	9588.2747	0.64
9128.2747	0.852	9598.2747	0.633
9138.2747	0.846	9608.2747	0.621
9148.2747	0.84	9618.2747	0.614
9158.2747	0.841	9628.2747	0.608
9168.2747	0.84	9638.2747	0.602
9178.2747	0.834	9648.2747	0.596
9188.2747	0.834	9658.2747	0.59
9198.2747	0.827	9668.2747	0.583
9208.2747	0.827	9678.2747	0.583
9218.2747	0.821	9688.2747	0.577
9228.2747	0.822	9698.2747	0.571
9238.2747	0.815	9708.2747	0.564
9248.2747	0.821	9718.2747	0.564
9258.2747	0.815	9728.2747	0.564
9268.2747	0.809	9738.2747	0.558
9278.2747	0.809	9748.2747	0.552
9288.2747	0.802	9758.2747	0.552
9298.2747	0.803	9768.2747	0.552
9308.2747	0.796	9778.2747	0.552
9318.2747	0.796	9788.2747	0.546
9328.2747	0.796	9798.2747	0.552
9338.2747	0.79	9808.2747	0.553
9348.2747	0.783	9818.2747	0.553
9358.2747	0.777	9828.2747	0.552
9368.2747	0.777	9838.2747	0.547
9378.2747	0.771	9848.2747	0.546
9388.2747	0.771	9858.2747	0.552

Time After Pumping Stopped (minutes)	Residual Drawdown (feet)
9868.2747	0.552
9878.2747	0.552
9888.2747	0.552
9898.2747	0.558
9908.2747	0.564
9918.2747	0.564
9928.2747	0.564
9938.2747	0.572

TABLE 5
CROSSROADS VENTURES, INC.
Constant Rate Test at Well R1
Well R3

Date	Time	Depth to Water (feet)	Remarks
9/7/2002	10:12	27.33	well R1 pump on at 10:30
9/7/2002	11:09	31.35	
9/7/2002	11:48	33.97	
9/7/2002	16:45	42.47	
9/8/2002	9:17	52.50	
9/9/2002	6:36	58.15	
9/9/2002	13:00	59.34	
9/10/2002	9:38	61.65	
9/10/2002	14:31	49.55	well R1 pump off at 10:30
9/11/2002	8:28	38.29	
9/11/2002	13:44	36.76	
9/12/2002	9:51	33.00	
9/13/2002	13:47	30.23	
9/16/2002	16:09	28.10	

TABLE 6
CROSSROADS VENTURES, INC.
Constant Rate Test at Well R1
Residential Well 1

Date	Time	Depth to Water (feet)	Remarks
9/7/2002	9:50	22.40	R1 pump on at 10:30, well in use
9/7/2002	15:40	22.50	well in use
9/8/2002	9:00	23.28	
9/8/2002	13:50	23.40	
9/9/2002	10:00	23.80	well in use
9/9/2002	14:00	23.87	well in use
9/10/2002	8:00	24.15	R1 pump off at 10:30, well in use
9/10/2002	11:32	24.15	well in use
9/10/2002	14:41	23.97	
9/11/2002	9:00	23.50	
9/12/2002	11:40	23.20	well in use
9/13/2002	15:00	23.10	well in use
9/14/2002	12:00	22.90	
9/16/2002	15:00	22.70	
9/17/2002	8:30	23.00	well in use

TABLE 7
CROSSROADS VENTURES, INC.
Constant Rate Test at Well R1
Residential Well 2

Date	Time	Depth to Water (feet)	Remarks
9/7/2002	9:00	2.25	well R1 pump on at 10:30
9/7/2002	15:35	2.30	
9/8/2002	8:00	2.20	
9/8/2002	15:30	2.26	
9/9/2002	8:30	2.30	
9/9/2002	15:45	2.25	
9/10/2002	7:30	2.25	well R1 pump off at 10:30
9/10/2002	13:30	2.30	
9/11/2002	15:30	2.30	
9/12/2002	9:00	2.25	
9/13/2002	10:15	2.35	
9/14/2002	9:00	2.30	
9/16/2002	9:00	2.25	

TABLE 8
CROSSROADS VENTURES, INC.
Constant Rate Test at Well R1
Residential Well 3

Date	Time	Overflow (gallons)	Remarks
9/7/2002	8:30	0	in use, well R1 pump on at 10:30
9/7/2002	15:30	0.3	
9/8/2002	8:30	0.3	
9/8/2002	15:00	0	in use
9/9/2002	9:00	0.3	
9/9/2002	16:00	0	in use
9/10/2002	8:00	0.3	well R1 pump off at 10:30
9/10/2002	17:00	0.3	
9/11/2002	15:00	0	in use
9/12/2002	10:00	0.3	
9/13/2002	15:00	0.3	
9/14/2002	10:00	0	in use
9/16/2002	17:00	0.3	
9/17/2002	8:00	0.3	

TABLE 9
CROSSROADS VENTURES, INC.
Constant Rate Test at Well R1
Pine Hill Water Company Well PH-1

Date	Time	Depth to Water (feet)	Remarks
9/7/2002	10:11	8.83	Well R1 pump on at 10:30
9/7/2002	16:17	8.86	
9/8/2002	8:00	8.80	
9/8/2002	13:58	8.89	
9/9/2002	7:40	8.80	
9/9/2002	14:20	8.86	
9/10/2002	8:00	8.70	Well R1 pump off at 10:30
9/10/2002	11:41	8.69	
9/10/2002	14:00	8.71	
9/11/2002	13:27	8.70	
9/13/2002	14:00	8.80	
9/16/2002	16:30	8.95	

TABLE 10
CROSSROADS VENTURES, INC.
Constant Rate Test at Well R1
Station Road Well

Date	Time	Depth to Water (feet)	Remarks
9/7/2002	10:17	37.85	Well R1 pump on at 10:30
9/7/2002	16:24	37.85	
9/8/2002	8:05	37.80	
9/8/2002	14:05	37.95	
9/9/2002	7:45	37.80	
9/9/2002	14:25	37.85	
9/10/2002	8:05	37.72	Well R1 pump off at 10:30
9/10/2002	11:45	37.75	
9/10/2002	14:05	37.73	
9/11/2002	13:35	37.72	
9/13/2002	14:10	37.74	
9/16/2002	16:25	38.10	

TABLE 11
CROSSROADS VENTURES, INC.
Constant Rate Test at Well R1
Residential Well 4

Date	Time	Depth to Water (feet)	Remarks
9/7/2002	9:46	12.84	R1 pump on at 10:30
9/7/2002	15:36	14.95	
9/8/2002	8:58	18.80	
9/8/2002	13:45	19.50	
9/9/2002	9:56	21.45	
9/9/2002	14:00	21.80	
9/10/2002	8:00	22.75	well R1 pump off at 10:30
9/10/2002	11:29	22.48	
9/10/2002	14:44	20.78	
9/11/2002	8:19	16.90	
9/11/2002	13:53	16.40	
9/12/2002	8:30	15.10	
9/13/2002	8:45	14.15	
9/13/2002	13:52	14.08	
9/14/2002	10:00	13.47	
9/16/2002	10:00	13.30	
9/17/2002	8:30	13.17	

TABLE 12
CROSSROADS VENTURES, INC.
Field Water Quality Analysis
Well R1

Date	Time	pH	Conductivity (us)	Turbidity (NTU)	Remarks
9/7/2002	10:50	7.6	154.8	8.7	Pump on at 10:30
9/7/2002	16:30	7.9	180	1.79	
9/8/2002	9:30	7.7	180.0	1.08	
9/8/2002	21:00	7.6	192.1	2.29	
9/9/2002	13:40	7.4	137	4.35	
9/10/2002	9:15	7.6	178	2.46	

Note: All samples collected at pipe orifice outlet.

TABLE 13
CROSSROADS VENTURES, INC.
Constant Rate Test at Well R1
Well Point WP-1

Date	Time	Depth to Water (feet)	Remarks
9/7/2002	10:05	10.09	Well R1 pump on at 10:30
9/7/2002	11:46	10.00	
9/7/2002	16:25	10.02	
9/8/2002	9:07	10.00	
9/9/2002	6:34	10.20	
9/9/2002	13:10	10.20	
9/10/2002	9:28	10.32	Well R1 pump off at 10:30
9/10/2002	14:20	10.32	
9/11/2002	13:45	10.40	
9/12/2002	9:50	10.30	
9/14/2002	9:55	10.20	
9/16/2002	15:52	10.37	

TABLE 14
CROSSROADS VENTURES, INC.
Constant Rate Test at Well R1
Well Point WP-2

Date	Time	Depth to Water (feet)	Remarks
9/7/2002	9:57	7.06	Well R1 pump on at 10:30
9/7/2002	11:42	6.97	
9/7/2002	16:50	6.97	
9/8/2002	9:22	6.96	
9/8/2002	8:51	6.96	
9/9/2002	6:21	6.96	
9/9/2002	13:00	6.98	
9/10/2002	9:43	6.97	Well R1 pump off at 10:30
9/10/2002	14:20	7.0	
9/11/2002	13:46	7.0	
9/12/2002	9:53	7.0	
9/14/2002	10:00	7.0	
9/16/2002	16:10	7.0	

TABLE 15
CROSSROADS VENTURES, INC.
Constant Rate Test at Well R1
Stream Gauge SG-1

Date	Time	Depth to Water (feet)	Remarks
9/7/2002	10:01	2.74	Well R1 pump on at 10:30
9/7/2002	11:43	2.73	
9/7/2002	16:50	2.74	
9/8/2002	9:07	2.73	
9/8/2002	20:52	2.74	
9/9/2002	6:24	2.74	
9/9/2002	13:00	2.74	
9/10/2002	9:28	2.73	Well R1 pump off at 10:30
9/10/2002	14:20	2.73	
9/11/2002	13:45	2.74	
9/12/2002	9:45	2.74	
9/16/2002	15:52	2.69	

TABLE 16
CROSSROADS VENTURES, INC.
Constant Rate Test at Well R1
Stream Gauge SG-2

Date	Time	Depth to Water (feet)	Remarks
9/7/2002	10:04	3.06	Well R1 pump on at 10:30
9/7/2002	11:45	3.03	
9/7/2002	16:47	3.01	
9/8/2002	9:20	3.02	
9/8/2002	20:52	3.02	
9/9/2002	6:26	3.04	
9/10/2002	9:30	3.01	Well R1 pump off at 10:30
9/10/2002	14:22	3.00	
9/11/2002	13:45	3.01	
9/12/2002	9:50	3.00	
9/16/2002	15:50	3.00	

TABLE 17
CROSSROADS VENTURES, INC.
Constant Rate Test at Well R1
Pond Gauge P-1

Date	Time	Depth to Water (feet)	Remarks
9/7/2002	10:09	2.32	Well R1 pump on on at 10:30
9/7/2002	11:52	2.32	
9/7/2002	16:40	2.32	
9/8/2002	9:12	2.30	
9/9/2002	6:41	2.30	
9/9/2002	13:00	2.30	
9/10/2002	4:32	2.30	Well R1 pump off at 10:30
9/10/2002	14:20	2.30	
9/11/2002	13:46	2.30	
9/12/2002	9:55	2.31	
9/13/2002	13:45	2.30	
9/16/2002	16:05	2.27	

TABLE 18
CROSSROADS VENTURES, INC.
Field Water Quality Analysis
Birch Creek

Date	Time	pH	Conductivity (us)	Turbidity (NTU)	Remarks
9/7/2002	11:10	7.4	143.9	1.02	Well R1 pump on at 10:30
9/7/2002	16:55	7.4	150.7	0.94	
9/8/2002	9:48	7.4	187	1.42	
9/9/2002	13:25	7.6	142	0.69	
9/9/2002	21:00	6.8	176.5	3.81	
9/10/2002	9:30	7.2	114	1.35	
9/10/2002	10:45	7.2	164	2.65	Well R1 pump off at 10:30

TABLE 19
CROSSROADS VENTURES LLC
Constant Rate Test at Well R1
Birch Creek Temperature Data

Date	Time	Temperature (°Fahrenheit)	Date	Time	Temperature (°Fahrenheit)
8/31/2002	8:21 AM	55.97	9/7/2002	12:21 PM	58.73
8/31/2002	12:21 PM	59.42	9/7/2002	4:21 PM	62.17
8/31/2002	4:21 PM	60.8	9/7/2002	8:21 PM	60.11
8/31/2002	8:21 PM	60.11	9/8/2002	12:21 AM	57.35
9/1/2002	12:21 AM	58.73	9/8/2002	4:21 AM	55.97
9/1/2002	4:21 AM	57.35	9/8/2002	8:21 AM	55.28
9/1/2002	8:21 AM	56.66	9/8/2002	12:21 PM	59.42
9/1/2002	12:21 PM	57.35	9/8/2002	4:21 PM	62.85
9/1/2002	4:21 PM	58.73	9/8/2002	8:21 PM	60.8
9/1/2002	8:21 PM	58.04	9/9/2002	12:21 AM	58.73
9/2/2002	12:21 AM	57.35	9/9/2002	4:21 AM	57.35
9/2/2002	4:21 AM	56.66	9/9/2002	8:21 AM	56.66
9/2/2002	8:21 AM	56.66	9/9/2002	12:21 PM	60.11
9/2/2002	12:21 PM	58.04	9/9/2002	4:21 PM	63.54
9/2/2002	4:21 PM	60.11	9/9/2002	8:21 PM	61.48
9/2/2002	8:21 PM	59.42	9/10/2002	12:21 AM	59.42
9/3/2002	12:21 AM	58.04	9/10/2002	4:21 AM	58.04
9/3/2002	4:21 AM	58.04	9/10/2002	8:21 AM	57.35
9/3/2002	8:21 AM	57.35			
9/3/2002	12:21 PM	60.8			
9/3/2002	4:21 PM	63.54			
9/3/2002	8:21 PM	61.48			
9/4/2002	12:21 AM	60.11			
9/4/2002	4:21 AM	60.11			
9/4/2002	8:21 AM	59.42			
9/4/2002	12:21 PM	62.17			
9/4/2002	4:21 PM	63.54			
9/4/2002	8:21 PM	60.8			
9/5/2002	12:21 AM	59.42			
9/5/2002	4:21 AM	58.04			
9/5/2002	8:21 AM	58.04			
9/5/2002	12:21 PM	60.8			
9/5/2002	4:21 PM	62.85			
9/5/2002	8:21 PM	60.11			
9/6/2002	12:21 AM	57.35			
9/6/2002	4:21 AM	55.97			
9/6/2002	8:21 AM	54.58			
9/6/2002	12:21 PM	58.73			
9/6/2002	4:21 PM	61.48			
9/6/2002	8:21 PM	59.42			
9/7/2002	12:21 AM	57.35			
9/7/2002	4:21 AM	55.28			
9/7/2002	8:21 AM	55.28			

APPENDIX A

UCDOH Work Scope Letter

ALPHA GEOSCIENCE
Geology
Hydrology
Remediation
Water Supply

August 27, 2002

Mr. Dean Palen
Ulster County Department of Health
300 Flatbush Avenue
Kingston, New York 12401-2740

Re: Additional Well Testing
Belleayre Resort

Dear Mr. Palen:

Crossroads Ventures LLC (Crossroads) is continuing the evaluation of water sources for their proposed Big Indian Plateau facility. Wells R1 and R2 will be tested as sources of irrigation and potable water, respectively. The primary objectives of this testing are to evaluate the yield of the irrigation well (R1) and to evaluate the yields of both wells (R1 and R2) during times in which both wells are pumping simultaneously. The yield of well R1 will be evaluated during a step rate pumping test and a 72-hour constant rate test. The combined yield of wells R1 and R2 will be evaluated by a simultaneous, 72-hour, constant rate pumping test. Alpha Geoscience (Alpha) has prepared this work scope per the request of Crossroads to conduct pumping tests, water quality testing, data analysis and reporting. The proposed work scope is presented herein for Ulster County Department of Health (DOH) approval.

Previous Work

Wells R1 and R2 were installed, developed and tested by pumping. The pumping tests included a 24-hour constant rate test at well R1 and a 72-hour constant rate test with Part 5 water quality analysis for well R2. The drilling logs, well completion logs, well yield results, and water quality test results were presented in the Belleayre Resort Draft Environmental Impact Statement (DEIS) dated January 2002. The locations of wells R1, R2 and other monitoring locations used during previous well testing are presented in Figure 1.

Step Rate Testing

A step rate pumping test will be performed at well R1 to provide a benchmark for future evaluation of well performance and to select a pumping rate for the constant rate test at well R1. The test will involve a minimum of three , 100 minute consecutive pumping periods at rates to be determined in the field.

679 Plank Road ▪ Clifton Park, New York 12065 ▪ (518) 348-6995 ▪ FAX (518) 348-6966

The test pump and discharge system will be installed by Crossroads' well installation and testing contractor, Titan Drilling Corporation (Titan). The pump discharge will be routed to Birch Creek downstream of the well R1 area. A pipe orifice will be used to measure flow rate. A data logger monitoring system will be installed by Alpha for automated water level data collection. Alpha personnel will be present for the entire step rate test to collect data and document test procedures.

Constant Rate Testing

A 72-hour, constant rate pumping test will be performed at well R1. This test will be performed to evaluate well yield, aquifer response to pumping and water quality. The test will also provide data to evaluate the potential impact of well R1 pumping on the Birch Creek and existing water supplies in this area. It is anticipated that the test will be performed at a rate that exceeds the 50 gallons per minute (gpm) projected average replenishment rate for the irrigation ponds.

The discharge system used for the step rate test will also be used for the constant rate test to measure flow rate and route water to Birch Creek. Data logger monitoring systems will be installed by Alpha for automated water level measurement at wells R1 and R2. A transducer will be installed at the site to monitor barometric pressure. Water level data will be collected prior to testing, throughout the pumping period and during the recovery period after pumping stops. Alpha personnel will be on-site to also collect data at the beginning and end of the test. Water level and pumping rate data will be collected by Titan and Crossroads personnel throughout the testing and during the period when Alpha personnel are not on site.

Staff gauges will be installed in Birch Creek and in a wetland at the edge of the site. A well point with a total depth of approximately 10 feet will be installed between well R1 and Birch Creek to provide a monitoring location within the unconsolidated deposits. Well R3, which is not currently considered a source of potable or irrigation water, will also be monitored. The three residential wells (Residential - 1, 2 and 3) located near the site and monitored during previously conducted pumping tests will be monitored. Pine Hill Water Company well PH-1 and the Station Road well will be monitored.

Simultaneous Testing

Wells R1 and R2 will be pumped simultaneously during a 72-hour constant rate test. The test will be performed to evaluate the aquifer response and potential impacts to water levels during conditions when both wells R1 and R2 are being used. It is anticipated that well R1 will be pumped at a rate that exceeds the 50 gpm projected average replenishment rate for the irrigation ponds and that well R2 will be pumped at a rate that is greater than the 64 gpm projected average daily demand for potable water.

A separate discharge system including piping and orifice will be used to measure the pumping rate and route water from well R2 to Birch Creek. A well point will be installed between well R2 and Birch Creek to provide a monitoring location in the unconsolidated deposits in this area. The same monitoring locations used for the individual, constant rate test at well R1 will be monitored during the simultaneous test. Alpha personnel will be on-site to collect data at the beginning and end of the simultaneous test. Water level and pumping rate data will also be collected by Crossroads and Titan personnel throughout the test.

Water Quality Testing

Water quality testing of well discharge and the Birch Creek will be conducted in the field during the constant rate testing of well R1 and R2. The field testing will include the measurement of turbidity, conductivity, pH and temperature. These results will be used to evaluate general water quality and to assess if wells R1 and R2 are hydraulically connected to Birch Creek.

Samples will also be collected from well R2 at the end of the simultaneous test and submitted to a New York State Department of Health (NYSDOH)-certified laboratory for Part 5 analysis (assuming radiological and SOC exemptions).

Data Analysis and Reporting

Water level data collected from the step test, constant rate test and simultaneous test will be graphed to project long term drawdown at the test pumping rates. Water level data, water quality data, and observations made during on-site testing will be used to describe the potential impact from pumping.

A letter report will be prepared and submitted to the UCDOH and NYSDOH Central Office that describes objectives and methods and presents data, interpretations and conclusions. The report will also include final laboratory water quality testing results.

Schedule

Crossroads plans to begin the constant rate and simultaneous tests on or about September 3, 2002 and September 10, 2002, respectively. We would like to conduct this testing as soon as possible in order to evaluate long term well yield and the potential impacts of pumping under the current dry conditions.

Please call me, or Steve Trader if you have any questions regarding the proposed well testing, data analysis and reporting. We will contact your office on August 29, 2002 to discuss any questions or comments you may have regarding the proposed scope of work.

Sincerely,
Alpha Geoscience

Michael D. Palleschi
Senior Hydrogeologist

MDP/dw
attachment
cc: C. Costello, UCDOH
M. Holt, NYSDOH
A. Ciesluk, Jr., NYSDEC
D. Gitter, Crossroads
M.B. Bianconi, Delaware Engineering
K. Franke, L.A. Group
T. Johnson, Titan

F:\projects\2002\02121-02140\02130-Belleayre Pumping Test\addl testing prop.wpd

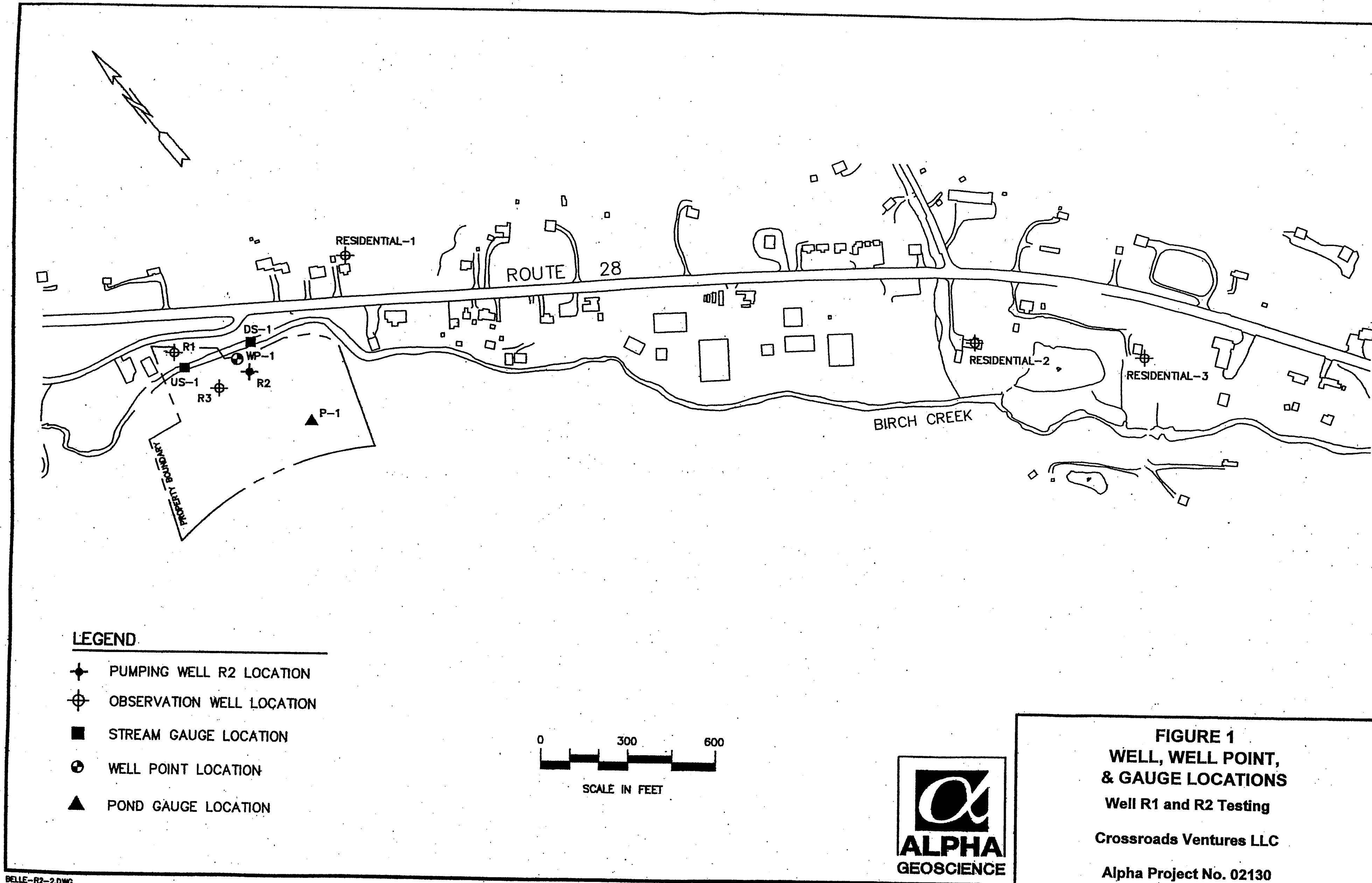


FIGURE 1
WELL, WELL POINT, & GAUGE LOCATIONS
Well R1 and R2 Testing

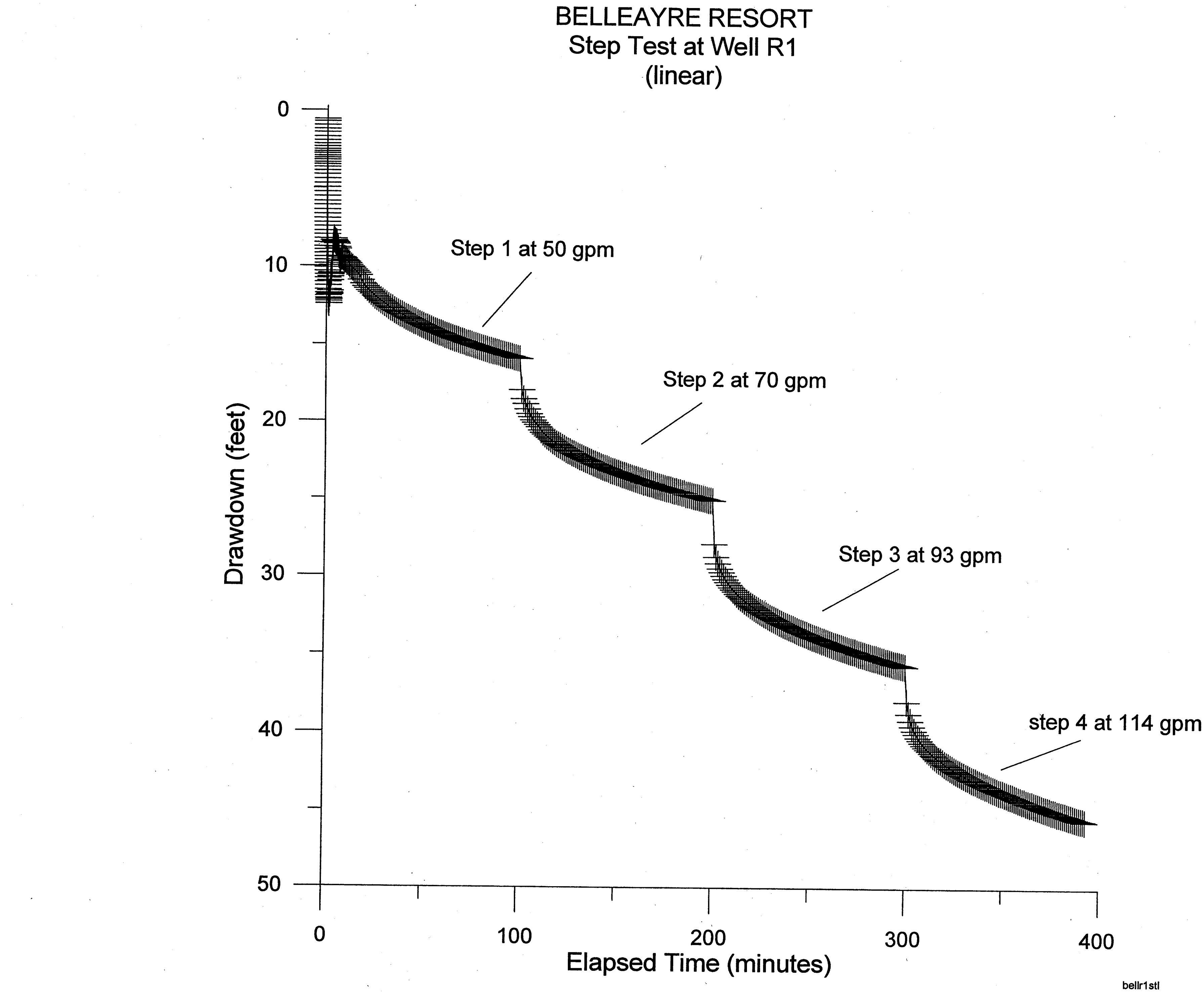
Crossroads Ventures LLC

Alpha Project No. 02130

BELLE-R2-2.DWG

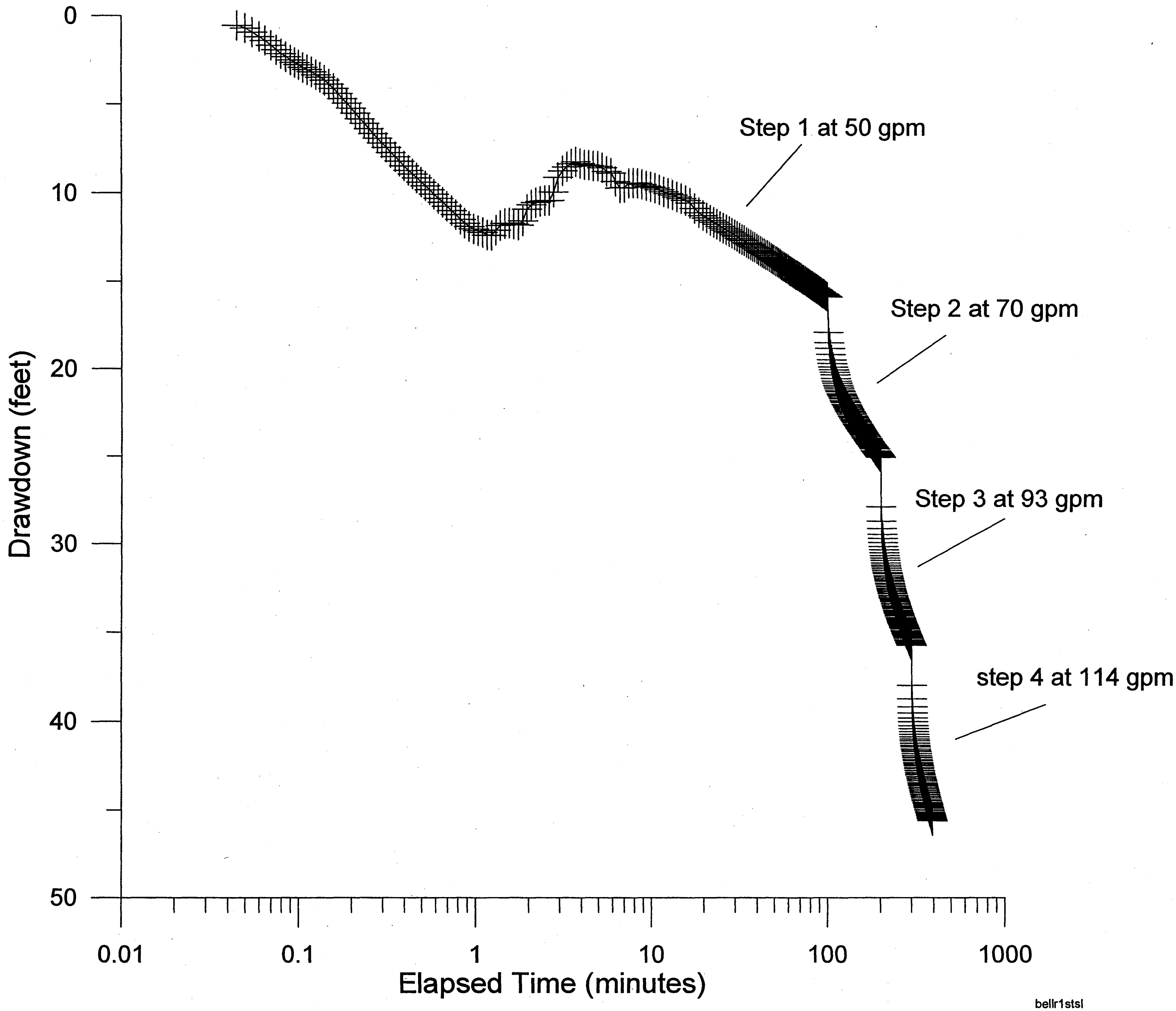
APPENDIX B

Step Rate Test Graphs



BELLEAYRE RESORT
Step Test at Well R1
(linear)
Step 1 at 50 gpm
Step 2 at 70 gpm
Step 3 at 93 gpm
step 4 at 114 gpm
Drawdown (feet)
0
10
20
30
40
50
0
100
200
300
400
Elapsed Time (minutes)
bellr1stl

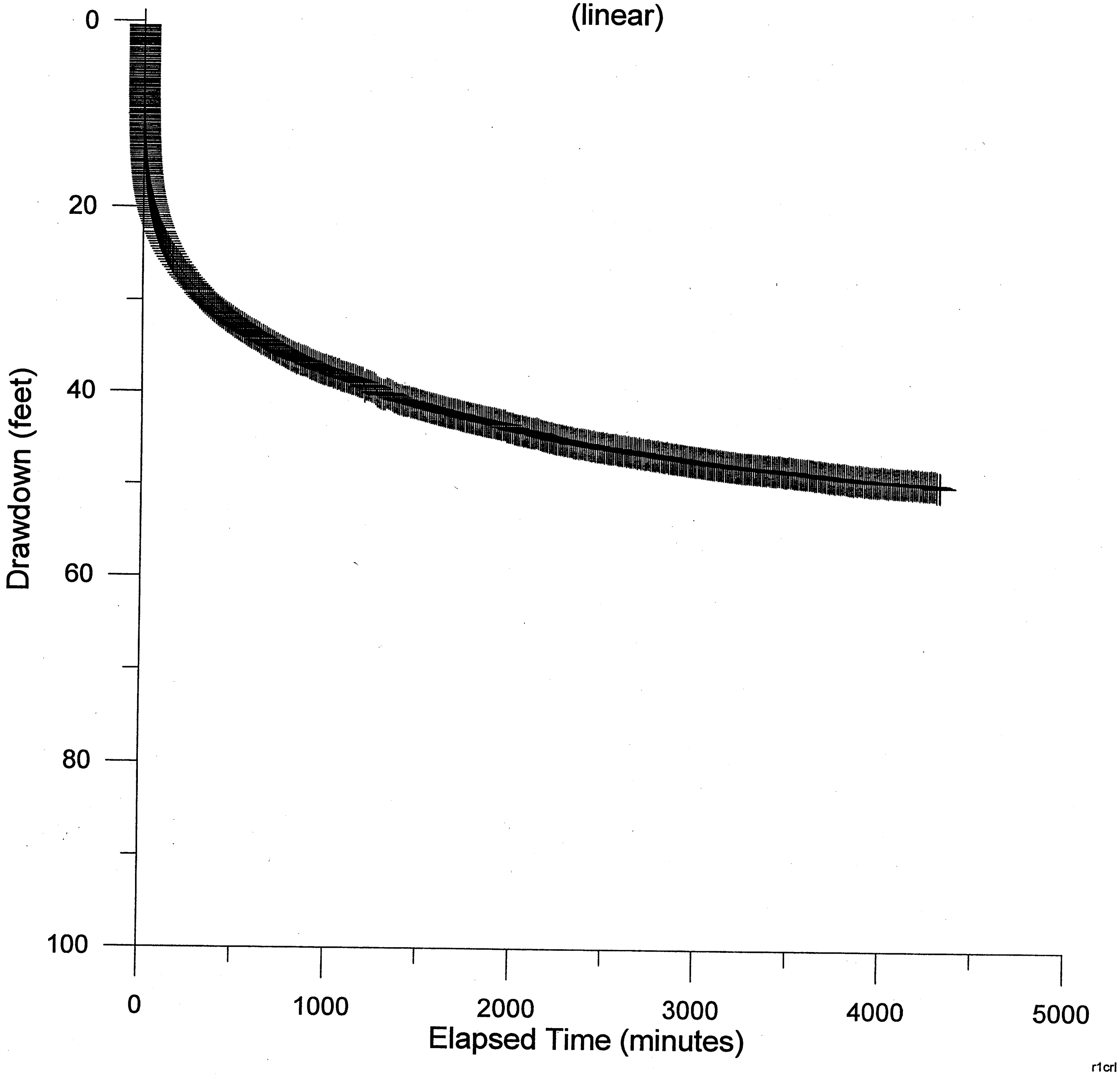
BELLEAYRE RESORT
Step Test at Well R1
(semi-log)

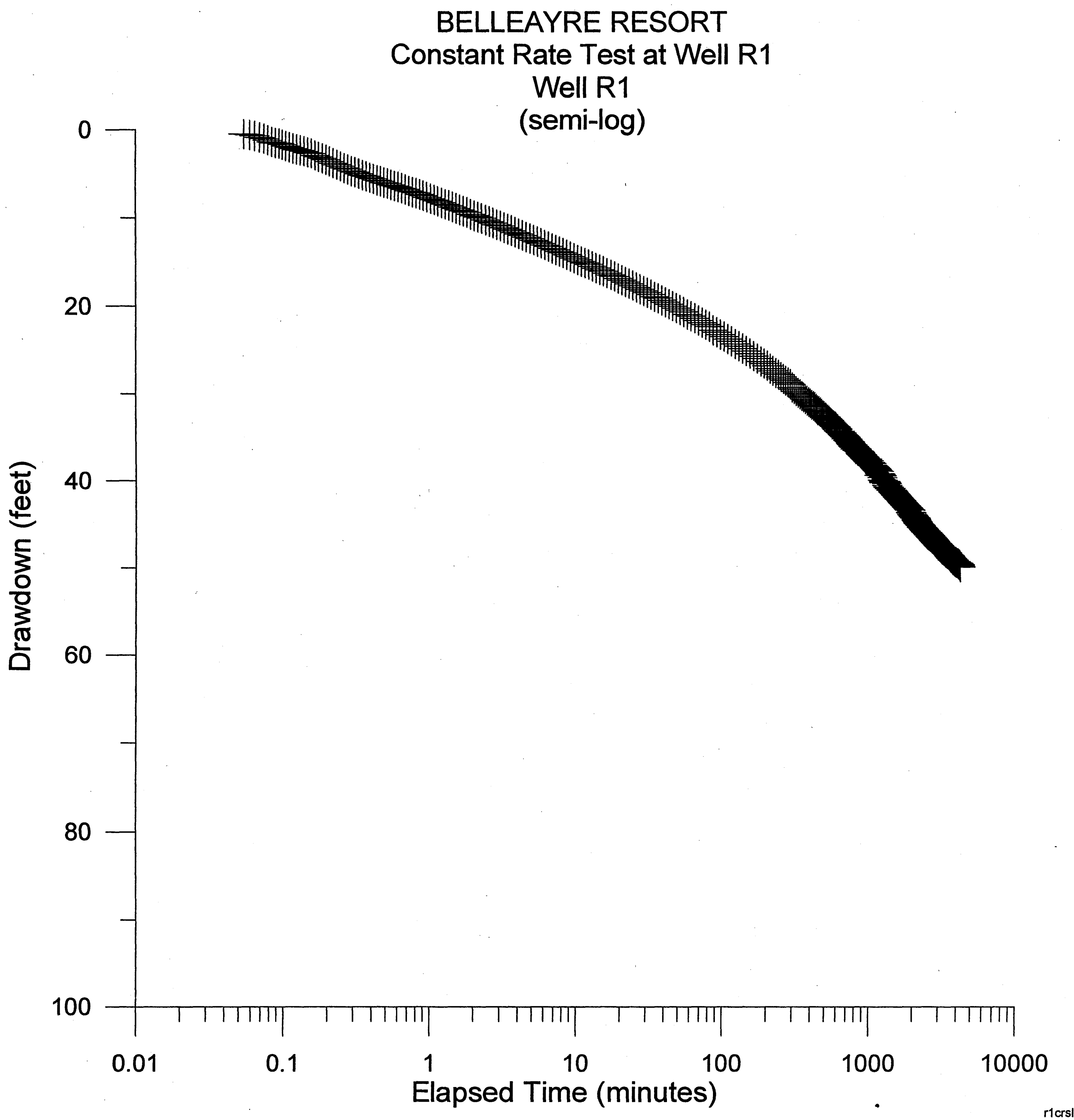


APPENDIX C

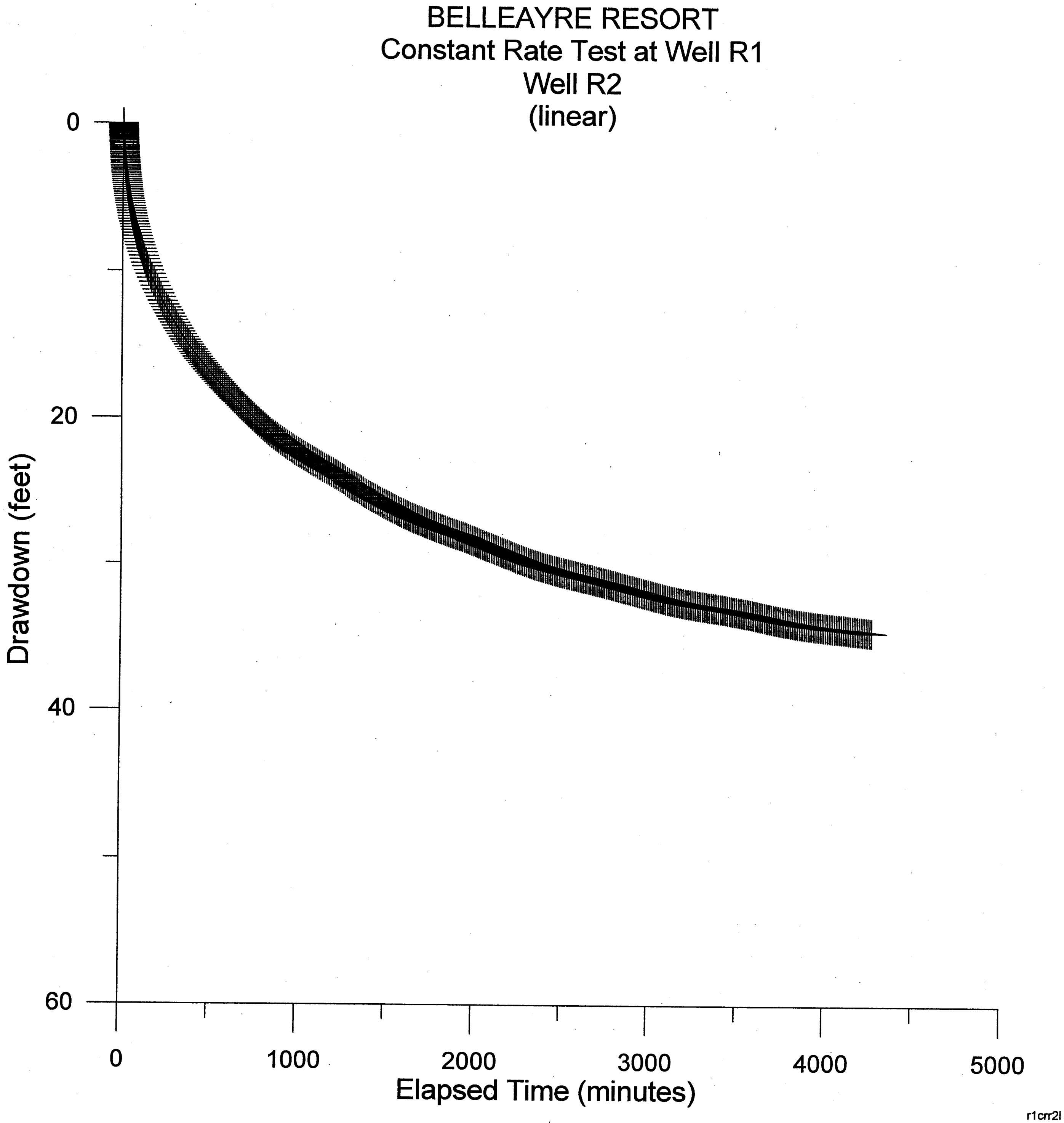
Constant Rate Test Graphs

BELLEAYRE RESORT
Constant Rate Test at Well R1
Well R1
(linear)

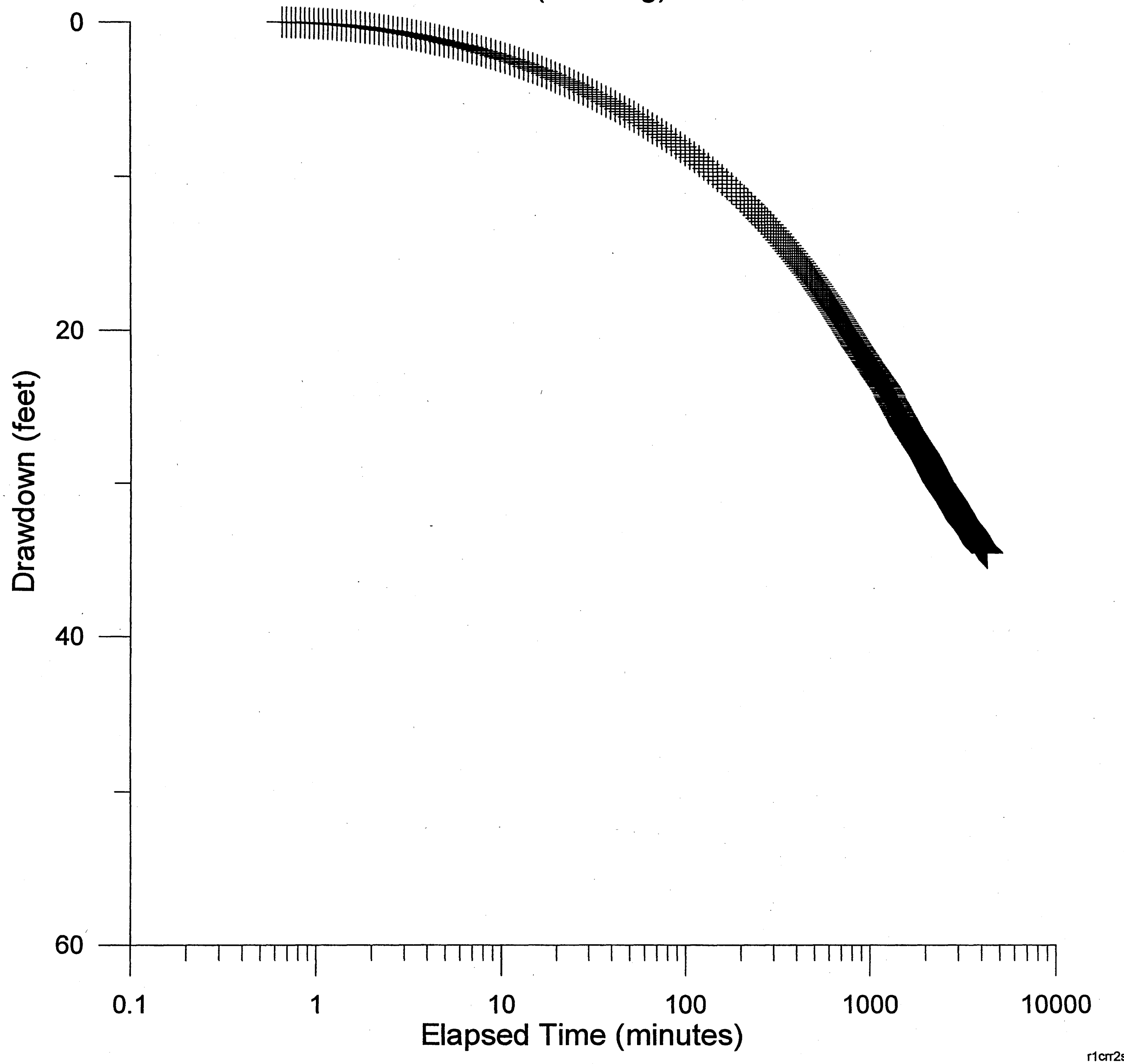




BELLEAYRE RESORT
Constant Rate Test at Well R1
Well R1
(semi-log)
Drawdown (feet)
0
20
40
60
80
100
0.01
0.1
1
10
100
1000
10000
Elapsed Time (minutes)
r1crsl

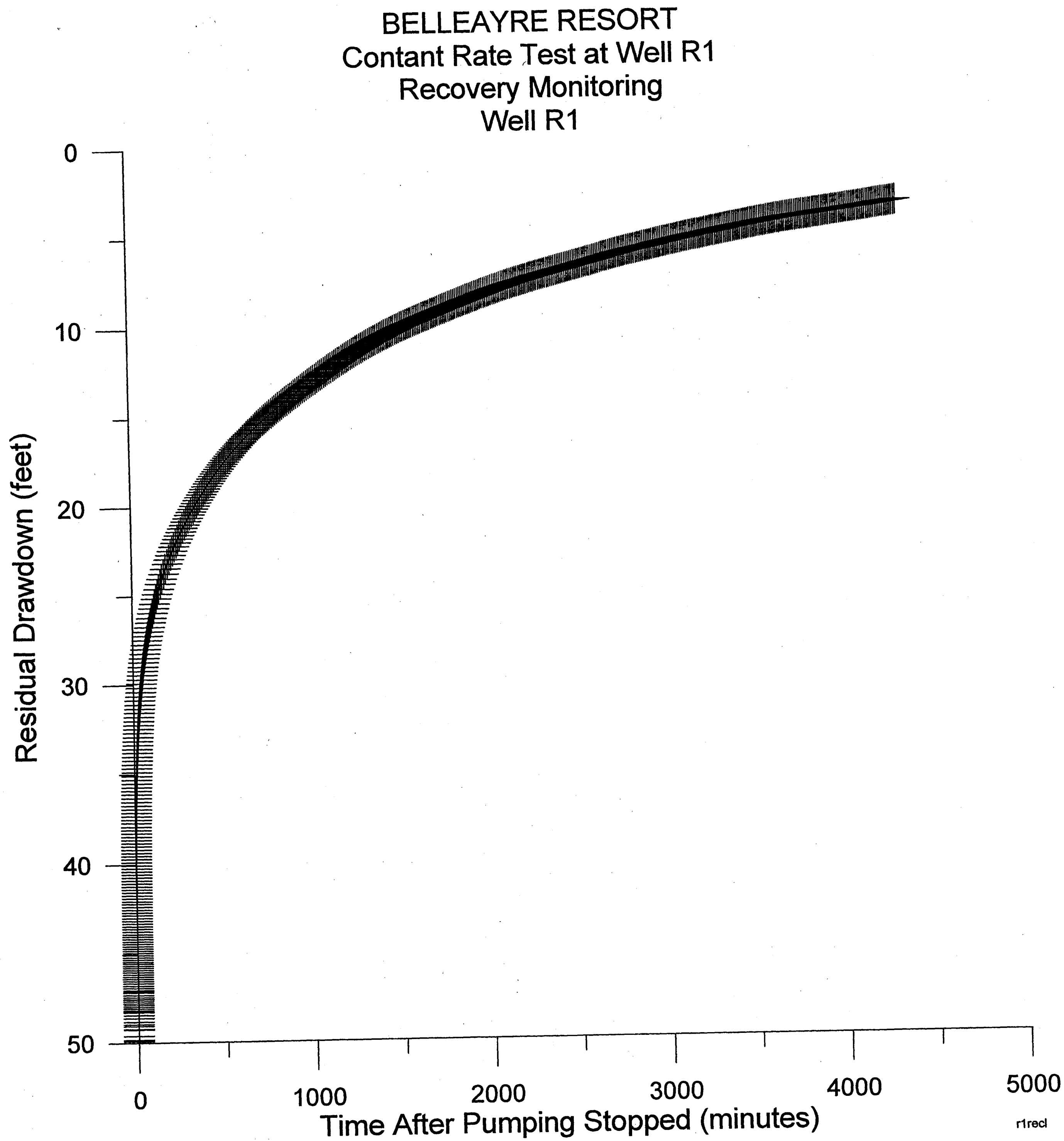

BELLEAYRE RESORT
Constant Rate Test at Well R1
Well R2
(linear)
0
20
40
60
Drawdown (feet)
0
1000
2000
3000
4000
5000
Elapsed Time (minutes)
r1crr2l

BELLEAYRE RESORT
Constant Rate Test at Well R1
Well R2
(semi-log)

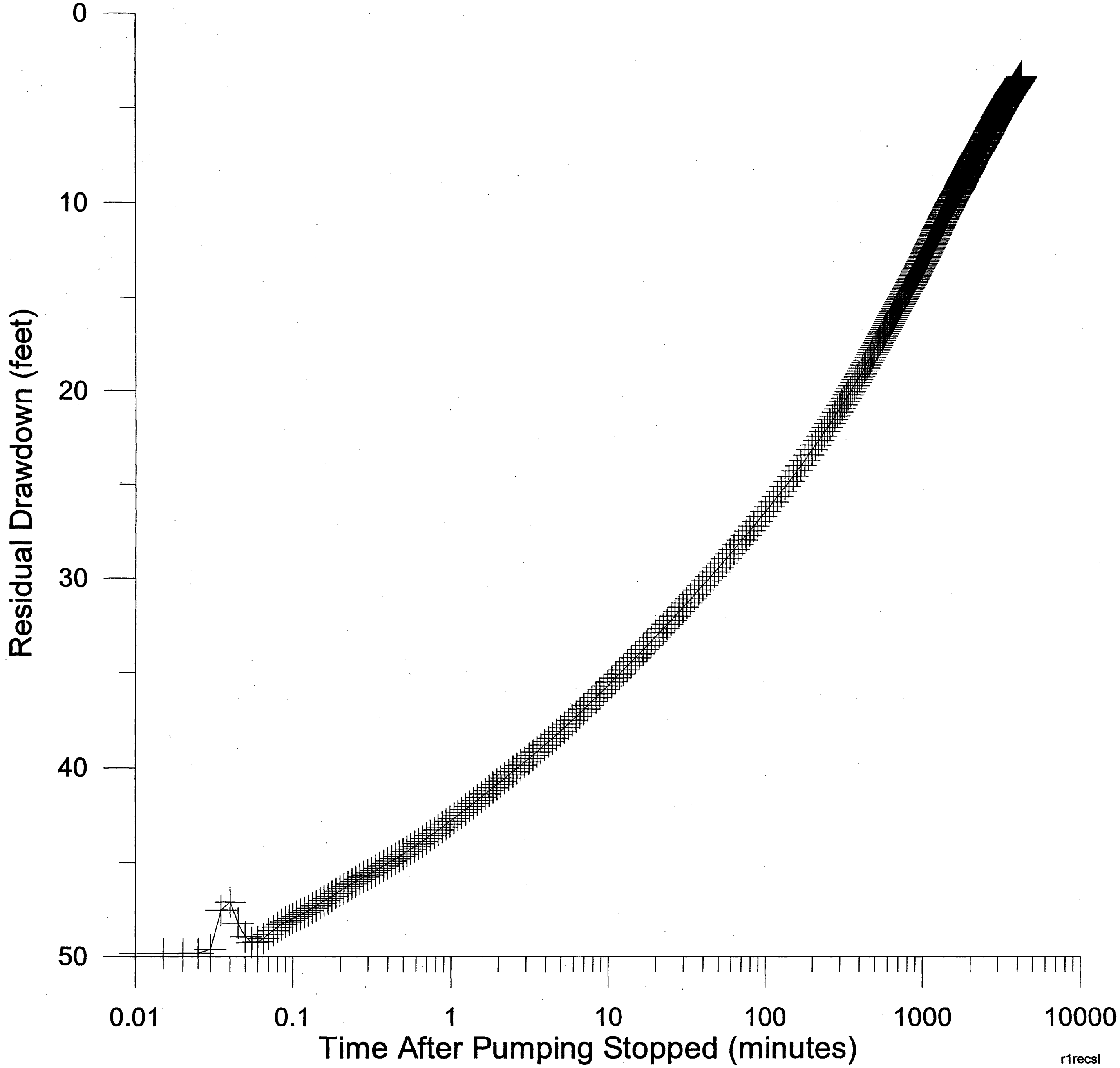


APPENDIX D

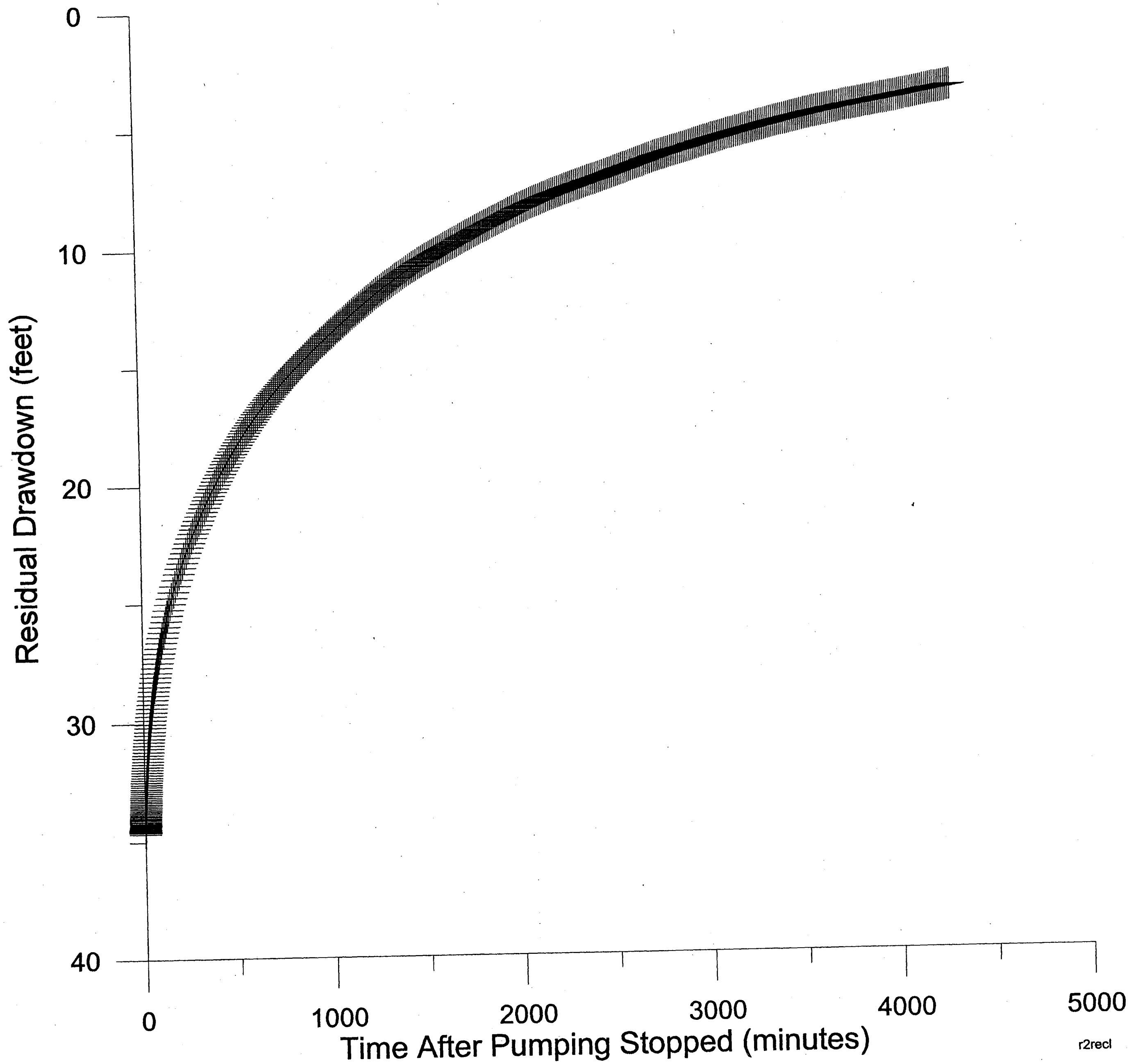
Recovery Results

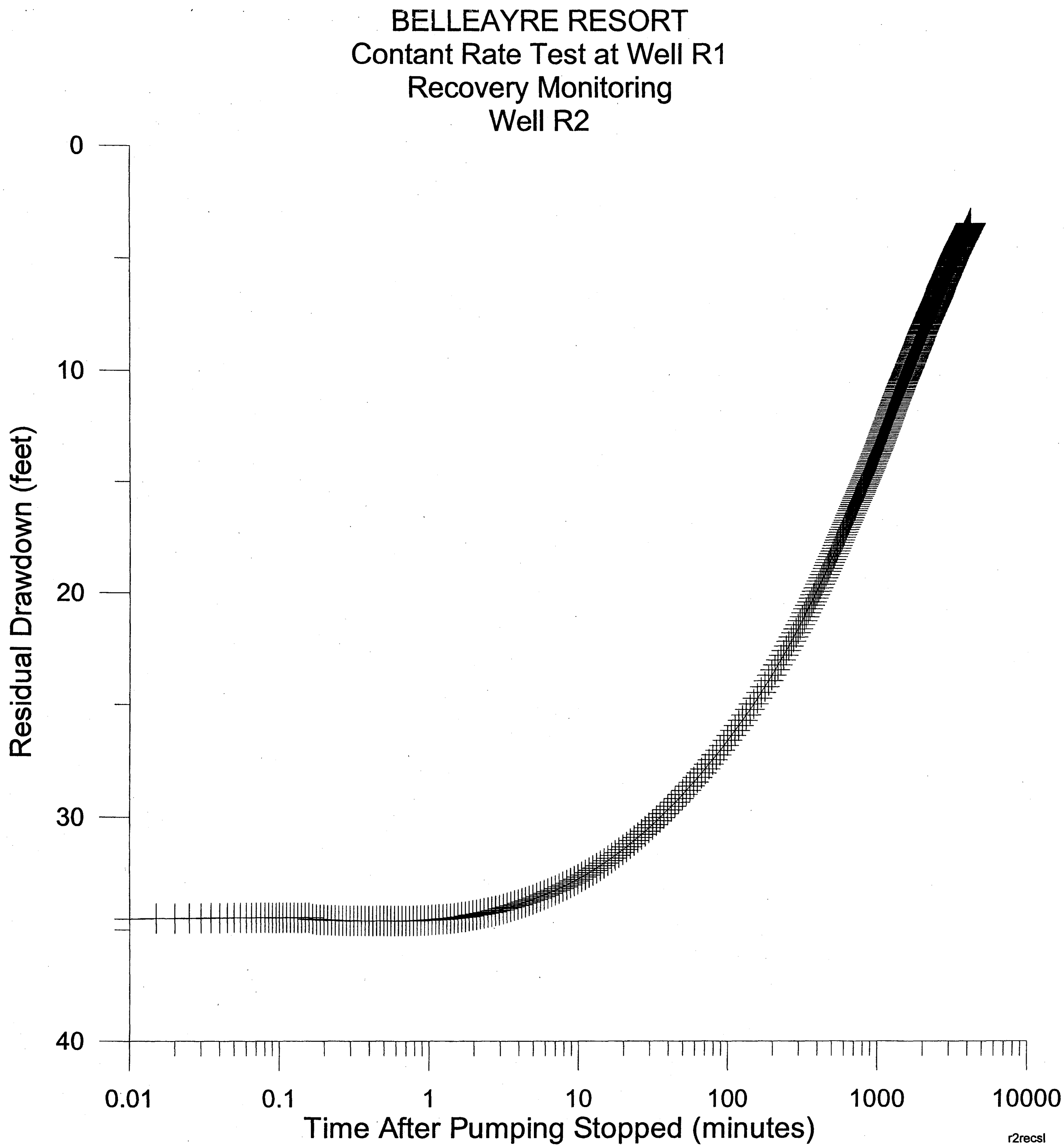

BELLEAYRE RESORT
Contant Rate Test at Well R1
Recovery Monitoring
Well R1
Residual Drawdown (feet)
0
10
20
30
40
50
0
1000
2000
3000
4000
5000
Time After Pumping Stopped (minutes)
r1recl

BELLEAYRE RESORT
Contant Rate Test at Well R1
Recovery Monitoring
Well R1



BELLEAYRE RESORT
Contant Rate Test at Well R1
Recovery Monitoring
Well R2




BELLEAYRE RESORT
Contant Rate Test at Well R1
Recovery Monitoring
Well R2
Residual Drawdown (feet)
0
10
20
30
40
0.01
0.1
1
10
100
1000
10000
Time After Pumping Stopped (minutes)
r2recsl

APPENDIX E

Laboratory Results

PHOENIX

ACCREDITED IN ACCORDANCE WITH nelac

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06040
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

September 30, 2002

FOR: Attn: Mr. Michael Pallechi
Alpha GeoScience
679 Plank Road
Clifton Park, NY 12065

Sample Information		Custody Information		Date	Time
Matrix:	WATER	Collected by:	MP	09/10/02	9:15
Location Code:	ALPHAGEO	Received by:	KJB	09/11/02	14:14
Project Code:		Analyzed by:	see "By" below		
P.O.#:	02130				

RECEIVED OCT 02 2002 By

Laboratory Data

SDG I.D.: GAE34990

Client ID: BELLEAYRE PUMP TEST WELL R1

Phoenix I.D.: AE34990

Parameter	Result	RL	Units	Date	Time	By	Reference
Calcium	19.310	0.010	mg/L	09/12/02		EK	200.7/6010
Iron	0.034	0.002	mg/L	09/12/02		EK	6010/E200.7
Hardness (CaCO3)	65.6	0.10	mg/L	09/13/02		EK	S2340B
Magnesium	4.21	0.01	mg/L	09/12/02		EK	200.7/6010
Manganese	0.019	0.001	mg/L	09/12/02		EK	200.7/6010
Sodium	13.5	0.02	mg/L	09/12/02		EK	200.7/6010
Alkalinity (CaCO3)	76	40	mg/L	09/26/02		EG	SM2320B
Chloride	17	3.0	mg/L	09/14/02		G/E	300.0/9056
Conductivity	210	1.0	umhos/cm	09/12/02		CL	SM2510B
Hydrogen Sulfide	BDL	0.05	mg/L	09/23/02		PJ	SM4500SH
Langelier Index	-1.67		pH units	09/26/02		CF	SM203
pH	6.97	0.10	pH Units	09/12/02	23:00	CD	E150.1/SW9045
Tot. Diss. Solids	160	5.0	mg/L	09/12/02		CF	SM2540C
Turbidity	1.43	0.05	NTU	09/11/02	23:00	CD	S214A/E180.1
Total Metals Digest	Completed			09/11/02		G	SW846 - 3005

Comments: ND=Not detected BDL = Below Detection Limit RL=Reporting Limit

If there are any questions regarding this data, please call Phoenix Client Services at extension 200.

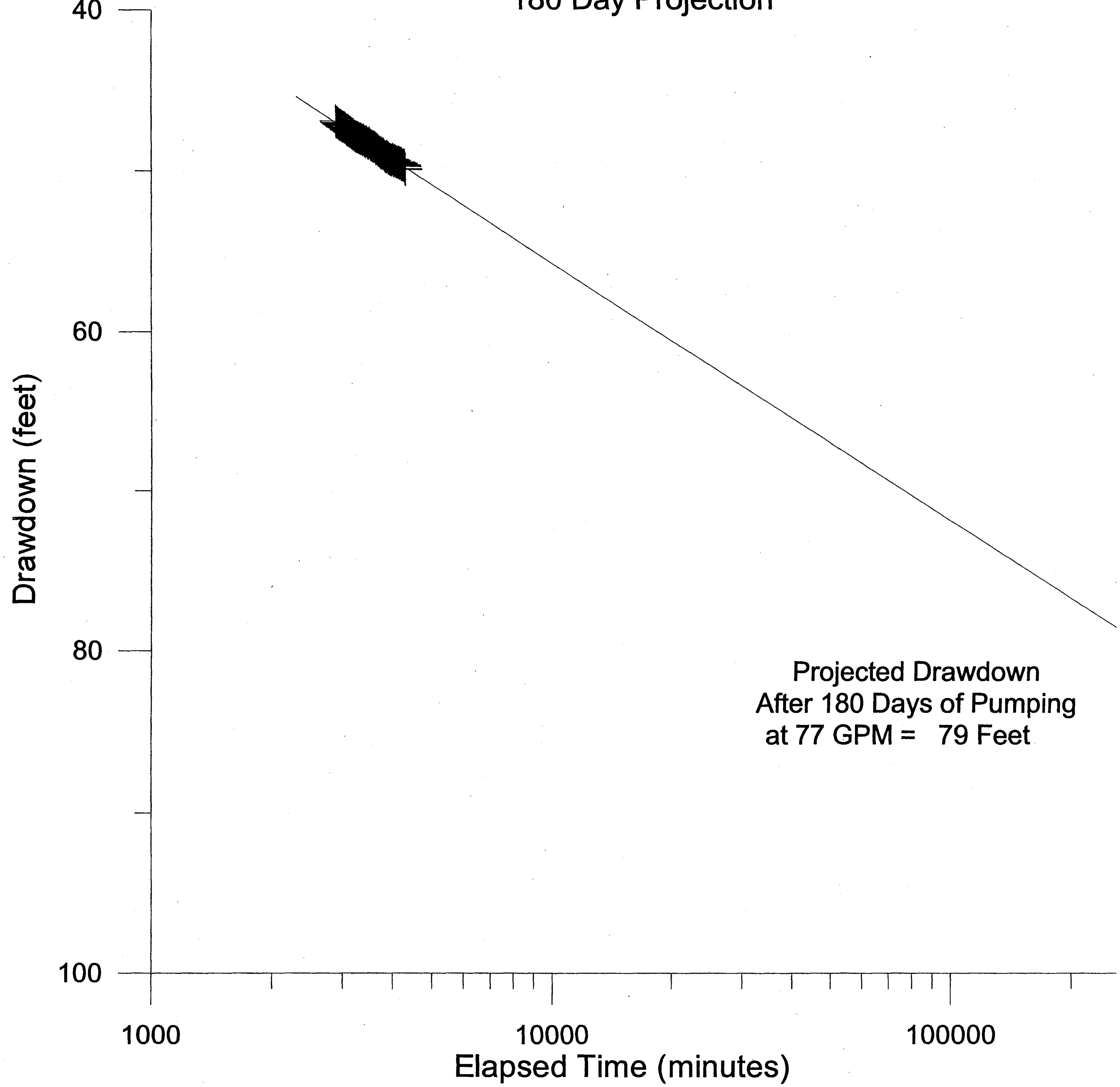
Phyllis Shiller

Phyllis Shiller, Laboratory Director
September 30, 2002

APPENDIX F

Drawdown and Yield Projection

BELLEAYRE RESORT
Constant Rate Test at Well R1
Well R1
180 Day Projection



r1crpro180

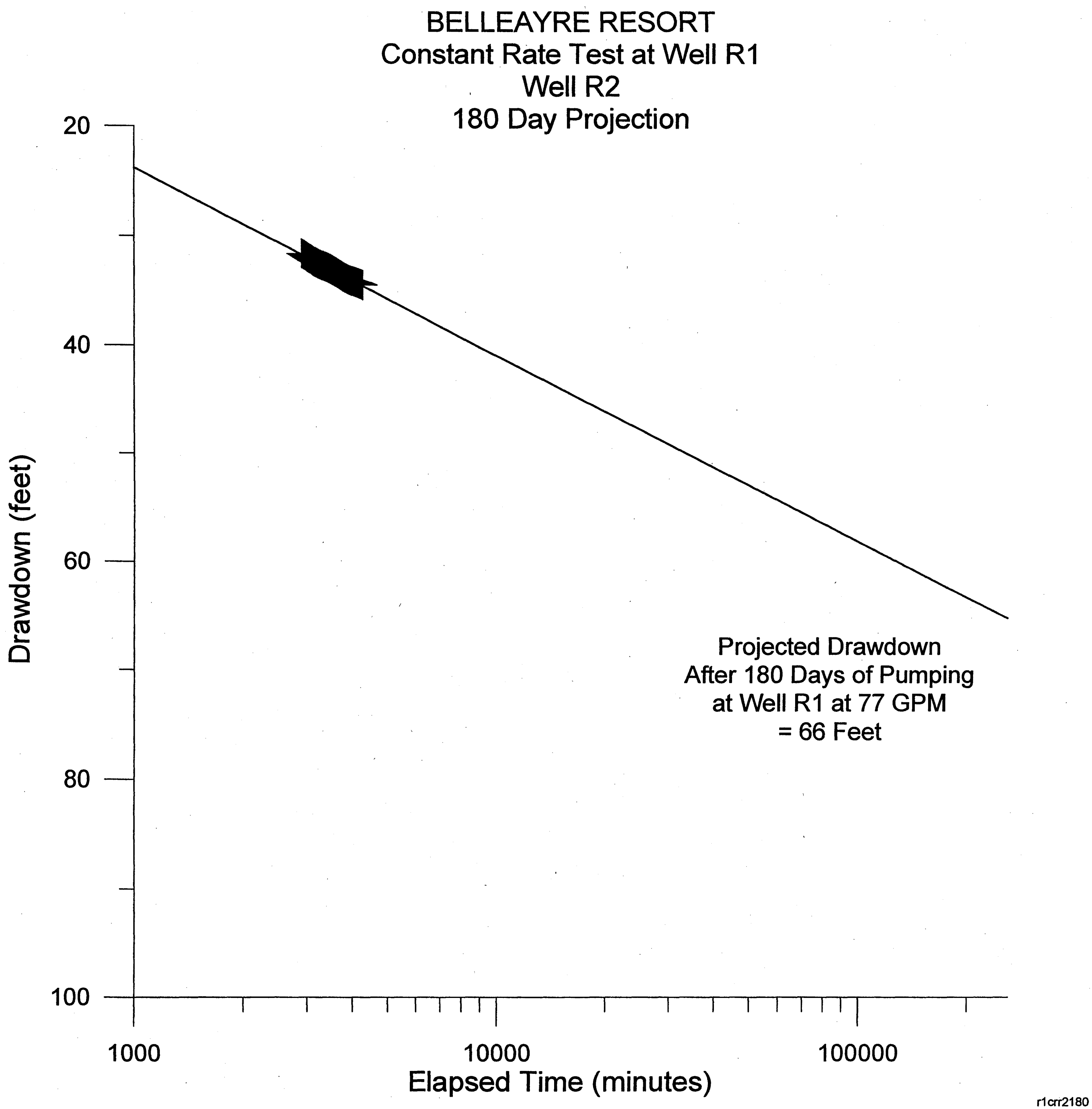

BELLEAYRE RESORT
Constant Rate Test at Well R1
Well R2
180 Day Projection
Drawdown (feet)
20
40
60
80
100
1000
10000
100000
Elapsed Time (minutes)
Projected Drawdown
After 180 Days of Pumping
at Well R1 at 77 GPM
= 66 Feet
r1crr2180

Exhibit J

Disinfection Calculations and Example Equipment

DELAWARE ENGINEERING
28 Madison Ave. Ext.
Albany, NY 12203

PROJECT: Crossroads
DESCRIPTION: Chlorine Demand
Belleayre Ridge

DATE 11/28/00
SHEET 1 OF 1
BY MTD Ck'ed ____

Assume: need 2 ppm CL for groundwater
AVE. FLOW = 112,550 gpd
PEAK = 3 × AVE = 337,650 gpd
Cl_2 : HOCl is ≈ 1:1

① AVE FLOW NaOCl demand:
2 ppm Cl × 0.112 MGD = 0.224 gal CL
using 15% by vol. NaOCl

$0.224 @ 100\% \times \frac{1 \text{ gal NaOCl}}{15\% \text{ CL}} =$ **1.49 gal/day NaOCl**

② PEAK FLOW NaOCl demand:
2 ppm Cl × 0.34 MGD = 0.68

$0.68 @ 100\% \times \frac{1 \text{ gal NaOCl}}{15\% \text{ CL}} =$ **4.53 gal/day NaOCl**

③ DAY TANK SIZING (BASED ON PEAK FLOW)
FOR 30 HRS @ 2.5 ppm
2.5 (.34 MGD) = 0.85 gal of CL

$0.85 \cdot \frac{1}{15\%} = 5.7$ gal/day NaOCl

$5.7 \frac{\text{gal}}{\text{day}} \cdot \frac{1 \text{ day}}{24 \text{ hr}} \cdot 30 \text{ hr} = 7.1$ gal day tank

≈ 10 gal day tank

reorder replacement pump → Cat. #4 Wallis Terman

④ Peak Chlorine conc. @ peak flow (pump det.)
Water flow = 0.34 MGD; max. pump output = 1 gph
Chlorine conc in soln = 15%

24 (GPD NaOCl soln (15%)) × .15 = 3.6

3.6 / .34 MGD = **10.6 ppm CL max at peak flow**

PULSAtron®

SERIES E PLUS SPECIFICATIONS

GENERAL

Chemical metering pumps shall be positive displacement non-hydraulic, solenoid driven, diaphragm type pumps. Output shall be "hot" rated (at operating temperature) and shall be adjustable while pumps are in operation. Positive flow shall be ensured by a minimum of four ball type check valves. A bleed valve shall be provided (on most units) for the manual evacuation of entrapped air or vapors and safe relief of pressure in the discharge line.

CONTROLS

The control panel shall be located opposite the liquid handling end of pump Output volume adjustments shall be made by independent dial knobs for stroke length and stroke rate. Stroke length adjustment shall have a locking lever Control functions shall be either manual, external pacing with stop, or automatic with stop. For all operating modes, a green indicator light on the control panel shall illuminate when pump is in operation and strobe once for each pump stroke. In all operating modes, a red indicator light on the control panel shall illuminate when pump operation is halted via the stop function

Manual (Standard)
Pump control shall be selectable between on and off by means of a 2-position switch

External Pacing w/Stop (Optional)
Pump control shall be selectable between manual and external by means of a 3 position center off switch In external mode, the pump shall accept dry contact closures (ex contacting flow meter). As contact closes, the pump shall stroke once, minimal contact closure time is 10 msec. Contact must open and close for each pump stroke Maximum closures - 125 per minute.

A dry contact closure to the stop function shall cause pump to halt operation and illuminate a red indicator light on pump control panel in either manual or external pacing mode. Pump shall resume normal operation when contact opens.

Automatic w/ Stop (Optional)
Pump control shall be selectable between manual and automatic by means of a 3 position center off switch. In automatic mode, the pump shall accept a direct 4-20 mADC signal (without a signal interface or conversion device). Internal resistance shall be 124 ohms

A dry contact closure to the stop function shall cause pump to halt operation in either manual or automatic mode and illuminate a red indicator light on the pump control panel Pump shall resume normal operation when contact opens

ELECTRONIC DRIVE

To prevent damage to pump from over heating, the solenoid shall have automatic reset thermal overload protection. For overpressure conditions, pump shall automatically stop pulsating when discharge pressure exceeds pump pressure rating by not more than 35% when pump is set at maximum stroke

The electronic circuitry shall be EMI resistant and shall employ a metal oxide varistor (MOV) for lightning protection. A fuse mounted on the pump control panel accessible from the outside of the pump shall provide circuit overload protection.

Internal wiring between electronic circuit board, solenoid, and power shall be quick disconnect terminals at least 3/16" wide

ENCLOSURE

Pump drive shall be encased in a water resistant housing constructed of a chemically resistant glass filled polyester. The control panel shall be enclosed by a hinged dust cover constructed of polycarbonate plastic The electronic circuitry shall be mounted at the rear of the pump for maximum protection against chemical intrusion

AGENCY LISTINGS

MATERIALS OF CONSTRUCTION

Pump Head - GFPPL, PVC, SAN, PVDF, 316SS
Diaphragm - Teflon faced, hypalon backed
Check Valves
- Seats/O-Rings - Teflon, Hypalon, Viton
- Balls - Ceramic, Teflon, 316SS, Alloy C
- Housing - GFPPL, PVC, PVDF, 316SS

Bleed Valve - GFPPL, PVC, PVDF
Tubing - Suction 4 ft. PVC
- Discharge 8 ft. PE

Important. Material Code - GFPPL = Glass-filled Polypropylene, PVC = Polyvinyl Chloride, SAN = Styrene-Acrylonitrile, PE = Polyethylene, PVDF = Polyvinylidene Flouride. Teflon, Hypalon and Viton are registered trademarks of E I DuPont Company.

NOTES:

- NSF listing is not available on models LPK2, K3, K5 and LPH8, models with PVDF components or select models (refer to price schedule for details)
- Pump heads in 316SS and PVDF are not available with Model LPH8.
- Pump heads in SAN are not available on pump models rated above 100 PSI.
- Bleed valve not available on pumps configured for high viscosity, NPT connections or Model LPH8
- Tubing may be supplied in PVDF, Polypropylene, or black U.V. inhibited PE.

RX TIME 02/15 '01 17:25 LOCATION:+

Series E PLUS

PULSAtron Electronic Metering Pumps

Key Features:

- ***Automatic Control,*** either 4-20 mADC direct, inverse or external pacing, with stop function
- ***Manual Control*** by on-line adjustable stroke rate and stroke length.
- ***UL Listed*** for demanding ***OUTDOOR*** and indoor application Also CSA and NSF approved
- ***Auto-Off-Manual*** switch.
- ***Highly Reliable*** timing circuit.
- ***Circuit Protection*** against voltage and current upsets.
- ***Circuit Breaker,*** panel mounted.
- ***Solenoid Protection*** by thermal overload with auto-reset.
- ***Water Resistant,*** for outdoor installation.
- ***Indicator Lights,*** panel mounted.
- ***Safe & Easy Priming*** with durable leak-free **bleed valve assembly** (standard most models)

Complete Selection

Twenty distinct models are available having pressure capabilities to 300 PSIG @ 3 GPD, and flow capacities to 500 GPD @ 20 PSIG, with turndown ratios up to 100 1. Metering performance is reproducible to within ± 2% of maximum capacity.

Pump heads, cartridge check valve assemblies and tubing are stocked in several corrosion-resistant plastic, elastomeric and alloy materials along with stainless steel that safely handle a wide variety of chemicals.

Please refer to the reverse side for Series E PLUS specifications

Operating Benefits

Reliable metering performance. Our guided check valves, with their state-of-the-art seat and ball designs, provide precise seating, and excellent priming and suction lift characteristics. Our timing circuit is highly reliable and, by design, virtually unaffected by temperature, EMI and other electrical disturbances.

Rated "hot" for continuous duty. Series E PLUS pumps continue to meet their specifications for pressure and capacity even during extended use. That's because our high quality solenoid is separately encapsulated in a fin-cooled, thermo-conductive, enclosure that effectively dissipates heat.

High viscosity capability. A straight flow path and ample clearance between the diaphragm and head enable standard PULSAtron pumps to handle viscous chemicals up to a viscosity of 3000 CPS. For higher viscosity applications, larger, spring-loaded connections are available

Leak-free, sealless, liquid end. Our diaphragms are of superior construction—teflon-faced, bonded to a composite of Hypalon and fabric layers, and reinforced with a metal insert for optimum flexibility and durability.

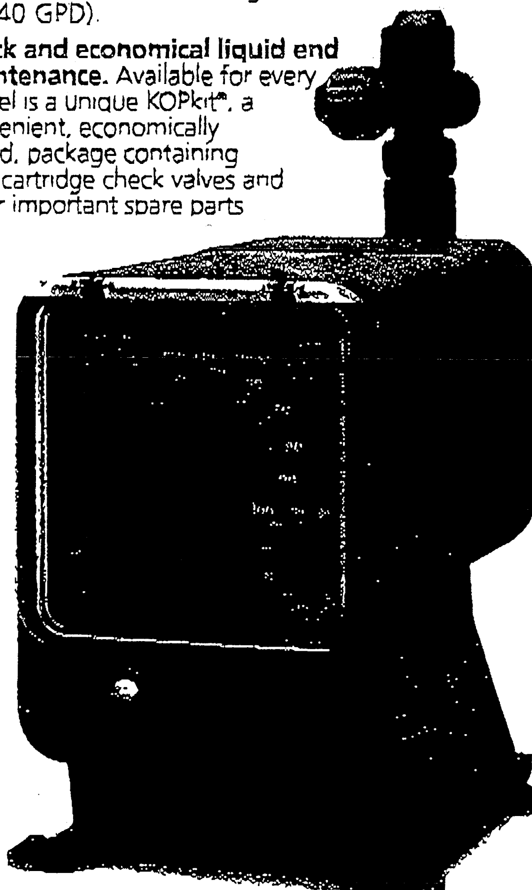
System Compatibility

A wide variety of chemicals can be pumped. Liquid end materials include glass-filled polypropylene (GFPPL), PVC, styrene-acrylonitrile (SAN), Polyvinylidene Fluoride (PVDF), Teflon, Hypalon, Viton, ceramic, alloys and 316SS.

Immediate installation and start-up. Included as standard accessories with all models are an injection/back pressure valve assembly and a foot valve/strainer assembly*, including discharge and suction tubing and tube straightener (*not available with high viscosity connections for > 3000 CPS)

Safe and easy priming and valve maintenance. Included as a standard accessory is a bleed valve assembly, including return tubing (available only on (those models with tubing connections and ≤ 240 GPD).

Quick and economical liquid end maintenance. Available for every model is a unique KOPkit*, a convenient, economically priced, package containing new cartridge check valves and other important spare parts



For additional information about PULSAtron's mid-range Series E and Series A PLUS refer to Technical Sheet No. EMP-022 and EMP-025 respectively. For information about the economical Series C PLUS and Series C refer to Technical Sheet Nos EMP-026 and EMP-024

PULSAFEEDER
A Unit of IDEX Corporation

Feb-15-2001 06:27pm From-SIEWERT EQUIPMENT CO + T-367 P.003/008 F-433

SIEWERT EQUIPMENT CO. INC.
Pump & Mixer Specialist
175 Akron St. Rochester, NY 14609
(716) 482-9640 FAX (716) 482-4149

PULSAtron® Series E PLUS Specifications

Important: Series E PLUS — 20 model selections. Digit 1 and 2 (LP) signify product class, digit 3 and 4 signify pressure/flow. For full model selection information refer to Price Schedule EMP-PS LX, or reference guide No. EMP-003.

Pressure and Flow Rate Capacity

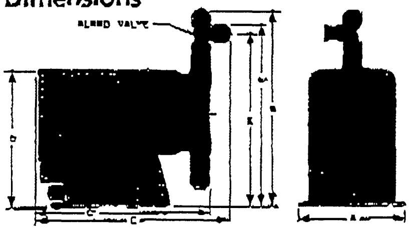
Capacity, nominal																			
GPD	3	5	6	11	12	14	20	21	24	40	42	44	60	75	94	120	190	240	500
GPH	13	0 20	0 25	0 45	0 50	58	0 83	0.87	1 0	1 66	1 75	1 83	2 5	3 17	3 91	5 00	8 00	10 00	20 00
LPH	49	79	95	1 73	1 89	2.20	3 15	3 31	3 78	6 31	6 62	6 94	9 5	11 83	14 82	18 93	29 96	37 85	78 85
Pressure, max PSIG/Bar																			
300/21	LPK2	—		—	—	—		—	—	—	—		—	—	—	—	·	—	—
250/17	-	LPB2	—	LPD3	—	—	LPF4	--	—	LPH4	—	—	—	—	—	—	—	—	—
150/10			LPA2	-	LPB3	—	—	LPD4	—	—	LPG4	—	LPK5	LPH5	—	—	—	—	—
100/7	—	—	—		LPA3	LPK3	—	·	LPB4	—	—	LPE4	·	--	LPG5	LPH6	—	-	—
50/3 3	—	—	—	—	·	—	—	—	·	—	—	—	—	·	—	—	LPK7	—	—
35/2 4	—	—		—	—	·	—	—	—	·	·	—	—	—	—	—		LPH7	—
20/1 3	—	—	—		—	—	—	..	—	—	—	—	—	—	—	—	—	--	LPH8

Liquid End Materials

Series	Pump Head	Diaphragm	Check Valves: Seats / O-rings	Check Valves: Balls	Fittings	Bleed Valve	Injection Valve Assembly Foot Valve Assembly	Tubing
E PLUS	GFPPL PVC SAN PVDF 316SS	Teflon-faced Hypalon-backed	Teflon, Hypalon, Viton	Ceramic, Teflon, 316SS, Alloy C	GFPPL PVC PVDF 316SS	Same as fitting and check valve selected, except 316SS	Same as fitting and check valve selected	Clear PVC White PE

Important: Material Code — GFPPL = Glass-filled Polypropylene, PVC = Polyvinyl Chloride, SAN = Styrene-Acrylonitrile, PE = Polyethylene, PVDF = Polyvinylidene Fluoride. Teflon, Hypalon and Viton are registered trademarks of E.I. DuPont Company.

Dimensions



Series E PLUS Dimensions (inches)

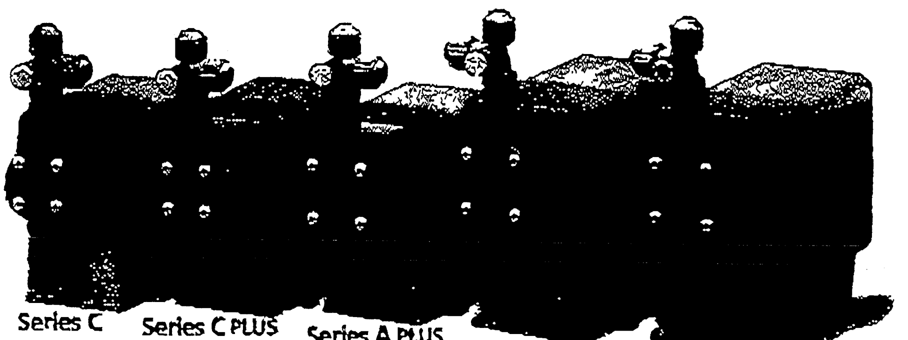
Model No.	A	B	B'	C	C'	D	E	Shipping Weight (Lbs.)
LPA2	5 4	10.3	—	10 8		7 5	9.0	13
LPA3	5 4	10.6	—	10 7	—	7 5	9 2	13
LPB2	5 4	10 3	—	10 8	-	7 5	9.0	13
LPB3	5 4	10 6	—	10 7	—	7 3	9 2	13
LPB4	5 4	10 6	—	10 7	-	7 3	9 2	13
LPD3	5 4	10 6	—	11 7	—	7 3	9 2	15
LPD4	5 4	10 6	·	11 2	—	7 5	9 2	15
LPE4	5 4	10 6		11 2	—	7 5	9 2	15
LPF4	5 4	10 6		11 7	—	7 5	9 7	17
LPG4	5 4	10 6	—	11 7	—	7 5	9 7	18
LPG5	5 4	11.0	—	11 7	—	7.5	9 6	18
LPH4	6 2	11.0	—	11 2	—	8.2	9 6	21
LPH5	6 2	11 3	—	11 2	—	8.2	10 0	21
LPH6	6 2	11 3	—	11 7		8.2	10 0	21
LPH7	6 1	11 7	—	11 7	—	8 2	10.3	21
LPH8*	6 1	—	10 9	—	10 6	8 2	—	25
LPK2	5 4	10 3	-	10 8	—	7 5	9 0	13
LPK3	5 4	10 6	—	10 7	—	7 5	9 2	13
LPK5	5 4	11.0	—	11 7	—	7 5	9 6	18
LPK7	6 1	11 7	—	11 2	—	8 2	10 3	21

Note: Inches x 2 54=cm
* The LPH8 is designed without a bleed valve available

KOPkit®

Pulsafeeder has built a reputation for superior reliability by supplying carefully designed, high quality equipment. Even the best equipment, however, requires a minimal amount of maintenance. KOPkits are designed to guard against unnecessary downtime and assure you the highest level of efficient and uninterrupted service from our PULSAtron pumps. KOPkits contain recommended spare parts for those parts that usually require preventive maintenance. KOPkits immediately available in all wetted materials at very affordable prices.

PULSAtron's Full Range of Electronic Metering Pumps.



Series C Series C PLUS Series A PLUS Series E Series E PLUS

PULSAFEEDER
A Unit of IDEX Corporation
IDEX
Standard Pump Operations
27101 Airport Road • Punta Gorda, Florida 33982
(813) 575-2000 • FAX (813) 575-4085

Technical Sheet No. EMP-021
PULSAtron and KOPkit are trademarks of Pulsafeeder
Printed in U.S.A. 3/94

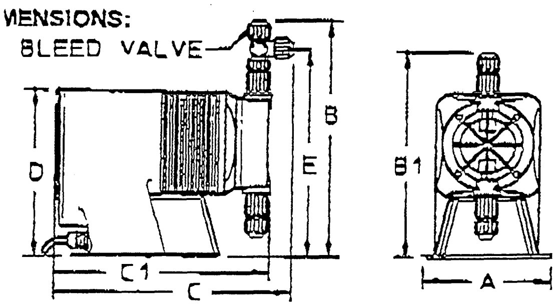
SERIES E PLUS SPECIFICATIONS

MODEL		K2	B2	A2	D3	B3	A3	K3	F4	D4	B4	H4	G4	E4	K5	H5	G5	H6	K7	H7	H8
Capacity	GPD	3	5	6	11	12	12	14	20	21	24	40	42	44	60	75	94	120	190	240	500
nominal	GPH	0 13	0.2	0 25	0 45	0.5	0.5	0 58	0.83	0.87	1	1 66	1 75	1.83	2.5	3.17	3.91	5	8	10	20
(max)	LPH	0.47	0 79	0.95	1 73	1 89	1.89	2 2	3 15	3.31	3 78	6.31	6.62	6 94	9 5	11 83	14.82	18 93	29 98	37 85	78 85
Pressure	PSIG	300	250	150	250	150	100	100	250	150	100	250	150	100	150	150	100	100	50	35	20
(max)	BAR	21	17	10	17	10	7	7	17	10	7	17	10	7	10	10	7	7	3.3	2 4	1.3
Connections	Tubing	1/4" ID X 3/8" OD 3/8" ID X 1/2" OD 3/16" ID X 5/16" OD													3/8" ID X 1/2" OD 1/2" ID x 3/4" OD (LPH8 ONLY)						
	Piping	1/4" FNPT													1/4" FNPT 1/2" FNPT						
Reproducibility at max. capacity		+/- 2%																			
Viscosity Max CPS		For viscosity up to 3000 CPS. select connection size 3 4. B or C with 316SS ball material Flow rate will determine connection/ball size 3000 - 10.000 CPS require spring loaded ball checks See Selection Guide for proper connection.																			
Stroke Frequency Max SPM		125																			
Stroke Frequency Turn-Down Ratio		10 1																			
Stroke Length Turn-Down Ratio		10:1																			
Power Input		115 VAC/50-60 HZ/1 ph 230 VAC/50-60 HZ/1 ph																			
Average Current Draw @ 115 VAC Amps @ 230 VAC Amps		1 0 0 5																			
Peak Input Power Watts		300																			
Average Input Power @ max SPM Watts		130																			

NOTE: Foot valve and bleed valve not available with High Viscosity (. 3000 CPS) connections.

DIMENSIONS:

MENSIONS:



Series E Plus Dimensions (Inches)								
Model No.	A	B	B1	C	C1	D	E	Shipping Weight
LPA2	5.4	12 7	-	11 3	-	7.5	9 5	13
LPA3	5.4	13	-	11.2	-	7.5	9 7	13
LPB2	5.4	12 7	-	11 3	-	7.5	9 5	13
LPB3	5.4	13	-	11 2	-	7.5	9 7	13
LPB4	5.4	13	-	11 2	-	7.5	9 7	13
LPD3	5.4	13	-	11 7	-	7.5	9 7	15
LPD4	5.4	13	-	11 7	-	7.5	9 7	15
LPE4	5 4	13	-	11.7	-	7 5	9 7	15
LPF4	5.4	13	-	12 2	-	7 5	9.7	18
LPG4	5 4	13	-	12.2	-	7 5	9.7	18
LPG5	5.4	13 4	-	12.2	-	7 5	10 1	18
LPH4	6 2	13.4	-	11 7	-	8 2	10 1	21
LPH5	6 2	13 7	-	11 7	-	8 2	10 5	21
LPH6	6 2	13.7	-	11 7	-	8.2	10 5	21
LPH7	6 1	13 7	-	11 7	-	8.2	10 8	21
LPH8*	6 1	-	10 9	-	10.6	8 2	-	25
LPK2	5 4	12.7	-	11 3	-	7 5	9 5	13
LPK3	5 4	13	-	11 2	-	7 5	9 7	13
LPK5	5 4	13 4	-	12 2	-	7.5	10 1	18
LPK7	6 1	14 14	-	11 7	-	8 2	10.8	21

NOTE: Inches X 2.54 = cm
*the LPH8 is designed without a bleed valve available

OPTIONAL ACCESSORIES AVAILABLE:

- MIXER
- TANKS
- FLOW METERS
- LIQUID LEVEL CONTROLLER
- TIMERS
- TEST KITS
- KOPkits
- CORPORATION STOPS
- WALL MOUNT KITS
- FIVE FUNCTION VALVE
- HAND HELD TESTERS

PULSAFEEDER®
A Unit of IDEX Corporation

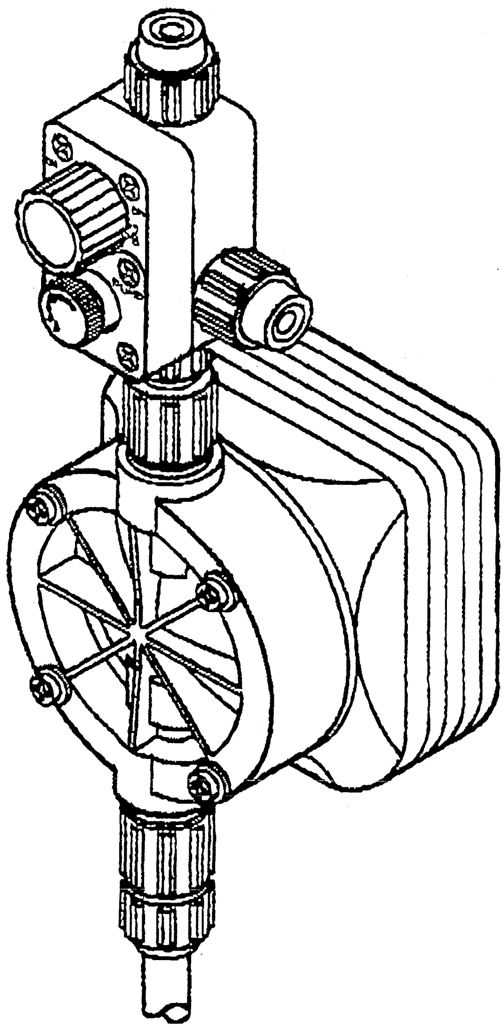
27101 Airport Road, Punta Gorda, FL 33982
Phone: 941-575-3800 Fax: 800-456-4085
941-575-4085

07/98 EMP-040

Accessories

PULSAFEEDER®
A Unit of IDEX Corporation

DG/5FV
Five Function Valve with De-Gas



With the DG/5FV you don't have to give up the accuracy and control of a solenoid metering pump in order to pump gaseous solutions. Available in a variety of materials and popular sizes, the DG/5FV is ready to tackle most applications. Not only does the DG/5FV provide degassing, it is packed with features that increase safety, enhance performance and generally improves the convenience of operation.

FEATURES

- De-Gas – Bypass gasses and fluid during normal pump operation. Allows for the constant removal of gases that would otherwise "air bind" the pump.
- Back Pressure – Maintains output reproducibility and allows metering into atmospheric discharge.
- Anti-Siphon – Prevents siphoning through the pump when point of injection is lower than the pump or into the suction line of another pump. Rated at total vacuum.
- Air Bleed – Used during priming to manually remove air from the pump head.
- Discharge Drain – Depressurize pump discharge line without loosening tubing or fittings. Protects the operator from chemical exposure.

SPECIFICATIONS

Material Of Construction:

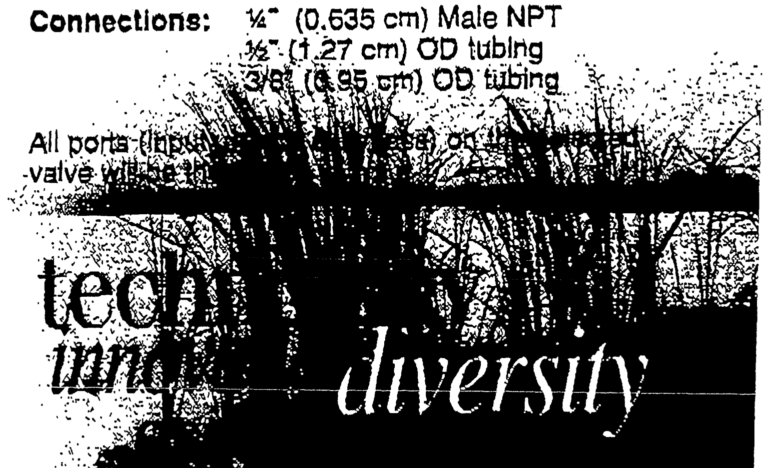
Valve Body	Polyvinylidene Flouride (PVDF) Polyvinyle Chloride (PVC)
Diaphragm	Teflon faced Hypalon
O-Rings	Viton or Hypalon
Hardware	188 Stainless Steel (recessed)

Maximum Flow:	240 GPD (37.85 LPH)
Minimum Flow:	3 GPD (.47 LPH)
Maximum Viscosity:	1000 CPS
MAX Pressure Ratings:	Up to 250 psi (17 BAR)

Note: Degas/bypass volume is adjustable, typically 1-10% of pump output.

Connections: ¼" (0.635 cm) Male NPT
½" (1.27 cm) OD tubing
3/8" (0.95 cm) OD tubing

All ports (inpu... valve will be th...



IDEX
IDEX CORPORATION

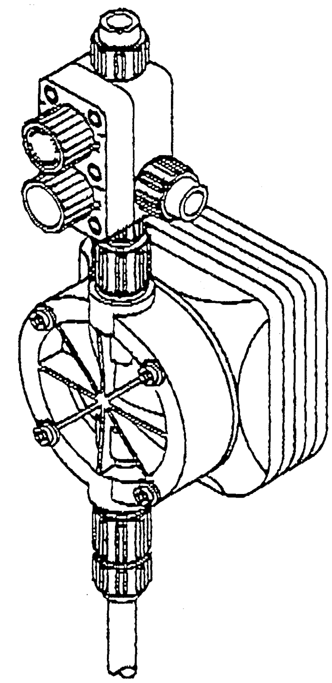
PULSAFEEDER
A Unit of IDEX Corporation

5 - FUNCTION VALVE

DESCRIPTION

Under certain conditions, metering pumps may require more than one device to increase safety of pump operation, enhance performance, and improve convenience of operation. The Pulsafeeder 5-function valve can meet most of these requirements in one neat package. A compact, diaphragm type, multi-function valve, the 5-function valve provides the following:

- **Pressure Relief** - Relieves excessive pressure that might build up in the pump discharge line protecting tubing and connections.
- **Back Pressure** - Maintains pump output repeatability and allows metering into atmospheric discharge.
- **Anti-Siphon** - Prevents siphoning through pump when point of injection is lower than pump or into suction line of another pump. Rated at total vacuum.
- **Pumphead Air Bleed** - Used as an aid in priming allowing manual removal of air from pumphead.
- **Discharge Drain** - Depressurize pump discharge line without loosening tubing or fittings protecting operator from chemical exposure.



OPERATION

The functions are selected by setting two, independent, dual position selector knobs. A label on the back panel of the 5-Function Valve identifies each function with selector knob positions. This guide with selector knob detents, provides error free settings and positive identification of function selected.

The 5-Function Valve connects to the existing pumphead discharge valves on most PULSAtron, Chem-Tech Series 100 and Series 200 pumps. With a generous flow path, the 5-Function Valve is capable of handling large output flows and viscous liquids. A return port located on the side body provides flow of chemical back to solution tank when pressure relief, pumphead air bleed, or discharge drain functions are utilized. Pressure relief settings are fixed, the proper 5-Function Valve model must be selected based on pump's maximum pressure rating. There are three different pump settings: 100, 150, and 250 psi distinguished by blue, green and red colored adjustment knobs respectively. The back pressure and anti-siphon functions may be turned off allowing pressure relief function to operate alone.

Note: When ordering 5-Function Valve with pump use suffix code - 500.

SPECIFICATIONS

Material Of Construction

Valve Body	- Glass Filled Polypropylene (GFPPL) - Polyvinylidene fluoride (PVDF)
Diaphragms	- Teflon faced hypalon
O-Rings	- Teflon
Hardware	- 188 Stainless Steel (recessed)

Maximum Flow - 240 GPD

Maximum Viscosity - 1000 CPS

Pressure Relief Settings (nominal cracking pressure)
- 250 PSI (275)
- 150 PSI (175)
- 100 PSI (125)

NOTE: Pressure relief may occur at 50% above maximum pressure rating of pump.

Connections
- 1/4" X 3/8" tubing
- 3/8" X 1/2" tubing
- 1/4" MNPT

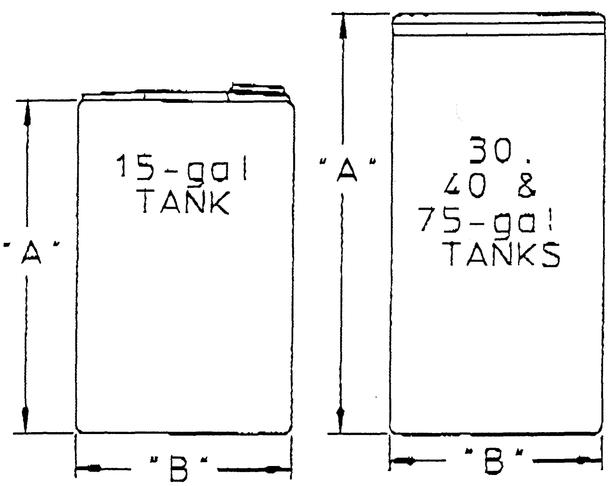
Relief Port
- 1/4" X 3/8" tubing
- 1/4" MNPT (with NPT connection only)

PULSAFEEDER

SERIES 6000 TANK SYSTEM

The Series 6000 Tank Systems are a rugged line of tanks designed to fit most solution handling needs All tanks are constructed of high density polyethylene (PE) and come in a variety of sizes

LIGHT DUTY LINEAR TANKS

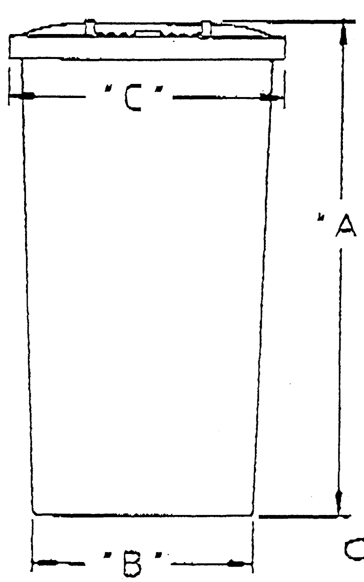


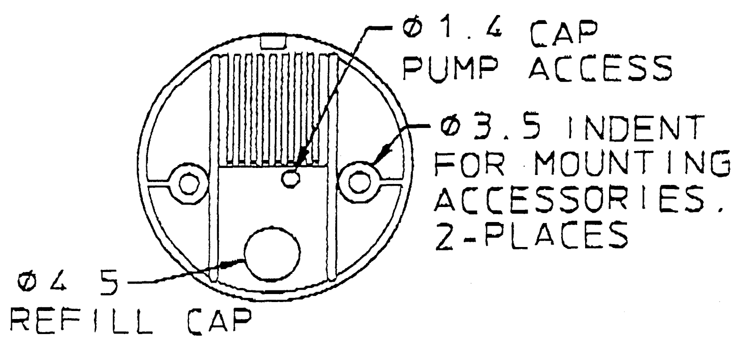
Model	Size Gallon	Wall	Dimensions (in.) A	B
40375	15	0.078	25	14.5
40360	30	0.094	32	18.5
40361	40	0.094	41.25	18.5
40362	*75	0.125	41.75	24.25

15 gallon tanks are translucent with 5 gal. increments and feature child resistant black caps. Other tanks have full fitted lids. 30/40 gal. tanks are non-translucent white. ***75 gallon tanks are black.** Tanks will not support pumps or mixers on covers. Use heavy duty tapered tanks for top mounting of pumps or mixers.

HEAVY DUTY TAPERED TANKS

TAPERED PE TANKS feature rigid covers which allow the top mounting of Chem-Tech S100, 200 and most PULSAtron pump models. 1/20 HP Flange Mount Mixers may also be mounted on the cover. Tanks are translucent with 5 gal. graduations. (Not suitable for use with 1/3 HP Flange Mount Mixers.)





Model	Size Gallon	Wall	Dimensions (in.) A	B	C
40365	35	0.125	28	20	23
J40366	55	0.125	42.5	18.5	23

OPTION →

PULSAFEEDER
A Unit of IDEX Corporation

27101 Airport Road, Punta Gorda, FL 33982
Phone: 941-575-3800 Fax: 800-456-4085
941-575-4085

Exhibit K

Corrosion Control Calculations and Example Equipment

DELAWARE ENGINEERING
28 Madison Ave. Ext.
Albany, NY 12203

PROJECT: CROSSROADS
DESCRIPTION: CORROSION CONTROL - Pine Hill (BELLEAYRE RIDGE)

DATE 12/4/00
SHEET 1 OF 2
BY MTD Ck'ed

FROM MOST RECENT TESTING - 10/6/00

pH = 6.54
LSI = -2.45
alk = 19 mg/L, EW = 50, so ALK = 19/50 = 0.38 meq/L

AT pH 6.54 $\alpha_0(H_2CO_3)$ = 38.44% ~ .3844
$\alpha_1(HCO_3^-)$ = 61.56% ~ .6156
$\alpha_2(CO_3)$ = ∅

Carbonate Species Table 10.5 from Fetter Hydrology Book

Alk ≅ $C_T CO_3(\alpha_1 + 2\alpha_2)$

$C_T CO_3 = \frac{Alk}{(\alpha_1 + 2\alpha_2)} = \frac{0.38}{(.6156 + 2(0))} = 0.62$ meq/L

Raise pH to the point where LSI = 0

LSI = pH - pHs; if LSI = -2.45; raise pH 2.45
∴ 6.54 + 2.45 = 8.99

	@6.54	α x .62 meq/L	Convert $\alpha_0 \to \alpha_1$	α Final @ 8.99≈9	x (.62) meq/L
α_0	.3844	.238	∅	∅	
α_1	.6156	.382	.238 + .382 = 0.62	96%	.595
α_2	∅	∅	∅	4%	.025
Caustic added (α_0)			0.238	0.025	

Caustic Req'd = 0.238 + 0.025 = 0.263 meq/L

using NaOH (50% grade) EW = 40 NaOH Req'd = 0.263 · 40 = 10.52 mg/L

NaOH usage @ ave. flow Q =
usage = 0.11 · 10.52/.5 · 8.34 #/mg/ppm = 19.3 #/day

Cost @ \$0.15/lb = 19.3#/day · 0.15/lb = \$2.89/day · 365 day/yr = \$1056.80/yr

DELAWARE ENGINEERING
28 Madison Ave. Ext.
Albany, NY 12203

PROJECT: CROSSROADS
DESCRIPTION: CORROSION CONTROL – PINE HILL (BELLEAYRE RIDGE)

DATE 12/4/00

BY MTD Ck'ed

DAY TANK SIZING (BASED ON PEAK FLOW FOR 30 hours @ 10.5 ppm)

$.44 \cdot \frac{10.5}{.5} = 9.24 \frac{gal}{day}$ NaOH

$9.24 \frac{gal}{day} \cdot \frac{1 day}{24 hrs} \cdot 30 hrs =$ **11.55 gal tank**

COPY

Al 7.

PO Box 733
Marlboro, NY 12542
Phone 914-236-7823
Fax 914-236-3911
ELAP #10824

ENVIRONMENTAL LABWORKS, INC.

October 17, 2000

Mr. Al Frisenda
Pine Hill Water Company
P.O. Box 250
Highmount, NY 12441

Dear Mr. Frisenda,

The following are results of the analyses performed on drinking water samples from the Pine Hill Water Company, collected and received at the laboratory 10/6/00.

Collected By: Al Frisenda

LOCATION	PARAMETER	RESULTS	MAX. CONT. LEVEL	METHOD
Key West Café	LEAD	0.031 mg/L	0.015 mg/L	EPA 200.9
	COPPER	2.47 mg/L	1.3 mg/L	SM18-3111B
Frame Shop	LEAD	0.004 mg/L	0.015 mg/L	EPA 200.9
	COPPER	3.38 mg/L	1.3 mg/L	SM18-3111B
Spring Overflow	ARSENIC	ND<0.002 mg/L	0.05 mg/L	SM18-3114B
	IRON, Total	ND<0.05 mg/L	0.3 mg/L	EPA 200.7
	MANGANESE	ND<0.05 mg/L	0.3 mg/L	EPA 200.7
	ALKALINITY	19 mg/L	----------	EPA 310.1
	CALCIUM, Total	31 mg/L	----------	SM18,3500Ca-D
	pH	6.54 units		EPA 150.1
	TOTAL DISS. SOLIDS	76 mg/L	500 mg/L	SM18,2540C
	CORROSIVITY	SI = -2.45		SM18,2330

ND = None Detected

For Corrosivity a slightly positive number usually indicates noncorrosive conditions, while a negative number tends toeard corrosion.

The data contained in this report were obtained using EPA or other approved methodologies. The outside laboratory ELAP #11216 used is NYS ELAP certified for these analyses.

If you have any questions or require any additional services, please do not hesitate to contact us at 914-236-7823.

Thank You,

Anthony J. Falco
Laboratory Director

PULSAtron®

SERIES E PLUS SPECIFICATIONS

GENERAL

Chemical metering pumps shall be positive displacement non-hydraulic, solenoid driven, diaphragm type pumps. Output shall be "hot" rated (at operating temperature) and shall be adjustable while pumps are in operation. Positive flow shall be ensured by a minimum of four ball type check valves. A bleed valve shall be provided (on most units) for the manual evacuation of entrapped air or vapors and safe relief of pressure in the discharge line.

CONTROLS

The control panel shall be located opposite the liquid handling end of pump Output volume adjustments shall be made by independent dial knobs for stroke length and stroke rate. Stroke length adjustment shall have a locking lever Control functions shall be either manual, external pacing with stop, or automatic with stop. For all operating modes, a green indicator light on the control panel shall illuminate when pump is in operation and strobe once for each pump stroke. In all operating modes, a red indicator light on the control panel shall illuminate when pump operation is halted via the stop function

Manual (Standard)
Pump control shall be selectable between on and off by means of a 2-position switch

External Pacing w/Stop (Optional)
Pump control shall be selectable between manual and external by means of a 3 position center off switch In external mode, the pump shall accept dry contact closures (ex contacting flow meter). As contact closes, the pump shall stroke once, minimal contact closure time is 10 msec. Contact must open and close for each pump stroke Maximum closures - 125 per minute.

A dry contact closure to the stop function shall cause pump to halt operation and illuminate a red indicator light on pump control panel in either manual or external pacing mode. Pump shall resume normal operation when contact opens.

Automatic w/ Stop (Optional)
Pump control shall be selectable between manual and automatic by means of a 3 position center off switch. In automatic mode, the pump shall accept a direct 4-20 mADC signal (without a signal interface or conversion device). Internal resistance shall be 124 ohms

A dry contact closure to the stop function shall cause pump to halt operation in either manual or automatic mode and illuminate a red indicator light on the pump control panel Pump shall resume normal operation when contact opens

ELECTRONIC DRIVE

To prevent damage to pump from over heating, the solenoid shall have automatic reset thermal overload protection. For overpressure conditions, pump shall automatically stop pulsating when discharge pressure exceeds pump pressure rating by not more than 35% when pump is set at maximum stroke

The electronic circuitry shall be EMI resistant and shall employ a metal oxide varistor (MOV) for lightning protection. A fuse mounted on the pump control panel accessible from the outside of the pump shall provide circuit overload protection.

Internal wiring between electronic circuit board, solenoid, and power shall be quick disconnect terminals at least 3/16" wide

ENCLOSURE

Pump drive shall be encased in a water resistant housing constructed of a chemically resistant glass filled polyester. The control panel shall be enclosed by a hinged dust cover constructed of polycarbonate plastic The electronic circuitry shall be mounted at the rear of the pump for maximum protection against chemical intrusion

AGENCY LISTINGS

MATERIALS OF CONSTRUCTION

Pump Head - GFPPL, PVC, SAN, PVDF, 316SS
Diaphragm - Teflon faced, hypalon backed
Check Valves
- Seats/O-Rings - Teflon, Hypalon, Viton
- Balls - Ceramic, Teflon, 316SS, Alloy C
- Housing - GFPPL, PVC, PVDF, 316SS

Bleed Valve - GFPPL, PVC, PVDF
Tubing - Suction 4 ft. PVC
- Discharge 8 ft. PE

Important. Material Code - GFPPL = Glass-filled Polypropylene, PVC = Polyvinyl Chloride, SAN = Styrene-Acrylonitrile, PE = Polyethylene, PVDF = Polyvinylidene Flouride. Teflon, Hypalon and Viton are registered trademarks of E I DuPont Company.

NOTES:

- NSF listing is not available on models LPK2, K3, K5 and LPH8, models with PVDF components or select models (refer to price schedule for details)
- Pump heads in 316SS and PVDF are not available with Model LPH8.
- Pump heads in SAN are not available on pump models rated above 100 PSI.
- Bleed valve not available on pumps configured for high viscosity, NPT connections or Model LPH8
- Tubing may be supplied in PVDF, Polypropylene, or black U.V. inhibited PE.

RX TIME 02/15 '01 17:25 LOCATION:+

Series E PLUS

PULSAtron Electronic Metering Pumps

Key Features:

- *Automatic Control,* either 4-20 mADC direct, inverse or external pacing, with stop function
- *Manual Control* by on-line adjustable stroke rate and stroke length.
- *UL Listed* for demanding *OUTDOOR* and indoor application Also CSA and NSF approved
- *Auto-Off-Manual* switch.
- *Highly Reliable* timing circuit.
- *Circuit Protection* against voltage and current upsets.
- *Circuit Breaker,* panel mounted.
- *Solenoid Protection* by thermal overload with auto-reset.
- *Water Resistant,* for outdoor installation.
- *Indicator Lights,* panel mounted.

Safe & Easy Priming with durable leak-free **bleed valve assembly** (standard most models)

Complete Selection

Twenty distinct models are available having pressure capabilities to 300 PSIG @ 3 GPD, and flow capacities to 500 GPD @ 20 PSIG, with turndown ratios up to 100 1. Metering performance is reproducible to within ± 2% of maximum capacity.

Pump heads, cartridge check valve assemblies and tubing are stocked in several corrosion-resistant plastic, elastomeric and alloy materials along with stainless steel that safely handle a wide variety of chemicals.

Please refer to the reverse side for Series E PLUS specifications

Operating Benefits

Reliable metering performance. Our guided check valves, with their state-of-the-art seat and ball designs, provide precise seating, and excellent priming and suction lift characteristics. Our timing circuit is highly reliable and, by design, virtually unaffected by temperature, EMI and other electrical disturbances.

Rated "hot" for continuous duty. Series E PLUS pumps continue to meet their specifications for pressure and capacity even during extended use. That's because our high quality solenoid is separately encapsulated in a fin-cooled, thermo-conductive, enclosure that effectively dissipates heat.

High viscosity capability. A straight flow path and ample clearance between the diaphragm and head enable standard PULSAtron pumps to handle viscous chemicals up to a viscosity of 3000 CPS. For higher viscosity applications, larger, spring-loaded connections are available

Leak-free, sealless, liquid end. Our diaphragms are of superior construction–teflon-faced, bonded to a composite of Hypalon and fabric layers, and reinforced with a metal insert for optimum flexibility and durability.

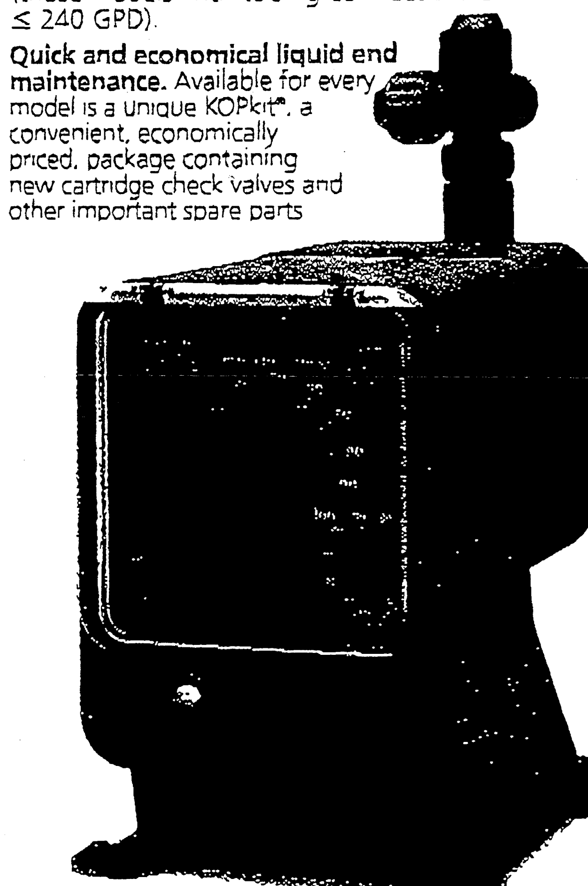
System Compatibility

A wide variety of chemicals can be pumped. Liquid end materials include glass-filled polypropylene (GFPPL), PVC, styrene-acrylonitrile (SAN), Polyvinylidene Fluoride (PVDF), Teflon, Hypalon, Viton, ceramic, alloys and 316SS.

Immediate installation and start-up. Included as standard accessories with all models are an injection/back pressure valve assembly and a foot valve/strainer assembly*, including discharge and suction tubing and tube straightener (*not available with high viscosity connections for > 3000 CPS)

Safe and easy priming and valve maintenance. Included as a standard accessory is a bleed valve assembly, including return tubing (available only on (those models with tubing connections and ≤ 240 GPD).

Quick and economical liquid end maintenance. Available for every model is a unique KOPkit®, a convenient, economically priced, package containing new cartridge check valves and other important spare parts



For additional information about PULSAtron's mid-range Series E and Series A PLUS refer to Technical Sheet No. EMP-022 and EMP-025 respectively. For information about the economical Series C PLUS and Series C refer to Technical Sheet Nos EMP-026 and EMP-024

PULSAFEEDER
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Feb-15-2001 08:27pm From-SIEWERT EQUIPMENT CO + T-367 P.008/008 F-433

SIEWERT EQUIPMENT CO. INC.
Pump & Mixer Specialist
175 Akron St. Rochester, NY 14609
(716) 482-9640 FAX (716) 482-4149

PULSAtron® Series E PLUS Specifications

Important: Series E PLUS — 20 model selections. Digit 1 and 2 (LP) signify product class. digit 3 and 4 signify pressure/flow.
For full model selection information refer to Price Schedule EMP-PS LX. or reference guide No. EMP-003.

Pressure and Flow Rate Capacity

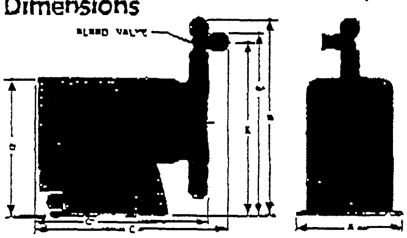
Capacity, nominal																				
GPD	3	5	6	11	12	14	20	21	24	40	42	44	60	75	94	120	190	240	500
GPH	13	0 20	0 25	0 45	0 50	58	0 83	0.87	1 0	1 66	1 75	1 83	2 5	3 17	3 91	5 00	8 00	10 00	20 00
LPH	49	79	95	1 73	1 89	2.20	3 15	3 31	3 78	6 31	6 62	6 94	9 5	11 83	14 82	18 93	29 96	37 85	78 85
Pressure, max PSIG/Bar																			
300/21	LPK2	—		—	—	—		—	—	—	—		—	—	—	—	.	—	—
250/17	-	LPB2	—	LPD3	—	—	LPE4	--	—	LPH4	—	—	—	—	—	—	—	—	—
150/10			LPA2	-	LPB3	—	—	LPD4	—	—	LPG4	—	LPK5	LPH5	—	—	—	—	—
100/7	—	—	—		LPA3	LPK3	—	.	LPB4	—	—	LPE4	.	—	LPG5	LPH6	—	-	—
50/3 3	—	—	—	—	.	—	—	—	.	—	—	—	—	-	—	—	LPK7	—	—
35/2 4	—	—		—	—	—	.	—	—	-	.	.	—	—	—	—		LPH7	—
20/1 3	—	—	—		—	—	—	..	—	—	—	—	—	—	—	—	—	--	LPH8

Liquid End Materials

Series	Pump Head	Diaphragm	Check Valves: Seats / O-rings	Check Valves: Balls	Fittings	Bleed Valve	Injection Valve Assembly Foot Valve Assembly	Tubing
E PLUS	GFPPL PVC SAN PVDF 316SS	Teflon-faced Hypalon-backed	Teflon, Hypalon, Viton	Ceramic, Teflon, 316SS, Alloy C	GFPPL PVC PVDF 316SS	Same as fitting and check valve selected, except 316SS	Same as fitting and check valve selected	Clear PVC White PE

Important: Material Code — GFPPL = Glass-filled Polypropylene, PVC = Polyvinyl Chloride, SAN = Styrene-Acrylonitrile, PE = Polyethylene, PVDF = Polyvinylidene Fluoride. Teflon, Hypalon and Viton are registered trademarks of E.I. DuPont Company.

Dimensions



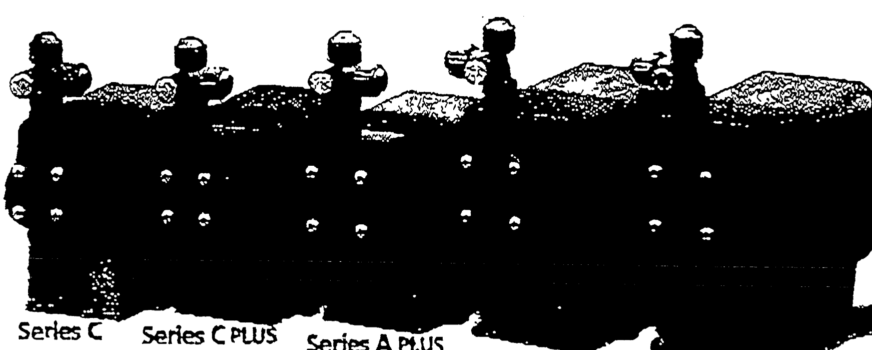
Series E PLUS Dimensions (inches)								
Model No.	A	B	B'	C	C'	D	E	Shipping Weight (Lbs.)
LPA2	5 4	10 3	—	10 8		7 5	9 0	13
LPA3	5 4	10 6	—	10 7	—	7 5	9 2	13
LPB2	5 4	10 3	—	10 8	-	7 5	9 0	13
LPB3	5 4	10 6	—	10 7	—	7 5	9 2	13
LPB4	5 4	10 6	—	10 7	—	7 5	9 2	13
LPD3	5 4	10 6	—	11 7	—	7 5	9 2	15
LPD4	5 4	10 6	.	11 2	—	7 5	9 2	15
LPE4	5 4	10 6		11 2	—	7 5	9 2	15
LPE4	5 4	10 6		11 7	—	7 5	9 2	18
LPG4	5 4	10 6	—	11 7	—	7 5	9 2	18
LPG5	5 4	11 0	—	11 7	—	7 5	9 6	18
LPH4	6 2	11 0	—	11 2	—	8 2	9 6	21
LPH5	6 2	11 3	—	11 2	—	8 2	10 0	21
LPH6	6 2	11 3	—	11 7		8 2	10 0	21
LPH7	6 1	11 7	—	11 7	—	8 2	10 3	21
LPH8*	6 1	—	10 9	—	10 6	8 2	—	25
LPK2	5 4	10 3	-	10 8	—	7 5	9 0	13
LPK3	5 4	10 6	—	10 7	—	7 5	9 2	13
LPK5	5 4	11 0	—	11 7	—	7 5	9 6	18
LPK7	6 1	11 7	—	11 2	—	8 2	10 3	21

Note: Inches x 2 54=cm
* The LPH8 is designed without a bleed valve available

KOPkit®

Pulsafeeder has built a reputation for superior reliability by supplying carefully designed, high quality equipment. Even the best equipment, however, requires a minimal amount of maintenance KOPkits are designed to guard against unnecessary downtime and assure you the highest level of efficient and uninterrupted service from our PULSAtron pumps. KOPkits contain recommended spare parts for those parts that usually require preventive maintenance KOPkits immediately available in all wetted materials at very affordable prices.

PULSAtron's Full Range of Electronic Metering Pumps.



Series C Series C PLUS Series A PLUS Series E Series E PLUS

PULSAFEEDER
A Unit of IDEX Corporation

Standard Pump Operations
27101 Airport Road • Punta Gorda, Florida 33982
(813) 575-2000 • FAX (813) 575-4085

Technical Sheet No. EMP-021
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Printed in U S.A. 3/94

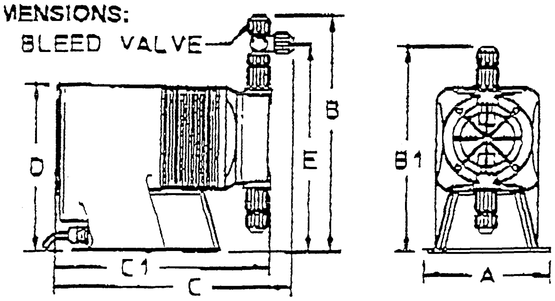
SERIES E PLUS SPECIFICATIONS

MODEL		K2	B2	A2	D3	B3	A3	K3	F4	D4	B4	H4	G4	E4	K5	H5	G5	H6	K7	H7	H8
Capacity	GPD	3	5	6	11	12	12	14	20	21	24	40	42	44	60	75	94	120	190	240	500
nominal	GPH	0 13	0.2	0 25	0 45	0.5	0.5	0 58	0.83	0.87	1	1 66	1 75	1.83	2.5	3.17	3.91	5	8	10	20
(max)	LPH	0.47	0 79	0.95	1 73	1 89	1.89	2 2	3 15	3.31	3 78	6.31	6.62	6 94	9 5	11 83	14.82	18 93	29 96	37 85	78 85
Pressure	PSIG	300	250	150	250	150	100	100	250	150	100	250	150	100	150	150	100	100	50	35	20
(max)	BAR	21	17	10	17	10	7	7	17	10	7	17	10	7	10	10	7	7	3.3	2 4	1.3
Connections	Tubing Piping	1/4" ID X 3/8" OD 3/8" ID X 1/2" OD 3/16" ID X 5/16" OD 1/4" FNPT													3/8" ID X 1/2" OD 1/2" ID x 3/4" OD (LPH8 ONLY) 1/4" FNPT 1/2" FNPT						
Reproducibility at max. capacity		+/- 2%																			
Viscosity Max CPS		For viscosity up to 3000 CPS. select connection size 3 4. B or C with 316SS ball material Flow rate will determine connection/ball size 3000 - 10.000 CPS require spring loaded ball checks See Selection Guide for proper connection.																			
Stroke Frequency Max SPM		125																			
Stroke Frequency Turn-Down Ratio		10 1																			
Stroke Length Turn-Down Ratio		10:1																			
Power Input		115 VAC/50-60 HZ/1 ph 230 VAC/50-60 HZ/1 ph																			
Average Current Draw @ 115 VAC Amps @ 230 VAC Amps		1 0 0 5																			
Peak Input Power Watts		300																			
Average Input Power @ max SPM Watts		130																			

NOTE: Foot valve and bleed valve not available with High Viscosity (. 3000 CPS) connections.

DIMENSIONS:

MENSIONS:



Series E Plus Dimensions (Inches)								
Model No.	A	B	B1	C	C1	D	E	Shipping Weight
LPA2	5.4	12 7	-	11 3	-	7.5	9 5	13
LPA3	5.4	13	-	11.2	-	7.5	9 7	13
LPB2	5.4	12 7	-	11 3	-	7.5	9 5	13
LPB3	5.4	13	-	11 2	-	7.5	9 7	13
LPB4	5.4	13	-	11 2	-	7.5	9 7	13
LPD3	5.4	13	-	11 7	-	7.5	9 7	15
LPD4	5.4	13	-	11 7	-	7.5	9 7	15
LPE4	5 4	13	-	11.7	-	7 5	9 7	15
LPF4	5.4	13	-	12 2	-	7 5	9.7	18
LPG4	5 4	13	-	12.2	-	7 5	9.7	18
LPG5	5.4	13 4	-	12.2	-	7 5	10 1	18
LPH4	6 2	13.4	-	11 7	-	8 2	10 1	21
LPH5	6 2	13 7	-	11 7	-	8 2	10 5	21
LPH6	6 2	13.7	-	11 7	-	8.2	10 5	21
LPH7	6 1	13 7	-	11 7	-	8.2	10 8	21
LPH8*	6 1	-	10 9	-	10.6	8 2	-	25
LPK2	5 4	12.7	-	11 3	-	7 5	9 5	13
LPK3	5 4	13	-	11 2	-	7 5	9 7	13
LPK5	5 4	13 4	-	12 2	-	7.5	10 1	18
LPK7	6 1	14 14	-	11 7	-	8 2	10.8	21

NOTE: Inches X 2.54 = cm
*the LPH8 is designed without a bleed valve available

OPTIONAL ACCESSORIES AVAILABLE:

- MIXER
- TANKS
- FLOW METERS
- LIQUID LEVEL CONTROLLER
- TIMERS
- TEST KITS
- KOPkits
- CORPORATION STOPS
- WALL MOUNT KITS
- FIVE FUNCTION VALVE
- HAND HELD TESTERS

PULSAFEEDER®
A Unit of IDEX Corporation

27101 Airport Road, Punta Gorda, FL 33982
Phone: 941-575-3800 Fax: 800-456-4085
941-575-4085

07/98 EMP-040

Accessories

PULSAFEEDER®
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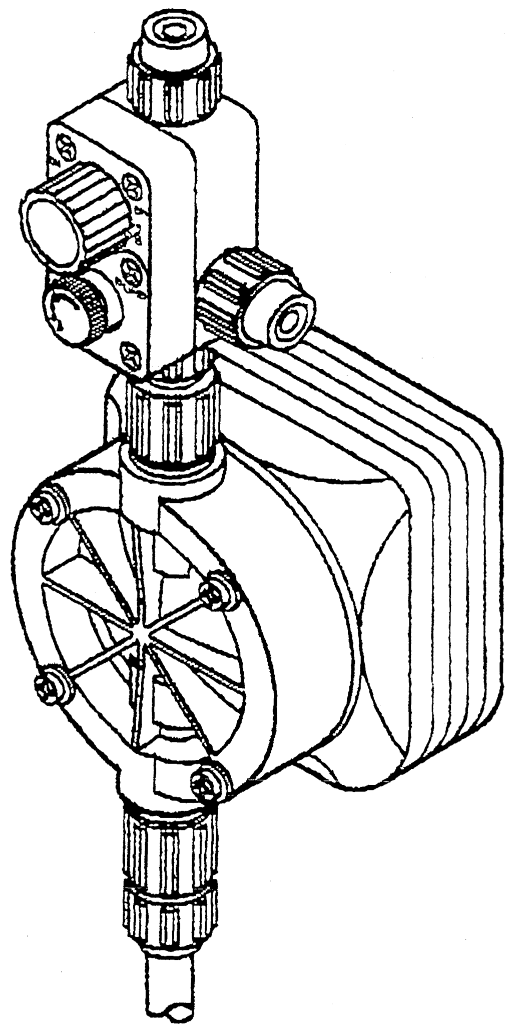
DG/5FV
Five Function Valve with De-Gas



With the DG/5FV you don't have to give up the accuracy and control of a solenoid metering pump in order to pump gaseous solutions. Available in a variety of materials and popular sizes, the DG/5FV is ready to tackle most applications. Not only does the DG/5FV provide degassing, it is packed with features that increase safety, enhance performance and generally improves the convenience of operation.

FEATURES

- De-Gas – Bypass gasses and fluid during normal pump operation. Allows for the constant removal of gases that would otherwise "air bind" the pump.
- Back Pressure – Maintains output reproducibility and allows metering into atmospheric discharge.
- Anti-Siphon – Prevents siphoning through the pump when point of injection is lower than the pump or into the suction line of another pump. Rated at total vacuum.
- Air Bleed – Used during priming to manually remove air from the pump head.
- Discharge Drain – Depressurize pump discharge line without loosening tubing or fittings. Protects the operator from chemical exposure.

SPECIFICATIONS

Material Of Construction:

Valve Body	Polyvinylidene Flouride (PVDF) Polyvinyle Chloride (PVC)
Diaphragm	Teflon faced Hypalon
O-Rings	Viton or Hypalon
Hardware	188 Stainless Steel (recessed)

Maximum Flow:	240 GPD (37.85 LPH)
Minimum Flow:	3 GPD (.47 LPH)
Maximum Viscosity:	1000 CPS
MAX Pressure Ratings:	Up to 250 psi (17 BAR)

Note: Degas/bypass volume is adjustable, typically 1-10% of pump output.

Connections: ¼" (0.635 cm) Male NPT
½" (1.27 cm) OD tubing
3/8" (0.95 cm) OD tubing

All ports (inpu... valve will be th...

PULSAFEEDER

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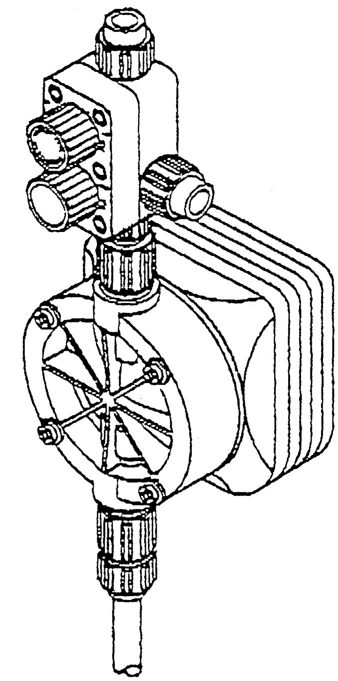
5 - FUNCTION VALVE

DESCRIPTION

Under certain conditions, metering pumps may require more than one device to increase safety of pump operation, enhance performance, and improve convenience of operation. The Pulsafeeder 5-function valve can meet most of these requirements in one neat package. A compact, diaphragm type, multi-function valve, the 5-function valve provides the following:

- **Pressure Relief** - Relieves excessive pressure that might build up in the pump discharge line protecting tubing and connections.
- **Back Pressure** - Maintains pump output repeatability and allows metering into atmospheric discharge.
- **Anti-Siphon** - Prevents siphoning through pump when point of injection is lower than pump or into suction line of another pump. Rated at total vacuum.
- **Pumphead Air Bleed** - Used as an aid in priming allowing manual removal of air from pumphead.
- **Discharge Drain** - Depressurize pump discharge line without loosening tubing or fittings protecting operator from chemical exposure.



OPERATION

The functions are selected by setting two, independent, dual position selector knobs. A label on the back panel of the 5-Function Valve identifies each function with selector knob positions. This guide with selector knob detents, provides error free settings and positive identification of function selected.

The 5-Function Valve connects to the existing pumphead discharge valves on most PULSAtron, Chem-Tech Series 100 and Series 200 pumps. With a generous flow path, the 5-Function Valve is capable of handling large output flows and viscous liquids. A return port located on the side body provides flow of chemical back to solution tank when pressure relief, pumphead air bleed, or discharge drain functions are utilized. Pressure relief settings are fixed, the proper 5-Function Valve model must be selected based on pump's maximum pressure rating. There are three different pump settings: 100, 150, and 250 psi distinguished by blue, green and red colored adjustment knobs respectively. The back pressure and anti-siphon functions may be turned off allowing pressure relief function to operate alone.

Note: When ordering 5-Function Valve with pump use suffix code - 500.

SPECIFICATIONS

__Material Of Construction__

Valve Body	- Glass Filled Polypropylene (GFPPL) - Polyvinylidene fluoride (PVDF)
Diaphragms	- Teflon faced hypalon
O-Rings	- Teflon
Hardware	- 188 Stainless Steel (recessed)

__Maximum Flow__ - 240 GPD

__Maximum Viscosity__ - 1000 CPS

__Pressure Relief Settings__ (nominal cracking pressure)
- 250 PSI (275)
- 150 PSI (175)
- 100 PSI (125)

NOTE: Pressure relief may occur at 50% above maximum pressure rating of pump.

__Connections__
- 1/4" X 3/8" tubing
- 3/8" X 1/2" tubing
- 1/4" MNPT

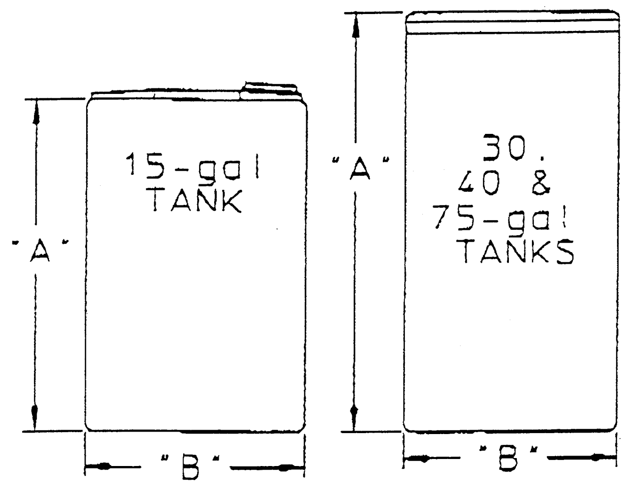
__Relief Port__
- 1/4" X 3/8" tubing
- 1/4" MNPT (with NPT connection only)

PULSAFEEDER

SERIES 6000 TANK SYSTEM

The Series 6000 Tank Systems are a rugged line of tanks designed to fit most solution handling needs All tanks are constructed of high density polyethylene (PE) and come in a variety of sizes

LIGHT DUTY LINEAR TANKS

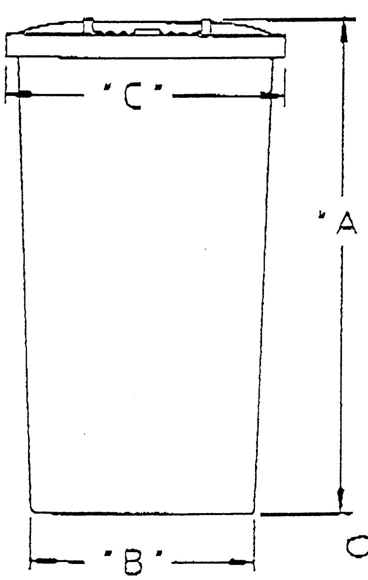


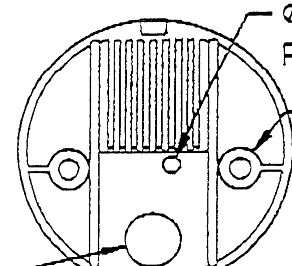
Model	Size Gallon	Wall	Dimensions (in.) A	B
40375	15	0.078	25	14.5
40360	30	0.094	32	18.5
40361	40	0.094	41.25	18.5
40362	*75	0.125	41.75	24.25

15 gallon tanks are translucent with 5 gal. increments and feature child resistant black caps. Other tanks have full fitted lids. 30/40 gal. tanks are non-translucent white. ***75 gallon tanks are black.** Tanks will not support pumps or mixers on covers. Use heavy duty tapered tanks for top mounting of pumps or mixers.

HEAVY DUTY TAPERED TANKS

TAPERED PE TANKS feature rigid covers which allow the top mounting of Chem-Tech S100, 200 and most PULSAtron pump models. 1/20 HP Flange Mount Mixers may also be mounted on the cover. Tanks are translucent with 5 gal. graduations. (Not suitable for use with 1/3 HP Flange Mount Mixers.)





Model	Size Gallon	Wall	Dimensions (in.) A	B	C
40365	35	0.125	28	20	23
J40366	55	0.125	42.5	18.5	23

OPTION →

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Phone: 941-575-3800 Fax: 800-456-4085
941-575-4085

THE
BELLEAYRE RESORT
AT
CATSKILL PARK

CONCEPTUAL DESIGN REPORT

THE WILDACRES RESORT and HIGHMOUNT GOLF CLUB/ HIGHMOUNT ESTATES WATER SUPPLY, TREATMENT and DISTRIBUTION

December 2002

Prepared for:

Crossroads Ventures, LLC
72 Andrew Lane Road
Mt. Tremper, New York 12457

Prepared by:

Delaware Engineering, P.C.
28 Madison Avenue Extension
Albany, New York 12203

Table of Contents

Tables

Exhibits

1.0 INTRODUCTION

1.1 General

Crossroads Ventures, LLC (Crossroads Ventures) owns approximately 1,960 acres in the Catskill Mountains, located south of New York Route 28 and on lands on either side of Belleayre Mountain Ski Center, in New York State. Crossroads Ventures is proposing to develop the area and create recreation-oriented resort developments. Consistent with numerous economic and land use studies that have been prepared for the region, it is the intent of Crossroads Ventures to provide recreational and residential facilities that will enhance the tourism attractiveness of the area as a four-season recreation destination. Development plans include a mixture of recreational and lodging facilities.

The overall project proposed by Crossroads Ventures is entitled, *Belleayre Resort at Catskill Park.* Of the 1,960 acres, approximately 573 acres would be affected by the development of the project while the remaining 1,387 acres would remain undeveloped.

There are several alternatives available for the supply, treatment and distribution of water for the resort developments. This plan has been prepared for Crossroads Ventures by Delaware Engineering, P.C. (Delaware Engineering), to address the water supply needs of two areas of the project. These areas are referred to as the *Wildacres Resort and Highmount Golf Club (WRHGC)* and *Highmount Estates* developments. Potable water needs for the developments listed above will be satisfied through the purchase of water from the Village of Fleischmanns. Raw water from a new Village well will be pumped to the developments for treatment prior to distribution. Alternatively, the Village has planned improvements to their existing system that will allow Crossroads to purchase either treated or untreated water from the Village's existing supply. Regardless of the source used by the Village to supply water to Crossroads, hydrogeologic studies support the ability of the Village to supply the required amounts of water without impact to the Village drinking water supply or to adjacent Emory Brook. To satisfy the need for non-potable irrigation water at these developments, Crossroads will utilize treated wastewater, excess potable water, on-site wells, and collected stormwater. The treated wastewater would be pumped from the on-site proposed wastewater treatment plant (WWTP) to a lined storage pond within the development for distribution to the areas where it is needed. The well water would also be conveyed to an on-site pond for irrigation needs.

1.2 Project Description

The overall project site lies within two non-contiguous tracts of land, one tract located on either side of the Belleayre Mountain Ski Center. **Drawing 1** (Exhibit A) depicts the size and location of the project site.

The larger tract of land for this project will be approximately 1,242 acres. It is located in Ulster County to the east of the Belleayre Mountain Ski Center and extending from Lost

Clove on the southeastern boundary to Woodchuck Hollow on the western boundary. These lands are primarily second growth forest but there is a large house known as the Brisbane Mansion and a few smaller seasonal dwellings located on this land. Currently, none of the residences are inhabited. Development of this tract will largely be confined to 331 acres and consist of two areas, designated the *Big Indian Country Club* and *Belleayre Highlands*. The balance of the 911 acres will remain undeveloped. Water supply, treatment and distribution for this area is not the subject of this plan and will be discussed under separate cover.

The smaller of the two tracts is located to the west of the Ski Center (**Drawing 2** in Exhibit A). The boundary line between Ulster and Delaware counties bisects this property, which includes acreage in the towns of Shandaken and Middletown. These lands are located north of County Route 49A and on either side of Gunnison Road. Additionally, they include the former Highmount Ski Area, the Marlowe Mansion, lands directly to the west on Galli Curci Road (County Route 49A) and lands between County Route 49A and County Route 49. Of the approximate 718 acres described, 242 acres will be developed and about 476 acres will remain undeveloped and preserved in its natural state. The lands described above have been designated the *WRHGC* and *Highmount Estates* developments.

The *WRHGC* section of the *Wildacres Resort* will encompass the easternmost portion of land and is planned to include an eighteen-hole championship golf course, a driving range, a golf course clubhouse with a 40-seat snack bar, pro shop, locker rooms with both steam and sauna, maintenance and receiving buildings, 168 two bedroom detached lodging units with their own clubhouse (containing a 40-seat snack bar, game room, pool, health club, and offices), a Children's Center, and a 250-room hotel. The hotel will be located across from the existing Belleayre Mountain Ski Center and contain 250 rooms (50 with kitchens), 2 restaurants of 450 seats, a 100-seat beverage lounge, shops, 500-seat ballroom/auditorium, 200-seat ballroom, offices/meeting space, a full service spa with 15 treatment rooms and a lap pool, an indoor pool, and an interfaith chapel. Marlowe Mansion (currently the Wildacres Hotel) will be renovated and converted to a 150-seat restaurant. Adjacent to these facilities and moving west past the former Highmount Ski Center will be the *Highmount Estates* area. This will be a subdivision of 21 residential lots. Also, the former Highmount Ski Center will become the *Wilderness Activity Center*. The *Center* will contain a café with a library and lounge area, locker rooms, and athletic facilities (rock climbing walls, ice climbing walls, etc.). It will also be the home base for the outdoor activities on the Highmount section of Belleayre Mountain.

The development projection described above takes into account all foreseen future expansions of the *WRHGC* and *Highmount Estates* resorts. The approximate 476 acres will remain undeveloped.

2.0 SITE CONDITIONS

The 718-acre parcel of land designated for the proposed *WRHGC/Highmount Estates* developments is partially located in two New York counties, Ulster and Delaware. The parcel is across from the Belleayre Mountain Ski Center and to the west, including the former Highmount Ski Center and the lands to and across Todd Mountain Road. These lands are primarily undeveloped with the exception of a few existing facilities including the Marlowe Mansion and buildings related to the former Highmount Ski Center.

The northern portions of *WRHGC* and *Highmount Estates,* which encompasses 128 detached lodging units, its clubhouse (including the pool; game room; health club; reception, sales and operational offices; and snack bar), the Children's Center, and 12 holes of the golf course, lie in Delaware County in the Town of Middletown. Per Middletown Code, these lands are currently zoned Rural V (R-5) with the exception of the northern strip of land in *WRHGC*, which is zoned Rural III (R-3). R-5 is described in Section 405 of the Code. R-3 is described in Section 404 of the Code.

The southern portions of *WRHGC* and *Highmount Estates* are located in Ulster County in the Town of Shandaken. Per Shandaken Code, these lands are currently zoned Residential District R3 and R5 with the exception of the far southeast portion of WRHGC, which is zoned Residential District R1.5. R5 is described in Article III Section 116-5 C1 of the Code. R3 is described in Article III, Section 116-5C2 of the Code and R1.5 is described in Article III, Section 116-5C3 of the Code.

Wetlands are present at a handful of locations throughout the proposed *WRHGC* site. The surface area of the individual wetlands range from 0.4 acres to 3.6 acres. The former Highmount Ski Center contains four wetland areas with an average surface area of 0.1 acres. No wetlands are present at the proposed *Highmount Estates* site. In total, approximately 7 acres of the 242-acre development are designated as wetlands.

2.1 Water Works Systems

As noted, a majority of the *WRHGC* and *Highmount Estates* areas are currently undeveloped with the exception of a few existing motels including the Marlowe Mansion and buildings related to the former Highmount Ski Center. Historically, these units used on-site wells and springs for their potable water needs.

Downgradient from *WRHGC* and *Highmount Estates*, the Village of Fleischmanns is serviced by the Village's water facility. The facility provides potable drinking water to approximately 350 people. The source of the water is from a combination of springs and wells. The springs are located on the north-facing lower slopes of Belleayre Mountain to the southeast of the Village. The springs are in the vicinity of the Delaware and Ulster railroad tracks, approximately 200 feet east of a north flowing tributary to Emory Brook. Two of the wells (Well #1 and Well#2) are located along Emory Brook on the east end of the Village. Well #3 is located near the base of Belleayre Mountain, approximately 1000 feet south of Emory Brook.

Water from the springs is accumulated in an enclosed 180,000-gallon reservoir structure. Well #3 water is utilized to maintain an appropriate water level in the reservoir. The reservoir feeds the Village system. When higher demands are required, Well #1 and Well #2 are put into service due to the need for minor structural repairs, however it can be easily placed in service with repairs.

2.2 Topography

The topography of the land proposed for the *WRHGC/ Highmount Estates* development generally slopes in varying degrees from the south to the north. Specifically, *WRHGC* development will occupy land that slopes from an approximate elevation of 2,300 feet amsl in the southern lands adjacent to County Route 49A to 1,800 feet amsl to the north along NYS Route 28. The proposed *Highmount Estates* development slopes radially out from an elevation of 2,800 feet amsl at its southern most point to 2,400 feet amsl at the limits of the western most planned lot.

2.3 Soil and Water Conditions

Based on the soil survey prepared for the DEIS. The *WRHGC* site is mostly areas of shallow and moderately deep, very stony soils formed in glacial till soils that are derived from red shale and sandstone. There are some areas of deep glacial till soils that have a very firm fragipan. A few areas of the deep till do not have fragipan. The deep soils with fragipan are well drained Lewbeach and moderately well drained Willowemoc soils. The deep glacial till soil without fragipan is well drained Elka. At the base of steep slopes along the outlet of small streams coming off the mountain there are some broad areas of very gravelly glacial outwash. The *Highmount Estates* development is comprised of mostly shallow Halcott and moderately deep Vly soils. See DEIS Section 3.6 Soils for more information.

Eleven test pits and three percolation tests were conducted in November 2000, in the northeastern portion of the *WRHGC* development that lies in Delaware County, to further characterize the subsurface conditions. The findings indicated that at every test pit location the typical boundary condition was an impervious layer (fragipan) at 25 to 35 inches below the surface. Deeper percolation tests revealed that the upper, browner glacial soils that are loamier, "perced" more rapidly than the underlying redder glacial till soils. These soils are derived from red shale and silt and contain more clay. The percolation rates were found to be 0.53 minutes per inch or less for the shallow test pits. The deep test pits demonstrated percolation rates greater than 60 minutes per inch.

3.0 WATER USAGE

This section provides an estimate of the projected water supply demand required for the *WRHGC* and *Highmount Estates* developments. The estimated average daily flow demand was determined by multiplying the number of planned development units (e.g. detached lodging units, restaurant seats, single-family residential lots, etc.) by unit flow rate standards established by the New York State Department of Health (NYSDOH), entitled *Rural Water Supply.*

In determining expected average daily loadings, it was assumed that the usage or occupancy of the facilities would be at capacity for each day of the year. Even though the proposed developments are intended to be a "four-season" resort, the level of occupancy will vary during the year. It was also assumed that conveyance piping leakage would not be considered since the distribution system will be newly installed. Additionally, it should be noted that this estimate takes into account all the anticipated development to the 718-acre parcel. For these reasons, the estimate is considered conservative. Table 1 provides an estimate of the water supply demand.

3.1 Potable Flow Requirements

The projected average daily demand from both portions of the WRHGC development is estimated to be 136,635 gallons or 94.9 gallons per minute (gpm). In accordance with Section 15-0314 of the NYS Environmental Conservation Law, all of the planned development units will be constructed with water-saving plumbing facilities. This would result in an approximately 20 percent reduction in the estimated average daily flow, for a total of 109,308 design average day demand (75.9 gpm).

The maximum daily demand was determined by assuming it to be 1.65 times the average daily demand. At an average daily demand of 136,635 gpd, the maximum daily demand is approximately 225,448 gpd. Assuming a 20 percent reduction in flow from the use of water-saving fixtures, the design maximum day demand would be 180,358 gpd.

The design maximum hourly demand is expected to be 3 times the average, or 327,924 gpd (13,664 gph). This would compensate for those times of the day when there is abnormally high water usage (e.g. morning showers, etc.).

Based on the above estimates, nearly 67 percent of the anticipated potable water demand will be from residential type facilities (e.g. lodging units). The remainder will be from recreational/entertainment venues, restaurant usage and the laundry facilities located at the lodging facilities.

3.2 Non-Potable Flow Estimate

The non-potable flow requirements for the proposed *WRHGC* and *Highmount Estates* developments include irrigation water for the golf course fairways, putting greens, etc at

WRHGC. Amounts of irrigation water will vary depending on weather conditions, particularly temperature and rainfall. Larger quantities will be required during the period when the turf is being established. It has been intended and proposed, under separate cover, that this non-potable water demand be satisfied mainly by treated wastewater from an on-site wastewater treatment plant. If there is not adequate stormwater to supplement treated wastewater, excess potable water and on-site well water would be used as a supplement. During turf establishment, when there is less treated wastewater available, excess potable water can be used for irrigation.

3.3 Fire Flow Requirements

Recommended fire flows associated with the proposed *WRHGC* and *Highmount Estates* were computed in accordance with the requirements of the Insurance Services Office. Table 2 summarizes the calculation results. Based on the fire flow projections for the hotel/conference center (facility requiring the greatest demand), the finished water storage tank will have a capacity of 289,308 gallons (180,000 gallons [1,500x60x2] for fire flow plus the average daily potable consumption of 109,308 gallons). The complete fire flow calculations can be referenced in Exhibit B.

The fire/potable water distribution system containing hydrant quantities and installation locations will be designed in compliance with the *Recommended Standards For Water Works-Great Lakes Upper Mississippi River Board of State Public Health & Environmental Managers*. A more detailed discussion of the distribution system can be reviewed in Section 8.3 of this report.

4.0 SEWERAGE SYSTEM

Delaware Engineering has prepared and submitted a conceptual wastewater treatment and disposal plan for the *WRHGC/Highmount Estates* developments, for review and comment, concurrently with this report.

The neighboring Village of Fleischmanns historically and currently utilizes individual subsurface absorption beds for their sewage disposal/treatment needs. However, the Village has submitted a Facility Plan to the NYSDEC and New York City Department of Environmental Protection (NYCDEP) for review and approval to construct a WWTP with a capacity to meet the Village's needs.

5.0 POTENTIAL WATER SUPPLY SOURCES

Recommended Standards For Water Works-Great Lakes Upper Mississippi River Board of State Public Health & Environmental Managers dictates that a potable water source must have a capacity such that, 'the total developed groundwater source capacity shall equal or exceed the design maximum day demand' (1.65 x design average day demand) 'and equal or exceed the design average day demand with the largest producing well out of service'.

During the assessment of potential water sources, Delaware Engineering evaluated the primary sources based on the design maximum daily demand of 180,358 gpd, which takes the 20 percent reduction for use of water saving fixtures into account. Further, the back-up or emergency sources were reviewed based on the design average day demand of 109,308 gpd.

The following potential water sources were evaluated:

5.1 Village of Fleischmanns Water Supply

The neighboring Village of Fleischmanns receives their potable water from a combination of springs and wells. The springs are located on the north-facing lower slopes of Belleayre Mountain to the southeast of the Village. The springs are in the vicinity of the Delaware and Ulster railroad tracks, approximately 200 feet east of a north flowing tributary to Emory Brook. Two of the wells (Well #1 and Well#2) are located along Emory Brook on the east end of the Village. Well #3 is located near the northern base of the Belleayre Mountain hillside, approximately halfway between the springs and NY Route 28.

Water from the springs is accumulated in an enclosed 180,000-gallon reservoir structure. Well #3 water is utilized to maintain an appropriate water level in the reservoir. The reservoir feeds the Village system. When higher demands are required, Well #2 is put into service. Well #1 is currently out of service due to the need to for minor structural repairs, however it can be placed in service easily once repairs are affected.

Alpha Geoscience (Alpha) of Clifton Park, NY was hired by Crossroads Ventures with the permission of the Village of Fleischmanns to conduct an investigation of the Village of Fleischmanns' water supply. The primary objective of the investigation was to determine the total capacity of the Village water sources. In turn, it could be determined if capacity exists to meet the water demand of the proposed *WRHGC/ Highmount Estates* developments. Alpha evaluated the Village's water supply by collecting baseline water quality data and quantified the available yields from the springs and the three wells. Additionally, Titan Drilling of Arkville, NY (the Village of Fleischmanns' well contractor) and the NYSDOH were contacted to gain insight on the existing wells and the regulatory status of the Village's system, respectively.

Specifically, the springs were monitored once a week for one month in late 2000 and again in December of 2001 at drought stage. Monitoring included flow measurements and field analysis of the water quality. Samples from the Catch Basin #1 and #2 and Well #1, #2, and #3 were sent to a laboratory for analysis. Step-drawdown pumping tests were conducted on Well #1 and #2. A constant-rate pumping test was then conducted on Well #2 based on the results of the Well #2 step-drawdown test. Well #3 capacity was quantified by observing pumping cycles, well discharge, village water use records, and spring flow measurements.

Table 3 summarizes the analytical results from the water quality investigation and NYSDOH file review. The table compares the results to the maximum contaminant levels (MCL's) set-forth in the drinking water standards. A complete copy of the report prepared by Alpha on the Fleischmanns' water supply, including analytical results, is found in Exhibit D.

The components of the Village's supply were found to have the following conservatively estimated capacities:

Well #1:	94 gpm (135,360 gpd)
Well #2:	180 gpm (259,200 gpd)
Well #3:	60 gpm (85,920 gpd)
Springs:	64 gpm (92,160 gpd)*

* Measurement from December 2001 drought.

Village water department records indicate that the amount of water taken from the supply (consumption and leakage) ranges from 190,000 to 300,000 gpd, with an average of approximately 225,000 gpd. However, Village billing records based on service connection meter readings do not support the actual use of that volume of water. Additionally, consumer complaints regarding poor pressure contributes to the evidence that a significant volume of the water withdrawn and treated is lost to system leaks.

If the Village currently utilizes an average of 225,000 gpd of the over 500,000 gpd available and accounting for a 10% increase in demand per decade (for the next two decades) due to growth, the Village has an excess of 227,750 gpd. This value would provide an adequate surplus of high quality water for the *WRHGC/ Highmount Estates* developments.

It is useful to note that based on the 2000 Census, the Village of Fleischmanns has 351 inhabitants. Taking the standard factor used for population projection, 10% per decade population growth into account, it assumes that 385 people currently inhabit the Village. Using a 165 gallons per capita per day multiplier and assuming 20 to 30 percent leakage, the Village should be utilizing between 80,000 to 90,000 gpd, exclusive of commercial use. This demonstrates that a large amount of potable drinking water is being lost due to leaks in the distribution system. Repairing the leaks could result in an excess capacity of 400,000 gpd.

The Village recently identified and repaired a number of leaks resulting in a decrease in water use of 185,000 gpd. The current demand of the estimated 351 users of the Village of Fleischmanns is 40,000 gpd. Seasonal peak demand is expected to be 80,000 gpd to 90,000 gpd. Since this reduction is very recent and long-term demand figures are not available, the analysis in this report uses the worst-case more conservative former demand for the Village.

The Village has listed a water improvement project for subsidized funding with the New York State Environmental Facilities Corporation. The water improvement project provides for upgrades to the existing sources including wellhead protection for the wells located near Emory Brook, treatment system improvements, and line replacements and repairs to reduce system leaks. In listing the project with the State, the Village has shown its intent to maintain the system and make the repairs.

In addition to the existing source capacity of the Village wells and springs, an analysis of the development of a new groundwater source is feasible. Based on a hydrogeological evaluation of siting a well near the existing Village Well #3, it is anticipated that the well would provide a water supply that would not impact the Village's springs or Emory Brook (See Letter Addenda, Exhibit D). Should such a well be drilled, an evaluation of the well would be conducted including pumping test to assess potential impact to the existing area water resources. If a new well source is developed, it would be dedicated to the water supply for WRHGC/Highmount Estates and the Village system would provide the backup water source in compliance with applicable standards.

The demand analysis described above indicates that the Village of Fleischmanns water resources are capable of meeting the demand of both the Village and the Resort and that excess capacity in addition to those demands is available. In order to assess the potential impact of the increased taking required to service the Resort, Alpha prepared a Water Budget Analysis for the Wildacres Resort (See Exhibit E).

The Water Budget Analysis evaluates the amount of infiltration to the ground water system under existing (pre-construction) and post-construction conditions. The amount of infiltration to ground water is an indicator of the water available to recharge the wells and springs used by the Village of Fleischmanns. The analysis indicates that the post-development infiltration rate will minimally exceed the pre-development rate. This effect is caused by the positive infiltration characteristics of the golf course outweighing the negative infiltration characteristics of the post-development impervious surfaces.

The results of the Water Budget Analysis indicate that the use of the Village water sources to supply the Resort combined with the effects of the golf course and impervious structures will not limit, and will potentially increase, the amount of water available to recharge those water resources. The Water Budget Analysis was performed using a conservative approach in that the positive effects of the planned recycling of treated wastewater for irrigation are not incorporated in the calculations. If such a calculation were performed, it would indicate an even further increase in the positive infiltration rate. In addition, the Water Budget Analysis only evaluates the existing Village water resources. While the potential exists to install a new Village well for use by the Resort, production from any new source has not been incorporated in the Water Budget.

5.2 Highmount Spring

Alpha also conducted monthly spring flow measurements from January 2000 through September 2000 on various springs located in close proximity or within the proposed development properties. Exhibit C contains a table with the monthly monitoring results and monitoring location points.

Highmount Spring was one of the springs monitored. It is located northwest of the former Highmount Ski Area on the south side of Galli Curci Road in Ulster County. The flow measurement recorded ranged from 0.5 gpm in September to 23 gpm in April. The average monthly flow recorded was found to be 9.1 gpm (13,104 gpd). This flow rate is far below the estimated potable demand of 109,308 gpd for the developments. The low flows and the inconsistency make Highmount Spring inadequate as a major potable water source. However, Highmount Spring could contribute to landscape irrigation flow.

5.3 Wildacres #3 Spring

Wildacres #3 Spring was also one of the springs monitored by Alpha during 2000. It is located approximately 500 feet due east of Highmount Spring adjacent to a stream. The flow measurement recorded ranged from 4.8 gpm in September to 17.5 gpm in March and April. The monthly average flow recorded was found to be 9.8 gpm (14,064 gpd). This flow rate is a fraction of the estimated potable demand of 109,308 gpd for the developments. The low flows and the inconsistency make Wildacres #3 Spring inadequate as a major potable water source. As with Highmount Spring, Wildacres #3 Spring could provide landscape irrigation flow.

5.4 Existing On-Site Wells

The historic water supplies for the existing developed areas of the site consisted of two wells. One of the wells is located 400 feet northwest of the hotel structure (Marlowe Mansion) and the second one is on the south side of the hotel. The capacities of these wells are 4 gpm and <2 gpm, respectively. Another bedrock well, the 'Rashid' well is located along Gunnison Road. It is a 6-inch diameter well, 475 feet deep that produces 1.5 gpm.

Two additional bedrock wells have been installed. A 6 inch diameter well, the 'pool well' constructed northeast of the hotel in October 1999 was set to a depth of 498 feet below ground surface and has a capacity of 25 to 30 gpm. In November 2000, a second 6-inch diameter well, the 'Janius East' well, was installed adjacent to Van Loan Road above the railroad tracks. This well was installed to a depth of 698 feet below ground surface and yields 30+ gpm.

All the wells discussed could be utilized to meet localized landscape irrigation needs or contribute approximately 94,000 gpd for golf course irrigation.

5.5 Proposed Water Supply Source

The results of the Alpha investigation demonstrated that the Village of Fleischmanns has a more than adequate supply of water to meet their needs, their estimated future needs, and the needs of the *WRHGC/ Highmount Estates* developments. The water from the Village could be supplied raw (untreated) from a new well source and treated prior to distribution when utilized for potable needs, or could be supplied treated by the existing but upgraded Village treatment system.

This water supply option is beneficial for the Village and Crossroads Ventures. The Village has an opportunity to use the water supply improvements that would be made by the developer to attract other funding sources such as Housing and Urban Development Grants to improve the distribution system and in turn the streets, curbs, and sidewalks. Crossroads Ventures is provided with a high quality, reliable water source to meet its water needs. Exhibit F contains correspondences between Crossroads, the Village, Delaware Engineering and the New York State Department of Health in support of the Village of Fleischmanns sale of water to Crossroads Ventures.

Well logs and pump test documentation are provided in Exhibit D.

6.0 PROPOSED TREATMENT PROCESS

If the Village of Fleischmanns water supply is used to meet the water demands of the proposed developments, the water requires treatment for disinfection and corrosion control prior to distribution. The analytical results presented in **Table 3** support this assumption. Analytical laboratory reports are provided in **Exhibit D**.

6.1 Disinfection

The methods currently approved for the routine disinfection of drinking water are:

- Addition of gaseous chlorine or a sodium hypochlorite solution.
- Ultraviolet (UV) light exposure of a specified wavelength is used for bacteria reduction.
- Addition of ozone (O^3) gas.
- Addition of chloramines in the form of chlorine and ammonia.
- Addition of chlorine dioxide.

Of the above methods, chlorine is most frequently employed. UV disinfection and ozone are used occasionally, and are in wider use in Europe. The primary if not only, reason UV and Ozone are used instead of chlorine to reduce the likelihood that, some of the organic matter present in the surface water is converted to trihalomethane (THM) compounds, which are a health risk. Chlorine dioxide and chloramines are more difficult to correctly apply, and can result in nuisance taste and odor in water. Ozone is used in a few limited instances, but equipment costs and electricity to generate the ozone tend to be high. The primary benefit of chlorine over UV is that the chlorine provides residual disinfection, whereas UV does not. The advantage of residual disinfection capability is that, in the event that contamination occurs after water has left the treatment plant, the chlorine can destroy such bacterial contamination. Due to the advantages of chlorine and the lack of any compelling reason to apply the alternative methods here, chlorine addition is the method of choice.

The two methods of chlorine application typically used for drinking water are chlorine gas or the injection of liquid sodium hypochlorite solution. When introduced into the water, the same chemical reactions occur using either method, and the net result of their application is the same. The factors to be considered in selecting between the two chlorination methods are cost and the risk to workers and nearby residents. Sodium hypochlorite solution is made from chlorine gas, and is therefore more expensive to produce, distribute, and apply than the pure gas. For a large water plant, the material cost can outweigh the costs of providing the safeguards needed. When chlorine gas is used, it must be stored in a dedicated room, complete with gas monitors, remote alarms, and other worker safeguards. Chlorine gas exposure can cause affects ranging from severe lung damage to mortality. Two employees need to be present (with one waiting outside) when a chlorine room is entered or equipment is serviced. An emergency spill and evacuation plan must be developed for the vicinity of the site; areas downhill of the location are at particular risk since the gas is heavier than air and "flows" downhill in the event a cylinder leaks. For an approximate 100,000-gallon a day plant, the cost savings of chlorine gas over a liquid chlorine solution are marginal and are typically outweighed by the cost of facility construction and contingency planning.

For the preceding reasons, application of sodium hypochlorite solution is the preferred disinfection process. Chlorine would be applied using a metering pump with a variable speed drive that could increase or decrease chlorine application in response to the flow rate indicated on a flow meter.

Preliminary calculations indicate that the disinfection system will consist of a 30-gallon polyethylene day tank and two (one for backup) Pulsatron Model LPA2-MA-VTC1-520 metering pump capable of pumping at a rate of 6 gallons per day. At peak flow nearly 5.3 gallons per day of sodium hypochlorite will be required. At average flow only 2 gallons per day will be needed.

A 15% sodium hypochlorite solution, containing 2 parts per million (ppm) chlorine, will be injected into the water supply line as it leaves the wet well. Application at this point will result in approximately 30 minutes of contact time before it reaches the first user. If this does not provide 0.2 mg/l of minimum free chlorine residual throughout the water distribution system either the concentration of chlorine will be increased or a second disinfection point will be installed as water leaves the finished storage tank.

Exhibit G contains the calculations and example equipment that would be required for the disinfection system.

6.2 Corrosion Control

Corrosion occurs due to chemical or electrochemical conditions in the water that are not compatible with the pipes conveying the water. One commonly used screening factor is the Langelier Saturation Index (LSI), which mainly reflects the acidity and the hardness of the water. A positive LSI indicates scale may form, a negative LSI indicates the water may be corrosive. 1995 NYSDOH Village of Fleischmann's data indicated a LSI of (-) 2.49, which suggests that the water in the area is at least moderately corrosive. Additionally, the Village of Fleischmanns currently treats their water prior to distribution for corrosion control. The Village increases the alkalinity of the water though the injection of chemicals. Soda ash is the chemical that is used in their treatment process. The liquid compound is injected directly into the water in much the same way as the sodium hypochlorite solution is added for disinfection.

Analytical results from a March 27, 1995 sampling event of the entry point to the Village water supply were utilized to calculate the chemical demands. A copy of the calculations and laboratory report can be referenced in Exhibit H.

The calculations indicate the corrosion control system will consist of a 30-gallon polyethylene day tank and two (one for backup) Pulsatron Model LPK2-MA-KTC1-500 metering pump capable of pumping at a rate of 3 gallons per day. At peak flow, 2.2 gallons per day of a 50% NaOH solution and a NaOH concentration of 3.2 ppm will be required. At average flow only 0.84 gallons per day will be needed. The 50% NaOH solution will be injected into the water line as the water enters the distribution system adjacent to the wet well.

7.0 AUTOMATION

A number of measures can be taken to automate operations of the system. The objectives of automation included in this project are to eliminate frequent repetitive adjustments, provide automatic collection of routine operating data where possible, and to alert the operators when systems cease to function as required. Local automation can be used to open valves or start pumps under certain conditions. This level of automation can be used to link operations at one site to another, such as to start up the submersible well pump when the water level in the storage tank drops below the set level based on pressure. Remote automation uses telephone or radio communications to relay signals from one point to another, and can provide the added benefit of reporting the status of operations to a central point such as an existing office. Remote automation can consist of continuous communications between systems that automatically work together. It can also consist of a simpler dial-up system to allow the operator to start or stop equipment and check the status of levels, pressures, flow, etc. at remote sites via a computer interface.

The proposed level of automation for this project employs a limited number of locally automated processes such as: a dial-up system for remote operation; data logging of finished water total flow entering the supply line; pressure sensor in the finished water storage tank to de/activate the supply transfer pumps; level sensors in the clear-well and well #2 to activate/deactivate the submersible well pump or trigger alarms; automatic switch over to back-up pumps when primary pump is malfunctioning (if applicable); pH and chlorine residual monitoring and recording devices; and metering pumps with a variable speed drive that could increase or decrease treatment application in response to the flow rate indicated on a flow meter. The telephone-based system would be capable of calling several phone numbers or a pager in the event of problems.

8.0 PROJECT SITE SELECTION

Siting issues for the project are relevant to location of the well and the treatment system. The main factors considered in site evaluation and selection are:

- Hydraulic conditions and maintenance of gravity flow to the proposed developments to the extent possible,
- Physical conditions at the site which relate to construction, such as poor soils or high groundwater, and
- Availability of property or easements.

8.1 WRHGC/ Highmount Estates Water Sources

The Village of Fleischmanns receives their potable water from a combination of springs and wells. Based on Alpha's investigation, it is known that the Village currently withdraws an average of 225,000 gpd of the over 500,000 gpd available. Meter readings used for billing and consumer complaints regarding inadequate pressure indicate that a significant amount of the water withdrawn and treated is lost due to leaks. Notwithstanding the leaks, accounting for a 10% increase in demand per decade due to growth, the Village has an excess of 227,750 gpd. This value would provide an adequate surplus of high quality potable water for the *WRHGC/ Highmount Estates* developments. It is also known that a large amount of potable drinking water is being lost due to leaks in the distribution system. Repairing the leaks could result in an excess capacity of over 400,000 gpd. The Village recently identified and repaired a number of leaks resulting in a decrease in water use of 185,000 gpd. The current demand of the estimated 351 users of the Village of Fleischmanns is 40,000 gpd. Seasonal peak demand is estimated to be 80,000 gpd to 90,000 gpd. Since this reduction is very recent and long-term demand figures are not available, the analysis in this report uses the worst-case more conservative former demand for the Village.

A Water Budget Analysis was used to evaluate pre-development and post-development infiltration rates. The analysis indicates that the post-development infiltration rate will minimally exceed the pre-development rate. This effect is caused by the positive infiltration characteristics of the golf course outweighing the negative infiltration characteristics of the post-development impervious surfaces. The results of the Water Budget Analysis indicate that the use of the Village water sources to supply the Resort combined with the effects of the golf course and impervious structures will not limit, and will potentially increase, the amount of water available to recharge those water resources.

When the Village's largest producing water source (Well #2) is out of service, the capacity of Fleischmanns system becomes 313,920 gpd. Subtracting the projected demand of the Village in 2020 (63,500x1.1x1.1=76,835) and assuming the distribution piping leaks have been repaired, the available water for the *Wildacres Resort* becomes 237,085 gpd. This value meets the requirements in the *Recommended Standards For*

Water Works-Great Lakes Upper Mississippi River Board of State Public Health & Environmental Managers for the primary or back-up sources.

In addition to the Village's existing water sources, opportunities exist for the development of new sources in the form of a well or wells located near existing Well #3. The water supply needs of WRHGC/Highmount Estates may be met by a new well source owned and operated by the Village. Any new sources would be located, drilled, tested and permitted following New York State Department of Health guidelines and regulations.

The water for the Crossroads project would be conveyed to a 20,000-gallon clearwell using a 7.5 hp, 150 gpm (@ 80 feet of head) submersible pump. A dry well would be installed adjacent to the clear-well to house the 60 hp, 150 gpm (@ 1,025 feet of head), duplex pump station needed to transfer the water to the finished water storage tank on the Wildacres Activity Center (former Highmount Ski Center) lands.

The irrigation water demand can be satisfied through the use of on-site well(s), captured stormwater, treated wastewater, and excess potable water. The existing on-site wells provide approximately 190,000 gpd capacity, and the combination of the collected stormwater and treated wastewater with an anticipated 110,000 gpd minimum capacity, would supply approximately 300,000 gpd of irrigation water. Submersible well pumps will provide lift necessary to transfer the water from the well to on-site storage ponds. Treated wastewater would be pumped to the on-site ponds from the effluent wet well.

8.2 Corrosion Control/Disinfection Treatment Systems

The corrosion control system would be installed near the source. It would be housed to protect it from vandalism and weather and to provide chemical, mechanical and spare part storage.

The disinfection system would be housed in the same treatment shed as the corrosion control. The 15% sodium hypochlorite solution would be injected into the water source force main as the leaves the source area.

An in-line mixer would be installed to blend the solutions with the well water after application.

The housing and chemical storage facilities would be constructed in compliance with the *Recommended Standards for Water Works-Great Lakes Upper Mississippi River Board of State Public Health & Environmental Managers*.

8.3 Distribution System

8.3.1 Finished Water Storage Tank

The *WRHGC/ Highmount Estates* would have one water storage tank located in the southwest corner of the *Wilderness Activity Center* on Highmount at a ground elevation of 2,660 amsl (see Exhibit A, **Drawing 3 and 8**). The location was chosen such that the finished water could be gravity fed to the various lodging/recreational units throughout both developments with the minimum required pressure of 35 pounds per square inch (psi). Pressure reducing valves (PRVs) would be necessary at certain points in the distribution system to bring the pressure below the maximum recommended pressure of 80 psi.

The tank was sized to accommodate the average day potable water needs and the fire flow requirements. Based on the fire flow projections for the 15,000 sf clubhouse (facility requiring the greatest demand), the finished water storage tank would have a capacity of 289,308 gallons (180,000 gallons [1,100x60x2] plus the average daily consumption of 109,308 gallons). In order to accommodate this volume, a 19-foot high, 53-foot diameter tank can be used. The maximum capacity of this concrete floor tank is 319,000 gallons. The tank is designed to meet the structural requirements of the AWWA D-103 Standard and would be compliant with Part 7 of the *Recommended Standards For Water Works-Great Lakes Upper Mississippi River Board of State Public Health & Environmental Managers.* The tank would be fitted with a pressure sensor near the bottom of the tank that will control the duplex pump station. The sensor would be set to activate the pump when the pressure decreases 4.75 psi (11 feet of water; 182,600 gallons) and switch the pumps off when the tank contains 265,464 gallons of treated water (16 feet of finished water). A visual and/or audible alarm signal would be sent when the water level reaches an equivalent set low-low pressure (3.5 psi) or a high-high pressure (7.6 psi). In turn, the clear well would be fitted with level sensors to activate/deactivate the submersible supply well pump. This would ensure that there is an adequate supply of water on hand to meet the needs of the development.

The irrigation water for *WRHGC*, generated from the proposed on site wastewater treatment plant, would be pumped from a wet well and conveyed to the 7.3 million gallon capacity on-site lined pond, located in the northeast portion of the *WRHGC* development, for storage. The 'to be sited and installed' irrigation well water would be pumped to the closest on-site pond.

8.3.2 Transmission Lines

Approximately 7,000 linear feet of eight-inch diameter, cement lined, Class 52, ductile iron, force main would convey the well water from the Village of Fleischmanns Well #2 to the finished water storage tank on Highmount and a number of facilities on *WRHGC*. The force main would follow the path detailed in Exhibit A on **Drawings 3, 4, and 5**. As can be seen from the drawings, the pipe would traverse roads and a railroad along the way.

Approximately 5,300 and 10,800 linear feet of eight-inch diameter, cement-lined, Class 52, ductile iron, water main would convey gravity fed finished water from the storage tank to the *Highmount Estates* and portions of the *Wildacres Resort and Highmount Golf*

Club developments, respectively. The distribution lines are shown on **Drawings 3 through 7** in Exhibit A. The hydrants and gate valves are spaced and would be installed according to the *Recommended Standards For Water Works-Great Lakes Upper Mississippi River Board of State Public Health & Environmental Managers.* Specifically, every 600 feet for hydrants and 1,000 feet for valves per linear feet of water main in the developed areas. Locations for pressure reducing valves and air relief valves are also shown. These locations were chosen based on preliminary water pressure calculations and the topography of the site.

Water service lines would be installed with the necessary corporation stops, Type K copper piping, and curb box, stop, and valve. The sizing of these items varies with the type of service needed. Generally, the 21 privately owned single-family units would require ¾-inch appurtenances, the eight detached lodging unit blocks would require 3-inch appurtenances, and the hotel, conference center, and golf course clubhouse would require six-inch appurtenances.

Drawing 9 provides details of typical valve manholes, hydrants and their appurtenances, service laterals, and thrust blocks.

Four to six-inch diameter force mains could convey water from the on-site wells to the on-site ponds for irrigation purposes.

All piping would be installed below the frost zone and on continuous, uniform, and adequately compacted bedding. Prior to backfill placement, the piping would receive pressure and leakage testing in compliance with the current AWWA Standard C600. Backfill material would then be placed in tamped layers to a determined height above the pipe for protection and support. Native soils and/or finished grade materials can then be placed.

In instances where it is necessary for water piping to cross or border the sanitary sewer system, the minimum separation distances given in Part 8.6 of the *Recommended Standards For Water Works-Great Lakes Upper Mississippi River Board of State Public Health & Environmental Managers* will be adhered to. Surface water crossings would also be designed to adhere to the *Recommended Standards.*

8.3.3 Pumping Stations

A number of pumping locations/stations are necessary throughout the water system proposed for the *Wildacres Resort* due, in part, to the variable topography found at the project site. Based on preliminary calculations and hydraulic modeling results, the pumping stations and their requirements are as follows:

Pump Station/Location	Number of Pumps	Pump Specifications (or equivalent)
Corrosion Control System	2 plus spare	Pulsatron Metering Pump Model LPK2-MA-KTC1-500 3 gpd / 300 psi discharge press. 1 ph / 230 V / 50/60 Hz / 4.4 amps 1012 W
Disinfection System	2 plus spare	Pulsatron Metering Pump Model LPA2-MA-VTC1-520 6 gpd / 150 psi discharge press. 1 ph / 230 V / 50/60 Hz / 4.4 amps 1012 W
Irrigation Transfer Pumps for Treated WW	2 plus spare	Ingersoll-Dresser Pump 50 gpm @ 70 TDH 5 HP / 44.7 kW / 1775 rpm
Fleischmanns Submersible Well Pump	1 plus spare	Pleuger Submersible Well Pump Model NE66-4 / 7.5 HP 3 ph / 60 Hz / 208/230/460/575 V 150 gpm @ 77 TDH
Supply Transfer Pumps	2 plus spare	Ingersoll-Dresser Pump 300 gpm @ 1025 TDH 60 HP / 44.7 kW / 1775 rpm

The sizing of these pumps were based on calculations that accounted for elevation changes, head losses due to piping and valving, and desired flows. Following the calculation procedure, the estimated requirements were provided to a pump manufacturer and Delaware Engineering was supplied with recommended pumps.

All pumping facilities would be designed and installed per the *Recommended Standards For Water Works-Great Lakes Upper Mississippi River Board of State Public Health & Environmental Managers*. **Drawing 8** details a typical pump station.

9.0 FINANCING

There may be several different ownership scenarios within the developments.

A first option is that one single owner is the water supply and/or SPDES permit holder. Users of the development, be they residential or commercial, will pay one "utility" rate that covers all costs, similar to a management fee. In that case, rates would be a factor of the initial capital expense including debt service amortized over time in conjunction with a budgeted O&M cost as a rate per thousand gallons of "assumed" use. Assumed water use is defined as 300 gallon/day/lodging units, with factors added (using NYSDOH Equivalent Dwelling Unit (EDU) calculations) for higher use customers. Meters would still be installed to allow for accurate assumed use calculations, but they would not be used for monthly or regular billing.

A second scenario that may exist within the developments involves private owners. Where there is private ownership of units there would still need to be a single permit holder, perhaps a homeowner's association (HOA). Rates under this scenario could be calculated as a factor of the initial capital expense including debt service amortized over time in conjunction with a budgeted operation and maintenance cost as a rate per thousand gallons of actual metered use. Use of metered measures ensures better recovery of actual costs and may encourage water conservation.

Water and sewer rates are subject to guidelines provided by the NYS Public Service Commission (PSC). PSC review procedures would be followed.

TABLES

Table 1:

Estimated Water Demand for *Wildacres Resort and Highmount Golf Club/ Highmount Estates*

Facility Type	Units	Number	Daily Demand [1] (gal/unit/day)	Water Demand [2] (gpd)
Wildacres Resort and Highmount Golf Club				
Lodge	Rooms w/o Kitchen	200	120	24,000
	Rooms w/ Kitchen	50	150	7,500
Restaurant (3 rest; 600 seats; 4 seatings)	Patrons	2,400	7	16,800
** w/ 100 Seat Beverage Lounge (3 seatings)	Patrons	300	2	600
Retail Stores (10)	1000 SF	13	250	3,250
** Public Bathrooms	Toilets	4	400	1,600
Spa				
** w/ 15 Treatment Rooms and Lap Pool	Patrons	150	12	1,800
Indoor Pool	Swimmers	250	10	2,500
Meeting Space	100 SF	18	12	216
Offices - Administration and Operating	100 SF	55	12	660
Lodging Units (168-2 Bdrm)	Bedrooms	336	150	50,400
Lodging Unit Clubhouse--				
**Pool/ Health Club	Swimmers	168	12	2,016
**40 Seat Snack Bar (2 seatings)	Patrons	80	2	160
Offices - Reception/Sales/Operating	100 SF	8	12	96
Conference Center	100 SF	51	12	612
-Ballroom/Auditorium (2)	Seats	700	3	2,100
Golf Course Clubhouse	Members	154	25	3,850
** w/ 40 Seat Snack Bar (4 seatings)	Patrons	160	2	320
** w/ Steam and Sauna	Patrons	125	5	625
** w/ Offices - Pro/Sales/Operating	100 SF	5	12	60
Interfaith Chapel	Seats	250	3	750
Satelite Golf Maintenance	100 SF	15	12	180
Golf Maintenance	100 SF	85	12	1,020
** w/ offices/showers/lockers				
Children's Center	100 SF	75	12	900
			Potable Total	122,015
Highmount Estates				
Single-Family Home (21-4 Bdrm)	Bedrooms	84	150	12,600
Wilderness Activity Center				
Café with Lounge and Library	Patrons	60	2	120
Locker Rooms	Toilets	4	400	1,600
Sauna/ Steam Room/ Jacuzzi	Patrons	60	5	300
			Potable Total	14,620
			Combined Potable Total	136,635

[1] All hydraulic demand rates taken from *'rural water supply'-New York State Department of Health* and the *'Community Water Systems Source Book-Fifth Edition-Sixth Printing'*

[2] Demand (gpd)='Number' Value *Daily Demand (gal/unit/day)

Table 2:

Recommended Fire Flow for *Wildacres Resort at Highmount Golf Club/ Highmount Estates*

Facility	Recommended Fire Flow (gpm)	Duration In Hours	Minimum Residual Pressure (psi)
250-Room Hotel with Conference Center	1500	2	20
168 Lodging Units	500	2	20
Clubhouse	500	2	20
Marlowe Mansion Restaurant*	500	2	20
Golf Maintenance Building	1000	2	20
Highmount Estates- 21 Single Family Homes	500	2	20
and Wilderness Activity Center			

* Assumes Marlowe Mansion with be renovated and a sprinkler system installed.

Table 3:

Village of Fleischmanns Water Quality Analytical Results

Compound	Max. Contaminants Limits	Units	Catch Basin #1	Catch Basin #2	Well #1	Well #2	Well #3
			11/1/2000	11/1/2000	11/1/2000	11/15/2000	11/1/2000
E. Coli	Negative	/100 mls	Negative	Negative	Negative	Negative	Negative
Total Coliform	1/month	/100 mls	Positive	Positive	Positive	Positive	Positive
B.O.D./5 Day	2	mg/L	ND	ND	ND	ND	ND
pH	6.5-8.5						
Turbidity	5	ntu					
Chloride	250	mg/L	8.2	11	12	15	16
Nitrite as Nitrogen	1	mg/L	ND	ND	ND	ND	ND
Nitrate as Nitrogen	10	mg/L	0.31	0.48	0.42	0.36	0.42
Iron	0.3	mg/L	0.013	0.008	0.186	0.014	0.025
Sodium	20*	mg/L	3.8	5.6	7	10.2	10.6
Total Phosphorous	0.015	mg/L	ND	ND	ND	0.047	ND
Total Dissolved Solids	500	mg/L	45	55	55	69	94
Total Suspended Solids	5	mg/L	ND	ND	11	ND	ND
Pesticides 8081	Varies	μg/L	ND	ND	ND	ND	ND

1. Analyses performed by Phoenix Environmental Laboratories, Inc.
2. ND = Not Detected

* Recommended Value for Health Reasons

EXHIBITS

Exhibit A

Drawings
(Separate Attachment)

Exhibit B

Fire Flow Calculations

Leach (Highmount Estates) + Activity Center

A. potable water needs - ave. flow of 13,560 gpd
9.4 gpm

B. max. hourly demand:

9.4 gpm · 3 (peaking fact.) = 28.25 gpm

C. Fire flow:

per 'WATER AND WASTEWATER TECHNOLOGY' - Second Edition; Mark J. Hammer
TABLE 6-2 -
for dwellings over 100 ft apart
Req'd Fire Flow = 500 gpm

STORAGE FOR FIRE NEEDS = 500 gpm · 60 min/1 hr · 2 hr
= 60,000 gallons

D. STORAGE TANK NEEDS:
⇒ FIRE FLOW (gal) + WATER DEMAND DAILY (gal)

⇒ 60,000 + 13,560

73,560 gal

Piping - NEEDS TO BE SIZED TO CARRY GREATEST DEMAND — @ Leach fire flow of 500 gpm is greatest

DELAWARE ENGINEERING
28 Madison Ave. Ext.
Albany, NY 12203

PROJECT: Crossroads
DESCRIPTION: Wildacres Water Demands

DATE 10/25/00
SHEET 2 OF 3
BY MTD Ck'ed ____

Wildacres

A. Potable water needs - ave. flow 127,581 gpd (88.5 gpm)
NON-POTABLE - 300,000 gpd (208.33 gpm)

B. max. hourly demand:
88.5 gpm · 3 (peaking factor) = 266 gpm

C. FIRE FLOW:

$F = 18C(A)^{0.5}$ 'Water & WW Tech - 2nd Ed.' Equ. 6-1

(SF) A = Area excluding basements
C = Constant Coefficient
(gpm) F = Fire Flow

C = 1.0 - ordinary const.
0.8 - NON-COMBUSTIBLE CONST.
* If automatic sprinkles REDUCE F BY 75%
* LOW FIRE HAZ. REDUCE BY 25%

AREAS (SF)

1. Upper Lodge - 154,000
2. Lower Lodge - 145,000
3. TIMESHARE - 12,800 / BLOCK; 268 TH
4. CONF. CENTER - 30,000
5. CLUBHOUSE - 15,000
6. CHAPEL - 5,000
7. MANT. BLDG - 5,000
8. REC. / STORAGE - 2,500
9. Marlowe Mans Rest - 4,750

F's

1. $F = 18(.8)(154,000)^{0.5} \cdot .25 \cdot .075 = 1060 = 1100$
2. $F = 18(.8)(145,000)^{0.5} \cdot 0.25 \cdot 0.75 = 1028 = 1100$
3. $F = 18(1)(12,800)^{0.5} \cdot 0.75 \cdot 0.25 = 381 \rightarrow 500$
4. $F = 18(.8)(30,000)^{0.5} \cdot 0.25(0.75) = 468 \rightarrow 500$
5. $F = 18(1)(15,000)^{0.5} \cdot 0.75 \cdot 0.25 = 413 \rightarrow 500$
9. $F = 18(1.8)(4750)^{0.5} \cdot .75 \cdot .25 = 419 \rightarrow 500$ gpm

6., 7., & 8. will have lower demands so NOT CALC'D due to small S.F. & LOW FIRE HAZARD

$= 18(0.8)(329,000)^{0.5} \cdot 0.25 \cdot 0.75$ combined need ~1500 gpm

Wildacres Hotel/Conference Center HAD HIGHEST DEMANDS
ASSUME 1 FIRE AT A TIME. Vol of fire water needed:
1500 gpm · 60 min/hr · 2 (Table 6-4) (FIRE TIME DUR.) = 180,000 gal.

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DELAWARE ENGINEERING
28 Madison Ave. Ext.
Albany, NY 12203

PROJECT: CROSSROADS
DESCRIPTION: Wildacres, Water Demand (CONT.)

DATE 10/25/00
SHEET 3 OF 3
BY MTD Ck'ed ____

D. STORAGE TANK NEEDS:
→ FIRE VOLUME (GAL) + AVE. DAILY DEMAND (gal)

= 180,000 + 127,581 (ave flow − 20% (water saving fixtures))

= **281,000**

E. PIPING − NEEDS TO BE SIZED TO CARRY GREATEST DEMAND − @ (POTABLE & FIRE) Wildacres FIRE FLOW OF **1,500 gpm** is greatest

PIPING − NON-POTABLE − **208.33 gpm**

* Combined use Highmount Estates & Wildacres + Activity Center

Storage Needs
⇒ max fire volume + ave daily total

= 180,000 + 112,913 (20% reduction of potable demand)

= 292,913 gallons ⟸ fire & potable (day)

Aquarius Tank ⇒ @ 19 ft high + 53 ft Ø
hold 319,000 gal

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plumbing requiring pressure reducers in service connections, and undue stress is placed on mains in the ground. Pipe and fittings used in ordinary water distribution systems are designed for a maximum working pressure of 150 psi.

6-2 MUNICIPAL FIRE PROTECTION REQUIREMENTS

The Insurance Services Office (ISO)[1] has developed a standard schedule for the grading of municipalities with regard to their fire defenses and physical conditions. Fire defenses are weighted for evaluation on the basis of 39 percent for water supply, 39 percent for fire department, 13 percent for fire safety control, and 9 percent for fire service communications. In the evaluation of a municipality, deficiency points are assigned for deviations from the criteria published by the Insurance Services Office.[2] Reliability and adequacy of the following major water supply items are considered in the schedule: water supply source, pumping capacity, power supply, water supply mains, distribution mains, spacing of valves, and location of fire hydrants. These are all essential components for fire fighting facilities of a municipality.

Required Fire Flow

This is the rate of flow needed for fire fighting purposes to confine a major fire to the buildings within a block or other group complex. Determination of this flow depends on size, construction, occupancy, and exposure of buildings within and surrounding the block or group complex. The required fire flow is computed at appropriate locations in each section of the city. The minimum amount is 500 gpm, and the maximum for a single fire is 12,000 gpm. Where local conditions indicate that consideration must be given to simultaneous fires, an additional 2000 to 8000 gpm is required. A municipality will have domestic and commercial water demands at the time fires occur; therefore, an adequate system must be able to deliver the required fire flow for the specified duration with municipal consumption at the maximum daily rate. The maximum daily consumption is defined by the Insurance Services Office as the greatest total amount of water used during any 24-hr period in the past three years. This maximum daily rate, expressed in gallons per minute (liters per second) is the mean usage during the day of peak delivery. In cases where actual use figures are not available, the maximum consumption is estimated on the basis of use in other cities of similar character and climate. Such estimates are to be at least 50 percent greater than the average daily consumption, which is defined as the mean daily usage during a one-year period.

An estimate of fire flow required for a given fire area is calculated by the formula

$$F = 18C(A)^{0.5} \qquad (6\text{-}1)$$

where F = required fire flow, gallons per minute (answer is rounded off to the nearest 250 gpm).
C = coefficient related to type of construction: 1.5 for wood-frame construction, 1.0 for ordinary construction, 0.8 for non-combustible construction, and 0.6 for fire-resistive construction.
A = total floor area including all stories in the building, but excluding basements, square feet. For fire-resistive buildings, the six largest successive floor areas are used if the vertical openings are unprotected; but where the vertical openings are properly protected, only the three largest successive floor areas are included.

The fire flow formula, Eq. 6-1, expressed in SI metric units is

$$F = 3.7C(A)^{0.5} \qquad \text{(SI units)} \qquad (6\text{-}2)$$

where F = required fire flow, liters per second
A = total floor area, square meters

Regardless of the calculated value, the fire flow shall not exceed 8000 gpm (500 l/s) for wood-frame or ordinary construction, or 6000 gpm (380 l/s) for noncombustible or fire-resistive buildings. For a normal one-story building of any type, however, it may not exceed 6000 gpm. The fire flow shall not be less than 500 gpm (32 l/s). For groupings of single-family and small two-family dwellings no

Table 6-2. Required Fire Flows for Single-Family and Two-Family Residential Areas Not Exceeding Two Stories in Height

Distance Between Dwelling Units (ft)[b]	Required Fire Flows[a] (gpm)[c]
Over 100	500
31 to 100	750 to 1000
11 to 30	1000 to 1500
10 or less	1500 to 2000
Continuous buildings	2500

Source: Guide for Determination of Required Fire Flow, Insurance Services Office, December 1974.

[a] Where wood shingle roofs could contribute to spreading fires, add 500 gpm.
[b] 1.0 ft = 0.305 m
[c] 1.0 gpm = 0.0631 l/s

exceeding two stories in height, the fire flows in Table 6-2 may be used.

The value obtained by Eq. 6-1 (or Eq. 6-2) may be reduced up to 25 percent for occupancies having a light fire loading, or it may be increased up to 25 percent for high fire loading. Light fire loadings are occupancies of low hazard, such as all forms of housing, churches, hospitals, schools, offices, museums, and other public buildings. However, after credit is applied, the fire flow cannot be less than 500 gpm (32 l/s). High fire hazard loadings encompass all commercial and industrial activities that involve processing, mixing, storage, or dispensing of flammable and combustible materials. Chemical works, explosives, oil refineries, paint shops, and solvent extracting are examples.

Additional adjustments may be applicable to the fire flow as modified for occupancy. Completely automatic sprinkler protection may reduce the required flow up to 75 percent, but structures within 150 ft (45 m) of the fire area increase the required fire flow. The magnitude of increase for separation depends on the open distance, number of sides exposed, type of construction, occupancy, and other factors. The charge for one exposed side generally does not exceed a maximum of 25 percent, and the total penalty for all sides shall not exceed 75 percent.

Table 6-3. Approximate Fire Flow Requirements for the High-Value Districts in Small Communities

Population	Fire Flow (gpm)[a]	Duration (hr)
1000	1500	2
2500	2500	2
5000	3500	3
10,000	4000	4

[a] 1.0 gpm = 0.0631 l/s

After these final corrections, the fire flow shall not exceed 12,000 gpm (760 l/s) or be less than 500 gpm (32 l/s).

The *Guide*[3] was prepared for use by municipal survey and grading personnel of the Insurance Services Office and other fire insurance rating organizations. Although it is available to others as an aid in estimating fire flow requirements, considerable knowledge and experience in fire protection engineering are necessary for detailed application of the guidelines. For example, judgment is used for businesses and industries not specifically mentioned in the *Guide*. A thorough understanding of fire fighting operations is essential when considering the influences of accessibility and configuration of buildings.

Prior to the current grading schedule, municipal fire protection requirements were specified for high-value districts of a community based on population as given in Table 6-3. These requirements are still useful as rule-of-thumb values; however, they should be used only as guidelines in the absence of specific data for calculating the required fire flows. Many changes in community developments over recent years have led to the current ISO schedule. For instance, many towns and cities now have large shopping or office areas located in suburban districts away from the previous "downtown" high-value district.

Duration

The required duration for fire flow is given in Table 6-4. Major components of a water system, on which the reliability of fire flow depends—such as, pumping capacity, power source, supply mains, and treatment works—

Table 6-4. Required Duration for Fire Flow

Required Fire Flow (gpm)[a]	Required Duration (hr)
10,000 and greater	10
9500	9
9000	9
8500	8
8000	8
7500	7
7000	7
6500	6
6000	6
5500	5
5000	5
4500	4
4000	4
3500	3
3000	3
2500 or less	2

Source: *Grading Schedule for Municipal Fire Protection*, Insurance Services Office, 1974.

[a] 1.0 gpm = 0.0631 l/s

must have the ability to deliver the maximum daily consumption rate for several days plus the required fire flow for the number of hours specified at anytime during this interval. The period may be five, three, or two days depending on the system component under consideration and the anticipated out-of-service time needed for maintenance and repair work.

Pressure

The pressure in a distribution system must be high enough to permit pumpers of the fire department to obtain adequate flows from hydrants. In general, a minimum residual water pressure of 20 psi (140 kPa) is required during flow to overcome friction loss in the hydrant and suction hose. Higher pressure is needed where pumpers are not used; a residual pressure of not less than 75 psi permits effective use of streams direct from hydrants that are spaced close enough to allow short hose lines. Sustained high pressures are of value in permitting direct supply to automatic sprinkler systems, and building standpipe and hose systems.

Water-Supply Capacity

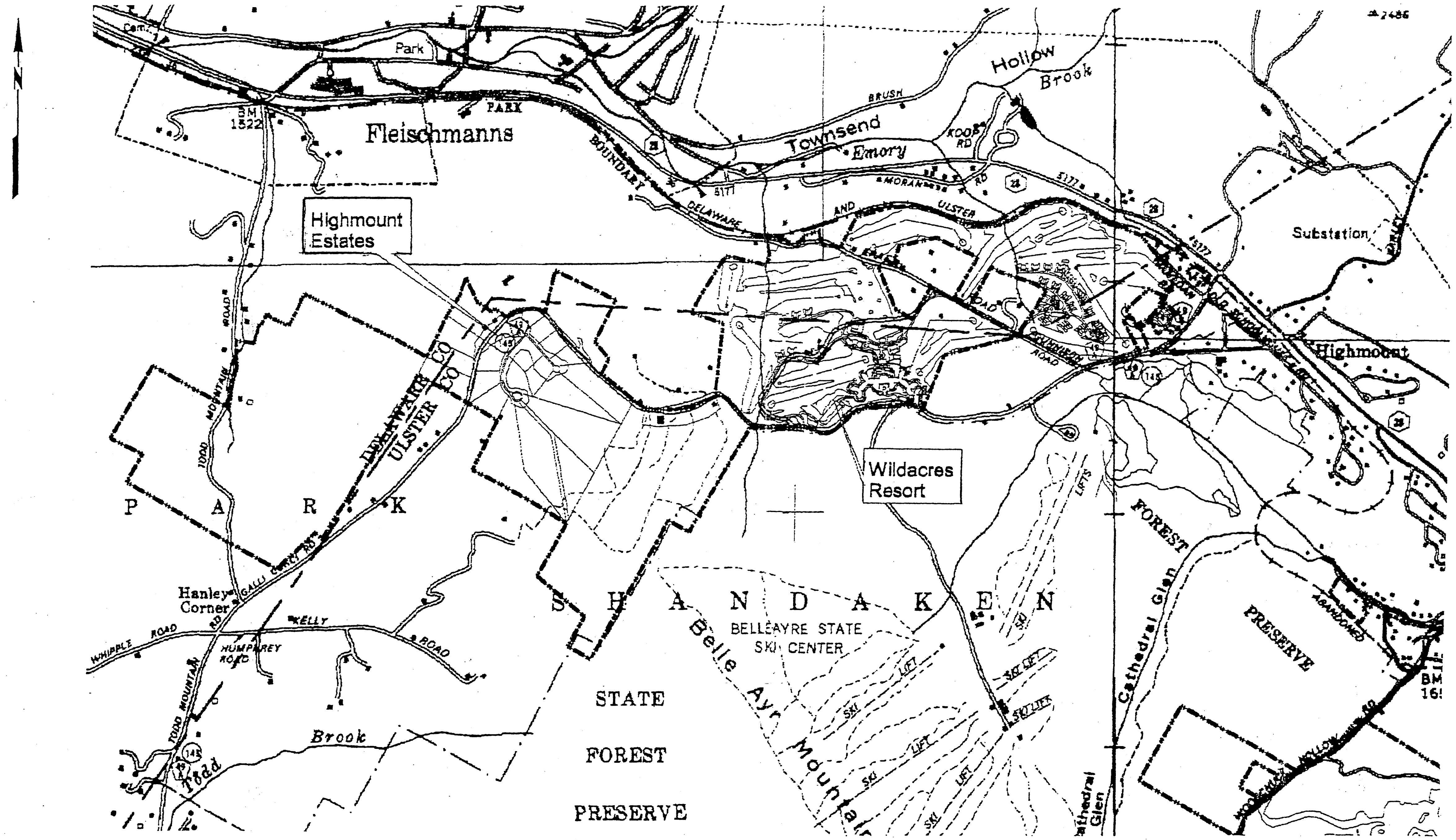
In evaluating a system, the ability to maintain the maximum daily consumption rate plus fire flow in the municipality, at minimum pressure, is considered with one or two pumps out of service. To have no insurance grading deficiency, the capacity remaining with the two most important pumps out of service, in conjunction with storage, must provide this flow for the specified duration any time during a five-day maximum consumption period. Some deficiency is charged against a system that can meet the requirement with only one inoperative pump. Where the capacity remaining, alone or with storage, does not equal the maximum daily use rate, only the amount that is available at required pressure may be considered.

Storage is frequently used to equalize pumping rates into the distribution system as well as to provide water for fire fighting. Since the volume of stored water fluctuates, only the normal minimum daily amount maintained is considered available for fire fighting. In determining the fire flow from storage, it is necessary to calculate the rate of delivery during a specified period. Even though the amount available in storage may be great, the flow to a hydrant cannot exceed the carrying capacity of the mains, and the residual pressure at the point of use cannot be less than 20 psi (140 kPa).

Although a gravity system, that is, delivering water without the use of pumps, is desirable from a fire protection standpoint because of reliability, well-designed and properly safeguarded pumping systems can be developed to such a high degree that no distinction is made between the reliability of gravity-fed and pump-fed systems by the Insurance Services Office. Where electrical power is used, the supply should be so arranged that a failure in any power line or repair of a transformer, or other power device, does not prevent delivery of required fire flow. Underground power lines laid directly from a substation of the power utility to the water plant and

Exhibit C

Spring and Stream Flow Measurements



GRAPHIC SCALE

50 0 750 1,500 3000

IN FEET

the LA group
Landscape Architecture
and Engineering, P.C.

40 Long Alley
Saratoga Springs
New York 12866
518/587-8100

Map adapted from The LA Group, P.C.

ALPHA GEOSCIENCE

FIGURE 1
Wildacres Resort Location Map

Belleayre Resort at Catskill Park
Highmount, New York

Alpha Project No. 02129

FILE: 00109-03.CNV

May. 31 2001 04:04PM P2 FAX NO. : 5187831793 FROM : ALPHA GEOSCIENCE

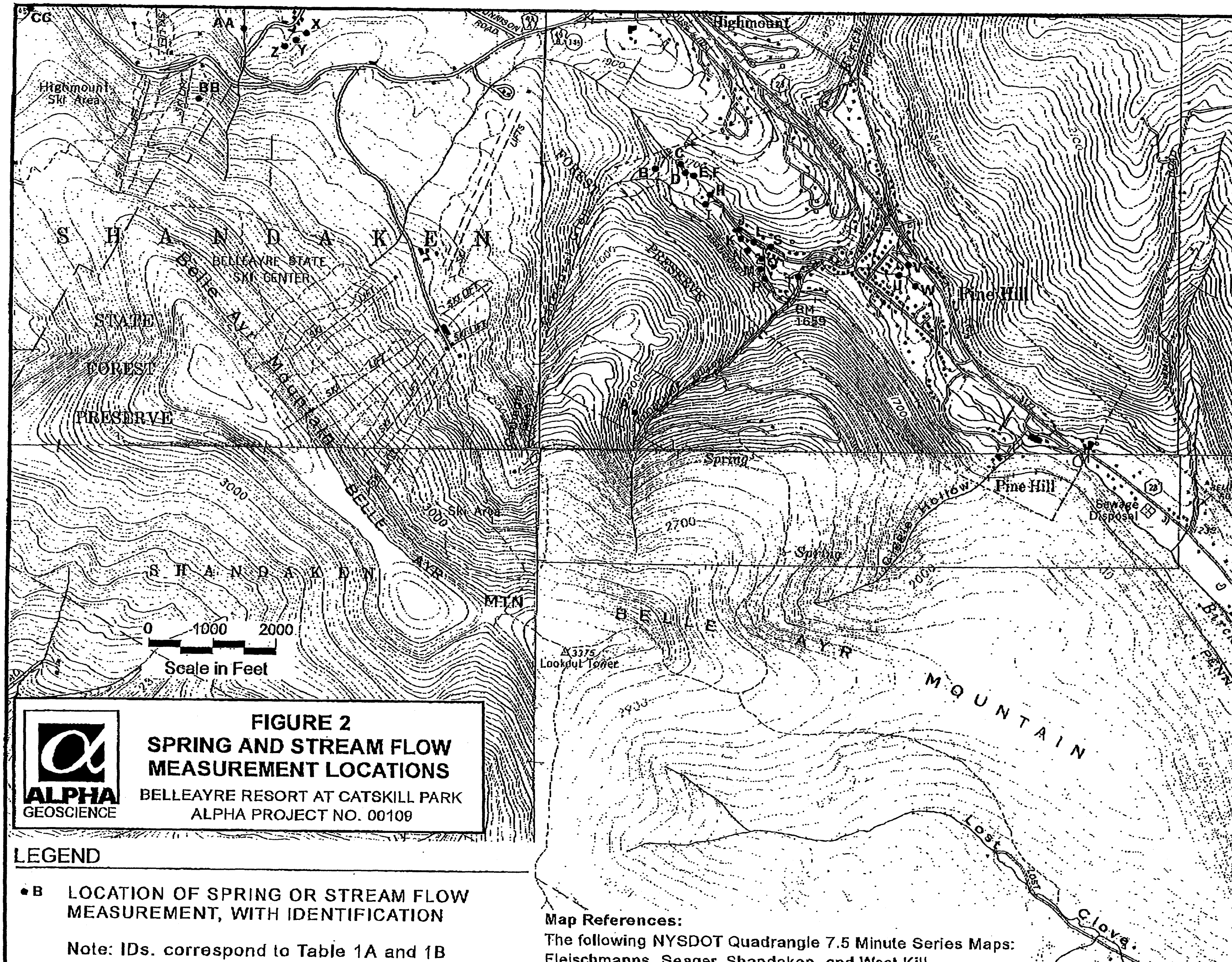


FIGURE 2
SPRING AND STREAM FLOW MEASUREMENT LOCATIONS

ALPHA GEOSCIENCE

BELLEAYRE RESORT AT CATSKILL PARK
ALPHA PROJECT NO. 00109

LEGEND

•B LOCATION OF SPRING OR STREAM FLOW MEASUREMENT, WITH IDENTIFICATION

Note: IDs. correspond to Table 1A and 1B

Map References:
The following NYSDOT Quadrangle 7.5 Minute Series Maps: Fleischmanns, Seager, Shandaken, and West Kill.

RX TIME 05/31 '01 16:00 LOCATION:5187831793

TABLE 1A
2000-2001 MONTHLY
SPRING AND STREAM FLOW MEASUREMENTS
Gallons Per Minute

Belleayre Resort
Alpha Project No. 00109

	Stream/Spring	2000 18-Jan	2000 2-Mar	2000 27-Mar	2000 20-Apr	2000 22-May	2000 26-Jun	2000 26-Jul	2000 29-Aug	2000 28-Sep	2000 26-Oct	2000 28-Nov	2000 27-Dec
A	Woodchuck Hollow Spring	NM[6]	NM	NM	NM	NM	87	27	28	22	56	38	39
B	Railroad Spring[1]	NM	NM	NM	NM	386	351	193	247	80	63	102	435
C	Crystal Spring Brook-above Bonnie View Spg.	73	1005	777	879	899	655	122	120	46	77	78	430
D	Bonnie View side ditch[2]	19	39	24	56	49	49	29	20	10	8	10	55
E	Pine Hill $H_2$0 Supply (meter)	0	NM	118	118	0	118	114	114	112	112	113	NM
F	Pine Hill $H_2$0 Supply overflow	48	11	10	10.5	102	7.5	0.7	.25 est.	0	0	0.7	9.5
G													
H	Crystal Spring Brook-above Cathedral Glen Brook	127	1,456	1,072	1,104	1,121	990	197	297	149	184	230	542
I	Cathedral Glen Brook-above CSB	242	3,499	3,730	2,531	2,889	2,317	730	843	286	653	1,070	597
J	Black ABS Pipe-above Silo A	NM	NM	19	19.7	18	18	9.9	5.1	2.2	2.2	1.7	11.5
K	Silo A	120	212	150	175	178	125	104	98	87	86	87	139
L	Crystal Spring Brook-below Silo A	435	4,941	4,618	4,857	4,307	3,157	1,391	1,074	799	1,296	1,304	1,880
M	Silo B 4" Pipe	NM	NM	NM	NM	NM	NM	96	94	51	121	113	150
N	Silo B Overflow	29	25	28	24	26	25	25	26	25	25	26	28.5
O	Silo B (M + N)	NM	NM	NM	NM	NM	NM	121	120	76	146	139	178.5
P	Station Rd. ditch-above Depot Spg.	35	101	55	226	287	164	89	26	0	50	11	226
Q	Station Rd. ditch-below Depot Spg.	107	433	167	402	372	426	220	245	90	193	176	472
R	Depot Spring Total[3,4]	101	357	140	200	111	287	156	246	115	168	192	275
S	Crystal Spring Brook-below Depot Spg.	780	5,565	4,316	4,939	4,570	4,158	1,677	1,172	1,048	1,467	1,882	2,744
T	Bailey Brook-above Crystal Spring Brook[5]	NM	NM	NM	NM	925	509	127	60	22	87	104	446
U	Crystal Spring Brook-above Birch Creek	NM	NM	NM	6,437	6,032	5,045	1,866	1,116	846	1,473	1,835	2,827
V	Birch Creek-above Crystal Spring Brook	NM	NM	NM	11,209	10,421	6,463	4,347	2,528	1,085	2,501	2,286	7,128
W	Birch Creek-below Crystal Spring Brook	NM	NM	NM	15,984	17,343	9,884	6,362	3,978	1,917	4,385	4,833	9,502
X	Wildacres #1 Spring	1	10.7	1.7	10	10.6	5.8	3.3	2.9	1	NM	NM	NM
Y	Wildacres #2 Spring	5.6	15	0.6	5.5	7.1	4.6	2.5	1.3	0.9	NM	NM	NM
Z	Wildacres #3 Spring	8.4	17.5	6.8	17.5	5.8	5.3	10.3	11.5	4.8	NM	NM	NM
AA	Davenport Spring	3.2	10.1	5.6	12.4	12.5	6.7	2	1.8	1.1	NM	NM	NM
BB	Highmount Spring	3.8	11.5	10	23	18.7	10.2	2.4	1.8	0.5	NM	NM	NM
CC	Leach Spring	3.4	4.4	6.1	13	5.1	6.9	11.1	6.3	5.6	6.8	6.1	12.2
DD	Birch Creek at USGS Big Indian Gauging Station[7]	5,835	41,741	19,300	25,134	26,481	13,914	6,284	4,488	2,154	3,725	2,873	12,567
EE	Esopus Creek at USGS Allaben Gauging Station[7]	50,718	235,187	76,301	107,719	132,854	80,789	33,662	24,686	11,220	22,890	29,623	72,710

	Stream/Spring	2001 30-Jan	2001 28-Feb	2001 29-Mar	2001 25-Apr	2001 30-May	2001 29-Jun	2001 30-Aug	2001 1-Oct	2001 13-Nov	2001 29-Nov	2001 14-Dec
A	Woodchuck Hollow Spring	NM	NM	NM	226	44	31	12	41	NM	NM	38
B	Railroad Spring[1]	100	306	199	525	214	172	0	0	0	0	0
C	Crystal Spring Brook-above Bonnie View Spg.	105	220	101	1644	97	80	30	16	NM	NM	NM
D	Bonnie View side ditch[2]	26	44	15	45	35	68	5	0	NM	NM	NM
E	Pine Hill $H_2$0 Supply (meter)	113	113.5	113.4	119	113.4	112	80	102.5	NM	NM	NM
F	Pine Hill $H_2$0 Supply overflow	NM	3	2.8	17.7	13.5	2.3	0	0			
G												
H	Crystal Spring Brook-above Cathedral Glen Brook	235	372	459	1,913	322	280	45	69	NM	NM	NM
I	Cathedral Glen Brook-above CSB	335	1,154	464	7,882	920	540	42	372	NM	NM	NM
J	Black ABS Pipe-above Silo A	5.6	9.4	12	20.6	9.9	5	1	0	NM	NM	NM
K	Silo A	109	113	106	167	93.5	93	69.5	73	69.3	70.8	79.7
L	Crystal Spring Brook-below Silo A	600	1,299	827	9,401	1,312	785	182	853	NM	NM	NM
M	Silo B 4" Pipe	133	161	176	189	187	185	27.5	159	NM	NM	165
N	Silo B Overflow	25	26.5	NA	NA	NA	NA	NA	NA	NM	NM	NA
O	Silo B (M + N)	158	187.5	176	189	187	185	27.5	159	NM	NM	165
P	Station Rd. ditch-above Depot Spg.	0	67	49	311	0	4	0	0	NM	NM	NM
Q	Station Rd. ditch-below Depot Spg.	123	406	387	813	223	170	28	147	NM	NM	NM
R	Depot Spring Total[3,4]	148	365	338	502	223	166	28	147	NM	NM	NM
S	Crystal Spring Brook-below Depot Spg.	1,088	1,528	1,373	9,039	1,336	1,022	280	738	NM	NM	NM
T	Bailey Brook-above Crystal Spring Brook[5]	41	71	84	1699	110	141	0	24	NM	NM	NM
U	Crystal Spring Brook-above Birch Creek	851	1,699	1,445	12,156	1,460	946	188	601	NM	NM	1080
V	Birch Creek-above Crystal Spring Brook	2,481	3,470	3,822	12,257	3,046	2,101	614	591	NM	NM	1435
W	Birch Creek-below Crystal Spring Brook	3,874	4,980	5,505	25,096	4,453	3,214	696	1,225	NM	NM	2205
X	Wildacres #1 Spring	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Y	Wildacres #2 Spring	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Z	Wildacres #3 Spring	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
AA	Davenport Spring	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
BB	Highmount Spring	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
CC	Leach Spring	2.5	4.9	NM	5.6	4	12	0	0	NM	NM	NM
DD	Birch Creek at USGS Big Indian Gauging Station[7]	5,386	8,527	9,874	31,418	7,630	6,732	987	1,885	1,212	2,289	5,386
EE	Esopus Creek at USGS Allaben Gauging Station[7]	22,890	38,151	55,206	121,633	66,307	25,583	4,937	11,221	7,630	8,303	23,788

Notes:
1 Railroad Spring drains into Cathedral Glen Brook, upstream from its confluence with Crystal Spring Brook
2 Bonnie View Side Ditch = Water from Bonnie View Spring that does not enter piping to Bonnie View Spring collection system.
3 Depot Spring flow = Station Rd ditch flow below DepotSpring, minus Station Rd. ditch flow above Depot Spring, plus Silo B overflow
4 Silo B overflow to reservoir disconnected in March 2001. For March 2001 and subsequent dates, total Depot Spring
flow = Station Rd Ditch below Depot Spring, minus Station Rd. Ditch above Depot Spring
5 Bailey Brook = Name given to unnamed stream in Woodchuck Hollow.
6 NM = Not Measured
7 Esopus Creek and Birch Creek flow values for September 2000 through December 2001 are "Provisional Data Subject To Revision" by the USGS

TABLE 1B
AVERAGE FLOWS
SPRING AND STREAM FLOW MEASUREMENTS (GPM)

BELLEAYRE RESORT
Alpha Project No. 00109

	STREAM OR SPRING (see Figure 2 for locations)	AVERAGE FLOW TO DATE
A	Woodchuck Hollow Spring	53
B	Railroad Spring[1]	198
C	Crystal Spring Brook-above Bonnie View Spg.	373
D	Bonnie View side ditch[2]	30
E	Pine Hill H_20 Supply (meter)	99
F	Pine Hill H_20 Supply overflow	5
G		
H	Crystal Spring Brook-above Cathedral Glen Brook	558
I	Cathedral Glen Brook-above CSB	1555
J	Black ABS Pipe-above Silo A	9
K	Silo A	113
L	Crystal Spring Brook-below Silo A	2266
M		
N		
O	Silo B	148
P	Station Rd. ditch-above Station Rd. Spg.	85
Q	Station Rd. ditch-below Station Rd. Spg.	280
R	Depot Spring Total[3,4]	213
S	Crystal Spring Brook-below Station Rd. Spg.	2536
T	Bailey Brook-above Crystal Spring Brook[5]	273
U	Crystal Spring Brook-above Birch Creek	2661
V	Birch Creek-above Crystal Spring Brook	4321
W	Birch Creek-below Crystal Spring Brook	6969
X	Wildacres #1 Spring	5
Y	Wildacres #2 Spring	5
Z	Wildacres #3 Spring	10
AA	Davenport Spring	6
BB	Highmount Spring	9
CC	Leach Spring	6
DD	Birch Creek at USGS Big Indian Gauging Station	10688
EE	Esopus Creek at USGS Allaben Gauging Station	54957

Notes:

1 Railroad Spring drains into Cathedral Glen Brook, upstream from its confluence with Crystal Spring Brook.
2 Bonnie View Side Ditch = Water from Bonnie View Spring that does not enter piping to Bonnie View Spring collection system.
3 Depot Spring flow = Station Rd ditch flow below Spring, minus Station Rd. ditch flow above Spring, plus Silo B overflow.
4 Silo B overflow to reservoir disconnected in March 2001. For March 2001 and subsequent dates, total Depot Spring flow = Station Rd Ditch below Spring, minus Station Rd. Ditch above Depot Spring.
5 Bailey Brook = Name given to unnamed stream in Woodchuck Hollow.

Exhibit D

Water Supply Evaluation
Village of Fleischmanns

ALPHA GEOSCIENCE
Geology
Hydrology
Remediation
Water Supply

JAN 1 5 2002

January 14, 2002

Mr. Dean Gitter
Crossroads Ventures LLC
PO Box 267
Mt. Tremper, New York 12457

Dear Mr. Gitter:

This letter serves as an addendum to Alpha Geoscience's (Alpha's) December 21, 2000 "Water Supply Evaluation" report for the Village of Fleischmanns. This addendum includes an updated summary of the original report's findings and explains how those findings pertain to the total water needs of the proposed Wildacres Resort.

Fleischmanns' existing water source consists of a combination of springs and wells. The springs feed into a 180,000 gallon capacity reservoir, which is at an elevation of approximately 1700 feet AMSL. Alpha's December 2000 report presents the findings from an evaluation of those springs and wells in November 2000. The evaluation included pumping tests at Well #1 and Well #2, spring flow measurements, and an estimate of production capacity of Well #3.

The total spring contribution measured in November, 2000 averaged 78.8 gpm (113,472 gpd). Alpha conservatively assumed a sustainable flow capacity of 39.4 gpm (56,736 gpd), one half of the November, 2000 average flow. Recent weather conditions, however, allowed for a chance to measure the total spring flow during actual drought conditions. The total spring flow contribution to the reservoir on December 14, 2001, after four months of drought conditions, was 64 gpm (92, 160 gpd). It is Alpha's opinion that the 64 gpm total spring flow is a more accurate measure of the sustainable flow capacity of the Village spring water source.

The sustainable yield of Well #1, which is currently out of service is 94 gpm (135,360 gpd), as estimated based on a stepped rate pumping test. A 24-hour constant rate pumping test was performed on Well #2 and indicated a sustainable yield of 180 gpm. Well #3, formerly identified by the Village as Well #4, was calculated to have a production rate of 89.5 gpm (128,880 gpd) on November 1, 2000. It is Alpha's conservative opinion that Well #3 can sustain a yield of 60 gpm (86,400 gpd), two-thirds of the measured production rate.

The total water capacity of the Village of Fleischmanns water sources is 398 gpm (573,120 gpd), calculated as follows:

Springs	64 gpm
Well #1	94 gpm
Well #2	180 gpm
Well #3	60 gpm
	398 gpm

Water quality data collected during the pumping tests at Well #1 and Well #2 showed no indication of any surface water influence from Emory Brook (Appendix C). Well #3 also has no direct relationship to Emory Brook, based on apparent water quality differences and water levels. The elevation of Emory Brook, near Well #1 and Well #2, is approximately 1500 feet. Well #3 is at an elevation of approximately 1660 feet AMSL and is 410 feet deep. NYSDOH file information (Appendix A) indicates that the depth to water in Well #3 is approximately 280 feet. This results in a water level elevation in Well #3 of approximately 1380 feet AMSL, which is 120 feet below the elevation of Emory Brook. The current withdrawal of water from Well #3 by the Village of Fleischmanns does not affect Emory Brook discharge or water quality.

Potable water for the proposed Wildacres Resort is expected to be purchased either from the Village of Fleischmanns existing water supply, or from a new well to be installed near Well #3 that will be dedicated for Wildacres' use. The potable demand for Wildacres is 76 gpm (109,440 gpd). Factoring in the potential use and purchase of water for irrigation, the project could require up to a peak total flow of 250,000 gpd (174 gpm). The existing water capacity of the Village of Fleischmanns wells and springs is 398 gpm (573,120 gpd). A community the size of Fleischmanns is expected to use 80,000 gpd (56 gpm) to 90,000 gpd (63 gpm), based on population and assuming 20% to 30% leakage (Section 3.9.3, DEIS). If the Wildacres peak total withdrawal of 174 gpm captures water currently available to Fleischmanns, then this will result in a net water capacity of 224 gpm (322,560 gpd) available for the Village of Fleischmanns. This amount far exceeds the expected water use for the community based on it's population. Water withdrawal from the proposed well, near Well #3, is not expected to have any effect on Emory Brook discharge or water quality since it will be installed in bedrock conditions akin to Well #3.

Sincerely,
Alpha Geoscience

Steven M. Trader

Steven M. Trader
Geologist

SMT/dw
cc: Mary Beth Larkin, Delaware Engineering
Kevin Franke, The L A Group
Terresa Bakner, Whiteman Osterman & Hanna

ALPHA GEOSCIENCE

Geology

Hydrology

Remediation

Water Supply

Water Supply Evaluation

Village of Fleischmanns
Delaware County, New York

Prepared for:

Crossroads Ventures LLC
P O Box 267
Mt. Tremper, New York 12457

Prepared by:

Alpha Geoscience
1071 Troy-Schenectady Road
Latham, New York 12110

December 21, 2000

WATER SUPPLY EVALUATION

Village of Fleischmanns
Delaware County, New York

Prepared for:

Crossroads Ventures LLC
P O Box 267
Mt. Tremper, New York 12457

December 21, 2000

ALPHA
GEOSCIENCE

TABLE OF CONTENTS

1.0 INTRODUCTION

This report documents field investigations performed by Alpha Geoscience (Alpha) in November, 2000 to evaluate the existing public water supply in the Village of Fleischmanns, Delaware County, New York (Figure 1). The primary objective of the evaluation was to determine if the Village of Fleischmanns has excess potable water capacity. This work was performed at the request of Crossroads Ventures, LLC.

The work involved the collection of baseline water quality data and the quantification of available yields from Fleischmanns' existing water source, which consists of a combination of springs and wells. The springs are located on the north-facing lower slopes of Belleayre Mountain, southeast of the Village (Figure 2). The springs are in the vicinity of the Delaware and Ulster Railroad track, approximately 200 feet east of a north-flowing tributary to Emory Brook. Spring flow is piped to collection points in two catch basins which then feed a covered reservoir, at an elevation of approximately 1700 feet above sea level (asl). The estimated 180,000-gallon reservoir is also maintained at an appropriate storage level by additional water fed from Well # 3 (formerly named Well #4), which is located approximately halfway down the hillside. The reservoir feeds the Village distribution system (elevation about 1,500 feet asl) through a 10-inch main.

The Village has two additional wells that are located along Emory Brook on the east end of the Village (Figure 2). Well #2, which is reportedly 175 feet deep and has a 15 horsepower pump rated at 150 gallons per minute (gpm), is pumped primarily during the summer months to meet the higher demands. Well #1 reportedly has a pump rated at 35 gpm, and is currently out-of-service due to water line damage in the channel of Emory Brook.

2.0 METHODS OF INVESTIGATION

The available capacity of the Fleischmanns water supply was evaluated through a site inspection, the review of existing information, and the testing of the springs and wells. The site inspection and review of existing information was conducted to develop an understanding of the system layout and to determine whether there is any history of water supply and/or water quality problems. The springs and selected wells were tested for both yield and general water quality. The water quality was also measured in selected surface water bodies to assess the likelihood that there is a surface water contribution to the springs. Details of these various methods are provided in the rest of this section.

2.1 Site Inspection and Review of Available Information

On October 5, 2000, Alpha conducted an inspection of the Village water sources and discussed the water system with Mr. Michael Myers, Water Superintendent, Village of Fleischmanns. Alpha also contacted representatives of the New York State Department of Health (NYSDOH) and on December 1, 2000 reviewed the Fleischmanns water system files at the district NYSDOH office in Oneonta, New York.

2.2 Spring Evaluations

Alpha conducted field monitoring at the two catch basins that feed the reservoir on five dates during the month of November, 2000 and collected two rounds of water samples from the two catch basins for laboratory analysis. The spring monitoring and sampling was conducted to quantify spring flows and to provide water quality baseline information about the source springs.

Field monitoring was conducted during dry weather on November 1, 7, and 21, 2000 and also during and after a rainfall event on November 14 and 15, 2000, respectively. Alpha documented the rain event by setting up a rain gauge at noon on November 14, 2000. The rain gauge captured 0.34 inches of rain between noon and the end of the rainfall at approximately 6 p.m. Mr. Myers reported that rain had fallen throughout the morning prior to the initiation of the rain gauge measurement. Alpha estimates that the total rainfall of November 14, 2000 was over one half inch.

Field monitoring included spring flow measurements at the two catch basins and field measurement of water quality parameters at the catch basins and at two surface water locations. Spring flow measurements were made at the eight pipes that carry spring flow to the two catch basins that feed the reservoir. The catch basin on the west side of the reservoir, named Catch Basin #1 herein, receives spring flow from two pipes. The catch basin on the east side of the reservoir, named Catch Basin # 2 herein, receives spring flow from two pipes.

Routine water quality field parameters were measured weekly at each of the spring flow locations and at the nearby tributary to Emory Brook. Routine water quality field parameters were also measured three times at Emory Brook, adjacent to Well #2. The water quality field parameters include temperature, specific conductivity, pH, oxidation-reduction potential (ORP), turbidity, and dissolved oxygen. Additionally, a series of three submersible temperature data loggers were installed and set to record water temperatures at 2-hour intervals in Catch Basins # 1 and #2 and in Emory Brook.

Water samples were collected for laboratory analysis at the two catch basins on November 1, 2000 (dry period) and November 15, 2000 (wet period). The samples were analyzed for bacteria (total coliform and E. coli.), 5-Day Biochemical Oxygen Demand (BOD), chloride, nitrite, nitrate, iron, sodium, phosphorus, total dissolved solids (TDS), and total suspended solids (TSS). The bacteriological sample collected at Catch Basin #2 on November 15, 2000 was destroyed during shipment and a replacement sample was collected on November 21, 2000.

2.3 Well Evaluations

Step-drawdown pumping tests were conducted on Wells #1 and #2 to estimate the specific capacities of each well. These tests involved pumping the wells at a series of progressively greater discharge rates and monitoring the resulting water-level drawdowns. The resulting data is used to calculate the discharge in gallons per minute per foot of drawdown.

A constant-rate pumping test was also conducted on Well #2, which was anticipated to have a greater yield than Well #1. The constant pumping rate was maintained for 24 hours.

An estimate of the production rate of Well #3, was made on November 1, 2000. On this date, Well #2 was supplying the Village system while the reservoir was being refilled by spring flow and by pumping Well #3. The production rate of Well # 3 was estimated by calculating the rate of increase in water volume in the reservoir and subtracting the result from the measured flow of spring water into the reservoir.

Routine water quality parameters were measured periodically in the field during pumping periods for each well. The field parameters measured on the well water were the same as those analyzed for the springs and surface water bodies (temperature, specific conductivity, pH, ORP, turbidity, and dissolved oxygen).

One water sample was collected from each well for laboratory analysis. The sample was collected from Well #1 at the conclusion of the step-rate testing on November 1, 2000. The sample was collected from Well #2 at the conclusion of the constant-rate test on November 15, 2000. The sample was collected from Well #3 through a valve at the well head on November 1, 2000. The well samples were analyzed for the same water quality parameters as the spring water (total coliform, E. coli., BOD, chloride, nitrite, nitrate, iron, sodium, phosphorus, TDS, and TSS).

3.0 RESULTS

3.1 Existing Information

Copies of selected documents obtained from the NYSDOH files at the Oneonta district office are included in Appendix A. Review of the documents in the NYSDOH files and observations made by Alpha while inspecting the water facilities with Mr. Myers resulted in the following observations:

- The Village water use ranges from approximately 250,000 to 300,000 gallons per day (GPD) in the summer months to approximately 190,000 to 200,000 GPD in the winter months. Based on a range of estimated population served of 625 (winter) to 1,000 (summer) and a water use of 100 GPD per capita, Alpha estimates that the Village water use is approximately three times the expected use for this community. The NYSDOH files contain numerous references to concerns over leakage in the distribution system.

- The raw water produced by the springs and wells is treated along the transmission line at the entrance to the Village. Treatment consists of chlorination and the addition of soda ash. The NYSDOH files contain references indicating concern that chlorine contact time in the system is minimal. The soda ash treatment is conducted to raise the pH of the water in an attempt to control corrosivity in the system. The corrosivity of the water results in lead and copper concentrations in the distribution system that have exceeded regulatory levels, and the action levels that have been exceeded for lead. The NYSDOH has recognized that the leakage in the distribution system limits the effectiveness of the soda ash addition for corrosion control.

- The Village has applied to the New York State for Drinking Water State Revolving Funds for financial support to make water system improvements including service line replacements, main line replacements, construction of a storage facility for finished water, and the installation of a new well. The new well is to be located on the same side of Emory Brook as the Village.

- The NYSDOH has initiated a Source Water Assessment to evaluate whether the Village's springs and wells can be classified as ground water under the direct influence of surface water.

- The NYSDOH has conducted a synthetic organic compound (SOC) vulnerability assessment of the Village system and granted the Village a waiver allowing reduced frequency of monitoring for SOCs.

- Watershed Rules and Regulations were enacted in 1984 to protect the Village wells and springs from contamination.

3.2 Spring Evaluations

3.2.1 Spring Flow

Spring flow measurements are listed on Table 1. Total spring flow averaged 78.8 gallons per minute (gpm), or 113,472 GPD. Catch Basin #2 produces approximately twice the flow of Catch Basin #1.

Catch Basin #1 was observed to receive most of its flow from an approximately three-inch diameter metal pipe. A nominal secondary flow was observed entering Catch Basin #1 through a black plastic pipe that lies on the ground surface near the catch basin. Both pipes appear to derive their flow from locations to the west of the catch basin; however, exact spring locations were not established. An unmeasured portion of the spring flow near Catch Basin #1 is apparently being lost, possibly from pipe leakage, as surface water flow was observed originating at Catch Basin #1 during each monitoring event.

Catch Basin #2 was observed to receive flow from six, four-inch, PVC pipes, which are in part exposed on the ground surface in the area upslope (i.e. south) of the reservoir. Spring box locations were not definitively identified. It appears that two spring boxes are located on the south side of the railroad track and one or more are located on the north side of the track. The area between the track and the reservoir was very wet throughout the month of November, 2000. The wetness in this area is likely the result of uncaptured spring flow and/or leakage from the spring piping.

The dimensions of the reservoir were measured to estimate its approximate capacity. The measured length (62.15 feet) and width (37.45 feet) of the reservoir are approximate, due to a flexible rubber lining on the inside walls. The depth was measured to be 9.54 feet below an overflow pipe on the east wall of the reservoir. The estimated capacity is 22,204.5 cubic feet, or 166,112 gallons.

3.2.2 Spring Water Quality

Temperature data recorded by the temperature loggers are presented in Appendix B. Water quality parameters measured at spring and surface water locations in the field are listed in Appendix C. Laboratory analytical reports are presented in Appendix D and summarized on Table 2.

The temperature data from the loggers placed in the Catch Basins indicate constant water temperatures in Catch Basin #1 (44.65 degrees Fahrenheit) and in Catch Basin # 2 (43.92 degrees Fahrenheit) throughout the logging period. By contrast, the temperature data from Emory Brook indicate a general decrease of water temperature throughout November, from the mid-40 degree Fahrenheit range to the upper-30 degree Fahrenheit range, as well as diurnal variations of as much as a few degrees per day.

Specific conductivity , pH, oxidation-reduction potential (ORP), turbidity, and dissolved oxygen data were within normal ranges for ground water. No appreciable differences were noted in any of these field parameters that would suggest a likelihood that the spring water is closely correlated to climatological or surface water conditions.

The total coliform results indicate coliform bacteria to be present in three of four samples collected from the two catch basins. E. coli. was not present in any of the catch basin samples.

BOD, nitrite, and TSS were not detected in any of the catch basin samples. Nitrate results were normal, with all concentrations less than 0.5 milligrams per liter (mg/l), or parts per million (ppm). TDS concentrations were normal, ranging between 35 ppm and 55 ppm.

Chloride concentrations were consistent in each catch basin between the two sampling events, at approximately 8 ppm in Catch Basin #1 and 11 ppm in Catch Basin #2. Similarly, sodium concentrations were consistent in each catch basin between the two sampling events, at approximately 4 ppm in Catch Basin #1 and 6 ppm in Catch Basin #2.

Iron concentrations were moderate, ranging from a low of 0.008 ppm in Catch Basin #2 to 0.046 ppm in Catch Basin #1. Total phosphorus was below the laboratory detection limit in samples collected from each catch basin on November 1, 2000 and near 0.05 ppm in samples collected from each catch basin on November 15, 2000.

3.3 Well Evaluations

3.3.1 Well #1 Step Drawdown Test

Well # 1 is a six-inch well located along Emory Brook, near the east end of the Village. Well #1 has been out-of service since a January 1996 flood. The existing pump was removed to install a temporary test pump, discharge piping, and a drop tube for recording water levels. The existing pump and piping were observed to be heavily coated with red mineral encrustation, probably iron deposits.

Well #1 was pumped with the test pump at stepped rates of 23 gpm, 57 gpm, 94 gpm, 113 gpm, and 94 gpm. The well reached relatively stable water levels at each rate step, except the highest (113 gpm), which resulted in a rapidly falling water level and produced a rusty color and high turbidity in the discharge water. After a few minutes at the highest pumping rate, the test pump was backed down to 94 gpm for the duration of the test. Specific capacity calculations, based on manual water level readings, are made for the stepped pumping rates on Well #1 as shown on Table 2.

Recovery of water level at the completion of the test was very rapid. Over 80 % of the drawdown was recovered in the first minute after the pump was shut down.

Data logger recordings of water level drawdown during the step rate test on Well # 1 are presented in Appendix E-1. Aqtesolv, an aquifer test analysis software marketed by HydroSOLVE, Inc, was used to conduct a Cooper-Jacob solution of the test data for an unconfined aquifer model. Results of the Aqtesolv analyses, also presented in Appendix E-1, indicate the following hydraulic coefficients for the bedrock aquifer:

- Transmissivity (T) = 2.556 centimeters^2 per second (cm^2/sec)
  = 2.75 x 10^{-3} feet ^{2} per second (ft^2/sec)

- Storativity (S) = 3.986

- Hydraulic Conductivity (K) = 4.19 x 10^{-4} centimeters per second (cm/sec)
  = 1.38 x 10^{-5} feet per second (ft/sec)

The permeability coefficient was calculated with the assumption of a 200-foot saturated aquifer thickness.

3.3.2 Well #2 Step Drawdown Test

Well #2 is the eight-inch, in-service well, also located along Emory Brook, approximately 425 feet upstream (east) of Well #1. Well #2 is primarily used in summer, but was observed to be in service prior to, and during, the November 1, 2000 step test on Well #1 .

The step test was conducted at Well #2 on November 7, 2000. The well was pumped with the existing service pump at stepped rates of 108 gpm, 180 gpm, and 216 gpm, which was the maximum pump output. The well reached relatively stable water levels at each step, although the level at the highest step varied rapidly up and down within a range of several feet, possibly due to pump limitations and/or cascading of water into the well from fractures exposed during drawdown. Water level readings were manually measured during this test in Well #2 and in Well #1, located approximately 425 feet west of Well #2. A transducer was installed in a drop tube in Well #2 and water levels were recorded with a data logger.

Specific capacity calculations, based on manual water level readings, are made for the stepped pumping rates on Well #2 as shown on Table 3.

Recovery at the end of pumping was also rapid in Well #2, recovering approximately 75 % of the drawdown in the first five minutes after the pump was shut down. An audible cascading of water was noted after pump shut down until the water level had recovered to a depth of about 37 feet below the measuring point.

Data logger recordings of water level drawdown during the step rate test on Well #2 are presented in Appendix E-2. Aqtesolv was used to conduct a Cooper-Jacob solution of the test data for an unconfined aquifer model. Results of the Aqtesolv analyses, also presented in Appendix E-2, indicate the following hydraulic coefficients for the bedrock aquifer:

- Transmissivity (T) = 4.638 cm^2/sec = 5.01 x 10^{-3} ft^2/sec

- Storativity (S) = 3.986

- Hydraulic Conductivity (K) = 7.63 x 10^{-4} cm/sec = 2.58 x 10^{-5} ft/sec

The permeability coefficient was calculated with the assumption of a 200-foot saturated aquifer thickness.

3.3.3 Well #2 Constant Rate Test

Well #2 was pumped at a constant rate of 180 gpm for 24 hours on November 14-15, 2000. Water levels in Well #2 and #1 were measured manually and were measured using transducers installed in the wells' drop tubes and the data logger. The water level in the pumping well exhibited some oscillations, but essentially had reached a stable level for within the last half of the pumping period. The water level reading for 11 hours after the start of the test was within 0.13 feet of the final reading at 24 hours. The oscillations in water level may be attributed to cascading water from fractures above the pumping water level and/or variations in the flow rate of the pump.

Data logger recordings of water level drawdown during the constant rate test on Well # 2 are presented in Appendix E-3. Aqtesolv was used to conduct a Cooper-Jacob solution of the test data for an unconfined aquifer model. Results of the Aqtesolv analyses, also presented in Appendix E-3, indicate the following hydraulic coefficients for the bedrock aquifer:

- Transmissivity (T) = 4.637 cm^2/sec = 5.01 x 10^{-3} ft^2/sec
- Storativity (S) = 0.5306
- Hydraulic Conductivity (K) = 7.07 x 10^{-4} cm/sec = 2.32 x 10^{-5} ft/sec

The permeability coefficient was calculated with the assumption of a 200-foot saturated aquifer thickness.

3.3.4 Well #3 Production Yield

Well #3 was in continuous operation on November 1, 2000 and was being used along with the spring flow to fill the reservoir. The Village was being supplied at this time by pumping of Well #2. Alpha measured the reservoir dimensions and the rate of water level rise in the reservoir.

Based on these measurements and the spring flow rate, estimates of Well #3's pumping rate were calculated, as shown on Table 4.

During the filling of the reservoir on November 1, 20000, Alpha personnel noted a slight sulfur odor at the reservoir, which was likely attributable to the Well #3 discharge.

3.3.5 Well Water Quality

Water quality parameters measured in the field are listed in Appendix C. Laboratory analytical reports are presented in Appendix D and are summarized on Table 5.

Field parameters were measured at Well #2 at 6 minutes after the start of pumping and at 368 minutes after pumping started, which was 80 minutes after the pumping rate was reduced from the highest rate (216 gpm). Results were generally in the normal range for ground water, with the following exceptions:

- Specific conductance was elevated in both readings. These elevated readings may be attributed to well water turbulence stirring up iron encrustations present in the well.
- Turbidity readings were also elevated in both readings. These elevated readings may also be attributed to turbulence in the well.

Field parameters were measured at Well #2 during the step rate test and during the constant rate test. Results were generally in the normal range for ground water. Field parameters measured at Well #3 were generally in the normal range for ground water, with the following exceptions:

- Turbidity readings were slightly elevated (i.e. greater than 1 NTU).
- A negative ORP value was measured on November 7, 2000. (Negative values indicate reducing conditions in the water)

Bacteriological analyses for the sample collected at Well #1 were positive for total coliform and negative for E. Coli. The TSS and iron content were slightly elevated, which is attributable to the agitation or turbulence in the well caused duringthe highest pumping rate of the step test. Other laboratory analytical results for the Well #1 sample were within normal ranges for ground water.

Bacteriological analyses for the sample collected at Well #2 were positive for total coliform and negative for E. Coli. Other laboratory analytical results for the Well #2 sample were within normal ranges for ground water.

Bacteriological analyses for the sample collected at Well #3 were positive for both total coliform and for E. Coli. It is noted that the sample was collected from Well # 3 at a valve located in the open air at the well head and that this valve was not "flared off" (purified) prior to sample collection. Other laboratory analytical results for the Well # 3 sample were within normal ranges for ground water.

4.0 CONCLUSIONS

In November, 2000, Alpha conducted an evaluation of the water supply sources of the Village of Fleischmanns, Delaware County, New York. The evaluation included making estimates of the capacities of the water sources and analyzing water quality. The capacity estimates were developed through the measurement of spring flows, pumping tests at Well #1 and Well #2, and calculating the production capacity of Well #3. The following capacities are estimated for the water sources on the basis of these evaluations:

- <u>Springs</u> - The average total spring flow measured in November, 2000 was 78.8 gpm. On the basis of observations of seasonal variations in spring flows in the area, Alpha has assumed a sustainable flow capacity of one half of the November, 2000 average flow, and estimates a spring capacity of 56,736 GPD.

- <u>Well #1 (currently out-of-service)</u> - The water level at Well #1 was relatively stable at the pumping rate of 94 gpm during the step rate pumping test. Although a constant rate pumping test was not performed on Well #1 to verify its sustained yield, Alpha interprets that a 94 gpm yield can be sustained at Well #1, based on the hydrogeologic setting of the well, which is located adjacent to the perennial stream, Emory Brook, and the well response during the step test. A pumping rate of 94 gpm for well #1 is equivalent to a capacity of 135,360 GPD.

- Well #2 - The water level at Well #2 was relatively stable up to the pumping rate of 216 gpm during the step rate pumping test and was stable at the pumping rate of 189 gpm during the 24 hour, constant rate pumping test. Although a 72-hour, constant rate pumping test was not performed on Well #2 to verify its sustained yield, Alpha interprets that a 180 gpm yield can be sustained at Well #2. The 180 gpm estimate is based on the hydrogeologic setting of the well, which is also located adjacent Emory Brook, and the well response during the 24-hour test. A pumping rate of 180 gpm for Well #2 is equivalent to a capacity of 259,200 GPD.

- Well #3 - The production rate of Well #3, as measured on November 1, 2000, was 89.5 gpm. Although sufficient information is not available to definitively establish the sustained yield of Well #3, we believe that this well has an estimated Well #3 capacity of 85,920 GPD. This opinion is based on an arbitrary assumption that the well can sustain a yield of two-thirds of the measured production rate of 89.5 gpm.

- The total water capacity of the Village of Fleischmanns, as estimated above, is 537,216 GPD.

- NYSDOH records indicate that the system has a daily water usage of 190,000 to 300,000 GPD. Alpha estimates that the Village water use is approximately three time the expected use for the community. The current excess water use by Fleischmanns is attributed to leakage in the distribution lines.

The following water quality results were derived from the evaluation:

- Field measurements of routine water quality parameters made at the wells, springs, and surface waters and laboratory analysis of samples collected from the springs and wells generally indicated satisfactory chemical quality of the water supply. Most of the results were generally within normal ranges for ground water.

- Bacteriological analyses of samples collected from the wells and springs indicated the presence of coliform bacteria and, in the case of Well #3, possible E. Coli bacteria in the raw water sources.

- No appreciable differences were noted in any of these field parameters that would suggest a likelihood that the spring water is closely correlated to climatological or surface water conditions.

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Table 1
Spring Flow Measurements
Fleischmanns (V) Water Supply

(flows in gallons per minute)	11/01/00	11/07/00	11/14/00	11/15/00	11/21/00	Average
Catch Basin #1						
Steel Pipe (SW Corner)	22.7	25.4	29.0	26.1	28.1	26.3
Black ABS Pipe	3.1	0.9	1.2	2.5	1.9	1.9
Total Catch Basin # 1	25.8	26.3	30.2	28.6	30.0	28.2
Catch Basin # 2						
Pipe # 1	7.3	6.9	7.1	7.5	7.3	7.2
Pipe # 2	1.3	1.0	0.9	1.0	1.0	1.0
Pipe # 3	22.1	23.7	24.2	24.0	24.7	23.7
Pipe # 4	14.5	15.0	15.4	15.4	15.3	15.1
Pipe # 5	3.1	2.0	3.7	3.5	3.1	3.1
Pipe # 6	0.5	0.4	0.5	0.5	0.4	0.5
Total Catch Basin # 2	47.8	49.0	51.8	51.9	51.8	50.5
Total Spring Flow	74.6	75.3	82.0	80.5	81.8	78.8

Table 2
Well #1 Step Rate Test Data
November 1, 2000
Fleischmanns (V) Water Supply

Steps	**Duration** (time)	**Discharge** (gpm)	**Water Level at End of Step** (feet)	**Rate of Drawdown Change at End of Step** (feet/minute)	**Specific Capacity** (gpm/foot of drawdown)
Static Level	pre-test	0	4.85	NA	NA
First Step	9:50-10.26	23	8.32	-0.00ft/5min	7.2
Second Step	10:26-12:11	57	14.58	-0.01ft/2.5min	9.1
Third Step	12:11-14:10	94	34.24	+0.18ft/1min	6.0
Fourth Step	14:10-14:26	113	51.82	-0.20ft/1min	NA
Fifth Step	14:26-15:52	94	43.63	-0.06ft/1min	NA
Recovery	15:52-16:17	0	5.18	+0.01ft/4min	NA

Table 3
Well #2 Step Rate Test Data
November 7, 2000
Fleischmanns (V) Water Supply

Steps	**Duration** (time)	**Discharge** (gpm)	**Water Level at End of Step** (feet)	**Rate of Drawdown Change at End of Step** (feet/minute)	**Specific Capacity** (gpm/foot of drawdown)
Static Level	pre-test	0	15.74	NA	NA
First Step	8:45-10:45	98	35.25	-0.01ft/2.5min	5
Second Step	10:45-13:25	180	63.79	-0.05ft/5min	6.3
Third Step	13:25-15:57	216	80.95	Fluctuating	10.2
Recovery	15:57-16:32	0	19.48	+0.07ft/2min	NA

Table 4
Well #3 Production Yield Estimate
November 1, 2000
Fleischmanns (V) Water Supply

Time Interval	Duration (minutes)	Water Level Rise (feet)	Increase In Volume (gallons)	Rate of Volume Increase (gpm)	Minus Spring Flow (gpm)	Estimated Production Rate (gpm)
11:20-13:00	100	0.95	16,541	165.4	74.5	89.9
13:00-14:39	99	0.95	16,193	163.6	74.5	89.1
					Average	89.5

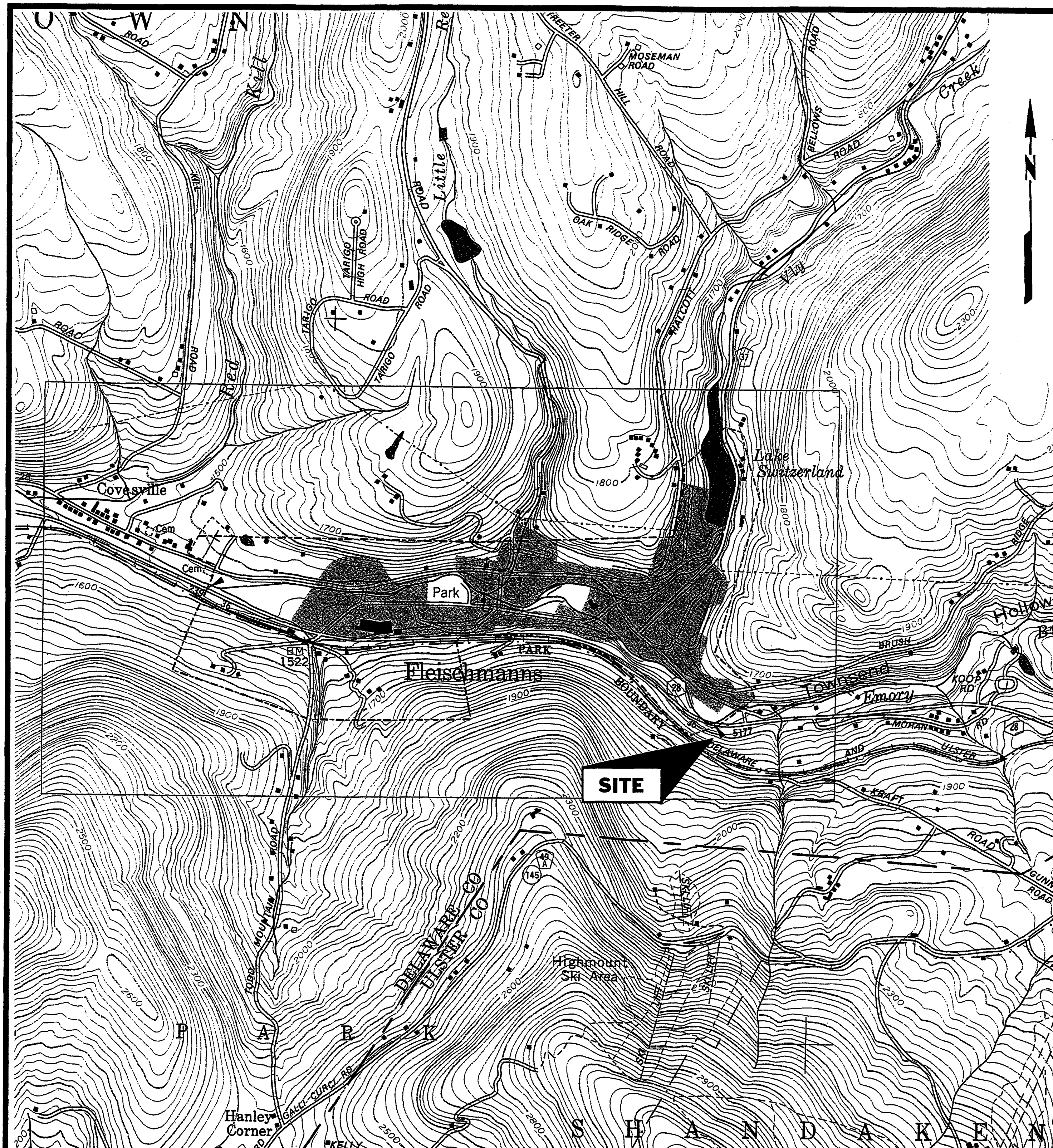
Table 5
Summary of Water Quality Analytical Results
Wells and Springs

Fleischmanns (V) Water Source

Alpha Project No. 00151

Compound	Units	Drinking Water Standards	Reservoir Catch Basin #1	Reservoir Catch Basin #1	Reservoir Catch Basin #2	Reservoir Catch Basin #2	Reservoir Catch Basin #2	Well # 1	Well # 2	Well # 3
			11/1/00	11/15/00	11/1/00	11/15/00	11/21/00	11/1/00	11/14/00	11/1/00
E. Coli	/100 mls		<0	<0	<0		<0	<0	<0	positive
Total Coliform	/100 mls	1/100 mls	positive	positive	positive		negative	positive	positive	positive
B.O.D./5 Day	mg/L		<2	<2	<2	<2		<2	<2	<2
Chloride	mg/L	250	8.2	8.0	11	11		12	15	16
Nitrite as Nitrogen	mg/L		<0.01	<0.01	<.01	<0.01		<.01	<0.01	<.01
Nitrate as Nitrogen	mg/L	10	0.31	0.33	0.48	0.45		0.42	0.36	0.42
Iron	mg/L	0.3	0.013	0.046	0.008	0.008		0.186	0.014	0.025
Sodium	mg/L		3.8	4.2	5.6	6		7	10.2	10.6
Total Phosphorous	mg/L		<0.015	0.047	<0.015	0.058		<0.015	0.047	<0.015
Total Dissolved Solids	mg/L		45	35	55	41		55	69	94
Total Suspended Solids	mg/L		<5	<5	<5	<5		11	<5	<5

Notes:
1. Analyses performed by Phoenix Environmental Laboratories, Inc.



1:24000

0 1000 2000

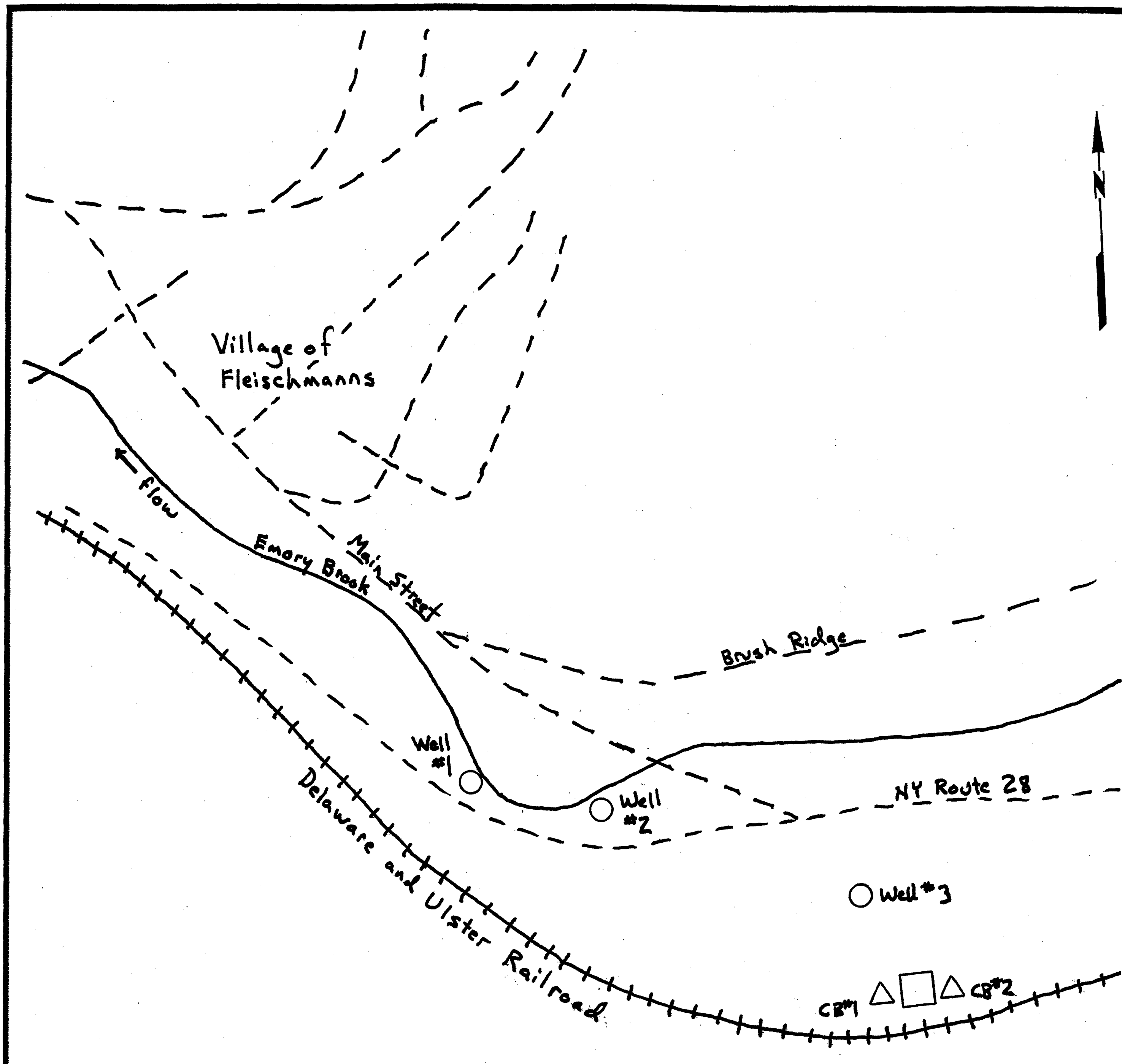
Scale

ALPHA GEOSCIENCE

FIGURE 1
SITE LOCATION MAP

Village of Fleischmans, New York

Project No. 00151- Task 1



LEGEND

○ Well

△ Spring Catch Basin

□ Raw Water Reservoir

500 Ft.

ALPHA GEOSCIENCE

FIGURE 2
WATER SYSTEM SKETCH

Village of Fleischmanns, New York

Project No. 00151- Task 1

APPENDIX A

COPIES OF SELECTED NYSDOH FILE INFORMATION

Source Water Assessment: Drinking Water **SYSTEM** **Report**

File review date: 11/15/2000 ,by: RES Sanitary survey (field)date:________,by:________

Data entered into SDWIS: 11/17/00 ,by: RES

System Name Fleischmanns Village
Water System Number: NY1200261 County Delaware
City/Town/Village ________
Facility Type: Public Water Supply System Type Community - Municipal
Operating Period: Year round
Last Sanitary Survey Date: 9/9/99 by: R. Sheppard
Activity Status: Active
Population Served: 625 Average Daily Water Production (gpd)________
Total System Production Capacity (gpd): ________

Are there any **WATERSHED RULES & REGULATIONS** (WR&R) ? Yes X No __ Pending __
WR&R Effective Date: 6/20/84 or WR&R Proposed Date: ________
Details of WR&R: Protects Village wells + springs from contamination within 500 feet.
Do WR&R apply to **all** water sources for this water system ? > **YES** X **NO** ___

Do **any** of the sources have a **DISINFECTION WAIVER** ? Yes ___ No X
Disinfection Waiver Effective Date: ________ Expiration Date: ________
Justification of Disinfection Waiver: ________

Do **all** water sources at this system have a disinfection waiver ? >**YES** ___ **NO** X

VOC/SOC VULNERABILITY Determination - Date done: ______ By: ______
Basis: VOC - 3 year sampling frequency. done 9/26/90 by RAF - springs used watershed area, wells #2 + #4 used 2000 foot radius. Springs + Well #4 → not vulnerable, Well #2 → vulnerable. SOC - done 3/1/95 - used one mile upgrade + 2500 feet downgrade - sampling waived after 2 quarterly samples

---

Describe existing **SOURCE PROTECTION** (system ownership, etc.) for each source: Limited ownership around all sources. - details unknown

(System name: Fleischmanns Village)

GROUND WATER RULE Issues ?: >> **YES** ✓ **NO** X **NOT APPLIC.** ___
(describe) Chlorine contact time is marginal.

ENHANCED SURFACE WATER TREATMENT RULE (ESTWR) and/or **DISINFECTION BY-PRODUCT RULE** (DPB) Issues ?: >>**YES**___ **NO** X
(describe) ___

Are there **PUBLIC OPINION ISSUES** re: **Source QUALITY**? >**YES**__ **NO** X
or about particular **SOURCES of CONTAMINATION** ? >> **YES** X **NO** ✓
(describe any public opinion issues) a large public outcry resulted when an auto parts business (junkyard) wanted to open adjacent to two unused Village wells (#5 + #6) - Village eventually sold these to the business.

Is there **OTHER INFORMATION** about the system available ? >**YES** X **NO** ✓
(research studies, engineering reports, water management strategies, etc. that might relate to source assessment)
(describe, and indicate the location of the information) Source studies being conducted on behalf of a large developer who wants to buy a large volume of water from the Village.

Does a **LOCAL AGENCY** have **CONCERNS** re: sources? > **YES** X **NO**___
(describe) Springs - exact location + construction details unknown, also well #1 transmission main out of service due to flood damage.

Are there **COMPLEX Distribution/Treatment aspects** ? >>> **YES** X **NO**__
(i.e. the basic treatment and distribution info in SDWIS is not adequate to describe issues - e.g. a source has a particular treatment only because another system source requires it; raw water varies by seasons; etc.)
(describe) The storage tank is for raw water - treatment occurs as the water enters the Village. There is high leakage in the distribution system which indirectly contributes to corrosion control problems because not enough soda ash can be added with the high water use.

Source Water Assessment: GROUND WATER SOURCE Report

File review date: 11/13/00, by: RES Sanitary survey (field) date:______,by:________
Data entered into SDWIS:_______, by:________

System Name: Fleischmanns Village

Water System Number: NY1200261 County: Delaware

	Source 1		Source 2	Source 3
Local Name (of Source):	Springs	Well #1	Well #2	Well #4
Water Type:	GW	GW	GW	GW
Approved Design Capacity of Source:	— Unit: —		Unit:	Unit:
NYSDEC-WSA permit # and issuance/decision date:				
Facility Flow for Source:	— Unit: —	70 gpm	150 Unit: gpm	70 Unit: gpm
Source Availability:	permanent	emergency	permanent	permanent
Well Type:	—	drilled	drilled	drilled
Yield (GPM):	—			
Yield detemination method:	—			
Depth at Completion (Ft):	—	70	200	410
Well Diameter (Inches):	—			
Well Covering:	—	well cap	well cap	well cap
Static Water Level Depth:	—			
Pump Type:	—	submersible	turbine?	submersible
Pump Capacity:	—			
Depth to Top of Well Screen:	—	N/A (rock well)	N/A (rock well)	N/A (rock well)
Well Casing Depth (Feet):	—	16	17	22
Casing Type:	—	steel	steel	steel
Well Log Type:	—	driller's	driller's	driller's

(attach a copy of the logs[s], and explain details and important or unusual features on page 3)

	Source 1		Source 2	Source 3
Latitude:	N42°8'56.20"	N42°9'3.73"	N42°9'2.53"	N42°8'57.05"
Longitude:	W74°31'5.39"	W74°31'19.72"	W74°31'14.56"	W74°31'7.53"
Determination Method:	map	map	map	map
Entity Description:		well	well	well

	Source 1		Source 2	Source 3
Is there a **Well Head Protection Plan** for this source ?	YES X NO__	Yes X	YES X NO__	YES X NO__
Is the Protection Plan being **implemented/enforced** ?	YES__ NO__ NA__		YES__ NO__ NA__	YES__ NO__ NA__

Description of Well Head Protection Plan(s): W R+R

(System name: Fleischmanns Village)

	Source 1 (Springs) Well #1	**Source 2** (Well #2)	**Source 3** (Well #4)

"Wellhead" Delineation Information

	Source 1	Source 2	Source 3
Date of Delineation:			
Delineation Type:			
Delineation Scale:			
Number of Zones:			

Delineation Description(s): ______

	Source 1	Source 2	Source 3
Is there a potential for **Surface Water Influence?**	YES X NO ___ Yes	YES X NO ___	YES ___ NO X
Distance from the well to the surface water body:	— <100	<100	
Measurement method:	— estimate	estimate	
Description of the nearby surface water body*:	shallow springs	— Emory Brook	

	Source 1	Source 2	Source 3
Are there any **Concerns Related to the source Construction/Location ?**	YES X NO ___ Yes	YES X NO ___	YES ___ NO X

Describe these concerns, for each source: Springs - exact location unknown as condition of springs is suspect. Wells #1 + #2 very close to Emory Brook.

*Describe the general water **quality** of the **nearby surface water body**(s) identified above, and any specific water quality concerns related to them:

Source 1: ______

Source 2: ______

Source 3: ______

Are there specific contaminant **Water Quality Concerns Related to Human Activity** for any of the ground water sources, based on **monitoring results**?

Source 1	Source 2	Source 3
YES ___ NO X No	YES ___ NO X	YES ___ NO X

Describe these water quality concerns, listing for each the **groundwater source to which it applies**, the **contaminant category** from the guidelines list, the **contamination level** from the list of these, the **specific contaminant** of concern with results and date, and any other useful information:

Describe any **naturally occurring water quality problems** (be sure to identify which ground water source):

Well #3 abandoned due to sulfur.

(System name: Fleischmanns Village)

Source 1 (Springs) well #1 **Source 2** (Well #2) **Source 3** (Well #4)

Have any **Potential Sources of Contamination** been identified near any of the ground water sources, **during any routine sanitary survey** ? YES X NO X no YES___ NO X YES___ NO X

Describe these contamination sources. Note the distance of the contamination source to each ground water source, and provide any additional information that might be useful.

Springs - may be some septic systems nearby -

Has there been a more Detailed Contaminant Inventory conducted for any of the ground water sources (such as might have been done by a PWS or planning department in developing a wellhead protection plan) ?

YES___ NO X no YES___ NO X YES___ NO X

Date of this inventory: ___ ___ ___

Description of this contaminant inventory(s): ___

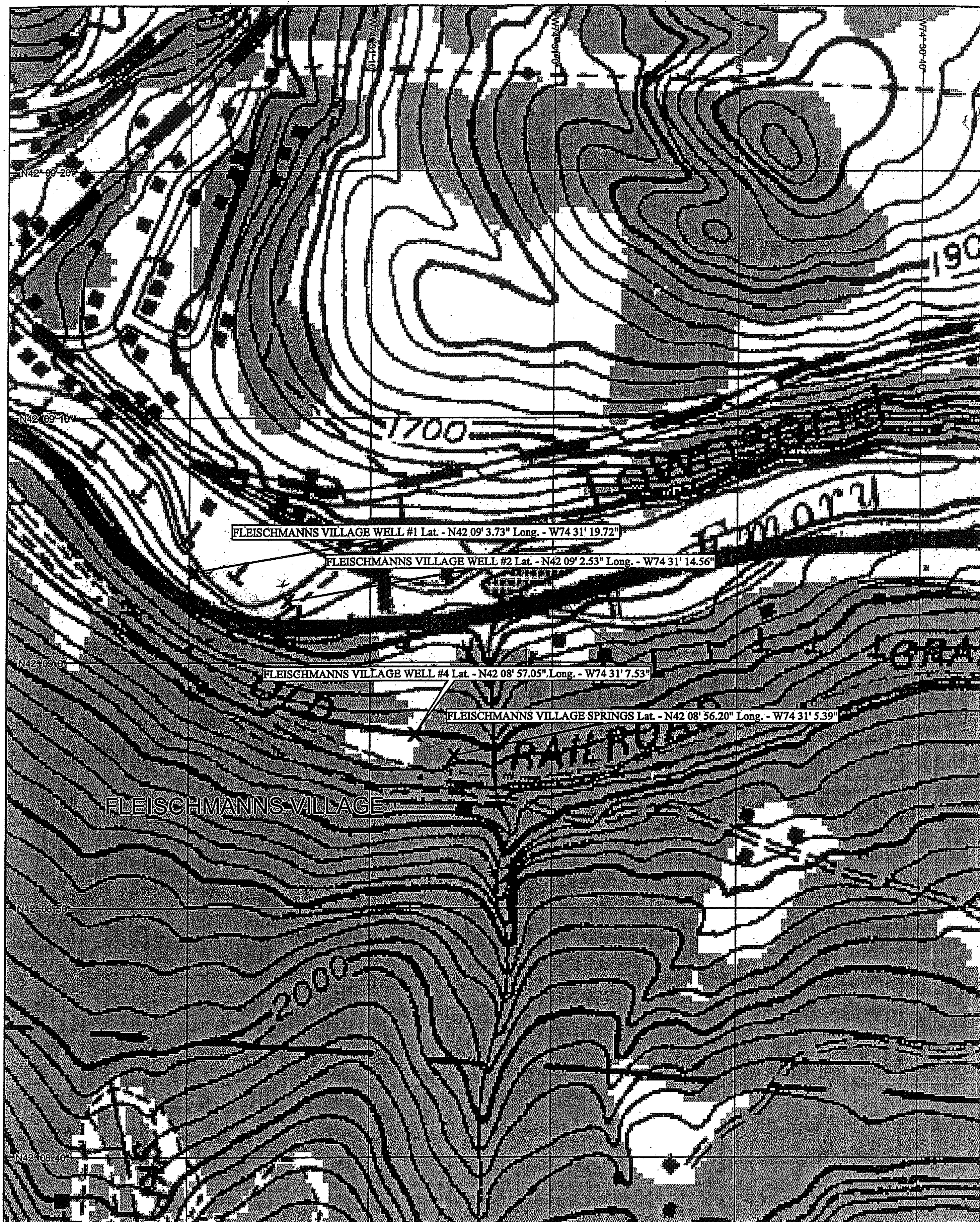
Detailed Well Log Information - summarize important features such as confining layers and the type of aquifer for each ground water source, and explain any unusual features of the source or well log

Well #1 - 16 feet of hardpan then bedrock

Well #2 - 5 feet of gravel, 12 feet of hardpan then bedrock

Well #4 - 5 feet of overburden then bedrock.

Additional Explanations or Information:



3-D TopoQuads Copyright © 1999 DeLorme Yarmouth, ME 04096 Source Data: USGS 250 ft Scale: 1 : 6,400 Detail: 15-0 Datum: NAD27

TABLE OF FLEISCHMANNS WELLS

Source of information - Charles Marin

Well #	1	2	3	4
Location	Adjacent Emory Brook	Adjacent Emory Brook	In Ball Park (no longer used)	Adjacent to springs and reservoir
Approx. Date Drilled	1927	1952	1954	1957
Drilled by	LEON VAN LOAN			
Depth Feet	70	200	140	410
Length of Casing - Ft.	16	17	30	22
Drilling Log	16 Ft. Hardpan Bedrock	5 ft. gravel - 12 ft. hardpan - Bedrock	30 ft. Hardpan Bedrock	5 ft. overburden to Bedrock
Maximum Capacity Ft.	200	170	100	130
Useful Capacity Ft. w/ present pump	70	150	80	Not in use
Time Used	All year/ as needed	summer/ as needed	July 1/Sept. 1 - 24 hr.	Not in use
Controlled	Floats on reservoir	Floats on reservoir	Manual	Not in use
Status of WRCA	Approved *	Approved *	Approved *	Not appl. for
Do problems exist because of Route 28	Yes	Yes	No	No

*Our records are not complete on this - for complete information check with Water Resource Commission

Bureau Of Environmental Sanitation

NEW YORK STATE DEPARTMENT OF HEALTH

Herman E. Hilleboe, M.D., Commissioner

General Description of Fleischmanns Water Supply — Water Supply

~~City~~, Village, ~~Town~~ Fleischmanns — County: Delaware

Give accurate locations and describe briefly but completely the water supply from each separate source to the distribution system, giving for each source the various treatment processes provided in order of occurrence.

List any residences or industries receiving raw water:

This description should be complete but simple and clear so as to be understandable by one unfamiliar with the supply.

(Attach Topograph sheet or make line sketch on reverse side)

Revision Dates 10/18/54 — 10-23-61

Wells: Two wells in separate pump houses near Emory Brook, first right turn after Sunoco Gas Station, going east on Route 28. Both wells are chlorinated.

Springs: Five springs on hillside emptying into a masonry reservoir with a metal roof, up an old road leading south from Route 28, ¼ to ½ mile east of wells. Springs are buried in hillside, built up with brick and laid up stone. They are very difficult to find unless one is familiar with them.

ADDITIONAL WELLS WELL LOCATED IN BALLFIELD ON WEST END OF VILLAGE IS CHLORINATED

WELL LOCATED APPROX 500' BELOW RESERVIOR, NO PUMP

New spring + catch basin built off N.E. corner of reservoir

Sheets in Survey: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25

FORM SAN. 118 (ADDITIONAL SPACES ON REVERSE SIDE) SHEET 2

2/86
revised 3/89
5/94
12/97

PUBLIC WATER SUPPLY

INSPECTION QUESTIONNAIRE

SUPPLIER: FLEISCHMANNS (V)

1. The water supply is administered by:

Organization: Fleischmanns Village Board

PO Box I-3 Address: Village Hall, Fleischmanns 12430

Contact person: Mayor: ~~Don Kearney~~ ? Phone (AC 914) 254-5514

2. Chief water plant operator: ~~Charles Maxim~~ Mike Myers — PO Box 344 (Wagner Ave)

OP #6751 Certificate grade C Number ~~10931~~ Expires ~~7-31-07~~

Work phone (AC 914) 254-~~4416~~ 254 5514 V. office Home phone (AC 914) 254-~~5334~~ 4912

List all other operators, with certificate grades and numbers.

~~Elwin Maxim~~; Grade ~~none~~ Number ______ Expires ______

~~Mike Moran~~ Erik Murad; Grade ~~none~~ none Number ______ Expires ______

3. What is the population served by your water distribution system? 450 yr. round 1000 in summer (census) SAY 250 x 2.5 = 625

4. What is the number of individual customer services within your distribution system?

Metered 250 year round 65 seasonal 315 Unmetered 3 (munic. bldgs)

5. List any other water purveyors or large industrial users that purchase water from your system, and the average daily amount of water sold to them.

NONE (– Regis Hotel ______ gpd

– Yashiva Camp) ______ gpd

______ gpd

6. List your water sources, the capacity or safe yield of each, and the amount of water produced at each during the last twelve (12) months.

Master meter installed 7/90

Wells 5,6 – Bailey prop. never tested or connected – sold to VW Parts – 7/2009

SOURCE	AVERAGE DAILY CAPACITY	AVERAGE DAILY PRODUCTION	TIME PERIOD
Springs	(sometimes dry) unk. gpd	211,000 gpd	11/96 – 10/97
Well #1 (70 gpm = 100,000) #2 (150 gpm = 216,000)	gpd	gpd	
abandoned irrig. well #3 (30 gpm = 43000) EMERG. ONLY; #4 (70 gpm = 100,000) TOTAL	416,000 + springs gpd	gpd	meters

7. What was the average daily water consumption, based on customer meter records, for the last twelve (12) months?

not totalled regularly (billed 6x year) unkn. gpd

What has been the maximum amount of water produced or consumed in one day?

7/97 347,800 gal

8. List your water distribution storage facilities, giving the location, capacity, and date of last cleaning/painting for each.

Storage Reservoir S. of Rte 28 — 180,000 gal — ~~last cleaned~~

(64' x 40' x 9.5') — gal — Last cleaned ? Long time

"rubber" lined — gal — Should try cleaning w/

[illegible]

9. List your water treatment facilities, giving the location and type of treatment provided at each.

(1996) Treatment Bldg (springs, well #4) — { elec. hypo – meter pumped
(Wellhouse #2, #1) — soda ash w/ mixer – fixed rate feed
Well #3 vault (abandoned) — ~~elec. hypo.~~
5,6 – never connected

10. Please answer the following questions with a "yes" or "no," and comment if appropriate.

a. Were any modifications to your water system made during the past year? WTP bldg 7/96 ______

b. Were there any emergencies? Flood 1/96 Soda ash 2/97 ______

c. Is there a written plan for responsibilities, communications, and actions during a water supply emergency? (drought plan not necessary) No

d. Is an auxiliary power source available for your pumping and treatment equipment? Except fire dept. gener. could run Cl_2 pump No

e. Is a standby chlorinator available? ______

f. Have you had any customer complaints about water quality recently? ______

g. Is there a program for protection against hazardous cross connections? {No formal program but problems are watched eg. back flow device @ house w/ own spr

h. Have watershed rules and regulations been enacted to protect your water sources? Enacted 8·16·84 Yes

Are the sources inspected regularly? Yes

11. Please have a map of the distribution system available during the inspection.

a. Is the map up-to-date? Good map Yes

b. What is the minimum working pressure in the distribution system, and where is it located (street)? Typical stat. is 75 psi. Lowest static is 40 psi @ Switzerland

c. At what frequency are water mains flushed? 3-4/year

d. Are line valves exercised regularly? Yes

e. What records of valve and curb stop locations, and distribution maintenance, are maintained? ______

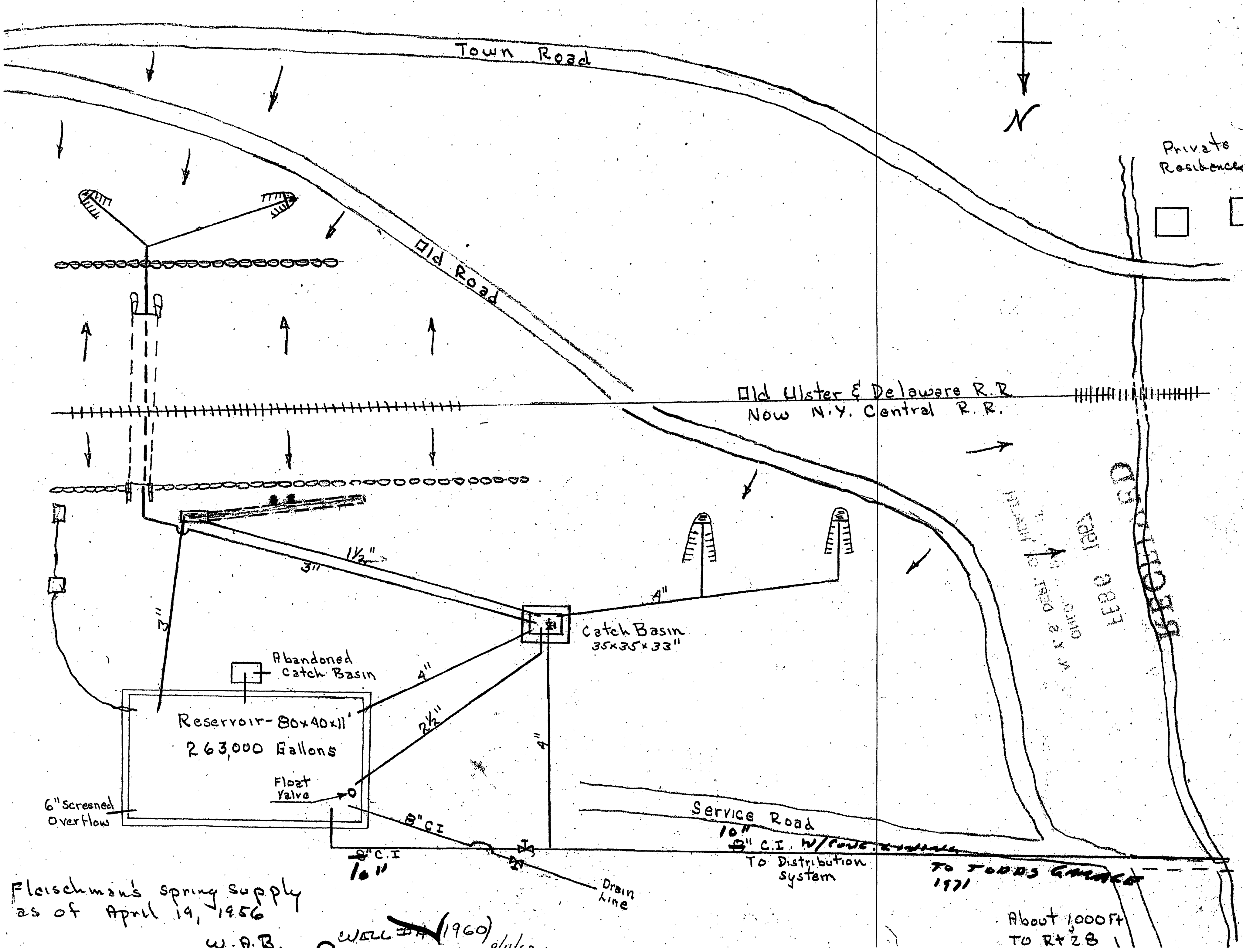
12. What approved water testing laboratory analyzes your bacteriological monitoring samples?
Kingston ~~[illegible]~~ Frequency one/month

What laboratory analyses are performed at your own facility?

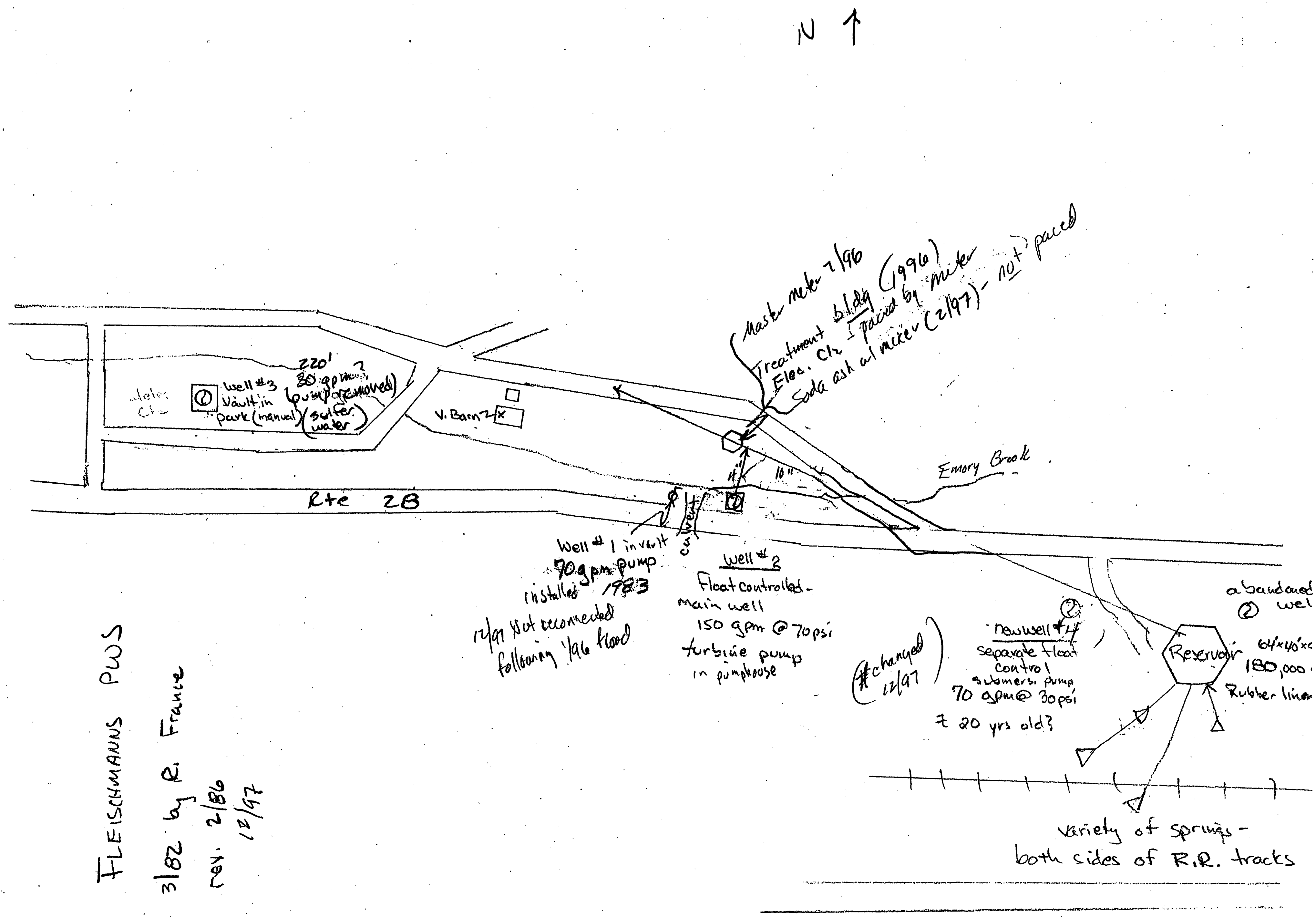
ANALYSIS	EQUIPMENT	FREQUENCY
Cl_2	DPD kit	~~[illegible]~~ daily
pH	Color kit or probe	daily

13. Who is your water supply consultant engineer? Rettew Engineering ~~[illegible]~~

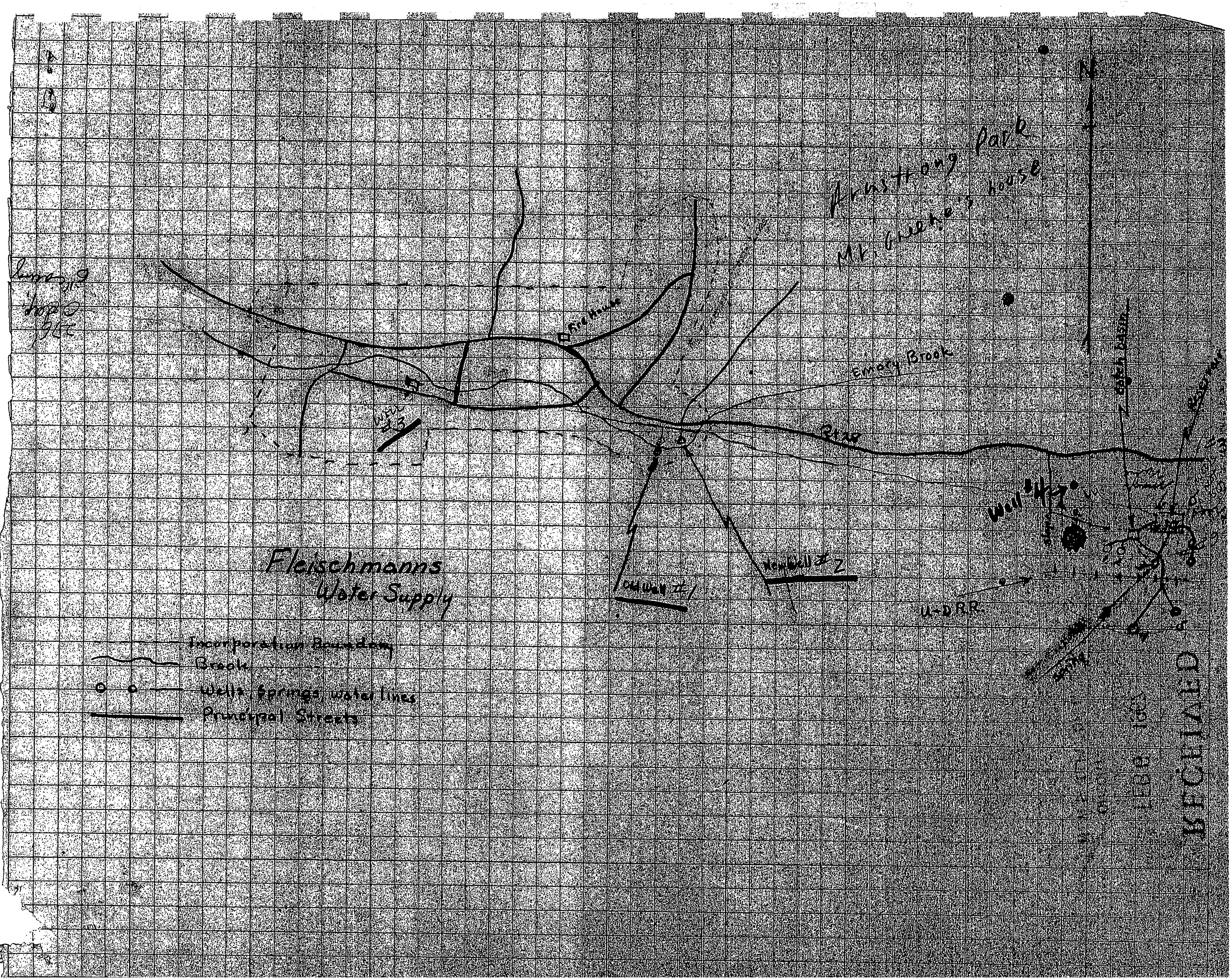
~~14. Is there a written emergency response plan?~~ ______



Fleischman's spring supply as of April 19, 1956
W.A.B.



N
Master meter 7/96
Treatment bldg (1996)
Elec. Cl2 - paced by meter
Soda ash at meter (2/97) - not paced
220'
30 gpm ?
(pump removed)
Well #3
Vault in park (manual)
(sulfer water)
V. Barn
Emory Brook
4"
10"
Rte 28
Well #1 in vault
70 gpm pump
installed 1983
12/97 Not reconnected following 1/96 flood
culvert
Well #2
Float controlled - main well
150 gpm @ 70 psi
turbine pump in pumphouse
(# changed 12/97)
new well #4
separate float control
submers. pump
70 gpm @ 30 psi
± 20 yrs old?
abandoned well
Reservoir
64'x40'x
180,000
Rubber liner
Variety of springs - both sides of R.R. tracks
FLEISCHMANNS PWS
3/82 by R. France
rev. 2/86
12/97



Fleischmanns
Water Supply
Armstrong Park
Mr. Greene's house
N
Fire House
Emory Brook
Rt 28
Well #3
Old Well #1
New Well #2
Well #4
catch basin
U-D RR
Incorporation Boundary
Brook
Wells, Springs, water lines
Principal Streets

RECEIVED

NEW YORK STATE DEPARTMENT OF HEALTH
Bureau of Public Water Supply Protection

Water Systems Operation Report

MICROBIOLOGICAL SAMPLE RESULTS

NEW YORK STATE DEPARTMENT OF HEALTH
ONEONTA DISTRICT OFFICE
28 HILL ST STE 201
ONEONTA NY 13820

TO	RAP
	RAF
	RES
	JSS
	BVH
	SMG
	DMB
	BAR
	TCM
	JCW
	CMH
	DISC
	FILE

Instructions: Complete form and submit to your local health unit within 10 days of the close of the reporting month.

NAME OF PUBLIC WATER SYSTEM	PROGRAM CODE	FEDERAL ID NUMBER	REPORTING MONTH/YEAR
V.O. Fleischmanns			1 0 / 00

Location V.O. Fleischmanns (C,V,T) County Delaware

10-11-00 Turn off pump #3 (Reservoir) 10-30-00 Started too Test wells 1 & 2 RSW

Source of Supply: ☑ Ground ☐ Surface

If surface, is filtration provided? ☐ Yes ☑ No

Did an emergency occur in any part of the water system? ☐ Yes ☑ No

Does the system have a disinfection waiver? ☐ Yes ☑ No

Date	Amount of Treated Water 1,000 Gals. per Day	CHLORINATION Gaseous: Weight of Cylinder Lbs.	CHLORINATION Gaseous: Chlorine Used Lbs. per 24 Hrs.	CHLORINATION Liquid: Hypo-chlorite Used Qts.	Free Chlorine Residual mg/l			
1				20	0.5			
2				–	0.5			
3				–	0.5			
4				–	0.5			
5				–	0.5			
6				–	0.5			
7				–	0.5			
8				20	0.5			
9				–	0.5			
10				–	0.5			
11				–	0.5			
12				–	0.5			
13				–	0.5			
14				–	0.5			
15				20	0.5			
16				–	0.5			
17				–	0.5			
18				–	0.5			
19				–	0.5			
20				–	0.5			
21				–	0.5			
22				20	0.5			
23				–	0.5			
24				–	0.5			
25				–	0.5			
26				–	0.5			
27				–	0.5			
28				–	0.5			
29				20	0.5			
30				–	0.5			
31				–	0.5			
Total								
Average								

Population served 315

Number of required routine samples* 1

Number of actual routine samples 1

Does a M&AR violation exist? ☐ Yes ☑ No

If yes, check reason(s) below.

_____ Actual number of samples fewer than required.

_____ Failure to analyze for E. coli if there was a positive result for total coliforms from routine, repeat or high turbidity (hiturb) sample.

_____ Failure to analyze repeat samples.

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NOV 3 2000
ONEONTA DISTRICT OFFICE

Does an MCL violation exist? ☐ Yes ☑ No

If yes, check reason(s) below.

_____ Two or more positive total coliform samples for systems collecting fewer than 40 samples (routine, repeat or hiturb) per month.

_____ More than 5% positive total coliform samples for systems collecting 40 or more samples (routine, repeat or hiturb) per month.

_____ When a positive Total Coliform sample is positive for E. coli and a repeat Total Coliform sample is positive, OR, when a positive Total Coliform sample is negative for E. coli, but the repeat Total Coliform sample is positive and also is positive for E. coli.

* Must collect a minimum of 5 routine samples the month following a repeat sample collection.

Reported by Michael Myers Date 10 / 31 / 00 Grade Level C

Title Water Supt. Signature Michael J. Myers Cert. No. 10931

VILLAGE OF FLEISHMANNS
WATER DEPARTMENT

DATE	TIME	GALLONS PER DAY	TOTAL USED GALS.PER DAY	PH	
10-1-00	710	328076400	215000	72	
10-2-00	500	328258500	182100	72	68
10-3-00	520	328453100	194600	72	
10-4-00	530	328648400	195300	72	
10-5-00	520	328839300	190900	72	
10-6-00	515	329039300	200000	72	
10-7-00	605	329250900	211600	72	
10-8-00	525	329455000	204100	72	
10-9-00	600	329676700	221700	72	68
10-10-00	525	329881000	204300	72	
10-11-00	525	330084300	203300	72	
10-12-00	525	330287600	203300	72	
10-13-00	515	330487600	200000	72	
10-14-00	615	330702100	214500	72	
10-15-00	530	330916100	214000	72	
10-16-00	505	331125000	209300	72	6.8
10-17-00	520	331332500	207500	72	
10-18-00	505	331534100	201600	72	
10-19-00	520	331739900	205800	72	
10-20-00	515	331946000	206100	72	
10-21-00	645	332167400	221400	72	
10-22-00	530	332367700	200300	72	
10-23-00	515	332578000	210300	72	6.8
10-24-00	520	332772500	194500	72	
10-25-00	510	332964200	191700	72	
10-26-00	515	333157400	193200	72	
10-27-00	525	333350900	193500	72	
10-28-00	540	333546800	195900	72	
10-29-00	455	333743900	197100	72	
10-30-00	510	333943200	199300	72	6.8
10-31-00	515	334135200	192000	72	
		Avg.	1954.45		

KINGSTON WATER DEPT. LABORATORY
ELAP #10160
1442 Sawkill Road
Kingston, N.Y. 12401
(914) 679-2216

BACTERIOLOGICAL EXAMINATION OF WATER

BOTTLE NUMBER	LAB NUMBER
E152	00100305

COLLECTED BY (LAST NAME)	DATE AND TIME COLLECTED	DATE AND TIME RECEIVED	SOURCE OF WATER	CHLORINATED
Myers	10-2-00/0845	10-2 10AM	Springs/Wells	NO ☐ YES ☑ ppm 0.5

EXACT COLLECTION POINT	SAMPLE COLLECTED FROM:	TELEPHONE # (PUBLIC SUPPLY ONLY)	REFRIGERATED
Village Garage	PRIVATE SUPPLY ☐ PUBLIC SUPPLY ☑	914-254-5574	YES ☐ NO ☑

REPORT TO BE MAILED TO:	NAME AND/OR LOCATIONS OF WATER SOURCE:
Michael Myers	V.O. Fleischmanns
P.O. Box 344, Wagner Ave.	Box 339, Main st.
Fleischmanns, N.Y. 12430	Fleischmanns N.Y. 12430

RESULTS OF EXAMINATION

BACTERIA / ML AT 35°C	TOTAL COLIFORMS / 100ML	OTHER TESTS:	REMARKS:	PAYMENT:
	ABSENT ☑ PRESENT ☐	E. COLI / 100ML ABSENT ☐ PRESENT ☐		BILL ☑ CASH ☐ CHECK ☐ #
	METHOD OF EXAMINATION: MPN ☐ MF ☑ COLILERT ☐			

INTERPRETATION OF RESULTS

THESE RESULTS INDICATE THAT THE WATER WAS OF A SATISFACTORY SANITARY QUALITY WHEN THE SAMPLE WAS COLLECTED.

REPORTED BY Barry Lord LAB DIRECTOR DATE 10/6/00

APPENDIX B

TEMPERATURE LOGGER DATA

Time	Temperature (*F)
11/7/00 11:57:11.0 AM	55.97
11/7/00 01:57:11.0 PM	44.65
11/7/00 03:57:11.0 PM	44.65
11/7/00 05:57:11.0 PM	44.65
11/7/00 07:57:11.0 PM	44.65
11/7/00 09:57:11.0 PM	44.65
11/7/00 11:57:11.0 PM	44.65
11/8/00 01:57:11.0 AM	44.65
11/8/00 03:57:11.0 AM	44.65
11/8/00 05:57:11.0 AM	44.65
11/8/00 07:57:11.0 AM	44.65
11/8/00 09:57:11.0 AM	44.65
11/8/00 11:57:11.0 AM	44.65
11/8/00 01:57:11.0 PM	44.65
11/8/00 03:57:11.0 PM	44.65
11/8/00 05:57:11.0 PM	44.65
11/8/00 07:57:11.0 PM	44.65
11/8/00 09:57:11.0 PM	44.65
11/8/00 11:57:11.0 PM	44.65
11/9/00 01:57:11.0 AM	44.65
11/9/00 03:57:11.0 AM	44.65
11/9/00 05:57:11.0 AM	44.65
11/9/00 07:57:11.0 AM	44.65
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11/9/00 01:57:11.0 PM	44.65
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11/9/00 05:57:11.0 PM	44.65
11/9/00 07:57:11.0 PM	44.65
11/9/00 09:57:11.0 PM	44.65
11/9/00 11:57:11.0 PM	44.65
11/10/00 01:57:11.0 AM	44.65
11/10/00 03:57:11.0 AM	44.65
11/10/00 05:57:11.0 AM	44.65
11/10/00 07:57:11.0 AM	44.65
11/10/00 09:57:11.0 AM	44.65
11/10/00 11:57:11.0 AM	44.65
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11/10/00 03:57:11.0 PM	44.65
11/10/00 05:57:11.0 PM	44.65
11/10/00 07:57:11.0 PM	44.65
11/10/00 09:57:11.0 PM	44.65
11/10/00 11:57:11.0 PM	44.65
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11/11/00 11:57:11.0 AM	44.65
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11/11/00 03:57:11.0 PM	44.65
11/11/00 05:57:11.0 PM	44.65
11/11/00 07:57:11.0 PM	44.65
11/11/00 09:57:11.0 PM	44.65
11/11/00 11:57:11.0 PM	44.65
11/12/00 01:57:11.0 AM	44.65
11/12/00 03:57:11.0 AM	44.65
11/12/00 05:57:11.0 AM	44.65
11/12/00 07:57:11.0 AM	44.65
11/12/00 09:57:11.0 AM	44.65
11/12/00 11:57:11.0 AM	44.65
11/12/00 01:57:11.0 PM	44.65
11/12/00 03:57:11.0 PM	44.65
11/12/00 05:57:11.0 PM	44.65
11/12/00 07:57:11.0 PM	44.65
11/12/00 09:57:11.0 PM	44.65
11/12/00 11:57:11.0 PM	44.65
11/13/00 01:57:11.0 AM	44.65

Time	Temperature (*F)
11/13/00 03:57:11.0 AM	44.65
11/13/00 05:57:11.0 AM	44.65
11/13/00 07:57:11.0 AM	44.65
11/13/00 09:57:11.0 AM	44.65
11/13/00 11:57:11.0 AM	44.65
11/13/00 01:57:11.0 PM	44.65
11/13/00 03:57:11.0 PM	44.65
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11/14/00 09:57:11.0 PM	44.65
11/14/00 11:57:11.0 PM	44.65
11/15/00 01:57:11.0 AM	44.65
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11/15/00 05:57:11.0 AM	44.65
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11/15/00 03:57:11.0 PM	44.65
11/15/00 05:57:11.0 PM	44.65
11/15/00 07:57:11.0 PM	44.65
11/15/00 09:57:11.0 PM	44.65
11/15/00 11:57:11.0 PM	44.65
11/16/00 01:57:11.0 AM	44.65
11/16/00 03:57:11.0 AM	44.65
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11/16/00 07:57:11.0 AM	44.65
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11/16/00 05:57:11.0 PM	44.65
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11/17/00 11:57:11.0 PM	44.65
11/18/00 01:57:11.0 AM	44.65
11/18/00 03:57:11.0 AM	44.65
11/18/00 05:57:11.0 AM	44.65
11/18/00 07:57:11.0 AM	44.65
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11/18/00 05:57:11.0 PM	44.65

Time	Temperature (*F)
11/18/00 07:57:11.0 PM	44.65
11/18/00 09:57:11.0 PM	44.65
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11/19/00 05:57:11.0 AM	44.65
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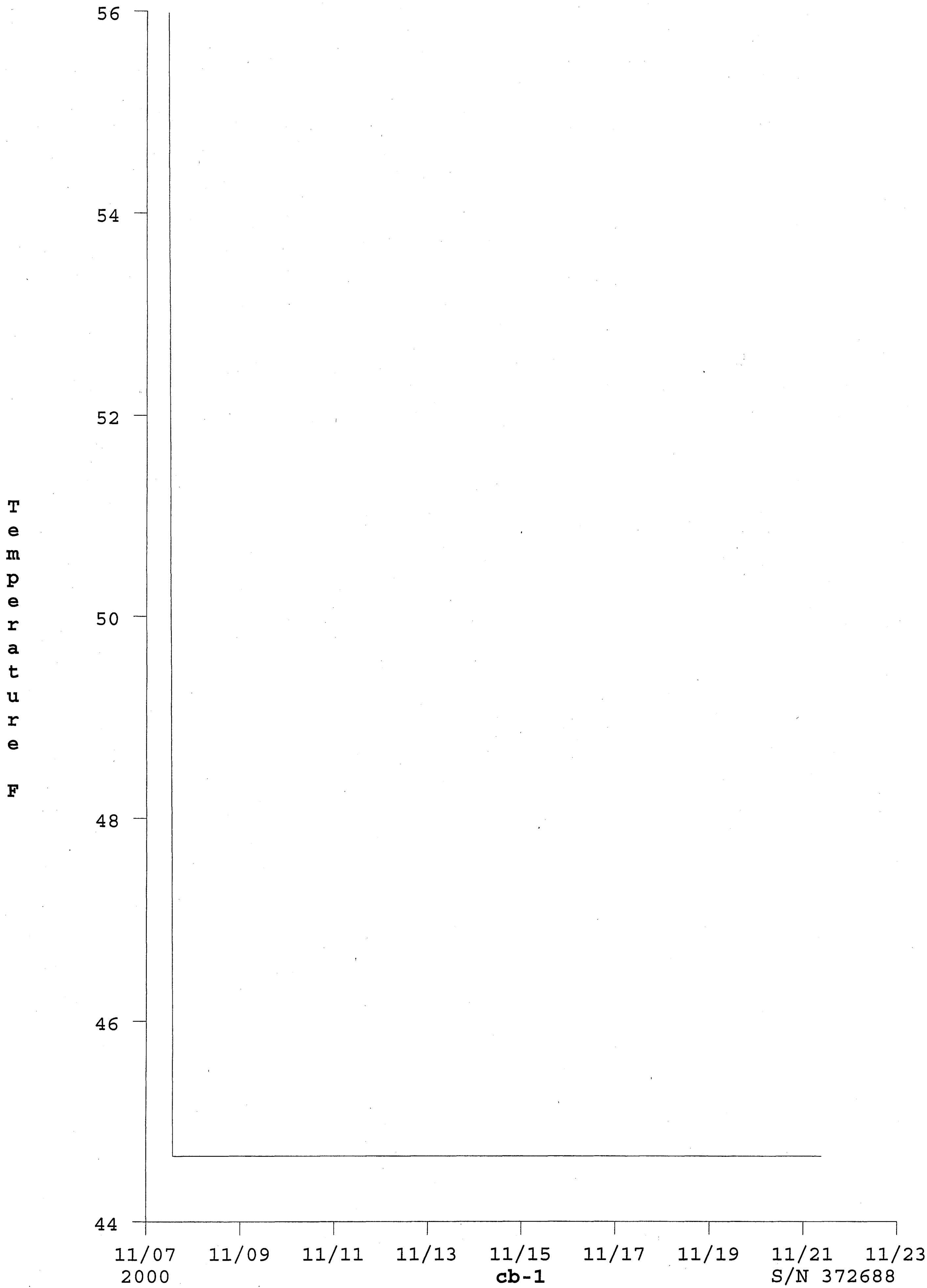
11/19/00 03:57:11.0 PM	44.65
11/19/00 05:57:11.0 PM	44.65
11/19/00 07:57:11.0 PM	44.65
11/19/00 09:57:11.0 PM	44.65
11/19/00 11:57:11.0 PM	44.65
11/20/00 01:57:11.0 AM	44.65
11/20/00 03:57:11.0 AM	44.65
11/20/00 05:57:11.0 AM	44.65
11/20/00 07:57:11.0 AM	44.65
11/20/00 09:57:11.0 AM	44.65
11/20/00 11:57:11.0 AM	44.65
11/20/00 01:57:11.0 PM	44.65
11/20/00 03:57:11.0 PM	44.65
11/20/00 05:57:11.0 PM	44.65
11/20/00 07:57:11.0 PM	44.65
11/20/00 09:57:11.0 PM	44.65
11/20/00 11:57:11.0 PM	44.65
11/21/00 01:57:11.0 AM	44.65
11/21/00 03:57:11.0 AM	44.65
11/21/00 05:57:11.0 AM	44.65
11/21/00 07:57:11.0 AM	44.65
11/21/00 09:57:11.0 AM	44.65


56
54
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44
Temperature F
11/07
2000
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11/11
11/13
11/15
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11/19
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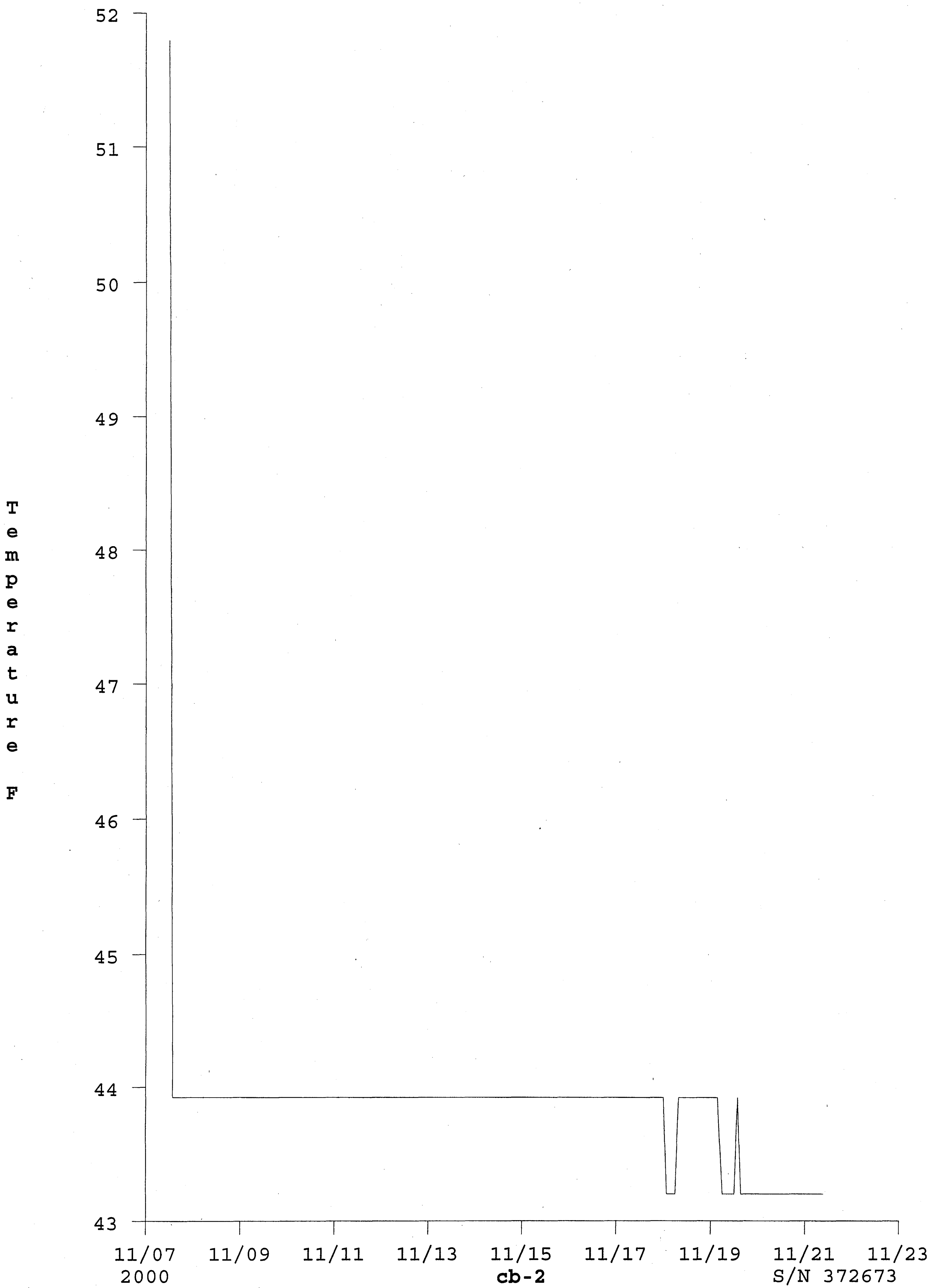
cb-1
S/N 372688

Time	Temperature (*F)
11/7/00 12:03:34.0 PM	51.79
11/7/00 02:03:34.0 PM	43.92
11/7/00 04:03:34.0 PM	43.92
11/7/00 06:03:34.0 PM	43.92
11/7/00 08:03:34.0 PM	43.92
11/7/00 10:03:34.0 PM	43.92
11/8/00 12:03:34.0 AM	43.92
11/8/00 02:03:34.0 AM	43.92
11/8/00 04:03:34.0 AM	43.92
11/8/00 06:03:34.0 AM	43.92
11/8/00 08:03:34.0 AM	43.92
11/8/00 10:03:34.0 AM	43.92
11/8/00 12:03:34.0 PM	43.92
11/8/00 02:03:34.0 PM	43.92
11/8/00 04:03:34.0 PM	43.92
11/8/00 06:03:34.0 PM	43.92
11/8/00 08:03:34.0 PM	43.92
11/8/00 10:03:34.0 PM	43.92
11/9/00 12:03:34.0 AM	43.92
11/9/00 02:03:34.0 AM	43.92
11/9/00 04:03:34.0 AM	43.92
11/9/00 06:03:34.0 AM	43.92
11/9/00 08:03:34.0 AM	43.92
11/9/00 10:03:34.0 AM	43.92
11/9/00 12:03:34.0 PM	43.92
11/9/00 02:03:34.0 PM	43.92
11/9/00 04:03:34.0 PM	43.92
11/9/00 06:03:34.0 PM	43.92
11/9/00 08:03:34.0 PM	43.92
11/9/00 10:03:34.0 PM	43.92
11/10/00 12:03:34.0 AM	43.92
11/10/00 02:03:34.0 AM	43.92
11/10/00 04:03:34.0 AM	43.92
11/10/00 06:03:34.0 AM	43.92
11/10/00 08:03:34.0 AM	43.92
11/10/00 10:03:34.0 AM	43.92
11/10/00 12:03:34.0 PM	43.92
11/10/00 02:03:34.0 PM	43.92
11/10/00 04:03:34.0 PM	43.92
11/10/00 06:03:34.0 PM	43.92
11/10/00 08:03:34.0 PM	43.92
11/10/00 10:03:34.0 PM	43.92
11/11/00 12:03:34.0 AM	43.92
11/11/00 02:03:34.0 AM	43.92
11/11/00 04:03:34.0 AM	43.92
11/11/00 06:03:34.0 AM	43.92
11/11/00 08:03:34.0 AM	43.92
11/11/00 10:03:34.0 AM	43.92
11/11/00 12:03:34.0 PM	43.92
11/11/00 02:03:34.0 PM	43.92
11/11/00 04:03:34.0 PM	43.92
11/11/00 06:03:34.0 PM	43.92
11/11/00 08:03:34.0 PM	43.92
11/11/00 10:03:34.0 PM	43.92
11/12/00 12:03:34.0 AM	43.92
11/12/00 02:03:34.0 AM	43.92
11/12/00 04:03:34.0 AM	43.92
11/12/00 06:03:34.0 AM	43.92
11/12/00 08:03:34.0 AM	43.92
11/12/00 10:03:34.0 AM	43.92
11/12/00 12:03:34.0 PM	43.92
11/12/00 02:03:34.0 PM	43.92
11/12/00 04:03:34.0 PM	43.92
11/12/00 06:03:34.0 PM	43.92
11/12/00 08:03:34.0 PM	43.92
11/12/00 10:03:34.0 PM	43.92
11/13/00 12:03:34.0 AM	43.92
11/13/00 02:03:34.0 AM	43.92

Time	Temperature (*F)
11/13/00 04:03:34.0 AM	43.92
11/13/00 06:03:34.0 AM	43.92
11/13/00 08:03:34.0 AM	43.92
11/13/00 10:03:34.0 AM	43.92
11/13/00 12:03:34.0 PM	43.92
11/13/00 02:03:34.0 PM	43.92
11/13/00 04:03:34.0 PM	43.92
11/13/00 06:03:34.0 PM	43.92
11/13/00 08:03:34.0 PM	43.92
11/13/00 10:03:34.0 PM	43.92
11/14/00 12:03:34.0 AM	43.92
11/14/00 02:03:34.0 AM	43.92
11/14/00 04:03:34.0 AM	43.92
11/14/00 06:03:34.0 AM	43.92
11/14/00 08:03:34.0 AM	43.92
11/14/00 10:03:34.0 AM	43.92
11/14/00 12:03:34.0 PM	43.92
11/14/00 02:03:34.0 PM	43.92
11/14/00 04:03:34.0 PM	43.92
11/14/00 06:03:34.0 PM	43.92
11/14/00 08:03:34.0 PM	43.92
11/14/00 10:03:34.0 PM	43.92
11/15/00 12:03:34.0 AM	43.92
11/15/00 02:03:34.0 AM	43.92
11/15/00 04:03:34.0 AM	43.92
11/15/00 06:03:34.0 AM	43.92
11/15/00 08:03:34.0 AM	43.92
11/15/00 10:03:34.0 AM	43.92
11/15/00 12:03:34.0 PM	43.92
11/15/00 02:03:34.0 PM	43.92
11/15/00 04:03:34.0 PM	43.92
11/15/00 06:03:34.0 PM	43.92
11/15/00 08:03:34.0 PM	43.92
11/15/00 10:03:34.0 PM	43.92
11/16/00 12:03:34.0 AM	43.92
11/16/00 02:03:34.0 AM	43.92
11/16/00 04:03:34.0 AM	43.92
11/16/00 06:03:34.0 AM	43.92
11/16/00 08:03:34.0 AM	43.92
11/16/00 10:03:34.0 AM	43.92
11/16/00 12:03:34.0 PM	43.92
11/16/00 02:03:34.0 PM	43.92
11/16/00 04:03:34.0 PM	43.92
11/16/00 06:03:34.0 PM	43.92
11/16/00 08:03:34.0 PM	43.92
11/16/00 10:03:34.0 PM	43.92
11/17/00 12:03:34.0 AM	43.92
11/17/00 02:03:34.0 AM	43.92
11/17/00 04:03:34.0 AM	43.92
11/17/00 06:03:34.0 AM	43.92
11/17/00 08:03:34.0 AM	43.92
11/17/00 10:03:34.0 AM	43.92
11/17/00 12:03:34.0 PM	43.92
11/17/00 02:03:34.0 PM	43.92
11/17/00 04:03:34.0 PM	43.92
11/17/00 06:03:34.0 PM	43.92
11/17/00 08:03:34.0 PM	43.92
11/17/00 10:03:34.0 PM	43.92
11/18/00 12:03:34.0 AM	43.92
11/18/00 02:03:34.0 AM	43.19
11/18/00 04:03:34.0 AM	43.19
11/18/00 06:03:34.0 AM	43.19
11/18/00 08:03:34.0 AM	43.92
11/18/00 10:03:34.0 AM	43.92
11/18/00 12:03:34.0 PM	43.92
11/18/00 02:03:34.0 PM	43.92
11/18/00 04:03:34.0 PM	43.92
11/18/00 06:03:34.0 PM	43.92

Time	Temperature (*F)
11/18/00 08:03:34.0 PM	43.92
11/18/00 10:03:34.0 PM	43.92
11/19/00 12:03:34.0 AM	43.92
11/19/00 02:03:34.0 AM	43.92
11/19/00 04:03:34.0 AM	43.92
11/19/00 06:03:34.0 AM	43.19
11/19/00 08:03:34.0 AM	43.19
11/19/00 10:03:34.0 AM	43.19
11/19/00 12:03:34.0 PM	43.19
11/19/00 02:03:34.0 PM	43.92
11/19/00 04:03:34.0 PM	43.19
11/19/00 06:03:34.0 PM	43.19
11/19/00 08:03:34.0 PM	43.19
11/19/00 10:03:34.0 PM	43.19
11/20/00 12:03:34.0 AM	43.19
11/20/00 02:03:34.0 AM	43.19
11/20/00 04:03:34.0 AM	43.19
11/20/00 06:03:34.0 AM	43.19
11/20/00 08:03:34.0 AM	43.19
11/20/00 10:03:34.0 AM	43.19
11/20/00 12:03:34.0 PM	43.19
11/20/00 02:03:34.0 PM	43.19
11/20/00 04:03:34.0 PM	43.19
11/20/00 06:03:34.0 PM	43.19
11/20/00 08:03:34.0 PM	43.19
11/20/00 10:03:34.0 PM	43.19
11/21/00 12:03:34.0 AM	43.19
11/21/00 02:03:34.0 AM	43.19
11/21/00 04:03:34.0 AM	43.19
11/21/00 06:03:34.0 AM	43.19
11/21/00 08:03:34.0 AM	43.19
11/21/00 10:03:34.0 AM	43.19


52
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Temperature F
11/07
2000
11/09
11/11
11/13
11/15
11/17
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11/23
cb-2
S/N 372673

Time	Temperature (*F)
11/7/00 11:01:15.0 AM	53.19
11/7/00 01:01:15.0 PM	46.82
11/7/00 03:01:15.0 PM	46.82
11/7/00 05:01:15.0 PM	45.38
11/7/00 07:01:15.0 PM	43.92
11/7/00 09:01:15.0 PM	43.19
11/7/00 11:01:15.0 PM	43.19
11/8/00 01:01:15.0 AM	42.46
11/8/00 03:01:15.0 AM	42.46
11/8/00 05:01:15.0 AM	41.72
11/8/00 07:01:15.0 AM	41.72
11/8/00 09:01:15.0 AM	42.46
11/8/00 11:01:15.0 AM	44.65
11/8/00 01:01:15.0 PM	46.82
11/8/00 03:01:15.0 PM	47.53
11/8/00 05:01:15.0 PM	46.1
11/8/00 07:01:15.0 PM	45.38
11/8/00 09:01:15.0 PM	44.65
11/8/00 11:01:15.0 PM	44.65
11/9/00 01:01:15.0 AM	43.92
11/9/00 03:01:15.0 AM	43.19
11/9/00 05:01:15.0 AM	43.92
11/9/00 07:01:15.0 AM	43.19
11/9/00 09:01:15.0 AM	44.65
11/9/00 11:01:15.0 AM	46.1
11/9/00 01:01:15.0 PM	46.82
11/9/00 03:01:15.0 PM	46.82
11/9/00 05:01:15.0 PM	46.82
11/9/00 07:01:15.0 PM	46.1
11/9/00 09:01:15.0 PM	46.1
11/9/00 11:01:15.0 PM	46.1
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11/10/00 03:01:15.0 AM	46.1
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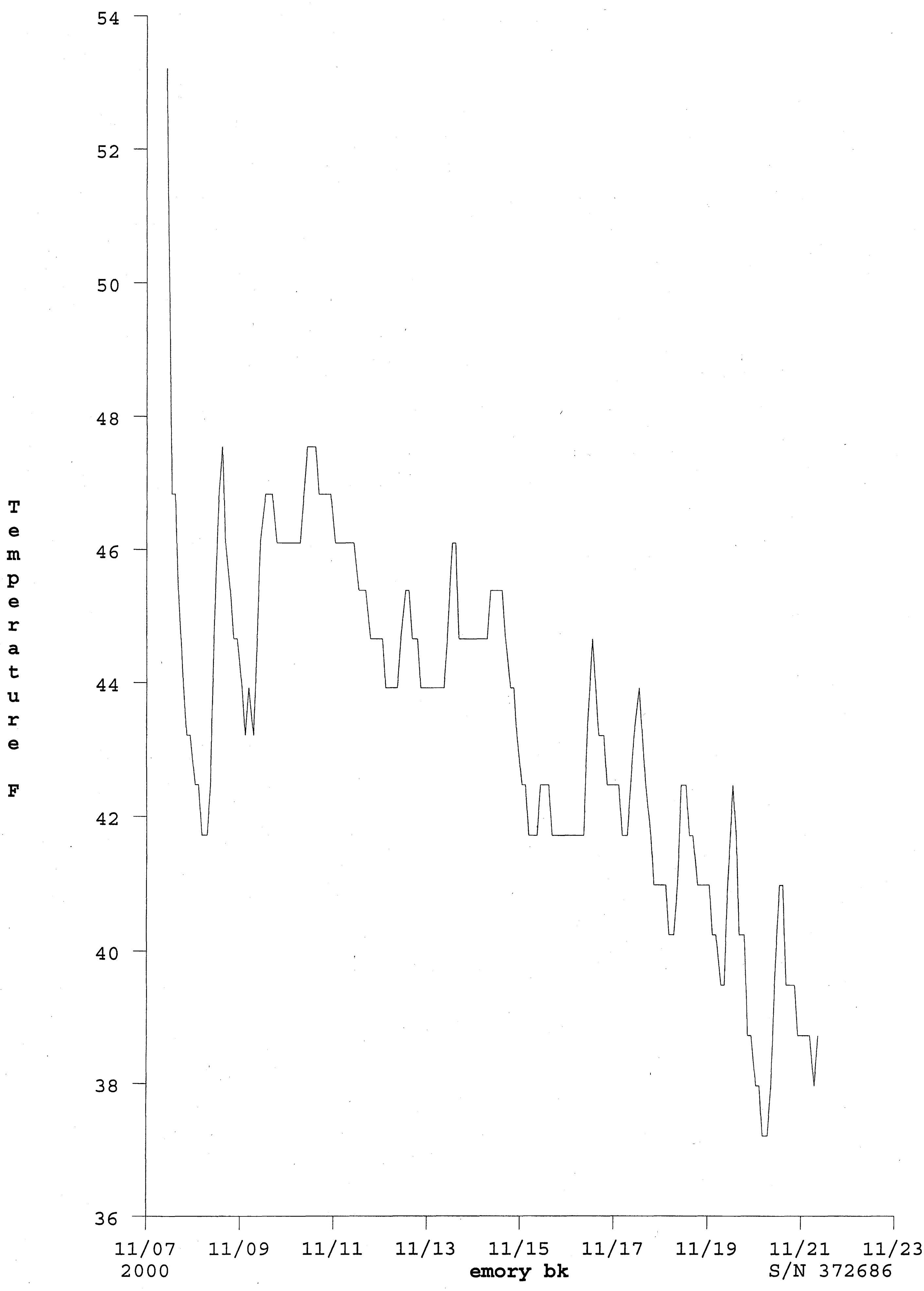
11/10/00 07:01:15.0 AM	46.1
11/10/00 09:01:15.0 AM	46.82
11/10/00 11:01:15.0 AM	47.53
11/10/00 01:01:15.0 PM	47.53
11/10/00 03:01:15.0 PM	47.53
11/10/00 05:01:15.0 PM	46.82
11/10/00 07:01:15.0 PM	46.82
11/10/00 09:01:15.0 PM	46.82
11/10/00 11:01:15.0 PM	46.82
11/11/00 01:01:15.0 AM	46.1
11/11/00 03:01:15.0 AM	46.1
11/11/00 05:01:15.0 AM	46.1
11/11/00 07:01:15.0 AM	46.1
11/11/00 09:01:15.0 AM	46.1
11/11/00 11:01:15.0 AM	46.1
11/11/00 01:01:15.0 PM	45.38
11/11/00 03:01:15.0 PM	45.38
11/11/00 05:01:15.0 PM	45.38
11/11/00 07:01:15.0 PM	44.65
11/11/00 09:01:15.0 PM	44.65
11/11/00 11:01:15.0 PM	44.65
11/12/00 01:01:15.0 AM	44.65
11/12/00 03:01:15.0 AM	43.92
11/12/00 05:01:15.0 AM	43.92
11/12/00 07:01:15.0 AM	43.92
11/12/00 09:01:15.0 AM	43.92
11/12/00 11:01:15.0 AM	44.65
11/12/00 01:01:15.0 PM	45.38
11/12/00 03:01:15.0 PM	45.38
11/12/00 05:01:15.0 PM	44.65
11/12/00 07:01:15.0 PM	44.65
11/12/00 09:01:15.0 PM	43.92
11/12/00 11:01:15.0 PM	43.92
11/13/00 01:01:15.0 AM	43.92

Time	Temperature (*F)
11/13/00 03:01:15.0 AM	43.92
11/13/00 05:01:15.0 AM	43.92
11/13/00 07:01:15.0 AM	43.92
11/13/00 09:01:15.0 AM	43.92
11/13/00 11:01:15.0 AM	44.65
11/13/00 01:01:15.0 PM	46.1
11/13/00 03:01:15.0 PM	46.1
11/13/00 05:01:15.0 PM	44.65
11/13/00 07:01:15.0 PM	44.65
11/13/00 09:01:15.0 PM	44.65
11/13/00 11:01:15.0 PM	44.65
11/14/00 01:01:15.0 AM	44.65
11/14/00 03:01:15.0 AM	44.65
11/14/00 05:01:15.0 AM	44.65
11/14/00 07:01:15.0 AM	44.65
11/14/00 09:01:15.0 AM	45.38
11/14/00 11:01:15.0 AM	45.38
11/14/00 01:01:15.0 PM	45.38
11/14/00 03:01:15.0 PM	45.38
11/14/00 05:01:15.0 PM	44.65
11/14/00 07:01:15.0 PM	43.92
11/14/00 09:01:15.0 PM	43.92
11/14/00 11:01:15.0 PM	43.19
11/15/00 01:01:15.0 AM	42.46
11/15/00 03:01:15.0 AM	42.46
11/15/00 05:01:15.0 AM	41.72
11/15/00 07:01:15.0 AM	41.72
11/15/00 09:01:15.0 AM	41.72
11/15/00 11:01:15.0 AM	42.46
11/15/00 01:01:15.0 PM	42.46
11/15/00 03:01:15.0 PM	42.46
11/15/00 05:01:15.0 PM	41.72
11/15/00 07:01:15.0 PM	41.72
11/15/00 09:01:15.0 PM	41.72
11/15/00 11:01:15.0 PM	41.72
11/16/00 01:01:15.0 AM	41.72
11/16/00 03:01:15.0 AM	41.72
11/16/00 05:01:15.0 AM	41.72
11/16/00 07:01:15.0 AM	41.72
11/16/00 09:01:15.0 AM	41.72
11/16/00 11:01:15.0 AM	43.19
11/16/00 01:01:15.0 PM	44.65
11/16/00 03:01:15.0 PM	43.92
11/16/00 05:01:15.0 PM	43.19
11/16/00 07:01:15.0 PM	43.19
11/16/00 09:01:15.0 PM	42.46
11/16/00 11:01:15.0 PM	42.46
11/17/00 01:01:15.0 AM	42.46
11/17/00 03:01:15.0 AM	42.46
11/17/00 05:01:15.0 AM	41.72
11/17/00 07:01:15.0 AM	41.72
11/17/00 09:01:15.0 AM	42.46
11/17/00 11:01:15.0 AM	43.19
11/17/00 01:01:15.0 PM	43.92
11/17/00 03:01:15.0 PM	43.19
11/17/00 05:01:15.0 PM	42.46
11/17/00 07:01:15.0 PM	41.72
11/17/00 09:01:15.0 PM	40.97
11/17/00 11:01:15.0 PM	40.97
11/18/00 01:01:15.0 AM	40.97
11/18/00 03:01:15.0 AM	40.97
11/18/00 05:01:15.0 AM	40.23
11/18/00 07:01:15.0 AM	40.23
11/18/00 09:01:15.0 AM	40.97
11/18/00 11:01:15.0 AM	42.46
11/18/00 01:01:15.0 PM	42.46
11/18/00 03:01:15.0 PM	41.72
11/18/00 05:01:15.0 PM	41.72

Time	Temperature (*F)
11/18/00 07:01:15.0 PM	40.97
11/18/00 09:01:15.0 PM	40.97
11/18/00 11:01:15.0 PM	40.97
11/19/00 01:01:15.0 AM	40.97
11/19/00 03:01:15.0 AM	40.23
11/19/00 05:01:15.0 AM	40.23
11/19/00 07:01:15.0 AM	39.48
11/19/00 09:01:15.0 AM	39.48
11/19/00 11:01:15.0 AM	40.97
11/19/00 01:01:15.0 PM	42.46
11/19/00 03:01:15.0 PM	41.72
11/19/00 05:01:15.0 PM	40.23
11/19/00 07:01:15.0 PM	40.23
11/19/00 09:01:15.0 PM	38.72
11/19/00 11:01:15.0 PM	38.72
11/20/00 01:01:15.0 AM	37.97
11/20/00 03:01:15.0 AM	37.97
11/20/00 05:01:15.0 AM	37.2
11/20/00 07:01:15.0 AM	37.2
11/20/00 09:01:15.0 AM	37.97
11/20/00 11:01:15.0 AM	39.48
11/20/00 01:01:15.0 PM	40.97
11/20/00 03:01:15.0 PM	40.97
11/20/00 05:01:15.0 PM	39.48
11/20/00 07:01:15.0 PM	39.48
11/20/00 09:01:15.0 PM	39.48
11/20/00 11:01:15.0 PM	38.72
11/21/00 01:01:15.0 AM	38.72
11/21/00 03:01:15.0 AM	38.72
11/21/00 05:01:15.0 AM	38.72
11/21/00 07:01:15.0 AM	37.97
11/21/00 09:01:15.0 AM	38.72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Temperature F
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emory bk
S/N 372686

APPENDIX C

FIELD WATER QUALITY DATA

FIELD WATER QUALITY DATA

ALPHA GEOSCIENCE
1071 Troy-Schenectady Road
Latham, New York 12110

Project Name: Fleischmanns Water Source
Project No. 00151 - Task 1
Date: November, 2000
Field Personnel: KJPhelan
Measuring Devices: Thermometer, HYDAC S.C., Hanna D.O., Digi-sense pH/ORP, LaMotte Turbidity

Location	Date	Time	Temp	Spec. Cond.	pH	ORP (mV)	Turbidity (NTUs)	Dissolved Oxygen (ppm)
Catch Basin #1	11/01/2000	13:20	45	71	6.49	38	0.83	9.3
Catch Basin #1	11/07/2000	9:45	46	65.5	6.75	20	0.51	9.2
Catch Basin #1	11/14/2000	15:10	45	67.3	6.26	51	0.77	9.0
Catch Basin #1	11/15/2000	9:30	44	68.5	6.78	20	4.30	9.0
Catch Basin #1	11/21/2000	10:35	44	78.9	6.40	42	0.50	8.7
Catch Basin #2	11/01/2000	13:50	45	87	6.65	29	0.67	9.6
Catch Basin #2	11/07/2000	11:35	45	81.7	6.83	17	0.48	9.7
Catch Basin #2	11/14/2000	16:10	45	64.4	6.40	42	0.63	10.5
Catch Basin #2	11/15/2000	10:00	44	89.0	6.62	29	0.49	10.1
Catch Basin #2	11/21/2000	10:50	44.5	104.1	6.49	36	0.39	9.5
Creek West of Reservoir	11/01/2000	15:15	45	67.8	6.78	20	5.30	9.6
Creek West of Reservoir	11/07/2000	14:05	45	70.3	7.13	0	0.28	9.2
Creek West of Reservoir	11/14/2000	16:45	45	954	6.50		1.52	10.7
Creek West of Reservoir	11/15/2000	9:15	44	72.0	7.06	4	0.50	9.2
Creek West of Reservoir	11/21/2000	12:30	42	84.2	6.88	14	0.39	10.0
Well # 3	11/01/2000	15:20	46	181	6.81	19	1.20	7.9
Well # 3	11/07/2000	14:20	47	204	7.16	-14	1.60	8.1
Well #1 (start step test)	11/01/2000	9:56	50	950.0	6.89	12	2.07	6.0
Well #1 (end step test)	11/01/2000	15:38	49	966.0	6.90	14	15.70	9.9
Well # 2 (start step test)	11/07/2000	9:00	48	145.5	6.78	20	0.92	5.1
Well # 2 (mid-step test)	11/07/2000	13:00	47	138.7	7.11	3	0.80	7.5
Well # 2 (end step test)	11/07/2000	15:50	49	139.6	6.95	11	2.91	11.6
Well # 2 (constant test + 0:40)	11/14/2000	14:00	47	147.7	6.58	32	0.96	5.5
Well # 2 (constant test + 7:45)	11/14/2000	20:05	46	142.2	6.80		0.63	6.8
Well # 2 (constant test + 15:55)	11/15/2000	5:15	46	118.5	6.79	20	0.75	5.9
Well # 2 (constant test + 18:50)	11/15/2000	8:30	47	170.4	6.77	20	0.73	5.7
Well # 2 (constant test + 23:49)	11/15/2000	12:11	47	136.5	7.12	5	0.63	6.1
Emory Brook	11/07/2000	15:35	46	79.8	7.13	2		8.7
Emory Brook	11/15/2000	8:45	41	80.3	7.11	1	0.74	10.6
Emory Brook	11/21/2000	9:40	39.5	82.7	6.77	21	0.55	11.0

REMARKS:

APPENDIX D

LABORATORY ANALYTICAL REPORTS

PHOENIX
Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O. Box 418, Manchester, CT 06040-0418
Tel. (860) 645-1102 Fax (860) 645-0823

November 27, 2000

Alpha GeoScience
1071 Troy-Schenectady
Latham NY 12110

Attention: Mr. Sam Gowan

Sample ID#: AD00584-87

This laboratory is in compliance with the QA/QC procedure outlined in EPA 600/4-79-019, Handbook for Analytical Quality in Water and Waste Water, March 1979, and SW846 QA/QC requirements of procedures used.

This report, starting with the cover sheet ending with the chain of custody, consists of 10 pages.

If you have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext. 200.

Sincerely yours,

Phyllis Shiller

Phyllis Shiller
Laboratory Director

CT Lab Registration #PH-0618
MA Lab Registration #MA-CT-007
NY Lab Registration #11301
RI Lab Registration #63
NH Lab Registration #213693-A,B
ME Lab Registration #CT-007

PHOENIX
Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O. Box 418, Manchester, CT 06040
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

November 27, 2000

FOR: Attn: Mr. Sam Gowan
Alpha GeoScience
1071 Troy-Schenectady
Latham, NY 12110

RECEIVED NOV 30 2000

Sample Information		Custody Information		Date	Time
Matrix:	WATER	Collected by:	KEVIN P	11/15/00	9:28
Location Code:	ALPHAGEO	Received by:	SW	11/16/00	9:30
Project Code:		Analyzed by:	see below		
P.O.#:	00151T1				

Laboratory Data

Client ID: FLEISCHMANS CATCH BASIN #1 Phoenix I.D. AD00584

Parameter	Result	RL	Units	Date	Time	by	Reference
E. Coli	Negative	0	/100mls	11/16/00	14:35	CP	SM9223B
Total Coliforms	Positive		/100mls	11/16/00	14:35	CP	9223B
B.O.D./5 day	BDL	2.0	mg/L	11/17/00	15:22	CP	SM5210B
Chloride	8.0	3.0	mg/L	11/16/00	21:59	J/E	9056
Nitrite as Nitrogen	BDL	0.01	mg/L	11/16/00	21:59	J/E	9056
Nitrate as Nitrogen	0.33	0.10	mg/L	11/16/00	21:59	J/E	9056
Iron	0.046	0.002	mg/L	11/21/00	11:58	EK	6010/E200.7
Sodium	4.20	0.10	mg/L	11/21/00	11:58	EK	6010/E200.7
Phosphorus,Total	0.047	0.015	mg/L	11/21/00	11:58	EK	6010/E200.7
Pesticide Extraction	Completed			11/16/00	21:45	PL	SW846-3510
Total Metals Digest	Completed			11/16/00	20:30	TR	SW846 - 3005
Tot. Diss. Solids	35	7.0	mg/L	11/20/00	11:00	GD	SM2540C
Total Suspended Solids	BDL	5.0	mg/L	11/20/00	14:30	GD	SM2540D
Pesticide							
4,4' -DDD	ND	0.1	ug/L	11/20/00	9:34	KCA	SW8081
4,4' -DDE	ND	0.1	ug/L	11/20/00	9:34	KCA	SW8081
4,4' -DDT	ND	0.1	ug/L	11/20/00	9:34	KCA	SW8081
a-BHC	ND	0.05	ug/L	11/20/00	9:34	KCA	SW8081
Aldrin	ND	0.05	ug/L	11/20/00	9:34	KCA	SW8081
b-BHC	ND	0.05	ug/L	11/20/00	9:34	KCA	SW8081
Chlordane	ND	0.5	ug/L	11/20/00	9:34	KCA	SW8081

Client ID: FLEISCHMANS CATCH BASIN #1 Phoenix I.D. AD00584

Parameter	Result	RL	Units	Date	Time	by	Reference
d-BHC	ND	0.05	ug/L	11/20/00	9:34	KCA	SW8081
Dieldrin	ND	0.1	ug/L	11/20/00	9:34	KCA	SW8081
Endosulfan I	ND	0.05	ug/L	11/20/00	9:34	KCA	SW8081
Endosulfan II	ND	0.1	ug/L	11/20/00	9:34	KCA	SW8081
Endosulfan Sulfate	ND	0.1	ug/L	11/20/00	9:34	KCA	SW8081
Endrin	ND	0.1	ug/L	11/20/00	9:34	KCA	SW8081
Endrin Aldehyde	ND	0.1	ug/L	11/20/00	9:34	KCA	SW8081
g-BHC (Lindane)	ND	0.05	ug/L	11/20/00	9:34	KCA	SW8081
Heptachlor	ND	0.05	ug/L	11/20/00	9:34	KCA	SW8081
Heptachlor epoxide	ND	0.05	ug/L	11/20/00	9:34	KCA	SW8081
Methoxychlor	ND	0.2	ug/L	11/20/00	9:34	KCA	SW8081
Toxaphene	ND	1.0	ug/L	11/20/00	9:34	KCA	SW8081

Comments: ND=Not detected BDL = Below Detection Limit RL=Reporting Limit

If there are any questions regarding this data, please call Phoenix Client Services at extension 200.

Phyllis Shiller, Laboratory Director
November 27, 2000

PHOENIX
Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O. Box 418, Manchester, CT 06040
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

November 27, 2000

FOR: Attn: Mr. Sam Gowan
Alpha GeoScience
1071 Troy-Schenectady
Latham, NY 12110

Sample Information		Custody Information		Date	Time
Matrix:	WATER	Collected by:	KEVIN P	11/15/00	9:58
Location Code:	ALPHAGEO	Received by:	SW	11/16/00	9:30
Project Code:		Analyzed by:	see below		
P.O.#:	00151T1				

Laboratory Data

Client ID: FLEISCHMANS CATCH BASIN #2 Phoenix I.D. AD00585

Parameter	Result	RL	Units	Date	Time	by	Reference
B.O.D./5 day	BDL	2.0	mg/L	11/17/00	15:22	CP	SM5210B
Chloride	11	3.0	mg/L	11/16/00	22:07	J/E	9056
Nitrite as Nitrogen	BDL	0.01	mg/L	11/16/00	22:07	J/E	9056
Nitrate as Nitrogen	0.45	0.10	mg/L	11/16/00	22:07	J/E	9056
Iron	0.008	0.002	mg/L	11/21/00	11:58	EK	6010/E200.7
Sodium	6.0	0.10	mg/L	11/21/00	11:58	EK	6010/E200.7
Phosphorus,Total	0.058	0.015	mg/L	11/21/00	11:58	EK	6010/E200.7
Pesticide Extraction	Completed			11/16/00	21:45	PL	SW846-3510
Total Metals Digest	Completed			11/16/00	20:30	TR	SW846 - 3005
Tot. Diss. Solids	41	5.0	mg/L	11/20/00	11:00	GD	SM2540C
Total Suspended Solids	BDL	5.0	mg/L	11/20/00	14:30	GD	SM2540D
Pesticide							
4,4' -DDD	ND	0.1	ug/L	11/20/00	9:34	KCA	SW8081
4,4' -DDE	ND	0.1	ug/L	11/20/00	9:34	KCA	SW8081
4,4' -DDT	ND	0.1	ug/L	11/20/00	9:34	KCA	SW8081
a-BHC	ND	0.05	ug/L	11/20/00	9:34	KCA	SW8081
Aldrin	ND	0.05	ug/L	11/20/00	9:34	KCA	SW8081
b-BHC	ND	0.05	ug/L	11/20/00	9:34	KCA	SW8081
Chlordane	ND	0.5	ug/L	11/20/00	9:34	KCA	SW8081
d-BHC	ND	0.05	ug/L	11/20/00	9:34	KCA	SW8081
Dieldrin	ND	0.1	ug/L	11/20/00	9:34	KCA	SW8081

Client ID: FLEISCHMANS CATCH BASIN #2 Phoenix I.D. AD00585

Parameter	Result	RL	Units	Date	Time	by	Reference
Endosulfan I	ND	0.05	ug/L	11/20/00	9:34	KCA	SW8081
Endosulfan II	ND	0.1	ug/L	11/20/00	9:34	KCA	SW8081
Endosulfan Sulfate	ND	0.1	ug/L	11/20/00	9:34	KCA	SW8081
Endrin	ND	0.1	ug/L	11/20/00	9:34	KCA	SW8081
Endrin Aldehyde	ND	0.1	ug/L	11/20/00	9:34	KCA	SW8081
g-BHC (Lindane)	ND	0.05	ug/L	11/20/00	9:34	KCA	SW8081
Heptachlor	ND	0.05	ug/L	11/20/00	9:34	KCA	SW8081
Heptachlor epoxide	ND	0.05	ug/L	11/20/00	9:34	KCA	SW8081
Methoxychlor	ND	0.2	ug/L	11/20/00	9:34	KCA	SW8081
Toxaphene	ND	1.0	ug/L	11/20/00	9:34	KCA	SW8081

Comments: ND=Not detected BDL = Below Detection Limit RL=Reporting Limit

If there are any questions regarding this data, please call Phoenix Client Services at extension 200.

Phyllis Shiller

Phyllis Shiller, Laboratory Director
November 27, 2000

PHOENIX
Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O. Box 418, Manchester, CT 06040
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

November 27, 2000

FOR: Attn: Mr. Sam Gowan
Alpha GeoScience
1071 Troy-Schenectady
Latham, NY 12110

Sample Information		Custody Information		Date	Time
Matrix:	WATER	Collected by:	KEVIN P	11/15/00	12:05
Location Code:	ALPHAGEO	Received by:	SW	11/16/00	9:30
Project Code:		Analyzed by:	see below		
P.O.#:	00151T1				

Laboratory Data

Client ID: FLEISCHMANS WELL #2 Phoenix I.D. AD00586

Parameter	Result	RL	Units	Date	Time	by	Reference
E. Coli	Negative	0	/100mls	11/16/00	14:35	CP	SM9223B
Total Coliforms	Positive		/100mls	11/16/00	14:35	CP	9223B
B.O.D./5 day	BDL	2.0	mg/L	11/17/00	15:22	CP	SM5210B
Chloride	15	3.0	mg/L	11/16/00	22:15	J/E	9056
Nitrite as Nitrogen	BDL	0.01	mg/L	11/16/00	22:15	J/E	9056
Nitrate as Nitrogen	0.36	0.10	mg/L	11/16/00	22:15	J/E	9056
Iron	0.014	0.002	mg/L	11/21/00	11:58	EK	6010/E200.7
Sodium	10.2	0.10	mg/L	11/21/00	11:58	EK	6010/E200.7
Phosphorus,Total	0.047	0.015	mg/L	11/21/00	11:58	EK	6010/E200.7
Pesticide Extraction	Completed			11/16/00	21:45	PL	SW846-3510
Total Metals Digest	Completed			11/16/00	20:30	TR	SW846 - 3005
Tot. Diss. Solids	69	5.0	mg/L	11/20/00	11:00	GD	SM2540C
Total Suspended Solids	BDL	5.0	mg/L	11/20/00	14:30	GD	SM2540D
Pesticide							
4,4' -DDD	ND	0.1	ug/L	11/20/00	9:34	KCA	SW8081
4,4' -DDE	ND	0.1	ug/L	11/20/00	9:34	KCA	SW8081
4,4' -DDT	ND	0.1	ug/L	11/20/00	9:34	KCA	SW8081
a-BHC	ND	0.05	ug/L	11/20/00	9:34	KCA	SW8081
Aldrin	ND	0.05	ug/L	11/20/00	9:34	KCA	SW8081
b-BHC	ND	0.05	ug/L	11/20/00	9:34	KCA	SW8081
Chlordane	ND	0.5	ug/L	11/20/00	9:34	KCA	SW8081

Client ID: FLEISCHMANS WELL #2 Phoenix I.D. AD00586

Parameter	Result	RL	Units	Date	Time	by	Reference
d-BHC	ND	0.05	ug/L	11/20/00	9:34	KCA	SW8081
Dieldrin	ND	0.1	ug/L	11/20/00	9:34	KCA	SW8081
Endosulfan I	ND	0.05	ug/L	11/20/00	9:34	KCA	SW8081
Endosulfan II	ND	0.1	ug/L	11/20/00	9:34	KCA	SW8081
Endosulfan Sulfate	ND	0.1	ug/L	11/20/00	9:34	KCA	SW8081
Endrin	ND	0.1	ug/L	11/20/00	9:34	KCA	SW8081
Endrin Aldehyde	ND	0.1	ug/L	11/20/00	9:34	KCA	SW8081
g-BHC (Lindane)	ND	0.05	ug/L	11/20/00	9:34	KCA	SW8081
Heptachlor	ND	0.05	ug/L	11/20/00	9:34	KCA	SW8081
Heptachlor epoxide	ND	0.05	ug/L	11/20/00	9:34	KCA	SW8081
Methoxychlor	ND	0.2	ug/L	11/20/00	9:34	KCA	SW8081
Toxaphene	ND	1.0	ug/L	11/20/00	9:34	KCA	SW8081

Comments: ND=Not detected BDL = Below Detection Limit RL=Reporting Limit

If there are any questions regarding this data, please call Phoenix Client Services at extension 200.

Phyllis Shiller

Phyllis Shiller, Laboratory Director
November 27, 2000

PHOENIX
Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O. Box 418, Manchester, CT 06040
Tel. (860) 645-1102 Fax (860) 645-0823

QC Report

AD00587 November 27, 2000

Sample ID *AD00587*

Analysis: **B.O.D./5 Day-Analysis QC** *AD00587*

QC BLANK: <2.0
QC CHECK SAMPLE % RECOVERY: 80.8
QC SAMPLE SPIKE % RECOVERY: N/C
QC SAMPLE REPLICATE % CHANGE: N/C

UNITS: Mg/L
QC SOURCE: GGA STD
SPIKED SAMPLE:AD00714
REPLICATE SAMPLE:AD00714

Analysis: **ICP Metals Analysis QC** *AD00587*

QC Source: ERA99101 MIN QCI 702 ICP 1000 Analyte	Blank	QC Check Sample (% Rec.)	QC Spike Sample (% Rec.)	QC Sample Replicate (% change)
Ag Silver	<0.01	104	79	0.0
Al Aluminum	<0.05	104	-	NC
As Arsenic	<0.05	99	101	NC
B Boron	<0.10	93	-	NC
Ba Barium	<0.01	98	91	0.0
Be Beryllium	<0.01	96	94	NC
Ca Calcium	<0.30	94	85	0.5
Cd Cadmium	<0.01	99	89	NC
Co Cobalt	<0.01	97	100	0.0
Cr Chromium	<0.01	99	98	NC
Cu Copper	<0.01	98	87	NC
Fe Iron	<0.05	97	86	3.3
K Potassium	<0.30	97	100	NC
Mg Magnesium	<0.02	95	82	0.2
Mn Manganese	<0.01	101	82	0.0
Mo Molybdenum	<0.05	91	95	0.0
Na Sodium	<0.50	97	87	0.3
Ni Nickel	<0.01	99	101	NC
P Phosphorus	<0.20	87	96	NC
Pb Lead	<0.05	100	88	NC
Se Selenium	<0.05	90	95	NC
Si Silicon	<0.20	87	-	2.2
Sn Tin	<0.25	94	94	NC
Sr Strontium	<0.01	97	99	0.0
Ti Titanium	<0.01	99	79	2.3
V Vanadium	<0.01	96	102	0.0
Zn Zinc	<0.01	99	96	NC
Zr Zirconium	<0.20	117	-	NC

Analysis: **Pesticides (GC) Analysis QC** *AD00587*

Analyte	Method Blank (ppb)	Matrix Spike (% Rec)	Matrix Spike Dup. (% Rec.)	RPD
g-BHC	ND	73%	82%	12%
Heptachlor	ND	70%	81%	15%
Aldrin	ND	69%	81%	16%
Dieldrin	ND	80%	90%	12%
Endrin	ND	92%	99%	7%
4,4'-DDT	ND	94%	94%	11%

Analysis: **Total Dissolved Solids QC** *AD00587*

QC BLANK:<5.0
QC CHECK SAMPLE % RECOVERY:100.6
QC SAMPLE SPIKE % RECOVERY:XXX
QC SAMPLE REPLICATE % CHANGE:0.0

UNITS:MG/L
QC SOURCE:ULTRA#72376
SPIKED SAMPLE:XXX
REPLICATED SAMPLE:AD00584

Analysis: **Total Suspended Solids QC** *AD00587*

QC BLANK:<5.0
QC CHECK SAMPLE % RECOVERY:102.6
QC SAMPLE REPLICATE % CHANGE:N/C

UNITS:MG/L
QC SOURCE:ULTRA#72376
REPLICATED SAMPLE:AD00585

If there are any questions regarding this data, please call Phoenix Client Services at extension 200.

Phyllis Shiller

Phyllis Shiller
Laboratory Director

PHOENIX

Environmental Laboratories, Inc.

587 East Middle Turnpike, P.O. Box 418, Manchester, CT 06040
Tel. (203) 645-1102 Fax (203) 645-0823

CHAIN OF CUSTODY RECORD

DATE RCVD: ____________

Customer: AlphaGeoscience
Address: 1071 Troy Schenectady Rd
Latham NY 12110

Project: Fleischman's - Water Source
Report To: Sam Gowan
Invoice To: Sam Gowan

Project P.O. 00151-T1
Phone #: (518) 783-1805
Fax #: (") 783-1793

Client Sample - Information - Identification

Sampler's Signature: x [signature]
Date: 11/15/00

Analysis Requested

Item #	Customers Sample Ident	Sample Matrix	Date	Time	Total Coliform	E-Coli	Pesticides (8081)	Iron	Sodium	Phosphorus	Chlorides	Nitrite	Nitrate	BOD	TSS	~~TS~~ TDS		VOA VIALS	PL( ) GL( ) HNO_3 (250) ML	PL( ) GL( ) ~~NaOH (1000~~) ML	PL( ) GL( ) AS IS (1000) ML	GL + H_2SO_4 ( ) ML	Field Filtered + HNO_3 ( ) ML	Bacteria Bottle	PHOENIX SAMPLE #
	Catch Basin #1	H_2O	11/15/00	9:28	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			1		2			1	00584
	Catch Basin #2	H_2O	11/15/00	9:58	~~✓~~	~~✓~~	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			1		2			~~1~~	00585
	Well #2	H_2O	11/15/00	12:05	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			1		2			1	00586
																									00587

Item #	Relinquished by:	Accepted by:	Date:	Time:
	[signature]	[signature]	11/15/00	7:00p
	EAD CONN	[signature]	11/15/00	9:30

Comments:
Note: Coliform / E-Coli container for Catch B. #2 lost in transit - Not Submitted. KP

14°C

Standard lab turnaround is 10 working days. Accelerated turnarounds are always available. Check with office on prevailing surcharge. ACCELERATED TURN-AROUND TIME REQUESTED: ___1 ___2 ___3 ___4 ___5 working days.

PHOENIX
Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O. Box 418, Manchester, CT 06040-0418
Tel. (860) 645-1102 Fax (860) 645-0823

RECEIVED
NOV 13 2000

November 10, 2000

Alpha GeoScience
1071 Troy-Schenectady
Latham NY 12110

Attention: Mr. Sam Gowan

Sample ID#: AC98347-51

This laboratory is in compliance with the QA/QC procedure outlined in EPA 600/4-79-019, Handbook for Analytical Quality in Water and Waste Water, March 1979, and SW846 QA/QC requirements of procedures used.

This report, starting with the cover sheet ending with the chain of custody, consists of 12 pages.

If you have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext. 200.

Sincerely yours,

Phyllis Shiller

Phyllis Shiller
Laboratory Director

CT Lab Registration #PH-0618
MA Lab Registration #MA-CT-007
NY Lab Registration #11301
RI Lab Registration #63
NH Lab Registration #213693-A,B
ME Lab Registration #CT-007

PHOENIX
Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O. Box 418, Manchester, CT 06040
Tel. (860) 645-1102 Fax (860) 645-0823

NOV 13 2000

Analysis Report
November 10, 2000

FOR: Attn: Mr. Sam Gowan
Alpha GeoScience
1071 Troy-Schenectady
Latham, NY 12110

Sample Information		Custody Information		Date	Time
Matrix:	WATER	Collected by:		11/01/00	13:20
Location Code:	ALPHAGEO	Received by:	SW	11/02/00	8:30
Project Code:		Analyzed by:	see below		
P.O.#:	00151				

Laboratory Data

Client ID: FLEISEHMANNS CATCH BASIN #1 Phoenix I.D. AC98347

Parameter	Result	RL	Units	Date	by	Reference
E. Coli	Negative	0	/100mls	11/02/00	CP	SM9223B
Total Coliforms	Positive		/100mls	11/02/00	CP	9223B
B.O.D./5 day	BDL	2.0	mg/L	11/03/00	CP	SM5210B
Chloride	8.2	3.0	mg/L	11/03/00	JRB	300.0
Nitrite as Nitrogen	BDL	0.01	mg/L	11/03/00	JRB	300.0
Nitrate as Nitrogen	0.31	0.10	mg/L	11/03/00	JRB	300.0
Iron	0.013	0.002	mg/L	11/07/00	EK	6010/E200.7
Sodium	3.80	0.10	mg/L	11/07/00	EK	6010/E200.7
Phosphorus,Total	BDL	0.015	mg/L	11/07/00	EK	6010/E200.7
Pesticide Extraction	Completed			11/04/00	PL	SW846-3510
Total Metal Digestion	Completed			11/02/00	T/J	E200.2
Tot. Diss. Solids	45	5.0	mg/L	11/06/00	G/M	SM2540C
Total Suspended Solids	BDL	5.0	mg/L	11/07/00	GD	SM2540D
Pesticide						
4,4' -DDD	ND	0.1	ug/L	11/07/00	KCA	SW8081
4,4' -DDE	ND	0.1	ug/L	11/07/00	KCA	SW8081
4,4' -DDT	ND	0.1	ug/L	11/07/00	KCA	SW8081
a-BHC	ND	0.05	ug/L	11/07/00	KCA	SW8081
Aldrin	ND	0.05	ug/L	11/07/00	KCA	SW8081
b-BHC	ND	0.05	ug/L	11/07/00	KCA	SW8081
Chlordane	ND	0.5	ug/L	11/07/00	KCA	SW8081

Client ID: FLEISEHMANNS CATCH BASIN #1 Phoenix I.D. AC98347

Parameter	Result	RL	Units	Date	by	Reference
d-BHC	ND	0.05	ug/L	11/07/00	KCA	SW8081
Dieldrin	ND	0.1	ug/L	11/07/00	KCA	SW8081
Endosulfan I	ND	0.05	ug/L	11/07/00	KCA	SW8081
Endosulfan II	ND	0.1	ug/L	11/07/00	KCA	SW8081
Endosulfan Sulfate	ND	0.1	ug/L	11/07/00	KCA	SW8081
Endrin	ND	0.1	ug/L	11/07/00	KCA	SW8081
Endrin Aldehyde	ND	0.1	ug/L	11/07/00	KCA	SW8081
g-BHC (Lindane)	ND	0.05	ug/L	11/07/00	KCA	SW8081
Heptachlor	ND	0.05	ug/L	11/07/00	KCA	SW8081
Heptachlor epoxide	ND	0.05	ug/L	11/07/00	KCA	SW8081
Methoxychlor	ND	0.2	ug/L	11/07/00	KCA	SW8081
Toxaphene	ND	1.0	ug/L	11/07/00	KCA	SW8081

Comments: ND=Not detected BDL = Below Detection Limit RL=Reporting Limit

If there are any questions regarding this data, please call Phoenix Client Services at extension 200.

Phyllis Shiller, Laboratory Director
November 10, 2000

PHOENIX
Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O. Box 418, Manchester, CT 06040
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

November 10, 2000

FOR: Attn: Mr. Sam Gowan
Alpha GeoScience
1071 Troy-Schenectady
Latham, NY 12110

Sample Information		Custody Information		Date	Time
Matrix:	WATER	Collected by:		11/01/00	13:50
Location Code:	ALPHAGEO	Received by:	SW	11/02/00	8:30
Project Code:		Analyzed by:	see below		
P.O.#:	00151				

Laboratory Data

Client ID: FLEISEHMANNS CATCH BASIN #2 Phoenix I.D. AC98348

Parameter	Result	RL	Units	Date	by	Reference
E. Coli	Negative	0	/100mls	11/02/00	CP	SM9223B
Total Coliforms	Positive		/100mls	11/02/00	CP	9223B
B.O.D./5 day	BDL	2.0	mg/L	11/03/00	CP	SM5210B
Chloride	11	3.0	mg/L	11/03/00	JRB	300.0
Nitrite as Nitrogen	BDL	0.01	mg/L	11/03/00	JRB	300.0
Nitrate as Nitrogen	0.48	0.10	mg/L	11/03/00	JRB	300.0
Iron	0.008	0.002	mg/L	11/07/00	EK	6010/E200.7
Sodium	5.60	0.10	mg/L	11/07/00	EK	6010/E200.7
Phosphorus,Total	BDL	0.015	mg/L	11/07/00	EK	6010/E200.7
Pesticide Extraction	Completed			11/04/00	PL	SW846-3510
Total Metal Digestion	Completed			11/02/00	T/J	E200.2
Tot. Diss. Solids	55	5.0	mg/L	11/06/00	G/M	SM2540C
Total Suspended Solids	BDL	5.0	mg/L	11/07/00	GD	SM2540D
Pesticide						
4,4' -DDD	ND	0.1	ug/L	11/07/00	KCA	SW8081
4,4' -DDE	ND	0.1	ug/L	11/07/00	KCA	SW8081
4,4' -DDT	ND	0.1	ug/L	11/07/00	KCA	SW8081
a-BHC	ND	0.05	ug/L	11/07/00	KCA	SW8081
Aldrin	ND	0.05	ug/L	11/07/00	KCA	SW8081
b-BHC	ND	0.05	ug/L	11/07/00	KCA	SW8081
Chlordane	ND	0.5	ug/L	11/07/00	KCA	SW8081

Client ID: FLEISEHMANNS CATCH BASIN #2 Phoenix I.D. AC98348

Parameter	Result	RL	Units	Date	by	Reference
d-BHC	ND	0.05	ug/L	11/07/00	KCA	SW8081
Dieldrin	ND	0.1	ug/L	11/07/00	KCA	SW8081
Endosulfan I	ND	0.05	ug/L	11/07/00	KCA	SW8081
Endosulfan II	ND	0.1	ug/L	11/07/00	KCA	SW8081
Endosulfan Sulfate	ND	0.1	ug/L	11/07/00	KCA	SW8081
Endrin	ND	0.1	ug/L	11/07/00	KCA	SW8081
Endrin Aldehyde	ND	0.1	ug/L	11/07/00	KCA	SW8081
g-BHC (Lindane)	ND	0.05	ug/L	11/07/00	KCA	SW8081
Heptachlor	ND	0.05	ug/L	11/07/00	KCA	SW8081
Heptachlor epoxide	ND	0.05	ug/L	11/07/00	KCA	SW8081
Methoxychlor	ND	0.2	ug/L	11/07/00	KCA	SW8081
Toxaphene	ND	1.0	ug/L	11/07/00	KCA	SW8081

Comments: ND=Not detected BDL = Below Detection Limit RL=Reporting Limit

If there are any questions regarding this data, please call Phoenix Client Services at extension 200.

Phyllis Shiller
Phyllis Shiller, Laboratory Director
November 10, 2000

PHOENIX
Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O. Box 418, Manchester, CT 06040
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

November 10, 2000

FOR: Attn: Mr. Sam Gowan
Alpha GeoScience
1071 Troy-Schenectady
Latham, NY 12110

Sample Information		Custody Information		Date	Time
Matrix:	WATER	Collected by:		11/01/00	15:20
Location Code:	ALPHAGEO	Received by:	SW	11/02/00	8:30
Project Code:		Analyzed by:	see below		
P.O.#:	00151				

Laboratory Data

Client ID: FLEISEHMANNS CATCH WELL #3 Phoenix I.D. AC98349

Parameter	Result	RL	Units	Date	by	Reference
E. Coli	Positive	0	/100mls	11/02/00	CP	SM9223B
Total Coliforms	Positive		/100mls	11/02/00	CP	9223B
B.O.D./5 day	BDL	2.0	mg/L	11/03/00	CP	SM5210B
Chloride	16	3.0	mg/L	11/03/00	JRB	300.0
Nitrite as Nitrogen	BDL	0.01	mg/L	11/03/00	JRB	300.0
Nitrate as Nitrogen	0.42	0.10	mg/L	11/03/00	JRB	300.0
Iron	0.025	0.002	mg/L	11/07/00	EK	6010/E200.7
Sodium	10.6	0.10	mg/L	11/07/00	EK	6010/E200.7
Phosphorus,Total	BDL	0.015	mg/L	11/07/00	EK	6010/E200.7
Pesticide Extraction	Completed			11/04/00	PL	SW846-3510
Total Metal Digestion	Completed			11/02/00	T/J	E200.2
Tot. Diss. Solids	94	5.0	mg/L	11/06/00	G/M	SM2540C
Total Suspended Solids	BDL	5.0	mg/L	11/07/00	GD	SM2540D
Pesticide						
4,4' -DDD	ND	0.1	ug/L	11/07/00	KCA	SW8081
4,4' -DDE	ND	0.1	ug/L	11/07/00	KCA	SW8081
4,4' -DDT	ND	0.1	ug/L	11/07/00	KCA	SW8081
a-BHC	ND	0.05	ug/L	11/07/00	KCA	SW8081
Aldrin	ND	0.05	ug/L	11/07/00	KCA	SW8081
b-BHC	ND	0.05	ug/L	11/07/00	KCA	SW8081
Chlordane	ND	0.5	ug/L	11/07/00	KCA	SW8081

Client ID: FLEISEHMANNS CATCH WELL #3 Phoenix I.D. AC98349

Parameter	Result	RL	Units	Date	by	Reference
d-BHC	ND	0.05	ug/L	11/07/00	KCA	SW8081
Dieldrin	ND	0.1	ug/L	11/07/00	KCA	SW8081
Endosulfan I	ND	0.05	ug/L	11/07/00	KCA	SW8081
Endosulfan II	ND	0.1	ug/L	11/07/00	KCA	SW8081
Endosulfan Sulfate	ND	0.1	ug/L	11/07/00	KCA	SW8081
Endrin	ND	0.1	ug/L	11/07/00	KCA	SW8081
Endrin Aldehyde	ND	0.1	ug/L	11/07/00	KCA	SW8081
g-BHC (Lindane)	ND	0.05	ug/L	11/07/00	KCA	SW8081
Heptachlor	ND	0.05	ug/L	11/07/00	KCA	SW8081
Heptachlor epoxide	ND	0.05	ug/L	11/07/00	KCA	SW8081
Methoxychlor	ND	0.2	ug/L	11/07/00	KCA	SW8081
Toxaphene	ND	1.0	ug/L	11/07/00	KCA	SW8081

Comments: ND=Not detected BDL = Below Detection Limit RL=Reporting Limit

If there are any questions regarding this data, please call Phoenix Client Services at extension 200.

Phyllis Shiller

Phyllis Shiller, Laboratory Director
November 10, 2000

PHOENIX
Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O. Box 418, Manchester, CT 06040
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

November 10, 2000

FOR: Attn: Mr. Sam Gowan
Alpha GeoScience
1071 Troy-Schenectady
Latham, NY 12110

Sample Information		Custody Information		Date	Time
Matrix:	WATER	Collected by:		11/01/00	15:45
Location Code:	ALPHAGEO	Received by:	SW	11/02/00	8:30
Project Code:		Analyzed by:	see below		
P.O.#:	00151				

Laboratory Data

Client ID: FLEISEHMANNS CATCH WELL #1 Phoenix I.D. AC98350

Parameter	Result	RL	Units	Date	by	Reference
E. Coli	Negative	0	/100mls	11/02/00	CP	SM9223B
Total Coliforms	Positive		/100mls	11/02/00	CP	9223B
B.O.D./5 day	BDL	2.0	mg/L	11/03/00	CP	SM5210B
Chloride	12	3.0	mg/L	11/03/00	JRB	300.0
Nitrite as Nitrogen	BDL	0.01	mg/L	11/03/00	JRB	300.0
Nitrate as Nitrogen	0.42	0.10	mg/L	11/03/00	JRB	300.0
Iron	0.186	0.002	mg/L	11/08/00	EK	6010/E200.7
Sodium	7.0	0.10	mg/L	11/08/00	EK	6010/E200.7
Phosphorus,Total	BDL	0.015	mg/L	11/08/00	EK	6010/E200.7
Pesticide Extraction	Completed			11/04/00	PL	SW846-3510
Total Metal Digestion	Completed			11/02/00	T/J	E200.2
Tot. Diss. Solids	55	5.0	mg/L	11/06/00	G/M	SM2540C
Total Suspended Solids	11	5.0	mg/L	11/07/00	GD	SM2540D
Pesticide						
4,4' -DDD	ND	0.1	ug/L	11/07/00	KCA	SW8081
4,4' -DDE	ND	0.1	ug/L	11/07/00	KCA	SW8081
4,4' -DDT	ND	0.1	ug/L	11/07/00	KCA	SW8081
a-BHC	ND	0.05	ug/L	11/07/00	KCA	SW8081
Aldrin	ND	0.05	ug/L	11/07/00	KCA	SW8081
b-BHC	ND	0.05	ug/L	11/07/00	KCA	SW8081
Chlordane	ND	0.5	ug/L	11/07/00	KCA	SW8081

Client ID: FLEISEHMANNS CATCH WELL #1 Phoenix I.D. AC98350

Parameter	Result	RL	Units	Date	by	Reference
d-BHC	ND	0.05	ug/L	11/07/00	KCA	SW8081
Dieldrin	ND	0.1	ug/L	11/07/00	KCA	SW8081
Endosulfan I	ND	0.05	ug/L	11/07/00	KCA	SW8081
Endosulfan II	ND	0.1	ug/L	11/07/00	KCA	SW8081
Endosulfan Sulfate	ND	0.1	ug/L	11/07/00	KCA	SW8081
Endrin	ND	0.1	ug/L	11/07/00	KCA	SW8081
Endrin Aldehyde	ND	0.1	ug/L	11/07/00	KCA	SW8081
g-BHC (Lindane)	ND	0.05	ug/L	11/07/00	KCA	SW8081
Heptachlor	ND	0.05	ug/L	11/07/00	KCA	SW8081
Heptachlor epoxide	ND	0.05	ug/L	11/07/00	KCA	SW8081
Methoxychlor	ND	0.2	ug/L	11/07/00	KCA	SW8081
Toxaphene	ND	1.0	ug/L	11/07/00	KCA	SW8081

Comments: ND=Not detected BDL = Below Detection Limit RL=Reporting Limit

If there are any questions regarding this data, please call Phoenix Client Services at extension 200.

Phyllis Shiller, Laboratory Director
November 10, 2000

PHOENIX
Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O. Box 418, Manchester, CT 06040
Tel. (860) 645-1102 Fax (860) 645-0823

QC Report

AC98351 November 10, 2000

Sample ID *AC98351*

Analysis: **B.O.D./5 Day-Analysis QC** *AC98351*

QC BLANK: <2.0
QC CHECK SAMPLE % RECOVERY:122
QC SAMPLE SPIKE % RECOVERY: N/C
QC SAMPLE REPLICATE % CHANGE: N/C

UNITS: Mg/L
QC SOURCE:GGA STD
SPIKED SAMPLE:AC98485
REPLICATE SAMPLE:AC98485

Analysis: **ICP Metals Analysis QC** *AC98351*

QC Source: ERA99101 MIN QCI 702 ICP 1000 Analyte	Blank	QC Check Sample (% Rec.)	QC Spike Sample (% Rec.)	QC Sample Replicate (% change)
Ag Silver	<0.01	104	92	0.0
Al Aluminum	<0.05	108	83	NC
As Arsenic	<0.05	96	75	NC
B Boron	<0.10	98	-	NC
Ba Barium	<0.01	101	93	NC
Be Beryllium	<0.01	99	97	NC
Ca Calcium	<0.30	101	102	3.2
Cd Cadmium	<0.01	102	93	NC
Co Cobalt	<0.01	98	91	NC
Cr Chromium	<0.01	102	102	NC
Cu Copper	<0.01	102	93	NC
Fe Iron	<0.05	103	91	NC
K Potassium	<0.30	100	101	3.8
Mg Magnesium	<0.02	99	95	3.2
Mn Manganese	<0.01	104	87	0.0
Mo Molybdenum	<0.05	102	100	NC
Na Sodium	<0.50	100	103	2.6
Ni Nickel	<0.01	103	105	NC
P Phosphorus	<0.20	94	91	NC
Pb Lead	<0.05	103	93	NC
Se Selenium	<0.05	105	90	NC
Si Silicon	<0.20	87	-	2.2
Sn Tin	<0.25	93	-	NC
Sr Strontium	<0.01	106	101	0.5
Ti Titanium	<0.01	102	92	NC
V Vanadium	<0.01	99	107	NC
Zn Zinc	<0.01	101	101	NC

PHOENIX **Environmental Laboratories, Inc.**
587 East Middle Turnpike, P.O. Box 418, Manchester, CT 06040
Tel. (860) 645-1102 Fax (860) 645-0823
Client Services (860) 645-8726

CHAIN OF CUSTODY RECORD

DATE RCVD: ____________

Customer: Alpha Geoscience
Address: 1071 Troy Schenectady Rd
Latham NY 12110

Project: Fleischmanns Task 1
Report To: Sam Gowan
Invoice To: Sam Gowan

Project P.O.: 00151
Phone #: (518) 783-1805
Fax #: (518) 763-1793

Client Sample – Information – Identification

Sampler's Signature: X [signature] Date: 11/1/00

Analysis Requested

Item #	Customers Sample Ident	Sample Matrix	Date	Time	Total Coliform	E-Coli	Pesticides (8081)	Iron	Sodium	Phosphorus	Chlorides	Nitrate	Nitrite	BOD	TSS	TDS		VOA VIALS	PL/GL HNO3 (250) ML	PL/GL NaOH ( ) ML	PL(X)/GL AS IS (1000) ML	GL + H2SO4 ( ) ML	Field Filtered + HNO3 ( ) ML	Bacteria Bottle	PHOENIX SAMPLE #
	Catch Basin #1	H_2O	11/1/00	13:20	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			1		2			1	98347
	Catch Basin #2	H_2O	11/1/00	13:50	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			1		2			1	98348
	Well #3	H_2O	11/1/00	15:20	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			1		2			1	98349
	Well #1	H_2O	11/1/00	15:45	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			1		2			1	98350
																									98351 QC

Item #	Relinquished by:	Accepted by:	Date:	Time:
	Delaware Connection:			
	[signature]	Eric	11/1/00	8:30 pm
	Eric	h Chapman	11/2/00	8:30

Comments: rec'd -2°

Standard lab turnaround is 10 working days. Accelerated turnarounds are always available. Check with office on prevailing surcharge. ACCELERATED TURN-AROUND TIME REQUESTED: ___1 ___2 ___3 ___4 ___5 working days.

Alpha Geoscience
1071 Troy-Schenectady Rd
Latham, NY 12110

RECEIVED NOV 22 2000

Sample ID: AB16188
Date Received: 11/22/2000
Time Received:: 07:26:00
PO Number:
Your Ref:

Customer:	Alpha Geoscience			*Collect Date:*	11/21/2000
Owner:	FLEISCHMANNS (V)	*Sample Pt:*	CATCH BASIN #2	*Collect Time:*	10:45:00
Sample Loc:	FLEISCHMANNS,NY SPRING RAW WATER	*Water Source:*	Spring	*Collected by:*	PHELAN,KEVIN
		Chlorinated::	No	*Potability:*	Yes
		Residual Chlorine:		*Grab/Comp:*	Grab

Test	Result	Analysis Unit	Acceptable Range	Method Used	Analyst Ref	
Total Coliform,Membrane Filter	Negative	per 100 mL	—	SM 9222	BJS	11/22/2000

Comments:

Sample is NEGATIVE for Total Coliform. This result indicates that the water WAS of a SATISFACTORY sanitary quality when sampled for the contaminants examined. Sample is negative for Escherichia coli.

Reviewed by Betty Sherman ______________________

Environmental Laboratory

Legend: < = Less Than, > = Greater Than

mg/KG=ppm, mcg/KG=ppb, mg/L=ppm, mcg/L=ppb

New York State DOH E.L.A.P. # 10350

(TEL) 518-472-9124
(FAX) 518-472-1032

BENDER - ST. PETER'S LABORATORY

Lab Sample ID

9 Samaritan Drive Albany, NY 12208

NYSDOH ELAP LABORATORY ID# 10350

Sample Drop Locations: Samples should be delivered to 9 Samaritan Drive if possible. Other locations available below.

(*For Bacteriological samples*: Drinking waters must be returned within 30 hours and surface waters within 6 hours.)

Clifton Park Office	Stuyvesant Plaza
963 Route 146 Clifton Park, NY 12065	6 Executive Park Drive Albany, NY 12203
(518)348-0639	(518)438-1348

REQUEST FOR WATER/WASTEWATER ANALYSIS (PLEASE PRINT)

Send Report and Bill to:
Name: Kevin Phelan
Address: Alpha Geoscience
1071 Troy - Schenectady Rd
City: Latham State: NY Zip: 12110
(Phone) (518) 7831805
PO# 00151 - Task 1
Your Reference # ~~00151~~

Additional copies or fax to:
Name: ____
Address: ____
City: ____ State: ____ Zip: ____
Fax: ____

SAMPLE INFORMATION

Sample location (address): Fleischmann's, NY Spring - Raw Water
Exact Sample point (kitchen cold water tap, hose end, well head,etc): Catch Basin #2
Owner of supply: Fleischmann's (V)
Date Collected: 11 / 21 / 00 Collected by: Kevin Phelan
Time Collected: 10:45 am Collector's Phone: (518) 783-1805
Potability: ☒ Potable ☐ Nonpotable
Collection Method: ☒ Grab ☐ Composite If composite, Start Time: ____ Finish Time: ____

Water Source:
☐ Swimming Pool ☐ Drilled Well Well Depth: ____ ft.
☒ Spring ☐ Driven Point Casing Depth: ____ ft.
☐ Surface Water (lake, stream) ☐ Dug Well Diameter: ____ in.
☐ Purchased Publie Water Supply ☐ Monitoring Well
☐ Other ____

Is sample chlorinated? ☐ Yes ☒ No Residual chlorine (field) ____ mg/L
Water Temperature (field) (if required) 44.5° F
Comments or description of any problems with water (i.e. odors, staining, tastes, residues, etc.) ____

This Section Applies To Samples From Public Water Suppliers

Supply/Facility Name: ____
Federal ID#. ____
Site # ____
Water Source Code ____

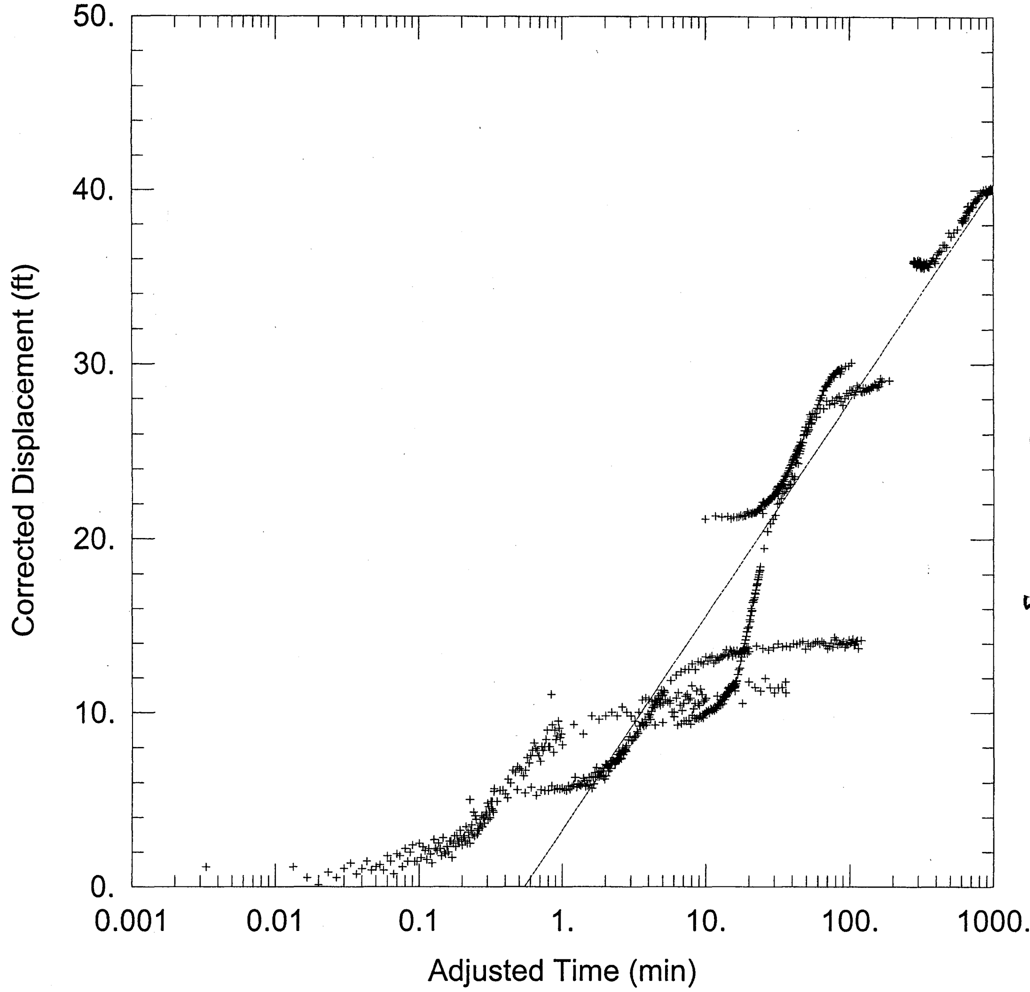
Type of Samples
☐ Routine ☐ Raw ☐ Monitoring
☐ Repeat ☐ Finished ☐ Surveillance
☐ Special ☐ Source ☐ Product

APPENDIX E

PUMP TEST DATA

APPENDIX E-1

STEP TEST - WELL #1



well 1 pumping w/ well 1 observations

WELL 1 - STEPPED RATE TEST

Data Set: F:\...\Well 1 Stepped Rate Test.aqt
Date: 12/08/00 Time: 17:11:11

PROJECT INFORMATION

Company: Alpha Geoscience
Client: Crossroads Ventures
Project: 00151-Task 1
Test Location: Fleischmanns
Test Well: Well 1
Test Date: 11/1/00

AQUIFER DATA

Saturated Thickness: 200. ft Anisotropy Ratio (Kz/Kr): 0.25

WELL DATA

Casing = 0.25' radius ; borehole = 0.225' radius

Pumping Wells

Well Name	X (ft)	Y (ft)
Well 1	0	0

Observation Wells

Well Name	X (ft)	Y (ft)
+ Well 1	0	0

SOLUTION

Aquifer Model: Unconfined Solution Method: Cooper-Jacob

T = 2.556 cm^2/sec = 2.75×10^{-3} ft^2/s S = 3.986

Data Set: F:\PROJECTS\2000\00141-00160\00151-Fleischmanns\Task 1-Village Water Source\well 1 step\Wel
Title: Well 1 - Stepped Rate Test
Date: 12/08/00
Time: 17:11:25

PROJECT INFORMATION

Company: Alpha Geoscience
Client: Crossroads Ventures
Project: 00151-Task 1
Location: Fleischmanns
Test Date: 11/1/00
Test Well: Well 1

AQUIFER DATA

Saturated Thickness: 200. ft
Anisotropy Ratio (Kz/Kr): 0.25

PUMPING WELL DATA

Number of pumping wells: 1

Pumping Well No. 1: Well 1

X Location: 0. ft
Y Location: 0. ft

Partially Penetrating Well
Depth To Top Of Screen: 16. ft
Depth To Bottom Of Screen: 70. ft

No. of pumping periods: 6

Pumping Period Data

Time (min)	Rate (gal/min)	Time (min)	Rate (gal/min)
0.	25.	260.	114.
36.	55.	276.	83.
141.	83.	362.3	0.

OBSERVATION WELL DATA

Number of observation wells: 1

Observation Well No. 1: Well 1

X Location: 0. ft
Y Location: 0. ft

Partially Penetrating Well
Depth To Top Of Screen: 16. ft
Depth To Bottom Of Screen: 70. ft

No. of observations: 1078

Observation Data

Time (min)	Displacement (ft)	Time (min)	Displacement (ft)
0.0033	0.348	141.6	15.49
0.0133	0.348	141.6	15.59
0.0166	0.158	141.6	16.03
0.02	0.031	141.6	15.9
0.0233	0.253	141.6	16.29
0.0266	0.158	141.7	16.73
0.03	0.316	141.7	16.54
0.0333	0.411	141.7	16.6
0.0366	0.221	141.7	17.11
0.04	0.316	141.7	17.23
0.0433	0.443	141.7	17.14
0.0466	0.285	141.8	17.3
0.05	0.348	141.8	17.43
0.0533	0.38	141.8	17.71
0.0566	0.285	141.8	17.65
0.06	0.538	141.8	17.9
0.0633	0.443	141.8	18.18
0.0666	0.221	141.8	18.25
0.07	0.57	141.9	18.31
0.0733	0.538	141.9	18.6
0.0766	0.348	141.9	18.57
0.08	0.665	141.9	18.72
0.0833	0.443	141.9	18.88
0.0866	0.602	141.9	19.04
0.09	0.728	142.	19.14
0.0933	0.443	142.	19.17
0.0966	0.443	142.	19.36
0.1	0.76	142.2	20.53
0.1033	0.507	142.4	21.61
0.1066	0.697	142.6	22.11
0.11	0.633	142.8	22.4
0.1133	0.475	143.	22.65
0.1166	0.665	143.2	23.38
0.12	0.57	143.4	23.44
0.1233	0.411	143.6	23.73
0.1266	0.823	143.8	24.08
0.13	0.665	144.	24.17
0.1333	0.633	144.2	24.36
0.1366	0.76	144.4	24.43
0.14	0.665	144.6	24.61
0.1433	0.538	144.8	24.68
0.1466	0.855	145.	24.65
0.15	0.602	145.2	25.18
0.1533	0.57	145.4	25.15
0.1566	0.697	145.6	25.
0.16	0.602	145.8	25.15
0.1633	0.792	146.	26.07
0.1666	0.792	146.2	26.07
0.17	0.507	146.4	26.39
0.1733	0.76	146.6	26.01
0.1766	0.887	146.8	26.67
0.18	0.697	147.	26.83
0.1833	0.887	147.2	26.99

Time (min)	Displacement (ft)	Time (min)	Displacement (ft)
0.1866	0.792	147.4	27.21
0.19	0.792	147.6	27.4
0.1933	0.982	147.8	27.4
0.1966	0.823	148.	27.88
0.2	0.728	148.2	27.91
0.2033	0.855	148.4	28.19
0.2066	0.887	148.6	28.45
0.21	0.792	148.8	27.97
0.2133	1.045	149.	27.97
0.2166	0.76	149.2	28.1
0.22	0.95	149.4	28.16
0.2233	0.855	149.6	28.41
0.2266	0.76	149.8	28.26
0.23	0.982	150.	28.67
0.2333	1.077	150.2	29.27
0.2366	0.918	150.4	28.98
0.24	1.299	150.6	28.64
0.2433	0.887	150.8	28.73
0.2466	1.235	151.	28.92
0.25	1.172	153.	29.11
0.2533	0.918	155.	29.68
0.2566	1.014	157.	29.68
0.26	0.982	159.	30.16
0.2633	1.014	161.	29.93
0.2666	1.109	163.	30.22
0.27	1.077	165.	30.03
0.2733	1.235	167.	30.38
0.2766	1.045	169.	30.47
0.28	1.204	171.	30.16
0.2833	1.204	173.	29.9
0.2866	1.109	175.	30.35
0.29	1.235	177.	30.7
0.2933	1.299	179.	30.54
0.2966	1.267	181.	30.89
0.3	1.457	183.	30.89
0.3033	1.172	185.	30.89
0.3066	1.394	187.	30.6
0.31	1.299	189.	30.76
0.3133	1.204	191.	31.2
0.3166	1.489	193.	31.07
0.32	1.362	195.	31.07
0.3233	1.489	197.	30.82
0.3266	1.33	199.	30.76
0.33	1.299	201.	31.04
0.3333	1.711	203.	30.79
0.35	1.489	205.	31.04
0.3666	1.679	207.	30.89
0.3833	1.679	209.	30.98
0.4	1.616	211.	31.01
0.4166	1.869	213.	30.89
0.4333	1.806	215.	31.11
0.45	2.028	217.	31.04
0.4666	1.996	219.	31.17
0.4833	2.091	221.	31.14

Time (min)	Displacement (ft)	Time (min)	Displacement (ft)
0.5	2.059	223.	31.33
0.5166	2.028	225.	31.27
0.5333	1.933	227.	31.3
0.55	2.028	229.	31.07
0.5666	2.249	231.	31.27
0.5833	2.154	233.	31.14
0.6	2.281	235.	31.49
0.6166	2.376	237.	31.68
0.6333	2.503	239.	31.45
0.65	2.408	241.	31.55
0.6666	2.376	260.	31.55
0.6833	2.281	260.	31.52
0.7	2.186	260.	31.8
0.7166	2.439	260.	31.71
0.7333	2.376	260.	31.77
0.75	2.439	260.	31.55
0.7666	2.566	260.	31.71
0.7833	2.725	260.	31.71
0.8	2.439	260.	31.74
0.8166	2.439	260.	31.9
0.8333	3.359	260.	31.77
0.85	2.82	260.	31.87
0.8666	2.344	260.	31.84
0.8833	2.725	260.	32.22
0.9	2.566	260.1	32.02
0.9166	2.63	260.1	32.06
0.9333	2.883	260.1	32.09
0.95	2.756	260.1	32.02
0.9666	2.598	260.1	32.15
0.9833	2.661	260.1	32.15
1.	2.471	260.1	32.15
1.2	2.82	260.1	32.18
1.4	2.661	260.1	32.15
1.6	2.978	260.1	32.31
1.8	2.915	260.1	32.28
2.	2.978	260.1	32.5
2.2	3.042	260.1	32.44
2.4	2.978	260.1	32.47
2.6	3.137	260.1	32.5
2.8	3.042	260.1	32.66
3.	2.978	260.1	32.82
3.2	2.883	260.1	32.47
3.4	3.042	260.1	33.1
3.6	3.264	260.1	32.06
3.8	3.295	260.1	33.16
4.	3.264	260.1	32.97
4.2	3.232	260.1	33.07
4.4	3.137	260.1	32.88
4.6	3.295	260.1	32.94
4.8	3.168	260.1	33.04
5.	3.2	260.1	33.26
5.2	3.264	260.1	33.13
5.4	3.232	260.1	33.01
5.6	3.2	260.1	33.32

Time (min)	Displacement (ft)	Time (min)	Displacement (ft)
5.8	3.042	260.1	33.29
6.	3.042	260.2	33.23
6.2	3.295	260.2	33.13
6.4	3.39	260.2	33.23
6.6	3.168	260.2	33.42
6.8	3.073	260.2	33.45
7.	3.2	260.2	33.45
7.2	3.327	260.2	33.48
7.4	3.359	260.2	33.48
7.6	3.264	260.2	33.39
7.8	3.295	260.2	33.45
8.	3.517	260.2	33.67
8.2	3.105	260.2	33.7
8.4	3.2	260.2	33.67
8.6	3.422	260.2	33.7
8.8	3.2	260.2	33.73
9.	3.168	260.2	33.77
9.2	3.454	260.2	33.77
9.4	3.359	260.2	33.77
9.6	3.232	260.2	33.7
9.8	3.264	260.2	33.8
10.	3.295	260.2	33.67
12.	3.327	260.2	33.83
14.	3.39	260.2	33.99
16.	3.422	260.2	33.92
18.	3.2	260.2	33.83
20.	3.58	260.2	33.92
22.	3.485	260.2	34.15
24.	3.422	260.2	34.37
26.	3.644	260.2	34.21
28.	3.485	260.3	34.02
30.	3.39	260.3	34.24
32.	3.485	260.3	34.53
34.	3.485	260.3	34.62
36.	3.39	260.3	33.96
36.	3.58	260.3	34.18
36.01	3.359	260.3	34.34
36.01	3.675	260.3	34.68
36.01	3.422	260.3	33.89
36.02	3.739	260.3	34.3
36.02	3.612	260.3	34.46
36.02	3.834	260.3	34.59
36.03	3.517	260.3	34.46
36.03	3.739	260.3	34.46
36.03	3.707	260.3	34.53
36.04	3.707	260.3	34.56
36.04	3.897	260.3	34.56
36.04	3.739	260.3	34.59
36.05	3.802	260.3	34.59
36.05	3.77	260.3	34.65
36.05	3.802	260.3	34.75
36.06	3.739	260.3	34.72
36.06	3.707	260.3	34.59
36.06	3.897	260.3	34.75

Time (min)	Displacement (ft)	Time (min)	Displacement (ft)
36.07	3.77	260.3	34.91
36.07	3.866	260.3	34.81
36.07	3.929	260.4	35.13
36.08	4.214	260.4	35.06
36.08	3.834	260.4	35.25
36.08	3.96	260.4	35.57
36.09	3.929	260.4	35.54
36.09	3.897	260.4	35.63
36.09	3.96	260.4	35.79
36.1	4.182	260.5	35.79
36.1	4.087	260.5	35.95
36.1	3.866	260.5	36.11
36.11	4.087	260.5	36.33
36.11	3.897	260.5	36.39
36.11	4.214	260.6	36.39
36.12	3.929	260.6	36.62
36.12	4.214	260.6	36.62
36.12	3.802	260.6	36.71
36.13	4.246	260.6	36.93
36.13	3.96	260.6	37.09
36.13	4.404	260.6	37.15
36.14	4.214	260.7	37.25
36.14	4.594	260.7	37.41
36.14	4.246	260.7	37.41
36.15	4.436	260.7	37.53
36.15	4.246	260.7	37.53
36.15	4.404	260.8	37.66
36.16	4.309	260.8	37.69
36.16	4.467	260.8	37.76
36.16	4.309	260.8	37.98
36.17	4.563	260.8	38.17
36.17	4.246	260.8	38.04
36.17	4.563	260.9	38.04
36.18	4.151	260.9	38.07
36.18	4.721	260.9	38.33
36.18	4.277	260.9	38.29
36.19	4.721	260.9	38.48
36.19	4.689	260.9	38.52
36.19	4.594	260.9	38.52
36.2	4.467	261.	38.58
36.2	4.658	261.	38.64
36.2	4.563	261.	38.9
36.21	4.848	261.2	39.62
36.21	4.563	261.4	40.35
36.21	4.848	261.6	40.89
36.22	4.753	261.8	41.36
36.22	4.88	262.	41.74
36.22	4.848	262.2	41.68
36.23	4.88	262.4	41.74
36.23	4.848	262.6	42.22
36.23	4.848	262.8	42.6
36.24	4.753	263.	43.01
36.24	4.721	263.2	43.23
36.24	4.848	263.4	43.48

Time (min)	Displacement (ft)	Time (min)	Displacement (ft)
36.25	4.943	263.6	43.99
36.25	4.848	263.8	43.93
36.25	4.974	264.	44.34
36.26	4.943	264.2	44.47
36.26	5.101	264.4	44.37
36.26	4.943	264.6	44.59
36.27	5.228	264.8	44.78
36.27	4.911	265.	44.88
36.27	5.133	265.2	45.07
36.28	4.974	265.4	45.07
36.28	5.165	265.6	45.26
36.28	4.974	265.8	45.38
36.29	4.943	266.	45.42
36.29	5.133	266.2	45.67
36.29	5.291	266.4	45.57
36.3	5.228	266.6	45.32
36.3	5.355	266.8	45.61
36.3	5.101	267.	45.7
36.31	5.228	267.2	45.83
36.31	5.196	267.4	45.83
36.31	5.228	267.6	45.98
36.32	5.291	267.8	46.02
36.32	5.323	268.	46.08
36.32	5.26	268.2	46.05
36.33	5.386	268.4	46.08
36.33	5.228	268.6	46.08
36.33	5.45	268.8	46.17
36.35	5.672	269.	45.92
36.37	5.798	269.2	45.67
36.38	5.64	269.4	45.92
36.4	5.672	269.6	46.3
36.42	5.767	269.8	46.21
36.43	5.83	270.	46.21
36.45	5.988	272.	46.46
36.47	5.925	274.	46.52
36.48	6.21	276.	46.78
36.5	6.21	276.	46.78
36.52	6.369	276.	46.68
36.53	6.337	276.	46.62
36.55	6.21	276.	46.52
36.57	6.464	276.	46.56
36.58	6.242	276.	46.62
36.6	6.337	276.	46.62
36.62	6.686	276.	46.65
36.63	6.559	276.	46.65
36.65	6.654	276.	46.59
36.67	6.464	276.	46.52
36.68	6.78	276.	46.52
36.7	6.939	276.	46.56
36.72	6.939	276.	46.59
36.73	7.034	276.1	46.56
36.75	7.224	276.1	46.62
36.77	7.161	276.1	46.65
36.78	7.224	276.1	46.59

Time (min)	Displacement (ft)	Time (min)	Displacement (ft)
36.8	7.066	276.1	46.56
36.82	7.256	276.1	46.59
36.83	7.414	276.1	46.52
36.85	7.288	276.1	46.56
36.87	7.129	276.1	46.71
36.88	7.509	276.1	46.33
36.9	7.256	276.1	45.92
36.92	7.636	276.1	46.3
36.93	7.414	276.1	46.27
36.95	7.446	276.1	46.24
36.97	7.636	276.1	46.21
36.98	7.604	276.1	46.24
37.	7.541	276.1	46.21
37.2	8.016	276.1	46.21
37.4	8.238	276.1	46.17
37.6	8.365	276.1	46.17
37.8	8.46	276.1	46.17
38.	8.46	276.1	46.24
38.2	8.681	276.1	46.11
38.4	8.46	276.1	46.11
38.6	8.777	276.1	45.98
38.8	8.745	276.1	45.95
39.	8.681	276.1	45.98
39.2	8.967	276.1	45.92
39.4	8.808	276.1	45.7
39.6	8.935	276.1	45.73
39.8	8.999	276.1	45.92
40.	8.713	276.2	46.17
40.2	8.808	276.2	45.86
40.4	8.935	276.2	45.42
40.6	8.872	276.2	45.86
40.8	8.967	276.2	45.61
41.	8.967	276.2	45.54
41.2	9.03	276.2	45.8
41.4	9.062	276.2	45.57
41.6	9.252	276.2	44.85
41.8	8.999	276.2	45.57
42.	9.062	276.2	45.51
42.2	9.252	276.2	45.57
42.4	9.188	276.2	45.48
42.6	8.999	276.2	45.51
42.8	9.22	276.2	45.54
43.	9.125	276.2	45.54
43.2	9.062	276.2	45.45
43.4	9.22	276.2	45.42
43.6	9.093	276.2	45.67
43.8	9.157	276.2	45.51
44.	9.188	276.2	45.42
44.2	9.188	276.2	45.45
44.4	9.157	276.2	45.48
44.6	9.284	276.2	45.29
44.8	9.188	276.2	45.29
45.	9.157	276.2	45.26
45.2	9.252	276.2	45.19

Time (min)	Displacement (ft)	Time (min)	Displacement (ft)
45.4	9.378	276.2	45.19
45.6	9.093	276.2	45.1
45.8	9.315	276.3	45.19
46.	9.188	276.3	45.1
48.	9.411	276.3	45.1
50.	9.315	276.3	45.1
52.	9.252	276.3	45.19
54.	9.347	276.3	45.29
56.	9.505	276.3	45.1
58.	9.378	276.3	45.23
60.	9.411	276.3	45.1
62.	9.378	276.3	45.07
64.	9.505	276.3	45.07
66.	9.473	276.3	45.13
68.	9.537	276.3	45.19
70.	9.6	276.3	45.13
72.	9.284	276.3	45.
74.	9.505	276.3	44.88
76.	9.411	276.3	45.04
78.	9.505	276.3	44.81
80.	9.569	276.3	44.91
82.	9.6	276.3	45.
84.	9.505	276.3	45.07
86.	9.6	276.3	44.91
88.	9.537	276.3	44.75
90.	9.442	276.3	45.19
92.	9.315	276.3	45.16
94.	9.411	276.3	44.91
96.	9.537	276.4	44.97
98.	9.378	276.4	45.13
100.	9.759	276.4	44.97
102.	9.664	276.4	44.78
104.	9.473	276.4	44.94
106.	9.505	276.4	44.66
108.	9.505	276.4	44.53
110.	9.537	276.5	44.47
112.	9.6	276.5	44.53
114.	9.378	276.5	44.34
116.	9.473	276.5	44.28
118.	9.473	276.5	44.43
120.	9.664	276.6	44.15
122.	9.537	276.6	44.21
124.	9.569	276.6	43.9
126.	9.695	276.6	43.83
128.	9.442	276.6	43.83
130.	9.505	276.6	43.9
132.	9.6	276.6	43.9
134.	9.632	276.7	43.74
136.	9.315	276.7	43.58
141.	9.632	276.7	43.58
141.	9.537	276.7	43.96
141.	9.505	276.7	43.61
141.	9.664	276.8	43.9
141.	11.03	276.8	43.48

Time (min)	Displacement (ft)	Time (min)	Displacement (ft)
141.	10.01	276.8	43.45
141.	9.505	276.8	43.26
141.	9.6	276.8	43.01
141.	9.759	276.8	43.14
141.	9.759	276.9	42.88
141.	9.79	276.9	43.04
141.	9.569	276.9	43.04
141.	10.11	276.9	42.82
141.	9.949	276.9	43.04
141.1	9.917	276.9	42.69
141.1	9.949	276.9	42.85
141.1	9.917	277.	42.73
141.1	10.08	277.	42.85
141.1	9.98	277.	42.91
141.1	10.08	277.2	42.19
141.1	9.949	277.4	41.97
141.1	10.23	277.6	41.65
141.1	10.2	277.8	41.93
141.1	10.36	278.	40.92
141.1	10.3	278.2	41.08
141.1	10.36	278.4	41.08
141.1	10.42	278.6	40.64
141.1	10.27	278.8	40.67
141.1	10.52	279.	40.54
141.1	10.42	279.2	40.38
141.1	10.49	279.4	40.1
141.1	10.39	279.6	39.75
141.1	10.49	279.8	39.88
141.1	10.55	280.	40.13
141.1	10.39	280.2	39.97
141.1	10.58	280.4	39.91
141.1	10.52	280.6	39.94
141.1	10.55	280.8	39.69
141.1	10.49	281.	39.75
141.1	10.71	281.2	39.47
141.1	10.84	281.4	39.69
141.1	10.77	281.6	39.5
141.1	10.74	281.8	39.53
141.1	10.71	282.	39.81
141.2	10.9	282.2	39.72
141.2	11.06	282.4	39.62
141.2	10.74	282.6	39.69
141.2	10.96	282.8	39.72
141.2	11.03	283.	39.4
141.2	11.06	283.2	39.81
141.2	10.8	283.4	39.37
141.2	11.25	283.6	39.75
141.2	11.18	283.8	39.59
141.2	11.18	284.	39.47
141.2	11.38	284.2	39.59
141.2	11.06	284.4	39.4
141.2	11.22	284.6	39.59
141.2	11.41	284.8	39.56
141.2	11.31	285.	39.81

Time (min)	Displacement (ft)	Time (min)	Displacement (ft)
141.2	11.25	285.2	39.91
141.2	11.38	285.4	39.4
141.2	11.31	285.6	39.66
141.2	11.47	285.8	39.56
141.2	11.53	286.	39.59
141.2	11.5	288.	39.66
141.2	11.76	290.	39.59
141.2	11.79	292.	39.84
141.2	11.56	294.	39.91
141.2	11.85	296.	39.88
141.2	11.72	298.	39.72
141.2	11.66	300.	39.91
141.2	11.69	302.	39.81
141.2	11.82	304.	39.91
141.2	11.76	306.	39.81
141.3	11.76	308.	39.91
141.3	11.85	310.	39.75
141.3	11.63	312.	39.78
141.3	11.76	314.	39.81
141.3	11.91	316.	39.72
141.3	11.82	318.	39.75
141.3	11.91	320.	39.88
141.3	11.91	322.	39.94
141.3	11.76	324.	39.69
141.3	12.04	326.	39.84
141.3	11.88	328.	39.75
141.3	12.07	330.	39.88
141.3	11.95	332.	39.88
141.3	11.91	334.	39.72
141.3	11.79	336.	39.5
141.3	12.01	338.	39.66
141.3	12.01	340.	39.94
141.3	12.04	342.	39.88
141.3	11.85	344.	39.78
141.3	11.91	346.	39.97
141.3	12.17	348.	39.78
141.3	12.04	350.	39.75
141.3	12.17	352.	39.91
141.3	12.23	354.	39.88
141.3	12.23	356.	39.91
141.3	12.2	358.	39.75
141.3	12.61	360.	39.84
141.4	12.9	362.	39.84
141.4	12.99	362.3	39.84
141.4	13.43	363.	8.3
141.4	13.69	364.	3.3
141.4	14.04	365.	1.7
141.4	14.13	366.	1.24
141.5	14.29	368.	0.76
141.5	14.54	370.	0.72
141.5	14.76	372.	0.6
141.5	14.99	379.	0.42
141.5	15.27	383.	0.34
141.6	15.49	387.	0.33

SOLUTION

Aquifer Model: Unconfined
Solution Method: Cooper-Jacob

VISUAL ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	
T	2.556	cm^2/sec
S	2.242	

AUTOMATIC ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	Std. Error	
T	2.556	0.02605	cm^2/sec
S	3.986	0.1698	

Parameter Correlations

	T	S
T	1.00	-0.90
S	-0.90	1.00

Residual Statistics

for weighted residuals

Sum of Squares . . . . 1.312E+04 ft^2
Variance . . . . 12.31 ft^2
Std. Deviation . . . . 3.509 ft
Mean . . . . -0.2041 ft
No. of Residuals . . . . 1068.
No. of Estimates 2

SE1000C
Environmental Logger

Unit# 02400 Test 0

Setups: INPUT 1

Type Level (F)
Mode TOC
I.D. 00001

Reference 0.000
Linearity 0.310
Scale factor 100.320
Offset 0.030
Delay mSEC 50.000

Step 0 11/1/00 9:48
25 gpm (0 min.)
Duration = 36 min

Elapsed Time	Well 1
0	0
0.0033	0.348
0.0066	0
0.01	-0.158
0.0133	0.348
0.0166	0.158
0.02	0.031
0.0233	0.253
0.0266	0.158
0.03	0.316
0.0333	0.411
0.0366	0.221
0.04	0.316
0.0433	0.443
0.0466	0.285
0.05	0.348
0.0533	0.38
0.0566	0.285
0.06	0.538
0.0633	0.443
0.0666	0.221
0.07	0.57
0.0733	0.538
0.0766	0.348
0.08	0.665
0.0833	0.443
0.0866	0.602
0.09	0.728
0.0933	0.443
0.0966	0.443
0.1	0.76
0.1033	0.507
0.1066	0.697
0.11	0.633
0.1133	0.475
0.1166	0.665

SE1000C
Environmental Logger

Unit# 02400 Test 0

Setups: INPUT 1

Type Level (F)
Mode TOC
I.D. 00001

Reference 0.000
Linearity 0.310
Scale factor 100.320
Offset 0.030
Delay mSEC 50.000

Step 1 11/1/00 10:24
55 gpm (36 min)
Duration = 105 min

Elapsed Time	INPUT 1
0	3.739
0.0033	3.58
0.0066	3.359
0.01	3.675
0.0133	3.422
0.0166	3.739
0.02	3.612
0.0233	3.834
0.0266	3.517
0.03	3.739
0.0333	3.707
0.0366	3.707
0.04	3.897
0.0433	3.739
0.0466	3.802
0.05	3.77
0.0533	3.802
0.0566	3.739
0.06	3.707
0.0633	3.897
0.0666	3.77
0.07	3.866
0.0733	3.929
0.0766	4.214
0.08	3.834
0.0833	3.96
0.0866	3.929
0.09	3.897
0.0933	3.96
0.0966	4.182
0.1	4.087
0.1033	3.866
0.1066	4.087
0.11	3.897
0.1133	4.214
0.1166	3.929

SE1000C
Environmental Logger

Unit# 02400 Test 0

Setups: INPUT 1

Type Level (F)
Mode TOC
I.D. 00001

Reference 0.000
Linearity 0.310
Scale factor 100.320
Offset 0.030
Delay mSEC 50.000

Step 2 11/1/00 12:09
83 gpm (141 min)
Duration = 119 min

Elapsed Time	INPUT 1
0	9.569
0.0033	9.632
0.0066	9.537
0.01	9.505
0.0133	9.664
0.0166	11.026
0.02	10.012
0.0233	9.505
0.0266	9.6
0.03	9.759
0.0333	9.759
0.0366	9.79
0.04	9.569
0.0433	10.107
0.0466	9.949
0.05	9.917
0.0533	9.949
0.0566	9.917
0.06	10.076
0.0633	9.98
0.0666	10.076
0.07	9.949
0.0733	10.234
0.0766	10.202
0.08	10.361
0.0833	10.298
0.0866	10.361
0.09	10.424
0.0933	10.266
0.0966	10.519
0.1	10.424
0.1033	10.487
0.1066	10.392
0.11	10.487
0.1133	10.551
0.1166	10.392

SE1000C
Environmental Logger

Unit# 02400 Test 0

Setups: INPUT 1

Type Level (F)
Mode TOC
I.D. 00001

Reference 0.000
Linearity 0.310
Scale factor 100.320
Offset 0.030
Delay mSEC 50.000

Step 3 11/1/00 14:08
114 gpm (260 min)
Duration = 16 min

Elapsed Time	INPUT 1
0	31.518
0.0033	31.55
0.0066	31.518
0.01	31.803
0.0133	31.708
0.0166	31.771
0.02	31.55
0.0233	31.708
0.0266	31.708
0.03	31.74
0.0333	31.898
0.0366	31.771
0.04	31.866
0.0433	31.835
0.0466	32.215
0.05	32.025
0.0533	32.056
0.0566	32.088
0.06	32.025
0.0633	32.151
0.0666	32.151
0.07	32.151
0.0733	32.183
0.0766	32.151
0.08	32.31
0.0833	32.278
0.0866	32.5
0.09	32.436
0.0933	32.468
0.0966	32.5
0.1	32.658
0.1033	32.816
0.1066	32.468
0.11	33.101
0.1133	32.056
0.1166	33.164

SE1000C
Environmental Logger

Unit# 02400 Test 0

Setups: INPUT 1

Type Level (F)
Mode TOC
I.D. 00001

Reference 0.000
Linearity 0.310
Scale factor 100.320
Offset 0.030
Delay mSEC 50.000

Step 4 11/1/00 14:24
83 gpm (276 min)
Duration = 86.3333 min

Elapsed Time	INPUT 1
0	46.745
0.0033	46.777
0.0066	46.682
0.01	46.619
0.0133	46.524
0.0166	46.555
0.02	46.619
0.0233	46.619
0.0266	46.65
0.03	46.65
0.0333	46.587
0.0366	46.524
0.04	46.524
0.0433	46.555
0.0466	46.587
0.05	46.555
0.0533	46.619
0.0566	46.65
0.06	46.587
0.0633	46.555
0.0666	46.587
0.07	46.524
0.0733	46.555
0.0766	46.713
0.08	46.334
0.0833	45.922
0.0866	46.302
0.09	46.27
0.0933	46.239
0.0966	46.207
0.1	46.239
0.1033	46.207
0.1066	46.207
0.11	46.175
0.1133	46.175
0.1166	46.175

Step 5 11/01/00 15:50.33
Recovery (362.3333 min)

Elapsed Time	INPUT 1	
0	39.845	XD
0.6667	8.3	Manual
1.6667	3.3	Manual
2.667	1.7	Manual
3.667	1.24	Manual
5.6667	0.76	XD
7.6667	0.72	Manual
9.6667	0.6	Manual
16.6667	0.42	Manual
20.6667	0.34	Manual
24.6667	0.33	Manual

c\..\00151\Task 1\Well 1 Stepped Rate Data.xls

0.12	0.57	0.12	4.214	0.12	10.583	0.12	32.974	0.12	46.239
0.1233	0.411	0.1233	3.802	0.1233	10.519	0.1233	33.07	0.1233	46.112
0.1266	0.823	0.1266	4.246	0.1266	10.551	0.1266	32.88	0.1266	46.112
0.13	0.665	0.13	3.96	0.13	10.487	0.13	32.943	0.13	45.985
0.1333	0.633	0.1333	4.404	0.1333	10.709	0.1333	33.038	0.1333	45.954
0.1366	0.76	0.1366	4.214	0.1366	10.836	0.1366	33.26	0.1366	45.985
0.14	0.665	0.14	4.594	0.14	10.773	0.14	33.133	0.14	45.922
0.1433	0.538	0.1433	4.246	0.1433	10.741	0.1433	33.006	0.1433	45.701
0.1466	0.855	0.1466	4.436	0.1466	10.709	0.1466	33.323	0.1466	45.732
0.15	0.602	0.15	4.246	0.15	10.899	0.15	33.291	0.15	45.922
0.1533	0.57	0.1533	4.404	0.1533	11.058	0.1533	33.228	0.1533	46.175
0.1566	0.697	0.1566	4.309	0.1566	10.741	0.1566	33.133	0.1566	45.859
0.16	0.602	0.16	4.467	0.16	10.963	0.16	33.228	0.16	45.416
0.1633	0.792	0.1633	4.309	0.1633	11.026	0.1633	33.418	0.1633	45.859
0.1666	0.792	0.1666	4.563	0.1666	11.058	0.1666	33.449	0.1666	45.606
0.17	0.507	0.17	4.246	0.17	10.804	0.17	33.449	0.17	45.542
0.1733	0.76	0.1733	4.563	0.1733	11.248	0.1733	33.481	0.1733	45.796
0.1766	0.887	0.1766	4.151	0.1766	11.184	0.1766	33.481	0.1766	45.574
0.18	0.697	0.18	4.721	0.18	11.184	0.18	33.386	0.18	44.846
0.1833	0.887	0.1833	4.277	0.1833	11.375	0.1833	33.449	0.1833	45.574
0.1866	0.792	0.1866	4.721	0.1866	11.058	0.1866	33.671	0.1866	45.511
0.19	0.792	0.19	4.689	0.19	11.216	0.19	33.703	0.19	45.574
0.1933	0.982	0.1933	4.594	0.1933	11.406	0.1933	33.671	0.1933	45.479
0.1966	0.823	0.1966	4.467	0.1966	11.311	0.1966	33.703	0.1966	45.511
0.2	0.728	0.2	4.658	0.2	11.248	0.2	33.734	0.2	45.542
0.2033	0.855	0.2033	4.563	0.2033	11.375	0.2033	33.766	0.2033	45.542
0.2066	0.887	0.2066	4.848	0.2066	11.311	0.2066	33.766	0.2066	45.447
0.21	0.792	0.21	4.563	0.21	11.47	0.21	33.766	0.21	45.416
0.2133	1.045	0.2133	4.848	0.2133	11.533	0.2133	33.703	0.2133	45.669
0.2166	0.76	0.2166	4.753	0.2166	11.501	0.2166	33.798	0.2166	45.511
0.22	0.95	0.22	4.88	0.22	11.755	0.22	33.671	0.22	45.416
0.2233	0.855	0.2233	4.848	0.2233	11.786	0.2233	33.829	0.2233	45.447
0.2266	0.76	0.2266	4.88	0.2266	11.564	0.2266	33.988	0.2266	45.479
0.23	0.982	0.23	4.848	0.23	11.85	0.23	33.924	0.23	45.289
0.2333	1.077	0.2333	4.848	0.2333	11.723	0.2333	33.829	0.2333	45.289
0.2366	0.918	0.2366	4.753	0.2366	11.66	0.2366	33.924	0.2366	45.258
0.24	1.299	0.24	4.721	0.24	11.691	0.24	34.146	0.24	45.194
0.2433	0.887	0.2433	4.848	0.2433	11.818	0.2433	34.368	0.2433	45.194
0.2466	1.235	0.2466	4.943	0.2466	11.755	0.2466	34.209	0.2466	45.099
0.25	1.172	0.25	4.848	0.25	11.755	0.25	34.019	0.25	45.194
0.2533	0.918	0.2533	4.974	0.2533	11.85	0.2533	34.241	0.2533	45.099
0.2566	1.014	0.2566	4.943	0.2566	11.628	0.2566	34.526	0.2566	45.099
0.26	0.982	0.26	5.101	0.26	11.755	0.26	34.621	0.26	45.099
0.2633	1.014	0.2633	4.943	0.2633	11.913	0.2633	33.956	0.2633	45.194
0.2666	1.109	0.2666	5.228	0.2666	11.818	0.2666	34.178	0.2666	45.289
0.27	1.077	0.27	4.911	0.27	11.913	0.27	34.336	0.27	45.099
0.2733	1.235	0.2733	5.133	0.2733	11.913	0.2733	34.684	0.2733	45.226
0.2766	1.045	0.2766	4.974	0.2766	11.755	0.2766	33.893	0.2766	45.099
0.28	1.204	0.28	5.165	0.28	12.04	0.28	34.304	0.28	45.068
0.2833	1.204	0.2833	4.974	0.2833	11.881	0.2833	34.463	0.2833	45.068
0.2866	1.109	0.2866	4.943	0.2866	12.071	0.2866	34.589	0.2866	45.131
0.29	1.235	0.29	5.133	0.29	11.945	0.29	34.463	0.29	45.194
0.2933	1.299	0.2933	5.291	0.2933	11.913	0.2933	34.463	0.2933	45.131
0.2966	1.267	0.2966	5.228	0.2966	11.786	0.2966	34.526	0.2966	45.004
0.3	1.457	0.3	5.355	0.3	12.008	0.3	34.558	0.3	44.878
0.3033	1.172	0.3033	5.101	0.3033	12.008	0.3033	34.558	0.3033	45.036
0.3066	1.394	0.3066	5.228	0.3066	12.04	0.3066	34.589	0.3066	44.814
0.31	1.299	0.31	5.196	0.31	11.85	0.31	34.589	0.31	44.909
0.3133	1.204	0.3133	5.228	0.3133	11.913	0.3133	34.653	0.3133	45.004
0.3166	1.489	0.3166	5.291	0.3166	12.167	0.3166	34.748	0.3166	45.068

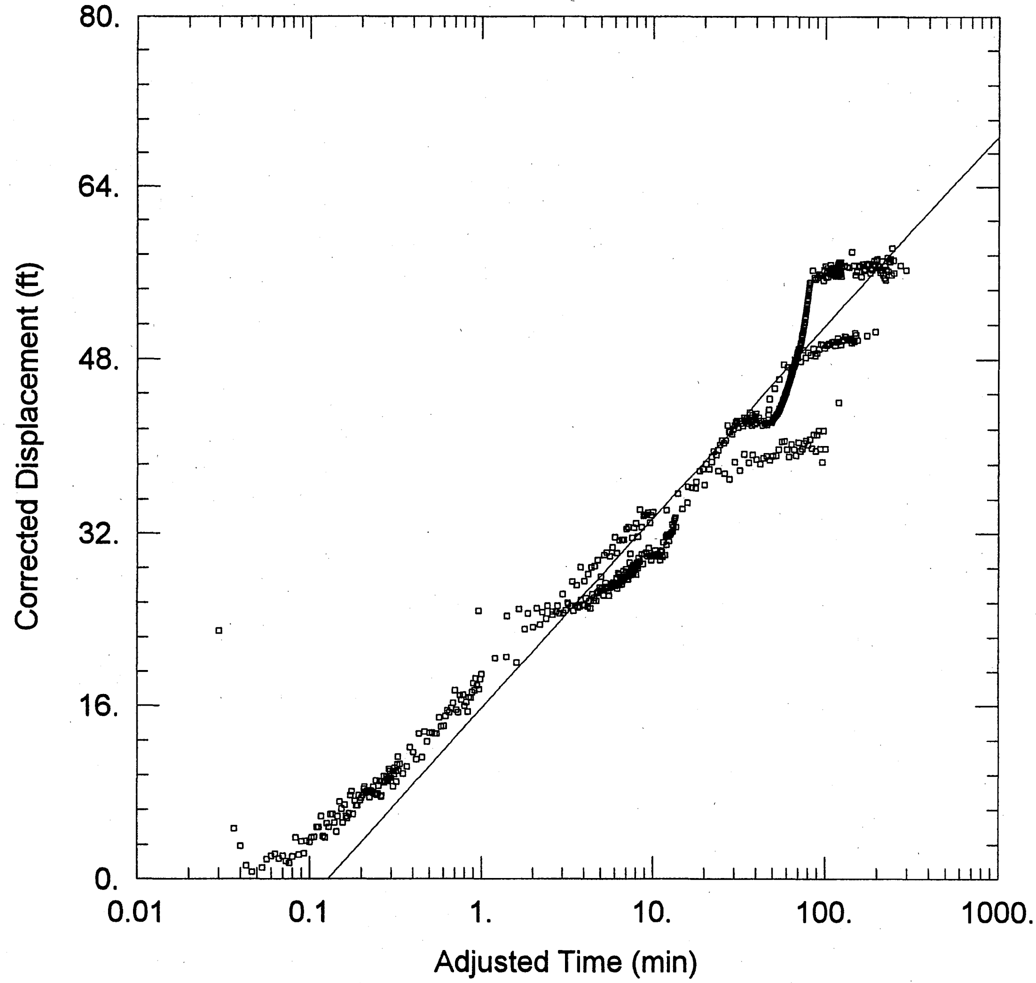
0.32	1.362	0.32	5.323	0.32	12.04	0.32	34.716	0.32	44.909
0.3233	1.489	0.3233	5.26	0.3233	12.167	0.3233	34.589	0.3233	44.751
0.3266	1.33	0.3266	5.386	0.3266	12.23	0.3266	34.748	0.3266	45.194
0.33	1.299	0.33	5.228	0.33	12.23	0.33	34.906	0.33	45.163
0.3333	1.711	0.3333	5.45	0.3333	12.198	0.3333	34.811	0.3333	44.909
0.35	1.489	0.35	5.672	0.35	12.61	0.35	35.128	0.35	44.973
0.3666	1.679	0.3666	5.798	0.3666	12.895	0.3666	35.064	0.3666	45.131
0.3833	1.679	0.3833	5.64	0.3833	12.99	0.3833	35.254	0.3833	44.973
0.4	1.616	0.4	5.672	0.4	13.434	0.4	35.571	0.4	44.783
0.4166	1.869	0.4166	5.767	0.4166	13.687	0.4166	35.539	0.4166	44.941
0.4333	1.806	0.4333	5.83	0.4333	14.035	0.4333	35.634	0.4333	44.656
0.45	2.028	0.45	5.988	0.45	14.131	0.45	35.792	0.45	44.53
0.4666	1.996	0.4666	5.925	0.4666	14.289	0.4666	35.792	0.4666	44.466
0.4833	2.091	0.4833	6.21	0.4833	14.542	0.4833	35.951	0.4833	44.53
0.5	2.059	0.5	6.21	0.5	14.764	0.5	36.109	0.5	44.34
0.5166	2.028	0.5166	6.369	0.5166	14.986	0.5166	36.331	0.5166	44.276
0.5333	1.933	0.5333	6.337	0.5333	15.271	0.5333	36.394	0.5333	44.434
0.55	2.028	0.55	6.21	0.55	15.493	0.55	36.394	0.55	44.15
0.5666	2.249	0.5666	6.464	0.5666	15.493	0.5666	36.616	0.5666	44.213
0.5833	2.154	0.5833	6.242	0.5833	15.588	0.5833	36.616	0.5833	43.896
0.6	2.281	0.6	6.337	0.6	16.031	0.6	36.71	0.6	43.833
0.6166	2.376	0.6166	6.686	0.6166	15.904	0.6166	36.932	0.6166	43.833
0.6333	2.503	0.6333	6.559	0.6333	16.285	0.6333	37.09	0.6333	43.896
0.65	2.408	0.65	6.654	0.65	16.728	0.65	37.154	0.65	43.896
0.6666	2.376	0.6666	6.464	0.6666	16.538	0.6666	37.249	0.6666	43.738
0.6833	2.281	0.6833	6.78	0.6833	16.602	0.6833	37.407	0.6833	43.58
0.7	2.186	0.7	6.939	0.7	17.108	0.7	37.407	0.7	43.58
0.7166	2.439	0.7166	6.939	0.7166	17.235	0.7166	37.534	0.7166	43.96
0.7333	2.376	0.7333	7.034	0.7333	17.14	0.7333	37.534	0.7333	43.612
0.75	2.439	0.75	7.224	0.75	17.298	0.75	37.66	0.75	43.896
0.7666	2.566	0.7666	7.161	0.7666	17.425	0.7666	37.692	0.7666	43.485
0.7833	2.725	0.7833	7.224	0.7833	17.71	0.7833	37.755	0.7833	43.453
0.8	2.439	0.8	7.066	0.8	17.647	0.8	37.977	0.8	43.263
0.8166	2.439	0.8166	7.256	0.8166	17.9	0.8166	38.167	0.8166	43.01
0.8333	3.359	0.8333	7.414	0.8333	18.185	0.8333	38.04	0.8333	43.137
0.85	2.82	0.85	7.288	0.85	18.249	0.85	38.04	0.85	42.884
0.8666	2.344	0.8666	7.129	0.8666	18.312	0.8666	38.072	0.8666	43.042
0.8833	2.725	0.8833	7.509	0.8833	18.597	0.8833	38.325	0.8833	43.042
0.9	2.566	0.9	7.256	0.9	18.565	0.9	38.293	0.9	42.82
0.9166	2.63	0.9166	7.636	0.9166	18.724	0.9166	38.483	0.9166	43.042
0.9333	2.883	0.9333	7.414	0.9333	18.882	0.9333	38.515	0.9333	42.694
0.95	2.756	0.95	7.446	0.95	19.041	0.95	38.515	0.95	42.852
0.9666	2.598	0.9666	7.636	0.9666	19.135	0.9666	38.578	0.9666	42.725
0.9833	2.661	0.9833	7.604	0.9833	19.167	0.9833	38.642	0.9833	42.852
1	2.471	1	7.541	1	19.357	1	38.895	1	42.915
1.2	2.82	1.2	8.016	1.2	20.529	1.2	39.623	1.2	42.187
1.4	2.661	1.4	8.238	1.4	21.606	1.4	40.351	1.4	41.966
1.6	2.978	1.6	8.365	1.6	22.113	1.6	40.889	1.6	41.649
1.8	2.915	1.8	8.46	1.8	22.398	1.8	41.364	1.8	41.934
2	2.978	2	8.46	2	22.651	2	41.744	2	40.921
2.2	3.042	2.2	8.681	2.2	23.379	2.2	41.681	2.2	41.079
2.4	2.978	2.4	8.46	2.4	23.443	2.4	41.744	2.4	41.079
2.6	3.137	2.6	8.777	2.6	23.728	2.6	42.219	2.6	40.636
2.8	3.042	2.8	8.745	2.8	24.076	2.8	42.599	2.8	40.668
3	2.978	3	8.681	3	24.172	3	43.01	3	40.541
3.2	2.883	3.2	8.967	3.2	24.361	3.2	43.232	3.2	40.383
3.4	3.042	3.4	8.808	3.4	24.425	3.4	43.485	3.4	40.098
3.6	3.264	3.6	8.935	3.6	24.615	3.6	43.991	3.6	39.75
3.8	3.295	3.8	8.999	3.8	24.678	3.8	43.928	3.8	39.876
4	3.264	4	8.713	4	24.646	4	44.34	4	40.13

4.2	3.232	4.2	8.808	4.2	25.185	4.2	44.466	4.2	39.971
4.4	3.137	4.4	8.935	4.4	25.153	4.4	44.371	4.4	39.908
4.6	3.295	4.6	8.872	4.6	24.995	4.6	44.593	4.6	39.94
4.8	3.168	4.8	8.967	4.8	25.153	4.8	44.783	4.8	39.686
5	3.2	5	8.967	5	26.072	5	44.878	5	39.75
5.2	3.264	5.2	9.03	5.2	26.072	5.2	45.068	5.2	39.465
5.4	3.232	5.4	9.062	5.4	26.388	5.4	45.068	5.4	39.686
5.6	3.2	5.6	9.252	5.6	26.008	5.6	45.258	5.6	39.496
5.8	3.042	5.8	8.999	5.8	26.673	5.8	45.384	5.8	39.528
6	3.042	6	9.062	6	26.832	6	45.416	6	39.813
6.2	3.295	6.2	9.252	6.2	26.99	6.2	45.669	6.2	39.718
6.4	3.39	6.4	9.188	6.4	27.212	6.4	45.574	6.4	39.623
6.6	3.168	6.6	8.999	6.6	27.402	6.6	45.321	6.6	39.686
6.8	3.073	6.8	9.22	6.8	27.402	6.8	45.606	6.8	39.718
7	3.2	7	9.125	7	27.876	7	45.701	7	39.401
7.2	3.327	7.2	9.062	7.2	27.908	7.2	45.827	7.2	39.813
7.4	3.359	7.4	9.22	7.4	28.193	7.4	45.827	7.4	39.37
7.6	3.264	7.6	9.093	7.6	28.446	7.6	45.985	7.6	39.75
7.8	3.295	7.8	9.157	7.8	27.972	7.8	46.017	7.8	39.591
8	3.517	8	9.188	8	27.972	8	46.081	8	39.465
8.2	3.105	8.2	9.188	8.2	28.098	8.2	46.049	8.2	39.591
8.4	3.2	8.4	9.157	8.4	28.162	8.4	46.081	8.4	39.401
8.6	3.422	8.6	9.284	8.6	28.415	8.6	46.081	8.6	39.591
8.8	3.2	8.8	9.188	8.8	28.257	8.8	46.175	8.8	39.56
9	3.168	9	9.157	9	28.668	9	45.922	9	39.813
9.2	3.454	9.2	9.252	9.2	29.27	9.2	45.669	9.2	39.908
9.4	3.359	9.4	9.378	9.4	28.985	9.4	45.922	9.4	39.401
9.6	3.232	9.6	9.093	9.6	28.636	9.6	46.302	9.6	39.655
9.8	3.264	9.8	9.315	9.8	28.732	9.8	46.207	9.8	39.56
10	3.295	10	9.188	10	28.922	10	46.207	10	39.591
12	3.327	12	9.411	12	29.112	12	46.46	12	39.655
14	3.39	14	9.315	14	29.682	14	46.524	14	39.591
16	3.422	16	9.252	16	29.682	16	46.777	16	39.845
18	3.2	18	9.347	18	30.156			18	39.908
20	3.58	20	9.505	20	29.935			20	39.876
22	3.485	22	9.378	22	30.22			22	39.718
24	3.422	24	9.411	24	30.03			24	39.908
26	3.644	26	9.378	26	30.378			26	39.813
28	3.485	28	9.505	28	30.473			28	39.908
30	3.39	30	9.473	30	30.156			30	39.813
32	3.485	32	9.537	32	29.903			32	39.908
34	3.485	34	9.6	34	30.346			34	39.75
36	3.39	36	9.284	36	30.695			36	39.781
		38	9.505	38	30.536			38	39.813
		40	9.411	40	30.885			40	39.718
		42	9.505	42	30.885			42	39.75
		44	9.569	44	30.885			44	39.876
		46	9.6	46	30.6			46	39.94
		48	9.505	48	30.758			48	39.686
		50	9.6	50	31.201			50	39.845
		52	9.537	52	31.075			52	39.75
		54	9.442	54	31.075			54	39.876
		56	9.315	56	30.821			56	39.876
		58	9.411	58	30.758			58	39.718
		60	9.537	60	31.043			60	39.496
		62	9.378	62	30.79			62	39.655
		64	9.759	64	31.043			64	39.94
		66	9.664	66	30.885			66	39.876
		68	9.473	68	30.98			68	39.781
		70	9.505	70	31.011			70	39.971

72	9.505	72	30.885	72	39.781
74	9.537	74	31.106	74	39.75
76	9.6	76	31.043	76	39.908
78	9.378	78	31.17	78	39.876
80	9.473	80	31.138	80	39.908
82	9.473	82	31.328	82	39.75
84	9.664	84	31.265	84	39.845
86	9.537	86	31.296	86	39.845
88	9.569	88	31.075		
90	9.695	90	31.265		
92	9.442	92	31.138		
94	9.505	94	31.486		
96	9.6	96	31.676		
98	9.632	98	31.455		
100	9.315	100	31.55		

APPENDIX E-2

STEP TEST - WELL #2



Well 2 pumping w/ well 2 observation

WELL 2 STEPPED RATE TEST

Data Set: F:\...\Well 2 Stepped Rate Test.aqt
Date: 12/07/00 Time: 17:07:13

PROJECT INFORMATION

Company: Alpha Geoscience
Client: Crossroads Ventures
Project: 00151 - Task 1
Test Location: Fleischmanns, NY
Test Well: Well 2
Test Date: 11/7/00

AQUIFER DATA

Saturated Thickness: 200. ft Anisotropy Ratio (Kz/Kr): 0.25

WELL DATA

Casing = 0.34' radius; Open Hole = 0.3' radius

Pumping Wells

Well Name	X (ft)	Y (ft)
Well 2	0	0

Observation Wells

Well Name	X (ft)	Y (ft)
▫ Well 2	0	0

SOLUTION

Automatic Match

Aquifer Model: Unconfined Solution Method: Cooper-Jacob

T = 4.638 cm^2/sec = 5.01×10^{-3} ft^2/s S = 0.9624

[illegible]

Data Set: F:\PROJECTS\2000\00141-00160\00151-Fleischmanns\Task 1-Village Water Source\well 2 step\Well 2
Title: Well 2 Stepped Rate Test
Date: 12/07/00
Time: 17:09:09

PROJECT INFORMATION

Company: Alpha Geoscience
Client: Crossroads Ventures
Project: 00151 - Task 1
Location: Fleischmanns, NY
Test Date: 11/7/00
Test Well: Well 2

AQUIFER DATA

Saturated Thickness: 200. ft
Anisotropy Ratio (Kz/Kr): 0.25

PUMPING WELL DATA

Number of pumping wells: 1

Pumping Well No. 1: Well 2

X Location: 0. ft
Y Location: 0. ft

Partially Penetrating Well
Depth To Top Of Screen: 17. ft
Depth To Bottom Of Screen: 200. ft

No. of pumping periods: 4

Pumping Period Data

Time (min)	Rate (gal/min)	Time (min)	Rate (gal/min)
0.	98.	260.	216.
120.	180.	400.	0.

OBSERVATION WELL DATA

Number of observation wells: 1

Observation Well No. 1: Well 2

X Location: 0. ft
Y Location: 0. ft

Partially Penetrating Well
Depth To Top Of Screen: 17. ft
Depth To Bottom Of Screen: 200. ft

No. of observations: 882

Observation Data

Time (min)	Displacement (ft)	Time (min)	Displacement (ft)
0.03	10.72	202.	47.1
0.0366	2.125	204.	46.97
0.04	1.395	206.	47.07

Time (min)	Displacement (ft)	Time (min)	Displacement (ft)
0.0433	0.539	208.	47.16
0.0466	0.285	210.	46.69
0.0533	0.475	212.	47.
0.0566	0.824	214.	46.81
0.06	0.951	216.	47.67
0.0633	1.046	218.	47.48
0.0666	0.856	220.	47.
0.07	0.951	240.	47.41
0.0733	0.729	260.	47.83
0.0766	0.666	260.	47.89
0.08	0.919	260.	47.92
0.0833	1.744	260.	47.64
0.0866	1.014	260.	47.86
0.09	1.585	260.	48.59
0.0933	1.078	260.	48.24
0.0966	1.617	260.	47.7
0.1	1.554	260.	47.92
0.1033	1.744	260.	47.95
0.1066	1.776	260.	47.76
0.11	2.188	260.	49.
0.1133	2.188	260.	49.54
0.1166	2.632	260.	47.98
0.12	1.807	260.	47.95
0.1233	1.744	260.1	48.11
0.1266	2.347	260.1	48.27
0.13	2.188	260.1	48.52
0.1333	2.727	260.1	48.62
0.1366	2.727	260.1	48.71
0.14	2.378	260.1	48.84
0.1433	1.998	260.1	48.9
0.1466	2.632	260.1	49.
0.15	3.234	260.1	49.09
0.1533	2.949	260.1	49.19
0.1566	2.378	260.1	49.41
0.16	3.107	260.1	49.41
0.1633	2.632	260.1	49.7
0.1666	2.568	260.1	49.63
0.17	2.759	260.1	49.76
0.1733	3.52	260.1	49.92
0.1766	3.678	260.1	50.11
0.18	2.727	260.1	50.14
0.1833	3.266	260.1	50.2
0.1866	3.076	260.1	50.42
0.19	3.076	260.1	50.52
0.1933	3.52	260.1	50.55
0.1966	3.298	260.1	50.71
0.2	3.393	260.1	50.8
0.2033	3.52	260.1	50.87
0.2066	3.773	260.1	50.99
0.21	3.869	260.1	51.12
0.2133	3.615	260.1	51.18
0.2166	3.71	260.1	51.41
0.22	3.647	260.1	51.37
0.2233	3.425	260.1	51.53
0.2266	3.742	260.2	51.56
0.23	3.71	260.2	51.72
0.2333	3.615	260.2	51.72
0.2366	3.869	260.2	51.85

Time (min)	Displacement (ft)	Time (min)	Displacement (ft)
0.24	3.583	260.2	51.94
0.2433	4.154	260.2	52.13
0.2466	3.551	260.2	52.2
0.25	3.583	260.2	52.32
0.2533	3.932	260.2	52.45
0.2566	4.122	260.2	52.45
0.26	3.456	260.2	52.67
0.2633	3.52	260.2	52.58
0.2666	4.122	260.2	52.67
0.27	4.344	260.2	52.8
0.2733	4.059	260.2	52.8
0.2766	4.122	260.2	52.92
0.28	4.313	260.2	53.02
0.2833	4.218	260.2	53.24
0.2866	4.154	260.2	53.27
0.29	4.629	260.2	53.27
0.2933	4.566	260.2	53.4
0.2966	4.249	260.2	53.46
0.3	4.122	260.2	53.53
0.3033	4.566	260.2	53.62
0.3066	3.9	260.2	53.65
0.31	4.408	260.2	53.94
0.3133	4.693	260.2	53.81
0.3166	4.566	260.2	53.97
0.32	4.091	260.2	54.03
0.3233	4.82	260.3	54.13
0.3266	5.169	260.3	54.1
0.33	4.566	260.3	54.19
0.3333	4.852	260.3	54.26
0.35	4.439	260.3	54.41
0.3666	4.757	260.3	54.38
0.3833	5.581	260.3	54.54
0.4	5.359	260.3	54.57
0.4166	5.042	260.3	54.73
0.4333	6.152	260.3	54.76
0.45	5.137	260.3	54.86
0.4666	6.247	260.3	54.83
0.4833	5.835	260.3	54.95
0.5	6.183	260.3	55.05
0.5166	6.215	260.3	55.02
0.5333	6.152	260.3	55.11
0.55	6.152	260.3	55.21
0.5666	6.849	260.3	55.24
0.5833	6.469	260.3	55.27
0.6	6.5	260.3	55.46
0.6166	6.913	260.3	55.36
0.6333	7.166	260.3	55.59
0.65	7.071	260.3	55.55
0.6666	7.262	260.3	55.59
0.6833	7.484	260.3	55.74
0.7	8.054	260.3	55.78
0.7166	7.198	260.4	56.06
0.7333	7.071	260.4	56.57
0.75	7.832	260.4	56.76
0.7666	7.642	260.4	56.85
0.7833	7.864	260.4	57.07
0.8	7.357	260.4	57.01
0.8166	7.515	260.4	57.26

Time (min)	Displacement (ft)	Time (min)	Displacement (ft)
0.8333	7.103	260.5	57.55
0.85	7.737	260.5	57.77
0.8666	7.705	260.5	57.96
0.8833	7.959	260.5	58.31
0.9	8.371	260.5	58.78
0.9166	8.054	260.6	58.94
0.9333	8.593	260.6	59.26
0.95	8.276	260.6	59.42
0.9666	8.118	260.6	59.8
0.9833	8.561	260.6	59.99
1.	8.784	260.6	60.27
1.2	9.481	260.6	60.56
1.4	9.544	260.7	60.65
1.6	9.291	260.7	61.09
1.8	10.78	260.7	61.35
2.	10.88	260.7	61.66
2.2	11.	260.7	61.98
2.4	11.26	260.8	62.17
2.6	11.41	260.8	62.42
2.8	11.83	260.8	62.81
3.	12.34	260.8	63.03
3.2	11.95	260.8	63.41
3.4	12.9	260.8	63.6
3.6	12.75	260.9	63.76
3.8	13.54	260.9	64.14
4.	12.94	260.9	64.33
4.2	13.25	260.9	64.61
4.4	13.54	260.9	64.89
4.6	13.6	260.9	65.12
4.8	13.86	260.9	65.31
5.	13.13	261.	65.59
5.2	14.08	261.	65.84
5.4	14.21	261.	65.94
5.6	14.02	261.2	67.68
5.8	14.43	261.4	66.67
6.	14.9	261.6	66.41
6.2	14.17	261.8	66.7
6.4	14.74	262.	67.14
6.6	14.78	262.2	67.05
6.8	14.78	262.4	67.02
7.	15.28	262.6	67.05
7.2	15.38	262.8	66.19
7.4	14.14	263.	67.74
7.6	14.87	263.2	68.25
7.8	15.35	263.4	66.7
8.	15.54	263.6	67.36
8.2	14.93	263.8	67.97
8.4	16.17	264.	66.79
8.6	15.38	264.2	67.59
8.8	15.89	264.4	67.24
9.	15.95	264.6	67.36
9.2	15.95	264.8	68.44
9.4	16.04	265.	67.43
9.6	15.57	265.2	67.65
9.8	15.92	265.4	67.97
10.	16.07	265.6	68.06
12.	16.14	265.8	67.02
14.	16.9	266.	67.9

Time (min)	Displacement (ft)	Time (min)	Displacement (ft)
16.	17.25	266.2	67.33
18.	17.47	266.4	68.03
20.	17.31	266.6	66.83
22.	18.39	266.8	67.81
24.	17.98	267.	66.89
26.	17.85	267.2	68.
28.	17.6	267.4	67.17
30.	18.39	267.6	68.47
32.	18.01	267.8	67.05
34.	18.74	268.	68.66
36.	18.36	268.2	67.84
38.	18.71	268.4	68.79
40.	18.52	268.6	67.24
42.	18.29	268.8	68.09
44.	18.58	269.	67.14
46.	18.64	269.2	68.6
48.	18.48	269.4	67.43
50.	18.64	269.6	68.82
52.	18.68	269.8	68.25
54.	18.96	270.	66.83
56.	19.31	272.	68.41
58.	19.34	274.	68.16
60.	18.96	276.	68.09
62.	18.61	278.	70.28
64.	19.18	280.	68.38
66.	18.96	282.	66.98
68.	18.68	284.	67.43
70.	19.28	286.	68.41
72.	18.9	288.	68.25
74.	18.99	290.	66.79
76.	19.25	292.	68.53
78.	19.37	294.	67.65
80.	19.15	296.	67.87
82.	19.44	298.	68.44
84.	19.02	300.	68.63
86.	19.63	302.	68.63
88.	18.9	304.	67.27
90.	19.63	306.	67.9
92.	19.82	308.	67.71
94.	18.99	310.	68.53
96.	18.39	312.	68.98
98.	19.82	314.	68.28
100.	18.99	316.	69.11
120.	21.12	318.	69.3
120.	21.84	320.	68.34
120.	21.4	322.	68.28
120.	22.04	324.	67.74
120.	21.62	326.	67.4
120.	22.07	328.	68.98
120.	21.75	330.	67.71
120.	22.29	332.	66.98
120.	21.81	334.	66.57
120.	21.78	336.	68.34
120.	21.62	338.	66.35
120.	21.69	340.	67.87
120.	21.91	342.	69.42
120.	22.48	344.	67.52
120.	22.29	346.	69.01

Time (min)	Displacement (ft)	Time (min)	Displacement (ft)
120.1	21.88	348.	68.88
120.1	22.32	350.	68.88
120.1	22.16	352.	69.3
120.1	22.26	354.	66.98
120.1	22.83	356.	70.81
120.1	22.41	358.	69.07
120.1	22.35	360.	67.27
120.1	22.99	380.	68.34
120.1	22.26	400.	67.78
120.1	22.76	400.	67.59
120.1	22.1	400.	67.65
120.1	23.3	400.	68.12
120.1	22.76	400.	68.03
120.1	23.05	400.	65.94
120.1	22.76	400.	66.67
120.1	23.4	400.	68.06
120.1	23.52	400.	68.88
120.1	23.94	400.	68.85
120.1	23.62	400.	67.43
120.1	23.81	400.	66.03
120.1	23.62	400.	64.89
120.1	23.27	400.	66.73
120.1	23.21	400.	67.55
120.1	24.32	400.1	67.55
120.1	23.81	400.1	67.08
120.1	24.	400.1	65.94
120.1	23.84	400.1	65.75
120.1	23.59	400.1	65.78
120.1	23.18	400.1	66.32
120.1	23.84	400.1	66.76
120.2	24.29	400.1	66.13
120.2	24.29	400.1	65.62
120.2	23.97	400.1	65.15
120.2	24.35	400.1	64.89
120.2	24.22	400.1	65.08
120.2	24.16	400.1	65.15
120.2	24.06	400.1	64.96
120.2	24.76	400.1	64.96
120.2	24.63	400.1	64.55
120.2	23.81	400.1	64.1
120.2	25.17	400.1	64.1
120.2	24.29	400.1	63.85
120.2	25.08	400.1	63.85
120.2	24.25	400.1	63.56
120.2	24.86	400.1	63.63
120.2	24.79	400.1	63.6
120.2	24.13	400.1	63.56
120.2	24.22	400.1	63.19
120.2	24.51	400.1	62.87
120.2	25.33	400.1	62.71
120.2	24.73	400.1	62.71
120.2	24.76	400.1	62.52
120.2	25.05	400.1	62.39
120.2	24.82	400.1	62.2
120.2	25.52	400.2	61.95
120.2	24.89	400.2	61.85
120.2	25.2	400.2	61.51
120.2	24.6	400.2	61.38

Time (min)	Displacement (ft)	Time (min)	Displacement (ft)
120.2	24.86	400.2	61.35
120.2	25.14	400.2	61.35
120.3	24.66	400.2	60.94
120.3	25.3	400.2	60.91
120.3	26.06	400.2	60.68
120.3	24.98	400.2	60.49
120.3	25.05	400.2	60.21
120.3	25.14	400.2	60.15
120.3	25.55	400.2	60.08
120.3	25.2	400.2	60.05
120.3	25.65	400.2	59.8
120.3	25.27	400.2	59.29
120.3	25.87	400.2	59.13
120.3	25.3	400.2	59.1
120.3	25.17	400.2	59.1
120.3	25.87	400.2	58.88
120.3	25.36	400.2	58.66
120.3	25.71	400.2	58.4
120.3	25.87	400.2	58.37
120.3	25.74	400.2	58.12
120.3	25.08	400.2	57.9
120.3	25.77	400.2	57.77
120.3	26.09	400.2	57.49
120.3	25.81	400.2	57.52
120.3	25.77	400.2	57.33
120.3	25.62	400.3	57.26
120.3	25.93	400.3	57.04
120.3	26.44	400.3	56.79
120.3	26.19	400.3	56.69
120.4	26.79	400.3	56.5
120.4	25.93	400.3	56.47
120.4	26.88	400.3	56.6
120.4	26.98	400.3	56.54
120.4	26.66	400.3	56.47
120.5	27.39	400.3	56.12
120.5	26.66	400.3	55.81
120.5	26.28	400.3	55.78
120.5	26.73	400.3	55.55
120.5	26.73	400.3	55.55
120.5	26.82	400.3	55.52
120.6	27.14	400.3	55.46
120.6	26.66	400.3	55.17
120.6	26.85	400.3	55.14
120.6	26.63	400.3	54.92
120.6	26.76	400.3	54.86
120.6	26.31	400.3	54.64
120.7	27.17	400.3	54.6
120.7	27.01	400.3	54.38
120.7	26.6	400.3	54.35
120.7	27.9	400.3	54.13
120.7	26.76	400.3	54.1
120.7	26.73	400.4	53.43
120.8	28.41	400.4	52.58
120.8	27.64	400.4	51.66
120.8	28.59	400.4	50.8
120.8	28.44	400.4	50.14
120.8	28.02	400.4	49.31
120.8	28.66	400.4	48.65

Time (min)	Displacement (ft)	Time (min)	Displacement (ft)
120.8	28.59	400.5	47.86
120.9	28.72	400.5	47.03
120.9	28.82	400.5	46.34
120.9	29.51	400.5	45.7
120.9	28.88	400.5	45.17
120.9	29.26	400.6	44.59
121.	29.86	400.6	44.06
121.	30.02	400.6	43.77
121.	30.15	400.6	43.45
121.	29.29	400.6	43.2
121.2	30.97	400.6	43.01
121.4	31.54	400.6	42.85
121.6	32.94	400.7	42.76
121.8	32.91	400.7	42.66
122.	34.49	400.7	42.54
122.2	34.68	400.7	42.44
122.4	35.16	400.7	42.31
122.6	34.71	400.8	42.25
122.8	35.82	400.8	42.12
123.	36.33	400.8	42.
123.2	35.98	400.8	41.84
123.4	36.42	400.8	41.74
123.6	36.93	400.8	41.62
123.8	37.34	400.9	41.46
124.	37.09	400.9	41.36
124.2	37.34	400.9	41.27
124.4	38.77	400.9	41.14
124.6	38.1	400.9	40.98
124.8	38.13	400.9	40.86
125.	37.94	400.9	40.73
125.2	38.39	401.	40.6
125.4	38.77	401.	40.48
125.6	39.02	401.	40.32
125.8	39.18	401.2	36.23
126.	38.55	401.4	32.59
126.2	39.15	401.6	30.02
126.4	38.92	401.8	28.09
126.6	39.15	402.	26.73
126.8	38.7	402.2	25.87
127.	39.49	402.4	24.73
127.2	39.46	402.6	23.78
127.4	39.12	402.8	22.99
127.6	39.43	403.	22.23
127.8	39.21	403.2	21.46
128.	38.89	403.4	20.67
128.2	39.97	403.6	19.97
128.4	39.12	403.8	19.31
128.6	39.24	404.	18.74
128.8	39.75	404.2	18.2
129.	39.31	404.4	17.69
129.2	39.21	404.6	17.25
129.4	39.56	404.8	16.81
129.6	39.59	405.	16.39
129.8	39.88	405.2	16.01
130.	38.96	405.4	15.63
132.	39.18	405.6	15.28
134.	41.24	405.8	14.97
136.	42.19	406.	14.65

Time (min)	Displacement (ft)	Time (min)	Displacement (ft)
138.	43.08	406.2	14.36
140.	44.56	406.4	14.08
142.	44.28	406.6	13.79
144.	44.22	406.8	13.51
146.	45.07	407.	13.25
148.	45.26	407.2	13.
150.	44.85	407.4	12.75
152.	45.99	407.6	12.53
154.	45.23	407.8	12.3
156.	45.74	408.	12.11
158.	45.48	408.2	11.92
160.	46.15	408.4	11.7
162.	45.42	408.6	11.51
164.	45.67	408.8	11.32
166.	46.05	409.	11.13
168.	46.59	409.2	10.97
170.	46.53	409.4	10.78
172.	46.21	409.6	10.62
174.	46.46	409.8	10.46
176.	46.65	410.	10.31
178.	46.56	412.	8.942
180.	46.75	414.	7.896
182.	46.88	416.	7.04
184.	46.43	418.	6.374
186.	46.75	420.	5.835
188.	47.19	422.	5.359
190.	46.84	424.	4.978
192.	46.53	426.	4.661
194.	46.91	428.	4.376
196.	47.03	430.	4.154
198.	47.35	432.	3.932
200.	47.32	434.	3.742

SOLUTION

Aquifer Model: Unconfined
Solution Method: Cooper-Jacob

VISUAL ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	
T	4.306	cm^2/sec
S	1.037	

AUTOMATIC ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	Std. Error	
T	4.638	0.04633	cm^2/sec
S	0.9624	0.04791	

Parameter Correlations

	T	S
T	1.00	-0.95

WELL 2 STEPPED RATE PUMPING TEST

SE1000C Environmental Logger		SE1000C Environmental Logger		SE1000C Environmental Logger		SE1000C Environmental Logger	
Unit# 02400 Test 0		Unit# 02400 Test 0		Unit# 02400 Test 0		Unit# 02400 Test 0	
Setups:	INPUT 1	Setups:	INPUT 1	Setups:	INPUT 1	Setups:	INPUT 1
Type	Level (F)	Type	Level (F)	Type	Level (F)	Type	Level (F)
Mode	TOC	Mode	TOC	Mode	TOC	Mode	TOC
I.D.	00001	I.D.	00001	I.D.	00001	I.D.	00001
Reference	0.000	Reference	0.000	Reference	0.000	Reference	0.000
Linearity	0.310	Linearity	0.310	Linearity	0.310	Linearity	0.310
Scale factor	100.320	Scale factor	100.320	Scale factor	100.320	Scale factor	100.320
Offset	0.030	Offset	0.030	Offset	0.030	Offset	0.030
Delay mSEC	50.000	Delay mSEC	50.000	Delay mSEC	50.000	Delay mSEC	50.000
Step 0 11/07 08:43:21		**Step 1** 11/07 10:43:30		**Step 2** 11/07 13:23:22		**Step 3** 11/07 15:55:21	
98 gpm		**180 gpm**		**216 gpm**		**Recovery**	
Elapsed Time	INPUT 1	Elapsed Time	INPUT 1	Elapsed Time	INPUT 1	Elapsed Time	INPUT 1
0.0000	0.000	0.0000	21.116	0.0000	47.826	0.0000	67.776
0.0033	-0.031	0.0033	21.844	0.0033	47.890	0.0033	67.586
0.0066	-0.031	0.0066	21.401	0.0066	47.921	0.0066	67.649
0.0100	-0.031	0.0100	22.035	0.0100	47.636	0.0100	68.124
0.0133	-0.031	0.0133	21.623	0.0133	47.858	0.0133	68.029
0.0166	-0.031	0.0166	22.067	0.0166	48.586	0.0166	65.939
0.0200	-0.063	0.0200	21.750	0.0200	48.238	0.0200	66.668
0.0233	-0.063	0.0233	22.288	0.0233	47.700	0.0233	68.061
0.0266	-0.126	0.0266	21.813	0.0266	47.921	0.0266	68.884
0.0300	10.717	0.0300	21.781	0.0300	47.953	0.0300	68.852
0.0333	-8.563	0.0333	21.623	0.0333	47.763	0.0333	67.427
0.0366	2.125	0.0366	21.686	0.0366	48.998	0.0366	66.034
0.0400	1.395	0.0400	21.908	0.0400	49.536	0.0400	64.895
0.0433	0.539	0.0433	22.478	0.0433	47.985	0.0433	66.731
0.0466	0.285	0.0466	22.288	0.0466	47.953	0.0466	67.554
0.0500	-0.570	0.0500	21.876	0.0500	48.111	0.0500	67.554
0.0533	0.475	0.0533	22.320	0.0533	48.270	0.0533	67.079
0.0566	0.824	0.0566	22.161	0.0566	48.523	0.0566	65.939
0.0600	0.951	0.0600	22.257	0.0600	48.618	0.0600	65.749
0.0633	1.046	0.0633	22.827	0.0633	48.713	0.0633	65.781
0.0666	0.856	0.0666	22.415	0.0666	48.840	0.0666	66.319
0.0700	0.951	0.0700	22.351	0.0700	48.903	0.0700	66.763
0.0733	0.729	0.0733	22.986	0.0733	48.998	0.0733	66.129
0.0766	0.666	0.0766	22.257	0.0766	49.093	0.0766	65.623
0.0800	0.919	0.0800	22.764	0.0800	49.188	0.0800	65.148
0.0833	1.744	0.0833	22.098	0.0833	49.410	0.0833	64.895
0.0866	1.014	0.0866	23.302	0.0866	49.410	0.0866	65.085

0.0900	1.585	0.0900	22.764	0.0900	49.695	0.0900	65.148
0.0933	1.078	0.0933	23.049	0.0933	49.632	0.0933	64.958
0.0966	1.617	0.0966	22.764	0.0966	49.758	0.0966	64.958
0.1000	1.554	0.1000	23.397	0.1000	49.917	0.1000	64.546
0.1033	1.744	0.1033	23.524	0.1033	50.107	0.1033	64.103
0.1066	1.776	0.1066	23.936	0.1066	50.138	0.1066	64.103
0.1100	2.188	0.1100	23.619	0.1100	50.202	0.1100	63.850
0.1133	2.188	0.1133	23.810	0.1133	50.424	0.1133	63.850
0.1166	2.632	0.1166	23.619	0.1166	50.518	0.1166	63.565
0.1200	1.807	0.1200	23.271	0.1200	50.550	0.1200	63.628
0.1233	1.744	0.1233	23.208	0.1233	50.709	0.1233	63.597
0.1266	2.347	0.1266	24.317	0.1266	50.803	0.1266	63.565
0.1300	2.188	0.1300	23.810	0.1300	50.867	0.1300	63.185
0.1333	2.727	0.1333	24.000	0.1333	50.994	0.1333	62.868
0.1366	2.727	0.1366	23.841	0.1366	51.120	0.1366	62.710
0.1400	2.378	0.1400	23.588	0.1400	51.184	0.1400	62.710
0.1433	1.998	0.1433	23.176	0.1433	51.405	0.1433	62.520
0.1466	2.632	0.1466	23.841	0.1466	51.374	0.1466	62.393
0.1500	3.234	0.1500	24.285	0.1500	51.532	0.1500	62.204
0.1533	2.949	0.1533	24.285	0.1533	51.564	0.1533	61.950
0.1566	2.378	0.1566	23.968	0.1566	51.722	0.1566	61.855
0.1600	3.107	0.1600	24.348	0.1600	51.722	0.1600	61.507
0.1633	2.632	0.1633	24.222	0.1633	51.849	0.1633	61.380
0.1666	2.568	0.1666	24.158	0.1666	51.944	0.1666	61.349
0.1700	2.759	0.1700	24.063	0.1700	52.134	0.1700	61.349
0.1733	3.520	0.1733	24.760	0.1733	52.197	0.1733	60.937
0.1766	3.678	0.1766	24.634	0.1766	52.324	0.1766	60.905
0.1800	2.727	0.1800	23.810	0.1800	52.450	0.1800	60.684
0.1833	3.266	0.1833	25.172	0.1833	52.450	0.1833	60.494
0.1866	3.076	0.1866	24.285	0.1866	52.672	0.1866	60.209
0.1900	3.076	0.1900	25.077	0.1900	52.577	0.1900	60.145
0.1933	3.520	0.1933	24.253	0.1933	52.672	0.1933	60.082
0.1966	3.298	0.1966	24.855	0.1966	52.799	0.1966	60.050
0.2000	3.393	0.2000	24.792	0.2000	52.799	0.2000	59.797
0.2033	3.520	0.2033	24.127	0.2033	52.925	0.2033	59.291
0.2066	3.773	0.2066	24.222	0.2066	53.020	0.2066	59.132
0.2100	3.869	0.2100	24.507	0.2100	53.242	0.2100	59.101
0.2133	3.615	0.2133	25.331	0.2133	53.274	0.2133	59.101
0.2166	3.710	0.2166	24.729	0.2166	53.274	0.2166	58.879
0.2200	3.647	0.2200	24.760	0.2200	53.400	0.2200	58.657
0.2233	3.425	0.2233	25.046	0.2233	53.464	0.2233	58.404
0.2266	3.742	0.2266	24.824	0.2266	53.527	0.2266	58.372
0.2300	3.710	0.2300	25.521	0.2300	53.622	0.2300	58.119
0.2333	3.615	0.2333	24.887	0.2333	53.654	0.2333	57.897
0.2366	3.869	0.2366	25.204	0.2366	53.939	0.2366	57.771
0.2400	3.583	0.2400	24.602	0.2400	53.813	0.2400	57.486
0.2433	4.154	0.2433	24.855	0.2433	53.971	0.2433	57.517
0.2466	3.551	0.2466	25.141	0.2466	54.034	0.2466	57.327
0.2500	3.583	0.2500	24.665	0.2500	54.129	0.2500	57.264
0.2533	3.932	0.2533	25.299	0.2533	54.097	0.2533	57.042
0.2566	4.122	0.2566	26.060	0.2566	54.192	0.2566	56.789
0.2600	3.456	0.2600	24.982	0.2600	54.255	0.2600	56.694

0.8500	7.737	0.8500	28.595	0.8500	63.755	0.8500	41.459
0.8666	7.705	0.8666	28.722	0.8666	64.135	0.8666	41.364
0.8833	7.959	0.8833	28.817	0.8833	64.325	0.8833	41.269
0.9000	8.371	0.9000	29.514	0.9000	64.610	0.9000	41.142
0.9166	8.054	0.9166	28.880	0.9166	64.895	0.9166	40.984
0.9333	8.593	0.9333	29.261	0.9333	65.116	0.9333	40.857
0.9500	8.276	0.9500	29.863	0.9500	65.306	0.9500	40.730
0.9666	8.118	0.9666	30.021	0.9666	65.591	0.9666	40.604
0.9833	8.561	0.9833	30.148	0.9833	65.844	0.9833	40.477
1.0000	8.784	1.0000	29.293	1.0000	65.939	1.0000	40.319
1.2000	9.481	1.2000	30.972	1.2000	67.681	1.2000	36.232
1.4000	9.544	1.4000	31.542	1.4000	66.668	1.4000	32.588
1.6000	9.291	1.6000	32.936	1.6000	66.414	1.6000	30.021
1.8000	10.781	1.8000	32.905	1.8000	66.699	1.8000	28.088
2.0000	10.876	2.0000	34.489	2.0000	67.142	2.0000	26.725
2.2000	11.003	2.2000	34.679	2.2000	67.047	2.2000	25.870
2.4000	11.257	2.4000	35.155	2.4000	67.016	2.4000	24.729
2.6000	11.415	2.6000	34.711	2.6000	67.047	2.6000	23.778
2.8000	11.827	2.8000	35.820	2.8000	66.193	2.8000	22.986
3.0000	12.335	3.0000	36.327	3.0000	67.744	3.0000	22.225
3.2000	11.954	3.2000	35.978	3.2000	68.250	3.2000	21.464
3.4000	12.905	3.4000	36.422	3.4000	66.699	3.4000	20.672
3.6000	12.746	3.6000	36.929	3.6000	67.364	3.6000	19.974
3.8000	13.539	3.8000	37.341	3.8000	67.965	3.8000	19.309
4.0000	12.937	4.0000	37.087	4.0000	66.794	4.0000	18.738
4.2000	13.254	4.2000	37.341	4.2000	67.586	4.2000	18.199
4.4000	13.539	4.4000	38.766	4.4000	67.237	4.4000	17.692
4.6000	13.603	4.6000	38.101	4.6000	67.364	4.6000	17.248
4.8000	13.856	4.8000	38.133	4.8000	68.440	4.8000	16.805
5.0000	13.127	5.0000	37.943	5.0000	67.427	5.0000	16.393
5.2000	14.078	5.2000	38.386	5.2000	67.649	5.2000	16.012
5.4000	14.205	5.4000	38.766	5.4000	67.965	5.4000	15.631
5.6000	14.015	5.6000	39.020	5.6000	68.061	5.6000	15.283
5.8000	14.427	5.8000	39.178	5.8000	67.016	5.8000	14.966
6.0000	14.902	6.0000	38.545	6.0000	67.902	6.0000	14.649
6.2000	14.173	6.2000	39.147	6.2000	67.332	6.2000	14.364
6.4000	14.744	6.4000	38.925	6.4000	68.029	6.4000	14.078
6.6000	14.776	6.6000	39.147	6.6000	66.826	6.6000	13.793
6.8000	14.776	6.8000	38.703	6.8000	67.807	6.8000	13.508
7.0000	15.283	7.0000	39.495	7.0000	66.889	7.0000	13.254
7.2000	15.378	7.2000	39.463	7.2000	67.997	7.2000	13.000
7.4000	14.142	7.4000	39.115	7.4000	67.174	7.4000	12.746
7.6000	14.871	7.6000	39.432	7.6000	68.472	7.6000	12.525
7.8000	15.346	7.8000	39.210	7.8000	67.047	7.8000	12.303
8.0000	15.537	8.0000	38.893	8.0000	68.662	8.0000	12.113
8.2000	14.934	8.2000	39.970	8.2000	67.839	8.2000	11.922
8.4000	16.170	8.4000	39.115	8.4000	68.789	8.4000	11.701
8.6000	15.378	8.6000	39.242	8.6000	67.237	8.6000	11.510
8.8000	15.885	8.8000	39.748	8.8000	68.092	8.8000	11.320
9.0000	15.949	9.0000	39.305	9.0000	67.142	9.0000	11.130
9.2000	15.949	9.2000	39.210	9.2000	68.599	9.2000	10.971
9.4000	16.044	9.4000	39.558	9.4000	67.427	9.4000	10.781

0.2633	3.520	0.2633	25.046	0.2633	54.414	0.2633	56.504
0.2666	4.122	0.2666	25.141	0.2666	54.382	0.2666	56.472
0.2700	4.344	0.2700	25.553	0.2700	54.541	0.2700	56.599
0.2733	4.059	0.2733	25.204	0.2733	54.572	0.2733	56.536
0.2766	4.122	0.2766	25.648	0.2766	54.731	0.2766	56.472
0.2800	4.313	0.2800	25.267	0.2800	54.762	0.2800	56.124
0.2833	4.218	0.2833	25.870	0.2833	54.857	0.2833	55.807
0.2866	4.154	0.2866	25.299	0.2866	54.826	0.2866	55.776
0.2900	4.629	0.2900	25.172	0.2900	54.952	0.2900	55.554
0.2933	4.566	0.2933	25.870	0.2933	55.047	0.2933	55.554
0.2966	4.249	0.2966	25.363	0.2966	55.016	0.2966	55.522
0.3000	4.122	0.3000	25.711	0.3000	55.111	0.3000	55.459
0.3033	4.566	0.3033	25.870	0.3033	55.206	0.3033	55.174
0.3066	3.900	0.3066	25.743	0.3066	55.237	0.3066	55.142
0.3100	4.408	0.3100	25.077	0.3100	55.269	0.3100	54.921
0.3133	4.693	0.3133	25.774	0.3133	55.459	0.3133	54.857
0.3166	4.566	0.3166	26.092	0.3166	55.364	0.3166	54.636
0.3200	4.091	0.3200	25.807	0.3200	55.586	0.3200	54.604
0.3233	4.820	0.3233	25.774	0.3233	55.554	0.3233	54.382
0.3266	5.169	0.3266	25.616	0.3266	55.586	0.3266	54.351
0.3300	4.566	0.3300	25.933	0.3300	55.744	0.3300	54.129
0.3333	4.852	0.3333	26.440	0.3333	55.776	0.3333	54.097
0.3500	4.439	0.3500	26.187	0.3500	56.061	0.3500	53.432
0.3666	4.757	0.3666	26.789	0.3666	56.567	0.3666	52.577
0.3833	5.581	0.3833	25.933	0.3833	56.757	0.3833	51.659
0.4000	5.359	0.4000	26.884	0.4000	56.852	0.4000	50.803
0.4166	5.042	0.4166	26.979	0.4166	57.074	0.4166	50.138
0.4333	6.152	0.4333	26.662	0.4333	57.011	0.4333	49.315
0.4500	5.137	0.4500	27.391	0.4500	57.264	0.4500	48.650
0.4666	6.247	0.4666	26.662	0.4666	57.549	0.4666	47.858
0.4833	5.835	0.4833	26.282	0.4833	57.771	0.4833	47.035
0.5000	6.183	0.5000	26.725	0.5000	57.961	0.5000	46.337
0.5166	6.215	0.5166	26.725	0.5166	58.309	0.5166	45.704
0.5333	6.152	0.5333	26.821	0.5333	58.784	0.5333	45.166
0.5500	6.152	0.5500	27.137	0.5500	58.942	0.5500	44.595
0.5666	6.849	0.5666	26.662	0.5666	59.259	0.5666	44.057
0.5833	6.469	0.5833	26.852	0.5833	59.417	0.5833	43.772
0.6000	6.500	0.6000	26.631	0.6000	59.797	0.6000	43.455
0.6166	6.913	0.6166	26.757	0.6166	59.987	0.6166	43.201
0.6333	7.166	0.6333	26.314	0.6333	60.272	0.6333	43.012
0.6500	7.071	0.6500	27.169	0.6500	60.557	0.6500	42.853
0.6666	7.262	0.6666	27.011	0.6666	60.652	0.6666	42.758
0.6833	7.484	0.6833	26.599	0.6833	61.095	0.6833	42.663
0.7000	8.054	0.7000	27.898	0.7000	61.349	0.7000	42.536
0.7166	7.198	0.7166	26.757	0.7166	61.665	0.7166	42.441
0.7333	7.071	0.7333	26.725	0.7333	61.982	0.7333	42.315
0.7500	7.832	0.7500	28.405	0.7500	62.172	0.7500	42.251
0.7666	7.642	0.7666	27.644	0.7666	62.425	0.7666	42.124
0.7833	7.864	0.7833	28.595	0.7833	62.805	0.7833	41.998
0.8000	7.357	0.8000	28.437	0.8000	63.027	0.8000	41.839
0.8166	7.515	0.8166	28.025	0.8166	63.407	0.8166	41.744
0.8333	7.103	0.8333	28.659	0.8333	63.597	0.8333	41.618

9.6000	15.568	9.6000	39.590	9.6000	68.820	9.6000	10.622
9.8000	15.917	9.8000	39.875	9.8000	68.250	9.8000	10.464
10.0000	16.075	10.0000	38.956	10.0000	66.826	10.0000	10.306
12.0000	16.139	12.0000	39.178	12.0000	68.409	12.0000	8.942
14.0000	16.900	14.0000	41.237	14.0000	68.155	14.0000	7.896
16.0000	17.248	16.0000	42.188	16.0000	68.092	16.0000	7.040
18.0000	17.470	18.0000	43.075	18.0000	70.276	18.0000	6.374
20.0000	17.312	20.0000	44.564	20.0000	68.377	20.0000	5.835
22.0000	18.389	22.0000	44.279	22.0000	66.984	22.0000	5.359
24.0000	17.978	24.0000	44.215	24.0000	67.427	24.0000	4.978
26.0000	17.851	26.0000	45.071	26.0000	68.409	26.0000	4.661
28.0000	17.597	28.0000	45.260	28.0000	68.250	28.0000	4.376
30.0000	18.389	30.0000	44.849	30.0000	66.794	30.0000	4.154
32.0000	18.009	32.0000	45.989	32.0000	68.535	32.0000	3.932
34.0000	18.738	34.0000	45.229	34.0000	67.649	34.0000	3.742
36.0000	18.358	36.0000	45.736	36.0000	67.871		
38.0000	18.707	38.0000	45.482	38.0000	68.440		
40.0000	18.516	40.0000	46.147	40.0000	68.630		
42.0000	18.294	42.0000	45.419	42.0000	68.630		
44.0000	18.580	44.0000	45.673	44.0000	67.269		
46.0000	18.643	46.0000	46.052	46.0000	67.902		
48.0000	18.485	48.0000	46.591	48.0000	67.712		
50.0000	18.643	50.0000	46.528	50.0000	68.535		
52.0000	18.675	52.0000	46.211	52.0000	68.979		
54.0000	18.960	54.0000	46.464	54.0000	68.282		
56.0000	19.309	56.0000	46.654	56.0000	69.105		
58.0000	19.340	58.0000	46.559	58.0000	69.295		
60.0000	18.960	60.0000	46.750	60.0000	68.345		
62.0000	18.611	62.0000	46.876	62.0000	68.282		
64.0000	19.182	64.0000	46.433	64.0000	67.744		
66.0000	18.960	66.0000	46.750	66.0000	67.396		
68.0000	18.675	68.0000	47.193	68.0000	68.979		
70.0000	19.277	70.0000	46.844	70.0000	67.712		
72.0000	18.897	72.0000	46.528	72.0000	66.984		
74.0000	18.992	74.0000	46.908	74.0000	66.573		
76.0000	19.245	76.0000	47.035	76.0000	68.345		
78.0000	19.372	78.0000	47.351	78.0000	66.351		
80.0000	19.150	80.0000	47.319	80.0000	67.871		
82.0000	19.436	82.0000	47.098	82.0000	69.422		
84.0000	19.024	84.0000	46.971	84.0000	67.522		
86.0000	19.626	86.0000	47.066	86.0000	69.010		
88.0000	18.897	88.0000	47.161	88.0000	68.884		
90.0000	19.626	90.0000	46.686	90.0000	68.884		
92.0000	19.816	92.0000	47.003	92.0000	69.295		
94.0000	18.992	94.0000	46.813	94.0000	66.984		
96.0000	18.389	96.0000	47.668	96.0000	70.814		
98.0000	19.816	98.0000	47.478	98.0000	69.074		
100.000	18.992	100.000	47.003	100.000	67.269		
120.000	19.499	120.000	47.415	120.000	68.345		
		140.000	47.890	140.000	68.535		

S	-0.95	1.00

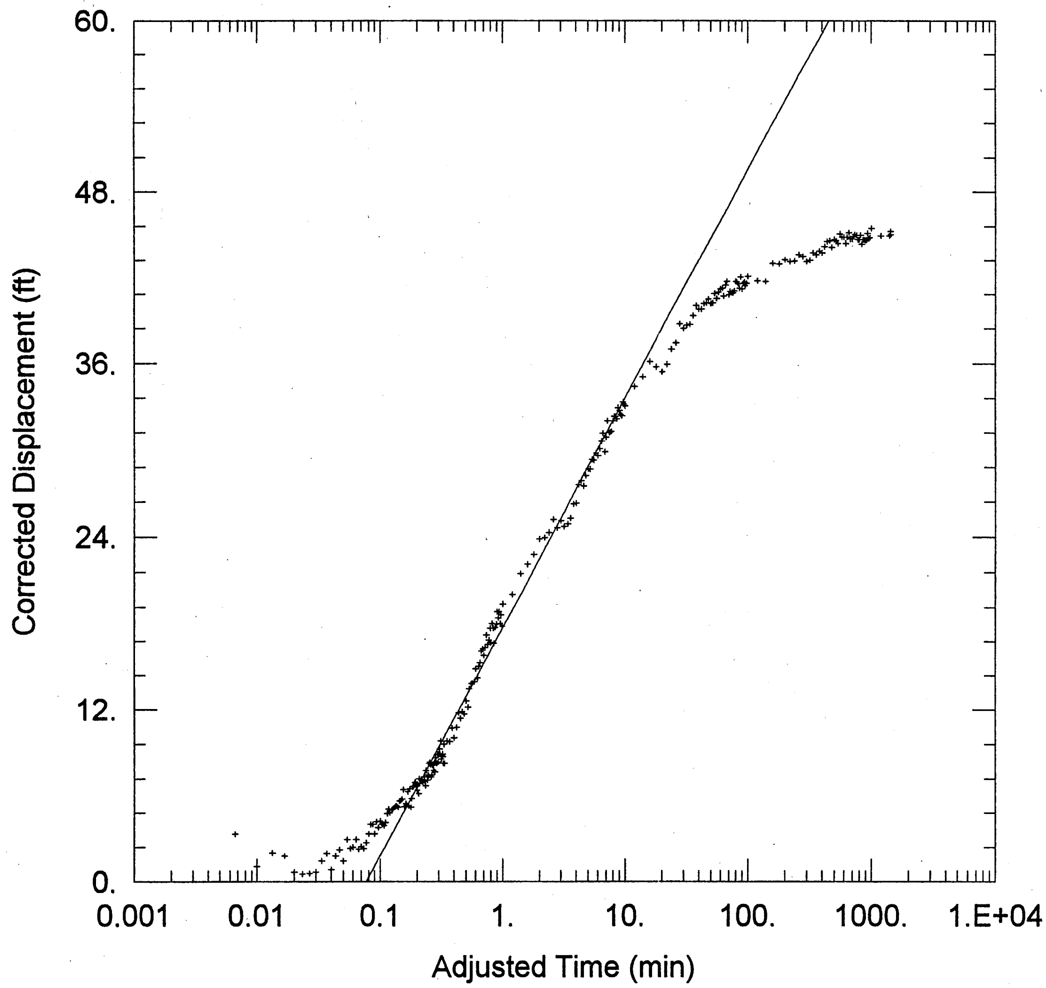
Residual Statistics

for weighted residuals

Sum of Squares. . . . . 6728.5 ft^2
Variance . . . . 9.851 ft^2
Std. Deviation . . . . 3.139 ft
Mean . . . . -0.03854 ft
No. of Residuals . . . . 685.
No. of Estimates 2

APPENDIX E-3

CONSTANT RATE TEST - WELL #2



well 2 pump with well 2 obs.

WELL 2 CONSTANT RATE TEST

Data Set: F:\...\Well 2 Constant (2).aqt
Date: 12/07/00 Time: 17:32:46

PROJECT INFORMATION

Company: Alpha Geoscience
Client: Crossroads Ventures
Project: 00151-Task 1
Test Location: Fleischmanns
Test Well: Well 2
Test Date: 11/14/00-11/15/00

AQUIFER DATA

Saturated Thickness: 200. ft Anisotropy Ratio (Kz/Kr): 0.25

WELL DATA Casing 0.34' radius; borehole 0.30' radius

Pumping Wells

Well Name	X (ft)	Y (ft)
Well 2	0	0

Observation Wells

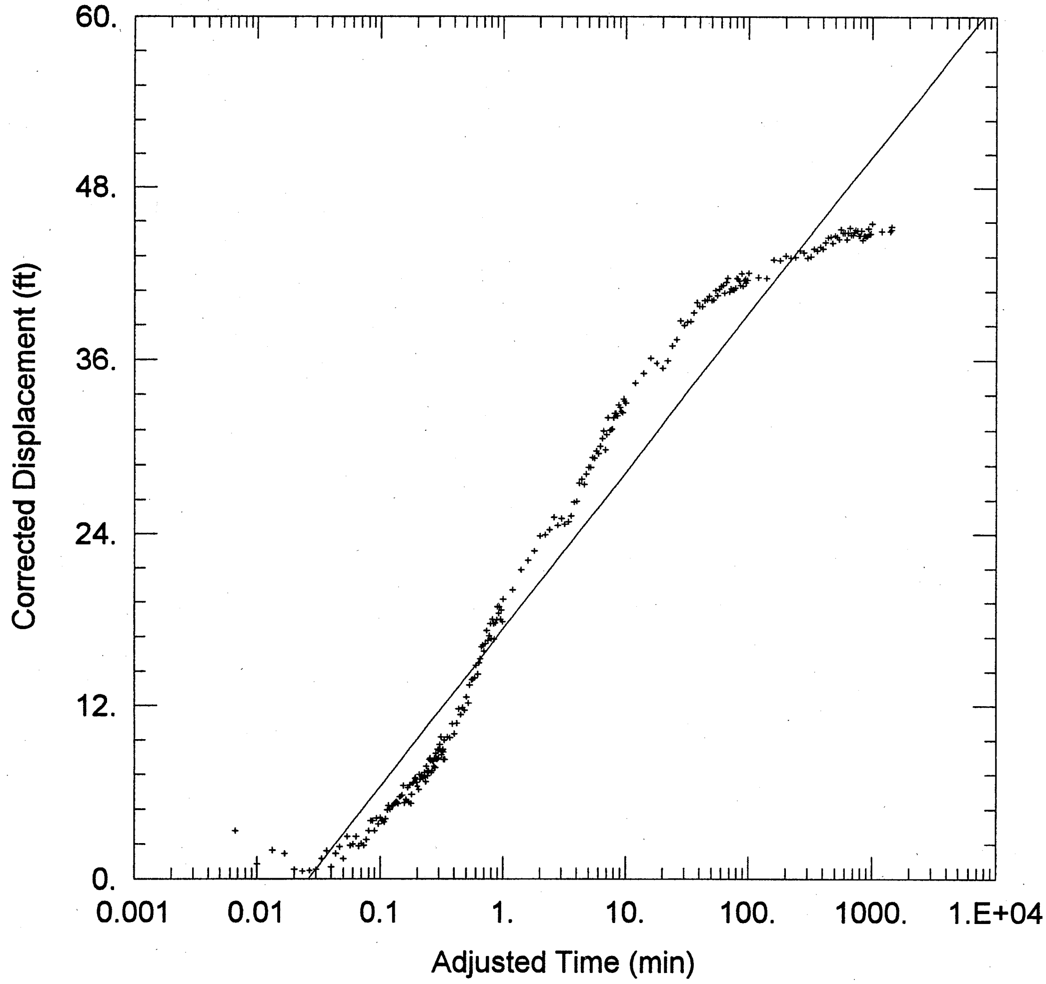
Well Name	X (ft)	Y (ft)
+ Well 2	0	0

SOLUTION Visual Match

Aquifer Model: Unconfined Solution Method: Cooper-Jacob

T = 4.295 cm^2/sec $= 4.637 \times 10^{-3}$ ft^2/s S = 0.5306

$K = T/b = 2.32 \times 10^{-5}$ ft/s $= 7.07 \times 10^{-4}$ cm/s



well 2 pump w/ well 2 obs.

WELL 2 CONSTANT RATE TEST

Data Set: F:\...\Well 2 Constant (2).aqt
Date: 12/07/00 Time: 17:29:10

PROJECT INFORMATION

Company: Alpha Geoscience
Client: Crossroads Ventures
Project: 00151-Task 1
Test Location: Fleischmanns
Test Well: Well 2
Test Date: 11/14/00-11/15/00

AQUIFER DATA

Saturated Thickness: 200. ft
Anisotropy Ratio (Kz/Kr): 0.25

WELL DATA

CASING 0.34' radius; borehole 0.3' radius

Pumping Wells

Well Name	X (ft)	Y (ft)
Well 2	0	0

Observation Wells

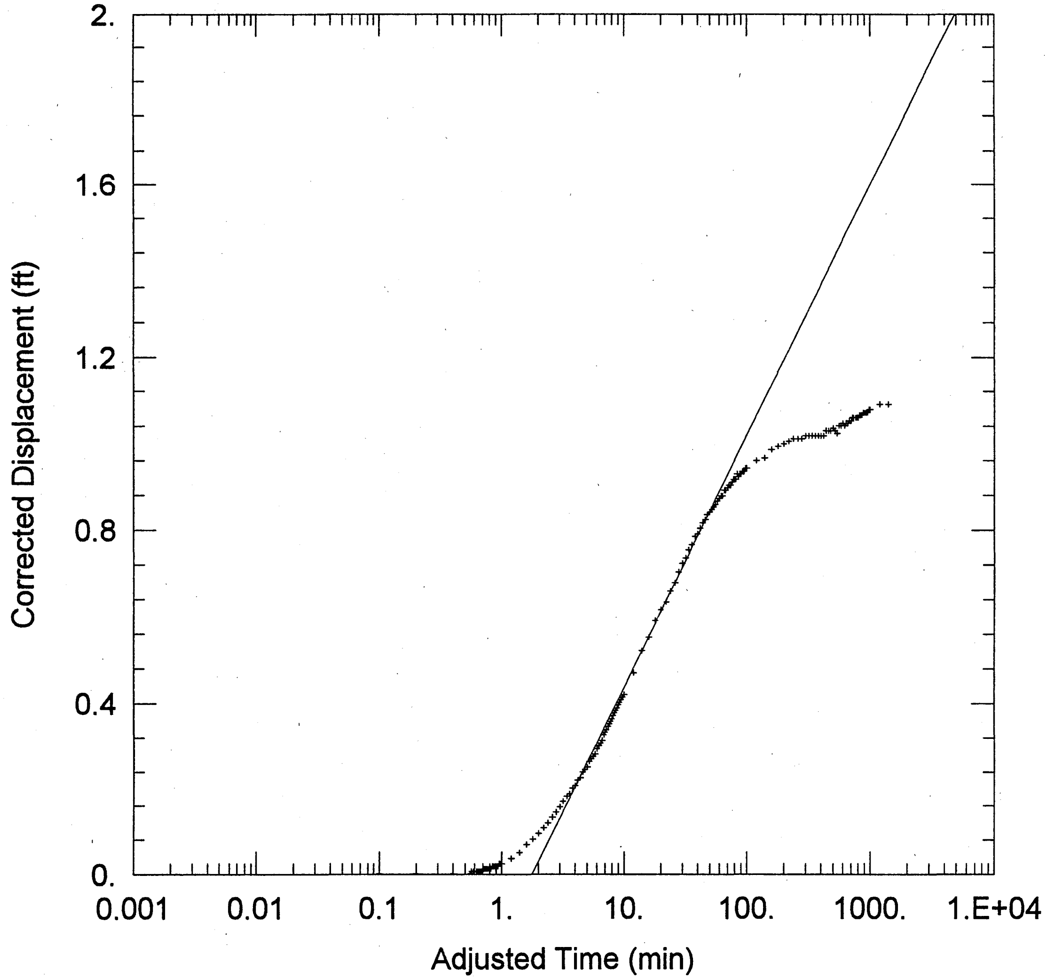
Well Name	X (ft)	Y (ft)
+ Well 2	0	0

SOLUTION

Automatic Match

Aquifer Model: Unconfined
Solution Method: Cooper-Jacob

T = 6.249 cm^2/sec $= 6.73 \times 10^{-3}\ ft^2/s$
S = 0.2606



Well 2 pump with well 1 obs.

CONSTANT RATE TEST

Data Set: F:\...\Well 2 Constant.aqt
Date: 12/07/00 Time: 17:20:08

PROJECT INFORMATION

Company: Alpha Geoscience
Client: Crossroads Ventures
Project: 00151-Task 1
Test Location: Fleischmanns
Test Well: Well 2
Test Date: 11/14/00-11/15/00

AQUIFER DATA

Saturated Thickness: 200. ft Anisotropy Ratio (Kz/Kr): 0.25

WELL DATA Casing 0.34' radius; Borehole = 0.3' radius

Pumping Wells

Well Name	X (ft)	Y (ft)
WELL 2	0	0

Observation Wells

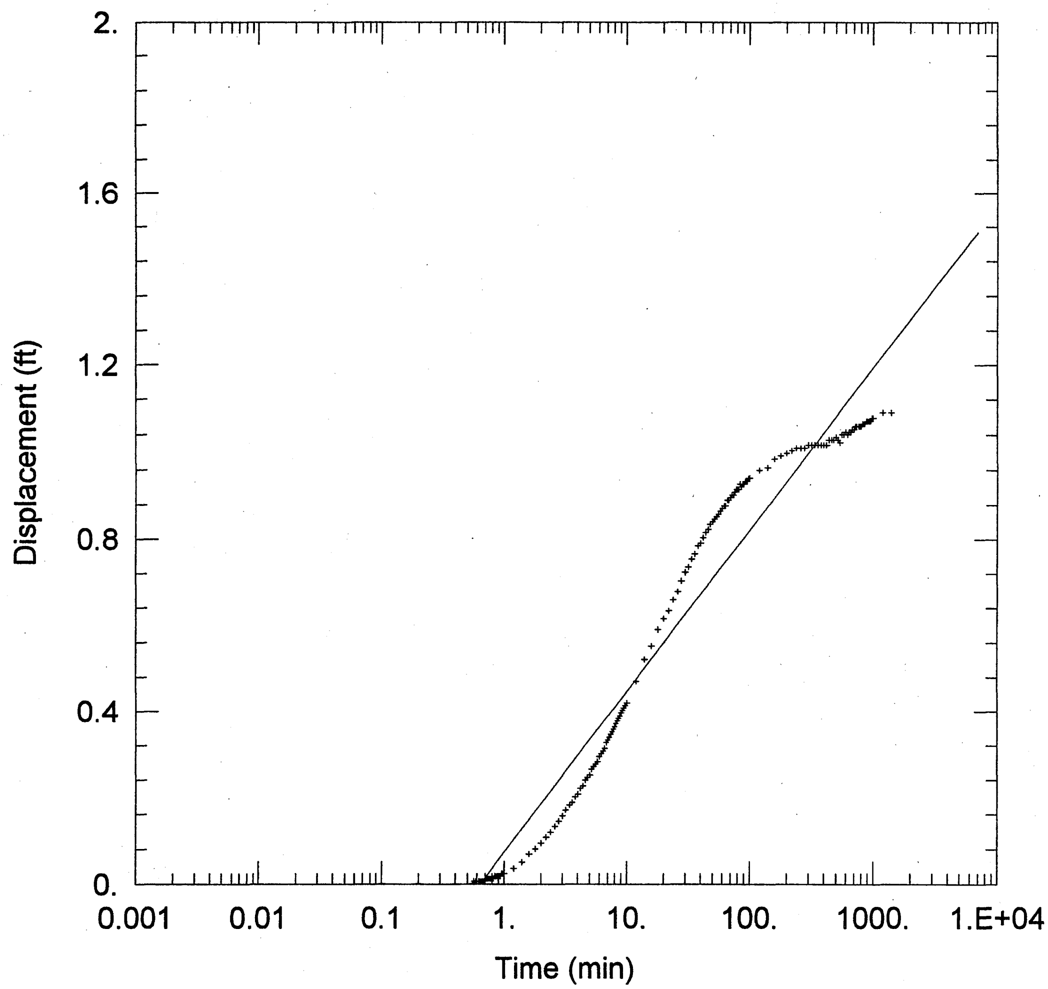
Well Name	X (ft)	Y (ft)
+ WELL 1	425	0

SOLUTION VISUAL MATCH

Aquifer Model: Unconfined
Solution Method: Cooper-Jacob

T = 117.4 cm^2/sec = 0.1267 ft^2/s
S = 0.0001669

K = T/b = 6.34x10^{-4} ft/s = 1.9x10^{-2} cm/s



Well 2 pump with Well 1 obs.

CONSTANT RATE TEST

Data Set: F:\...\Well 2 Constant.aqt
Date: 12/07/00 Time: 17:17:20

PROJECT INFORMATION

Company: Alpha Geoscience
Client: Crossroads Ventures
Project: 00151-Task 1
Test Location: Fleischmanns
Test Well: Well 2
Test Date: 11/14/00-11/15/00

AQUIFER DATA

Saturated Thickness: 200. ft Anisotropy Ratio (Kz/Kr): 0.25

WELL DATA

Casing = 0.34' radius; Borehole = 0.3' radius

Pumping Wells

Well Name	X (ft)	Y (ft)
WELL 2	0	0

Observation Wells

Well Name	X (ft)	Y (ft)
+ WELL 1	425	0

SOLUTION Automatic

Aquifer Model: Unconfined Solution Method: Cooper-Jacob

T = 182.8 cm^2/sec = 0.197 ft^2/s S = 9.334E-05

K = T/ = 9.87×10^{-4} ft/ ... ×10^{-2}

WELL 2 CONSTANT RATE PUMPING TEST

SE1000C
Environmental Data Logger

Unit# 02400 Test 0
CONSTANT RATE TEST - WELL 2

Setups:	INPUT 1	INPUT 2
Type	Level (F)	Level (F)
Mode	TOC	TOC
I.D.	1	4
Reference	0	0
Linearity	0.31	0.1
Scale factor	100.32	19.85
Offset	0.03	0
Delay mSEC	50	50
Step 0	11/14/2000 13:02	1:24

Elapsed Time	Well 2 Pumping	Well 1 Observation
0	0.19	-0.006
0.0033	7.675	-0.006
0.0066	3.33	-0.006
0.01	1.046	-0.006
0.0133	1.998	0
0.0166	1.776	-0.006
0.02	0.634	-0.006
0.0233	0.507	-0.006
0.0266	0.57	-0.006
0.03	0.634	-0.006
0.0333	1.427	-0.006
0.0366	1.934	-0.006
0.04	0.824	-0.006
0.0433	1.776	-0.006
0.0466	2.22	-0.006
0.05	1.427	-0.006
0.0533	2.949	0
0.0566	2.283	0
0.06	2.378	-0.006
0.0633	2.917	-0.006
0.0666	2.251	0
0.07	2.442	-0.006
0.0733	2.283	-0.006
0.0766	2.727	-0.006
0.08	3.361	-0.006
0.0833	3.996	-0.006
0.0866	3.996	-0.006
0.09	3.33	0
0.0933	4.186	0
0.0966	3.806	-0.006
0.1	4.25	0
0.1033	4.028	-0.006

0.1066	3.932	-0.006
0.11	4.154	0
0.1133	4.789	-0.006
0.1166	5.106	-0.006
0.12	4.852	-0.006
0.1233	5.074	0
0.1266	5.106	-0.006
0.13	5.233	0
0.1333	5.328	-0.006
0.1366	5.328	-0.006
0.14	5.264	-0.006
0.1433	5.708	-0.006
0.1466	5.772	0
0.15	5.835	0
0.1533	6.533	0
0.1566	5.296	0
0.16	5.518	-0.006
0.1633	5.455	0
0.1666	6.374	-0.006
0.17	5.36	0
0.1733	6.596	-0.006
0.1766	5.264	0
0.18	5.899	0
0.1833	6.723	0
0.1866	6.755	-0.006
0.19	7.04	0
0.1933	7.072	-0.006
0.1966	6.755	-0.006
0.2	6.501	0
0.2033	6.247	0
0.2066	7.294	-0.006
0.21	6.977	0
0.2133	7.262	-0.006
0.2166	7.199	0
0.22	7.135	0
0.2233	7.072	0
0.2266	7.453	0
0.23	7.135	0
0.2333	6.818	0
0.2366	7.896	0
0.24	7.199	0
0.2433	7.58	0
0.2466	7.548	0
0.25	8.436	0
0.2533	8.531	-0.006
0.2566	8.34	0
0.26	7.453	0
0.2633	7.611	0
0.2666	8.277	0
0.27	8.34	0
0.2733	7.928	0
0.2766	8.531	0
0.28	7.833	0
0.2833	8.848	0
0.2866	8.467	0
0.29	8.436	0
0.2933	9.102	0

0.2966	8.531	0
0.3	9.102	0
0.3033	9.514	0
0.3066	9.133	0
0.31	10.053	0
0.3133	8.753	0
0.3166	9.038	0
0.32	9.102	0
0.3233	8.943	0
0.3266	8.404	0
0.33	9.799	0
0.3333	8.436	0
0.35	10.053	0
0.3666	9.99	0
0.3833	11.004	0
0.4	10.275	0
0.4166	11.036	0
0.4333	12.114	0
0.45	11.702	0
0.4666	12.209	0
0.4833	12.019	0
0.5	13.033	0
0.5166	12.526	0
0.5333	13.921	0
0.55	14.302	0
0.5666	14.365	0.006
0.5833	14.461	0.006
0.6	15.412	0.006
0.6166	14.746	0.006
0.6333	15.602	0.006
0.65	15.887	0.006
0.6666	16.807	0.006
0.6833	16.965	0.006
0.7	16.489	0.006
0.7166	17.06	0.012
0.7333	18.011	0.012
0.75	17.314	0.012
0.7666	17.662	0.012
0.7833	18.55	0.012
0.8	17.441	0.012
0.8166	18.899	0.012
0.8333	18.582	0.019
0.85	17.409	0.019
0.8666	18.645	0.019
0.8833	18.867	0.019
0.9	19.85	0.019
0.9166	19.343	0.019
0.9333	19.85	0.019
0.95	18.931	0.025
0.9666	19.596	0.025
0.9833	18.709	0.025
1	20.421	0.025
1.2	21.181	0.037
1.4	22.798	0.05
1.6	23.496	0.069
1.8	24.257	0.081
2	25.461	0.094

2.2	25.587	0.107
2.4	26	0.119
2.6	27.014	0.132
2.8	26.317	0.144
3	26.919	0.157
3.2	26.443	0.169
3.4	26.634	0.182
3.6	27.078	0.188
3.8	28.25	0.201
4	28.313	0.207
4.2	29.772	0.22
4.4	30.088	0.226
4.6	29.708	0.239
4.8	30.532	0.245
5	31.039	0.251
5.2	31.039	0.264
5.4	31.863	0.27
5.6	31.8	0.276
5.8	32.402	0.283
6	32.18	0.295
6.2	32.75	0.302
6.4	33.384	0.308
6.6	34.05	0.314
6.8	32.465	0.327
7	33.701	0.333
7.2	35.096	0.339
7.4	34.082	0.346
7.6	34.113	0.352
7.8	34.208	0.358
8	35.127	0.364
8.2	35.476	0.371
8.4	35.476	0.377
8.6	35.286	0.383
8.8	36.173	0.39
9	35.951	0.396
9.2	35.634	0.402
9.4	35.539	0.409
9.6	36.68	0.415
9.8	36.522	0.415
10	36.331	0.421
12	38.011	0.471
14	38.803	0.522
16	40.165	0.553
18	39.69	0.591
20	39.247	0.616
22	39.912	0.635
24	41.211	0.66
26	41.781	0.679
28	43.397	0.704
30	43.017	0.723
32	43.302	0.736
34	43.365	0.755
36	44.126	0.767
38	45.076	0.786
40	44.728	0.792
42	44.696	0.805
44	45.203	0.817

46	45.298	0.824
48	45.646	0.836
50	45.235	0.843
52	45.298	0.849
54	46.122	0.855
56	45.71	0.861
58	46.28	0.868
60	46.565	0.874
62	46.597	0.88
64	45.9	0.88
66	46.882	0.893
68	47.23	0.893
70	46.058	0.899
72	46.312	0.905
74	46.249	0.905
76	46.217	0.912
78	46.375	0.918
80	47.23	0.918
82	47.167	0.918
84	47.009	0.931
86	46.597	0.924
88	47.642	0.931
90	46.534	0.931
92	47.072	0.937
94	47.167	0.937
96	46.819	0.937
98	47.072	0.943
100	47.737	0.943
120	47.326	0.962
140	47.262	0.968
160	48.973	0.987
180	48.878	0.994
200	49.29	1
220	49.1	1.006
240	49.194	1.012
260	49.765	1.012
280	49.575	1.012
300	49.131	1.019
320	49.226	1.019
340	49.955	1.019
360	49.796	1.019
380	50.145	1.019
400	49.955	1.019
420	50.525	1.019
440	51.032	1.031
460	51.095	1.031
480	50.493	1.031
500	51.19	1.038
520	51.095	1.031
540	50.81	1.025
560	51.76	1.044
580	51.443	1.044
600	51.412	1.05
620	50.81	1.044
640	51.412	1.05
660	51.855	1.05
680	51.285	1.056

700	51.254	1.056
720	51.507	1.063
740	51.665	1.063
760	51.602	1.063
780	51.19	1.063
800	51.19	1.063
820	51.633	1.069
840	50.778	1.069
860	51.19	1.069
880	51.222	1.075
900	51.159	1.075
920	51.222	1.075
940	51.792	1.075
960	51.317	1.075
980	51.38	1.082
1000	52.267	1.082
1200	51.57	1.094
1400	51.57	1.094
1440	51.982	1.094
1440.0033	51.697	1.094
1440.0066	52.172	1.094
1440.01	51.475	1.094
1440.0133	51.919	1.094
1440.0166	51.824	1.094
1440.02	51.982	1.094
1440.0233	51.982	1.094
1440.0266	52.362	1.094
1440.03	52.267	1.094
1440.0333	52.362	1.094
1440.0366	51.285	1.094
1440.04	51.697	1.094
1440.0433	51.602	1.094
1440.0466	51.348	1.094
1440.05	51.697	1.094
1440.0533	52.077	1.094
1440.0566	52.204	1.094
1440.06	51.317	1.094
1440.0633	51.602	1.094
1440.0666	51.855	1.094
1440.07	51.887	1.094
1440.0733	51.285	1.094
1440.0766	51.728	1.094
1440.08	50.05	1.094
1440.0833	48.941	1.094
1440.0866	50.493	1.094
1440.09	51.982	1.094
1440.0933	51.697	1.094
1440.0966	51.254	1.094
1440.1	50.81	1.094
1440.1033	50.842	1.094
1440.1066	50.62	1.094
1440.11	50.493	1.094
1440.1133	50.43	1.094
1440.1166	50.303	1.094
1440.12	50.208	1.094
1440.1233	50.082	1.094
1440.1266	49.955	1.094

1440.13	49.828	1.094
1440.1333	49.67	1.094
1440.1366	49.575	1.094
1440.14	49.448	1.094
1440.1433	49.29	1.094
1440.1466	49.131	1.094
1440.15	49.005	1.094
1440.1533	48.846	1.094
1440.1566	48.687	1.094
1440.16	48.529	1.094
1440.1633	48.371	1.094
1440.1666	48.244	1.094
1440.17	48.086	1.094
1440.1733	47.928	1.094
1440.1766	47.769	1.094
1440.18	47.642	1.094
1440.1833	47.484	1.094
1440.1866	47.326	1.094
1440.19	47.167	1.094
1440.1933	47.009	1.094
1440.1966	46.882	1.094
1440.2	46.723	1.094
1440.2033	46.565	1.094
1440.2066	46.407	1.094
1440.21	46.28	1.094
1440.2133	46.122	1.094
1440.2166	45.963	1.094
1440.22	45.805	1.094
1440.2233	45.678	1.094
1440.2266	45.52	1.094
1440.23	45.361	1.094
1440.2333	45.235	1.094
1440.2366	45.076	1.094
1440.24	44.918	1.094
1440.2433	44.791	1.094
1440.2466	44.633	1.094
1440.25	44.474	1.094
1440.2533	44.316	1.094
1440.2566	44.221	1.094
1440.26	44.062	1.094
1440.2633	43.904	1.094
1440.2666	43.746	1.094
1440.27	43.619	1.094
1440.2733	43.492	1.094
1440.2766	43.334	1.094
1440.28	43.207	1.094
1440.2833	43.048	1.094
1440.2866	42.922	1.094
1440.29	42.763	1.094
1440.2933	42.637	1.094
1440.2966	42.51	1.094
1440.3	42.352	1.094
1440.3033	42.225	1.094
1440.3066	42.098	1.094
1440.31	41.971	1.094
1440.3133	41.845	1.094
1440.3166	41.686	1.094

1440.32	41.591	1.094
1440.3233	41.465	1.094
1440.3266	41.369	1.094
1440.33	41.274	1.094
1440.3333	41.148	1.094
1440.35	40.673	1.094
1440.3666	40.229	1.094
1440.3833	39.912	1.094
1440.4	39.69	1.094
1440.4166	39.532	1.094
1440.4333	39.468	1.094
1440.45	39.468	1.094
1440.4666	39.468	1.094
1440.4833	39.468	1.094
1440.5	39.468	1.094
1440.5166	39.468	1.094
1440.5333	39.468	1.094
1440.55	39.437	1.094
1440.5666	39.437	1.094
1440.5833	39.437	1.094
1440.6	39.405	1.094
1440.6166	39.373	1.094
1440.6333	39.373	1.094
1440.65	39.342	1.094
1440.6666	39.31	1.094
1440.6833	39.31	1.094
1440.7	39.278	1.094
1440.7166	39.215	1.094
1440.7333	39.152	1.094
1440.75	39.088	1.094
1440.7666	38.993	1.094
1440.7833	38.581	1.094
1440.8	38.296	1.094
1440.8166	38.042	1.088
1440.8333	37.599	1.088
1440.85	37.155	1.088
1440.8666	36.712	1.088
1440.8833	36.268	1.088
1440.9	35.824	1.088
1440.9166	35.412	1.088
1440.9333	35.001	1.088
1440.95	34.589	1.088
1440.9666	34.208	1.088
1440.9833	33.86	1.088
1441	33.511	1.088
1441.2	29.93	1.082
1441.4	27.616	1.075
1441.6	26.475	1.069
1441.8	24.986	1.056
1442	23.781	1.044
1442.2	22.83	1.031
1442.4	22.006	1.019
1442.6	21.213	1.006
1442.8	20.421	0.987
1443	19.66	0.975
1443.2	18.962	0.962
1443.4	18.36	0.95

1443.6	17.821	0.937
1443.8	17.314	0.924
1444	16.838	0.912
1444.2	16.394	0.893
1444.4	15.982	0.88
1444.6	15.602	0.868
1444.8	15.253	0.849
1445	14.936	0.836
1445.2	14.619	0.824
1445.4	14.302	0.811
1445.6	14.017	0.805
1445.8	13.731	0.792
1446	13.446	0.78
1446.2	13.192	0.773
1446.4	12.939	0.761
1446.6	12.717	0.748
1446.8	12.495	0.736
1447	12.272	0.723
1447.2	12.051	0.717
1447.4	11.892	0.704
1447.6	11.67	0.698
1447.8	11.48	0.685
1448	11.321	0.679
1448.2	11.131	0.673
1448.4	10.973	0.66
1448.6	10.814	0.654
1448.8	10.624	0.641
1449	10.465	0.629
1449.2	10.306	0.629
1449.4	10.18	0.616
1449.6	10.021	0.616
1449.8	9.894	0.604
1450	9.736	0.597
1452	8.594	0.534
1454	7.706	0.484
1456	6.977	0.44
1458	6.406	0.402
1460	5.93	0.371
1462	5.518	0.333
1464	5.169	0.314
1466	4.884	0.295
1468	4.63	0.283
1470	4.44	0.27
1472	4.25	0.251
1474	4.091	0.245
1476	3.932	0.232
1478	3.806	0.22
1480	3.679	0.207
1482	3.584	0.201
1484	3.488	0.195
1486	3.393	0.188
1488	3.298	0.182
1490	3.235	0.176
1492	3.139	0.169
1494	3.076	0.163
1496	3.044	0.163
1498	2.981	0.157

1500	2.917	0.151
1502	2.854	0.151
1504	2.822	0.144
1506	2.759	0.138
1508	2.727	0.138
1510	2.664	0.132
1512	2.632	0.132
1514	2.569	0.125
1516	2.537	0.125
1518	2.505	0.119
1520	2.473	0.119
1522	2.442	0.113
1524	2.41	0.113
1526	2.347	0.113
1528	2.315	0.107
1530	2.283	0.107
1532	2.251	0.107
1534	2.22	0.1
1536	2.188	0.1
1538	2.188	0.1
1540	2.156	0.094

Exhibit E

Water Budget Analysis

WATER BUDGET ANALYSIS

Wildacres Resort
Belleayre Resort at Catskill Park
Highmount, New York

Prepared for:

Crossroads Ventures LLC
72 Andrew Lane Road
P.O. Box 267
Mount Tremper, New York 12457

November 2002

ALPHA GEOSCIENCE

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Geology
Hydrology
Remediation
Water Supply

Water Budget Analysis

Wildacres Resort
Belleayre Resort at Catskill Park
Highmount, New York

Prepared for:

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November 2002

TABLE OF CONTENTS

1.0 INTRODUCTION

This report presents the findings of a water budget analysis that was completed for the Wildacres Resort portion of the proposed Belleayre Resort at Catskill Park. The work was performed by Alpha Geoscience (Alpha) for Crossroads Ventures, L.L.C (Crossroads) as part of their assessment of potential environmental impacts associated with development of this portion of the overall project site. The Wildacres Resort project area is shown on Figure 1 and contains the proposed Wildacres hotel with Conference Center and Spa, octoplex units and their clubhouse, the Highmount Golf Club 18-hole course, and the 21-lot private home subdivision that will be known as the Highmount Estates.

The area covered by the water budget analysis is approximately 723 acres. The water budget area includes the project area, as well as the roads passing through the project area. The majority of that proposed development area is within the drainage basin that contains the water supplies for the Village of Fleischmanns. These water supplies, which consist of wells and springs, are downgradient of the project area and are being considered as the primary source of irrigation and potable water for the Wildacres Resort.

NYSDOH records indicate that Fleischmanns currently has a daily water usage of between 190,000 gpd and 300,000 gallons per day (gpd), depending on seasonal variation. A community the size of Fleischmans is expected to use 80,000 gpd to 90,000 gpd, based on population and assuming a 20% to 30% leakage (DEIS, Section 3.9.3). This indicates that the current Fleischmans water distribution system is losing 100,000 gpd to 220,000 gpd to leakage. The Village recently identified and repaired a number of leaks resulting in a decrease in water use of 185,000 gpd. The current demand of the estimated 351 users of the Village of Fleischmanns is 40,000 gpd. Since this reduction is very recent and long term demand figures are not available, the analysis in this report uses the worst case, more conservative, former demand for the Village. Alpha Geoscience evaluated the Fleischmanns water supply in 2000 (Alpha Geoscience, 2000) and again in 2002 (Alpha Geoscience, 2002). The existing water capacity of the Fleischmanns wells and springs is approximately 573,120 gpd, as determined for the drought conditions of 2001.

Alpha examined the potential effect that direct withdrawal by the Wildacres development might have on those resources (Alpha Geoscience, 2002). That examination revealed that direct withdrawal from the Fleischmanns water supply (as it currently exists, or from a proposed new well)to meet the Wildacres peak total flows for potable and irrigation water (250,560 gpd during the summer) would still leave Fleischmanns with a substantial excess capacity (Alpha Geoscience, 2002).

The purpose of the water budget analysis was to estimate the total quantitative change in the ground water resources affected by the Wildacres Resort project development. This was accomplished by first evaluating the amount of infiltration to the ground water system under existing conditions and then estimating the change in total infiltration that will be brought about as the result of the post-development conditions. The water budget provides a mechanism of estimating infiltration by balancing the amount of precipitation with runoff, percolation to the subsurface and evapotranspiration (evaporation of the ground surface and transpiration by plants). This balance is dependent on those factors such as vegetation cover, soil type and land use, which will change when development occurs. The change from the pre-development (existing conditions) to the post-development (peak development conditions) infiltration rates was estimated to assess impacts by factoring in modifications to the land by development. The amount of infiltration to the ground water system is the source of the Fleischmanns ground water supply. The estimated change in infiltration rates for the future conditions was used to assess the potential impacts to the Fleischmanns water supply resources.

2.0 METHODS

2.1 Existing Conditions

The areas that were analyzed for the existing conditions water budget correspond to the mapped soil areas within the project area as provided in the DEIS Section 3.6 and Appendix 12, "Soil Test Results". Plates 1 and 2 show the existing soil types and the mapped soil units throughout the entire Wildacres Resort project area. Each of the soil map units was numbered for identification and tracking purposes. Due to the large amount of open area in the western part of the project area, soil map units containing both wooded and non-wooded areas were subdivided. The numbering scheme on the existing conditions soils map reflects these subdivisions (e.g., 141 VhD is subdivided into 141-1 VhD and 141-2 VhD). Each of the numbered map units is listed in Appendix A with their corresponding soil type and calculated area. The areas for each of the mapped units of the same soil type and forest cover (wooded or non-wooded), were then summed to arrive at a total area within the project site (Appendix A).

Water budget analyses were then completed for each soil type, both wooded and non-wooded, based on climatic data from the Slide Mountain Station (NOAA Station ID 307799) and on specific soil properties presented in the DEIS Appendix 12, "Soil Test Results", and the Soil Survey of Greene County, New York (USDA, 1993). The Slide Mt. weather station is the closest weather station to the project area with a thirty-year record of temperature and precipitation. Precipitation at the Slide Mountain station is likely to be more similar to the project area than any other NOAA station due to its proximity, comparable elevation and its similar physiographic setting. It is located 8.7 miles south-southeast of Pine Hill and at an elevation of 2649 feet AMSL. The vast majority of the Wildacres project area is situated above 2000 feet AMSL.

Information on physical properties of the soils was obtained from neighboring Greene County soil survey because the Ulster County soil survey is out of date and the Delaware County soil survey with modern soil classifications has not yet been published. The soil type classifications presented in the DEIS Appendix 12 represent the modern classifications of the soils within the water budget area, therefore, the physical properties of the soil types can be obtained from any of the modern published soil surveys (See DEIS Section 3.6, "Soils" for more information).

The water budget analysis for each soil type within the project is summarized in Appendices B1 and B2 for wooded and non-wooded areas, respectively. Some soil types (e.g., VhC, VhD, and VhF) were analyzed together for the water budget based on their similar soil properties.

2.2 Post-Development Conditions

The entire area to be developed was subdivided into the following four different categories for water budget purposes: the Wildacres Resort grounds (areas W1 through W6), the golf course (areas G1 through G5), the ponds (areas P1 through P2), and Highmount Estates (H1). The Wildacres Resort grounds contain all the roads, buildings, sidewalks and landscaping that comprise the Resort, maintenance and service buildings, and the waste water treatment plant (WWTP). The golf course areas include the driving range and all tees, greens and fairways, exclusive of the ponds. The areas of the proposed golf course, ponds, and Resort grounds of the eastern project area are all shown on Plate 3. The Highmount Estates area, shown on Plate 4, includes the proposed subdivision roads, cul-de-sacs, and the proposed area to be cleared and graded.

The total area of land within the water budget area that will have changes in the soil properties for water budget purposes is approximately 204 acres. This area is shown on Plates 3 and 4, which are keyed to Table 1. The remaining 519 acres within the water budget area will remain largely undeveloped; consequently, that acreage will retain the soil properties that currently exist. Many of these undeveloped areas appear on Plate 4 as isolated remnants of the existing forest cover. Soil properties were assigned to each of the proposed areas to be developed based on proposed land use. The total area for each of the four categories of development was calculated, as was the total area of pavement (roads, sidewalks, tennis courts), buildings and non-wooded (grassy) areas within each area (Table 1).

The future, undeveloped area comprises the majority of the acreage within the project area. The total area for each soil type that will not be developed was determined for the post development phase and is listed in Appendix C. Some of the numbered soil map units for the existing conditions are expected to be truncated, subdivided, or eliminated by the proposed development of the Wildacres Resort grounds, golf course, ponds and Highmount Estates. The numbering scheme used for the existing conditions soil map units is retained in the future conditions maps (Plates 4 and 5), with additional letters where necessary to reflect subdivisions of a particular map unit (e.g., 100-1 HvF is subdivided into 100-1A HvF and 100-1B HvF). Most of the soil map units in the west area of the project are not expected to have any change in total area since little development other than Highmount Estates has been proposed there. The boundaries of those soil areas that are expected to change due to the proposed Highmount Estates development are highlighted with bold emphasis on Plate 4. Plate 5 shows the undeveloped soil areas that will remain in the eastern half of the project area after development of the golf course, ponds and hotel grounds. The soil map unit areas for the future conditions are included in Appendix C.

The water budgets for the existing and future conditions are the same for the soil types in the areas not to be developed (Appendices B1 and B2). Water budget analyses for the future conditions within each of the proposed development areas are summarized in Appendix D and were completed based on climatic data and estimated soil properties determined from land use. Several other key assumptions for the future, post-development, water budget analyses are presented in the following bullets:

- A weighted average approach was used to determine a runoff coefficient (CR) for each of the Wildacres Resort development areas (W1 through W6). The total areas of buildings (roof areas), pavement (roads, sidewalks, tennis courts), and non-wooded (grassy) areas were calculated for each area (Table 1). Runoff coefficients were then determined for each area by using published CR values in a weighted average.

- Soil moisture for each of the Wildacres development areas (W1 through W6) was determined by averaging the soil moisture for the existing soil types within each of the proposed development areas.

- The runoff coefficient and soil moisture values were determined for Highmount Estates (H1) in the same manner as with the Wildacres development areas (W1 through W6), except that the sizes and locations of the buildings (houses) that may be built in the Highmount Estates subdivision are unknown. Alpha considered the potential impacts to infiltration that the houses may have if 21 houses were built (outside of area H1) and each house covered 4000 sq. ft. of soil area. The runoff from these buildings will drain to the soil surrounding the buildings and will have the effect of additional precipitation to the surrounding soils. This precipitation surcharge to the surrounding soils largely offsets the loss of infiltration beneath each of the houses; consequently, the resulting change in infiltration to the ground water system is expected to be negligible.

- The top soil that will be used in construction of the Highmount Country Club golf course (Areas G1 through G5) is assumed to be a sandy loam that will have an average thickness of eight inches. The average solum thickness (depth to root base) for the golf course areas (G1 through G5) is expected to be approximately twelve inches once the course has fully developed.

- All runoff from the Wildacres Resort and the golf course areas was assumed to enter the three proposed storm water detention ponds (P1, P2 and P4) and to be lost to the system (i.e., no infiltration). This approach in determining the total change in infiltration rates for the project area is conservative since, in reality, not all storm runoff will enter the detention ponds – some will percolate downward along the drainage swales and through the pond bottoms. If this added infiltration were included in the analysis, the resulting infiltration rate would be higher.

- Downward infiltration from the irrigation pond (P3) was assumed to be non-existent due to the fact that the bottom of the irrigation pond will be covered with a geotextile or a clay liner.

- Irrigation water for the golf course is assumed to originate from the Fleischmanns water supply, which is located down gradient of the project area. In order to maintain a conservative approach in estimating the potential change in infiltration to the ground water system, the positive effects of irrigation water surcharge on the golf course areas were not included in the water budget analyses for the future development areas (Appendix D). The application of irrigation water throughout the golf course, would theoretically meet the soil moisture demand of the grass within each of the golf course areas (G1 through G5); therefore, it is assumed that the irrigation water will be completely removed from the system through evapotranspiration. However, the addition of irrigation water will actually increase the amount of infiltration to the ground water system by negating the soil moisture deficit that normally occurs during the summer months when the golf course would be in full operation. The irrigation water, in reality, will act as a precipitation surcharge with a resulting increase in infiltration throughout the golf course areas.

- The WWTP for Wildacres Resort will be designed such that the treated water can be diverted to the irrigation ponds or discharged to subsurface beds. Since the water passing through the WWTP will have been obtained from a source (Village of Fleischmanns) downgradient from and outside of the project area, WWTP discharge to the subsurface beds will be equivalent to additional recharge to the ground water system. In order to maintain a conservative approach in estimating the changes in infiltration to the ground water system, the beneficial and positive effects of WWTP subsurface discharge were not incorporated in the water budget analysis.

3.0 RESULTS

3.1 Existing Conditions

The water budget analysis performed for the existing conditions indicates that the infiltration rate for the entire area covered by the water budget analysis (723 acres) is approximately 695 gallons per minute (gpm), which is equivalent to 0.96 gpm per acre. Table 2 summarizes the annual infiltration by soil type under existing conditions.

3.2 Post-Development Conditions

Table 3 summarizes the annual infiltration estimated for each of the proposed development areas and for each soil type within the future, undeveloped project area. The water budget analysis for the future, post-development conditions indicates that the infiltration rate for the entire area will be approximately 708 gpm, which is equivalent to 0.98 gpm per acre. This 0.02 gpm per acre increase in the infiltration rate with respect to existing conditions represents a gain of approximately 14.5 gpm over the entire 723-acre water budget area. This small change in infiltration, although negligible when compared to the normal seasonal and yearly climate fluctuations, does indicate a slight increase in the ground water resources available to the area.

4.0 CONCLUSIONS

A water budget analysis was completed for an area containing the Wildacres Resort portion of the proposed Belleayre Resort at Catskill Park. The purpose of the water budget analysis was to estimate the amount of infiltration contributing to the ground water system under existing conditions and after peak development of Wildacres Resort. The results indicate that the current infiltration rate for the study area, using the existing conditions, is approximately 0.96 gpm per acre. The results of the water budget analysis completed for the future, post-development conditions indicate that infiltration to the ground water system in the area of analysis will be approximately 0.98 gpm per acre. This positive change indicates that there is a very slight increase in infiltration to the ground water after peak development of the Wildacres Resort. This slight increase equates to a gain of approximately 14.5 gpm of recharge to the ground water system from the entire 723-acre water budget area. This slight increase is due to the fact that the positive infiltration characteristics of the golf course make up for the negative infiltration characteristics of buildings and paved areas.

Golf course irrigation, WWTP subsurface discharge, and pond infiltration were considered but not incorporated into the water budget calculations. Incorporation of these factors into the analysis would further increase the amount of infiltration to the ground water system and result in more ground water resources for the area of study.

The results of this analysis indicate that the development of Wildacres Resort will not negatively impact the quantity of available water resources in the study area. Since the study area is upgradient of the Fleischmanns water supply, the water resources available to Fleischmanns will not be impacted by the development of the Resort. The direct withdrawal of water from the Village of Fleischmanns water supply, for potable and irrigation purposes, will still leave Fleischmanns with excess capacity as discussed in Alpha (2000) and Alpha (2002).

REFERENCES

Alpha Geoscience, 2000, Water supply Evaluation, Village of Fleischmanns, Delaware County, New York, consulting report prepared for Crossroads Ventures LLC, 14 p.

Alpha Geoscience, 2002, Addendum to Alpha Geoscience (2000) report "Water Supply Evaluation, Village of Fleischmanns, Delaware County, New York", letter to Mr. Dean Gitter, Crossroads Ventures LLC, 2 p.

Broad, William A., 1993, Soil Survey of Greene County, New York, United States Department of Agriculture, Soil Conservation Service in cooperation with Cornell University Agricultural Experiment Station, 349 p.

F:\projects\2002\02121-02140\02129-Wildacres\wildacres water budget report.wpd

TABLES

Table 1
Development Areas - Future Conditions

Wildacres Resort
Alpha Project No. 02129

Note: Refer to Plates 3 and 4 for location of area IDs

Wildacres

Area ID	Total Area (sq. ft.)	Total Area (acres)	Buildings (sq. ft.)	Buildings (acres)	Pavement (sq.ft.)	Pavement (acres)	Remarks
W1	1,582,807	36.34	259,946	5.97	388,934	8.93	Hotel, 5 octoplex units, Marlowe
W2	871,357	20.00	139,737	3.21	215,840	4.96	16 octoplex units
W3	18,972	0.44	730	0.02	4,360	0.10	
W4	17,865	0.41	1,800	0.04	5,321	0.12	
W5	29,816	0.68	7,342	0.17	2,677	0.06	WWTP
W6	57,476	1.32	8,701	0.20	19,893	0.46	
Total =	2,578,293	59.19	418,256	9.60	637,025	14.62	

Ponds

ID	Pond Area (sq. ft.)	Pond Area (acres)	Remarks
P1	25,450	0.58	storm water
P2	13,815	0.32	storm water
P3	129,505	2.97	irrigation pond
P4	9,688	0.22	storm water
Total =	178,458	4.10	

Golf Course Areas

Area ID	Total Area (sq. ft.)	- Pond Area (sq. ft.)	= Net Area (sq. ft.)	Net Area (acres)	Remarks
G1	1,802,799	0	1,802,799	41.39	Range; Holes 11, 12, 13, 16, 17
G2	598,117	9,688	588,429	13.51	Holes 14, 15
G3	2,108,621	143,320	1,965,301	45.12	Holes 2, 3, 4, 5, 6, 7, 8
G4	809,852	25,450	784,402	18.01	Holes 1, 9
G5	596,056	0	596,056	13.68	Holes 10, 18
Total =	5,915,445	178,458	5,736,987	131.70	

Highmount Estates

Area ID	Total Area (sq. ft.)	Total Area (acres)	Pavement (sq.ft)	Pavement (acres)
H1	392,509	9.01	63,442	1.46

Total Changed Area

Wildacres	2,578,293 sq. ft.
Golf Course	5,736,987 sq. ft.
Ponds	178,458 sq. ft.
Highmount	392,509 sq. ft.
	8,886,247 sq. ft. (204 acres)

TABLE 2
Water Contributions by Soil Type
Existing conditions

Wildacres Resort
Alpha Project No. 02129

	Soil Type	% of Project Area	Acreage	Percolation Rate (in/yr)	Total Perc. Rate (gpm)	gpm/acre
Wooded Areas	EkB	1.01%	7.32	21.90	8.3	1.1
	EkC	2.63%	18.99	16.49	16.2	0.9
	EkD	2.21%	15.99	16.49	13.6	0.9
	HrF (rock outcrop)	5.82%	42.06	0.00	0.0	0.0
	HrF (HaC)	11.82%	85.39	33.45	147.6	1.7
	HvD	0.09%	0.64	17.52	0.6	0.9
	HvF	3.54%	25.59	17.52	23.2	0.9
	LeB	0.82%	5.91	22.41	6.8	1.2
	LeC	2.73%	19.72	16.94	17.3	0.9
	LeD	2.77%	20.02	16.94	17.5	0.9
	LeF	2.14%	15.45	16.87	13.5	0.9
	OsB	1.32%	9.52	22.20	10.9	1.1
	OsC	0.27%	1.98	17.19	1.8	0.9
	VeD	1.65%	11.92	16.46	10.1	0.9
	VeF	2.37%	17.15	16.46	14.6	0.9
	VhB	0.07%	0.50	22.32	0.6	1.2
	VhC	4.98%	35.96	17.39	32.3	0.9
	VhD	16.82%	121.56	17.39	109.2	0.9
	VhF	10.47%	75.63	17.39	67.9	0.9
	VyB	2.13%	15.38	22.26	17.7	1.1
	VyC	4.68%	33.83	17.26	30.2	0.9
	VyD	3.09%	22.36	17.26	19.9	0.9
	WIB	3.97%	28.70	22.07	32.7	1.1
	WIC	2.16%	15.62	16.85	13.6	0.9
Non-Wooded Areas	EkC	0.19%	1.41	15.39	1.1	0.8
	EkD	0.25%	1.83	15.39	1.5	0.8
	HrF (rock outcrop)	1.50%	10.86	0.00	0.0	0.0
	HrF (HaC)	3.05%	22.04	31.79	36.2	1.6
	HvD	0.05%	0.37	16.64	0.3	0.9
	HvF	0.29%	2.07	16.64	1.8	0.9
	LeC	0.02%	0.14	16.00	0.1	0.8
	LeD	0.11%	0.78	16.00	0.6	0.8
	LeF	0.01%	0.04	15.87	0.0	0.8
	OsB	0.07%	0.48	21.20	0.5	1.1
	OsC	0.28%	2.00	13.54	1.4	0.7
	VeD	0.01%	0.10	15.89	0.1	0.8
	VeF	0.03%	0.19	15.89	0.2	0.8
	VhC	0.19%	1.40	16.48	1.2	0.9
	VhD	0.77%	5.55	16.48	4.7	0.9
	VhF	0.13%	0.94	16.48	0.8	0.9
	VyB	0.20%	1.46	21.24	1.6	1.1
	VyC	1.62%	11.72	16.33	9.9	0.8
	VyD	0.61%	4.42	16.33	3.7	0.8
	WIB	0.31%	2.22	22.37	2.6	1.2
	Paved Area	0.74%	5.38	0.00	0.0	0.0
	Marlowe Mansion	0.01%	0.07	0.00	0.0	0.0
		100.00%	722.7		694.4	

Total Infiltration Rate for Water Budget Area = 694.4 gpm/722.7 acres = 0.96 gpm/acre

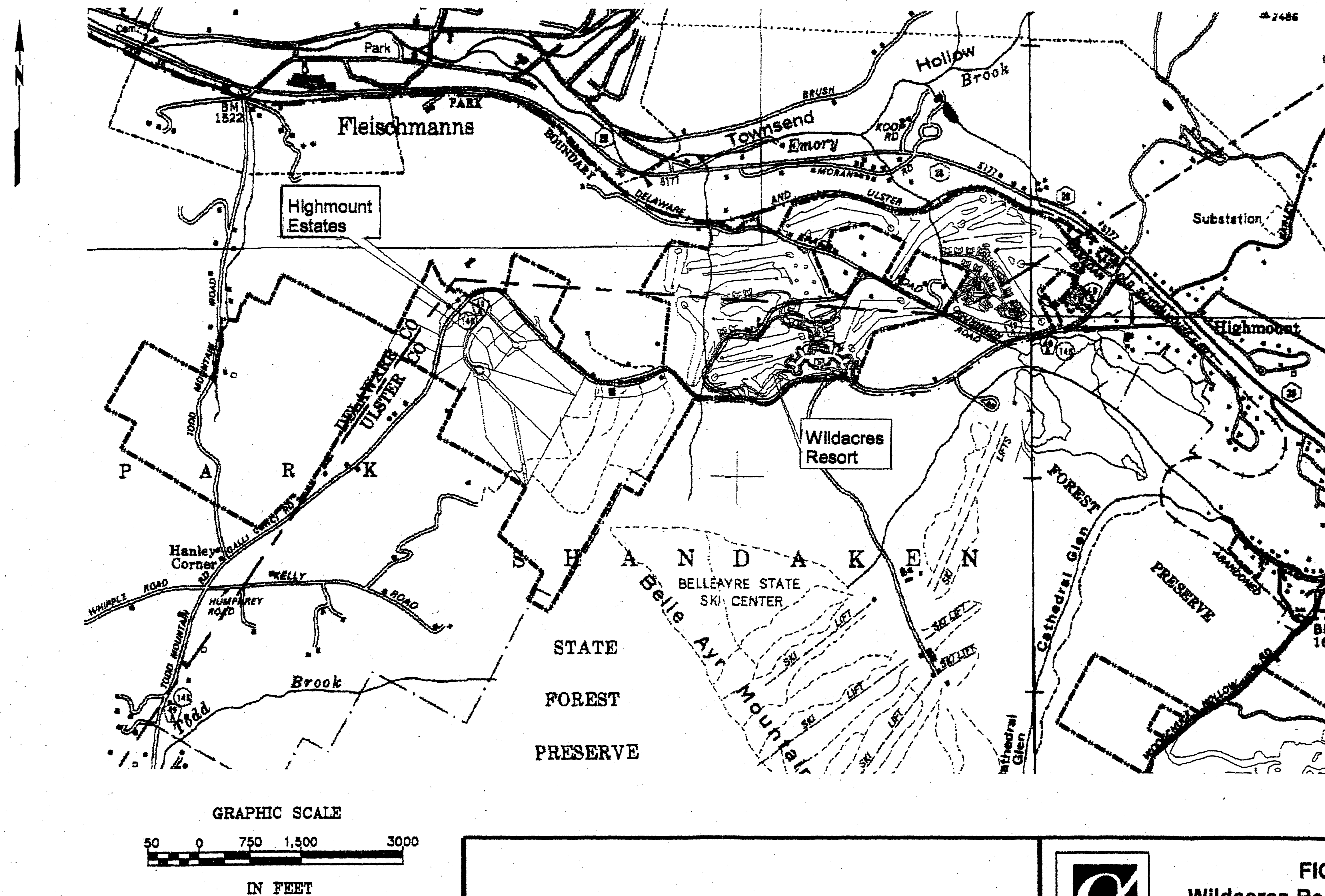
TABLE 3
Water Contributions by Soil Type
Future Conditions

Wildacres
Alpha Project No. 02129

	Soil Type	% of Project Area	Acreage	Percolation Rate (in/yr)	Total Perc. Rate (gpm)	gpm/acre
Undeveloped Wooded Areas	EkB	0.21%	1.50	21.90	1.7	1.1
	EkC	1.61%	11.64	16.49	9.9	0.9
	EkD	2.14%	15.45	16.49	13.2	0.9
	HrF (rock outcrop)	4.80%	34.69	0.00	0.0	0.0
	HrF (HaC)	9.74%	70.42	33.45	121.7	1.7
	HvD	0.09%	0.64	17.52	0.6	0.9
	HvF	1.99%	14.36	17.52	13.0	0.9
	LeB	0.09%	0.65	22.41	0.8	1.2
	LeC	1.99%	14.37	16.94	12.6	0.9
	LeD	2.77%	20.02	16.94	17.5	0.9
	LeF	2.14%	15.45	16.87	13.5	0.9
	OsB	0.24%	1.77	22.20	2.0	1.1
	OsC	0.27%	1.98	17.19	1.8	0.9
	VeD	1.61%	11.64	16.46	9.9	0.9
	VeF	2.37%	17.15	16.46	14.6	0.9
	VhB	0.06%	0.45	22.32	0.5	1.2
	VhC	1.88%	13.59	17.39	12.2	0.9
	VhD	11.69%	84.50	17.39	75.9	0.9
	VhF	10.08%	72.81	17.39	65.4	0.9
	VyB	1.19%	8.60	22.26	9.9	1.1
	VyC	2.12%	15.30	17.26	13.6	0.9
	VyD	1.29%	9.30	17.26	8.3	0.9
	WIB	0.95%	6.89	21.02	7.5	1.1
	WIC	0.97%	7.01	16.85	6.1	0.9
Undeveloped Non-Wooded Areas	EkC	0.19%	1.41	15.39	1.1	0.8
	EkD	0.25%	1.83	15.39	1.5	0.8
	HrF (rock outcrop)	1.50%	10.86	0.00	0.0	0.0
	HrF (HaC)	3.05%	22.04	31.79	36.2	1.6
	HvD	0.05%	0.37	16.64	0.3	0.9
	HvF	0.24%	1.74	16.64	1.5	0.9
	LeC	0.02%	0.14	16.00	0.1	0.8
	LeD	0.11%	0.78	16.00	0.6	0.8
	LeF	0.01%	0.04	15.87	0.0	0.8
	OsB	0.04%	0.28	21.20	0.3	1.1
	OsC	0.28%	2.00	13.54	1.4	0.7
	VeD	0.00%	0.00	15.89	0.0	0.0
	VeF	0.03%	0.19	15.89	0.2	0.8
	VhC	0.19%	1.40	16.48	1.2	0.9
	VhD	0.69%	5.01	16.48	4.3	0.9
	VhF	0.13%	0.94	16.48	0.8	0.9
	VyB	0.14%	1.02	21.24	1.1	1.1
	VyC	1.29%	9.33	16.33	7.9	0.8
	VyD	0.61%	4.41	16.33	3.7	0.8
	WIB	0.05%	0.33	22.37	0.4	1.2
Unchanged Paved Areas		0.61%	4.40	0.00	0.0	0.0
Wildacres Resort Area	W1	5.03%	36.34	13.86	26.0	0.7
	W2	2.77%	20.00	13.39	13.8	0.7
	W3	0.06%	0.44	18.48	0.4	1.0
	W4	0.06%	0.41	14.63	0.3	0.8
	W5	0.09%	0.68	14.47	0.5	0.7
	W6	0.18%	1.32	10.91	0.7	0.6
Ponds	P1	0.03%	0.22	0.00	0.0	0.0
	P2	0.04%	0.32	0.00	0.0	0.0
	P3	0.41%	2.97	0.00	0.0	0.0
	P4	0.08%	0.58	0.00	0.0	0.0
Golf Course	G1	5.73%	41.39	24.32	52.0	1.3
	G2	1.87%	13.51	24.32	17.0	1.3
	G3	6.24%	45.12	24.32	56.7	1.3
	G4	2.49%	18.01	24.32	22.6	1.3
	G5	1.89%	13.68	24.32	17.2	1.3
Highmount Estates	H1	1.25%	9.01	13.68	6.4	0.7
	Totals=	100.00%	722.7		708.4	

Total Infiltration Rate for Water Budget Area = 708.4 gpm/722.7 acres = 0.98 gpm/acre

FIGURE 1



the LA group
Landscape Architecture and Engineering, P.C.
40 Long Alley
Saratoga Springs
New York 12866
518/587-8100

Map adapted from The LA Group, P.C.

ALPHA GEOSCIENCE

FIGURE 1
Wildacres Resort Location Map

Belleayre Resort at Catskill Park
Highmount, New York

Alpha Project No. 02129

APPENDIX A

Soil Map Unit Areas - Existing Conditions

Wildacres Resort Water Budget
Alpha Project No. 02129
Soil Areas-Existing Conditions

Area ID	Soil Type	Total Area (ft^2)	Road Lengths (ft)	Road Area (ft^2)	Total Non-wooded Area (ft^2)	
15	EkB	20172		0	0	
161	EkB	73,426		0	0	
163	EkB	37,801		0	0	Total Soil Area Minus
165	EkB	187,532		0	0	Road Area (ft^2)
Total	EkB	318,931	0	0	0	318,931

6-1	EkC	15,150		0		
6-2	EkC	24,598	875	13,125	11,473	
14	EkC	91,357		0		
17-1	EkC	49,475		0		
17-2	EkC	5,679		0	5,679	
17-3	EkC	25,062		0		
17-4	EkC	40,374	553	8,295	32,079	
17-5	EkC	23,845		0		
17-6	EkC	31,535		0		
28	EkC	15,815		0		
30-1	EkC	87,397		0		
30-2	EkC	18,919	460	6,900	12,019	
30-3	EkC	32,136		0		
91	EkC	11,732		0		
124	EkC	32,110		0		
160	EkC	294,386		0		Total Soil Area Minus
164	EkC	117,353		0		Road Area (ft^2)
Total	EkC	916,923	1,888	28,320	61,250	888,603

5-1	EkD	61,200		0		
5-2	EkD	16,072	222	3,330	12,742	
5-3	EkD	76,939		0		
7-1	EkD	139,549		0		
7-2	EkD	21,408	471	7,065	14,343	
7-3	EkD	40,447	143	2,145	38,302	
7-4	EkD	88,483		0		
18-1	EkD	80,834		0		
18-2	EkD	2,041		0	2,041	
18-3	EkD	1,519		0	1,519	
29-1	EkD	11,481		0		
29-2	EkD	4,672		0	4,672	
29-3	EkD	210,664		0		
29-4	EkD	12,659	533	7,995	4,664	
29-5	EkD	1,567		0	1,567	
29-6	EkD	3,713		0		Total Soil Area Minus
145	EkD	23,634		0		Road Area (ft^2)
Total	EkD	796,882	1,369	20,535	79,850	776,347

Wildacres Resort Water Budget
Alpha Project No. 02129
Soil Areas-Existing Conditions

Area ID	Soil Type	Total Area (ft^2)	Road Lengths (ft)	Road Area (ft^2)	Total Non-wooded Area (ft^2)	Total Soil Area Minus Road Area (ft^2)
9	HrF	197,198		0		
48	HrF	180,520		0		
51	HrF	59,188		0		
53-1	HrF	2,484,002		0		
53-2	HrF	22,071		0		
53-3	HrF	58,665		0	58,665	
53-4	HrF	62,914		0	62,914	
53-5	HrF	26,775		0	26,775	
53-6	HrF	160,241		0		
53-7	HrF	24,469		0		
53-8	HrF	9,561		0		
53-9	HrF	32,928		0		
53-10	HrF	168,803		0	168,803	
53-11	HrF	27,700		0		
53-12	HrF	99,008		0	99,008	
53-13	HrF	6,105		0	6,105	
53-14	HrF	3,244		0		
65	HrF	29,239		0		
69	HrF	159,642		0		
85-1	HrF	729,969		0	729,969	
85-2	HrF	94,280		0		
85-3	HrF	35,430		0		
85-4	HrF	52,445		0		
85-5	HrF	15,201		0		
85-6	HrF	122,082		0		
85-7	HrF	75,584		0		
85-8	HrF	84,022		0	84,022	
85-9	HrF	11,174		0		
85-10	HrF	79,390		0		
85-11	HrF	9,828		0		
85-12	HrF	203,471		0		
85-13	HrF	11,215		0		
85-14	HrF	181,112		0	181,112	
85-15	HrF	31,126		0		
85-16	HrF	11,863		0	11,863	
85-17	HrF	18,387		0		
85-18	HrF	14,769		0		
86-1	HrF	1,077,013		0		
86-2	HrF	8,612	309	4,635	3,977	
98	HrF	74,258		0		
126	HrF	86,821		0		
137	HrF	149,001		0		
Total	HrF	6,989,326	309	4,635	1,433,213	6,984,691

Area ID	Soil Type	Total Area (ft^2)	Road Lengths (ft)	Road Area (ft^2)	Total Non-wooded Area (ft^2)	Total Soil Area Minus Road Area (ft^2)
81-1	HvD	15,039				
81-2	HvD	12,902				
81-3	HvD	16,194		0	16,194	
Total	HvD	44,135	0	0	16,194	44,135

Wildacres Resort Water Budget
Alpha Project No. 02129
Soil Areas-Existing Conditions

Area ID	Soil Type	Total Area (ft^2)	Road Lengths (ft)	Road Area (ft^2)	Total Non-wooded Area (ft^2)	Total Soil Area Minus Road Area (ft^2)
55-1	HvF	69,796		0		
55-2	HrF	17,399		0	17,399	
92-1	HvF	367,318		0		
92-2	HvF	23,842	440	6,600	17,242	
92-3	HvF	28,262		0		
92-4	HvF	10,213		0		
100-1	HvF	312,337		0		
100-2	HvF	30,669		0	30,669	
100-3	HvF	24,506		0		
100-4	HvF	5,546		0	5,546	
104	HvF	65,836		0		
116	HvF	23,488		0		
119-1	HvF	172,517		0		
119-2	HvF	22,887	251	3,765	19,122	
119-3	HvF	19,195		0		
122	HvF	21,063		0		
Total	HvF	1,214,874	691	10,365	89,978	1,204,509

Area ID	Soil Type	Total Area (ft^2)	Road Lengths (ft)	Road Area (ft^2)	Total Non-wooded Area (ft^2)	Total Soil Area Minus Road Area (ft^2)
146	LeB	94,212		0	0	
149	LeB	163,029		0	0	
Total	LeB	257,241	0	0	0	257,241

Area ID	Soil Type	Total Area (ft^2)	Road Lengths (ft)	Road Area (ft^2)	Total Non-wooded Area (ft^2)	Total Soil Area Minus Road Area (ft^2)
8	LeC	221,461		0		
32-1	LeC	50,454		0		
32-2	LeC	6,277		0	6,277	
32-3	LeC	23,684		0		
33	LeC	17,231		0		
35	LeC	14,289		0		
37	LeC	254,905		0		
147	LeC	104,055		0		
150	LeC	173,130		0		
Total	LeC	865,486	0	0	6,277	865,486

Area ID	Soil Type	Total Area (ft^2)	Road Lengths (ft)	Road Area (ft^2)	Total Non-wooded Area (ft^2)	Total Soil Area Minus Road Area (ft^2)
36-1	LeD	760,499		0		
36-2	LeD	34,192		0	34,192	
36-3	LeD	111,404		0		
Total	LeD	906,095	0	0	34,192	906,095

Area ID	Soil Type	Total Area (ft^2)	Road Lengths (ft)	Road Area (ft^2)	Total Non-wooded Area (ft^2)	Total Soil Area Minus Road Area (ft^2)
19	LeF	588,749		0		
31-1	LeF	61,140		0		
31-2	LeF	1,906		0	1,906	
31-3	LeF	1,048		0		
34	LeF	21,981		0		
Total	LeF	674,824	0	0	1,906	674,824

Wildacres Resort Water Budget
Alpha Project No. 02129
Soil Areas-Existing Conditions

Area ID	Soil Type	Total Area (ft²)	Road Lengths (ft)	Road Area (ft²)	Total Non-wooded Area (ft²)	
110-1	OsB	267700		0		
110-2	OsB	25,494	300	4,500	20,994	
131	OsB	74,387		0		Total Soil Area Minus
144	OsB	72,746		0		Road Area (ft²)
Total	OsB	440,327	300	4,500	20,994	435,827
54-1	OsC	44775		0		
54-2	OsC	158,577	4,770	71,550	87,027	
54-3	OsC	4,681		0		
54-4	OsC	2,528		0		Total Soil Area Minus
54-5	OsC	34,303		0		Road Area (ft²)
Total	OsC	244,864	4,770	71,550	87,027	173,314
39	VeD	425457		0		
43	VeD	81552		0		
167-1	VeD	7,673		0		
167-2	VeD	4,246		0	4,246	Total Soil Area Minus
167-3	VeD	4,720		0		Road Area (ft²)
Total	VeD	523,648	0	0	4,246	523,648
38-1	VeF	282097		0		
38-2	VeF	8473		0	8,473	
38-3	VeF	36,488		0		
40	VeF	20,171		0		Total Soil Area Minus
42	VeF	408,251		0		Road Area (ft²)
Total	VeF	755,480	0	0	8,473	755,480
50	VhB	21,656		0	0	Total Soil Area Minus
					0	Road Area (ft²)
Total		21,656	0	0	0	21,656
49	VhC	344064		0		
64	VhC	59888		0		
67	VhC	57078		0		
84-1	VhC	42884		0	42,884	
84-2	VhC	7373		0		
87	VhC	18984		0		
89	VhC	43197		0		
95	VhC	23302		0		
96	VhC	117792		0		
99	VhC	654781		0		
103	VhC	45592		0		
105	VhC	88007		0		
117-1	VhC	18160		0	18,160	Total Soil Area Minus
117-2	VhC	106,568		0		Road Area (ft²)
Total	VhC	1,627,670	0	0	61044	1,627,670

Wildacres Resort Water Budget
Alpha Project No. 02129
Soil Areas-Existing Conditions

Area ID	Soil Type	Total Area (ft²)	Road Lengths (ft)	Road Area (ft²)	Total Non-wooded Area (ft²)	Total Soil Area Minus Road Area (ft²)
2	VhD	48,079		0		
3	VhD	45,443		0		
4	VhD	39,870		0		
16	VhD	266,000		0		
25-1	VhD	126,427		0		
25-2	VhD	31,531		0	31,531	
25-3	VhD	1,417,766		0		
47-1	VhD	532,006		0		
47-2	VhD	3,438		0	3,438	
47-3	VhD	25,000	417	6255	18,745	
56-1	VhD	18,062		0	18,062	
56-2	VhD	45,507		0		
56-3	VhD	25,587		0	25,587	
63-1	VhD	191,898		0		
63-2	VhD	31,235		0	31,235	
63-3	VhD	65,179		0		
63-4	VhD	18,211		0	18,211	
63-5	VhD	17,243		0		
63-6	VhD	4,272		0		
63-7	VhD	1,816		0		
63-8	VhD	39,211		0		
63-9	VhD	2,467		0	2,467	
63-10	VhD	39,395		0	39,395	
63-11	VhD	4,445		0		
63-12	VhD	1,633		0		
63-13	VhD	647		0		
68	VhD	58,771		0		
70	VhD	75,744		0		
75	VhD	19,211		0		
82-1	VhD	27,412		0		
82-2	VhD	4,549		0	4,549	
83-1	VhD	15,228		0		
83-2	VhD	7,597		0	7,597	
88	VhD	56,395		0		
90	VhD	217,079		0		
93-1	VhD	5,737	214	3210	2,527	
93-2	VhD	8,921		0		
94	VhD	45,971		0		
97	VhD	78,252		0		
101	VhD	32,500		0		
106	VhD	659,831		0		
109	VhD	149,586		0		
112	VhD	33,309		0		
113	VhD	21,284		0		
115-1	VhD	174,762		0		
115-2	VhD	10,730	265	3975	6,755	
115-3	VhD	30,362		0		
118-1	VhD	62,993		0		
118-2	VhD	10,913	481	7215	3,698	
120	VhD	167,586		0		
127	VhD	173,524		0		
129	VhD	44,207		0		
134	VhD	22,586		0		
135	VhD	85,231		0		
139	VhD	39,763		0		
141-1	VhD	65,220		0		
141-2	VhD	20,275		0	20,275	
141-3	VhD	3,542	157	2355	1,187	
143-1	VhD	13,467	457	6855	6,612	
143-2	VhD	82,116		0		
Total	VhD	5,567,022	1991	29,865	241,871	5,537,157

Wildacres Resort Water Budget
Alpha Project No. 02129
Soil Areas-Existing Conditions

Area ID	Soil Type	Total Area (ft^2)	Road Lengths (ft)	Road Area (ft^2)	Total Non-wooded Area (ft^2)	Total Soil Area Minus Road Area (ft^2)
1	VhF	1,793,960		0		
10-1	VhF	475,972		0		
10-2	VhF	9,055	60	900	8,155	
10-3	VhF	3,911		0		
24	VhF	14,773		0		
27	VhF	23,445		0		
57-1	VhF	523,251		0		
57-2	VhF	7,310		0	7,310	
57-3	VhF	6,535		0	6,535	
66	VhF	66,212		0		
76-1	VhF	11,143		0	11,143	
76-2	VhF	2,420		0		
76-3	VhF	1,935		0	1,935	
76-4	VhF	3,822		0		
76-5	VhF	1,395		0	1,395	
80	VhF	67,499		0		
154-1	VhF	74,764		0		
154-2	VhF	8,831	295	4425	4,406	
154-3	VhF	84844		0		
159	VhF	73,360		0		
162	VhF	86,342		0		
Total	VhF	3,340,779	355	5,325	40,879	3,335,454

Area ID	Soil Type	Total Area (ft^2)	Road Lengths (ft)	Road Area (ft^2)	Total Non-wooded Area (ft^2)	Total Soil Area Minus Road Area (ft^2)
45-1	VyB	11,991		0	11,991	
45-2	VyB	6,400		0		
46-1	VyB	19,695		0	19,695	
46-2	VyB	11,462		0		
52	VyB	63,771		0		
62	VyB	63,469		0		
72-1	VyB	124,379		0		
72-2	VyB	8,711		0	8,711	
72-3	VyB	3,130		0		
74-1	VyB	60,652		0		
74-2	VyB	18,400		0	18,400	
108	VyB	118,192		0		
142-1	VyB	218,632		0		
142-2	VyB	10,173	353	5295	4,878	
Total	VyB	739,057	353	5,295	63,675	733,762

Soil Areas-Existing Conditions
Wildacres Resort Water Budget
Alpha Project No. 02129

Area ID	Soil Type	Total Area (ft^2)	Road Lengths (ft)	Road Area (ft^2)	Total Non-wooded Area (ft^2)	Total Soil Area Minus Road Area (ft^2)
11	VyC	16,966		0		
21	VyC	74,983		0		
22	VyC	36,186		0		
23	VyC	39,849		0		
26	VyC	50,233		0		
41	VyC	20,942		0		
44-1	VyC	209,327	1434	21510	187,817	
44-2	VyC	4,758		0		
44-3	VyC	9,113		0		
44-4	VyC	7,869		0		
44-5	VyC	4,493		0		
44-6	VyC	5,293		0		
44-7	VyC	15,992		0		
71	VyC	79,223		0		
73-1	VyC	12,206		0		
73-2	VyC	116,157		0	116,157	
78-1	VyC	22,449		0	22,449	
78-2	VyC	9,107		0		
79-1	VyC	96,381		0	96,381	
79-2	VyC	23,555		0		
79-3	VyC	2,650		0		
79-4	VyC	10,088		0		
107	VyC	84,389		0		
114-1	VyC	172,750		0		
114-2	VyC	69,362	1620	24300	45,062	
114-3	VyC	55,553		0		
121	VyC	11,962		0		
125	VyC	57,908		0		
128	VyC	37,163		0		
138	VyC	264,155		0		
140-1	VyC	56,366		0		
140-2	VyC	42,662	233	3495	39,167	
140-3	VyC	2,125		0		
148	VyC	38,332		0		
153-1	VyC	6,504	202	3030	3,474	
153-2	VyC	167,434		0		
156	VyC	50,731		0		
157	VyC	43,399		0		
166	VyC	8,077		0		
Total	VyC	2,036,692	3489	52,335	510,507	1,984,357

Wildacres Resort Water Budget
Alpha Project No. 02129
Soil Areas-Existing Conditions

Area #	Soil Type	Area (ft^2)	Total Area (ft^2)	Road Area (ft^2)	Total Non-wooded Area (ft	Total Non-wooded Area (ft
12	VyD	18,282		0		
13	VyD	24,878		0		
58	VyD	142,182		0		
59	VyD	28,455		0		
60	VyD	14,426		0		
61	VyD	37,722		0		
77-1	VyD	7,476		0	7,476	
77-2	VyD	4,909		0		
77-3	VyD	1,881		0		
77-4	VyD	25,412		0		
77-5	VyD	182,380		0	182,380	
77-6	VyD	3,154		0		
77-7	VyD	19,722		0		
77-8	VyD	3,338		0		
123	VyD	262,563		0		
155-1	VyD	4,221	98	1470	2,751	
155-2	VyD	113,480		0		Total Soil Area Minus Road Area
158	VyD	273,471		0		(ft^2)
Total	VyD	1,167,952	98	1,470	192,607	1,166,482
102-1	WIB	36,076		0		
102-2	WIB	100,616	ansion (3,812 sq. ft.)		100,616	
102-3	WIB	16,590		0		
102-4	WIB	10,080		0		
111	WIB	54,794		0		
133	WIB	55,134		0		
136	WIB	55,534		0		Total Soil Area Minus Road Area (ft2)
151	WIB	1,018,245		0		
Total	WIB	1,347,069	0	0	100,616	1,347,069
20	WIC	239,237		0	0	
130	WIC	39,258		0	0	
132	WIC	152,501		0	0	Total Soil Area Minus Road Area
152	WIC	249,300		0	0	(ft^2)
Total	WIC	680,296	0	0	0	680,296

Wildacres Resort Water Budget
Alpha Project No. 02129
Soil Areas-Existing Conditions

Marlowe Mansion	Total Road Area	Total Soil Area	Total Project Area
3812	234,195	31,243,034	31,481,041

Marlowe Mansion	Total Road Area	Open Field Total Soil Area	Total Project Area
3812	234,195	3,054,799	31,481,041

Marlowe Mansion	Total Road Area	Wooded Total Soil Area	Total Project Area
3812	234,195	28,192,047	31,481,041

soil type total areas as a percentage of total area		
EkB	0.0101	
EkC	0.0282	
EkD	0.0247	
HrF	----	6,984,691 = HrF
Rock Outcrop	0.0732	2,304,948 = HfF x .33
HaC	0.1487	4,679,743 = HrF x .67
HvD	0.0014	
HvF	0.0383	
LeB	0.0082	
LeC	0.0275	
LeD	0.0288	
LeF	0.0214	
OsB	0.0138	
OsC	0.0055	
VeD	0.0166	
VeF	0.0240	
VhB	0.0007	
VhC	0.0517	
VhD	0.1759	
VhF	0.1060	
VyB	0.0233	
VyC	0.0630	
VyD	0.0371	
WIB	0.0428 Marlowe Excluded	
WIC	0.0216	
Roads	0.0074	
Marlowe	0.0001	
	1.0000	

non-wooded soil type areas as a percentage of total area		
EkB	0.0000	
EkC	0.0019	
EkD	0.0025	
HrF	----	1,433,213 = HrF
Rock	0.0150	472960 = HrF x .33
HaC	0.0305	960,253 = HrF x .67
HvD	0.0005	
HvF	0.0029	
LeB	0.0000	
LeC	0.0002	
LeD	0.0011	
LeF	0.0001	
OsB	0.0007	
OsC	0.0028	
VeD	0.0001	
VeF	0.0003	
VhB	0.0000	
VhC	0.0019	
VhD	0.0077	
VhF	0.0013	
VyB	0.0020	
VyC	0.0162	
VyD	0.0061	
WIB	0.0031 Marlowe excluded	
WIC	0.0000	
	0.0969	

Wooded soil type areas as a percentage of total area		
EkB	0.0101	
EkC	0.0263	
EkD	0.0221	
HrF	----	5,551,478
Rock	0.0582	1,831,988
HaC	0.1182	3,719,490
HvD	0.0009	
HvF	0.0354	
LeB	0.0082	
LeC	0.0273	
LeD	0.0277	
LeF	0.0214	
OsB	0.0132	
OsC	0.0027	
VeD	0.0165	
VeF	0.0237	
VhB	0.0007	
VhC	0.0498	
VhD	0.1682	
VhF	0.1047	
VyB	0.0213	
VyC	0.0468	
VyD	0.0309	
WIB	0.0397	
WIC	0.0216	
	0.8955	

Wooded + Non-wooded + Roads + Marlowe = 1.0000

APPENDIX B1

Water Budget Analysis Tables - Existing Soil Types

Wooded Areas

WATER BUDGET DATA

Wildacres Resort
Analysis for Soil Type EkB: Wooded
Alpha Project No. 02129

	Precip.	PET	Runoff Coeff. (CR)	Runoff (RO) CR x Precip.	Infiltration (INF)	INF-PET	Σ Neg (INF-PET)	Soil Moisture Storage (ST)	Δ ST	AET	PERC
January	4.51	0.00	0.30	1.35	3.16	3.16	0.00	5.32	0.00	0.00	3.16
February	4.36	0.00	0.30	1.31	3.05	3.05	0.00	5.32	0.00	0.00	3.05
March	5.07	0.00	0.30	1.52	3.55	3.55	0.00	5.32	0.00	0.00	3.55
April	5.29	1.01	0.30	1.59	3.70	2.69	0.00	5.32	0.00	1.01	2.69
May	5.75	2.65	0.30	1.73	4.03	1.38	0.00	5.32	0.00	2.65	1.38
June	5.10	3.81	0.30	1.53	3.57	-0.24	-0.24	5.08	-0.24	3.81	0.00
July	4.70	4.61	0.30	1.41	3.29	-1.32	-1.56	3.90	-1.18	4.47	0.00
August	4.91	3.93	0.30	1.47	3.44	-0.49	-2.05	3.50	-0.40	3.84	0.00
September	4.72	2.81	0.30	1.42	3.30	0.49	0.00	3.99	0.49	2.81	0.00
October	4.72	1.43	0.30	1.42	3.30	1.87	0.00	5.32	1.33	1.43	0.55
November	6.00	0.25	0.30	1.80	4.20	3.95	0.00	5.32	0.00	0.25	3.95
December	5.11	0.00	0.30	1.53	3.58	3.58	0.00	5.32	0.00	0.00	3.58

Average Annual Precipitation: 60.24

Note(s):

Total Runoff : 18.07
Total AET: 20.27
Total Percolation: 21.90
60.24

02129\Existing Water Budget Data-Wooded - EkB

WATER BUDGET DATA

Wildacres Resort
Analysis for Soil Types EkC, EkD: Wooded
Alpha Project No. 02129

	Precip.	PET	Runoff Coeff. (CR)	Runoff (RO) CR x Precip.	Infiltration (INF)	INF-PET	Σ Neg (INF-PET)	Soil Moisture Storage (ST)	Δ ST	AET	PERC
January	4.51	0.00	0.40	1.80	2.71	2.71	0.00	5.32	0.00	0.00	2.71
February	4.36	0.00	0.40	1.74	2.62	2.62	0.00	5.32	0.00	0.00	2.62
March	5.07	0.00	0.40	2.03	3.04	3.04	0.00	5.32	0.00	0.00	3.04
April	5.29	1.01	0.40	2.12	3.17	2.16	0.00	5.32	0.00	0.00	3.04
May	5.75	2.65	0.40	2.30	3.45	0.80	0.00	5.32	0.00	1.01	2.16
June	5.10	3.81	0.40	2.04	3.06	-0.75	-0.75	4.61	-0.71	2.65	0.80
July	4.70	4.61	0.40	1.88	2.82	-1.79	-2.54	3.23	-1.38	3.77	0.00
August	4.91	3.93	0.40	1.96	2.95	-0.98	-3.52	2.64	-0.59	4.20	0.00
September	4.72	2.81	0.40	1.89	2.83	0.02	0.00	2.66	0.02	3.54	0.00
October	4.72	1.43	0.40	1.89	2.83	1.40	0.00	4.06	1.40	2.81	0.00
November	6.00	0.25	0.40	2.40	3.60	3.35	0.00	5.32	1.26	1.43	0.00
December	5.11	0.00	0.40	2.04	3.07	3.07	0.00	5.32	0.00	0.25	2.09

Average Annual Precipitation: 60.24

Note(s):

Total Runoff :	24.10
Total AET:	19.66
Total Percolation:	16.49
	60.24

WATER BUDGET DATA

Wildacres Resort
Analysis for Soil Type HrF: Wooded
Alpha Project No. 02129

	Direct HaC Precip.	Add'l HaC Precip due to Runoff from Rock Outcrop	Total Precip. To Halcott (HaC)	PET	Runoff Coeff. (CR)	Runoff (RO) CR x Precip.	Infiltration (INF)	INF-PET	Σ Neg (INF-PET)	Soil Moisture Storage (ST)	Δ ST	AET	PERC
January	4.51	2.22	6.73	0.00	0.40	2.69	4.04	4.04	0.00	1.43	0.00	0.00	4.04
February	4.36	2.15	6.51	0.00	0.40	2.60	3.90	3.90	0.00	1.43	0.00	0.00	3.90
March	5.07	2.50	7.57	0.00	0.40	3.03	4.54	4.54	0.00	1.43	0.00	0.00	4.54
April	5.29	2.61	7.90	1.01	0.40	3.16	4.74	3.73	0.00	1.43	0.00	1.01	3.73
May	5.75	2.83	8.58	2.65	0.40	3.43	5.15	2.50	0.00	1.43	0.00	2.65	2.50
June	5.10	2.51	7.61	3.81	0.40	3.04	4.57	0.76	0.00	1.43	0.00	3.81	0.76
July	4.70	2.31	7.01	4.61	0.40	2.81	4.21	-0.40	-0.40	1.03	-0.40	4.61	0.00
August	4.91	2.42	7.33	3.93	0.40	2.93	4.40	0.47	0.00	1.43	0.40	3.93	0.07
September	4.72	2.32	7.04	2.81	0.40	2.82	4.23	1.42	0.00	1.43	0.00	2.81	1.42
October	4.72	2.32	7.04	1.43	0.40	2.82	4.23	2.80	0.00	1.43	0.00	1.43	2.80
November	6.00	2.96	8.96	0.25	0.40	3.58	5.37	5.12	0.00	1.43	0.00	0.25	5.12
December	5.11	2.52	7.63	0.00	0.40	3.05	4.58	4.58	0.00	1.43	0.00	0.00	4.58
		29.67	89.91										

Average Annual Precipitation: 60.24 inches plus run-on from Rock Outcrop (29.67 inches) = 89.91 inches

Runoff : 35.96
Total AET: 20.50
Total Percolation: 33.45
PERC+AET+RUNOFF= 89.91

Note(s):
Total Wooded HrF area = 5,551,478 sq ft. , assumed to be 67% Halcott (HaC) and 33% Rock Outcrop.
Wooded HaC area = 3,719,490sq ft
Wooded Rock Outcrop area = 1,831,988 sq ft
Monthly rainfall on Rock Outcrop area assumed to runoff directly to Halcott (HaC) area as additional precipitation to Halcott area
(No percolation on Rock Outcrop area)

WATER BUDGET DATA

Wildacres Resort
Analysis for Soil Types HvD, HvF: Wooded
Alpha Project No. 02129

	Precip.	PET	Runoff Coeff. (CR)	Runoff (RO) CR x Precip.	Infiltration (INF)	INF-PET	Σ Neg (INF-PET)	Soil Moisture Storage (ST)	Δ ST	AET	PERC
January	4.51	0.00	0.40	1.80	2.71	2.71	0.00	1.90	0.00	0.00	2.71
February	4.36	0.00	0.40	1.74	2.62	2.62	0.00	1.90	0.00	0.00	2.62
March	5.07	0.00	0.40	2.03	3.04	3.04	0.00	1.90	0.00	0.00	3.04
April	5.29	1.01	0.40	2.12	3.17	2.16	0.00	1.90	0.00	1.01	2.16
May	5.75	2.65	0.40	2.30	3.45	0.80	0.00	1.90	0.00	2.65	0.80
June	5.10	3.81	0.40	2.04	3.06	-0.75	-0.75	1.22	-0.68	3.74	0.00
July	4.70	4.61	0.40	1.88	2.82	-1.79	-2.54	0.45	-0.77	3.59	0.00
August	4.91	3.93	0.40	1.96	2.95	-0.98	-3.52	0.25	-0.20	3.15	0.00
September	4.72	2.81	0.40	1.89	2.83	0.02	0.00	0.27	0.02	2.81	0.00
October	4.72	1.43	0.40	1.89	2.83	1.40	0.00	1.67	1.40	1.43	0.00
November	6.00	0.25	0.40	2.40	3.60	3.35	0.00	1.90	0.23	0.25	3.12
December	5.11	0.00	0.40	2.04	3.07	3.07	0.00	1.90	0.00	0.00	3.07

Average Annual Precipitation: 60.24

Note(s):

Total Runoff :	24.10
Total AET:	18.63
Total Percolation:	17.52
	60.24

WATER BUDGET DATA

Wildacres Resort
Analysis for Soil Type LeB: Wooded
Alpha Project No. 02129

	Precip.	PET	Runoff Coeff. (CR)	Runoff (RO) CR x Precip.	Infiltration (INF)	INF-PET	Σ Neg (INF-PET)	Soil Moisture Storage (ST)	Δ ST	AET	PERC
January	4.51	0.00	0.30	1.35	3.16	3.16	0.00	3.20	0.00	0.00	3.16
February	4.36	0.00	0.30	1.31	3.05	3.05	0.00	3.20	0.00	0.00	3.05
March	5.07	0.00	0.30	1.52	3.55	3.55	0.00	3.20	0.00	0.00	3.55
April	5.29	1.01	0.30	1.59	3.70	2.69	0.00	3.20	0.00	1.01	2.69
May	5.75	2.65	0.30	1.73	4.03	1.38	0.00	3.20	0.00	2.65	1.38
June	5.10	3.81	0.30	1.53	3.57	-0.24	-0.24	2.89	-0.24	3.81	0.00
July	4.70	4.61	0.30	1.41	3.29	-1.32	-1.56	1.85	-0.87	4.16	0.00
August	4.91	3.93	0.30	1.47	3.44	-0.49	-2.05	1.56	-0.20	3.64	0.00
September	4.72	2.81	0.30	1.42	3.30	0.49	0.00	2.05	0.49	2.81	0.00
October	4.72	1.43	0.30	1.42	3.30	1.87	0.00	3.20	0.82	1.43	1.05
November	6.00	0.25	0.30	1.80	4.20	3.95	0.00	3.20	0.00	0.25	3.95
December	5.11	0.00	0.30	1.53	3.58	3.58	0.00	3.20	0.00	0.00	3.58

Average Annual Precipitation: 60.24

Note(s):

Total Runoff :	18.07
Total AET:	19.76
Total Percolation:	22.41
	60.24

WATER BUDGET DATA

Wildacres Resort
Analysis for Soil Types LeC, LeD: Wooded
Alpha Project No. 02129

	Precip.	PET	Runoff Coeff. (CR)	Runoff (RO) CR x Precip.	Infiltration (INF)	INF-PET	Σ Neg (INF-PET)	Soil Moisture Storage (ST)	Δ ST	AET	PERC
January	4.51	0.00	0.40	1.80	2.71	2.71	0.00	3.20	0.00	0.00	2.71
February	4.36	0.00	0.40	1.74	2.62	2.62	0.00	3.20	0.00	0.00	2.62
March	5.07	0.00	0.40	2.03	3.04	3.04	0.00	3.20	0.00	0.00	3.04
April	5.29	1.01	0.40	2.12	3.17	2.16	0.00	3.20	0.00	1.01	2.16
May	5.75	2.65	0.40	2.30	3.45	0.80	0.00	3.20	0.00	2.65	0.80
June	5.10	3.81	0.40	2.04	3.06	-0.75	-0.75	2.48	-0.72	3.78	0.00
July	4.70	4.61	0.40	1.88	2.82	-1.79	-2.54	1.34	-1.14	3.96	0.00
August	4.91	3.93	0.40	1.96	2.95	-0.98	-3.52	0.98	-0.36	3.31	0.00
September	4.72	2.81	0.40	1.89	2.83	0.02	0.00	1.00	0.02	2.81	0.00
October	4.72	1.43	0.40	1.89	2.83	1.40	0.00	2.40	1.40	1.43	0.00
November	6.00	0.25	0.40	2.40	3.60	3.35	0.00	3.20	0.80	0.25	2.55
December	5.11	0.00	0.40	2.04	3.07	3.07	0.00	3.20	0.00	0.00	3.07

Average Annual Precipitation: 60.24

Note(s):

Total Runoff :	24.10
Total AET:	19.20
Total Percolation:	16.94
	60.24

WATER BUDGET DATA

Wildacres Resort
Analysis for Soil Type LeF: Wooded
Alpha Project No. 02129

	Precip.	PET	Runoff Coeff. (CR)	Runoff (RO) CR x Precip.	Infiltration (INF)	INF-PET	Σ Neg (INF-PET)	Soil Moisture Storage (ST)	Δ ST	AET	PERC
January	4.51	0.00	0.40	1.80	2.71	2.71	0.00	3.60	0.00	0.00	2.71
February	4.36	0.00	0.40	1.74	2.62	2.62	0.00	3.60	0.00	0.00	2.62
March	5.07	0.00	0.40	2.03	3.04	3.04	0.00	3.60	0.00	0.00	3.04
April	5.29	1.01	0.40	2.12	3.17	2.16	0.00	3.60	0.00	1.01	2.16
May	5.75	2.65	0.40	2.30	3.45	0.80	0.00	3.60	0.00	2.65	0.80
June	5.10	3.81	0.40	2.04	3.06	-0.75	-0.75	2.91	-0.69	3.75	0.00
July	4.70	4.61	0.40	1.88	2.82	-1.79	-2.54	1.69	-1.22	4.04	0.00
August	4.91	3.93	0.40	1.96	2.95	-0.98	-3.52	1.30	-0.39	3.34	0.00
September	4.72	2.81	0.40	1.89	2.83	0.02	0.00	1.32	0.02	2.81	0.00
October	4.72	1.43	0.40	1.89	2.83	1.40	0.00	2.72	1.40	1.43	0.00
November	6.00	0.25	0.40	2.40	3.60	3.35	0.00	3.60	0.88	0.25	2.47
December	5.11	0.00	0.40	2.04	3.07	3.07	0.00	3.60	0.00	0.00	3.07

Average Annual Precipitation: 60.24

Note(s):

Total Runoff :	24.10
Total AET:	19.28
Total Percolation:	16.87
	60.24

02129\Existing Water Budget Data-Wooded\LeF

TABLE 8
WATER BUDGET DATA

Wildacres Resort
Analysis for Soil Type OsB: Wooded
Alpha Project No. 02129

	Precip.	PET	Runoff Coeff. (CR)	Runoff (RO) CR x Precip.	Infiltration (INF)	INF-PET	Σ Neg (INF-PET)	Soil Moisture Storage (ST)	Δ ST	AET	PERC
January	4.51	0.00	0.30	1.35	3.16	3.16	0.00	2.52	0.00	0.00	3.16
February	4.36	0.00	0.30	1.31	3.05	3.05	0.00	2.52	0.00	0.00	3.05
March	5.07	0.00	0.30	1.52	3.55	3.55	0.00	2.52	0.00	0.00	3.55
April	5.29	1.01	0.30	1.59	3.70	2.69	0.00	2.52	0.00	1.01	2.69
May	5.75	2.65	0.30	1.73	4.03	1.38	0.00	2.52	0.00	2.65	1.38
June	5.10	3.81	0.30	1.53	3.57	-0.24	-0.24	2.28	-0.24	3.81	0.00
July	4.70	4.61	0.30	1.41	3.29	-1.32	-1.56	1.26	-1.02	4.31	0.00
August	4.91	3.93	0.30	1.47	3.44	-0.49	-2.05	1.00	-0.26	3.70	0.00
September	4.72	2.81	0.30	1.42	3.30	0.49	0.00	1.49	0.49	2.81	0.00
October	4.72	1.43	0.30	1.42	3.30	1.87	0.00	2.52	1.03	1.43	0.85
November	6.00	0.25	0.30	1.80	4.20	3.95	0.00	2.52	0.00	0.25	3.95
December	5.11	0.00	0.30	1.53	3.58	3.58	0.00	2.52	0.00	0.00	3.58

Average Annual Precipitation: 60.24

Note(s):

Total Runoff :	18.07
Total AET:	19.97
Total Percolation:	22.20
	60.24

WATER BUDGET DATA

Wildacres Resort
Analysis for Soil Type OsC: Wooded
Alpha Project No. 02129

	Precip.	PET	Runoff Coeff. (CR)	Runoff (RO) CR x Precip.	Infiltration (INF)	INF-PET	Σ Neg (INF-PET)	Soil Moisture Storage (ST)	Δ ST	AET	PERC
January	4.51	0.00	0.40	1.80	2.71	2.71	0.00	2.52	0.00	0.00	2.71
February	4.36	0.00	0.40	1.74	2.62	2.62	0.00	2.52	0.00	0.00	2.62
March	5.07	0.00	0.40	2.03	3.04	3.04	0.00	2.52	0.00	0.00	3.04
April	5.29	1.01	0.40	2.12	3.17	2.16	0.00	2.52	0.00	0.00	3.04
May	5.75	2.65	0.40	2.30	3.45	0.80	0.00	2.52	0.00	1.01	2.16
June	5.10	3.81	0.40	2.04	3.06	-0.75	-0.75	1.79	-0.73	2.65	0.80
July	4.70	4.61	0.40	1.88	2.82	-1.79	-2.54	0.83	-0.96	3.79	0.00
August	4.91	3.93	0.40	1.96	2.95	-0.98	-3.52	0.54	-0.29	3.78	0.00
September	4.72	2.81	0.40	1.89	2.83	0.02	0.00	0.56	0.02	3.24	0.00
October	4.72	1.43	0.40	1.89	2.83	1.40	0.00	1.96	1.40	2.81	0.00
November	6.00	0.25	0.40	2.40	3.60	3.35	0.00	2.52	0.56	1.43	0.00
December	5.11	0.00	0.40	2.04	3.07	3.07	0.00	2.52	0.00	0.25	2.79

Average Annual Precipitation: 60.24

Note(s):

Total Runoff :	24.10
Total AET:	18.96
Total Percolation:	17.19
	60.24

WATER BUDGET DATA

Wildacres Resort
Analysis for Soil Types VeD, VeF: Wooded
Alpha Project No. 02129

	Precip.	PET	Runoff Coeff. (CR)	Runoff (RO) CR x Precip.	Infiltration (INF)	INF-PET	Σ Neg (INF-PET)	Soil Moisture Storage (ST)	Δ ST	AET	PERC
January	4.51	0.00	0.40	1.80	2.71	2.71	0.00	3.50	0.00	0.00	2.71
February	4.36	0.00	0.40	1.74	2.62	2.62	0.00	3.50	0.00	0.00	2.62
March	5.07	0.00	0.40	2.03	3.04	3.04	0.00	3.50	0.00	0.00	3.04
April	5.29	1.01	0.40	2.12	3.17	2.16	0.00	3.50	0.00	1.01	2.16
May	5.75	2.65	0.40	2.30	3.45	0.80	0.00	3.50	0.00	2.65	0.80
June	5.10	3.81	0.40	2.04	3.06	-0.75	-0.75	2.78	-0.72	3.78	0.00
July	4.70	4.61	0.40	1.88	2.82	-1.79	-2.54	1.57	-1.21	4.03	0.00
August	4.91	3.93	0.40	1.96	2.95	-0.98	-3.52	0.79	-0.78	3.73	0.00
September	4.72	2.81	0.40	1.89	2.83	0.02	0.00	0.81	0.02	2.81	0.00
October	4.72	1.43	0.40	1.89	2.83	1.40	0.00	2.21	1.40	1.43	0.00
November	6.00	0.25	0.40	2.40	3.60	3.35	0.00	3.50	1.29	0.25	2.06
December	5.11	0.00	0.40	2.04	3.07	3.07	0.00	3.50	0.00	0.00	3.07

Average Annual Precipitation: 60.24

Note(s):

Total Runoff : 24.10
Total AET: 19.69
Total Percolation: 16.46
60.24

WATER BUDGET DATA

Wildacres Resort
Analysis for Soil Type VhB: Wooded
Alpha Project No. 02129

	Precip.	PET	Runoff Coeff. (CR)	Runoff (RO) CR x Precip.	Infiltration (INF)	INF-PET	Σ Neg (INF-PET)	Soil Moisture Storage (ST)	Δ ST	AET	PERC
January	4.51	0.00	0.30	1.35	3.16	3.16	0.00	2.16	0.00	0.00	3.16
February	4.36	0.00	0.30	1.31	3.05	3.05	0.00	2.16	0.00	0.00	3.05
March	5.07	0.00	0.30	1.52	3.55	3.55	0.00	2.16	0.00	0.00	3.55
April	5.29	1.01	0.30	1.59	3.70	2.69	0.00	2.16	0.00	1.01	2.69
May	5.75	2.65	0.30	1.73	4.03	1.38	0.00	2.16	0.00	2.65	1.38
June	5.10	3.81	0.30	1.53	3.57	-0.24	-0.24	1.89	-0.27	3.84	0.00
July	4.70	4.61	0.30	1.41	3.29	-1.32	-1.56	0.96	-0.93	4.22	0.00
August	4.91	3.93	0.30	1.47	3.44	-0.49	-2.05	0.76	-0.20	3.64	0.00
September	4.72	2.81	0.30	1.42	3.30	0.49	0.00	1.25	0.49	2.81	0.00
October	4.72	1.43	0.30	1.42	3.30	1.87	0.00	2.16	0.91	1.43	0.97
November	6.00	0.25	0.30	1.80	4.20	3.95	0.00	2.16	0.00	0.25	3.95
December	5.11	0.00	0.30	1.53	3.58	3.58	0.00	2.16	0.00	0.00	3.58

Average Annual Precipitation: 60.24

Note(s):

Total Runoff :	18.07
Total AET:	19.85
Total Percolation:	22.32
	60.24

02129\Existing Water Budget Data-Wooded\VhB

WATER BUDGET DATA

Wildacres Resort
Analysis for Soil Types VhC, VhD, VhF: Wooded
Alpha Project No. 02129

	Precip.	PET	Runoff Coeff. (CR)	Runoff (RO) CR x Precip.	Infiltration (INF)	INF-PET	Σ Neg (INF-PET)	Soil Moisture Storage (ST)	Δ ST	AET	PERC
January	4.51	0.00	0.40	1.80	2.71	2.71	0.00	2.16	0.00	0.00	2.71
February	4.36	0.00	0.40	1.74	2.62	2.62	0.00	2.16	0.00	0.00	2.62
March	5.07	0.00	0.40	2.03	3.04	3.04	0.00	2.16	0.00	0.00	3.04
April	5.29	1.01	0.40	2.12	3.17	2.16	0.00	2.16	0.00	1.01	2.16
May	5.75	2.65	0.40	2.30	3.45	0.80	0.00	2.16	0.00	2.65	0.80
June	5.10	3.81	0.40	2.04	3.06	-0.75	-0.75	1.48	-0.68	3.74	0.00
July	4.70	4.61	0.40	1.88	2.82	-1.79	-2.54	0.63	-0.85	3.67	0.00
August	4.91	3.93	0.40	1.96	2.95	-0.98	-3.52	0.38	-0.25	3.20	0.00
September	4.72	2.81	0.40	1.89	2.83	0.02	0.00	0.40	0.02	2.81	0.00
October	4.72	1.43	0.40	1.89	2.83	1.40	0.00	1.80	1.40	1.43	0.00
November	6.00	0.25	0.40	2.40	3.60	3.35	0.00	2.16	0.36	0.25	2.99
December	5.11	0.00	0.40	2.04	3.07	3.07	0.00	2.16	0.00	0.00	3.07

Average Annual Precipitation: 60.24

Note(s):

Total Runoff :	24.10
Total AET:	18.76
Total Percolation:	17.39
	60.24

WATER BUDGET DATA

Wildacres Resort
Analysis for Soil Type VyB: Wooded
Alpha Project No. 02129

	Precip.	PET	Runoff Coeff. (CR)	Runoff (RO) CR x Precip.	Infiltration (INF)	INF-PET	Σ Neg (INF-PET)	Soil Moisture Storage (ST)	Δ ST	AET	PERC
January	4.51	0.00	0.30	1.35	3.16	3.16	0.00	2.40	0.00	0.00	3.16
February	4.36	0.00	0.30	1.31	3.05	3.05	0.00	2.40	0.00	0.00	3.05
March	5.07	0.00	0.30	1.52	3.55	3.55	0.00	2.40	0.00	0.00	3.55
April	5.29	1.01	0.30	1.59	3.70	2.69	0.00	2.40	0.00	1.01	2.69
May	5.75	2.65	0.30	1.73	4.03	1.38	0.00	2.40	0.00	2.65	1.38
June	5.10	3.81	0.30	1.53	3.57	-0.24	-0.24	2.16	-0.24	3.81	0.00
July	4.70	4.61	0.30	1.41	3.29	-1.32	-1.56	1.16	-1.00	4.29	0.00
August	4.91	3.93	0.30	1.47	3.44	-0.49	-2.05	0.94	-0.22	3.66	0.00
September	4.72	2.81	0.30	1.42	3.30	0.49	0.00	1.43	0.49	2.81	0.00
October	4.72	1.43	0.30	1.42	3.30	1.87	0.00	2.40	0.97	1.43	0.91
November	6.00	0.25	0.30	1.80	4.20	3.95	0.00	2.40	0.00	0.25	3.95
December	5.11	0.00	0.30	1.53	3.58	3.58	0.00	2.40	0.00	0.00	3.58

Average Annual Precipitation: 60.24

Note(s):

Total Runoff :	18.07
Total AET:	19.91
Total Percolation:	22.26
	60.24

02129\Existing Water Budget Data-Wooded\VyB

WATER BUDGET DATA

Wildacres Resort
Analysis for Soil Types VyC, VyD: Wooded
Alpha Project No. 02129

	Precip.	PET	Runoff Coeff. (CR)	Runoff (RO) CR x Precip.	Infiltration (INF)	INF-PET	Σ Neg (INF-PET)	Soil Moisture Storage (ST)	Δ ST	AET	PERC
January	4.51	0.00	0.40	1.80	2.71	2.71	0.00	2.40	0.00	0.00	2.71
February	4.36	0.00	0.40	1.74	2.62	2.62	0.00	2.40	0.00	0.00	2.62
March	5.07	0.00	0.40	2.03	3.04	3.04	0.00	2.40	0.00	0.00	3.04
April	5.29	1.01	0.40	2.12	3.17	2.16	0.00	2.40	0.00	1.01	2.16
May	5.75	2.65	0.40	2.30	3.45	0.80	0.00	2.40	0.00	2.65	0.80
June	5.10	3.81	0.40	2.04	3.06	-0.75	-0.75	1.69	-0.71	3.77	0.00
July	4.70	4.61	0.40	1.88	2.82	-1.79	-2.54	0.75	-0.94	3.76	0.00
August	4.91	3.93	0.40	1.96	2.95	-0.98	-3.52	0.49	-0.26	3.21	0.00
September	4.72	2.81	0.40	1.89	2.83	0.02	0.00	0.51	0.02	2.81	0.00
October	4.72	1.43	0.40	1.89	2.83	1.40	0.00	1.91	1.40	1.43	0.00
November	6.00	0.25	0.40	2.40	3.60	3.35	0.00	2.40	0.49	0.25	2.86
December	5.11	0.00	0.40	2.04	3.07	3.07	0.00	2.40	0.00	0.00	3.07

Average Annual Precipitation: 60.24

Note(s):

Total Runoff :	24.10
Total AET:	18.89
Total Percolation:	17.26
	60.24

02129\Existing Water Budget Data-Wooded\VyC,VyD

WATER BUDGET DATA

Wildacres Resort
Analysis for Soil Type WIB: Wooded
Alpha Project No. 02129

	Precip.	PET	Runoff Coeff. (CR)	Runoff (RO) CR x Precip.	Infiltration (INF)	INF-PET	Σ Neg (INF-PET)	Soil Moisture Storage (ST)	Δ ST	AET	PERC
January	4.51	0.00	0.30	1.35	3.16	3.16	0.00	3.50	0.00	0.00	3.16
February	4.36	0.00	0.30	1.31	3.05	3.05	0.00	3.50	0.00	0.00	3.05
March	5.07	0.00	0.30	1.52	3.55	3.55	0.00	3.50	0.00	0.00	3.55
April	5.29	1.01	0.30	1.59	3.70	2.69	0.00	3.50	0.00	1.01	2.69
May	5.75	2.65	0.30	1.73	4.03	1.38	0.00	3.50	0.00	2.65	1.38
June	5.10	3.81	0.30	1.53	3.57	-0.24	-0.24	3.33	-0.17	3.74	0.00
July	4.70	4.61	0.30	1.41	3.29	-1.32	-1.56	2.13	-1.20	4.49	0.00
August	4.91	3.93	0.30	1.47	3.44	-0.49	-2.05	1.85	-0.28	3.72	0.00
September	4.72	2.81	0.30	1.42	3.30	0.49	0.00	2.34	0.49	2.81	0.00
October	4.72	1.43	0.30	1.42	3.30	1.87	0.00	3.50	1.16	1.43	0.72
November	6.00	0.25	0.30	1.80	4.20	3.95	0.00	3.50	0.00	0.25	3.95
December	5.11	0.00	0.30	1.53	3.58	3.58	0.00	3.50	0.00	0.00	3.58

Average Annual Precipitation: 60.24

Note(s):

Total Runoff :	18.07
Total AET:	20.10
Total Percolation:	22.07
	60.24

WATER BUDGET DATA

Wildacres Resort
Analysis for Soil Type WIC: Wooded
Alpha Project No. 02129

	Precip.	PET	Runoff Coeff. (CR)	Runoff (RO) CR x Precip.	Infiltration (INF)	INF-PET	Σ Neg (INF-PET)	Soil Moisture Storage (ST)	Δ ST	AET	PERC
January	4.51	0.00	0.40	1.80	2.71	2.71	0.00	3.50	0.00	0.00	2.71
February	4.36	0.00	0.40	1.74	2.62	2.62	0.00	3.50	0.00	0.00	2.62
March	5.07	0.00	0.40	2.03	3.04	3.04	0.00	3.50	0.00	0.00	3.04
April	5.29	1.01	0.40	2.12	3.17	2.16	0.00	3.50	0.00	1.01	2.16
May	5.75	2.65	0.40	2.30	3.45	0.80	0.00	3.50	0.00	2.65	0.80
June	5.10	3.81	0.40	2.04	3.06	-0.75	-0.75	2.76	-0.74	3.80	0.00
July	4.70	4.61	0.40	1.88	2.82	-1.79	-2.54	1.57	-1.19	4.01	0.00
August	4.91	3.93	0.40	1.96	2.95	-0.98	-3.52	1.18	-0.39	3.34	0.00
September	4.72	2.81	0.40	1.89	2.83	0.02	0.00	1.20	0.02	2.81	0.00
October	4.72	1.43	0.40	1.89	2.83	1.40	0.00	2.60	1.40	1.43	0.00
November	6.00	0.25	0.40	2.40	3.60	3.35	0.00	3.50	0.90	0.25	2.45
December	5.11	0.00	0.40	2.04	3.07	3.07	0.00	3.50	0.00	0.00	3.07

Average Annual Precipitation: 60.24

Note(s):

Total Runoff :	24.10
Total AET:	19.30
Total Percolation:	16.85
	60.24

APPENDIX B2

Water Budget Analysis Tables - Existing Soil Types
Non-Wooded Areas

WATER BUDGET DATA

Wildacres Resort
Analysis for Soil Types EkC, EkD: Non-Wooded
Alpha Project No. 02129

	Precip.	PET	Runoff Coeff. (CR)	Runoff (RO) CR x Precip.	Infiltration (INF)	INF-PET	Σ Neg (INF-PET)	Soil Moisture Storage (ST)	Δ ST	AET	PERC
January	4.51	0.00	0.42	1.89	2.62	2.62	0.00	5.32	0.00	0.00	2.62
February	4.36	0.00	0.42	1.83	2.53	2.53	0.00	5.32	0.00	0.00	2.53
March	5.07	0.00	0.42	2.13	2.94	2.94	0.00	5.32	0.00	0.00	2.94
April	5.29	1.01	0.42	2.22	3.07	2.06	0.00	5.32	0.00	0.00	2.94
May	5.75	2.65	0.42	2.42	3.34	0.69	0.00	5.32	0.00	1.01	2.06
June	5.10	3.81	0.42	2.14	2.96	-0.85	-0.85	4.42	-0.90	2.65	0.69
July	4.70	4.61	0.42	1.97	2.73	-1.88	-2.73	3.07	-1.35	3.86	0.00
August	4.91	3.93	0.42	2.06	2.85	-1.08	-3.82	2.44	-0.63	4.08	0.00
September	4.72	2.81	0.42	1.98	2.74	-0.07	-3.89	2.38	-0.06	3.48	0.00
October	4.72	1.43	0.42	1.98	2.74	1.31	0.00	3.69	1.31	2.80	0.00
November	6.00	0.25	0.42	2.52	3.48	3.23	0.00	5.32	1.63	1.43	0.00
December	5.11	0.00	0.42	2.15	2.96	2.96	0.00	5.32	0.00	0.25	1.60

Average Annual Precipitation: 60.24

Note(s):

Total Runoff : 25.30
Total AET: 19.55
Total Percolation: 15.39
60.24

WATER BUDGET DATA

Wildacres Resort
Analysis for Soil Type HrF: Non-Wooded
Alpha Project No. 02129

	Direct HaC Precip.	Run-on from Rock Outcrop	Total Precip. To Halcott (HaC)	PET	Runoff Coeff. (CR)	Runoff (RO) CR x Precip.	Infiltration (INF)	INF-PET	Σ Neg (INF-PET)	Soil Moisture Storage (ST)	Δ ST	AET	PERC
January	4.51	2.22	6.73	0.00	0.42	2.83	3.90	3.90	0.00	1.43	0.00	0.00	3.90
February	4.36	2.15	6.51	0.00	0.42	2.73	3.77	3.77	0.00	1.43	0.00	0.00	3.77
March	5.07	2.50	7.57	0.00	0.42	3.18	4.39	4.39	0.00	1.43	0.00	0.00	4.39
April	5.29	2.61	7.90	1.01	0.42	3.32	4.58	3.57	0.00	1.43	0.00	1.01	3.57
May	5.75	2.83	8.58	2.65	0.42	3.60	4.98	2.33	0.00	1.43	0.00	2.65	2.33
June	5.10	2.51	7.61	3.81	0.42	3.20	4.41	0.60	0.00	1.43	0.00	3.81	0.60
July	4.70	2.31	7.01	4.61	0.42	2.95	4.07	-0.54	-0.54	1.03	-0.40	4.47	0.00
August	4.91	2.42	7.33	3.93	0.42	3.08	4.25	0.32	0.00	1.43	0.40	3.93	-0.08
September	4.72	2.32	7.04	2.81	0.42	2.96	4.09	1.28	0.00	1.43	0.00	2.81	1.28
October	4.72	2.32	7.04	1.43	0.42	2.96	4.09	2.66	0.00	1.43	0.00	1.43	2.66
November	6.00	2.96	8.96	0.25	0.42	3.76	5.19	4.94	0.00	1.43	0.00	0.25	4.94
December	5.11	2.52	7.63	0.00	0.42	3.20	4.42	4.42	0.00	1.43	0.00	0.00	4.42
		29.67											

Average Annual Precipitation: 60.24 inches plus run-on from Rock Outcrop (29.67 inches) = 89.91 inches

Runoff : 37.76
Total AET: 20.36
Total Percolation: 31.79
PERC+AET+RUNOFF= 89.91

Note(s):
Total Non-Wooded HrF area = 1,433,213 sq ft. , assumed to be 67% Halcott (HaC) and 33% Rock Outcrop.
Non-Wooded HaC area = 960,253 sq ft
Non-Wooded Rock Outcrop area = 472,960 sq ft
Monthly rainfall on Rock Outcrop area assumed to runoff directly to Halcott (HaC) area as additional precipitation to Halcott area

WATER BUDGET DATA

Wildacres Resort
Analysis for Soil Types HvD,HvF: Non-Wooded
Alpha Project No. 02129

	Precip.	PET	Runoff Coeff. (CR)	Runoff (RO) CR x Precip.	Infiltration (INF)	INF-PET	Σ Neg (INF-PET)	Soil Moisture Storage (ST)	Δ ST	AET	PERC
January	4.51	0.00	0.42	1.89	2.62	2.62	0.00	1.90	0.00	0.00	2.62
February	4.36	0.00	0.42	1.83	2.53	2.53	0.00	1.90	0.00	0.00	2.53
March	5.07	0.00	0.42	2.13	2.94	2.94	0.00	1.90	0.00	0.00	2.94
April	5.29	1.01	0.42	2.22	3.07	2.06	0.00	1.90	0.00	1.01	2.06
May	5.75	2.65	0.42	2.42	3.34	0.69	0.00	1.90	0.00	2.65	0.69
June	5.10	3.81	0.42	2.14	2.96	-0.85	-0.85	1.14	-0.76	3.72	0.00
July	4.70	4.61	0.42	1.97	2.73	-1.88	-2.73	0.41	-0.73	3.46	0.00
August	4.91	3.93	0.42	2.06	2.85	-1.08	-3.82	0.22	-0.19	3.04	0.00
September	4.72	2.81	0.42	1.98	2.74	-0.07	-3.89	0.21	-0.01	2.75	0.00
October	4.72	1.43	0.42	1.98	2.74	1.31	0.00	1.52	1.31	1.43	0.00
November	6.00	0.25	0.42	2.52	3.48	3.23	0.00	1.90	0.38	0.25	2.85
December	5.11	0.00	0.42	2.15	2.96	2.96	0.00	1.90	0.00	0.00	2.96

Average Annual Precipitation: 60.24

Note(s):

Total Runoff : 25.30
Total AET: 18.30
Total Percolation: 16.64
60.24

02129\Existing Water Budget Data-Open Areas\HvD,HvF

WATER BUDGET DATA

Wildacres Resort
Analysis for Soil Types LeC, LeD: Non-Wooded
Alpha Project No. 02129

	Precip.	PET	Runoff Coeff. (CR)	Runoff (RO) CR x Precip.	Infiltration (INF)	INF-PET	Σ Neg (INF-PET)	Soil Moisture Storage (ST)	Δ ST	AET	PERC
January	4.51	0.00	0.42	1.89	2.62	2.62	0.00	3.20	0.00	0.00	2.62
February	4.36	0.00	0.42	1.83	2.53	2.53	0.00	3.20	0.00	0.00	2.53
March	5.07	0.00	0.42	2.13	2.94	2.94	0.00	3.20	0.00	0.00	2.94
April	5.29	1.01	0.42	2.22	3.07	2.06	0.00	3.20	0.00	1.01	2.06
May	5.75	2.65	0.42	2.42	3.34	0.69	0.00	3.20	0.00	2.65	0.69
June	5.10	3.81	0.42	2.14	2.96	-0.85	-0.85	2.36	-0.84	3.80	0.00
July	4.70	4.61	0.42	1.97	2.73	-1.88	-2.73	1.26	-1.10	3.83	0.00
August	4.91	3.93	0.42	2.06	2.85	-1.08	-3.82	0.89	-0.37	3.22	0.00
September	4.72	2.81	0.42	1.98	2.74	-0.07	-3.89	0.87	-0.02	2.76	0.00
October	4.72	1.43	0.42	1.98	2.74	1.31	0.00	2.18	1.31	1.43	0.00
November	6.00	0.25	0.42	2.52	3.48	3.23	0.00	3.20	1.02	0.25	2.21
December	5.11	0.00	0.42	2.15	2.96	2.96	0.00	3.20	0.00	0.00	2.96

Average Annual Precipitation: 60.24

Note(s):

Total Runoff :	25.30
Total AET:	18.94
Total Percolation:	16.00
	60.24

WATER BUDGET DATA

Wildacres Resort
Analysis for Soil Type LeF: Non-Wooded
Alpha Project No. 02129

	Precip.	PET	Runoff Coeff. (CR)	Runoff (RO) CR x Precip.	Infiltration (INF)	INF-PET	Σ Neg (INF-PET)	Soil Moisture Storage (ST)	Δ ST	AET	PERC
January	4.51	0.00	0.42	1.89	2.62	2.62	0.00	3.60	0.00	0.00	2.62
February	4.36	0.00	0.42	1.83	2.53	2.53	0.00	3.60	0.00	0.00	2.53
March	5.07	0.00	0.42	2.13	2.94	2.94	0.00	3.60	0.00	0.00	2.94
April	5.29	1.01	0.42	2.22	3.07	2.06	0.00	3.60	0.00	0.00	2.94
May	5.75	2.65	0.42	2.42	3.34	0.69	0.00	3.60	0.00	1.01	2.06
June	5.10	3.81	0.42	2.14	2.96	-0.85	-0.85	2.80	-0.80	2.65	0.69
July	4.70	4.61	0.42	1.97	2.73	-1.88	-2.73	1.59	-1.21	3.76	0.00
August	4.91	3.93	0.42	2.06	2.85	-1.08	-3.81	1.16	-0.43	3.94	0.00
September	4.72	2.81	0.42	1.98	2.74	-0.07	-3.88	1.14	-0.02	3.28	0.00
October	4.72	1.43	0.42	1.98	2.74	1.31	0.00	2.45	1.31	2.76	0.00
November	6.00	0.25	0.42	2.52	3.48	3.23	0.00	3.60	1.15	1.43	0.00
December	5.11	0.00	0.42	2.15	2.96	2.96	0.00	3.60	0.00	0.25	2.08

Average Annual Precipitation: 60.24

Note(s):

Total Runoff : 25.30
Total AET: 19.07
Total Percolation: 15.87
60.24

02129\Existing Water Budget Data-Open Areas\LeF

WATER BUDGET DATA

Wildacres Resort
Analysis for Soil Types OsB: Non-Wooded
Alpha Project No. 02129

	Precip.	PET	Runoff Coeff. (CR)	Runoff (RO) CR x Precip.	Infiltration (INF)	INF-PET	Σ Neg (INF-PET)	Soil Moisture Storage (ST)	Δ ST	AET	PERC
January	4.51	0.00	0.32	1.44	3.07	3.07	0.00	2.52	0.00	0.00	3.07
February	4.36	0.00	0.32	1.40	2.96	2.96	0.00	2.52	0.00	0.00	2.96
March	5.07	0.00	0.32	1.62	3.45	3.45	0.00	2.52	0.00	0.00	3.45
April	5.29	1.01	0.32	1.69	3.60	2.59	0.00	2.52	0.00	1.01	2.59
May	5.75	2.65	0.32	1.84	3.91	1.26	0.00	2.52	0.00	2.65	1.26
June	5.10	3.81	0.32	1.63	3.47	-0.34	-0.34	2.18	-0.34	3.81	0.00
July	4.70	4.61	0.32	1.50	3.20	-1.41	-1.75	1.14	-1.04	4.24	0.00
August	4.91	3.93	0.32	1.57	3.34	-0.59	-2.35	0.91	-0.23	3.57	0.00
September	4.72	2.81	0.32	1.51	3.21	0.40	0.00	1.31	0.40	2.81	0.00
October	4.72	1.43	0.32	1.51	3.21	1.78	0.00	2.52	1.21	1.43	0.57
November	6.00	0.25	0.32	1.92	4.08	3.83	0.00	2.52	0.00	0.25	3.83
December	5.11	0.00	0.32	1.64	3.47	3.47	0.00	2.52	0.00	0.00	3.47

Average Annual Precipitation: 60.24

Note(s):

Total Runoff :	19.28
Total AET:	19.76
Total Percolation:	21.20
	60.24

WATER BUDGET DATA

Wildacres Resort
Analysis for Soil Type OsC: Non-Wooded
Alpha Project No. 02129

	Precip.	PET	Runoff Coeff. (CR)	Runoff (RO) CR x Precip.	Infiltration (INF)	INF-PET	Σ Neg (INF-PET)	Soil Moisture Storage (ST)	Δ ST	AET	PERC
January	4.51	0.00	0.42	1.89	2.62	2.62	0.00	2.52	0.00	0.00	2.62
February	4.36	0.00	0.42	1.83	2.53	2.53	0.00	2.52	0.00	0.00	2.53
March	5.07	0.00	0.42	2.13	2.94	2.94	0.00	2.52	0.00	0.00	2.94
April	5.29	1.01	0.42	2.22	3.07	2.06	0.00	2.52	0.00	3.07	0.00
May	5.75	2.65	0.42	2.42	3.34	0.69	0.00	2.52	0.00	3.34	0.00
June	5.10	3.81	0.42	2.14	2.96	-0.85	-0.85	1.69	-0.83	3.79	0.00
July	4.70	4.61	0.42	1.97	2.73	-1.88	-2.73	0.77	-0.92	3.65	0.00
August	4.91	3.93	0.42	2.06	2.85	-1.08	-3.81	0.48	-0.29	3.14	0.00
September	4.72	2.81	0.42	1.98	2.74	-0.07	-3.88	0.47	-0.01	2.75	0.00
October	4.72	1.43	0.42	1.98	2.74	1.31	0.00	1.78	1.31	1.43	0.00
November	6.00	0.25	0.42	2.52	3.48	3.23	0.00	2.52	0.74	0.25	2.49
December	5.11	0.00	0.42	2.15	2.96	2.96	0.00	2.52	0.00	0.00	2.96

Average Annual Precipitation: 60.24

Note(s):

Total Runoff :	25.30
Total AET:	21.40
Total Percolation:	13.54
	60.24

WATER BUDGET DATA

Wildacres Resort
Analysis for Soil Types VeD, VeF: Non-Wooded
Alpha Project No. 02129

	Precip.	PET	Runoff Coeff. (CR)	Runoff (RO) CR x Precip.	Infiltration (INF)	INF-PET	Σ Neg (INF-PET)	Soil Moisture Storage (ST)	Δ ST	AET	PERC
January	4.51	0.00	0.42	1.89	2.62	2.62	0.00	3.50	0.00	0.00	2.62
February	4.36	0.00	0.42	1.83	2.53	2.53	0.00	3.50	0.00	0.00	2.53
March	5.07	0.00	0.42	2.13	2.94	2.94	0.00	3.50	0.00	0.00	2.94
April	5.29	1.01	0.42	2.22	3.07	2.06	0.00	3.50	0.00	1.01	2.06
May	5.75	2.65	0.42	2.42	3.34	0.69	0.00	3.50	0.00	2.65	0.69
June	5.10	3.81	0.42	2.14	2.96	-0.85	-0.85	2.68	-0.82	3.78	0.00
July	4.70	4.61	0.42	1.97	2.73	-1.88	-2.73	1.52	-1.16	3.89	0.00
August	4.91	3.93	0.42	2.06	2.85	-1.08	-3.81	1.08	-0.44	3.29	0.00
September	4.72	2.81	0.42	1.98	2.74	-0.07	-3.88	1.06	-0.02	2.76	0.00
October	4.72	1.43	0.42	1.98	2.74	1.31	0.00	2.37	1.31	1.43	0.00
November	6.00	0.25	0.42	2.52	3.48	3.23	0.00	3.50	1.13	0.25	2.10
December	5.11	0.00	0.42	2.15	2.96	2.96	0.00	3.50	0.00	0.00	2.96

Average Annual Precipitation: 60.24

Note(s):

Total Runoff : 25.30
Total AET: 19.05
Total Percolation: 15.89
60.24

WATER BUDGET DATA

Wildacres Resort
Analysis for Soil Types VhC, VhD, VhF: Non-Wooded
Alpha Project No. 02129

	Precip.	PET	Runoff Coeff. (CR)	Runoff (RO) CR x Precip.	Infiltration (INF)	INF-PET	Σ Neg (INF-PET)	Soil Moisture Storage (ST)	Δ ST	AET	PERC
January	4.51	0.00	0.42	1.89	2.62	2.62	0.00	2.16	0.00	0.00	2.62
February	4.36	0.00	0.42	1.83	2.53	2.53	0.00	2.16	0.00	0.00	2.53
March	5.07	0.00	0.42	2.13	2.94	2.94	0.00	2.16	0.00	0.00	2.94
April	5.29	1.01	0.42	2.22	3.07	2.06	0.00	2.16	0.00	1.01	2.06
May	5.75	2.65	0.42	2.42	3.34	0.69	0.00	2.16	0.00	2.65	0.69
June	5.10	3.81	0.42	2.14	2.96	-0.85	-0.85	1.38	-0.78	3.74	0.00
July	4.70	4.61	0.42	1.97	2.73	-1.88	-2.73	0.56	-0.82	3.55	0.00
August	4.91	3.93	0.42	2.06	2.85	-1.08	-3.81	0.32	-0.24	3.09	0.00
September	4.72	2.81	0.42	1.98	2.74	-0.07	-3.88	0.31	-0.01	2.75	0.00
October	4.72	1.43	0.42	1.98	2.74	1.31	0.00	1.62	1.31	1.43	0.00
November	6.00	0.25	0.42	2.52	3.48	3.23	0.00	2.16	0.54	0.25	2.69
December	5.11	0.00	0.42	2.15	2.96	2.96	0.00	2.16	0.00	0.00	2.96

Average Annual Precipitation: 60.24

Note(s):

Total Runoff :	25.30
Total AET:	18.46
Total Percolation:	16.48
	60.24

WATER BUDGET DATA

Wildacres Resort
Analysis for Soil Types VyB: Non-Wooded
Alpha Project No. 02129

	Precip.	PET	Runoff Coeff. (CR)	Runoff (RO) CR x Precip.	Infiltration (INF)	INF-PET	Σ Neg (INF-PET)	Soil Moisture Storage (ST)	Δ ST	AET	PERC
January	4.51	0.00	0.32	1.44	3.07	3.07	0.00	2.40	0.00	0.00	3.07
February	4.36	0.00	0.32	1.40	2.96	2.96	0.00	2.40	0.00	0.00	2.96
March	5.07	0.00	0.32	1.62	3.45	3.45	0.00	2.40	0.00	0.00	3.45
April	5.29	1.01	0.32	1.69	3.60	2.59	0.00	2.40	0.00	1.01	2.59
May	5.75	2.65	0.32	1.84	3.91	1.26	0.00	2.40	0.00	2.65	1.26
June	5.10	3.81	0.32	1.63	3.47	-0.34	-0.34	2.06	-0.34	3.81	0.00
July	4.70	4.61	0.32	1.50	3.20	-1.41	-1.75	1.04	-1.02	4.22	0.00
August	4.91	3.93	0.32	1.57	3.34	-0.59	-2.35	0.83	-0.21	3.55	0.00
September	4.72	2.81	0.32	1.51	3.21	0.40	0.00	1.23	0.40	2.81	0.00
October	4.72	1.43	0.32	1.51	3.21	1.78	0.00	2.40	1.17	1.43	0.61
November	6.00	0.25	0.32	1.92	4.08	3.83	0.00	2.40	0.00	0.25	3.83
December	5.11	0.00	0.32	1.64	3.47	3.47	0.00	2.40	0.00	0.00	3.47

Average Annual Precipitation: 60.24

Note(s):

Total Runoff :	19.28
Total AET:	19.72
Total Percolation:	21.24
	60.24

02129\Existing Water Budget Data-Open Areas\VyB

WATER BUDGET DATA

Wildacres Resort
Analysis for Soil Types VyC, VyD: Non-Wooded
Alpha Project No. 02129

	Precip.	PET	Runoff Coeff. (CR)	Runoff (RO) CR x Precip.	Infiltration (INF)	INF-PET	Σ Neg (INF-PET)	Soil Moisture Storage (ST)	Δ ST	AET	PERC
January	4.51	0.00	0.42	1.89	2.62	2.62	0.00	2.40	0.00	0.00	2.62
February	4.36	0.00	0.42	1.83	2.53	2.53	0.00	2.40	0.00	0.00	2.53
March	5.07	0.00	0.42	2.13	2.94	2.94	0.00	2.40	0.00	0.00	2.94
April	5.29	1.01	0.42	2.22	3.07	2.06	0.00	2.40	0.00	1.01	2.06
May	5.75	2.65	0.42	2.42	3.34	0.69	0.00	2.40	0.00	2.65	0.69
June	5.10	3.81	0.42	2.14	2.96	-0.85	-0.85	1.57	-0.83	3.79	0.00
July	4.70	4.61	0.42	1.97	2.73	-1.88	-2.73	0.69	-0.88	3.61	0.00
August	4.91	3.93	0.42	2.06	2.85	-1.08	-3.81	0.41	-0.28	3.13	0.00
September	4.72	2.81	0.42	1.98	2.74	-0.07	-3.88	0.40	-0.01	2.75	0.00
October	4.72	1.43	0.42	1.98	2.74	1.31	0.00	1.71	1.31	1.43	0.00
November	6.00	0.25	0.42	2.52	3.48	3.23	0.00	2.40	0.69	0.25	2.54
December	5.11	0.00	0.42	2.15	2.96	2.96	0.00	2.40	0.00	0.00	2.96

Average Annual Precipitation: 60.24

Note(s):

Total Runoff :	25.30
Total AET:	18.61
Total Percolation:	16.33
	60.24

WATER BUDGET DATA

Wildacres Resort
Analysis for Soil Types WIB: Non-Wooded (Existing Conditions)
Alpha Project No. 02129

	Precip. (inches)	Run-on from Marlowe (inches)	Precip. + Run-on (inches)	PET	Runoff Coeff. (CR)	Runoff (RO) CR x Precip.	Infiltration (INF)	INF-PET	Σ Neg (INF-PET)	Soil Moisture Storage (ST)	Δ ST	AET	PERC (inches)
January	4.51	0.17	4.68	0.00	0.32	1.50	3.18	3.18	0.00	3.50	0.00	0.00	3.18
February	4.36	0.17	4.53	0.00	0.32	1.45	3.08	3.08	0.00	3.50	0.00	0.00	3.08
March	5.07	0.19	5.26	0.00	0.32	1.68	3.58	3.58	0.00	3.50	0.00	0.00	3.58
April	5.29	0.20	5.49	1.01	0.32	1.76	3.73	2.72	0.00	3.50	0.00	1.01	2.72
May	5.75	0.22	5.97	2.65	0.32	1.91	4.06	1.41	0.00	3.50	0.00	2.65	1.41
June	5.10	0.19	5.29	3.81	0.32	1.69	3.60	-0.21	-0.21	3.27	-0.23	3.83	0.00
July	4.70	0.18	4.88	4.61	0.32	1.56	3.32	-1.29	-1.50	2.20	-1.07	4.39	0.00
August	4.91	0.19	5.10	3.93	0.32	1.63	3.47	-0.46	-1.97	1.89	-0.31	3.78	0.00
September	4.72	0.18	4.90	2.81	0.32	1.57	3.33	0.52	0.00	2.41	0.52	2.81	0.00
October	4.72	0.18	4.90	1.43	0.32	1.57	3.33	1.90	0.00	3.50	1.09	1.43	0.81
November	6.00	0.23	6.23	0.25	0.32	1.99	4.23	3.98	0.00	3.50	0.00	0.25	3.98
December	5.11	0.19	5.30	0.00	0.32	1.70	3.61	3.61	0.00	3.50	0.00	0.00	3.61
			62.52										

Average Annual Precipitation: 62.52 inches

Total Runoff (in.): 20.01
Total AET (in.): 20.14
Total Percolation (in.): 22.37
62.52

Note(s):
Marlowe Mansion roof area = 3812 ft^2
WIB Non-wooded Area, excluding Marlowe Mansion area = 100,616 ft^2
Monthly rainfall on Marlowe Mansion assumed to run-off directly to WIB soil (soil area ID = 102-2 WIB)
(No percolation to ground water beneath mansion)

APPENDIX C

Soil Map Unit Areas - Future Conditions

Wildacres Resort Water Budget
Alpha Project No. 02129
Soil Areas-Future Conditions

italics = area (ft^2) has changed, or is new

Area ID	Soil Type	Total Area (ft^2)	Road Lengths (ft)	Road Area (ft^2)	Total Non-wooded Area (ft^2)	Total Soil Area Minus Road Area(ft^2)
15	EkB	20172		0		
161	*EkB*	*4,975*		0		
163	*EkB*	*6,526*		0		
165-A	*EkB*	*24,742*		0		
165-B	*EkB*	*8,735*		0		
Total	EkB	65,150	0	0	0	65,150

Area ID	Soil Type	Total Area (ft^2)	Road Lengths (ft)	Road Area (ft^2)	Total Non-wooded Area (ft^2)	Total Soil Area Minus Road Area(ft^2)
6-1	EkC	15,150		0		
6-2	EkC	24,598	875	13,125	11,473	
14	EkC	91,357		0		
17-1	EkC	49,475		0		
17-2	EkC	5,679		0	5,679	
17-3	EkC	25,062		0		
17-4	EkC	40,374	553	8,295	32,079	
17-5	EkC	23,845		0		
17-6	EkC	31,535		0		
28	EkC	15,815		0		
30-1	EkC	87,397		0		
30-2	EkC	18,919	460	6,900	12,019	
30-3	EkC	32,136		0		
91	EkC	11,732		0		
124	*EkC*	*18,799*		0		
160-A	*EkC*	*6,021*		0		
160-B	*EkC*	*11,913*		0		
160-C	*EkC*	*12,670*		0		
160-D	*EkC*	*25,609*		0		
164-A	*EkC*	*37,824*		0		
164-B	*EkC*	*10,536*		0		
Total	EkC	596,446	1,888	28,320	61,250	568,126

Area ID	Soil Type	Total Area (ft^2)	Road Lengths (ft)	Road Area (ft^2)	Total Non-wooded Area (ft^2)	Total Soil Area Minus Road Area(ft^2)
5-1	EkD	61,200		0		
5-2	EkD	16,072	222	3,330	12,742	
5-3	EkD	76,939		0		
7-1	EkD	139,549		0		
7-2	EkD	21,408	471	7,065	14,343	
7-3	EkD	40,447	143	2,145	38,302	
7-4	EkD	88,483		0		
18-1	EkD	80,834		0		
18-2	EkD	2,041		0	2,041	
18-3	EkD	1,519		0	1,519	
29-1	EkD	11,481		0		
29-2	EkD	4,672		0	4,672	
29-3	EkD	210,664		0		
29-4	EkD	12,659	533	7,995	4,664	
29-5	EkD	1,567		0	1,567	
29-6	EkD	3,713		0		
145	*EkD*	*0*		0		
Total	EkD	773,248	1,369	20,535	79,850	752,713

Wildacres Resort Water Budget
Alpha Project No. 02129
Soil Areas-Future Conditions

italics = area (ft^2) has changed, or is new

Area ID	Soil Type	Total Area (ft^2)	Road Lengths (ft)	Road Area (ft^2)	Total Non-wooded Area (ft^2)	Total Soil Area Minus Road Area(ft^2)
9	HrF	197,198		0		
48	*HrF*	*171,726*		0		
51-A	*HrF*	*50,665*		0		
51-B	*HrF*	*1,938*		0		
53-1	*HrF*	*2,373,324*		0		
53-2	HrF	22,071		0		
53-3	HrF	58,665		0	58,665	
53-4	HrF	62,914		0	62,914	
53-5	HrF	26,775		0	26,775	
53-6	HrF	160,241		0		
53-7	HrF	24,469		0		
53-8	HrF	9,561		0		
53-9	HrF	32,928		0		
53-10	HrF	168,803		0	168,803	
53-11	HrF	27,700		0		
53-12	HrF	99,008		0	99,008	
53-13	HrF	6,105		0	6,105	
53-14	HrF	3,244		0		
65	HrF	29,239		0		
69	HrF	159,642		0		
85-1	HrF	729,969		0	729,969	
85-2	HrF	94,280		0		
85-3	HrF	35,430		0		
85-4	HrF	52,445		0		
85-5	HrF	15,201		0		
85-6	HrF	122,082		0		
85-7	HrF	75,584		0		
85-8	HrF	84,022		0	84,022	
85-9	HrF	11,174		0		
85-10	HrF	79,390		0		
85-11	HrF	9,828		0		
85-12	HrF	203,471		0		
85-13	HrF	11,215		0		
85-14	HrF	181,112		0	181,112	
85-15	HrF	31,126		0		
85-16	HrF	11,863		0	11,863	
85-17	HrF	18,387		0		
85-18	HrF	14,769		0		
86-1A	*HrF*	*90,127*		0		
86-1B	*HrF*	*37,889*		0		
86-1C	*HrF*	*305,576*		0		
86-1D	*HrF*	*9,702*		0		
86-1E	*HrF*	*15,996*		0		
86-1F	*HrF*	*10,145*		0		
86-1G	*HrF*	*5,197*		0		
86-1H	*HrF*	*4,145*		0		
86-2	HrF	8,612	309	4,635	3,977	
98	*HrF*	*0*		0		
126-A	*HrF*	*29,366*		0		
126-B	*HrF*	*10,874*		0		
137-A	*HrF*	*7,355*		0		
137-B	*HrF*	*3,899*		0		
137-C	*HrF*	*9,863*		0		
Total	HrF	6,016,310	309	4,635	1,433,213	6,011,675

Wildacres Resort Water Budget
Alpha Project No. 02129
Soil Areas-Future Conditions

italics = area (ft^2) has changed, or is new

Area ID	Soil Type	Total Area (ft^2)	Road Lengths (ft)	Road Area (ft^2)	Total Non-wooded Area (ft^2)	Total Soil Area Minus Road Area(ft^2)
81-1	HvD	15,039		0		
81-2	HvD	12,902		0		
81-3	HvD	16,194		0	16,194	
Total	HvD	44,135	0	0	16,194	44,135
55-1	HvF	69,796		0		
55-2	HvF	17,399		0	17,399	
92-1A	*HvF*	*17,706*		0		
92-1B	*HvF*	*210,989*		0		
92-1C	*HvF*	*19,095*		0		
92-2	HvF	23,842	440	6,600	17,242	
92-3	HvF	28,262		0		
92-4	HvF	10,213		0		
100-1A	*HvF*	*29,797*		0		
100-1B	*HvF*	*78,211*		0		
100-2	*HvF*	*16,608*		0	16,608	
100-3A	*HvF*	*6,601*		0		
100-3B	*HvF*	*1,798*		0		
100-4	HvF	5,546		0	5,546	
104-A	*HvF*	*7,681*		0		
104-B	*HvF*	*8,167*		0		
116	*HvF*	*13,512*		0		
119-1A	*HvF*	*84,190*		0		
119-1B	*HvF*	*4,582*		0		
119-1C	*HvF*	*6,069*		0		
119-2	*HvF*	*22,594*	251	3,765	18,829	
119-3	*HvF*	*18,909*		0		
122	*HvF*	*10,110*		0		
Total	HvF	711,677	691	10,365	75,624	701,312
146	*LeB*	*0*		0	0	
149	*LeB*	*28,280*		0	0	
Total	LeB	28,280	0	0	0	28,280
8	LeC	221,461		0		
32-1	LeC	50,454		0		
32-2	LeC	6,277		0	6,277	
32-3	LeC	23,684		0		
33	LeC	17,231		0		
35	LeC	14,289		0		
37	LeC	254,905		0		
147	*LeC*	*0*		0		
150	*LeC*	*43,850*		0		
Total	LeC	632,151	0	0	6,277	632,151
36-1	LeD	760,499		0		
36-2	LeD	34,192		0	34,192	
36-3	LeD	111,404		0		
Total	LeD	906,095	0	0	34,192	906,095
19	LeF	588,749		0		
31-1	LeF	61,140		0		
31-2	LeF	1,906		0	1,906	
31-3	LeF	1,048		0		
34	LeF	21,981		0		
Total	LeF	674,824	0	0	1,906	674,824

Wildacres Resort Water Budget
Alpha Project No. 02129
Soil Areas-Future Conditions

italics = area (ft^2) has changed, or is new

Area ID	Soil Type	Total Area (ft^2)	Road Lengths (ft)	Road Area (ft^2)	Total Non-wooded Area (ft^2)	
110-1	*OsB*	*56,907*		0		
110-2	*OsB*	*12,408*		0	12,408	
131	*OsB*	*20,134*		0		Total Soil Area Minus
144	*OsB*	*0*		0		Road Area(ft^2)
Total	OsB	89,449	0	0	12,408	89,449
54-1	OsC	44775		0		
54-2	OsC	158,577	4,770	71,550	87,027	
54-3	OsC	4,681		0		
54-4	OsC	2,528		0		Total Soil Area Minus
54-5	OsC	34,303		0		Road Area(ft^2)
Total	OsC	244,864	4,770	71,550	87,027	173,314
39	VeD	425457		0		
43	VeD	81552		0		
167-1	*VeD*	*0*		0		
167-2	*VeD*	*0*		0	0	Total Soil Area Minus
167-3	*VeD*	*0*		0		Road Area(ft^2)
Total	VeD	507,009	0	0	0	507,009
38-1	VeF	282097		0		
38-2	VeF	8473		0	8,473	
38-3	VeF	36,488		0		
40	VeF	20,171		0		Total Soil Area Minus
42	VeF	408,251		0		Road Area(ft^2)
Total	VeF	755,480	0	0	8,473	755,480
50	*VhB*	*19,520*		0		Total Soil Area Minus Road Area(ft^2)
Total		19,520	0	0	0	19,520
49-A	*VhC*	*7823*		0		
49-B	*VhC*	*186527*		0		
49-C	*VhC*	*68058*		0		
67	VhC	57078		0		
84-1	VhC	42884		0	42,884	
84-2	VhC	7373		0		
87	VhC	18984		0		
89	*VhC*	*19226*		0		
95	VhC	23302		0		
96-A	*VhC*	*9753*		0		
96-B	*VhC*	*8066*		0		
96-C	*VhC*	*5340*		0		
99-A	*VhC*	*67831*		0		
99-B	*VhC*	*25568*		0		
99-C	*VhC*	*14391*		0		
99-D	*VhC*	*14042*		0		
103	*VhC*	*8090*		0		
105-A	*VhC*	*4418*		0		
105-B	*VhC*	*4865*		0		
105-C	*VhC*	*22888*		0		
117-1	VhC	18160		0	18,160	Total Soil Area Minus
117-2	*VhC*	*18,151*		0		Road Area(ft^2)
Total	VhC	652,818	0	0	61044	652,818

Wildacres Resort Water Budget
Alpha Project No. 02129
Soil Areas-Future Conditions

italics = area (ft²) has changed, or is new

Area ID	Soil Type	Total Area (ft²)	Road Lengths (ft)	Road Area (ft²)	Total Non-wooded Area (ft²)	Total Soil Area Minus Road Area(ft²)
2	VhD	48,079		0		
3	VhD	45,443		0		
4	VhD	39,870		0		
16	VhD	266,000		0		
25-1	VhD	126,427		0		
25-2	VhD	31,531		0	31,531	
25-3	VhD	1,417,766		0		
47-1A	*VhD*	*155,045*		0		
47-1B	*VhD*	*16,731*		0		
47-1C	*VhD*	*30,428*		0		
47-1D	*VhD*	*98,391*		0		
47-1E	*VhD*	*162,048*		0		
47-2	VhD	3,438		0	3,438	
47-3	VhD	25,000	417	6255	18,745	
56-1	VhD	18,062		0	18,062	
56-2	VhD	45,507		0		
56-3	VhD	25,587		0	25,587	
63-1	VhD	191,898		0		
63-2	VhD	31,235		0	31,235	
63-3	VhD	65,179		0		
63-4	VhD	18,211		0	18,211	
63-5	VhD	17,243		0		
63-6	VhD	4,272		0		
63-7	VhD	1,816		0		
63-8	VhD	39,211		0		
63-9	VhD	2,467		0	2,467	
63-10	VhD	39,395		0	39,395	
63-11	VhD	4,445		0		
63-12	VhD	1,633		0		
63-13	VhD	647		0		
68	VhD	58,771		0		
70	VhD	75,744		0		
75	VhD	19,211		0		
82-1	VhD	27,412		0		
82-2	VhD	4,549		0	4,549	
83-1	VhD	15,228		0		
83-2	VhD	7,597		0	7,597	
88	*VhD*	*41,017*		0		
90-A	*VhD*	*28,677*		0		
90-B	*VhD*	*20,115*		0		
90-C	*VhD*	*23,138*		0		
90-D	*VhD*	*21,134*		0		
93-1	VhD	5,737	214	3210	2,527	
93-2	VhD	8,921		0		
94	*VhD*	*45,557*		0		
97-A	*VhD*	*7,646*		0		
97-B	*VhD*	*25,556*		0		
101	*VhD*	*30,087*		0		
106-A	*VhD*	*44,753*		0		
106-B	*VhD*	*94,218*		0		
106-C	*VhD*	*19,989*		0		
106-D	*VhD*	*17,964*		0		
106-E	*VhD*	*7,425*		0		
106-F	*VhD*	*41,650*		0		
109	*VhD*	*0*		0		
112	*VhD*	*2,449*		0		
113	*VhD*	*0*		0		
115-1A	*VhD*	*3,414*		0		
115-1B	*VhD*	*1,861*		0		
115-1C	*VhD*	*13,420*		0		
115-1D	*VhD*	*38,054*		0		
115-2	VhD	10,730	287.26	*4309*	*6,421*	
115-3A	*VhD*	*12,046*		0		
115-3B	*VhD*	*10,825*		0		
118-1A	*VhD*	*20,951*		0		
118-1B	*VhD*	*4,219*		0		
118-2	VhD	10,913	481	7215	3,698	
120	*VhD*	*4,315*		0		
127-A	*VhD*	*28,626*		0		
127-B	*VhD*	*24,806*		0		
127-C	*VhD*	*18,460*		0		
129-A	*VhD*	*2,533*		0		
129-B	*VhD*	*16,732*		0		
134	*VhD*	*0*		0		
135	*VhD*	*12,296*		0		
139-A	*VhD*	*4,426*		0		
139-B	*VhD*	*2,883*		0		
141-1	*VhD*	*0*		0		
141-2	*VhD*	*0*		0	0	
141-3	*VhD*	*0*	0	0	0	
143-1	*VhD*	*8,806*	*260*	*3900*	*4,906*	
143-2	*VhD*	*6,324*		0		
Total	VhD	3,924,190	1659.26	24,889	218,369	3,899,301

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Soil Areas-Future Conditions

italics = area (ft^2) has changed, or is new

Area ID	Soil Type	Total Area (ft^2)	Road Lengths (ft)	Road Area (ft^2)	Total Non-wooded Area (ft^2)	
1	VhF	1,793,960		0		
10-1	VhF	475,972		0		
10-2	VhF	9,055	60	900	8,155	
10-3	VhF	3,911		0		
24	VhF	14,773		0		
27	VhF	23,445		0		
57-1	VhF	523,251		0		
57-2	VhF	7,310		0	7,310	
57-3	VhF	6,535		0	6,535	
66	VhF	66,212		0		
76-1	VhF	11,143		0	11,143	
76-2	VhF	2,420		0		
76-3	VhF	1,935		0	1,935	
76-4	VhF	3,822		0		
76-5	VhF	1,395		0	1,395	
80	VhF	67,499		0		
154-1A	*VhF*	*69,232*		0		
154-1B	*VhF*	*1,808*		0		
154-2	VhF	8,831	295	4425	4,406	
154-3	*VhF*	*59765*		0		
159	*VhF*	*25,609*		0		
162-A	*VhF*	*2,676*		0		Total Soil Area Minus Road
162-B	*VhF*	*37,368*		0		Area(ft^2)
Total	VhF	3,217,927	355	5,325	40,879	3,212,602

45-1	VyB	11,991		0	11,991	
45-2	VyB	6,400		0		
46-1	*VyB*	*5,506*		0	5,506	
46-2	*VyB*	*6,292*		0		
52	VyB	63,771		0		
62	VyB	63,469		0		
72-1	VyB	124,379		0		
72-2	VyB	8,711		0	8,711	
72-3	VyB	3,130		0		
74-1	VyB	60,652		0		
74-2	VyB	18,400		0	18,400	
108	*VyB*	*46,489*		0		
142-1	*VyB*	*0*		0		Total Soil Area Minus Road
142-2	*VyB*	*0*	0	0	0	Area(ft^2)
Total	VyB	419,190	0	0	44,608	419,190

Wildacres Resort Water Budget
Alpha Project No. 02129
Soil Areas-Future Conditions

italics = area (ft^2) has changed, or is new

Area ID	Soil Type	Total Area (ft^2)	Road Lengths (ft)	Road Area (ft^2)	Total Non-wooded Area (ft^2)	Total Soil Area Minus Road Area(ft^2)
11	VyC	16,966		0		
21	VyC	74,983		0		
22	VyC	36,186		0		
23	VyC	39,849		0		
26	VyC	50,233		0		
41	VyC	20,942		0		
44-1	*VyC*	*184,784*	1434	21510	163,274	
44-2	*VyC*	*0*		0		
44-3	VyC	9,113		0		
44-4	VyC	7,869		0		
44-5	VyC	4,493		0		
44-6	VyC	5,293		0		
44-7	VyC	15,992		0		
71	VyC	79,223		0		
73-1	VyC	12,206		0		
73-2	VyC	116,157		0	116,157	
78-1	VyC	22,449		0	22,449	
78-2	VyC	9,107		0		
79-1	VyC	96,381		0	96,381	
79-2	VyC	23,555		0		
79-3	VyC	2,650		0		
79-4	VyC	10,088		0		
107-A	*VyC*	*16,796*		0		
107-B	*VyC*	*11,795*		0		
114-1A	*VyC*	*37,160*		0		
114-1B	*VyC*	*2,079*		0		
114-2	*VyC*	*4,504*	0	0	4,504	
114-3A	*VyC*	*5,289*		0		
114-3B	*VyC*	*2,882*		0		
121	VyC	11,962		0		
125	*VyC*	*27,382*		0		
128-A	*VyC*	*3,248*		0		
128-B	*VyC*	*6,289*		0		
138-A	*VyC*	*4,793*		0		
138-B	*VyC*	*9,273*		0		
138-C	*VyC*	*22,039*		0		
138-D	*VyC*	*17,795*		0		
140-1	*VyC*	*18,325*		0		
140-2	*VyC*	*0*	0	0	0	
140-3	*VyC*	*0*		0		
148	*VyC*	*0*		0		
153-1	VyC	6,504	202	3030	3,474	
153-2	*VyC*	*28,207*		0		
156	*VyC*	*16,177*		0		
157	*VyC*	*0*		0		
166	*VyC*	*6,315*		0		
Total	VyC	1,097,333	1636	24,540	406,239	1,072,793

Wildacres Resort Water Budget
Alpha Project No. 02129
Soil Areas-Future Conditions

italics = area (ft^2) has changed, or is new

Area #	Soil Type	Area (ft^2)	Road Lengths (ft)	Road Area (ft^2)	Total Non-wooded Area (ft^2)	
12	VyD	18,282		0		
13	VyD	24,878		0		
58	VyD	142,182		0		
59	VyD	28,455		0		
60	VyD	14,426		0		
61	VyD	37,722		0		
77-1	VyD	7,476		0	7,476	
77-2	VyD	4,909		0		
77-3	VyD	1,881		0		
77-4	VyD	25,412		0		
77-5	VyD	182,380		0	182,380	
77-6	VyD	3,154		0		
77-7	VyD	19,722		0		
77-8	VyD	3,338		0		
123-A	*VyD*	*20,640*		0		
123-B	*VyD*	*2,463*		0		
155-1	*VyD*	*3,810*	98	1470	2,340	
155-2A	*VyD*	*19,824*		0		
155-2B	*VyD*	*24,144*		0		
155-2C	*VyD*	*8,431*		0		Total Soil Area Minus
158	*VyD*	*5,393*		0		Road Area (ft^2)
Total	VyD	598,922	98	1,470	192,196	597,452

102-1A	*WIB*	*2,844*		0		
102-1B	*WIB*	*1,593*		0		
102-2	*WIB*	*14,337*		0	14,337	
102-3	*WIB*	*8,214*		0		
102-4	*WIB*	*4,077*		0		
111-A	*WIB*	*1,387*		0		
111-B	*WIB*	*4,746*		0		
133	*WIB*	*0*		0		Total Soil Area Minus
136	*WIB*	*7,747*		0		Road Area Minus
151	*WIB*	*269,479*		0		Marlowe (ft^2)
Total	WIB	314,424	0	0	14,337	314,424

20	WIC	239,237		0		
130-A	*WIC*	*2,476*		0		
130-B	*WIC*	*14,812*		0		
132-A	*WIC*	*5,880*		0		
132-B	*WIC*	*3,366*		0		
152-A	*WIC*	*6,581*		0		Total Soil Area Minus
152-B	*WIC*	*33,000*		0		Road Area (ft^2)
Total	WIC	305,352	0	0	0	305,352

Wildacres Resort Water Budget
Alpha Project No. 02129
Soil Areas-Future Conditions

Undeveloped Areas		(A) + (B)	(C)	(A)+(B)+(C)	
(A) Total Road Area	(B) Total Soil Area	Total Undeveloped Project Area	Total Developed Project Area	Total Project Area	Total Developed Area as % of Total Proj. Area
191,629	22,403,165	22,594,794	8,886,247	31,481,041	0.28227

Total Road Area	Non-Wooded Total Soil Area	Total Project Area
191,629	2,794,086	31,481,041

Total Road Area	Wooded Total Soil Area	Total Project Area
191,629	19,609,079	31,481,041

soil type areas as a percentage of total area (D)		
EkB	0.0021	
EkC	0.0180	
EkD	0.0239	
HrF	----	6,011,675 = HrF
Rock	0.0630	1,983,853 = HfF x .33
HaC	0.1279	4,027,822 = HrF x .67
HvD	0.0014	
HvF	0.0223	
LeB	0.0009	
LeC	0.0201	
LeD	0.0288	
LeF	0.0214	
OsB	0.0028	
OsC	0.0055	
VeD	0.0161	
VeF	0.0240	
VhB	0.0006	
VhC	0.0207	
VhD	0.1239	
VhF	0.1020	
VyB	0.0133	
VyC	0.0341	
VyD	0.0190	
WIB	0.0100	
WIC	0.0097	
Roads	0.0061	
	0.7177	

Non-Wooded soil type areas as a percentage of total area (E)		
EkB	0.0000	
EkC	0.0019	
EkD	0.0025	
HrF	----	1,433,213 = HrF
Rock	0.0150	472,960 = HrF x .33
HaC	0.0305	960,253 = HrF x .67
HvD	0.0005	
HvF	0.0024	
LeB	0.0000	
LeC	0.0002	
LeD	0.0011	
LeF	0.0001	
OsB	0.0004	
OsC	0.0028	
VeD	0.0000	
VeF	0.0003	
VhB	0.0000	
VhC	0.0019	
VhD	0.0069	
VhF	0.0013	
VyB	0.0014	
VyC	0.0129	
VyD	0.0061	
WIB	0.0005	
WIC	0.0000	
	0.0888	

Wooded soil type areas as a percentage of total area (D-E)	
EkB	0.0021
EkC	0.0161
EkD	0.0214
HrF	----
Rock	0.0480
HaC	0.0974
HvD	0.0009
HvF	0.0199
LeB	0.0009
LeC	0.0199
LeD	0.0277
LeF	0.0214
OsB	0.0024
OsC	0.0027
VeD	0.0161
VeF	0.0237
VhB	0.0006
VhC	0.0188
VhD	0.1169
VhF	0.1008
VyB	0.0119
VyC	0.0212
VyD	0.0129
WIB	0.0095
WIC	0.0097
	0.6229

Wooded + Non-wooded + Roads + Developed Area = 1.0000

APPENDIX D

Water Budget Analysis Tables - Proposed Areas of Development

WATER BUDGET DATA

Wildacres Resort
Analysis for Wildacres Developed Area W1 (Future Conditions)
Alpha Project No. 02129

	Precip.	PET	Runoff Coeff. (CR)	Runoff (RO) CR x Precip.	Infiltration (INF)	INF-PET	Σ Neg (INF-PET)	Soil Moisture Storage (ST)	Δ ST	AET	PERC
January	4.51	0.00	0.48	2.16	2.35	2.35	0.00	2.22	0.00	0.00	2.35
February	4.36	0.00	0.48	2.09	2.27	2.27	0.00	2.22	0.00	0.00	2.27
March	5.07	0.00	0.48	2.43	2.64	2.64	0.00	2.22	0.00	0.00	2.64
April	5.29	1.01	0.48	2.54	2.75	1.74	0.00	2.22	0.00	0.00	1.74
May	5.75	2.65	0.48	2.76	2.99	0.34	0.00	2.22	0.00	1.01	0.34
June	5.10	3.81	0.48	2.45	2.65	-1.16	-1.16	1.42	-0.80	3.45	0.00
July	4.70	4.61	0.48	2.26	2.44	-2.17	-3.33	0.47	-0.95	3.39	0.00
August	4.91	3.93	0.48	2.36	2.55	-1.38	-4.70	0.24	-0.23	2.78	0.00
September	4.72	2.81	0.48	2.27	2.45	-0.36	-5.06	0.20	-0.04	2.49	0.00
October	4.72	1.43	0.48	2.27	2.45	1.02	0.00	1.22	1.02	1.43	0.00
November	6.00	0.25	0.48	2.88	3.12	2.87	0.00	2.22	1.00	0.25	1.87
December	5.11	0.00	0.48	2.45	2.66	2.66	0.00	2.22	0.00	0.00	2.66

Average Annual Precipitation: 60.24

Note(s):

Total Runoff :	28.92
Total AET:	17.46
Total Percolation:	13.86
	60.24

WATER BUDGET DATA

Wildacres Resort
Analysis for Wildacres Developed Area W2 (Future Conditions)
Alpha Project No. 02129

	Precip.	PET	Runoff Coeff. (CR)	Runoff (RO) CR x Precip.	Infiltration (INF)	INF-PET	Σ Neg (INF-PET)	Soil Moisture Storage (ST)	Δ ST	AET	PERC
January	4.51	0.00	0.48	2.16	2.35	2.35	0.00	3.00	0.00	0.00	2.35
February	4.36	0.00	0.48	2.09	2.27	2.27	0.00	3.00	0.00	0.00	2.27
March	5.07	0.00	0.48	2.43	2.64	2.64	0.00	3.00	0.00	0.00	2.64
April	5.29	1.01	0.48	2.54	2.75	1.74	0.00	3.00	0.00	1.01	1.74
May	5.75	2.65	0.48	2.76	2.99	0.34	0.00	3.00	0.00	2.65	0.34
June	5.10	3.81	0.48	2.45	2.65	-1.16	-1.16	2.01	-0.99	3.64	0.00
July	4.70	4.61	0.48	2.26	2.44	-2.17	-3.33	0.93	-1.08	3.52	0.00
August	4.91	3.93	0.48	2.36	2.55	-1.38	-4.70	0.57	-0.36	2.91	0.00
September	4.72	2.81	0.48	2.27	2.45	-0.36	-5.06	0.51	-0.06	2.51	0.00
October	4.72	1.43	0.48	2.27	2.45	1.02	0.00	1.53	1.02	1.43	0.00
November	6.00	0.25	0.48	2.88	3.12	2.87	0.00	3.00	1.47	0.25	1.40
December	5.11	0.00	0.48	2.45	2.66	2.66	0.00	3.00	0.00	0.00	2.66

Average Annual Precipitation: 60.24

Note(s):

Total Runoff :	28.92
Total AET:	17.93
Total Percolation:	13.39
	60.24

WATER BUDGET DATA

Use HvF

Wildacres Resort
Analysis for Wildacres Developed Area W3 (Future Conditions)
Alpha Project No. 02129

	Precip.	PET	Runoff Coeff. (CR)	Runoff (RO) CR x Precip.	Infiltration (INF)	INF-PET	Σ Neg (INF-PET)	Soil Moisture Storage (ST)	Δ ST	AET	PERC
January	4.51	0.00	0.38	1.71	2.80	2.80	0.00	1.90	0.00	0.00	2.80
February	4.36	0.00	0.38	1.66	2.70	2.70	0.00	1.90	0.00	0.00	2.70
March	5.07	0.00	0.38	1.93	3.14	3.14	0.00	1.90	0.00	0.00	3.14
April	5.29	1.01	0.38	2.01	3.28	2.27	0.00	1.90	0.00	1.01	2.27
May	5.75	2.65	0.38	2.19	3.57	0.92	0.00	1.90	0.00	2.65	0.92
June	5.10	3.81	0.38	1.94	3.16	-0.65	-0.65	1.30	-0.60	3.76	0.00
July	4.70	4.61	0.38	1.79	2.91	-1.70	-2.35	0.49	-0.81	3.72	0.00
August	4.91	3.93	0.38	1.87	3.04	-0.89	-3.23	0.30	-0.19	3.23	0.00
September	4.72	2.81	0.38	1.79	2.93	0.12	0.00	0.42	0.12	2.81	0.00
October	4.72	1.43	0.38	1.79	2.93	1.50	0.00	1.90	1.48	1.43	0.01
November	6.00	0.25	0.38	2.28	3.72	3.47	0.00	1.90	0.00	0.25	3.47
December	5.11	0.00	0.38	1.94	3.17	3.17	0.00	1.90	0.00	0.00	3.17

Average Annual Precipitation: 60.24

Note(s):

Total Runoff :	22.89
Total AET:	18.87
Total Percolation:	18.48
	60.24

WATER BUDGET DATA

Wildacres Resort
Analysis for Wildacres Developed Area W4 (Future Conditions)
Alpha Project No. 02129

	Precip.	PET	Runoff Coeff. (CR)	Runoff (RO) CR x Precip.	Infiltration (INF)	INF-PET	Σ Neg (INF-PET)	Soil Moisture Storage (ST)	Δ ST	AET	PERC
January	4.51	0.00	0.46	2.07	2.44	2.44	0.00	2.34	0.00	0.00	2.44
February	4.36	0.00	0.46	2.01	2.35	2.35	0.00	2.34	0.00	0.00	2.35
March	5.07	0.00	0.46	2.33	2.74	2.74	0.00	2.34	0.00	0.00	2.74
April	5.29	1.01	0.46	2.43	2.86	1.85	0.00	2.34	0.00	0.00	1.85
May	5.75	2.65	0.46	2.65	3.11	0.46	0.00	2.34	0.00	1.01	0.46
June	5.10	3.81	0.46	2.35	2.75	-1.06	-1.06	1.42	-0.92	3.67	0.00
July	4.70	4.61	0.46	2.16	2.54	-2.07	-3.13	0.53	-0.89	3.43	0.00
August	4.91	3.93	0.46	2.26	2.65	-1.28	-4.41	0.30	-0.23	2.88	0.00
September	4.72	2.81	0.46	2.17	2.55	-0.26	-4.67	0.27	-0.03	2.58	0.00
October	4.72	1.43	0.46	2.17	2.55	1.12	0.00	1.39	1.12	1.43	0.00
November	6.00	0.25	0.46	2.76	3.24	2.99	0.00	2.34	0.95	0.25	2.04
December	5.11	0.00	0.46	2.35	2.76	2.76	0.00	2.34	0.00	0.00	2.76

Average Annual Precipitation: 60.24

Note(s):

Total Runoff : 27.71
Total AET: 17.90
Total Percolation: 14.63
60.24

WATER BUDGET DATA

Wildacres Resort
Analysis for Wildacres Developed Area W5 (Future Conditions)
Alpha Project No. 02129

	Precip.	PET	Runoff Coeff. (CR)	Runoff (RO) CR x Precip.	Infiltration (INF)	INF-PET	Σ Neg (INF-PET)	Soil Moisture Storage (ST)	Δ ST	AET	PERC
January	4.51	0.00	0.45	2.03	2.48	2.48	0.00	3.58	0.00	0.00	2.48
February	4.36	0.00	0.45	1.96	2.40	2.40	0.00	3.58	0.00	0.00	2.40
March	5.07	0.00	0.45	2.28	2.79	2.79	0.00	3.58	0.00	0.00	2.79
April	5.29	1.01	0.45	2.38	2.91	1.90	0.00	3.58	0.00	1.01	1.90
May	5.75	2.65	0.45	2.59	3.16	0.51	0.00	3.58	0.00	2.65	0.51
June	5.10	3.81	0.45	2.30	2.81	-1.01	-1.01	2.99	-0.59	3.40	0.00
July	4.70	4.61	0.45	2.12	2.59	-2.03	-3.04	1.46	-1.53	4.12	0.00
August	4.91	3.93	0.45	2.21	2.70	-1.23	-4.26	1.00	-0.46	3.16	0.00
September	4.72	2.81	0.45	2.12	2.60	-0.21	-4.48	0.94	-0.06	2.66	0.00
October	4.72	1.43	0.45	2.12	2.60	1.17	0.00	2.11	1.17	1.43	0.00
November	6.00	0.25	0.45	2.70	3.30	3.05	0.00	3.58	1.47	0.25	1.58
December	5.11	0.00	0.45	2.30	2.81	2.81	0.00	3.58	0.00	0.00	2.81

Average Annual Precipitation: 60.24

Note(s):

Total Runoff : 27.11
Total AET: 18.67
Total Percolation: 14.47
60.24

WATER BUDGET DATA

Wildacres Resort
Analysis for Wildacres Developed Area W6 (Future Conditions)
Alpha Project No. 02129

	Precip.	PET	Runoff Coeff. (CR)	Runoff (RO) CR x Precip.	Infiltration (INF)	INF-PET	Σ Neg (INF-PET)	Soil Moisture Storage (ST)	Δ ST	AET	PERC
January	4.51	0.00	0.53	2.39	2.12	2.12	0.00	3.50	0.00	0.00	2.12
February	4.36	0.00	0.53	2.31	2.05	2.05	0.00	3.50	0.00	0.00	2.05
March	5.07	0.00	0.53	2.69	2.38	2.38	0.00	3.50	0.00	0.00	2.38
April	5.29	1.01	0.53	2.80	2.49	1.48	0.00	3.50	0.00	1.01	1.48
May	5.75	2.65	0.53	3.05	2.70	0.05	0.00	3.50	0.00	2.65	0.05
June	5.10	3.81	0.53	2.70	2.40	-1.41	-1.41	2.28	-1.22	3.62	0.00
July	4.70	4.61	0.53	2.49	2.21	-2.40	-3.81	1.10	-1.18	3.39	0.00
August	4.91	3.93	0.53	2.60	2.31	-1.62	-5.43	0.67	-0.43	2.74	0.00
September	4.72	2.81	0.53	2.50	2.22	-0.59	-6.02	0.57	-0.10	2.32	0.00
October	4.72	1.43	0.53	2.50	2.22	0.79	0.00	1.36	0.79	1.43	0.00
November	6.00	0.25	0.53	3.18	2.82	2.57	0.00	3.50	2.14	0.25	0.43
December	5.11	0.00	0.53	2.71	2.40	2.40	0.00	3.50	0.00	0.00	2.40

Average Annual Precipitation: 60.24

Note(s):

Total Runoff :	31.93
Total AET:	17.40
Total Percolation:	10.91
	60.24

WATER BUDGET DATA

Wildacres Resort
Analysis for Golf Course Areas G1 - G5 (Future Conditions)
Alpha Project No. 02129

	Precip.	PET	Runoff Coeff. (CR)	Runoff (RO) CR x Precip.	Infiltration (INF)	INF-PET	Σ Neg (INF-PET)	Soil Moisture Storage (ST)	Δ ST	AET	PERC
January	4.51	0.00	0.26	1.17	3.34	3.34	0.00	2.40	0.00	0.00	3.34
February	4.36	0.00	0.26	1.13	3.23	3.23	0.00	2.40	0.00	0.00	3.23
March	5.07	0.00	0.26	1.32	3.75	3.75	0.00	2.40	0.00	0.00	3.75
April	5.29	1.01	0.26	1.38	3.91	2.90	0.00	2.40	0.00	1.01	2.90
May	5.75	2.65	0.26	1.50	4.26	1.61	0.00	2.40	0.00	2.65	1.61
June	5.10	3.81	0.26	1.33	3.77	-0.04	-0.04	2.32	-0.08	3.85	0.00
July	4.70	4.61	0.26	1.22	3.48	-1.13	-1.17	1.38	-0.94	4.42	0.00
August	4.91	3.93	0.26	1.28	3.63	-0.30	-1.47	1.18	-0.20	3.83	0.00
September	4.72	2.81	0.26	1.23	3.49	0.68	0.00	1.86	0.68	2.81	0.00
October	4.72	1.43	0.26	1.23	3.49	2.06	0.00	2.40	0.54	1.43	1.53
November	6.00	0.25	0.26	1.56	4.44	4.19	0.00	2.40	0.00	0.25	4.19
December	5.11	0.00	0.26	1.33	3.78	3.78	0.00	2.40	0.00	0.00	3.78

Average Annual Precipitation: 60.24

Total Runoff :	15.66
Total AET:	20.26
Total Percolation:	24.32
	60.24

Note(s):
Soil moisture storage (ST) for golf course area based on sandy loam substrate with 12" root zone and soil moisture capacity of 0.20 in/in.
Runoff coefficient (CR) for golf course area determined from Dunne and Leopold, 1978

WATER BUDGET DATA

Wildacres Resort
Analysis for Highmount Estates Area H1 (Future Conditions)
Alpha Project No. 02129

	Precip.	PET	Runoff Coeff. (CR)	Runoff (RO) CR x Precip.	Infiltration (INF)	INF-PET	Σ Neg (INF-PET)	Soil Moisture Storage (ST)	Δ ST	AET	PERC
January	4.51	0.00	0.49	2.21	2.30	2.30	0.00	1.88	0.00	0.00	2.30
February	4.36	0.00	0.49	2.14	2.22	2.22	0.00	1.88	0.00	0.00	2.22
March	5.07	0.00	0.49	2.48	2.59	2.59	0.00	1.88	0.00	0.00	2.59
April	5.29	1.01	0.49	2.59	2.70	1.69	0.00	1.88	0.00	1.01	1.69
May	5.75	2.65	0.49	2.82	2.93	0.28	0.00	1.88	0.00	2.65	0.28
June	5.10	3.81	0.49	2.50	2.60	-1.21	-1.21	0.93	-0.95	3.55	0.00
July	4.70	4.61	0.49	2.30	2.40	-2.21	-3.42	0.26	-0.67	3.07	0.00
August	4.91	3.93	0.49	2.41	2.50	-1.43	-4.85	0.11	-0.15	2.65	0.00
September	4.72	2.81	0.49	2.31	2.41	-0.40	-5.25	0.09	-0.02	2.43	0.00
October	4.72	1.43	0.49	2.31	2.41	0.98	0.00	1.07	0.98	1.43	0.00
November	6.00	0.25	0.49	2.94	3.06	2.81	0.00	1.88	0.81	0.25	2.00
December	5.11	0.00	0.49	2.50	2.61	2.61	0.00	1.88	0.00	0.00	2.61

Average Annual Precipitation: 60.24

Note(s):

Total Runoff :	29.52
Total AET:	17.04
Total Percolation:	13.68
	60.24

WATER BUDGET DATA

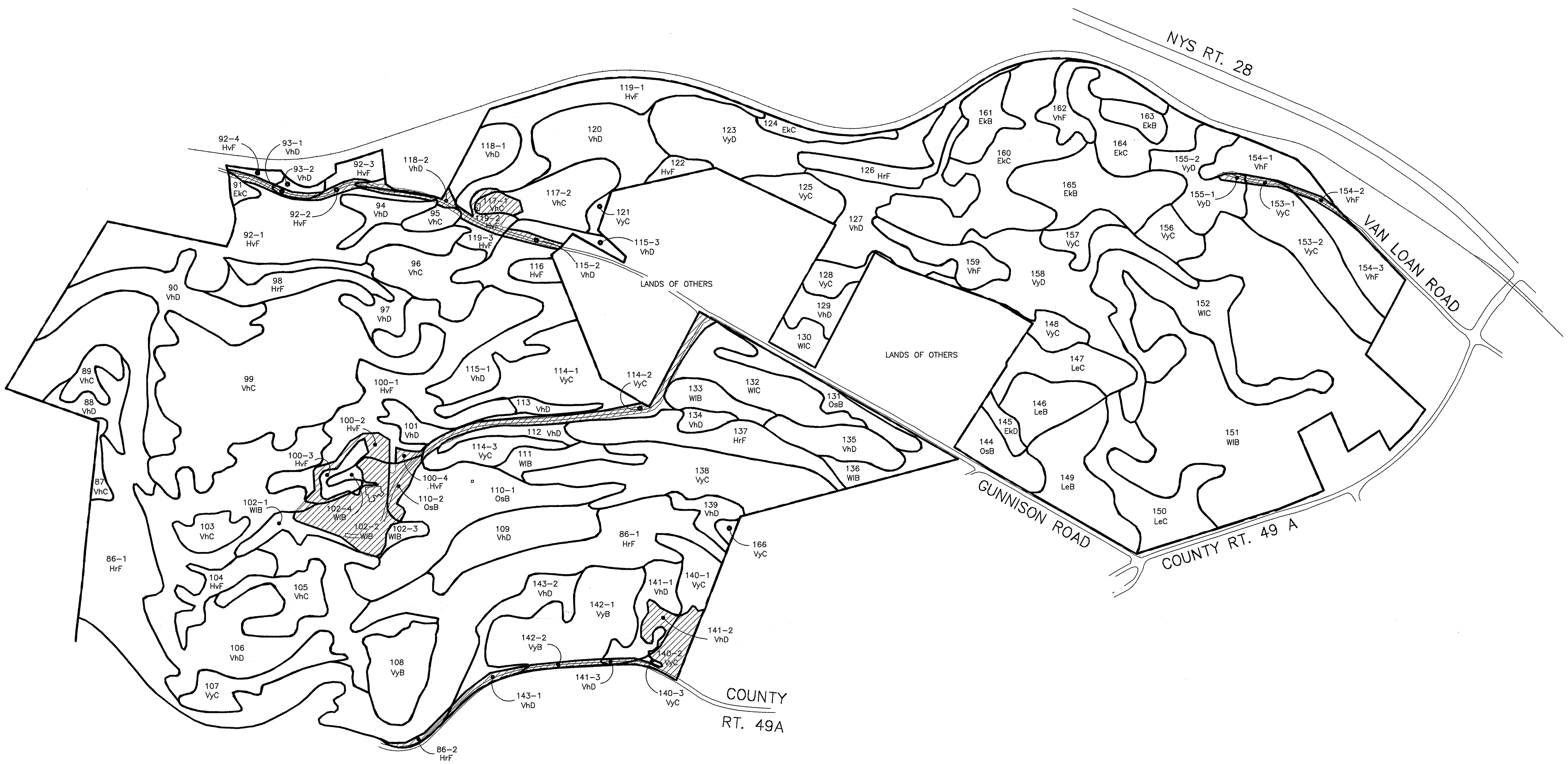
Wildacres Resort
Analysis for Soil Types WIB: Non-Wooded (Future Conditions)
Alpha Project No. 02129

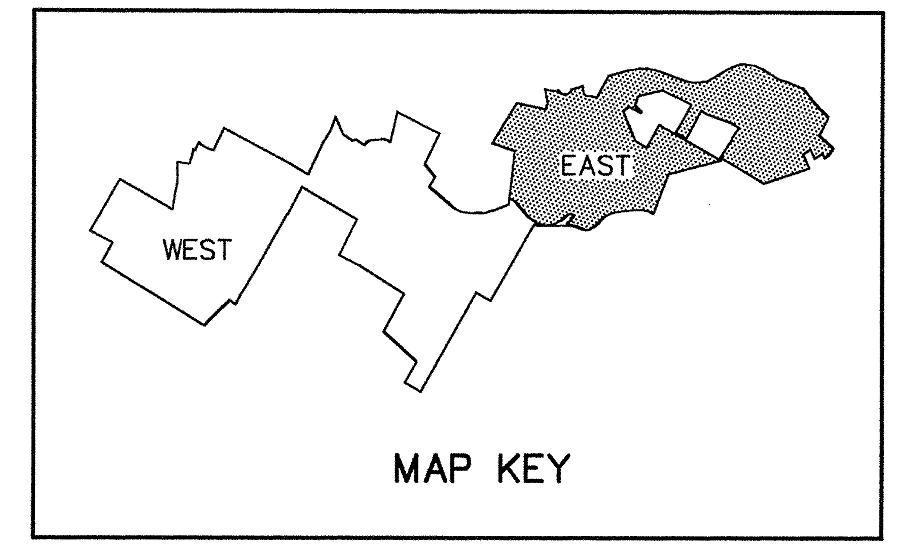
	Precip. (inches)	PET	Runoff Coeff. (CR)	Runoff (RO) CR x Precip.	Infiltration (INF)	INF-PET	Σ Neg (INF-PET)	Soil Moisture Storage (ST)	Δ ST	AET	PERC (inches)
January	4.51	0.00	0.32	1.44	3.07	3.07	0.00	3.50	0.00	0.00	3.07
February	4.36	0.00	0.32	1.40	2.96	2.96	0.00	3.50	0.00	0.00	2.96
March	5.07	0.00	0.32	1.62	3.45	3.45	0.00	3.50	0.00	0.00	3.45
April	5.29	1.01	0.32	1.69	3.60	2.59	0.00	3.50	0.00	1.01	2.59
May	5.75	2.65	0.32	1.84	3.91	1.26	0.00	3.50	0.00	2.65	1.26
June	5.10	3.81	0.32	1.63	3.47	-0.34	-0.34	3.15	-0.35	3.82	0.00
July	4.70	4.61	0.32	1.50	3.20	-1.41	-1.75	2.05	-1.10	4.30	0.00
August	4.91	3.93	0.32	1.57	3.34	-0.59	-2.35	1.71	-0.34	3.68	0.00
September	4.72	2.81	0.32	1.51	3.21	0.40	0.00	2.11	0.40	2.81	0.00
October	4.72	1.43	0.32	1.51	3.21	1.78	0.00	3.50	1.39	1.43	0.39
November	6.00	0.25	0.32	1.92	4.08	3.83	0.00	3.50	0.00	0.25	3.83
December	5.11	0.00	0.32	1.64	3.47	3.47	0.00	3.50	0.00	0.00	3.47

Average Annual Precipitation: 60.24 inches

Total Runoff (in.) :	19.28
Total AET (in.):	19.94
Total Percolation (in.):	21.02
	60.24

Note(s):
Soil Area excludes Marlowe Mansion, which is included in Wildacres Resort area W1 for the future conditions. This soil area is essentially undeveloped, however, the total percolation is different than existing conditions due to the exclusion of the Marlowe Mansion. The effects of the building are incorporated in the runoff coefficient for W1.





0 300 600 900
SCALE: 1" = 300'

LEGEND

SOIL AREA DELINEATION WITH SYMBOL AND ID. NUMBER (HATCHED: NON-WOODED)

SOIL AREA DELINEATION WITH SYMBOL AND ID. NUMBER (NO HATCHING: WOODED)

ALPHA GEOSCIENCE

PROJECT: 02129

WILDACRES AREA-2E.DWG

PLATE 1

EXISTING CONDITIONS
(EAST AREA)
SOIL AREA IDENTIFICATION MAP

WILDACRES RESORT
HIGHMOUNT, NEW YORK

LEGEND

SOIL AREA DELINEATION WITH SYMBOL AND ID. NUMBER (HATCHED: NON-WOODED)

SOIL AREA DELINEATION WITH SYMBOL AND ID. NUMBER (NO HATCHING: WOODED)

ALPHA GEOSCIENCE

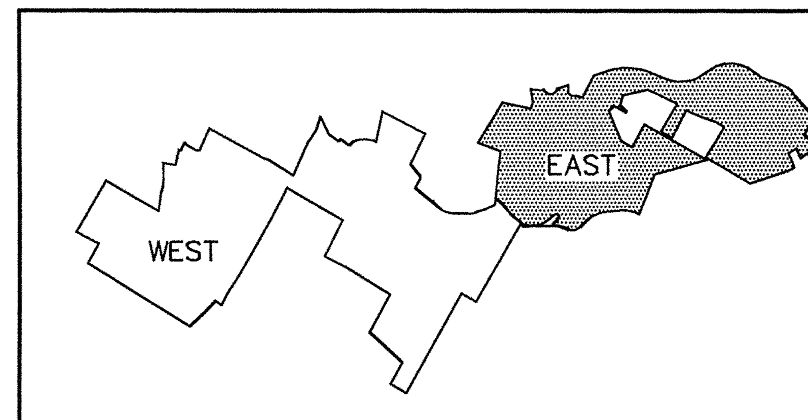
PROJECT: 02129

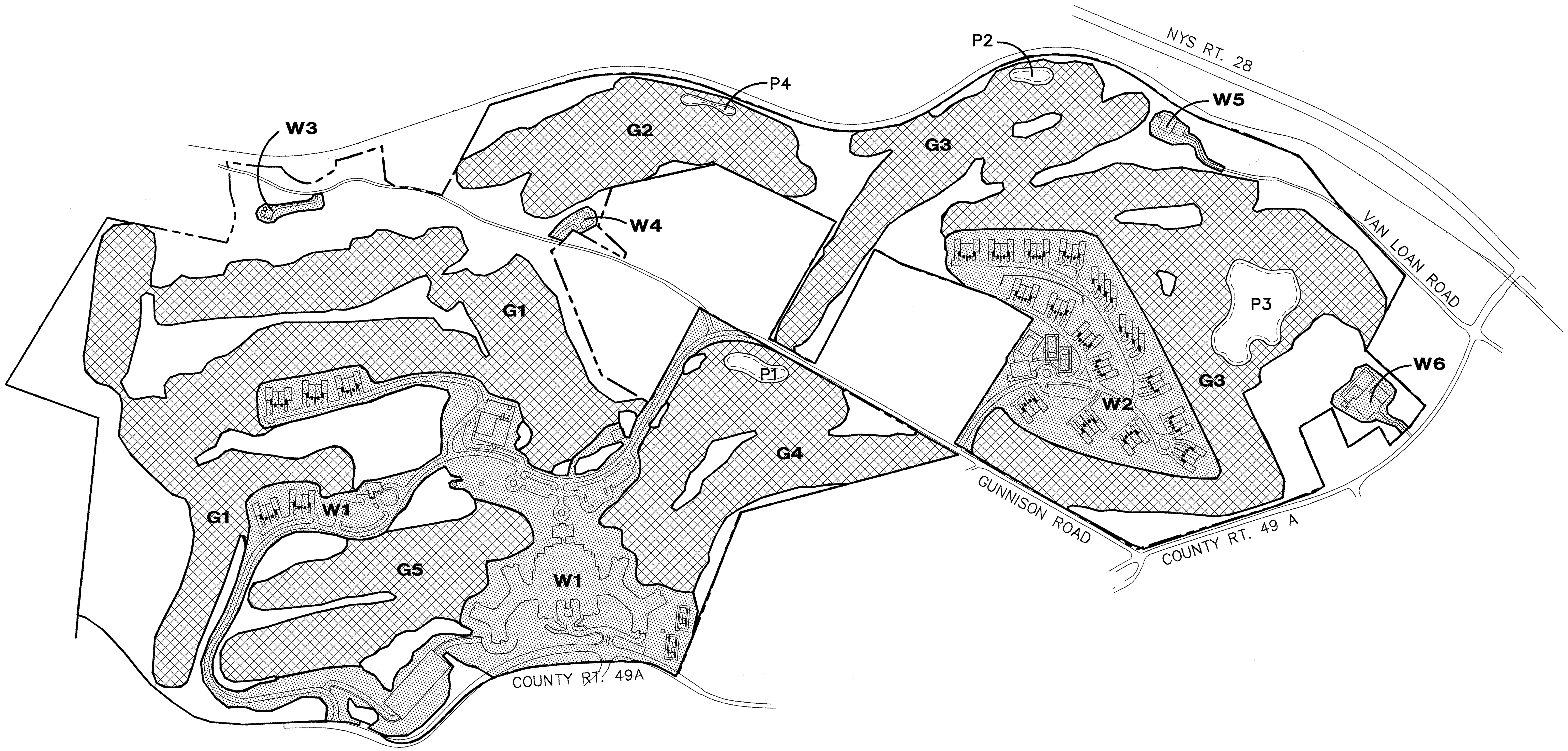
WILDACRES AREA-1E.DWG

PLATE 2

EXISTING CONDITIONS
(WEST AREA)
SOIL AREA IDENTIFICATION MAP

WILDACRES RESORT
HIGHMOUNT, NEW YORK





LEGEND

- G1 — HIGHMOUNT COUNTRY CLUB GOLF COURSE AREA WITH ID.
- W3 — WILD ACRES RESORT DEVELOPMENT AREA WITH ID.
- P2 — POND WITH ID.
- UNDEVELOPED SOIL AREA

0 300 600 900

SCALE: 1" = 300'

ALPHA GEOSCIENCE

PROJECT: 02129

WILDACRES AREA-2P1.DWG

PLATE 3

FUTURE CONDITIONS – DEVELOPED LANDS (EAST AREA)

WILDACRES RESORT
HIGHMOUNT, NEW YORK

LEGEND

H1 — PROPOSED HIGHMOUNT ESTATES DEVELOPMENT AREA

SOILS AREAS UNCHANGED FROM EXISTING CONDITIONS
SEE PLATE 2 FOR SOILS DESIGNATIONS

47-1D VhD — SOILS AREAS ALTERED BY DEVELOPMENT BOUNDARY

HIGHMOUNT ESTATES SUBDIVISION BOUNDARY

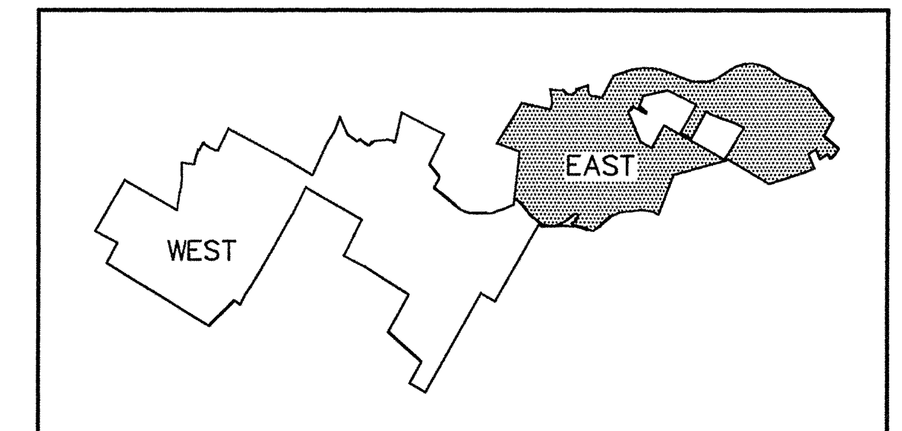
ALPHA GEOSCIENCE

PLATE 4

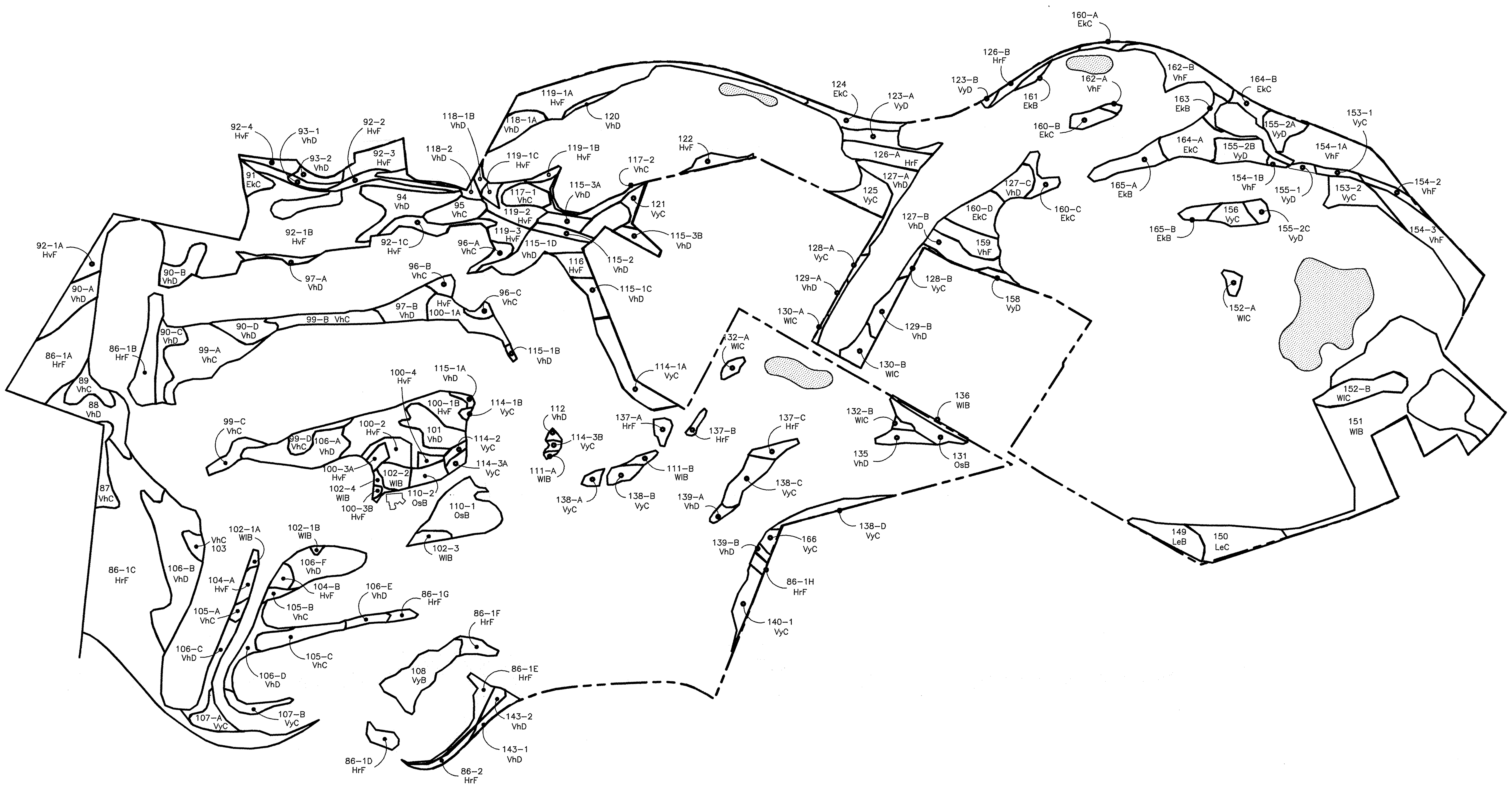
FUTURE CONDITIONS – UNDEVELOPED SOILS AND DEVELOPED LANDS (WEST AREA)

PROJECT: 02129
WILDACRES AREA-1P.DWG

WILDACRES RESORT
HIGHMOUNT, NEW YORK



MAP KEY



0 300 600 900

SCALE: 1" = 300'

LEGEND

86-1F HrF — UNDEVELOPED SOIL AREA DELINEATION WITH SYMBOL AND ID. NUMBER UNDISTURBED FROM EXISTING CONDITIONS

PONDS

ALPHA GEOSCIENCE

PLATE 5
FUTURE CONDITIONS – UNDEVELOPED SOILS (EAST AREA)

WILDACRES RESORT
HIGHMOUNT, NEW YORK

PROJECT: 02129
WILDACRES AREA-2P2.DWG

Exhibit F

Village of Fleischmanns Water Supply Correspondence

STATE OF NEW YORK
DEPARTMENT OF HEALTH

Office of Public Health Oneonta District Office 28 Hill St., Ste. 201 Oneonta, New York 13820 (607) 432-3911
FAX (607) 432-0089

Antonia C. Novello, M.D., M.P.H., Dr.P.H.
Commissioner

Dennis P. Whalen
Executive Deputy Commissioner

MAR 09 2001

March 2, 2001

Mayor Donald Kearney
and Fleischmanns Village Board
P.O. Box I-3
Fleischmanns, New York 12430

Re: Public Water Supply
Fleischmanns Village
Delaware County

Gentlemen:

We have reviewed the "Water Supply Evaluation" report on your water sources, prepared by Alpha Geoscience at the request of Crossroads Ventures. The report provides a good overview of the capacity and quality of your water sources. Following are some of the more important points made in the report.

a. Water use in the Village is three times the expected norm for the population served.

b. Well No. 1 is still not in service, as a result of the January 1996 flood.

c. Repair work is needed around spring collection basin #1.

d. Coliform bacteria were detected in all of your sources.

e. Special monitoring that was conducted (for temperature, etc.) indicates there is no surface water influence affecting the quality of the spring water, even though repairs are needed to the collection system.

f. The Hill Well (referenced in the report as Well No. 3) has some sulfur in it. Sulfur can cause some taste and odor problems, and because it exerts a demand for chlorine it can contribute to erratic chlorine residual problems.

The report concludes with the following estimates of sustainable outputs from your sources.

Springs:	57,000 gal/day	(based on 1/2 of the November 2000 flow)
Well No. 1:	135,000 gal/day	(94 gpm - estimate)
Well No. 2:	259,000 gal/day	(180 gpm - estimate based on pump tests)
Well No. 3:	86,000 gal/day	(60 gpm - estimated as 2/3 of the pump capacity)
Total:	537,000 gal/day	

The report does not present a definitive assessment of how much "excess" capacity the system has available to supply new users such as Crossroads Ventures. Another omission in the study is that the true sources of the springs (that is, the origins of the pipes that discharge into the catch basins near the storage reservoir) were not identified. The report also does not address two important issues related to both water quantity and quality. One is corrosion control and system lead levels. Presently, lead levels remain high because the limited amount of corrosion control chemical that can reasonably be injected daily is inadequate for the amount of water being used. Additional water users would aggravate that problem. The second is chlorine contact time. The fact that coliform bacteria were found in all of the sources during this study points out the need for proper disinfection, including adequate contact time. The existing arrangements do not provide this, since the treatment vault is close to the first customer. This problem was first identified in 1990, and the Village planned to relocate the treatment system. Unfortunately, all parties neglected this point in the ensuing years. The issue arose again during our own source assessment recently. Additional demand from new customers will aggravate this problem also.

Following are our conclusions about your water sources, based on the report and these comments.

Water Quality - The sources provide good quality water, with the following exceptions that would be aggravated by additional system demand.

- Chlorination effectiveness is questionable due to limited contact time.

- The water is corrosive, which contributes to lead and copper problems in the system.

Water Quantity - For the design of new systems, standards require that the system be able to supply peak day demands with the largest source out of service (for maintenance or repairs, etc.). In addition to removing your largest source (Well #2) when calculating your reliable demand capacity, we would question the reliability of the springs during drought periods. Therefore, your reliable source capacity should be calculated based on Well #1 (assuming it was functional) and Well #3. This total is 221,000 gpd, which is about your current average demand. Therefore, some improvements would be needed in order for you to supply water to a new service area.

We recommend the following actions to address the quantity and quality issues described above.

1. Complete the repairs and improvements necessary to reactivate Well No. 1.

2. Institute a formal leak detection and reduction program.

3. Repair the spring collection systems near the reservoir.

4. Identify the original sources of the springs, so they can be upgraded if necessary and properly protected.

5. Devise and implement arrangements to increase chlorine contact time.

6. Assess your corrosion control measures and revise them to reduce system lead levels.

7. Investigate the possible advantages of using Well #1 or #2 as your primary backup source to eliminate regular use of the sulfur water from Well #3.

Most of the improvements recommended above are included in the comprehensive improvement project, for which you have a Drinking Water State Revolving Fund (DWSRF) hardship application pending. That project includes other improvements that will be useful for supplying new customers, most notably a treated water storage tank and a new well source.

Approval for supplying water from the Village system to the Crossroads Ventures project will require our approval of plans, which must include pumping arrangements and other engineering materials as well as address the issues discussed above. We look forward to working with the Village and Crossroads Ventures as they give additional consideration to this concept.

Sincerely,

Roger A. France, P.E.
Senior Sanitary Engineer

cc: Mr. Meyers, Water Superintendent
Mr. Kerzic, Delaware Engineering
Mr. Phelan, Alpha Geoscience
Crossroads Ventures LLC
Rettew Engineering
Ms. Emmitt, Bureau of Public Water Supply Protection

RAF:cmh

crossroads ventures llc

The Hon. Rose Marie Vernon,
Village of Fleischmanns,
New York, 12430

December 3, 2001

Dear Mayor Vernon:

Crossroads Ventures LLC is in the process of evaluating alternative water supplies which might be available for that portion of its proposed development known as the Wildacres Resort. Crossroads would like to know whether the Village would be interested in providing such a water supply to this resort. In that event, Crossroads would accept full responsibility for studying and evaluating the adequacy of the Village water supply, and would, in addition, pay for the costs of treating any water which would be used for Wildacres. Crossroads would, of course, pay for any water it uses at rates to be established with the Village.

We are not, at this time, asking for the Village to commit itself irretrievably to selling water for the resort. For Crossroads to expend the resources necessary to evaluate the suitability of this source as an alternative, however, we need an expression of interest from the Village and the Village's cooperation, at absolutely no expense or inconvenience to the Village, in conducting the necessary technical studies and interfacing with the appropriate regulatory agencies.

Thank you for your consideration of this request. Please let me know in writing if this approach is acceptable to the Village.

Very truly yours,

Dean Gitter,
Managing Partner

p.o. box 267 · andrew lane rd · mt. tremper, n.y. 12457
ph: 8 LOCATION:845 688 6887 x: 845/688- RX TIME 12/03 '01 15:58 allc@usa.net

ROSE MARIE VERNON
MAYOR
LORRAINE DE MARFIO
VILLAGE CLERK

THE VILLAGE OF FLEISCHMANNS
TOWN OF MIDDLETOWN-DELAWARE COUNTY
FLEISCHMANNS, NEW YORK 12430
http://www.catskill.net/fleisch
PHONE: (845)254-5514

Main Street
P.O. 339
FAX: (845)254-4571

December 10, 2001

Dean L. Gitter
Crossroads Ventures, LLC
72 Andrew Lane
Mt. Tremper, New York 12457

Re: Village Water Supply to the Proposed
Wildacres & Highmount Developments

Dear Mr. Gitter:

The Village of Fleischmanns has received your letter of Dec. 3, 2001 regarding the potential of the Village supplying water to the Wildacres & Highmount developments proposed by Crossroads Ventures.

In light of your letter, we have reviewed our past and current water system operation and use, as well as a study of our water resources prepared by a qualified hydro geologist. We have also reviewed the finances and needs of our current water system.

While we are not in a position to make a firm commitment and enter a specific agreement at this time, we offer Crossroads Ventures this letter as an expression of interest in selling water to the proposed developments. This letter does not commit the Village or Crossroads to the supply and purchase of water, but provides a basis for which that arrangement can be explored. Based on our preliminary review, it appears that such an arrangement would be beneficial to both the Village & Crossroads.

We are aware that a number of actions, potentially including improvements to our system, will have to be undertaken to make such an arrangement a reality. This letter also serves as our understanding that Crossroads will work with the Village and regulatory agencies to in good faith to explore what actions may be undertaken, the cost and funding of these actions, and the development of a fair water rate for the purchase of water. We look forward to continuing discussions regarding the sale of water to Crossroads Ventures with you.

Very truly yours,

Rose Marie Vernon
Mayor

Delaware Engineering, P.C.
28 Madison Avenue Extension
Albany, New York 12203
Tel: 518.452.1290
Fax: 518.452.1335

December 14, 2001

Roger A. France, P.E.
Senior Sanitary Engineer
New York State Department of Health
28 Hill Street
Suite 201
Oneonta, NY 13820

Re: Public Water Supply
Village of Fleischmanns
Delaware County

Dear Mr. France:

Crossroads Ventures, LLC (Crossroads) is preparing documentation for an environmental review under the State Environmental Quality Review Act (SEQR) for a proposed recreational development located in both Ulster and Delaware counties. A portion of the development, known collectively as Wildacres Resort and Highmount Golf Club, is located in the Town of Middletown, Delaware County, adjacent to the Village of Fleischmanns. Delaware Engineering (Delaware) is providing assistance to Crossroads in addressing the water supply and wastewater disposal needs of the proposed development. In exploring alternatives for water supply to the Wildacres/Highmount development, the Village of Fleischmanns public water supply was identified as a potential source of potable water for the development.

After initial discussions with Village representatives, representatives from Delaware together with hydrogeologists from Alpha Geoscience, Latham, New York, reviewed system assets and Department of Health records, and interviewed the water system operator. This preliminary review resulted in a further, more detailed study of the quantity and quality of the Village's sources of water. A study and report, entitled *Water Supply Evaluation, Village of Fleischmanns, Delaware County, New York, December 21, 2000*, was prepared by Alpha Geoscience. The purpose of the study was to identify and discuss the sources of water controlled and used by the Village of Fleischmanns for potable water supply. The intent was to assess whether adequate water resources exist for the Village to consider supplying water to Crossroads. The study was not commissioned by the Village and was not intended to address the current operational status or repairs needed for the Village water system. Copies of the study were supplied to the Village and your office. Your letter of March 2000 (attached) recognizes receipt of the study report and identifies a number of concerns regarding the sources, treatment, and distribution of water in the Village system.

Recently, representatives of Crossroads and the Village met to discuss the potential of the Village supplying water to the development. A variety of topics were covered in the meeting including the current condition of the village system, the source capacity, and the steps that might be taken to allow the Village to supply water to the development. This meeting resulted in Crossroads' written request for a written expression of interest from the Village to provide water to the proposed development. The Village responded with an affirmative written letter of interest. Copies of both correspondences are provided as attachments to this letter.

A number of measures are anticipated to make the provision of Village water to the development a reality. The overall relationship between Crossroads and the Village will be evaluated, with the likely result being a formal water purchase agreement. Crossroads would be an out-of-district user to the Village water supply. The Village would establish a water rate for raw water and/or bulk use.

The primary source(s) of water for the resort may be developed as separate sources from the Village supply. Preliminary investigation has determined that the drilling of a new well or wells on Village land up gradient of the existing Village covered reservoir and adjacent to the Ulster County rail road property may provide viable water for the development. The well or wells would be located, drilled, cased, grouted, set, pump tested and sampled for water quality in accordance with Department of Heath and Village guidance and standards. Documentation supporting the lack of impact on other public water supplies as well as information necessary to determine the potential influence of surface water would be provided for the new well or wells.

Crossroads would likely propose to buy raw, untreated water from the Village, necessitating a pump station to convey water up to the development parcel. The well and pump station would be owned, operated, and maintained by the Village. The backup source for the development could be the blended spring and well waters in the Village reservoir. The capacity of the springs and wells was established in the December 2000 Alpha Geoscience report. Based on the concerns stated in your March 2000 letter regarding spring flows during draught periods, spring measurements for December 2001 were taken. The springs yielded 64 gpm or 92,160 gpd under draught conditions.

Since Crossroads would receive raw, untreated water from the Village, a transportation corporation would be formed to hold the permit for the water supply and to be responsible for treatment, distribution, and maintenance.

This approach to water supply from the Village to the development would not impact existing Village source water capacity or treatment, but would supply the Village with revenue that could be used to address source upgrades, treatment issues and distribution system problems in the Village.

Your comments on this approach to water supply for the proposed development would be very helpful in continuing our water supply investigation and environmental review. We seem to have an opportunity to create a win-win situation whereby Crossroads has a quality water supply and the Village of Fleischmanns is provided with needed water system revenue. I can be reached at 518-452-1290 if you have any questions or need further information.

Sincerely,

Mary Beth Larkin
Project Manager

C: D. Gitter, Crossroads Ventures, LLC
R.M. Vernon, Mayor, Village of Fleischmanns

Att.

STATE OF NEW YORK
DEPARTMENT OF HEALTH

Office of Public Health | Oneonta District Office | 28 Hill St., Ste. 201 | Oneonta, New York 13820 | (607) 432-3911
FAX (607) 432-0089

Antonia C. Novello, M.D., M.P.H., Dr.P.H.
Commissioner

Dennis P. Whalen
Executive Deputy Commissioner

December 27, 2001

Ms. Mary Beth Larkin
Delaware Engineering, P.C.
28 Madison Avenue Extension
Albany, New York 12203

Re: Proposed Temporary Residence/
Public Water Supply
Wildacres Resort
Fleischmanns Village
Delaware County

DEC 31 2001

Dear Ms. Larkin:

Your letter of December 14, describing a possible arrangement whereby the Village of Fleischmanns would sell raw water to the proposed Wildacres Resort complex, from a new well, has been considered. This office would have no objection to such an arrangement. Since this arrangement would not use the Village's existing water system, a determination of potential effects on the existing system is obviously not needed. The owners/operators of the Wildacres Resort complex would, of course, have to comply with design and operation requirements for public water supplies, as you have stated.

If Wildacres Resort were to purchase treated water from the existing Village system, certain upgrades to the Village system would be required. In particular, any arrangement that would exacerbate any of the water quality and quantity concerns outlined in my letter of March 2, 2001 would require upgrade or compensation measures. This office has no objection to arrangements of this sort, either, as long as these concerns are addressed satisfactorily by the Village and/or Crossroads Ventures.

One final comment: we note you have measured the output of the Village springs recently (64 gpm). Because current drought conditions in the area are severe (although not of record levels), we would consider some portion of this flow as legitimate source "capacity" when making source vs. demand calculations.

Do not hesitate to contact me with any additional questions on these issues.

Sincerely,

Roger A. France, P.E.
Senior Sanitary Engineer

cc: Mayor Vernon and Fleischmanns Village Board
Mr. Myers, Village of Fleischmanns Water Superintendent
Rettew Engineering
Mr. Phillips, Bureau of Public Water Supply Protection

RAF:cmh

Exhibit G

Disinfection Calculations and Example Equipment

DELAWARE ENGINEERING
28 Madison Ave. Ext.
Albany, NY 12203

PROJECT: CROSSROADS
DESCRIPTION: Chlorine Demand
Wildacres / Highmount Est.

DATE 11/28/00
SHEET 1 OF 1
BY MTD Ck'ed ____

Assumptions: need 2 ppm CL for groundwater
(w/ 5% reduction for fixtures - conservative) AVE. DAILY FLOW = 92 gpm (133,000 gpd)
PEAK FLOW = 3 x ave = 398,592 gpd
Cl_2 : HOCL is ≈ 1:1

① ppm Chlorine → gal Chlorine @ 100% Flow (ave.)

2 ppm CL x 0.132 MGD = 0.3 gal CL

using 15% by volume Sodium hypochlorite

$0.3 \text{ gal @ 100\%} \times \frac{1 \text{ gal NaOCL}}{15\% \text{ CL by vol}} =$ **2 gal/day NaOCL**

② @ peak flow

2 ppm CL x 0.4 MGD = 0.8 gal CL

$0.8 \text{ gal} \times \frac{1 \text{ gallon NaOCL}}{15\% \text{ by vol CL}} =$ **5.3 gal/day NaOCL**

DAY TANK SIZING
BASED ON PEAK FLOW FOR 30 hrs @ 2.5 ppm conc.

2.5 ppm (0.4 MGD) = 1.0 gal of CL

$1.0 \cdot \frac{1}{15\%} = 6.7$ gal/day NaOCL

$6.7 \frac{\text{gal}}{\text{day}} \times \frac{1 \text{ day}}{24 \text{ hr}} \cdot 30 \text{ hr storage} = 8.3 \frac{\text{gallon}}{\text{day}}$

tank ≈ 10 gall

③ Peak Chlorine conc. at peak flow (pump determined)
water flow = 0.61 MGD; max. pump output =
Chlorine conc. in sol. = 15%
24 (gpd NaOCL) x .15 = 3.6
3.6 / .4 MGD = **9 ppm CL max at peak flow**

graph.xls 2/2/2000 1:17 PM

PULSAtron®

SERIES E PLUS SPECIFICATIONS

GENERAL

Chemical metering pumps shall be positive displacement non-hydraulic, solenoid driven, diaphragm type pumps. Output shall be "hot" rated (at operating temperature) and shall be adjustable while pumps are in operation. Positive flow shall be ensured by a minimum of four ball type check valves. A bleed valve shall be provided (on most units) for the manual evacuation of entrapped air or vapors and safe relief of pressure in the discharge line.

CONTROLS

The control panel shall be located opposite the liquid handling end of pump Output volume adjustments shall be made by independent dial knobs for stroke length and stroke rate. Stroke length adjustment shall have a locking lever Control functions shall be either manual, external pacing with stop, or automatic with stop. For all operating modes, a green indicator light on the control panel shall illuminate when pump is in operation and strobe once for each pump stroke. In all operating modes, a red indicator light on the control panel shall illuminate when pump operation is halted via the stop function

<u>Manual</u> (Standard)
Pump control shall be selectable between on and off by means of a 2-position switch

<u>External Pacing w/Stop</u> (Optional)
Pump control shall be selectable between manual and external by means of a 3 position center off switch In external mode, the pump shall accept dry contact closures (ex contacting flow meter). As contact closes, the pump shall stroke once, minimal contact closure time is 10 msec. Contact must open and close for each pump stroke Maximum closures - 125 per minute.

A dry contact closure to the stop function shall cause pump to halt operation and illuminate a red indicator light on pump control panel in either manual or external pacing mode. Pump shall resume normal operation when contact opens.

<u>Automatic w/ Stop</u> (Optional)
Pump control shall be selectable between manual and automatic by means of a 3 position center off switch. In automatic mode, the pump shall accept a direct 4-20 mADC signal (without a signal interface or conversion device). Internal resistance shall be 124 ohms

A dry contact closure to the stop function shall cause pump to halt operation in either manual or automatic mode and illuminate a red indicator light on the pump control panel Pump shall resume normal operation when contact opens

ELECTRONIC DRIVE

To prevent damage to pump from over heating, the solenoid shall have automatic reset thermal overload protection. For overpressure conditions, pump shall automatically stop pulsating when discharge pressure exceeds pump pressure rating by not more than 35% when pump is set at maximum stroke

The electronic circuitry shall be EMI resistant and shall employ a metal oxide varistor (MOV) for lightning protection. A fuse mounted on the pump control panel accessible from the outside of the pump shall provide circuit overload protection.

Internal wiring between electronic circuit board, solenoid, and power shall be quick disconnect terminals at least 3/16" wide

ENCLOSURE

Pump drive shall be encased in a water resistant housing constructed of a chemically resistant glass filled polyester. The control panel shall be enclosed by a hinged dust cover constructed of polycarbonate plastic The electronic circuitry shall be mounted at the rear of the pump for maximum protection against chemical intrusion

AGENCY LISTINGS

MATERIALS OF CONSTRUCTION

Pump Head - GFPPL, PVC, SAN, PVDF, 316SS
Diaphragm - Teflon faced, hypalon backed
Check Valves
- Seats/O-Rings - Teflon, Hypalon, Viton
- Balls - Ceramic, Teflon, 316SS, Alloy C
- Housing - GFPPL, PVC, PVDF, 316SS

Bleed Valve - GFPPL, PVC, PVDF
Tubing - Suction 4 ft. PVC
- Discharge 8 ft. PE

Important. Material Code - GFPPL = Glass-filled Polypropylene, PVC = Polyvinyl Chloride, SAN = Styrene-Acrylonitrile, PE = Polyethylene, PVDF = Polyvinylidene Flouride. Teflon, Hypalon and Viton are registered trademarks of E I DuPont Company.

NOTES:

- NSF listing is not available on models LPK2, K3, K5 and LPH8, models with PVDF components or select models (refer to price schedule for details)
- Pump heads in 316SS and PVDF are not available with Model LPH8.
- Pump heads in SAN are not available on pump models rated above 100 PSI.
- Bleed valve not available on pumps configured for high viscosity, NPT connections or Model LPH8
- Tubing may be supplied in PVDF, Polypropylene, or black U.V. inhibited PE.

RX TIME 02/15 '01 17:25 LOCATION:+

Series E PLUS PULSAtron Electronic Metering Pumps

Key Features:

- *Automatic Control,* either 4-20 mADC direct, inverse or external pacing, with stop function
- *Manual Control* by on-line adjustable stroke rate and stroke length.
- *UL Listed* for demanding *OUTDOOR* and indoor application Also CSA and NSF approved
- *Auto-Off-Manual* switch.
- *Highly Reliable* timing circuit.
- *Circuit Protection* against voltage and current upsets.
- *Circuit Breaker,* panel mounted.
- *Solenoid Protection* by thermal overload with auto-reset.
- *Water Resistant,* for outdoor installation.
- *Indicator Lights,* panel mounted.

Safe & Easy Priming with durable leak-free **bleed valve assembly** (standard most models)

Complete Selection

Twenty distinct models are available having pressure capabilities to 300 PSIG @ 3 GPD, and flow capacities to 500 GPD @ 20 PSIG, with turndown ratios up to 100 1. Metering performance is reproducible to within ± 2% of maximum capacity.

Pump heads, cartridge check valve assemblies and tubing are stocked in several corrosion-resistant plastic, elastomeric and alloy materials along with stainless steel that safely handle a wide variety of chemicals.

Please refer to the reverse side for Series E PLUS specifications

Operating Benefits

Reliable metering performance. Our guided check valves, with their state-of-the-art seat and ball designs, provide precise seating, and excellent priming and suction lift characteristics. Our timing circuit is highly reliable and, by design, virtually unaffected by temperature, EMI and other electrical disturbances.

Rated "hot" for continuous duty. Series E PLUS pumps continue to meet their specifications for pressure and capacity even during extended use. That's because our high quality solenoid is separately encapsulated in a fin-cooled, thermo-conductive, enclosure that effectively dissipates heat.

High viscosity capability. A straight flow path and ample clearance between the diaphragm and head enable standard PULSAtron pumps to handle viscous chemicals up to a viscosity of 3000 CPS. For higher viscosity applications, larger, spring-loaded connections are available

Leak-free, sealless, liquid end. Our diaphragms are of superior construction–teflon-faced, bonded to a composite of Hypalon and fabric layers, and reinforced with a metal insert for optimum flexibility and durability.

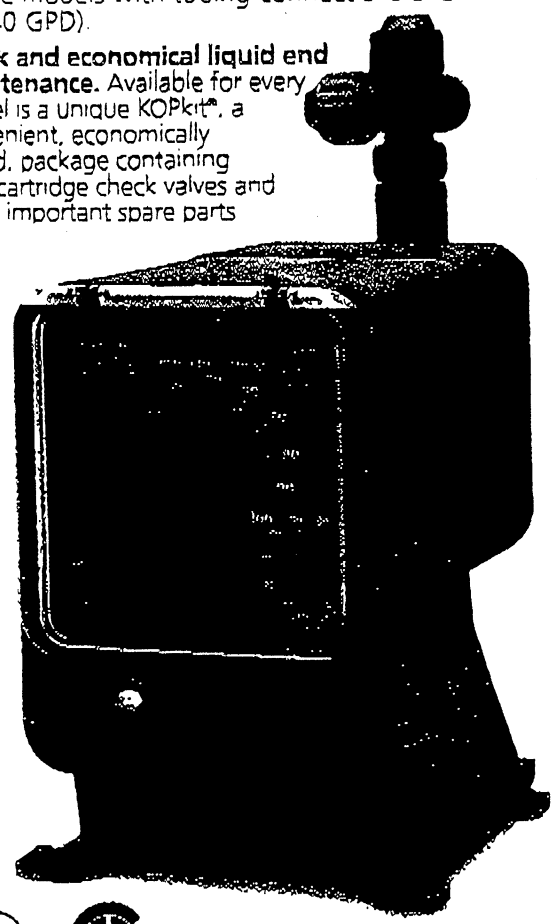
System Compatibility

A wide variety of chemicals can be pumped. Liquid end materials include glass-filled polypropylene (GFPPL), PVC, styrene-acrylonitrile (SAN), Polyvinylidene Fluoride (PVDF), Teflon, Hypalon, Viton, ceramic, alloys and 316SS.

Immediate installation and start-up. Included as standard accessories with all models are an injection/back pressure valve assembly and a foot valve/strainer assembly*, including discharge and suction tubing and tube straightener (*not available with high viscosity connections for > 3000 CPS)

Safe and easy priming and valve maintenance. Included as a standard accessory is a bleed valve assembly, including return tubing (available only on (those models with tubing connections and ≤ 240 GPD).

Quick and economical liquid end maintenance. Available for every model is a unique KOPkit®, a convenient, economically priced, package containing new cartridge check valves and other important spare parts



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For additional information about PULSAtron's mid-range Series E and Series A PLUS refer to Technical Sheet No. EMP-022 and EMP-025 respectively. For information about the economical Series C PLUS and Series C refer to Technical Sheet Nos EMP-026 and EMP-024

Feb-15-2001 06:27pm From-SIEWERT EQUIPMENT CO + T-367 P.003/008 F-433

RX TIME 02/15 '01 17:25
LOCATION:+
SIEWERT EQUIPMENT CO. INC.
Pump & Mixer Specialist
175 Akron St. Rochester, NY 14609
(716) 482-9640 FAX (716) 482-4149

PULSAtron® Series E PLUS Specifications

Important: Series E PLUS — 20 model selections. Digit 1 and 2 (LP) signify product class, digit 3 and 4 signify pressure/flow.
For full model selection information refer to Price Schedule EMP-PS LX. or reference guide No. EMP-003.

Pressure and Flow Rate Capacity

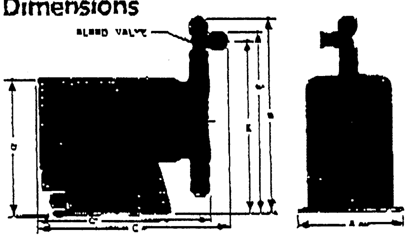
Capacity, nominal																				
	GPD	3	5	6	11	12	14	20	21	24	40	47	44	60	75	94	120	190	240	500
	GPH	13	0 20	0 25	0 45	0 50	58	0 83	0.87	1 0	1 66	1 75	1 83	2 5	3 17	3 91	5 00	8 00	10 00	20 00
	LPH	49	79	95	1 73	1 89	2.20	3 15	3 31	3 78	6 31	6 62	6 94	9 5	11 83	14 82	18 93	29 96	37 85	78 85
Pressure, max PSIG/Bar																				
300/21		LPK2	—		—	—	—		—	—	—	—		—	—	—	—	.	—	—
250/17		-	LPB2	—	LPD3	—	—	LPF4	-..	—	LPH4	—	—	—	—	—	—	—	—	—
150/10				LPA2	--	LPB3	—	—	LPD4	—	—	LPG4	—	LPK5	LPH5	—	—	—	—	—
100/7		—	—	—		LPA3	LPK3	—	.	LPB4	—	—	LPE4	.	—	LPG5	LPH6	—	—	—
50/3 3		—	—	—	—	.	—	—	—	.	—	—	—	—	.	—	—	LPK7	—	—
35/2 4		—	—		—	—	—	.	—	—	—	.	.	—	—	—	—		LPH7	—
20/1 3		—	—	—		—	—	—	..	—	—	—	—	—	—	—	—	—	-..	LPH8

Liquid End Materials

Series	Pump Head	Diaphragm	Check Valves		Fittings	Bleed Valve	Injection Valve Assembly Foot Valve Assembly	Tubing
			Seats / O-rings	Balls				
E PLUS	GFPPL PVC SAN PVDF 316SS	Teflon-faced Hypalon-backed	Teflon, Hypalon, Viton	Ceramic, Teflon, 316SS, Alloy C	GFPPL PVC PVDF 316SS	Same as fitting and check valve selected. except 316SS	Same as fitting and check valve selected	Clear PVC White PE

Important: Material Code — GFPPL = Glass-filled Polypropylene, PVC = Polyvinyl Chloride, SAN = Styrene-Acrylonitrile, PE = Polyethylene, PVDF = Polyvinylidene Fluoride. Teflon, Hypalon and Viton are registered trademarks of E.I. DuPont Company.

Dimensions



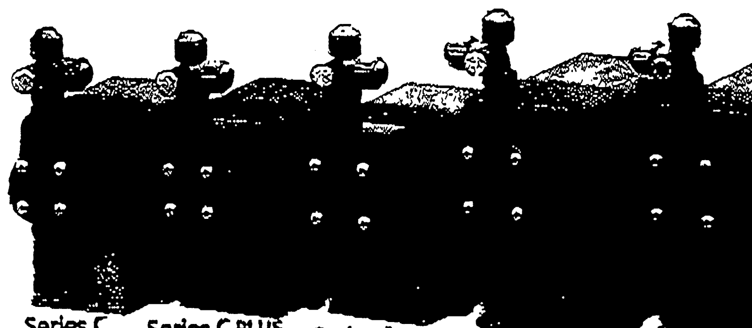
Series E PLUS Dimensions (inches)								
Model No.	A	B	B'	C	C'	D	E	Shipping Weight (Lbs.)
LPA7	5 4	10 3	—	10 8		7 5	9 0	13
LPA3	5 4	10 6	—	10 7	—	7 5	9 2	13
LPB2	5 4	10 3	—	10 8	-	7 5	9 0	13
LPB3	5 4	10 6	—	10 7	—	7 3	9 2	13
LPB4	5 4	10 6	—	10 7	-	7 3	9 2	13
LPD3	5 4	10 6	—	11 7	—	7 3	9 2	15
LPD4	5 4	10 6	.	11 2	—	7 5	9 2	15
LPF4	5 4	10 6		11 2	—	7 5	9 2	15
LPF4	5 4	10 6		11 7	—	7 5	9 7	17
LPG4	5 4	10 6	—	11 7	—	7 5	9 7	18
LPG3	5 4	11 0	—	11 7	—	7 5	9 6	18
LPH4	6 2	11 0	—	11 2	—	8 2	9 6	21
LPH5	6 2	11 3	—	11 2	—	8 2	10 0	21
LPH6	6 2	11 3	—	11 7		8 2	10 0	21
LPH7	6 1	11 7	—	11 7	—	8 2	10 3	21
LPH8*	6 1	—	10 9	—	10 6	8 2	—	25
LPK2	5 4	10 3	-	10 8	—	7 5	9 0	13
LPK3	5 4	10 6	—	10 7	—	7 5	9 2	13
LPK5	5 4	11 0	—	11 7	—	7 5	9 6	18
LPK7	6 1	11 7	—	11 2	—	8 2	10 3	21

Note: Inches x 2 54=cm
* The LPH8 is designed without a bleed valve available

KOPkit®

Pulsafeeder has built a reputation for superior reliability by supplying carefully designed, high quality equipment. Even the best equipment, however, requires a minimal amount of maintenance. KOPkits are designed to guard against unnecessary downtime and assure you the highest level of efficient and uninterrupted service from our PULSAtron pumps. KOPkits contain recommended spare parts for those parts that usually require preventive maintenance. KOPkits immediately available in all wetted materials at very affordable prices.

PULSAtron's Full Range of Electronic Metering Pumps.



Series C Series C PLUS Series A PLUS Series E Series E PLUS

PULSAFEEDER
A Unit of IDEX Corporation

Standard Pump Operations
27101 Airport Road • Punta Gorda, Florida 33982
(813) 575-2000 • FAX (813) 575-4085

Technical Sheet No. EMP-021
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Feb-15-2001 06:28pm From-SIEWERT EQUIPMENT CO + T-367 P.004/008 F-433

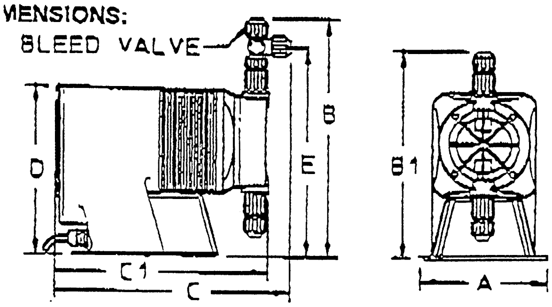
SERIES E PLUS SPECIFICATIONS

MODEL		K2	B2	A2	D3	B3	A3	K3	F4	D4	B4	H4	G4	E4	K5	H5	G5	H6	K7	H7	H8
Capacity	GPD	3	5	6	11	12	12	14	20	21	24	40	42	44	60	75	94	120	190	240	500
nominal	GPH	0 13	0.2	0 25	0 45	0.5	0.5	0 58	0.83	0.87	1	1 66	1 75	1.83	2.5	3.17	3.91	5	8	10	20
(max)	LPH	0.47	0 79	0.95	1 73	1 89	1.89	2 2	3 15	3.31	3 78	6.31	6.62	6 94	9 5	11 83	14.82	18 93	29 96	37 85	78 85
Pressure	PSIG	300	250	150	250	150	100	100	250	150	100	250	150	100	150	150	100	100	50	35	20
(max)	BAR	21	17	10	17	10	7	7	17	10	7	17	10	7	10	10	7	7	3.3	2 4	1.3
Connections	Tubing Piping	1/4" ID X 3/8" OD 3/8" ID X 1/2" OD 3/16" ID X 5/16" OD 1/4" FNPT													3/8" ID X 1/2" OD 1/2" ID x 3/4" OD (LPH8 ONLY) 1/4" FNPT 1/2" FNPT						
Reproducibility at max. capacity		+/- 2%																			
Viscosity Max CPS		For viscosity up to 3000 CPS. select connection size 3 4, B or C with 316SS ball material Flow rate will determine connection/ball size 3000 - 10,000 CPS require spring loaded ball checks See Selection Guide for proper connection.																			
Stroke Frequency Max SPM		125																			
Stroke Frequency Turn-Down Ratio		10 1																			
Stroke Length Turn-Down Ratio		10:1																			
Power Input		115 VAC/50-60 HZ/1 ph 230 VAC/50-60 HZ/1 ph																			
Average Current Draw @ 115 VAC Amps @ 230 VAC Amps		1 0 0 5																			
Peak Input Power Watts		300																			
Average Input Power @ max SPM Watts		130																			

NOTE: Foot valve and bleed valve not available with High Viscosity (. 3000 CPS) connections.

DIMENSIONS:

MENSIONS:



Model No.	A	B	B1	C	C1	D	E	Shipping Weight
LPA2	5.4	12 7	-	11 3	-	7.5	9 5	13
LPA3	5.4	13	-	11.2	-	7.5	9 7	13
LPB2	5.4	12 7	-	11 3	-	7.5	9 5	13
LPB3	5.4	13	-	11 2	-	7.5	9 7	13
LPB4	5.4	13	-	11 2	-	7.5	9 7	13
LPD3	5.4	13	-	11 7	-	7.5	9 7	15
LPD4	5.4	13	-	11 7	-	7.5	9 7	15
LPE4	5 4	13	-	11.7	-	7 5	9 7	15
LPF4	5.4	13	-	12 2	-	7 5	9.7	18
LPG4	5 4	13	-	12.2	-	7 5	9.7	18
LPG5	5.4	13 4	-	12.2	-	7 5	10 1	18
LPH4	6 2	13.4	-	11 7	-	8 2	10 1	21
LPH5	6 2	13 7	-	11 7	-	8 2	10 5	21
LPH6	6 2	13.7	-	11 7	-	8.2	10 5	21
LPH7	6 1	13 7	-	11 7	-	8.2	10 8	21
LPH8*	6 1	-	10 9	-	10.8	8 2	-	25
LPK2	5 4	12.7	-	11 3	-	7 5	9 5	13
LPK3	5 4	13	-	11 2	-	7 5	9 7	13
LPK5	5 4	13 4	-	12 2	-	7.5	10 1	18
LPK7	6 1	14 14	-	11 7	-	8 2	10.8	21

NOTE: Inches X 2.54 = cm
*the LPH8 is designed without a bleed valve available

OPTIONAL ACCESSORIES AVAILABLE:

- MIXER
- TANKS
- FLOW METERS
- LIQUID LEVEL CONTROLLER
- TIMERS
- TEST KITS
- KOPkits
- CORPORATION STOPS
- WALL MOUNT KITS
- FIVE FUNCTION VALVE
- HAND HELD TESTERS

PULSAFEEDER®
A Unit of IDEX Corporation

27101 Airport Road, Punta Gorda, FL 33982
Phone: 941-575-3800 Fax: 800-456-4085
941-575-4085

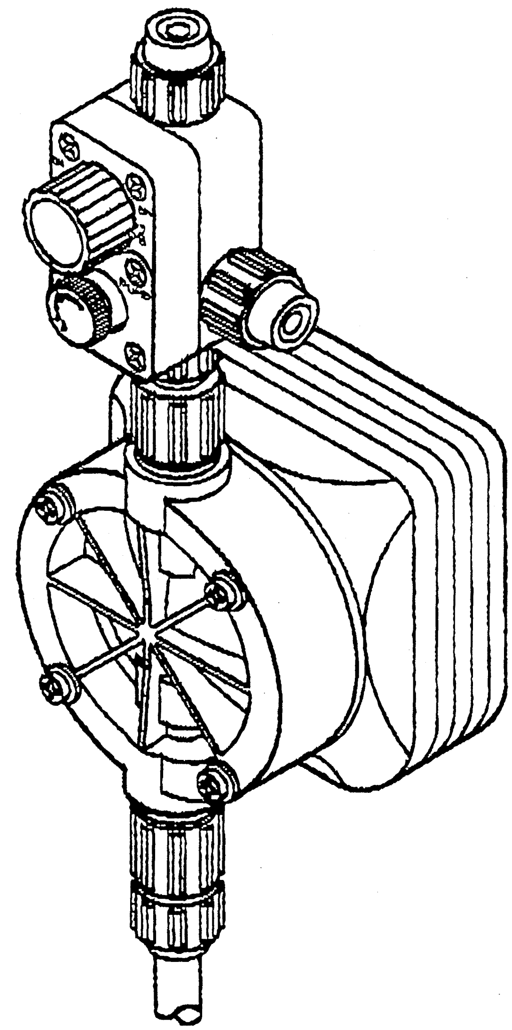
07/98 EMP-040

Accessories

PULSAFEEDER
A Unit of IDEX Corporation

DG/5FV
Five Function Valve with De-Gas

With the DG/5FV you don't have to give up the accuracy and control of a solenoid metering pump in order to pump gaseous solutions. Available in a variety of materials and popular sizes, the DG/5FV is ready to tackle most applications. Not only does the DG/5FV provide degassing, it is packed with features that increase safety, enhance performance and generally improves the convenience of operation.



FEATURES

- De-Gas – Bypass gasses and fluid during normal pump operation. Allows for the constant removal of gases that would otherwise "air bind" the pump.
- Back Pressure – Maintains output reproducibility and allows metering into atmospheric discharge.
- Anti-Siphon – Prevents siphoning through the pump when point of injection is lower than the pump or into the suction line of another pump. Rated at total vacuum.
- Air Bleed – Used during priming to manually remove air from the pump head.
- Discharge Drain – Depressurize pump discharge line without loosening tubing or fittings. Protects the operator from chemical exposure.

SPECIFICATIONS

Material Of Construction:

Valve Body	Polyvinylidene Flouride (PVDF) Polyvinyle Chloride (PVC)
Diaphragm	Teflon faced Hypalon
O-Rings	Viton or Hypalon
Hardware	188 Stainless Steel (recessed)

Maximum Flow:	240 GPD (37.85 LPH)
Minimum Flow:	3 GPD (.47 LPH)
Maximum Viscosity:	1000 CPS
MAX Pressure Ratings:	Up to 250 psi (17 BAR)

Note: Degas/bypass volume is adjustable, typically 1-10% of pump output.

Connections: ¼" (0.635 cm) Male NPT
½" (1.27 cm) OD tubing
3/8" (0.95 cm) OD tubing

All ports [illegible] valve will be [illegible]

IDEX
IDEX CORPORATION

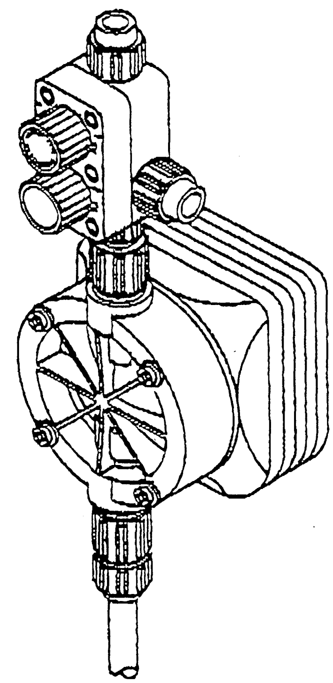
PULSAFEEDER
A Unit of IDEX Corporation

5 - FUNCTION VALVE

DESCRIPTION

Under certain conditions, metering pumps may require more than one device to increase safety of pump operation, enhance performance, and improve convenience of operation. The Pulsafeeder 5-function valve can meet most of these requirements in one neat package. A compact, diaphragm type, multi-function valve, the 5-function valve provides the following:

- **Pressure Relief** - Relieves excessive pressure that might build up in the pump discharge line protecting tubing and connections.
- **Back Pressure** - Maintains pump output repeatability and allows metering into atmospheric discharge.
- **Anti-Siphon** - Prevents siphoning through pump when point of injection is lower than pump or into suction line of another pump. Rated at total vacuum.
- **Pumphead Air Bleed** - Used as an aid in priming allowing manual removal of air from pumphead.
- **Discharge Drain** - Depressurize pump discharge line without loosening tubing or fittings protecting operator from chemical exposure.



OPERATION

The functions are selected by setting two, independent, dual position selector knobs. A label on the back panel of the 5-Function Valve identifies each function with selector knob positions. This guide with selector knob detents, provides error free settings and positive identification of function selected.

The 5-Function Valve connects to the existing pumphead discharge valves on most PULSAtron, Chem-Tech Series 100 and Series 200 pumps. With a generous flow path, the 5-Function Valve is capable of handling large output flows and viscous liquids. A return port located on the side body provides flow of chemical back to solution tank when pressure relief, pumphead air bleed, or discharge drain functions are utilized. Pressure relief settings are fixed, the proper 5-Function Valve model must be selected based on pump's maximum pressure rating. There are three different pump settings: 100, 150, and 250 psi distinguished by blue, green and red colored adjustment knobs respectively. The back pressure and anti-siphon functions may be turned off allowing pressure relief function to operate alone.

Note: When ordering 5-Function Valve with pump use suffix code - 500.

SPECIFICATIONS

Material Of Construction

Valve Body	- Glass Filled Polypropylene (GFPPL)
	- Polyvinylidene fluoride (PVDF)
Diaphragms	- Teflon faced hypalon
O-Rings	- Teflon
Hardware	- 188 Stainless Steel (recessed)

Maximum Flow - 240 GPD

Maximum Viscosity - 1000 CPS

Pressure Relief Settings (nominal cracking pressure)
- 250 PSI (275)
- 150 PSI (175)
- 100 PSI (125)

NOTE: Pressure relief may occur at 50% above maximum pressure rating of pump.

Connections
- 1/4" X 3/8" tubing
- 3/8" X 1/2" tubing
- 1/4" MNPT

Relief Port
- 1/4" X 3/8" tubing
- 1/4" MNPT (with NPT connection only)

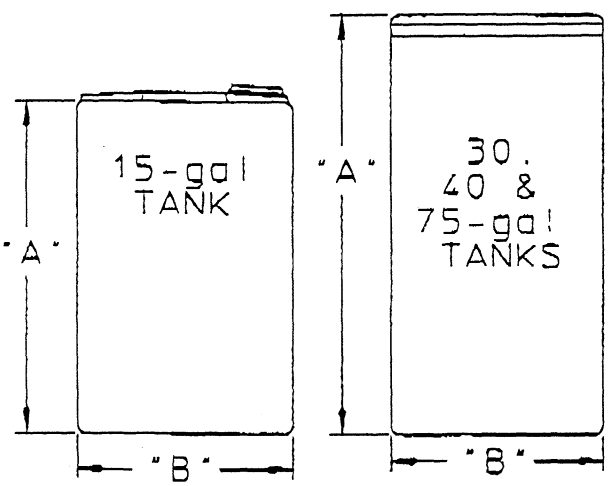
RX TIME 02/15 '01 17:25 LOCATION:+

PULSAFEEDER

SERIES 6000 TANK SYSTEM

The Series 6000 Tank Systems are a rugged line of tanks designed to fit most solution handling needs All tanks are constructed of high density polyethylene (PE) and come in a variety of sizes

LIGHT DUTY LINEAR TANKS

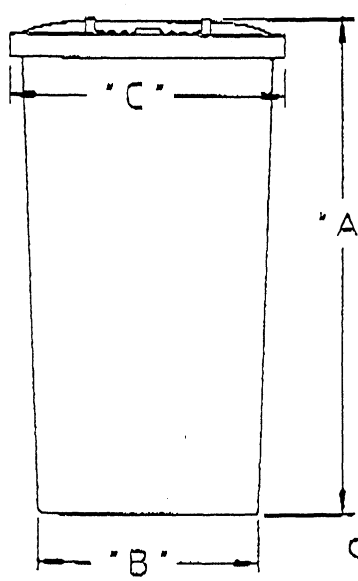


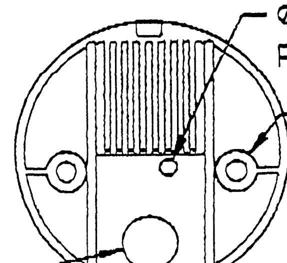
Model	Size Gallon	Wall	Dimensions (in.) A	B
40375	15	0.078	25	14.5
40360	30	0.094	32	18.5
40361	40	0.094	41.25	18.5
40362	*75	0.125	41.75	24.25

15 gallon tanks are translucent with 5 gal. increments and feature child resistant black caps. Other tanks have full fitted lids. 30/40 gal. tanks are non-translucent white. ***75 gallon tanks are black.** Tanks will not support pumps or mixers on covers. Use heavy duty tapered tanks for top mounting of pumps or mixers.

HEAVY DUTY TAPERED TANKS

TAPERED PE TANKS feature rigid covers which allow the top mounting of Chem-Tech S100, 200 and most PULSAtron pump models. 1/20 HP Flange Mount Mixers may also be mounted on the cover. Tanks are translucent with 5 gal. graduations. (Not suitable for use with 1/3 HP Flange Mount Mixers.)





Model	Size Gallon	Wall	Dimensions (in.) A	B	C
40365	35	0.125	28	20	23
OPTION → J40366	55	0.125	42.5	18.5	23

PULSAFEEDER
A Unit of IDEX Corporation

27101 Airport Road, Punta Gorda, FL 33982
Phone: 941-575-3800 Fax: 800-456-4085
941-575-4085

Feb-15-2001 06:29pm From-SIEWERT EQUIPMENT CO + T-367 P.008/008 F-433

Exhibit H

Corrosion Control Calculations, Analytical Data, and Example Equipment

DELAWARE ENGINEERING
28 Madison Ave. Ext.
Albany, NY 12203

PROJECT: CROSSROADS
DESCRIPTION: CORROSION CONTROL – FLEISCHMANN'S (Wildacres Resort)

DATE 11/30/00
SHEET 1 OF 2
BY MTD Ck'ed ____

FROM MOST RECENT NYSDOH TESTING RESULTS (3/27/95)

pH = 7.37
Alk = 12.5 mg/L EW = 50, so Alk = 12.5/50 = .25 meq/l
LSI = −2.49

AT ph = 7.37 α_0 (H_2CO_3) = 4.13% } Carbonate Species
α_1 (HCO_3^-) = 95.87% } Table 10.5 from
α_2 (CO_3) = ∅ } Fetter Hydrology Book

$$Alk \simeq C_{TCO_3}(\alpha_1 + 2\alpha_2)$$

$$C_{TCO_3} = \frac{Alk}{(\alpha_1 + 2\alpha_2)} = \frac{.25}{(.959 + 2(\emptyset))} = 0.26 \text{ meq/l}$$

Raise pH to the point where LSI = 0

LSI = pH − pHs → FROM TABLES BASED ON T.D.S., Ca, Alk, & Temp
0 = x − (9.30 + A + B) − (C + D)
0 = x − [9.3 + .08 + 2.28 − 1.1 − 0.7)
x = 9.86

	@7.37	α×(.26) meq/L	Convert $\alpha_0 \to \alpha_1$	α Final @ 9.86	x(.26) meq/L
α_0	.0413	.01	∅	0	0
α_1	.9587	.25	.01 + .25 = .26	74.2%	0.19
α_2	0	∅	∅	25.84%	0.07
Caustic added (α_0)			0.01	0.07	

Caustic Req = ∅.∅1 + 0.07 = 0.08 meq/L

using NaOH (50% grade) NaOH EW = 40 NaOH Req = 0.08 · 40 = 3.2 mg/l

NaOH usage @ ave. flow Q = 132,864 gpd
usage = .132 MGD · 3.2 ppm · 8.34#/MG / .5 soln = 7#/day

Cost ~ $0.15/lb = $1.05/day = $385/yr

graph.xls 2/2/2000 1:17 PM

cont. →

DELAWARE ENGINEERING
28 Madison Ave. Ext.
Albany, NY 12203

PROJECT: CROSSROADS
DESCRIPTION: CORROSION CONTROL – FLEISCHMANN'S (Wildacres Resort)

DATE 12/4/00
SHEET 2 OF 2
BY MTD Ck'ed ____

DAY TANK SIZING (BASED ON PEAK FLOW FOR 30 HRS @ 3.2 ppm)

$0.34\ \text{MGD} \cdot \frac{3.2\ \text{ppm}}{0.5\ \text{soln}} = 2.2\ \text{gpd NaOH}$

$2.2\ \text{gpd} \cdot \frac{1\ \text{day}}{24\ \text{hrs}} \cdot 30\ \text{hrs} = \boxed{2.72\ \text{gal tank}}$

STATE OF NEW YORK - DEPARTMENT OF HEALTH - ONEONTA DISTRICT
28 Hill Street, Suite 201, ONEONTA, NY 13820-9324
Telephone (607) 432-3911 **FAX (607) 432-0089**

FAX MEMORANDUM

To: Marie Dowd, Delaware Engineering **At FAX:** (518) 452-1335

From: Ron Sheppard **No. of pages including this cover sheet:** 10

Date: 11/30/2000

Subject: Fleischmanns Village

Sending here LSI results for Fleischmanns.
Please let us know if you need anything else.

Ron.

FLI
FRIEND LABORATORY INC

ONE RESEARCH CIRCLE WAVERLY, NY 14892-1532
TELEPHONE (607) 565-3500 FAX (607) 565-4083

DATE Apr 26, 1995

LAB SAMPLE ID : 78654

Fleischmanns, Village of
Michael Myers
Box I-3
Main Street
Fleischmanns NY 12430

SAMPLE SOURCE	:	VILLAGE OF FLEISCHMANNS
ORIGIN	:	ENTRY POINT
DESCRIPTION	:	GRAB
SAMPLED ON	:	03/27/95 by CLIENT
DATE RECEIVED	:	03/29/95
P.O. NO.	:	

Analysis Performed	Result	Units	Date Analyzed	Method	Notebook Reference	Analyst
Alkalinity as CaCO3	12.5	mg/L	04/03/95	EPA 310.1	94-229-29	BJH
Cyanide, Total	ND<0.009	mg/L	03/30/95	EPA 335.3	94-162-36	crp
Fluoride	ND<0.20	mg/L	03/30/95	EPA 340.2	93-191-88	RHN
Calcium Hardness as CaCO3	12.5	mg/L	04/03/95	SM3500CAD	94-185-05	CLA
Nitrate as N	0.429	mg/L	04/05/95	EPA 353.2	91-070-75	RHN
Nitrite as N	0.024	mg/L	03/29/95	EPA 353.2	94-219-43	CRP
pH	7.37		03/29/95	EPA 150.1	95-044	DM
Solids, Dissolved	63	mg/L	03/31/95	EPA 160.1	95-052-09	JAS
Sulfate as SO4	8.3	mg/L	04/11/95	EPA 375.4	94-239-12	AKC

LSI: 7.37 − [9.30 + .08 + 2.28 − 1.10 − 0.70]
= −2.49

* pH as received in lab.

For questions regarding this report, please call Customer Services.

cc : NYSDOH, Albany

QC

NY 10252 PA 68180 NJ 73168 EPA NY 033

Approved by: Lindsay Brown
QUALITY ASSURANCE

The information in this report is accurate to the best of our knowledge and ability. In no event shall our liability exceed the cost of these services. Your samples will be discarded after 14 days unless we are advised otherwise.

Albany, NY Scranton, PA Jamestown, NY Boston, MA Syracuse, NY Watertown, NY

J' Na C

0873 NEW YORK STATE DEPARTMENT OF HEALTH 1257 (-30)
WADSWORTH CENTER FOR LABORATORIES AND RESEARCH

PAGE 1 RESULTS OF EXAMINATION FINAL REPORT

SAMPLE ID: 921002682 SAMPLE RECEIVED:92/12/23/11 CHARGE: 6.27 Rec ✓
PROGRAM: 100:MUNICIPAL WATER SUPPLIES
SOURCE ID: 451000 DRAINAGE BASIN:14 GAZETTEER CODE:1230
POLITICAL SUBDIVISION:FLEISCHMANNS V. COUNTY:DELAWARE
LATITUDE: LONGITUDE: Z DIRECTION:
LOCATION: FLEISCHMANN V
DESCRIPTION:CWT KIT SINK EMERY BROOK INN EAST MAIN ST.
REPORTING LAB: 10:LABORATORY OF INORGANIC ANALYTICAL CHEMISTRY - ALBANY
TEST PATTERN: 10-073:OCSS-I SAFE DRINKING WATER ACT + CORROSIVITY
SAMPLE TYPE: 021:FINISHED WATER, CHLORINATED - SURVEILLANCE
TIME OF SAMPLING: 92/12/17 13:45 DATE PRINTED:93/01/20

PARAMETER	RESULT
FLUORIDE, FREE	< 0.1 MG/L
NITROGEN, NITRATE (+NO2) AS N	0.25 MG/L
TEMPERATURE, WATER, FIELD	NOT REPT [NA]
PH	6.50
ALKALINITY TO PH 4.5 (AS CACO3)	16. MG/L
SOLIDS, TOTAL DISSOLVED, 180 C	54. MG/L
LANGELIER INDEX - AT 20C	-3.03

ANALYSIS: ICP-1 ICP GROUPING 1

PARAMETER	RESULT
MERCURY	< 0.2 MCG/L
ARSENIC	< 10. MCG/L
SELENIUM	< 5. MCG/L
LEAD	7.2 MCG/L
BERYLLIUM	< 1. MCG/L
SILVER	< 10. MCG/L
BARIUM	14. MCG/L
CADMIUM	< 5. MCG/L
COBALT	< 5. MCG/L
CHROMIUM	< 5. MCG/L
COPPER	1590. MCG/L
IRON	< 10. MCG/L
MANGANESE	< 5. MCG/L
NICKEL	< 5. MCG/L
STRONTIUM	< 50. MCG/L
TITANIUM	< 5. MCG/L
VANADIUM	< 5. MCG/L
ZINC	< 10. MCG/L
MOLYBDENUM	< 20. MCG/L
ANTIMONY	< 80. MCG/L
TIN	< 50. MCG/L
THALLIUM	< 80. MCG/L

**** CONTINUED ON NEXT PAGE ****

COPIES SENT TO: CO(1), RO(0), LPHE(2), FED( ), INFO-P( ), INFO-L( )

NEW YORK STATE DEPARTMENT OF HEALTH
ONEONTA DISTRICT OFFICE
RD 4 BOX 51C
ONEONTA,N.Y. 13820

SUBMITTED BY:FRANCE

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER FOR LABORATORIES AND RESEARCH

PAGE 1 RESULTS OF EXAMINATION FINAL REPORT

SAMPLE ID. 851003310 SAMPLE RECEIVED: 85/12/20/17 CHARGE: 6.5
PROGRAM: 100: MUNICIPAL WATER SUPPLIES
SOURCE ID. 451000 DRAINAGE BASIN 14 GAZETTEER CODE: 1230
POLITICAL SUBDIVISION: FLEISCHMANNS V. COUNTY: DELAWARE
LATITUDE: LONGITUDE: I DIRECTION:
LOCATION: FLEISCHMANNS V
DESCRIPTION: RESERVOIR OVERFLOW SPRING WATER
REPORTING LAB: 10: LABORATORY OF INORGANIC ANALYTICAL CHEMISTRY - ALBANY
TEST PATTERN: 10F03 1005-1 SAFE DRINKING WATER ACT
SAMPLE TYPE: 00: RAW WATER - SURVEILLANCE
TIME OF SAMPLING: 85/12.17 12:00 DATE PRINTED: 86/02/0?

"PREVIOUS SAMPLING INDICATED CORROSIVE WATER."

PARAMETER	RESULT
01FLUORIDE FLUORIDE, FREE	< 0.1 MG/L
01NITRATE NITROGEN, NITRATE + NITRITE, AS N	0.45 MG/L
01LEAD LEAD	< 10. MCG/L
01BARIUM BARIUM	< 0.5 MG/L
01SILVER SILVER	< 0.02 MG/L
01MERCURY MERCURY	0.2 MCG/L
21ARSENIC ARSENIC	< 10. MCG/L
21CADMIUM CADMIUM	< 1.0 MCG/L
21CHROMIUM CHROMIUM	< 10. MCG/L
21SELENIUM SELENIUM	< 5.0 MCG/L

FOLLOWING PARAMETERS NOT PART OF TEST PATTERN

PARAMETER	RESULT
01CALCIUM CALCIUM	9.4 MG/L
01IRON IRON	< 0.05 MG/L
01MANGAN MANGANESE	< 0.02 MG/L
01PH PH	6.7
01ALKALIN ALKALINITY TO PH 4.5	16. MG/L
05HARDNESS HARDNESS, CALCIUM AS CACO3	23. MG/L
01LANGEL LANGELIER INDEX (CORROSIVITY) AT 20 C	-2.40
01SOLIDDIS SOLIDS, TOTAL DISSOLVED, 180 C	100. MG/L

**** END OF REPORT ****

COPIES SENT TO: CO(1), RO(1), LPHE(2), FED(0), INFO-P(0), INFO-L(0)

NEW YORK STATE DEPARTMENT OF HEALTH
ONEONTA DISTRICT OFFICE
PO BOX 500
ONEONTA, N.Y. 13820

SUBMITTED BY: FRANKS

NEW YORK STATE DEPARTMENT OF HEALTH

Oneonta District Office

LANGELIER INDEX FOR: FLEISCHMANNS VILLAGE (Village Hall)

DATE: April 24, 1973

Equasion $pH_s = (9.30 + A + B) - (C + D)$

Saturation Index $= pH - pH_s$

S.I.	=	0	Water is in Chemical Balance
S.I.	>	0	Water has Scale-Forming Tendencies
S.I.	<	0	Water has Corrosive Tendencies

Distribution System

T.D.S.	65.	=	.08	(From Table A)
Ca Hardness	20.	=	.90	(From Table C)
Alkalinity	10.	=	1.00	(From Table D)
pH	6.6	=	6.6	
Assume Temp.	55° F.	=	2.27	(From Table B)

$pH_s = (9.30 + .08 + 2.27) - (.90 + 1.00)$
$= 11.65 - 1.90$
$= 9.75$

S.I. = 6.6 - 9.75 = -3.15*

* Indicates Corrosive Tendencies

LANGELIER INDEX FOR: Fleischmanns Well No. 2

DATE: 4/24/03

Equation pH_s = (9.30 + A + B) - (C + D)

Saturation Index = $pH - pH_s$

S.I. = 0		Water is in Chemical Balance
S.I. > 0		Water has Scale-Forming Tendencies
S.I. < 0		Water has Corrosive Tendencies

Distribution System

T.D.S.	213	= 0.13	(From Table A)
Ca Hardness	35	= 1.15	(From Table C)
Alkalinity	39	= 1.59	(From Table D)
pH	6.9	= 6.90	
Assume Temp. 55° F.		= 2.35	(From Table B)

pH_s = (9.30 + 0.13 + 2.35) - (1.15 + 1.59)
= 8.97
=

S.I. = 6.9 - 9.0 = -2.1

ALKALINITY (D)

Tens	UNITS 0	1	2	3	4	5	6	7	8	9
0		0.00	0.30	0.48	0.60	0.70	0.78	0.85	0.90	0.95
10	1.00	1.04	1.08	1.11	1.15	1.18	1.20	1.23	1.26	1.29
20	1.30	1.32	1.34	1.36	1.38	1.40	1.42	1.43	1.45	1.46
30	1.48	1.49	1.51	1.52	1.53	1.54	1.56	1.57	1.58	1.59
40	1.60	1.61	1.62	1.63	1.64	1.65	1.66	1.67	1.68	1.69
50	1.70	1.71	1.72	1.72	1.73	1.74	1.75	1.76	1.76	1.77
60	1.78	1.79	1.79	1.80	1.81	1.81	1.82	1.83	1.83	1.84
70	1.85	1.85	1.86	1.86	1.87	1.88	1.88	1.89	1.89	1.90
80	1.90	1.91	1.91	1.92	1.92	1.93	1.93	1.94	1.94	1.95
90	1.95	1.96	1.96	1.97	1.97	1.98	1.98	1.99	1.99	2.00
100	2.00	2.00	2.01	2.01	2.02	2.02	2.03	2.03	2.03	2.04
110	2.04	2.05	2.05	2.05	2.06	2.06	2.06	2.07	2.07	2.08
120	2.08	2.08	2.09	2.09	2.09	2.10	2.10	2.10	2.11	2.11
130	2.11	2.12	2.12	2.12	2.13	2.13	2.13	2.14	2.14	2.14
140	2.15	2.15	2.15	2.16	2.16	2.16	2.16	2.17	2.17	2.17
150	2.18	2.18	2.18	2.18	2.19	2.19	2.19	2.20	2.20	2.20
160	2.20	2.21	2.21	2.21	2.21	2.22	2.22	2.23	2.23	2.23
170	2.23	2.23	2.23	2.24	2.24	2.24	2.24	2.25	2.25	2.25
180	2.26	2.26	2.26	2.26	2.26	2.27	2.27	2.27	2.27	2.28
190	2.28	2.28	2.28	2.29	2.29	2.29	2.29	2.29	2.30	2.30
200	2.30	2.30	2.30	2.31	2.31	2.31	2.31	2.32	2.32	2.32

Hundreds	TENS 0	10	20	30	40	50	60	70	80	90
200		2.32	2.34	2.36	2.38	2.40	2.42	2.43	2.45	2.46
300	2.48	2.49	2.51	2.52	2.53	2.54	2.56	2.57	2.58	2.59
400	2.60	2.61	2.62	2.63	2.64	2.65	2.66	2.67	2.68	2.69
500	2.70	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

PULSAtron®

SERIES E PLUS SPECIFICATIONS

GENERAL
Chemical metering pumps shall be positive displacement non-hydraulic, solenoid driven, diaphragm type pumps. Output shall be "hot" rated (at operating temperature) and shall be adjustable while pumps are in operation. Positive flow shall be ensured by a minimum of four ball type check valves. A bleed valve shall be provided (on most units) for the manual evacuation of entrapped air or vapors and safe relief of pressure in the discharge line.

CONTROLS
The control panel shall be located opposite the liquid handling end of pump. Output volume adjustments shall be made by independent dial knobs for stroke length and stroke rate. Stroke length adjustment shall have a locking lever. Control functions shall be either manual, external pacing with stop, or automatic with stop. For all operating modes, a green indicator light on the control panel shall illuminate when pump is in operation and strobe once for each pump stroke. In all operating modes, a red indicator light on the control panel shall illuminate when pump operation is halted via the stop function.

Manual (Standard)
Pump control shall be selectable between on and off by means of a 2-position switch.

External Pacing w/Stop (Optional)
Pump control shall be selectable between manual and external by means of a 3 position center off switch. In external mode, the pump shall accept dry contact closures (ex. contacting flow meter). As contact closes, the pump shall stroke once, minimal contact closure time is 10 msec. Contact must open and close for each pump stroke. Maximum closures - 125 per minute.

A dry contact closure to the stop function shall cause pump to halt operation and illuminate a red indicator light on pump control panel in either manual or external pacing mode. Pump shall resume normal operation when contact opens.

Automatic w/ Stop (Optional)
Pump control shall be selectable between manual and automatic by means of a 3 position center off switch. In automatic mode, the pump shall accept a direct 4-20 mADC signal (without a signal interface or conversion device). Internal resistance shall be 124 ohms.

A dry contact closure to the stop function shall cause pump to halt operation in either manual or automatic mode and illuminate a red indicator light on the pump control panel. Pump shall resume normal operation when contact opens.

ELECTRONIC DRIVE
To prevent damage to pump from over heating, the solenoid shall have automatic reset thermal overload protection. For overpressure conditions, pump shall automatically stop pulsating when discharge pressure exceeds pump pressure rating by not more than 35% when pump is set at maximum stroke.

The electronic circuitry shall be EMI resistant and shall employ a metal oxide varistor (MOV) for lightning protection. A fuse mounted on the pump control panel accessible from the outside of the pump shall provide circuit overload protection.

Internal wiring between electronic circuit board, solenoid, and power shall be quick disconnect terminals at least 3/16" wide.

ENCLOSURE
Pump drive shall be encased in a water resistant housing constructed of a chemically resistant glass filled polyester. The control panel shall be enclosed by a hinged dust cover constructed of polycarbonate plastic. The electronic circuitry shall be mounted at the rear of the pump for maximum protection against chemical intrusion.

AGENCY LISTINGS

MATERIALS OF CONSTRUCTION
Pump Head - GFPPL, PVC, SAN, PVDF, 316SS
Diaphragm - Teflon faced, hypalon backed
Check Valves
- Seats/O-Rings - Teflon, Hypalon, Viton
- Balls - Ceramic, Teflon, 316SS, Alloy C
- Housing - GFPPL, PVC, PVDF, 316SS

Bleed Valve - GFPPL, PVC, PVDF
Tubing - Suction 4 ft. PVC
- Discharge 8 ft. PE

Important. Material Code - GFPPL = Glass-filled Polypropylene, PVC = Polyvinyl Chloride, SAN = Styrene-Acrylonitrile, PE = Polyethylene, PVDF = Polyvinylidene Flouride. Teflon, Hypalon and Viton are registered trademarks of E.I. DuPont Company.

NOTES:
- NSF listing is not available on models LPK2, K3, K5 and LPH8, models with PVDF components or select models (refer to price schedule for details)
- Pump heads in 316SS and PVDF are not available with Model LPH8.
- Pump heads in SAN are not available on pump models rated above 100 PSI.
- Bleed valve not available on pumps configured for high viscosity, NPT connections or Model LPH8
- Tubing may be supplied in PVDF, Polypropylene, or black U.V. inhibited PE.

Series E PLUS

PULSAtron Electronic Metering Pumps

Key Features:

- ***Automatic Control,*** either 4-20 mADC direct, inverse or external pacing, with stop function
- ***Manual Control*** by on-line adjustable stroke rate and stroke length.
- ***UL Listed*** for demanding ***OUTDOOR*** and indoor application Also CSA and NSF approved
- ***Auto-Off-Manual*** switch.
- ***Highly Reliable*** timing circuit.
- ***Circuit Protection*** against voltage and current upsets.
- ***Circuit Breaker,*** panel mounted.
- ***Solenoid Protection*** by thermal overload with auto-reset.
- ***Water Resistant,*** for outdoor installation.
- ***Indicator Lights,*** panel mounted.
- ***Safe & Easy Priming*** with durable leak-free **bleed valve assembly** (standard most models)

Complete Selection

Twenty distinct models are available having pressure capabilities to 300 PSIG @ 3 GPD, and flow capacities to 500 GPD @ 20 PSIG, with turndown ratios up to 100 1. Metering performance is reproducible to within ± 2% of maximum capacity.

Pump heads, cartridge check valve assemblies and tubing are stocked in several corrosion-resistant plastic, elastomeric and alloy materials along with stainless steel that safely handle a wide variety of chemicals.

Please refer to the reverse side for Series E PLUS specifications

Operating Benefits

Reliable metering performance. Our guided check valves, with their state-of-the-art seat and ball designs, provide precise seating, and excellent priming and suction lift characteristics. Our timing circuit is highly reliable and, by design, virtually unaffected by temperature, EMI and other electrical disturbances.

Rated "hot" for continuous duty. Series E PLUS pumps continue to meet their specifications for pressure and capacity even during extended use. That's because our high quality solenoid is separately encapsulated in a fin-cooled, thermo-conductive, enclosure that effectively dissipates heat.

High viscosity capability. A straight flow path and ample clearance between the diaphragm and head enable standard PULSAtron pumps to handle viscous chemicals up to a viscosity of 3000 CPS. For higher viscosity applications, larger, spring-loaded connections are available

Leak-free, sealless, liquid end. Our diaphragms are of superior construction–teflon-faced, bonded to a composite of Hypalon and fabric layers, and reinforced with a metal insert for optimum flexibility and durability.

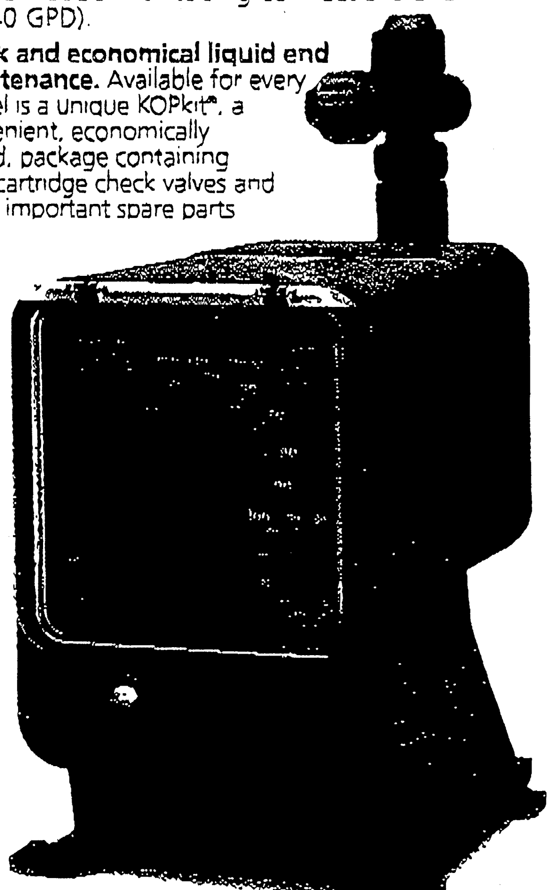
System Compatibility

A wide variety of chemicals can be pumped. Liquid end materials include glass-filled polypropylene (GFPPL), PVC, styrene-acrylonitrile (SAN), Polyvinylidene Fluoride (PVDF), Teflon, Hypalon, Viton, ceramic, alloys and 316SS.

Immediate installation and start-up. Included as standard accessories with all models are an injection/back pressure valve assembly and a foot valve/strainer assembly*, including discharge and suction tubing and tube straightener (*not available with high viscosity connections for > 3000 CPS)

Safe and easy priming and valve maintenance. Included as a standard accessory is a bleed valve assembly, including return tubing (available only on (those models with tubing connections and ≤ 240 GPD).

Quick and economical liquid end maintenance. Available for every model is a unique KOPkit®, a convenient, economically priced, package containing new cartridge check valves and other important spare parts



PULSAFEEDER
A Unit of IDEX Corporation

For additional information about PULSAtron's mid-range Series E and Series A PLUS refer to Technical Sheet No. EMP-022 and EMP-025 respectively. For information about the economical Series C PLUS and Series C refer to Technical Sheet Nos EMP-026 and EMP-024

SIEWERT EQUIPMENT CO. INC.
Pump & Mixer Specialist
175 Akron St. Rochester, NY 14609
(716) 482-9640 FAX (716) 482-4149

PULSAtron® Series E PLUS Specifications

Important: Series E PLUS — 20 model selections. Digit 1 and 2 (LP) signify product class. digit 3 and 4 signify pressure/flow. For full model selection information refer to Price Schedule EMP-PS LX. or reference guide No. EMP-003.

Pressure and Flow Rate Capacity

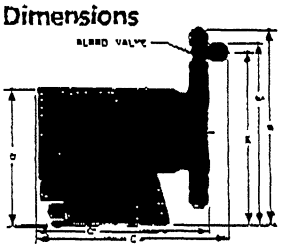
Capacity, nominal																				
	GPD	3	5	6	11	12	14	20	21	24	40	47	44	60	75	94	120	190	240	500
	GPH	13	0 20	0 25	0 45	0 50	58	0 83	0.87	1 0	1 66	1 75	1 83	2 5	3 17	3 91	5 00	8 00	10 00	20 00
	LPH	49	79	95	1 73	1 89	2.20	3 15	3 31	3 78	6 31	6 62	6 94	9 5	11 83	14 82	18 93	29 96	37 85	78 85
Pressure, max PSIG/Bar																				
300/21		LPK2	—		—	—	—		—	—	—	—		—	—	—	—	·	—	—
250/17		-	LPB2	—	LPD3	—	—	LPE4	..	—	LPH4	—	—	—	—	—	—	—	—	—
150/10				LPA2	-	LPB3	—	—	LPD4	—	—	LPG4	—	LPK5	LPH5	—	—	—	—	—
100/7		—	—	—		LPA3	LPK3	—	.	LPB4	—	—	LPE4	.	-	LPG5	LPH6	—	—	—
50/3 3		—	—	—	—	·	—	—	—	·	—	—	—	—	·	—	—	LPK7	—	—
35/2 4		—	—		—	—	—	·	—	—	—	·	·	—	—	—	—		LPH7	—
20/1 3		—	—	—		—	—	—	..	—	—	—	—	—	—	—	—	—	-..	LPH8

Liquid End Materials

Series	Pump Head	Diaphragm	Check Valves		Fittings	Bleed Valve	Injection Valve Assembly Foot Valve Assembly	Tubing
			Seats / O-rings	Balls				
E PLUS	GFPPL PVC SAN PVDF 316SS	Teflon-faced Hypalon-backed	Teflon, Hypalon, Viton	Ceramic, Teflon, 316SS, Alloy C	GFPPL PVC PVDF 316SS	Same as fitting and check valve selected, except 316SS	Same as fitting and check valve selected	Clear PVC White PE

Important: Material Code — GFPPL = Glass-filled Polypropylene, PVC = Polyvinyl Chloride, SAN = Styrene-Acrylonitrile, PE = Polyethylene, PVDF = Polyvinylidene Fluoride. Teflon, Hypalon and Viton are registered trademarks of E.I. DuPont Company.

Dimensions



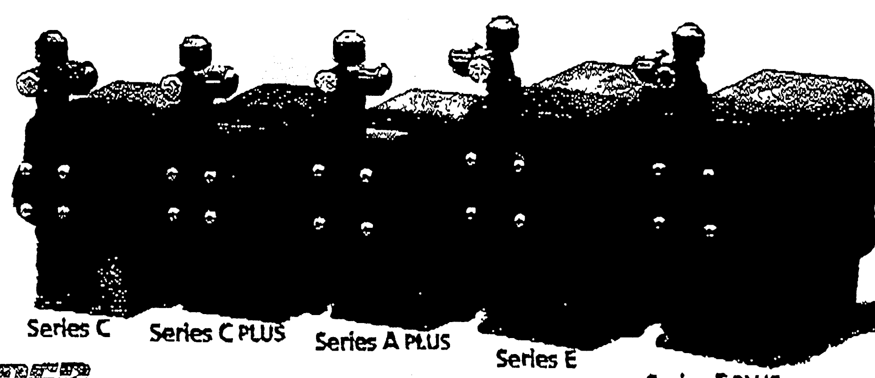
Series E PLUS Dimensions (inches)								
Model No.	A	B	B'	C	C'	D	E	Shipping Weight (Lbs.)
LPA2	5 4	10 3	—	10 8		7 5	9 0	13
LPA3	5 4	10 6	—	10 7	—	7 5	9 2	13
LPB2	5 4	10 3	—	10 8	-	7 5	9 0	13
LPB3	5 4	10 6	—	10 7	—	7 3	9 2	13
LPB4	5 4	10 6	—	10 7	-	7 3	9 2	13
LPD3	5 4	10 6	—	11 7	—	7 3	9 2	15
LPD4	5 4	10 6	·	11 7	—	7 5	9 2	15
LPE4	5 4	10 6		11 7	—	7 5	9 2	15
LPE4	5 4	10 6		11 7	—	7 5	9 2	17
LPG4	5 4	10 6	—	11 7	—	7 5	9 7	18
LPG5	5 4	11 0	—	11 7	—	7 5	9 6	18
LPH4	6 2	11 0	—	11 2	—	8 2	9 6	21
LPH5	6 2	11 3	—	11 2	—	8 2	10 0	21
LPH6	6 2	11 3	—	11 7		8 2	10 0	21
LPH7	6 1	11 7	—	11 7	—	8 2	10 3	21
LPH8*	6 1	—	10 9	—	10 6	8 2	—	25
LPK2	5 4	10 3	-	10 8	—	7 5	9 0	13
LPK3	5 4	10 6	—	10 7	—	7 5	9 2	13
LPK5	5 4	11 0	—	11 7	—	7 5	9 6	18
LPK7	6 1	11 7	—	11 2	—	8 2	10 3	21

Note: Inches x 2 54=cm
* The LPH8 is designed without a bleed valve available

KOPkit®

Pulsafeeder has built a reputation for superior reliability by supplying carefully designed, high quality equipment. Even the best equipment, however, requires a minimal amount of maintenance. KOPkits are designed to guard against unnecessary downtime and assure you the highest level of efficient and uninterrupted service from our PULSAtron pumps. KOPkits contain recommended spare parts for those parts that usually require preventive maintenance. KOPkits immediately available in all wetted materials at very affordable prices.

PULSAtron's Full Range of Electronic Metering Pumps.



Series C Series C PLUS Series A PLUS Series E Series E PLUS

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A Unit of IDEX Corporation
IDEX

Standard Pump Operations
27101 Airport Road • Punta Gorda, Florida 33982
(813) 575-2000 • FAX (813) 575-4085

Technical Sheet No. EMP-021
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SERIES E PLUS SPECIFICATIONS

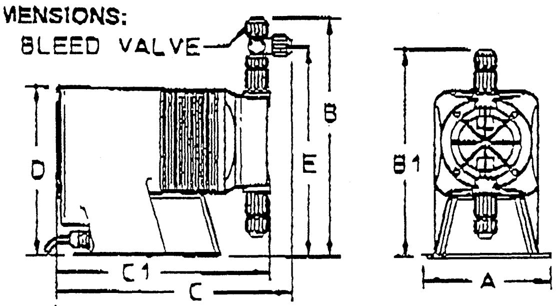
<table>
<tr><th colspan="2">MODEL</th><th>K2</th><th>B2</th><th>A2</th><th>D3</th><th>B3</th><th>A3</th><th>K3</th><th>F4</th><th>D4</th><th>B4</th><th>H4</th><th>G4</th><th>E4</th><th>K5</th><th>H5</th><th>G5</th><th>H6</th><th>K7</th><th>H7</th><th>H8</th></tr>
<tr><td>Capacity</td><td>GPD</td><td>3</td><td>5</td><td>6</td><td>11</td><td>12</td><td>12</td><td>14</td><td>20</td><td>21</td><td>24</td><td>40</td><td>42</td><td>44</td><td>60</td><td>75</td><td>94</td><td>120</td><td>190</td><td>240</td><td>500</td></tr>
<tr><td>nominal</td><td>GPH</td><td>0 13</td><td>0.2</td><td>0 25</td><td>0 45</td><td>0.5</td><td>0.5</td><td>0 58</td><td>0.83</td><td>0.87</td><td>1</td><td>1 66</td><td>1 75</td><td>1.83</td><td>2.5</td><td>3.17</td><td>3.91</td><td>5</td><td>8</td><td>10</td><td>20</td></tr>
<tr><td>(max)</td><td>LPH</td><td>0.47</td><td>0 79</td><td>0.95</td><td>1 73</td><td>1 89</td><td>1.89</td><td>2 2</td><td>3 15</td><td>3.31</td><td>3 78</td><td>6.31</td><td>6.62</td><td>6 94</td><td>9 5</td><td>11 83</td><td>14.82</td><td>18 93</td><td>29 98</td><td>37 85</td><td>78 85</td></tr>
<tr><td>Pressure</td><td>PSIG</td><td>300</td><td>250</td><td>150</td><td>250</td><td>150</td><td>100</td><td>100</td><td>250</td><td>150</td><td>100</td><td>250</td><td>150</td><td>100</td><td>150</td><td>150</td><td>100</td><td>100</td><td>50</td><td>35</td><td>20</td></tr>
<tr><td>(max)</td><td>BAR</td><td>21</td><td>17</td><td>10</td><td>17</td><td>10</td><td>7</td><td>7</td><td>17</td><td>10</td><td>7</td><td>17</td><td>10</td><td>7</td><td>10</td><td>10</td><td>7</td><td>7</td><td>3.3</td><td>2 4</td><td>1.3</td></tr>
<tr><td colspan="2">Connections Tubing

Piping</td><td colspan="13">1/4" ID X 3/8" OD
3/8" ID X 1/2" OD
3/16" ID X 5/16" OD
1/4" FNPT</td><td colspan="7">3/8" ID X 1/2" OD
1/2" ID x 3/4" OD (LPH8 ONLY)

1/4" FNPT
1/2" FNPT</td></tr>
<tr><td colspan="2">Reproducibility at max. capacity</td><td colspan="20">+/- 2%</td></tr>
<tr><td colspan="2">Viscosity Max CPS</td><td colspan="20">For viscosity up to 3000 CPS. select connection size 3 4. B or C with 316SS ball material Flow rate will determine connection/ball size 3000 - 10.000 CPS require spring loaded ball checks See Selection Guide for proper connection.</td></tr>
<tr><td colspan="2">Stroke Frequency Max SPM</td><td colspan="20">125</td></tr>
<tr><td colspan="2">Stroke Frequency Turn-Down Ratio</td><td colspan="20">10 1</td></tr>
<tr><td colspan="2">Stroke Length Turn-Down Ratio</td><td colspan="20">10:1</td></tr>
<tr><td colspan="2">Power Input</td><td colspan="20">115 VAC/50-60 HZ/1 ph
230 VAC/50-60 HZ/1 ph</td></tr>
<tr><td colspan="2">Average Current Draw
@ 115 VAC Amps
@ 230 VAC Amps</td><td colspan="20">1 0
0 5</td></tr>
<tr><td colspan="2">Peak Input Power Watts</td><td colspan="20">300</td></tr>
<tr><td colspan="2">Average Input Power @ max SPM Watts</td><td colspan="20">130</td></tr>
</table>

NOTE: Foot valve and bleed valve not available with High Viscosity (. 3000 CPS) connections.

DIMENSIONS:



Series E Plus Dimensions (Inches)								
Model No.	A	B	B1	C	C1	D	E	Shipping Weight
LPA2	5.4	12 7	-	11 3	-	7.5	9 5	13
LPA3	5.4	13	-	11.2	-	7.5	9 7	13
LPB2	5.4	12 7	-	11 3	-	7.5	9 5	13
LPB3	5.4	13	-	11 2	-	7.5	9 7	13
LPB4	5.4	13	-	11 2	-	7.5	9 7	13
LPD3	5.4	13	-	11 7	-	7.5	9 7	15
LPD4	5.4	13	-	11 7	-	7.5	9 7	15
LPE4	5 4	13	-	11.7	-	7 5	9 7	15
LPF4	5.4	13	-	12 2	-	7 5	9.7	18
LPG4	5 4	13	-	12.2	-	7 5	9.7	18
LPG5	5.4	13 4	-	12.2	-	7 5	10 1	18
LPH4	6 2	13.4	-	11 7	-	8 2	10 1	21
LPH5	6 2	13 7	-	11 7	-	8 2	10 5	21
LPH6	6 2	13.7	-	11 7	-	8.2	10 5	21
LPH7	6 1	13 7	-	11 7	-	8.2	10 8	21
LPH8*	6 1	-	10 9	-	10.6	8 2	-	25
LPK2	5 4	12.7	-	11 3	-	7 5	9 5	13
LPK3	5 4	13	-	11 2	-	7 5	9 7	13
LPK5	5 4	13 4	-	12 2	-	7.5	10 1	18
LPK7	6 1	14 14	-	11 7	-	8 2	10.8	21

NOTE: Inches X 2.54 = cm
*the LPH8 is designed without a bleed valve available

OPTIONAL ACCESSORIES AVAILABLE:

- MIXER
- TANKS
- FLOW METERS
- LIQUID LEVEL CONTROLLER
- TIMERS
- TEST KITS
- KOPkits
- CORPORATION STOPS
- WALL MOUNT KITS
- FIVE FUNCTION VALVE
- HAND HELD TESTERS

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Accessories

PULSAFEEDER®
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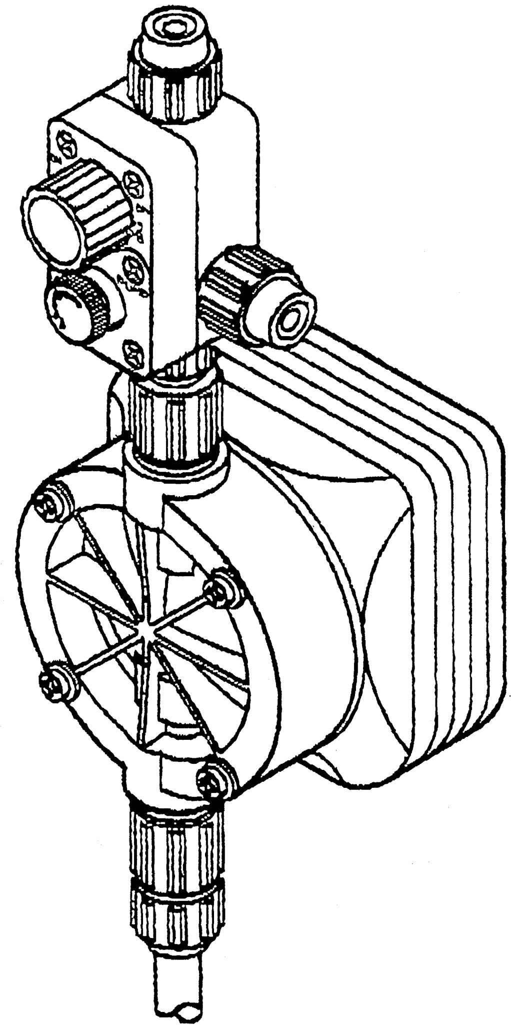
DG/5FV
Five Function Valve with De-Gas



With the DG/5FV you don't have to give up the accuracy and control of a solenoid metering pump in order to pump gaseous solutions. Available in a variety of materials and popular sizes, the DG/5FV is ready to tackle most applications. Not only does the DG/5FV provide degassing, it is packed with features that increase safety, enhance performance and generally improves the convenience of operation.

FEATURES

- De-Gas – Bypass gasses and fluid during normal pump operation. Allows for the constant removal of gases that would otherwise "air bind" the pump.
- Back Pressure – Maintains output reproducibility and allows metering into atmospheric discharge.
- Anti-Siphon – Prevents siphoning through the pump when point of injection is lower than the pump or into the suction line of another pump. Rated at total vacuum.
- Air Bleed – Used during priming to manually remove air from the pump head.
- Discharge Drain – Depressurize pump discharge line without loosening tubing or fittings. Protects the operator from chemical exposure.

SPECIFICATIONS

Material Of Construction:

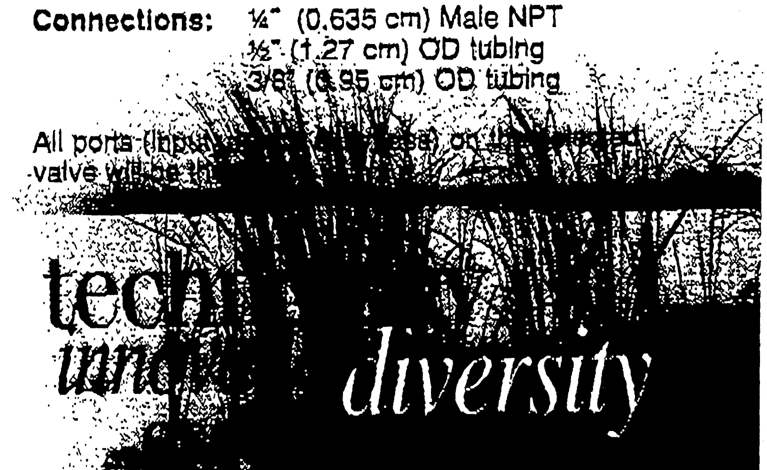
Valve Body	Polyvinylidene Flouride (PVDF) Polyvinyle Chloride (PVC)
Diaphragm	Teflon faced Hypalon
O-Rings	Viton or Hypalon
Hardware	188 Stainless Steel (recessed)

Maximum Flow:	240 GPD (37.85 LPH)
Minimum Flow:	3 GPD (.47 LPH)
Maximum Viscosity:	1000 CPS
MAX Pressure Ratings:	Up to 250 psi (17 BAR)

Note: Degas/bypass volume is adjustable, typically 1-10% of pump output.

Connections: ¼" (0.635 cm) Male NPT
½" (1.27 cm) OD tubing
3/8" (0.95 cm) OD tubing

All ports (inpu[illegible] valve wi[illegible]



IDEX
IDEX CORPORATION

PULSAFEEDER

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5 - FUNCTION VALVE

DESCRIPTION

Under certain conditions, metering pumps may require more than one device to increase safety of pump operation, enhance performance, and improve convenience of operation. The Pulsafeeder 5-function valve can meet most of these requirements in one neat package. A compact, diaphragm type, multi-function valve, the 5-function valve provides the following:

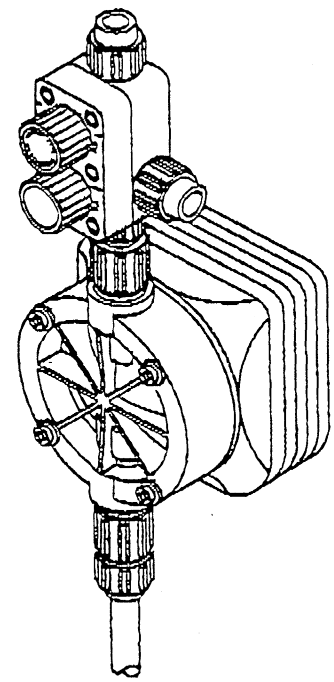
- **Pressure Relief** - Relieves excessive pressure that might build up in the pump discharge line protecting tubing and connections.
- **Back Pressure** - Maintains pump output repeatability and allows metering into atmospheric discharge.
- **Anti-Siphon** - Prevents siphoning through pump when point of injection is lower than pump or into suction line of another pump. Rated at total vacuum.
- **Pumphead Air Bleed** - Used as an aid in priming allowing manual removal of air from pumphead.
- **Discharge Drain** - Depressurize pump discharge line without loosening tubing or fittings protecting operator from chemical exposure.

OPERATION

The functions are selected by setting two, independent, dual position selector knobs. A label on the back panel of the 5-Function Valve identifies each function with selector knob positions. This guide with selector knob detents, provides error free settings and positive identification of function selected.

The 5-Function Valve connects to the existing pumphead discharge valves on most PULSAtron, Chem-Tech Series 100 and Series 200 pumps. With a generous flow path, the 5-Function Valve is capable of handling large output flows and viscous liquids. A return port located on the side body provides flow of chemical back to solution tank when pressure relief, pumphead air bleed, or discharge drain functions are utilized. Pressure relief settings are fixed, the proper 5-Function Valve model must be selected based on pump's maximum pressure rating. There are three different pump settings: 100, 150, and 250 psi distinguished by blue, green and red colored adjustment knobs respectively. The back pressure and anti-siphon functions may be turned off allowing pressure relief function to operate alone.

Note: When ordering 5-Function Valve with pump use suffix code - 500.



SPECIFICATIONS

Material Of Construction

Valve Body	- Glass Filled Polypropylene (GFPPL)
	- Polyvinylidene fluoride (PVDF)
Diaphragms	- Teflon faced hypalon
O-Rings	- Teflon
Hardware	- 188 Stainless Steel (recessed)

Maximum Flow - 240 GPD

Maximum Viscosity - 1000 CPS

Pressure Relief Settings (nominal cracking pressure)
- 250 PSI (275)
- 150 PSI (175)
- 100 PSI (125)

NOTE: Pressure relief may occur at 50% above maximum pressure rating of pump.

Connections
- 1/4" X 3/8" tubing
- 3/8" X 1/2" tubing
- 1/4" MNPT

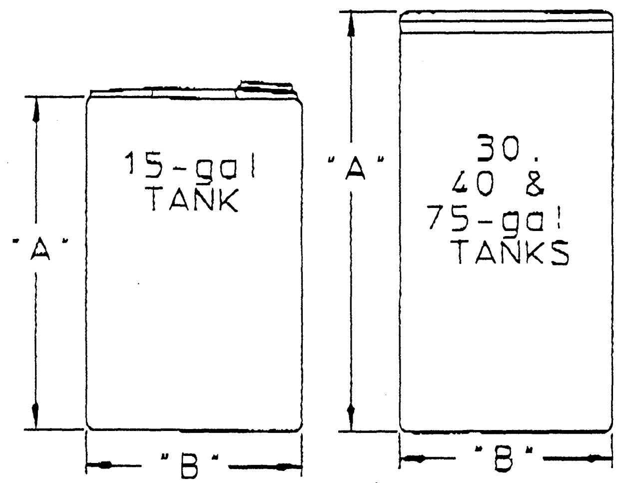
Relief Port
- 1/4" X 3/8" tubing
- 1/4" MNPT (with NPT connection only)

PULSAFEEDER

SERIES 6000 TANK SYSTEM

The Series 6000 Tank Systems are a rugged line of tanks designed to fit most solution handling needs All tanks are constructed of high density polyethylene (PE) and come in a variety of sizes

LIGHT DUTY LINEAR TANKS

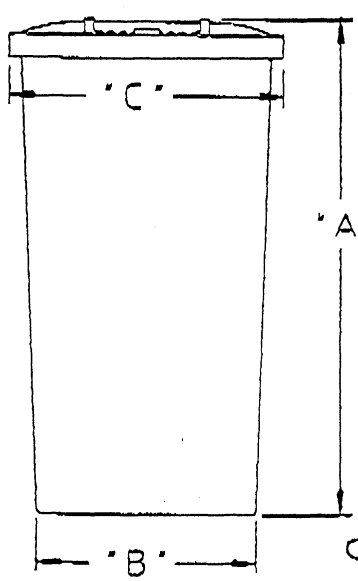


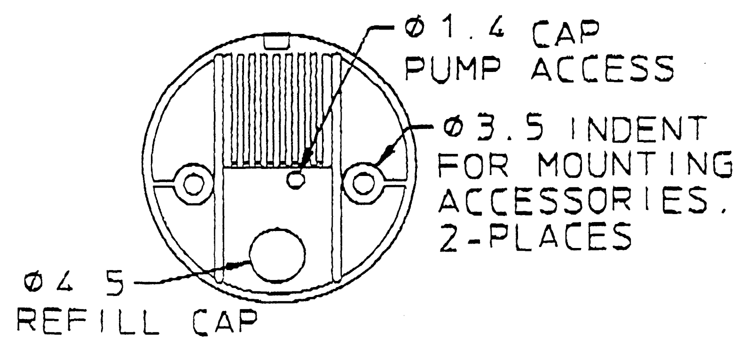
Model	Size Gallon	Wall	Dimensions (in.) A	B
40375	15	0.078	25	14.5
40360	30	0.094	32	18.5
40361	40	0.094	41.25	18.5
40362	*75	0.125	41.75	24.25

15 gallon tanks are translucent with 5 gal. increments and feature child resistant black caps. Other tanks have full fitted lids. 30/40 gal. tanks are non-translucent white. ***75 gallon tanks are black.** Tanks will not support pumps or mixers on covers. Use heavy duty tapered tanks for top mounting of pumps or mixers.

HEAVY DUTY TAPERED TANKS

TAPERED PE TANKS feature rigid covers which allow the top mounting of Chem-Tech S100, 200 and most PULSAtron pump models. 1/20 HP Flange Mount Mixers may also be mounted on the cover. Tanks are translucent with 5 gal. graduations. (Not suitable for use with 1/3 HP Flange Mount Mixers.)





Model	Size Gallon	Wall	Dimensions (in.) A	B	C
40365	35	0.125	28	20	23
J40366	55	0.125	42.5	18.5	23

OPTION →

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Phone: 941-575-3800 Fax: 800-456-4085
941-575-4085

Exhibit I

Letter and Village of Fleischmann's Water Treatment Data

Delaware Engineering, P.C.
28 Madison Avenue Extension
Albany, New York 12203
Tel: 518.452.1290
Fax: 518.452.1335

May 15, 2003

Mr. Dean Gitter
Managing Partner
Crossroads Ventures, LLC
72 Andrew Lane Road
Mt. Tremper, NY 12457

Re: DEIS for the Belleayre Resort at Catskill Park
Response to comments of Tim Miller Associates
Received by Crossroads 4/22/03 via FAX

Dear Mr.Gitter:

This letter is intended to provide information and clarification of several water supply issues raised by Tim Miller and Associates in their review of the Section 2.2.3 of the DEIS for the Belleayre Resort at Catskill Park. The comments concern the actual and worst case water demand of Village of Fleischmanns and the means through which the Wildacres Resort would receive water from the Village as well as the compensation to the Village for the supply of water.

Village of Fleischmanns Existing Demand

In recent years, the Village of Fleischmanns has treated an average of 225,000 gallons of water per day. Given the population and the number and type of commercial uses within the water service area, this value has been viewed as excessive by the Village's water system operator as well as the New York State Department of Health. The corrosive nature of the Village's water supply requires treatment prior to distribution to avoid leaching of lead and copper from aging service connections and plumbing within buildings. The Village has been challenged to treat 225,000 or more gallons of water a day due to the limitations of the existing treatment and storage system.

The Village of Fleischmanns is engaged in a project to construct a new wastewater treatment plant to serve the Village residents and businesses. During the design of the sewer collection system, it became necessary for the Village to locate the existing water lines so that minimum separation distances could be maintained between the existing water and the new sewer lines. Wisely, during the survey of the water lines, the Village of Fleischmanns also had the contractor identify major leaks in the water lines. The major leaks were repaired by the Village water system operator and Village forces in late August of 2002.

Attachment A includes the daily log sheets completed by the water system operator. The data shows that for a period of 87 days prior to August 26, 2002, the Village of Fleischmanns treated an average of 239,463 gallons of water per day. This value is consistent with the estimated 225,000 gpd of water discussed in the DEIS. However, after the major leaks were repaired, the amount of water treated by the Village dropped to average 55,916 gpd for the 247 day (8 month) period including August 27, 2002 though April 30, 2003.

These values incorporate all demand of the Village of Fleischmanns, including residential and commercial. During the eight month period since the repairs to the water mains were made, only two random days exceeded 100,000 gpd, with the peak demand being 134,100 gpd on March 2, 2003 and the other being October 25, 2002 with a demand of 100,800 gpd. The days prior to and after these peak demand days are close to the average demand of 56,000 gpd. There is no trend to the spikes in use on these two days. The eight months of data provides enough data for long term analysis and represents a stable condition for the Village's water demand. The average daily demand for the system overall dropped approximately 80% or about 185,000 gpd.

The text of the DEIS states that the projected average day demand for the Village, excluding commercial use, is 80,000 to 90,000 gpd. This value is a mathematical calculation based on the number of persons living in the Village and an assumed rate of water use and disposal. When the DEIS was submitted in December 2002, the Village had experienced an actual reduction in the amount of water treated due to the leak repairs. However, since only four months of data regarding the lower water use was available, there was a concern that the lower use may not be representative of a stable status for the water system. Therefore, the projection was briefly discussed in the DEIS to give reviewers an idea of what the water use could be with some, but not all, leaks repaired. It should be noted that the source versus demand calculations used to determine the availability of water from the Fleischmanns system were not based on the projected values, but were based on the actual average daily use of 225,000 gpd. The discussion of the projection becomes a moot point, given the availability of eight months of actual data to support the reduced water demand.

In summary, the Village of Fleischmanns existing sources are more than adequate to meet the water needs of the entire Village, both residential and commercial, with over 500,000 gpd of water available from current Village-owned sources. Given that the water demand for the Village has been reduced through distribution system leak repairs to an average of 55,916 gpd, theoretically, the Village has over 445,000 gpd of excess water. Even using the post-leak repair peak day demand of 134,100 gpd, the Village still has over 366,000 gpd of excess water. The reduction in the amount of water to be treated has allowed the Village water system operator to provide significantly more effectively treatment and addresses in part concerns of the New York State Department of Health, the Village Board and residents.

Water Supply to the Wildacres Resort from the Village of Fleischmanns

As currently proposed, the Wildacres Resort would receive raw water from the Village of Fleischmanns existing sources, which would then be pumped to a treatment facility located on Crossroads Ventures land, treated to reduce corrosivity and disinfected, then pumped to a storage tank located at a high elevation on the Resort lands and through the distribution system for use by patrons and employees of the Wildacres facilities. The engineering, permitting, construction and equipment necessary to pump raw water from the Village system to the Resort would be paid to the Village by the Resort. It has been assumed that the Village of Fleischmanns would treat the Resort as an "out of district" water user and bill the Resort for the water supplied accordingly. Since the Village would not be treating the water, the on-going cost to supply the water to the Resort would be minimal (e.g. power to operate pumps), providing an opportunity for the Village to gain revenue from the sale.

As an alternative to the Resort being supplied from existing Village-owned sources, a new groundwater well could be established by the Village, the capital cost for which would be paid for by the Resort. This alternative is offered for several reasons. While it has been demonstrated that the Village of Fleischmanns has more than enough excess water capacity to supply both residents and businesses within the existing service area and the Wildacres Resort, a new groundwater source developed to serve the Resort would essentially leave the Village with all its current water resources in tact and at its full discretionary disposal. In addition, it may be easier for the Village to supply raw water, maintain and monitor Resort water use if the source of supply is separate from the existing Village system. The Wildacres Resort would still require an interconnection to the existing Village system in order to have a "back-up;" however, the connection could be valved and opened either automatically or manually during an emergency.

With respect to the much needed improvements to the Village of Fleischmanns water supply system, while some repairs to the water mains have been made and a dramatic reduction in the amount of water treated has occurred, the water system is still in need of additional improvements. Those improvements include the need to rehabilitate and reconnect the two out of service groundwater wells, improve treatment facilities, rebuild and secure the spring water collection system, and incorporate additional storage in the system, as well as continuing repairs and maintenance to the distribution system. The Village has applied for subsidized funding from the Drinking Water State Revolving Fund (DWSRF) to finance the needed water system improvements. The Village expects to receive a confirmation letter discussing the terms of the project financing later this month. These upgrades and repairs the Village water system would be conducted and funded by DWSRF regardless of the proposed Wildacres Resort project and request for water.

In a letter dated December 14, 2001, Delaware Engineering requested comments from the New York State Department of Health (NYSDOH) regarding potential Village of Fleischmanns water supply options for the Wildacres Resort. In response, the NYSDOH provided a letter, stating that the NYSDOH has no objection to the sale of raw water from a new well by the Village of Fleischmanns to the Wildacres Resort. The letter further states that since the water source would be separate from the Village's existing system, a review of the impacts of the sale on the existing system would not be warranted. However, the letter also states that if the Village were to *supply treated* water from the existing system, upgrades to the system would be required to address conditions as outlined in a previous NYSDOH letter. Nevertheless, the NYSDOH letter states that the sale of water from the Village's existing system to the Wildacres Resort would also not be objectionable, providing the previously outlined conditions were addressed to the satisfaction of the Department. Copies of these correspondences are included in Appendices 6 and 7 of the DEIS.

Compensation to the Village of Fleischmanns

The Village of Fleischmanns is in a position where improvements to the existing water system are needed and highly recommended by the NYSDOH. The Village has sought subsidized funding through the DWSRF Disadvantaged Community (Hardship) program to finance the much needed improvements.

The formal agreement for the sale of raw water from either existing or new sources between the Village of Fleischmanns and the Wildacres Resort will incorporate terms that will provide revenue to the Village in excess of the Village's operational costs associated with the sale of water to the Resort. No capital investment by the Village will be necessary to supply such water. The Resort would fund and/or construct sources (including the drilling of a new well to be used as the primary water source for the Resort), pumping, treatment, and distribution solely required for the Village to convey water to the Resort. Under the scenario where a new well is drilled, the well and well pump would be funded by the Resort and owned by the Village.

Since the Village will have no capital expenses associated with the provision of the water and very little operation and maintenance on the facilities required to supply the Resort raw water, the revenue will be excess to the Village and should assist in creating a positive cash flow for the Village's water system.

Summary

In summary, the supply of water by the Village of Fleischmanns to the Wildacres Resort can be accomplished in several ways. The Village's existing water supplies are more than adequate to meet the demands of the Village and those of the Wildacres Resort. Alternatively, a new Village well could be constructed for the sole purpose of supplying water to the Resort. In either case, the Resort will fund the facilities necessary for the Village to supply water to the Resort and the Village will receive an on-going source of revenue from the sale of water.

As always, if you have any questions or require further information, please contact us.

Sincerely,

Mary Beth Bianconi
Project Manager

Enclosure

C: T. Bakner
K. Graham
G. Kerzic

Attachment A

VILLAGE OF FLEISCHMANNS
WATER DEPT.

DATE	TIME	GALLONS PER DAY	TOTAL USED GALS PER DAY	PH	PHOSPHATE
6-1-02	640	425004800	204200	7.2	1.0
6-2-02	510	425206200	201400	7.2	1.0
6-3-02	625	425421300	215100	7.2 68	1.0
6-4-02	615	425616000	194700	72	1.0
6-5-02	625	425812700	201700	72	1.0
6-6-02	600	426016900	199200	7.2	1.0
6-7-02	620	426220800	203900	7.2	1.0
6-8-02	530	426420000	199200	7.2	1.0
6-9-02	630	426640100	220100	72	1.0
6-10-02	625	426850600	210500	72 68	1.0
6-11-02	615	427055600	205000	72	1.0
6-12-02	545	427257400	201800	72	1.0
6-13-02	610	427466100	208700	72	1.0
6-14-02	525	427665000	198900	72	1.0
6-15-02	555	427868500	203500	72	1.0
6-16-02	600	428071900	203400	72	1.0
6-17-02	615	428278600	206700	72	1.0
6-18-02	635	428486500	207900	72	1.0
6-19-02	600	428682300	195800	7.2	1.0
6-20-02	600	428897700	215400	7.2	1.0
6-21-02	525	429140900	243200	7.2	1.0
6-22-02	630	429433000	293100	72	1.0
6-23-02	625	429678300	245300	72	1.0
6-24-02	605	429932200	253900	72	1.0
6-25-02	620	480181900	249700	72	1.0
6-26-02	605	480432100	250200	72	1.0
6-27-02	610	480684500	252400	72	1.0
6-28-02	600	480927400	242900	72	1.0
6-29-02	520	481239400	312000	72	1.0
6-30-02	635	481559000	319600	72	1.0
	Avg.	[illegible]	218423		

VILLAGE OF FLEISCHMANNS
WATER DEPT.

DATE	TIME	GALLONS PER DAY	TOTAL USED GALS PER DAY	PH	PHOSPHATE
7-1-02	610	481853500	294500	7.2	1.0
7-2-02	610	482146000	292500	7.2	1.0
7-3-02	600	482452900	306900	7.2	1.0
7-4-02	535	482786600	333700	7.2	1.0
7-5-02	540	483123700	337100	7.2	1.0
7-6-02	530	483454400	330700	7.2	1.0
7-7-02	545	483753100	298700	7.2	1.0
7-8-02	610	484077200	324100	7.2	1.0
7-9-02	550	484379600	302400	7.2	1.0
7-10-02	600	484689300	309700	7.2	1.0
7-11-02	515	484964800	275500	7.2	1.0
7-12-02	615	485271300	306500	7.2	1.0
7-13-02	555	485591600	320300	7.2	1.0
7-14-02	520	485904300	312700	7.2	1.0
7-15-02	625	486235300	331000	7.2	1.0
7-16-02	620	486541200	305900	7.2	1.0
7-17-02	600	486834400	293200	7.2	1.0
7-18-02	605	487125300	290900	7.2	1.0
7-19-02	620	487417700	292400	7.2	1.0
7-20-02	600	487753900	336200	7.2	1.0
7-21-02	520	488061000	307100	7.2	1.0
7-22-02	635	488395200	334200	7.2	1.0
7-23-02	640	488709900	314700	7.2	1.0
7-24-02	620	489006500	296600	7.2	1.0
7-25-02	540	48930900	302500	7.2	1.0
7-26-02	620	48962760	318600	7.2	1.0
7-27-02	530	48993300	305400	7.2	1.0
7-28-02	610	49025040	317400	7.2	1.0
7-29-02	610	490578100	327700	7.2	1.0
7-30-02	6:15	490904300	326200	7.2	1.0
7-31-02	610	491218400	314100	7.2	1.0
		Avg.	302093		

VILLAGE OF FLEISCHMANNS
WATER DEPT.

DATE	TIME	GALLONS PER DAY	TOTAL USED GALS PER DAY	PH	PHOSPHATE	
8-1-02	605	491533600	315200	72	1.0	
8-2-02	610	491856600	323000	7.2	1.0	
8-3-02	605	492192800	336200	7.2	1.0	
8-4-02	555	492527600	334800	7.2	1.0	
8-5-02	610	492894400	366800	7.2	1.0	Repaired service leak (Wagner [illegible])
8-6-02	610	493173200	278800	7.2	1.0	Repaired 2" main (Main St)
8-7-02	600	493320300	147100	7.2	1.0	
8-8-02	555	493449200	128900	7.2	1.0	
8-9-02	6:00	493580800	131600	72	1.0	
8-10-02	605	493725300	144500	72	1.0	
8-11-02	530	493862900	137600	72	1.0	
8-12-02	620	494006100	143200	7.2	1.0	
8-13-02	625	494132200	126100	7.2	1.0	
8-14-02	605	494249700	117500	7.2	1.0	
8-15-02	615	494379600	129900	72	1.0	
8-16-02	625	494507700	128100	7.2	1.0	
8-17-02	615	494646800	139100	7.2	1.0	
8-18-02	530	494780700	133900	7.2	1.0	
8-19-02	630	494932800	152100	7.2	1.0	
8-20-02	625	495065000	132200	7.2	1.0	Repaired Service Leak [illegible]
8-21-02	625	495187400	122400	7.2	1.0	
8-22-02	620	495297100	109200	7.2	1.0	
8-23-02	615	495410800	113700	72	1.0	
8-24-02	520	495521000	110200	72	1.0	
8-25-02	650	495631900	110900	72	1.0	
8-26-02	630	495733400	101500	72	1.0	
8-27-02	640	495814100	80700	72	1.0	
8-28-02	630	495888300	74200	72	1.0	
8-29-02	625	495956700	68400	7.2	1.0	
8-30-02	635	496027800	71100	7.2	1.0	
8-31-02	605	496094700	66900	7.2	1.0	
		Avg.	147132			

VILLAGE OF FLEISCHMANNS
WATER DEPT.

DATE	TIME	GALLONS PER DAY	TOTAL USED GALS PER DAY	PH	PHOSPHATE
9-1-02	725	496174600	29900	7.2	1.0
9-2-02	610	496233700	59100	7.2	1.0
9-3-02	635	496285300	51600	7.2	1.0
9-4-02	630	496326500	41200	7.4	1.0
9-5-02	630	496369300	42800	7.4	1.0
9-6-02	625	496414500	45200	7.4	1.0
9-7-02	550	496456000	41500	7.4	1.0
9-8-02	640	496510000	54000	7.4	1.0
9-9-02	635	496562300	52300	7.4	1.0
9-10-02	630	496610100	47800	7.4	1.0
9-11-02	640	496657900	47800	7.4	1.0
9-12-02	630	496702900	45000	7.4	1.0
9-13-02	635	496748800	45900	7.4	1.0
9-14-02	600	496791200	42400	7.4	1.0
9-15-02	620	496844300	53100	7.4	1.0
9-16-02	640	496893000	48700	7.4	1.0
9-17-02	645	496935300	42300	7.4	1.0
9-18-02	630	496995300	60000	7.4	1.0
9-19-02	635	497054500	59200	7.4	1.0
9-20-02	640	497114400	59900	7.4	1.0
9-21-02	645	497172400	58000	7.4	1.0
9-22-02	620	497235900	63500	7.4	1.0
9-23-02	635	497297300	61400	7.4	1.0
9-24-02	630	497352100	54800	7.4	1.0
9-25-02	630	497408100	56000	7.4	1.0
9-26-02	630	497464400	56300	7.4	1.0
9-27-02	645	497517900	53500	7.4	1.0
9-28-02	610	497573000	55100	7.4	1.0
9-29-02	600	497634900	61900	7.4	1.0
9-30-02	645	497696400	61500	7.4	1.0
		Avg.	507266		

VILLAGE OF FLEISCHMANNS
WATER DEPT.

DATE	TIME	GALLONS PER DAY	TOTAL USED GALS PER DAY	PH	PHOSPHATE	
10-1-02	635	497745900	49500	7.4	1.0	
10-2-02	640	497780600	34700	7.4	1.0	
10-3-02	630	497815300	34700	7.4	1.0	Flushed Hydrants
10-4-02	635	4978565	41200	7.4	1.0	Flushed Hydrants
10-5-02	510	497898600	42100	7.4	1.0	Flushed Hydrants
10-6-02	625	497957100	58500	7.4	1.0	
10-7-02	635	498008300	51200	7.4	1.0	Flow tested Hydrants
10-8-02	645	498048800	40500	7.4	1.0	
10-9-02	635	498088300	39500	7.4	1.0	
10-10-02	635	498129100	40800	7.4	1.0	
10-11-02	615	498167100	38000	7.4	1.0	
10-12-02	605	498205900	38800	7.4	1.0	
10-13-02	710	498254800	48900	7.4	1.0	
10-14-02	530	498298400	43600	7.4	1.0	
10-15-02	630	498346100	47700	7.4	1.0	
10-16-02	630	498387900	41800	7.4	1.0	
10-17-02	630	498427700	39800	7.4	1.0	
10-18-02	630	498467000	39300	7.4	1.0	
10-19-02	645	498506800	39800	7.4	1.0	
10-20-02	605	498559600	52800	7.4	1.0	
10-21-02	640	498610100	50500	7.4	1.0	
10-22-02	700	498651700	41600	7.4	1.0	
10-23-02	635	498693100	41400	7.4	1.0	
10-24-02	630	498733800	40700	7.4	1.0	
10-25-02	630	498834600	100800	7.4	1.0	
10-26-02	600	498883100	48500	7.4	1.0	
10-27-02	540	498931200	48100	7.4	1.0	
10-28-02	630	498982100	50900	7.4	1.0	
10-29-02	640	499027400	45300	7.4	1.0	
10-30-02	645	499072600	45200	7.4	1.0	
10-31-02	620	499112900	40300	7.4	1.0	

VILLAGE OF FLEISCHMANNS
WATER DEPT.

DATE	TIME	GALLONS PER DAY	TOTAL USED GALS PER DAY	PH	PHOSPHATE
11-1-02	640	49915400	41200	7.4	1.0
11-2-02	630	499193800	39700	7.4	1.0
11-3-02	705	499245800	52000	7.4	1.0
11-4-02	650	499292400	46600	7.4	1.0
11-5-02	700	499335200	42800	7.4	1.0
11-6-02	615	499380800	45600	7.4	1.0
11-7-02	645	499431200	50400	7.4	1.0
11-8-02	640	499480900	49700	7.4	1.0
11-9-02	510	499522000	41100	7.4	1.0
11-10-02	540	499574800	52800	7.4	1.0
11-11-02	725	499623500	48700	7.4	1.0
11-12-02	645	499666400	42900	7.4	1.0
11-13-02	510	499709000	42600	7.4	1.0
11-14-02	640	499754400	45400	7.4	1.0
11-15-02	645	499797800	43400	7.4	1.0
11-16-02	525	499836400	38600	7.4	1.0
11-17-02	635	499884700	48300	7.4	1.0
11-18-02	800	499939300	54600	7.4	1.0
11-19-02	6:30	499985400	46100	7.4	1.0
11-20-02	6:45	500034200	51200	7.4	1.0
11-21-02	6:58	500080900	48700	7.4	1.0
11-22-02	6:35	500126900	54000	7.4	1.0
11-23-02	6:25	500172900	46000	7.4	1.0
11-24-02	6:00	500223800	49100	7.4	1.0
11-25-02	6:35	500271100	47300	7.4	1.0
11-26-02	6:15	500315300	44200	7.4	1.0
11-27-02	8:25	500364700	49400	7.4	1.0
11-28-02	6:00	500402100	47500	7.4	1.0
11-29-02	6:35	500451100	49000	7.4	1.0
11-30-02	6:00	500501900	49200	7.4	1.0
12-		Avg.	44906		

VILLAGE OF FLEISCHMANNS
WATER DEPT.

DATE	TIME	GALLONS PER DAY	TOTAL USED GALS PER DAY	PH	PHOSPHATE	
12-1-02	7:30	500560800	57900	7.4	1.0	
12-2-02	6:45	500613700	52900	7.4	1.0	
12-3-02	7:40	500664400	50700	7.4	1.0	
12-4-02	615	500709500	43100	7.4	1.0	
12-5-02	645	500755300	47800	7.4	1.0	
12-6-02	805	500801800	46500	7.4	1.0	
12-7-02	620	500842000	40200	7.4	1.0	
12-8-02	605	500892000	50000	7.4	1.0	
12-9-02	610	500943200	51200	7.4	1.0	
12-10-02	645	500996500	53300	7.4	1.0	
12-11-02	735	501050400	53900	7.4	1.0	
12-12-02	8:45	501115400	65000	7.4	1.0	
12-13-02	620	501186500	71100	7.4	1.0	[illegible]
12-14-02	430	501255100	68600	7.4	1.0	[illegible]
12-15-02	530	501335400	80300	7.4	1.0	[illegible]
12-16-02	820	501420600	85200	7.4	1.0	[illegible]
12-17-02	630	501483700	63100	7.4	1.0	[illegible]
12-18-02	715	501557600	73900	7.4	1.0	[illegible]
12-19-02	530	501623600	66000	7.4	1.0	[illegible]
12-20-02	505	501695200	71600	7.4	1.0	[illegible]
12-21-02	530	501770200	75000	7.4	1.0	[illegible]
12-22-02	500	501848700	78500	7.4	1.0	[illegible]
12-23-02	740	501938700	90000	7.4	1.0	[illegible]
12-24-02	545	502013000	74300	7.4	1.0	[illegible]
12-25-02	445	502090100	77100	7.4	1.0	[illegible]
12-26-02	510	502166300	76200	7.4	1.0	[illegible]
12-27-02	830	502252800	86500	7.4	1.0	[illegible]
12-28-02	515	502322800	70000	7.4	1.0	[illegible]
12-29-02	540	502410400	87600	7.4	1.0	[illegible]
12-30-02	610	502496300	85900	7.4	1.0	[illegible]
12-31-02	545	502581100	84800	7.4	1.0	[illegible]

Avg. 65100

VILLAGE OF FLEISCHMANNS
WATER DEPT.

DATE	TIME	GALLONS PER DAY	TOTAL USED GALS PER DAY	PH	PHOSPHATE	
1-1-03	445	502649800	68700	7.4	1.0	[illegible]
1-2-03	545	502713200	63400	7.4	1.0	[illegible]
1-3-03	1110	502784800	71600	7.4	1.0	[illegible]
1-4-03	835	502839600	54800	7.4	1.0	[illegible]
1-5-03	600	502893000	53400	7.4	1.0	[illegible]
1-6-03	445	502946100	53100	7.4	1.0	[illegible]
1-7-03	600	502995200	49100	7.4	1.0	[illegible]
1-8-03	715	503045000	49800	7.4	1.0	[illegible]
1-9-03	735	503089700	44700	7.4	1.0	[illegible]
1-10-03	725	503137100	47400	7.4	1.0	[illegible]
1-11-03	730	503203600	66500	7.4	1.0	[illegible]
1-12-03	620	503256000	52400	7.4	1.0	[illegible]
1-13-03	710	503313900	57900	7.4	1.0	[illegible]
1-14-03	730	503363700	49800	7.4	1.0	[illegible]
1-15-03	600	503418900	55200	7.4	1.0	[illegible]
1-16-03	600	503470300	51400	7.4	1.0	[illegible]
1-17-03	750	503521900	51600	7.4	1.0	[illegible]
1-18-03	525	503567000	45100	7.4	1.0	[illegible]
1-19-03	545	503632700	65700	7.4	1.0	[illegible]
1-20-03	630	503700900	68200	7.4	1.0	[illegible]
1-21-03	615	503756200	55300	7.4	1.0	[illegible]
1-22-03	710	503805700	49500	7.4	1.0	[illegible]
1-23-03	740	503858700	53000	7.4	1.0	[illegible]
1-24-03	745	503904700	46000	7.4	1.0	[illegible]
1-25-03	535	503947400	42700	7.4	1.0	[illegible]
1-26-03	535	504010300	62900	7.4	1.0	[illegible]
1-27-03	800	504075700	65400	7.4	1.0	[illegible]
1-28-03	620	504125700	50000	7.4	1.0	[illegible]
1-29-03	735	504183500	57800	7.4	1.0	[illegible]
1-30-03	615	504232500	54000	7.4	1.0	[illegible]
1-31-03	635	504302000	64500	7.4	1.0	[illegible]
		Avg	53296			

VILLAGE OF FLEISCHMANNS
WATER DEPT.

DATE	TIME	GALLONS PER DAY	TOTAL USED GALS PER DAY	PH	PHOSPHATE	
2-1-03	530	504363600	61600	1.0	2.4	[illegible]
2-2-03	730	504437300	73700	1.0	2.4	[illegible]
2-3-03	700	504501800	64500	1.0	2.4	[illegible]
2-4-03	640	504565400	63600	1.0	2.4	[illegible]
2-5-03	600	504624900	59500	1.0	2.4	[illegible]
2-6-03	610	504687300	62400	1.0	2.4	[illegible]
2-7-03	10:00	504758300	71000	1.0	2.4	[illegible]
2-8-03	645	504804700	46400	1.0	2.4	[illegible]
2-9-03	530	504867800	63100	1.0	2.4	[illegible]
2-10-03	900	504943900	76100	1.0	2.4	[illegible]
2-11-03	900	504997200	53300	1.0	2.4	[illegible]
2-12-03	620	505043100	45900	1.0	2.4	[illegible]
2-13-03	905	505103500	60400	1.0	2.4	[illegible]
2-14-03	625	505151200	47700	1.0	2.4	[illegible]
2-15-03	530	505208400	57200	1.0	2.4	[illegible]
2-16-03	530	505280400	72000	1.0	2.4	[illegible]
2-17-03	600	505355600	75200	1.0	2.4	[illegible]
2-18-03	935	505442100	86500	1.0	2.4	[illegible]
2-19-03	1005	505509100	67000	1.0	2.4	[illegible]
2-20-03	615	505560100	51000	1.0	2.4	[illegible]
2-21-03	635	505624600	64500	1.0	2.4	[illegible]
2-22-03	600	505692000	67400	1.0	2.4	[illegible]
2-23-03	640	505762100	70100	1.0	2.4	[illegible]
2-24-03	610	505820600	58500	1.0	2.4	[illegible]
2-25-03	625	505882200	62100	1.0	2.4	[illegible]
2-26-03	615	505943300	60600	1.0	2.4	[illegible]
2-27-03	630	506002200	58900	1.0	2.4	[illegible]
2-28-03	625	506058800	56600	1.0	2.4	[illegible]
		Avg.	60500			

VILLAGE OF FLEISCHMANNS
WATER DEPT.

Main leak Wagner Depot St.

DATE	TIME	GALLONS PER DAY	TOTAL USED GALS PER DAY	PH	PHOSPHATE	
3-1-03	630	506121300	62500	7.4	1.0	MDM
3-2-03	500	506255400	134100	7.4	1.0	MDM
3-3-03	630	506322500	67100	7.4	1.0	MDM
3-4-03	600	506377600	55100	7.4	1.0	MDM
3-5-03	625	506433400	55800	7.4	1.0	MDM
3-6-03	615	506487500	54100	7.4	1.0	MDM
3-7-03	615	506541700	54200	7.4	1.0	MDM
3-8-03	630	506600900	59200	7.4	1.0	MDM
3-9-03	605	506663100	62200	7.4	1.0	MDM
3-10-03	605	506725300	62200	7.4	1.0	MDM
3-11-03	615	506782000	56700	7.4	1.0	MDM
3-12-03	610	506836200	54200	7.4	1.0	MDM
3-13-03	615	506891400	55200	7.4	1.0	MDM
3-14-03	645	506949600	58200	7.4	1.0	MDM
3-15-03	540	507006100	56500	7.4	1.0	MDM
3-16-03	630	507071500	65400	7.4	1.0	MDM
3-17-03	640	507135900	63400	7.4	1.0	MDM
3-18-03	630	507182300	54400	7.4	1.0	MDM
3-19-03	610	507245000	55700	7.4	1.0	MDM
3-20-03	655	507303000	58000	7.4	1.0	MDM
3-21-03	650	507361900	58900	7.4	1.0	MDM
3-22-03	510	507416700	54800	7.4	1.0	MDM
3-23-03	530	507479800	63100	7.4	1.0	MDM
3-24-03	605	507539500	59700	7.4	1.0	MDM
3-25-03	500	507591600	52100	7.4	1.0	MDM
3-26-03	640	507650500	58900	7.4	1.0	MDM
3-27-03	625	507703900	53400	7.4	1.0	MDM
3-28-03	630	507752700	48800	7.4	1.0	MDM
3-29-03	640	507800400	47700	7.4	1.0	MDM
3-30-03	740	507853700	53300	7.4	1.0	MDM
3-31-03	630	507901100	47400	7.4	1.0	MDM
		Avg.	57400			

VILLAGE OF FLEISCHMANNS
WATER DEPT.

DATE	TIME	GALLONS PER DAY	TOTAL USED GALS PER DAY	PH	PHOSPHATE	
4-1-03	610	507946200	45600	7.4	1.0	[illegible]
4-2-03	620	507991400	45200	7.4	1.0	[illegible]
4-3-03	615	508038100	46200	7.4	1.0	[illegible]
4-4-03	615	508082300	44200	7.4	1.0	[illegible]
4-5-03	805	508136600	49300	7.4	1.0	[illegible]
4-6-03	555	508187400	50800	7.4	1.0	[illegible]
4-7-03	610	508238600	51200	7.4	1.0	[illegible]
4-8-03	715	508294000	55400	7.4	1.0	[illegible]
4-9-03	610	508338200	44200	7.4	1.0	[illegible]
4-10-03	610	508387900	49700	7.4	1.0	[illegible]
4-11-03	605	508435500	48600	7.4	1.0	[illegible]
4-12-03	645	508484500	49000	7.4	1.0	[illegible]
4-13-03	520	508533800	48900	7.4	1.0	[illegible]
4-14-03	6:00	508581800	48000	7.4	1.0	[illegible]
4-15-03	630	508649900	68100	7.4	1.0	[illegible]
4-16-03	640	508718300	68400	7.4	1.0	[illegible]
4-17-03	620	508768500	50200	7.4	1.0	[illegible]
4-18-03	600	508815100	46600	7.4	1.0	[illegible]
4-19-03	625	508865200	50100	7.4	1.0	[illegible]
4-20-03	620	508921300	56100	7.4	1.0	[illegible]
4-21-03	635	508988100	66800	7.4	1.0	[illegible]
4-22-03	610	509051300	63200	7.4	1.0	[illegible]
4-23-03	610	509115800	64500	7.4	1.0	[illegible]
4-24-03	615	509178100	62300	7.4	1.0	[illegible]
4-25-03	615	509244300	66200	7.4	1.0	[illegible]
4-26-03	610	509307300	63000	7.4	1.0	[illegible]
4-27-03	520	509373900	66600	7.4	1.0	[illegible]
4-28-03	620	509437600	63700	7.4	1.0	[illegible]
4-29-03	615	509486400	48800	7.4	1.0	[illegible]
4-30-03	615	509531500	45100	7.4	1.0	[illegible]