crossroads ventures llc

DRAFT
Environmental Impact Statement

Appendix 2

NYSDEC Permit Applications

Big Indian Plateau Water Supply

Wildacres Resort Water Supply

Big Indian Plateau Wastewater SPDES

Wildacres Resort Wastewater SPDES

Belleayre Resort Stormwater Individual SPDES

Stream Distrubance and 401 Water Quality Certification

The Belleayre Resort at Catskill Park

APPLICATION FOR PUBLIC WATER SUPPLY PERMIT

Big Indian Plateau
Town of Shandaken, Ulster County

January 15, 2002

Prepared for:

New York State Department of Environmental Conservation
Bureau of Water Resources
625 Broadway
Albany, NY 12207

Prepared by:

Delaware Engineering, P.C.
28 Madison Avenue Extension
Albany, NY 12203

Application for Public Water Supply Permit
Big Indian Plateau
Ulster County, New York

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PUBLIC WATER SUPPLY PERMIT APPLICATION

95-19-4 (10/90)—7a

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
ALBANY, NEW YORK 12233-0001

APPLICATION FOR PUBLIC WATER SUPPLY PERMIT

Supplement W-1

Read instructions on reverse side of last sheet before completing this application.
PLEASE TYPE OR PRINT CLEARLY IN INK.

FOR DEPARTMENT USE ONLY

PROJECT DESCRIPTION

1. TYPE OF PROJECT
Completely new system, including source, treatment, storage and distribution facilities. See attached figure for limits of service area.

2. PROJECT PURPOSE
Water service to a new resort development entitled " Big Indian Plateau ". The planned resort resides on 322 acres of a 1,242 acre parcel of land in Ulster County.

3. THIS PROJECT INVOLVES: (Check appropriate items)
☐ ACQUISITION of existing facilities. ☒ INSTALLATION of new facilities. ☐ CHANGES in capacities of existing facilities.
☐ ABANDONMENT of existing facilities.
For items checked, provide BRIEF description or identification:
Installation of complete system, including 3 spring collection basins, pump station, treatment system, distribution mains, and a 286,000 gallon storage tank.

4. This project will involve the taking of up to 152,000 gallons of water ~~(per minute)~~ (per day) from Silo A, Rosenthal Well #2 (proposed source)
Figure given represents ☐ increase in taking or ☒ total taking.

5. If certain exhibits are omitted or reduced in scope by incorporation of files on prior applications, identify such applications and exhibits: (If more than 3, use 3 most recent or 3 most significant.)

WSA No.	NAME	EXHIBITS

6. PROJECT AUTHORIZATION
List all exhibits documenting the project authorization, such as resolutions, certificates of incorporation, contracts, referendum results, etc. (See special instructions accompanying this form):

7. PROJECT JUSTIFICATION
By the act of signing this application, the applicant certifies that each of the following statutory conditions is or will be satisfied, AND that a proper justification for each is given in exhibits attached to this application:
A. The plans proposed by the applicant are justified by public necessity.
B. The plans take proper consideration of other sources of supply which are or may become available.
C. The plans provide for proper and safe construction of all work connected therewith.
D. The plans provide for the proper sanitary control of the watershed and proper protection of the supply.
E. The plans provide for an adequate water supply.
F. The plans are just and equitable to the other municipal corporations and civil divisions of the state affected thereby and to the inhabitants thereof, particular consideration being given to their present and future necessities for sources of water supply.
G. The plans make fair and equitable provisions for the determination and payment of any and all damages to persons and property, both direct and indirect, which will result from the acquisition of said lands or the execution of said plans.
H. The plans, in accordance with local water resources needs and conditions, include a description of an adequate near term and long range water conservation program.

8. SEQR STATUS:
Lead Agency - NYSDEC
A DEIS is being submitted concurrently with this application.

9. SIGNATURE The Silk Road Organization, Inc. Managing Member by [signature], President

10. DATE 2/14/03

PERMIT ADMINISTRATOR

APPLICATION FOR PUBLIC WATER SUPPLY

ITEM #7- PROJECT JUSTIFICATION

A. The plans proposed by the applicant are justified by public necessity.

The area to be serviced by the new water system is presently without water. This area is proposed for development as a four-season recreation destination. Development plans include a mixture of recreational, hotel, lodging, residential and limited commercial facilities. The availability of water from the new system will permit this area to be developed and enhance the viability of the development. The new water system would provide a primary and backup source and the necessary fire protection.

B. The plans take proper consideration of other sources of supply, which are or may become available.

A number of water supply options were reviewed, including the use of on-site wells, various springs, and becoming 'out of district users' of the Pine Hill Water Company. The proximity of Silo A and Rosenthal Well #2 to each other and the proposed development, the abundance of water available from the springs, and the desire to not infringe upon the sources and supply of the Hamlet of Pine Hill prompted the decision to utilize Silo A and Rosenthal Well #2.

C. The plans provide for proper and safe construction of all work connected therewith.

Engineering plans for the project have been prepared by a firm licensed to practice engineering in the State of New York. The planned construction will be undertaken in a safe manner. All services in connection with the planning and construction of this project will be carried out by professionals thoroughly experienced and qualified to undertake such work.

D. The plans provide for the proper sanitary control of the watershed and proper protection of the supply.

All parts of the water system facilities will be owned, operated and maintained by the Transportation Corporation. This includes transmission and distribution mains, service laterals and connections, hydrants and valves, the storage tank, pump stations, treatment units, monitoring and recording equipment, and protection of the sources. All components of the system will be constructed and operated in accordance with standards set forth by the New York State Department of Conservation, Ulster County and New York State Departments of Health.

E. <u>The plans provide for an adequate water supply.</u>

Alpha Geoscience (Alpha) of Latham, NY conducted 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* resort development. 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 April 2001 on the various springs/wells located in close proximity or within the proposed development property. During November/December 2001, a test well was installed northwest of the NYSDEC's Day Use Area. This well has been designated Rosenthal Well #2. A 72-hour pump test was performed to determine the sustainable capacity of the well.

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.

Silo A was one of the springs monitored by Alpha. The November 2001 flow measurement recorded (determined to be the month considered a statistical drought) was found to be 69 gpm (99,792 gpd). This source has a capacity sufficient to be the primary or back-up potable water source for *Big Indian Plateau.*

Rosenthal Well #2 was determined to have a sustainable capacity of 82 gpm (118,080 gpd). This capacity is sufficient for the well to be used as a primary or back-up potable water source.

F. <u>The plans are just and equitable to other Municipal Corporations and Civil Divisions of the State affected thereby and to the inhabitants thereof, particular consideration being given to their present and future necessities for the sources of the water supply.</u>

Use of Silo A and Rosenthal Well#2 will not adversely affect any other civil division of the State.

G. The plans make fair and equitable provisions for the determination and payment of any and all damages to persons and property, both direct and indirect, which will result from the acquisition of said lands or the execution of said plans.

The contractor performing the work will be required to obtain the proper insurance bonds to pay the cost of damages to persons and property resulting from his actions.

H. The plans, in accordance with local water resources needs and conditions, include a description of an adequate near term and long range water conservation program.

See attached Water Conservation Program Form.

ENGINEERING REPORT

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1.0 INTRODUCTION

This report has been prepared to present information relevant to the design and construction of a new public water distribution system in the Town of Shandaken in Ulster County, New York. The new system will serve the potable water needs of a "four-season" resort development proposed by Crossroads Ventures, LLC, entitled the *Big Indian Plateau.*

1.1 Project Description

The 1,242-acre parcel of land designated for the proposed *Big Indian Plateau* resort development is located in Ulster County, New York, south of the Hamlet of Pine Hill (See Figure 1). 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. Development of this *Big Indian Plateau* will largely be confined to 322 acres and consist of two resort areas, designated the *Big Indian Resort and Spa/ Big Indian County Club* and *Belleayre Highlands.*

The *Big Indian Resort and Spa/ Big Indian Country Club* area 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 club membership units; and a 150-suite lodge 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* resort area. This will include the existing restored Brisbane (formerly known as Turner) Mansion (containing a game room, 25-seat snack bar, and offices), the existing Caretaker's House, around which is planned 88 club membership units, a pool, and tennis courts. Gate houses are also proposed for the main entrance to *Big Indian Plateau* and the *Belleayre Highlands* resort area.

The development projection described above takes into account all foreseen future expansions of the *Big Indian Plateau* resort. The approximate 920 acres will remain undeveloped.

2.0 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. lodging units, restaurant seats, homes, 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 "four-season" resorts, 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.

2.1 Potable Flow Usage

The projected average daily demand from both developments 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. lodging units). The remainder will be from restaurant usage and the laundry facilities located at the lodging facilities.

2.2 Fire Flow Requirements

Recommended fire flows associated with the proposed *Big Indian Plateau* resort were computed in accordance with the requirements of the Insurance Services Office (ISO). Based on the fire flow projections for the 150-suite lodge (facility requiring the greatest demand), the finished water storage tank will have a capacity of at least 249,817 gallons

(135,000 gallons (1,125*60*2) for fire flow plus the average daily potable consumption of 114,817 gallons (irrigation water would be stored in on-site ponds)) for the *Big Indian Plateau* resort.

3.0 WATER SUPPLY

Alpha Geoscience (Alpha) of Latham, 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* resort 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 January 2001 on the various springs/wells located in close proximity or within the proposed development properties. A copy of the spring and stream flow measurements and a sketch identifying those of primary interest can be referenced in Appendix A and B. Table 2 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.

3.1 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 during November 2001, a period considered to statistically define a drought. The results of the monitoring indicated a sustainable capacity of 99,792 gpd (69 gpm). This source has a capacity sufficient to be 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.

3.2 Silo B Spring

Silo B is located approximately 1,700 feet southeast of the Bonnie View Springs, adjacent to where Bonnie View Avenue intersects Station Road. This spring is owned by The Silk Road Organization NY, Inc.

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 September (76 gpm). Assuming a 50% reduction to account for minor inaccuracies in measurement, drier weather periods, and to provide a production capacity safety factor, 38 gpm (54,720 gpd) 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*. However, if Silo B was developed and a deep, large diameter collection basin was installed, there is a potential for Silo B to produce as much as 280,000 gpd (with a 50% reduction taken). This value was calculated by subtracting the Cathedral Brook-below Silo A flow from the Cathedral Brook-below Station Road flow, subtracting out the Station Road ditch flow, and then halving the amount. This value well exceeds the required capacity necessary to meet either the primary or back-up potable water source.

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.

3.3 Upper (Woodchuck Hollow) Spring

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

This spring was monitored from June through December 2000. The September flow measurement recorded (with a 50% reduction) was 27 gpm (38,880 gpd). This value alone does not have the required capacity necessary to meet either the primary or back-up potable water source.

The water will require minimal treatment for disinfection and pH adjustment purposes.

3.4 Rosenthal Well #2

A well was installed to the east of the main entrance road and has been designated Rosenthal Well #2. Rosenthal Well #2 is located approximately 1,100 feet east of the NYSDEC Day Use Area and approximately 200 feet south of Route 28. A subsequent 72-hour pump test indicated that 'Rosenthal Well #2' has a 118,080 gpd (82 gpm) capacity. This capacity demonstrates the wells' potential to meet the primary or back-up source capacity criteria. The well was constructed to adhere to the *Recommended Standards for Water Works-Great Lakes Upper Mississippi River Board of State Public Health & Environmental Managers*. Currently, this well is being considered to meet the potable water supply demands of the *Big Indian Plateau* development.

Silo A (99,792 gpd) and Rosenthal Well #2 (118,080 gpd) would comprise the potable water system for the *Big Indian Plateau* development. Utilization of these sources 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*.

To ensure that Silo A 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 to the use of Rosenthal Well #2 and Silo A is their proximity to roadways. This allows easy access to the pumps and treatment equipment that will be needed to transfer and treat the water for *Big Indian Plateau* during operation and maintenance activities.

Usage of Silo A will not diminish the quality or impact the production of the waters of the Pine Hill Water Company.

4.0 PROPOSED TREATMENT PROCESS

Since groundwater and spring waters unaffected by surface waters will be utilized to meet the potable water needs of the proposed developments, the waters will not be filtered. Based on the review of the analytical data for the waters, the anticipated on-site treatment system will consist of disinfection and corrosion control.

4.1 Disinfection

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 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.

4.2 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 (-) 2.45, 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 suggest that the waters may be corrosive. Sampling of the water from Rosenthal Well #2 resulted in a LSI of (-) 0.52 which indicates that the water is only slightly 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.

It was assumed that the waters from selected sources would have similar characteristics as the relatively nearby Bonnie View Springs. Therefore, analytical results from an October 6, 2000 sampling event of the Pine Hill water supply were utilized to calculate the chemical demands.

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.

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	18000
Golf Course Clubhouse	Members	154	25	3850
** 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	6300
50 Seat Beverage Lounge (3 seatings)	Patrons	150	2	300
Spa with 15 Treatment Rooms and Lap Pool	Patrons	150	12	1800
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	21000
60-3 Bdrm Club Membership Units	Bedrooms	180	150	27000
**20 Triplex Buildings				
Golf Maintenance	100 SF	85	12	1020
Satellite Golf Maintenance	100 SF	15	12	180
Gate House	100 SF	1	12	12
			Potable Total	81759
Golf Course Irrigation Water*			**Non-Potable Total**	300,000
* Maintenance-Does not include seeding needs				
Belleayre Highlands				
Club Membership Units (88-2 Bdrm)	Bedrooms	176	150	26400
Caretakers Offices	100 SF	3	12	36
Carriage Barn Office/Shop	100 SF	10	12	120
Brisbane Mansion Clubhouse	Members	120	25	3000
** w/ 25 Seat Snack Bar (2 seatings) (Pool and	Patrons	50	2	100
Cabana Building w/ Lockers and Showers)	Swimmers	333	10	3330
Reception / Sales / Operational Offices	100SF	6	12	72
			Potable Total	33058
			Combined Potable Total	114817
			Total Water Needs	414,817

[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)

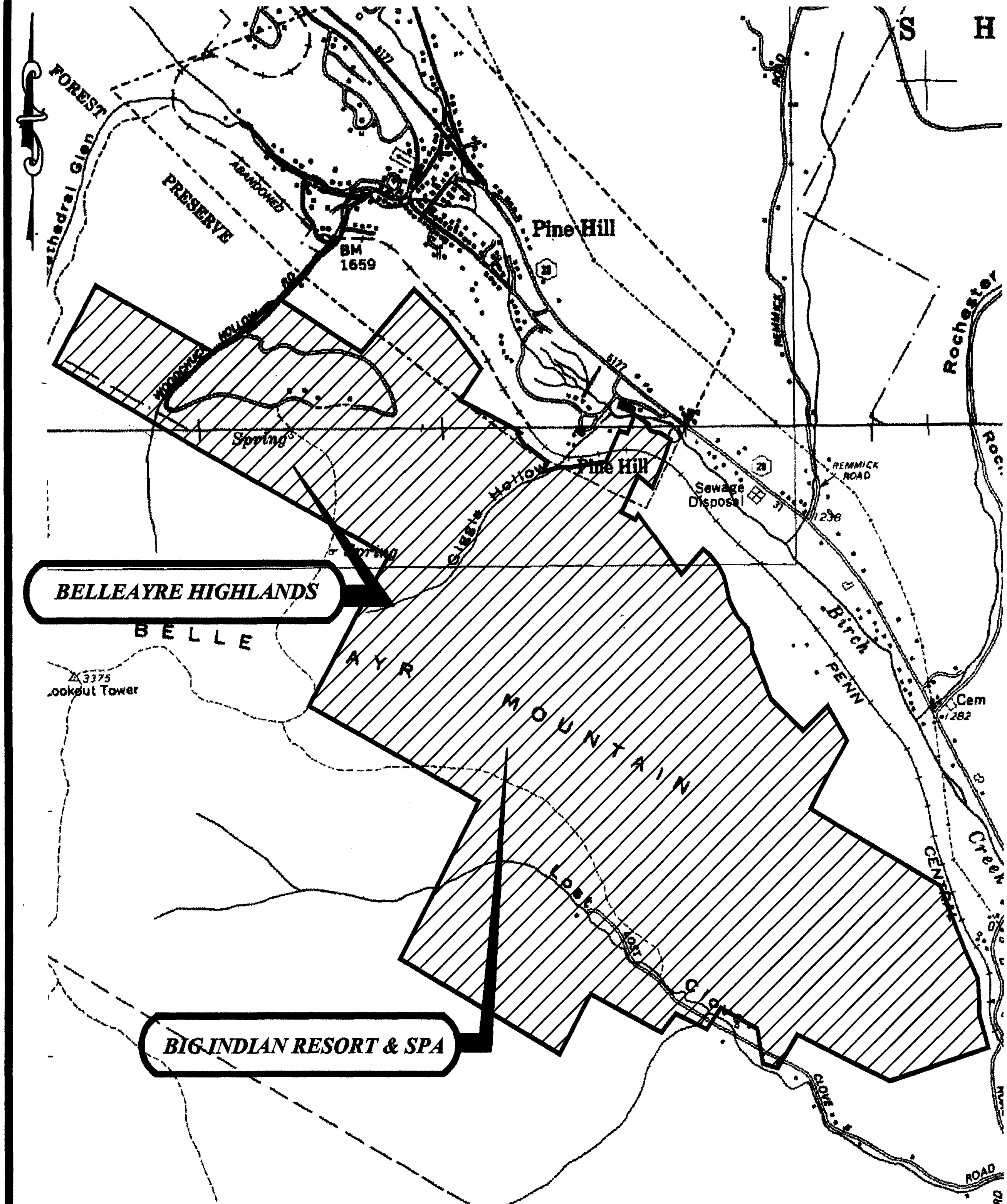
Table 2:

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



MAP REFERENCE:
SHANDAKEN & WEST KILL
QUADRANGLE–NYSDOT 7.5 MIN.

SITE LOCATION PLAN

0' 2000'

FIGURE 1

DELAWARE ENGINEERING, P.C.

28 Madison Avenue Extension
Albany, New York 12203

Phone 518–452–1290
FAX 518–452–1335

BIG INDIAN PLATEAU / BELLEAYRE HIGHLANDS

JANUARY 2002

FILENAME: CROSSROADS/NYSDEC.DWG

APPENDIX A

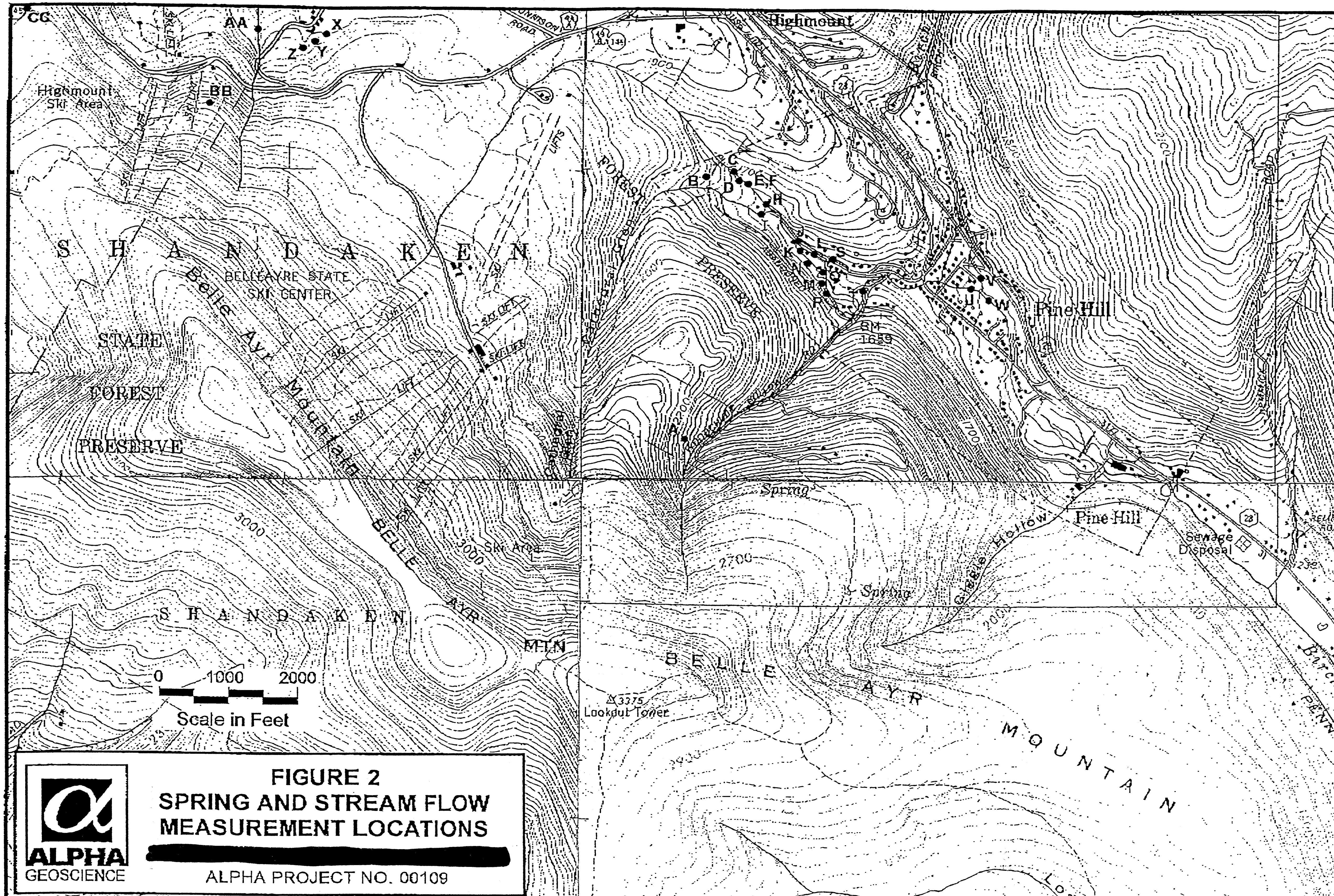


FIGURE 2
SPRING AND STREAM FLOW MEASUREMENT LOCATIONS

[redacted]

ALPHA GEOSCIENCE

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.

APPENDIX B

TABLE 1A
2000-2001 MONTHLY
SPRING AND STREAM FLOW MEASUREMENTS (GPM)

[redacted]
Alpha Project No. 00109

	Stream/Spring	2000												2001			
		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
A	Woodchuck Hollow Spring (Upper Spring)	NM[6]	NM	NM	NM	NM	214	67	70	54	138	94	96	NM	NM	NM	558
B	Railroad Spring[1]	NM	NM	NM	NM	951	866	476	610	197	156	251	1073	246	754	491	1295
C	Crystal Spring Brook-above Bonnie View Spg.	179	2478	1917	2168	2217	1615	301	296	114	191	193	1059	259	543	250	4054
D	Bonnie View side ditch[2]	46	96	58	137	121	122	72	34	24	10	22	135	63	109	37	110
E	Pine Hill H_20 Supply (meter)	0	NM	118	118	0	118	114	114	112	112	113	NM	113	113.5	113.4	119
F	Pine Hill H_20 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
G																	
H	Crystal Spring Brook-above Cathedral Glen Brook	312	3591	2644	2721	2765	2442	485	732	368	453	566	1336	579	918	1131	4716
I	Cathedral Glen Brook-above CSB	597	8627	9197	6240	7122	5714	1800	2078	705	1611	2639	1473	825	2845	1143	19433
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
K	Silo A	120	212	150	175	178	125	104	98	87	86	87	139	109	113	106	167
L	Crystal Spring Brook-below Silo A	1073	12183	11387	11976	10619	7783	3429	2648	1970	3196	3214	4636	1480	3204	2038	23180
M	Silo B 4" Pipe	NM	NM	NM	NM	NM	NM	96	94	51	121	113	150	133	161	176	189
N	Silo B Overflow	29	25	28	24	26	25	25	26	25	25	26	28.5	25	26.5	NA	NA
O	Silo B (M + N)	NM	NM	NM	NM	NM	NM	121	120	76	146	139	178.5	158	187.5	176	189
P	Station Rd. ditch-above Station Rd. Spg.	87	248	136	557	707	404	220	63	0	124	26	557	0	166	122	768
Q	Station Rd. ditch-below Station Rd. Spg.	264	1067	412	992	917	1050	543	605	221	476	435	1164	303	1001	955	2005
R	Schaedel Spring Total[3,4]	206	844	304	459	236	671	348	568	246	377	435	635.5	328	861.5	833	1237
S	Crystal Spring Brook-below Station Rd. Spg.	1923	13720	10642	12178	11269	10251	4135	2890	2585	3618	4641	6765	2683	3767	3386	22286
T	Bailey Brook-above Crystal Spring Brook[5]	NM	NM	NM	NM	2280	1256	314	149	54	215	256	1100	100	175	208	4189
U	Crystal Spring Brook-above Birch Creek	NM	NM	NM	15870	14873	12439	4601	2751	2087	3631	4524	6970	2098	4190	3564	29972
V	Birch Creek-above Crystal Spring Brook	NM	NM	NM	27636	25694	15934	10718	6234	2675	6167	5637	17574	6118	8555	9424	30220
W	Birch Creek-below Crystal Spring Brook	NM	NM	NM	39409	42762	24371	15687	9807	4726	10812	11916	23429	9551	12278	13572	61878
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
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
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
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
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
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
DD	Esopus Creek at USGS Allaben Gauging Station	50718	235187	77648	105026	127468	72710	33213	25583	10772	22890	29623	63285	22442	45781	60143	Unavailable

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 Schaedel 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 Schaedel Spring flow = Station Rd Ditch below Spring, minus Station Rd. Ditch above spring
5 Bailey Brook = Name given to unnamed stream in Woodchuck Hollow.
6 NM = Not Measured

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

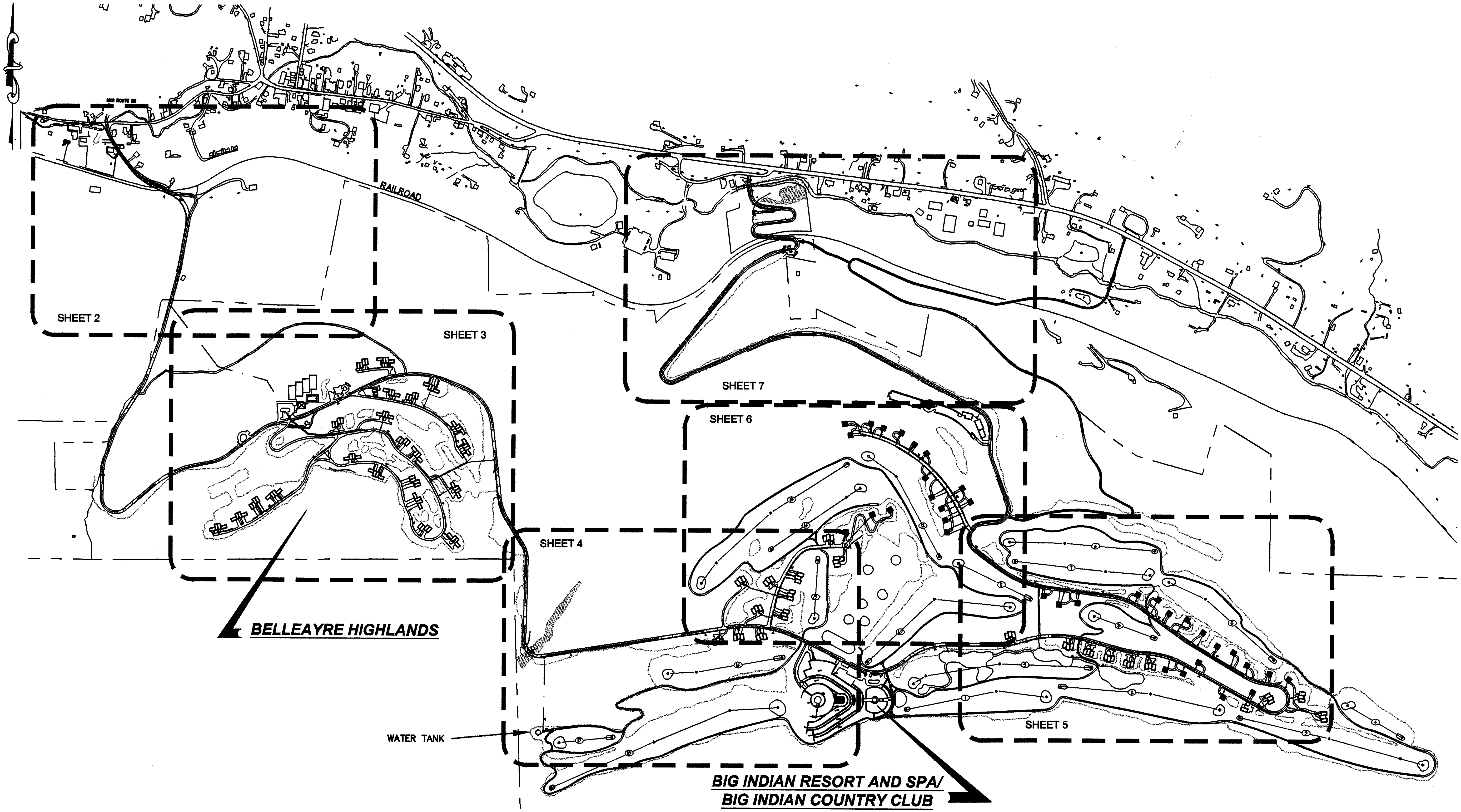
[redacted]
Alpha Project No. 00109

	STREAM OR SPRING (see Figure 2 for locations)	AVERAGE FLOW TO DATE	YR 2000[6] (or 12 Month) AVG. FLOW
A	Woodchuck Hollow Spring (Upper Spring)	161	161
B	Railroad Spring[1]	614	614
C	Crystal Spring Brook-above Bonnie View Spg.	1103	1046
D	Bonnie View side ditch[2]	75	73
E	Pine Hill H_20 Supply (meter)	115	115
F	Pine Hill H_20 Supply overflow	5.7	3.7
G			
H	Crystal Spring Brook-above Cathedral Glen Brook	1610	1535
I	Cathedral Glen Brook-above CSB	4503	3984
J	Black ABS Pipe-above Silo A	11	12
K	Silo A	129	130
L	Crystal Spring Brook-below Silo A	6501	6176
M	Silo B 4" Pipe	128	128
N	Silo B Overflow	26	26
O	Silo B (M + N)	149	149
P	Station Rd. ditch-above Station Rd. Spg.	262	261
Q	Station Rd. ditch-below Station Rd. Spg.	776	679
R	Schaedel Spring Total[3,4]	537	444
S	Crystal Spring Brook-below Station Rd. ditch	7296	7051
T	Bailey Brook-above Crystal Spring Brook[5]	858	858
U	Crystal Spring Brook-above Birch Creek	8275	6467
V	Birch Creek-above Crystal Spring Brook	13276	11864
W	Birch Creek-below Crystal Spring Brook	21554	18193
X	Wildacres #1 Spring	5	5
Y	Wildacres #2 Spring	5	5
Z	Wildacres #3 Spring	10	10
AA	Davenport Spring	6	6
BB	Highmount Spring	9	9
CC	Leach Spring	7	7
DD	Esopus Creek at USGS Allaben Gauging Station	65499	71177

Notes:
1 Railroad Spring drains into Cathedral Glen Brook, upstream
2 Bonnie View Side Ditch = Water from Bonnie View Spring that does not enter piping to Bonnie View Spring collection system.
3 Schaedel 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 Schaedel Spring flow = Station Rd Ditch below Spring, minus Station Rd. Ditch above spring
5 Bailey Brook = Name given to unnamed stream in Woodchuck Hollow.
6 Year 2000 Average Flow represents 12 months of complete data from the year 2000, if available; if 12 months of complete data is not available from the year 2000, then the highest number of months (up to 12) with complete data was used.

APPENDIX C

POTABLE WATER SYSTEM PLANS



BIG INDIAN PLATEAU DEVELOPMENT

0'　　800'

DELAWARE ENGINEERING, P.C.
28 Madison Avenue Extension
Albany, New York 12203
Phone 518-452-1290
FAX 518-452-1335

CONCEPT PLAN

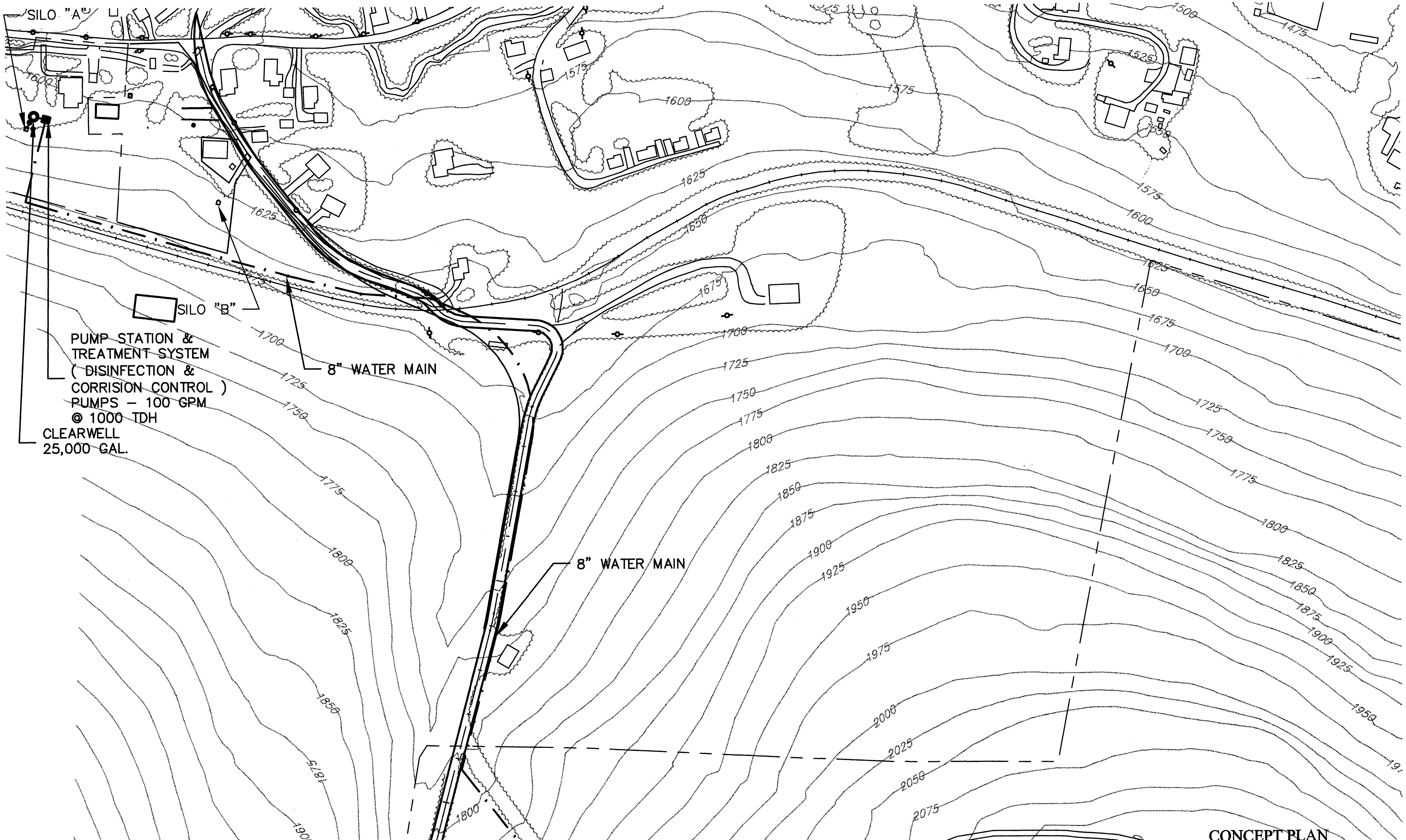
INDEX MAP FOR WATER DISTRIBUTION SYSTEM

BIG INDIAN PLATEAU

JANUARY 2002

SHEET 1

FILENAME: W_PLOT_TURNER15.DWG



CONCEPT PLAN

0' 200'

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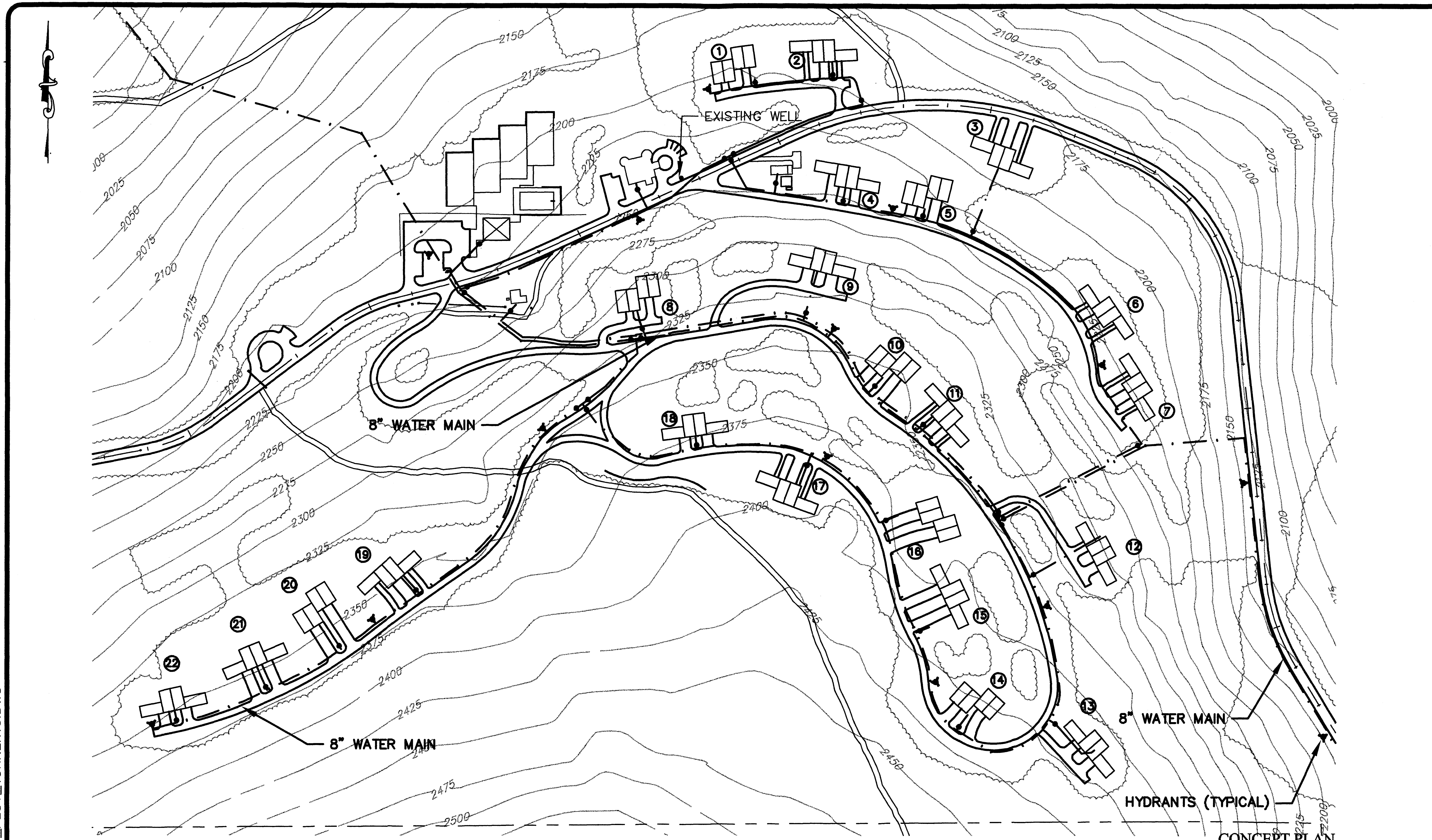
WATER DISTRIBUTION SYSTEM

BIG INDIAN PLATEAU /
BELLEAYRE HIGHLANDS

JANUARY 2002

SHEET 2

FILENAME: W_PLOT_TURNER09.DWG



CONCEPT PLAN

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FAX 518-452-1335

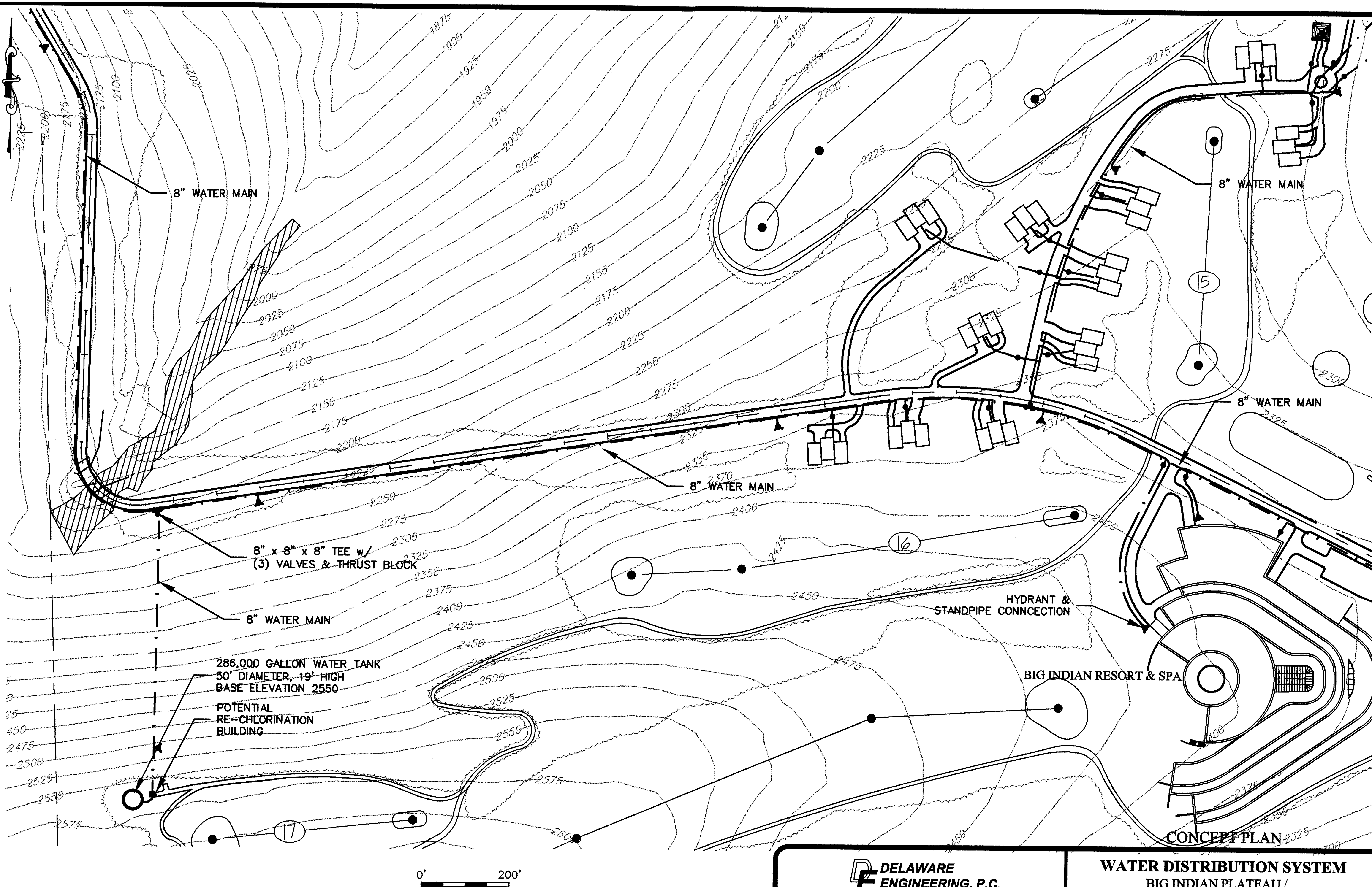
WATER DISTRIBUTION SYSTEM

BIG INDIAN PLATEAU /
BELLEAYRE HIGHLANDS

JANUARY 2002

SHEET 3

FILENAME: W_PLOT_TURNER10.DWG



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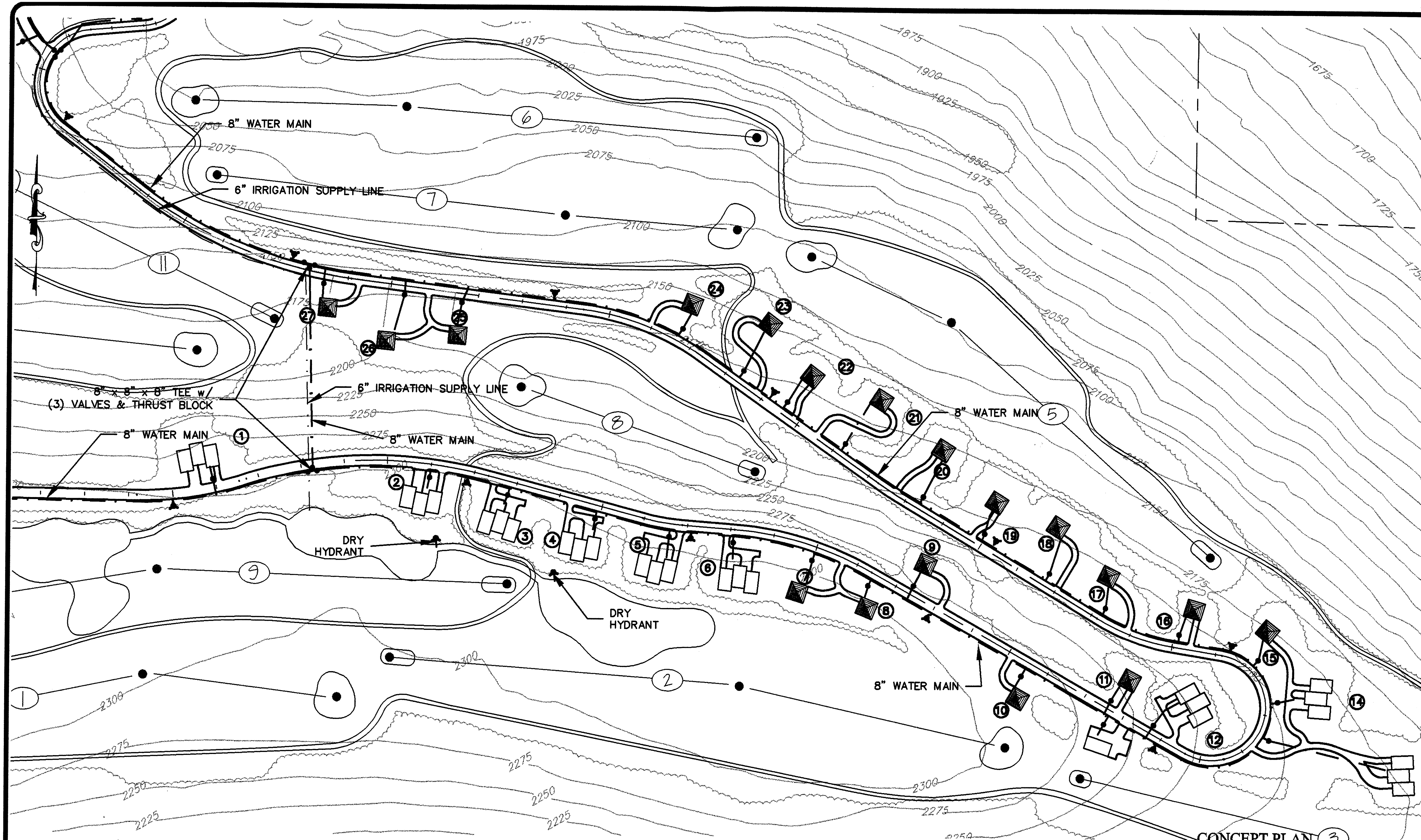
WATER DISTRIBUTION SYSTEM

BIG INDIAN PLATEAU /
BIG INDIAN RESORT AND SPA

JANUARY 2002

SHEET 4

FILENAME: W_PLOT_TURNER11.DWG



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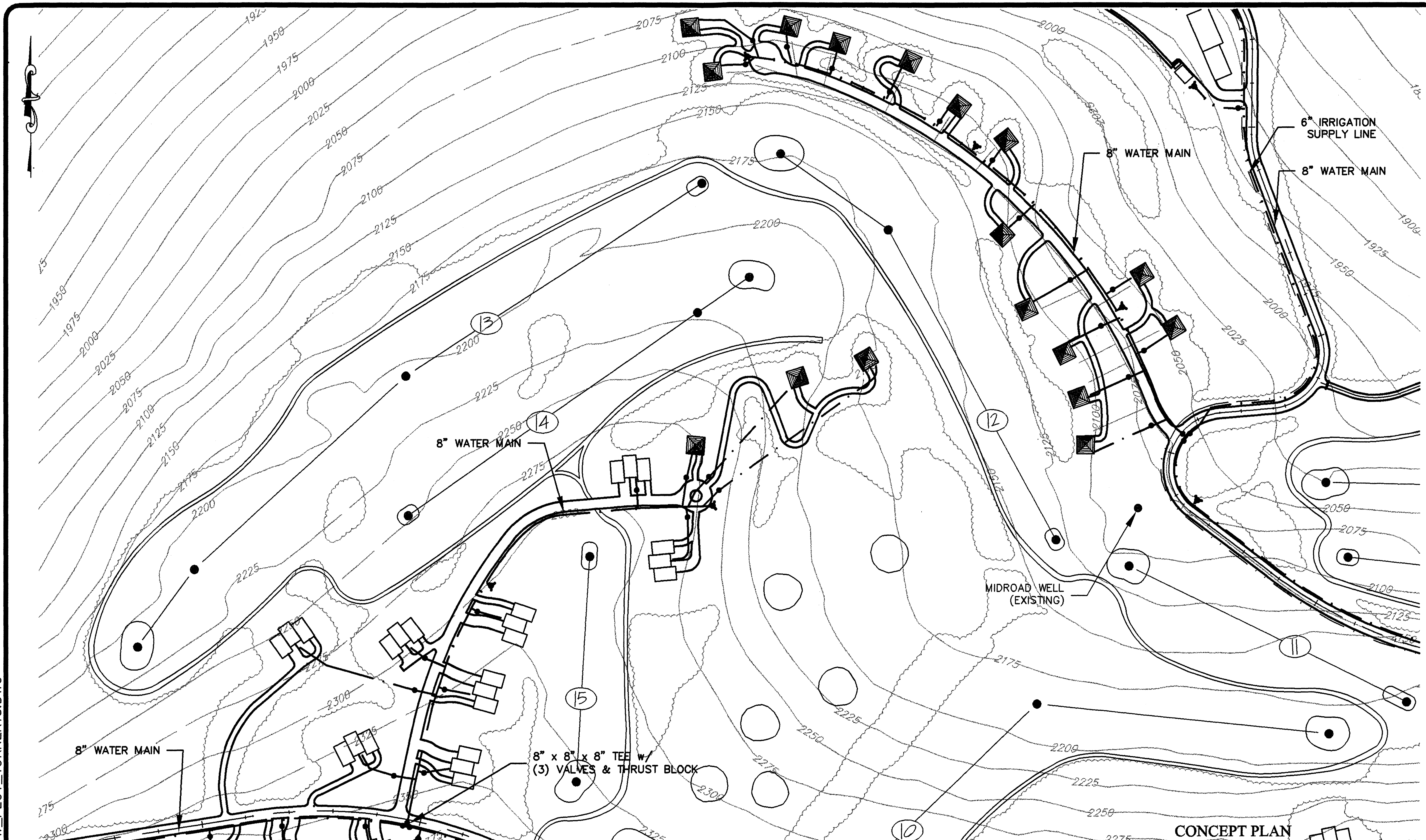
WATER DISTRIBUTION SYSTEM

BIG INDIAN PLATEAU /
BIG INDIAN RESORT AND SPA

JANUARY 2002

SHEET 5

FILENAME: W_PLOT_TURNER12.DWG



FILENAME: W_PLOT_TURNER13.DWG

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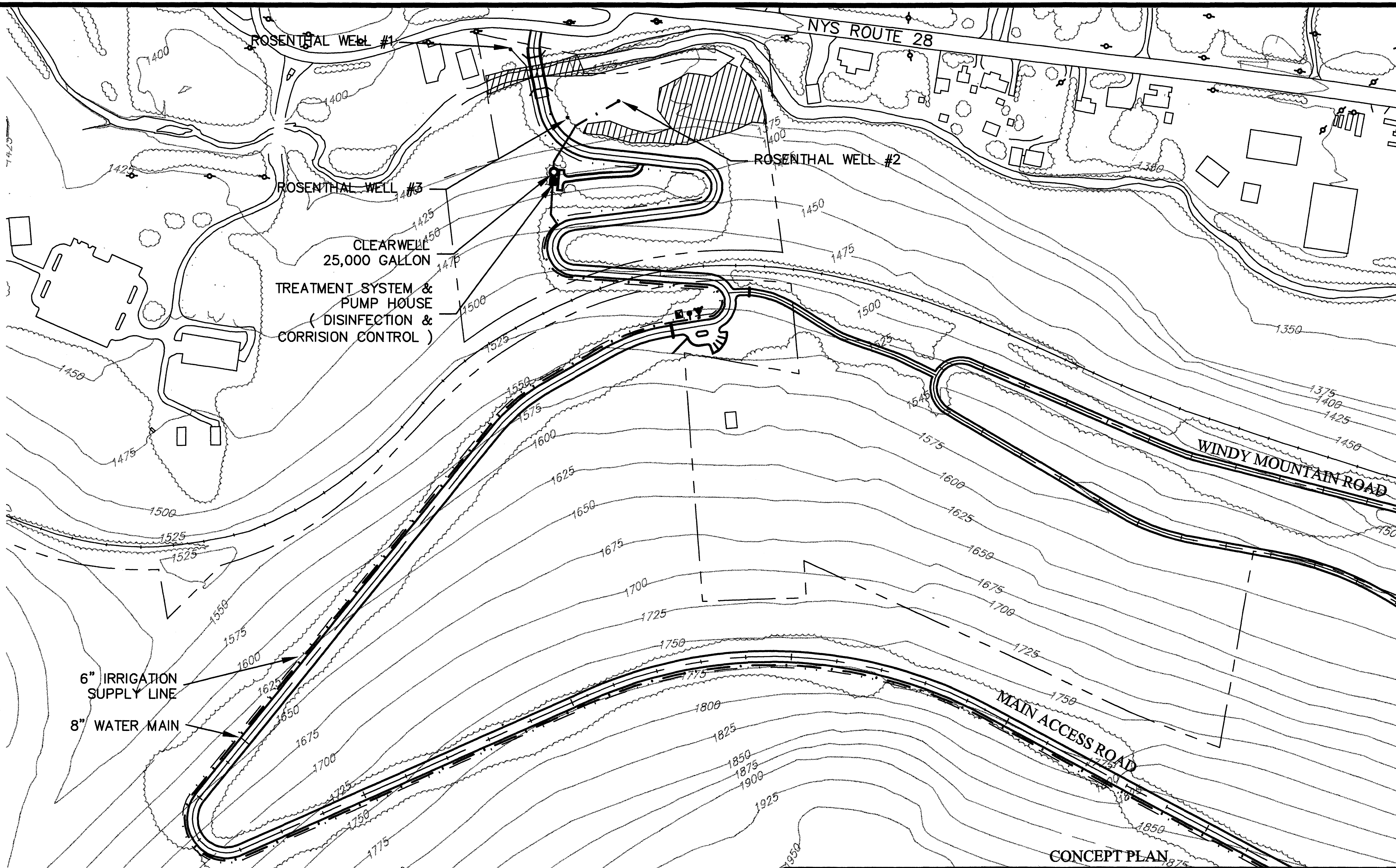
WATER DISTRIBUTION SYSTEM
BIG INDIAN PLATEAU /
BIG INDIAN RESORT AND SPA

JANUARY 2002

SHEET 6



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WATER DISTRIBUTION SYSTEM

BIG INDIAN PLATEAU /
BIG INDIAN RESORT AND SPA

JANUARY 2002

SHEET 7

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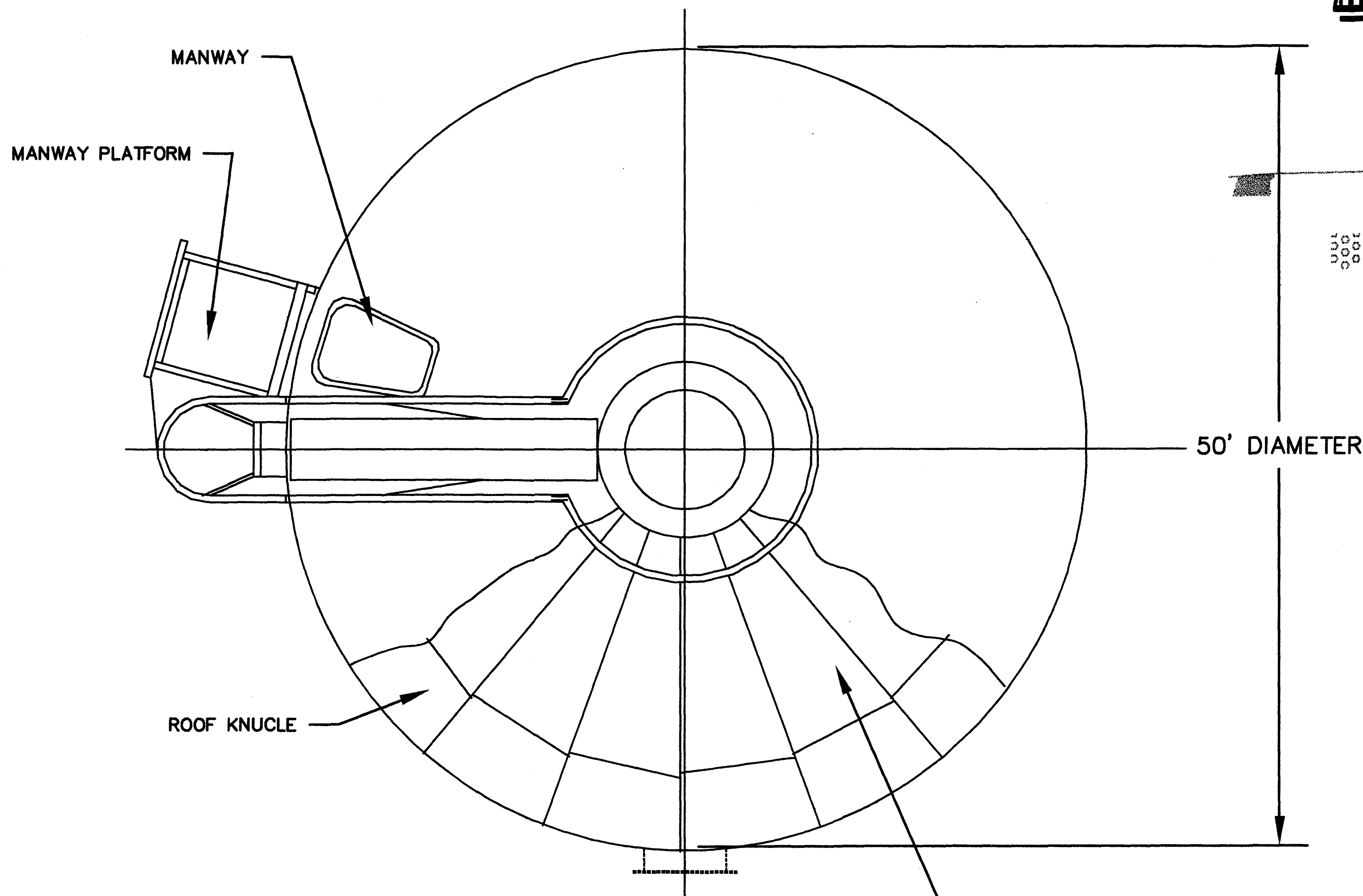
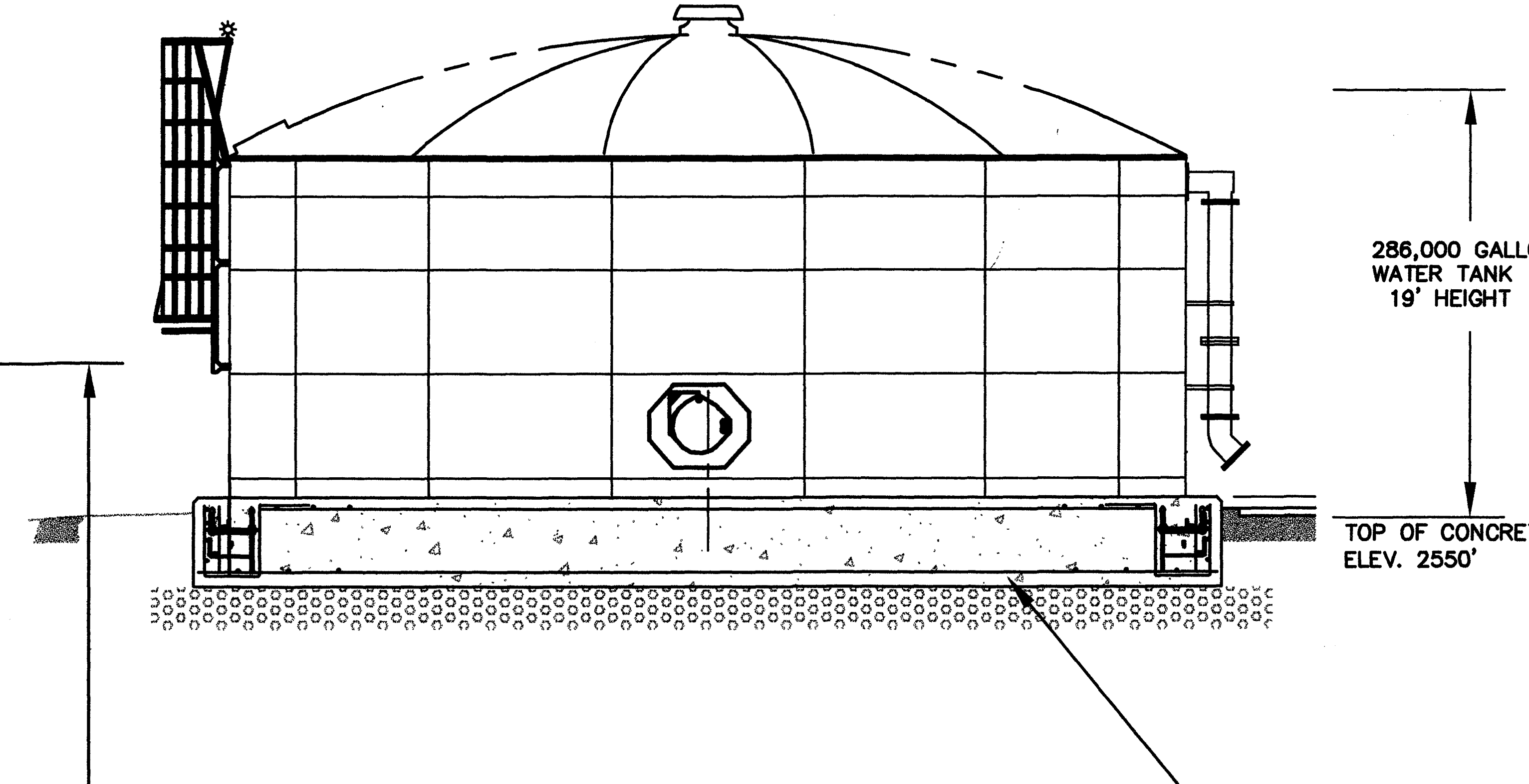


PLAN - WATER TANK
SCALE: 1" = 6'



SECTION - WATER TANK
SCALE: 1" = 6'

FILENAME: RIDGE_PUMP_TANK_SMALL.DWG

CONCEPT PLAN

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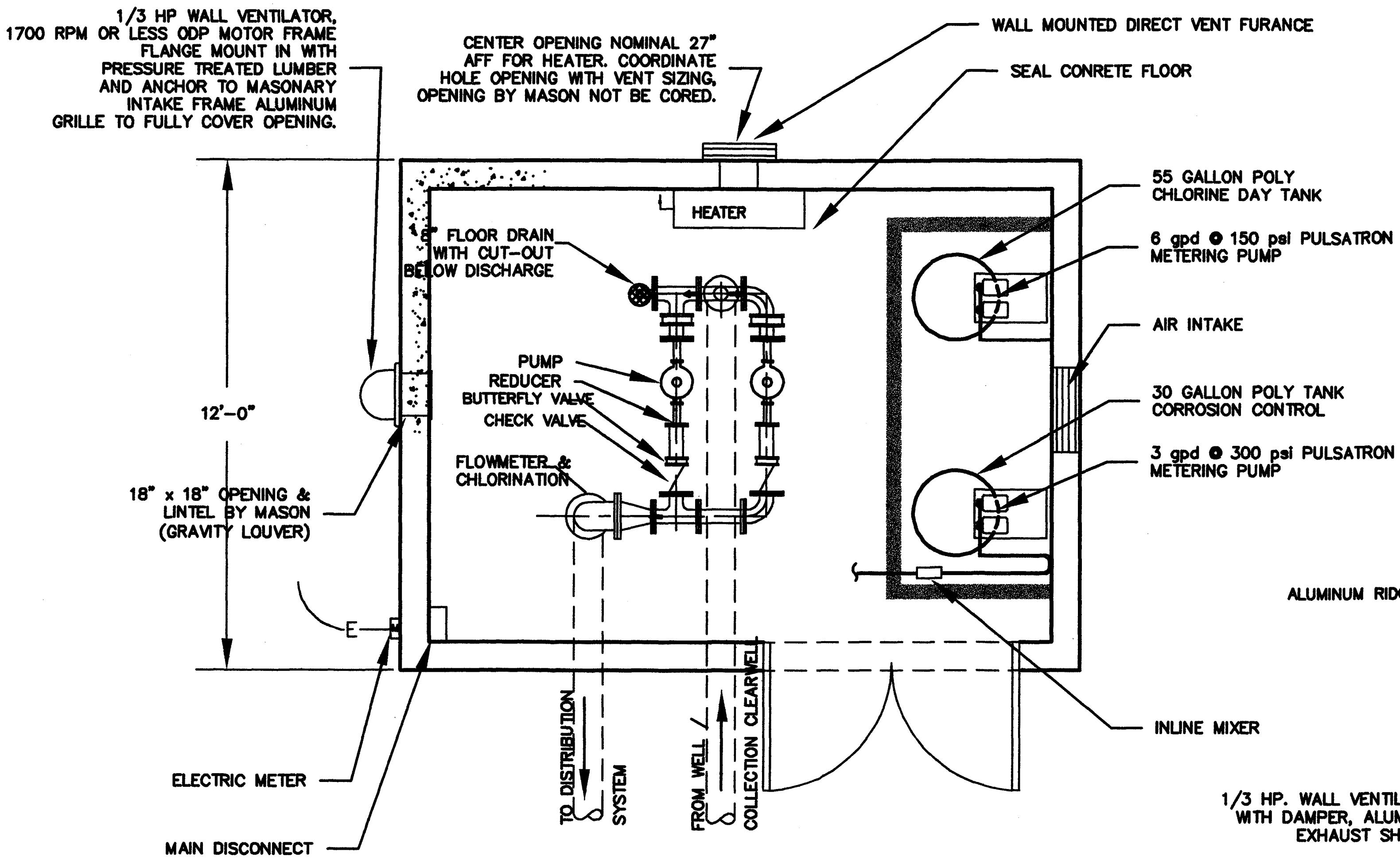
WATER - STORAGE TANK

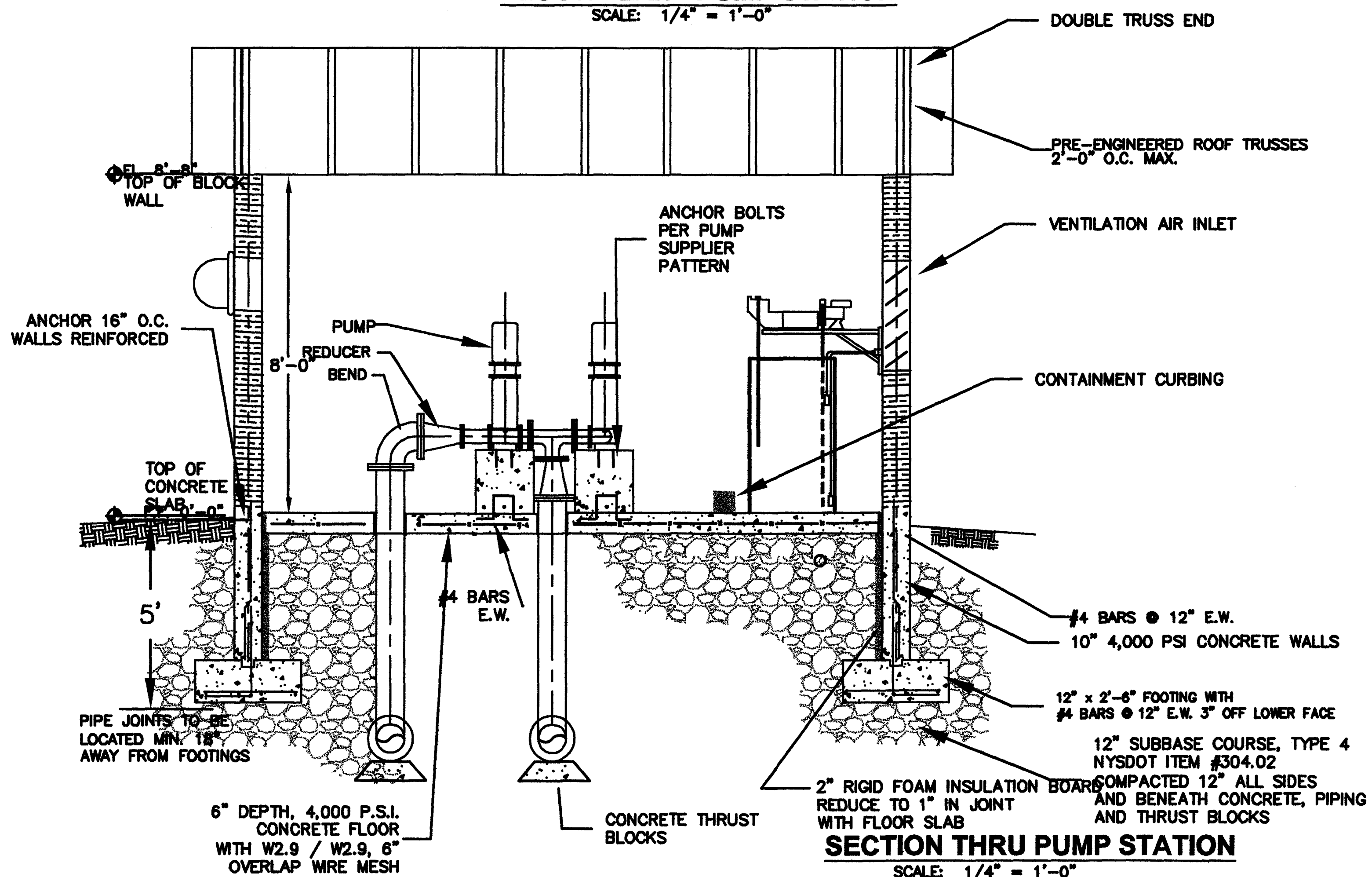
BIG INDIAN PLATEAU

JANUARY 2002

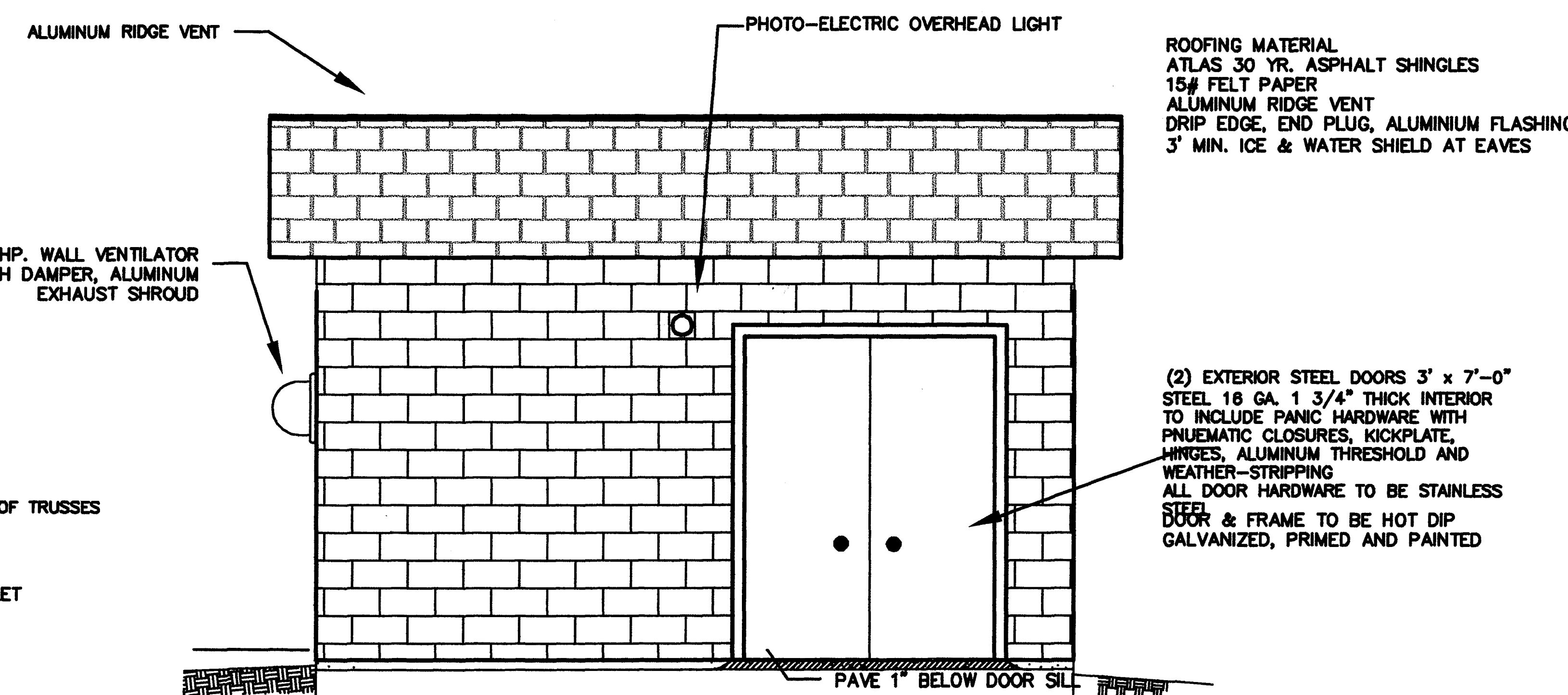
SHEET 8



FLOOR PLAN - PUMP STATION
SCALE: 1/4" = 1'-0"



SECTION THRU PUMP STATION
SCALE: 1/4" = 1'-0"



FRONT ELEVATION - PUMP STATION
SCALE: 1/4" = 1'-0"

CONCEPT PLAN

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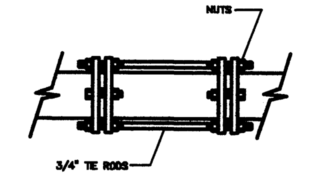
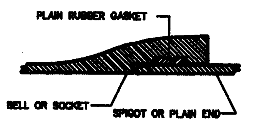
WATER - PUMP STATION
BIG INDIAN PLATEAU
JANUARY 2002
SHEET 9

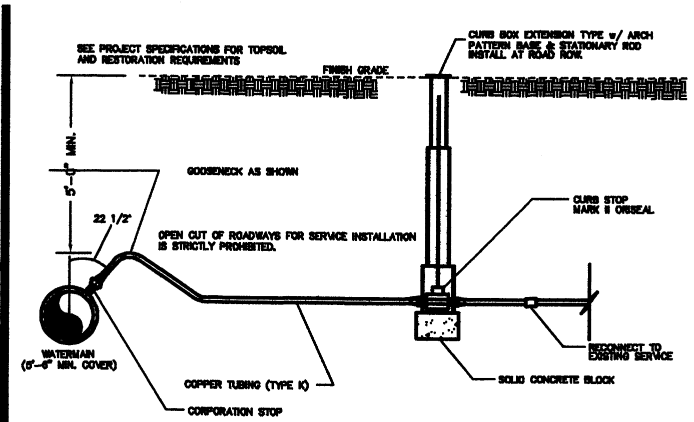
FILENAME: RIDGE_PUMP_TANK_SMALL.DWG



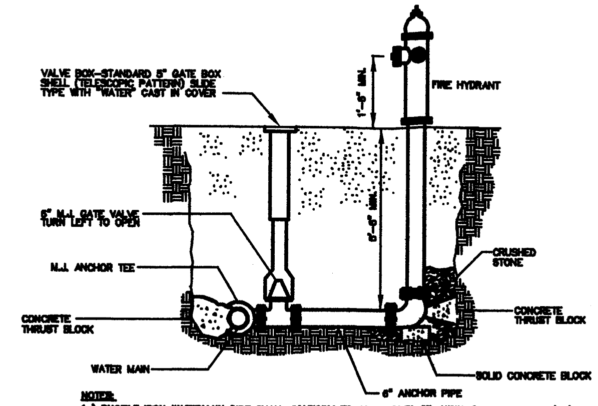
RETAINER GLAND & ROD DETAIL
SCALE: NOT TO SCALE



PUSH ON JOINT
SCALE: NOT TO SCALE



TYPICAL WATER SERVICE CONNECTION DETAIL
SCALE: NOT TO SCALE



NOTES:

1) DUCTILE IRON WATERMAIN PIPE SHALL CONFORM TO ANSI A21.51 OR AWWA C-151 CLASS 2 (52) THICKNESS DESIGNATION, CASTINGS, MARKINGS, TESTING AND INSTALLATION STANDARDS.
2) HYDRANT EXTENSIONS SHALL BE PROVIDED AS NECESSARY AT NO ADDITIONAL COST.
3) AT LOCATIONS OF HIGH GROUNDWATER, HYDRANT DRIP RODS SHALL BE TIED SHUT (AOBE).
4) HYDRANT, MARKERS ETC. MUST ALL BE LOCATED WITHIN ROW.

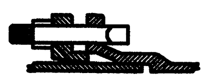
TYPICAL HYDRANT DETAIL
SCALE: NOT TO SCALE

TABLE NO. 1
THRUST BLOCK AREA REQUIRED

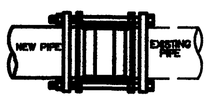
0–50 PSI TEST PRESSURE THRUST AREA REQ'D FT.^{2}						50–100 PSI TEST PRESSURE THRUST AREA REQ'D FT.^{2}						100–150 PSI TEST PRESSURE THRUST AREA REQ'D FT.^{2}					
NOMINAL PIPE DIAMETER	DEAD END	90° BEND	45° BEND	22 1/2° BEND	11 1/4° BEND	NOMINAL PIPE DIAMETER	DEAD END	90° BEND	45° BEND	22 1/2° BEND	11 1/4° BEND	NOMINAL PIPE DIAMETER	DEAD END	90° BEND	45° BEND	22 1/2° BEND	11 1/4° BEND
4	1.0	1.0	1.0	1.0	1.0	4	1.0	2.0	1.0	1.0	1.0	4	2.0	2.0	1.0	1.0	1.0
6	1.0	2.0	1.0	1.0	1.0	6	2.0	3.0	2.0	1.0	1.0	6	3.0	4.0	2.0	1.0	1.0
8	2.0	3.0	1.0	1.0	1.0	8	3.0	5.0	3.0	2.0	1.0	8	5.0	7.0	4.0	2.0	1.0
10	3.0	3.0	2.0	1.0	1.0	10	5.0	7.0	4.0	2.0	1.0	10	8.0	11.0	6.0	3.0	2.0
12	4.0	5.0	3.0	2.0	1.0	12	7.0	10.0	5.0	3.0	2.0	12	10.0	15.0	8.0	4.0	2.0
16	8.0	6.0	4.0	3.0	2.0	16	8.0	12.0	8.0	4.0	3.0	16	12.0	18.0	10.0	8.0	4.0

TABLE NO. 2
RESTRAINING ROD REQUIREMENTS FOR MECHANICAL JOINT PIPING SYSTEMS

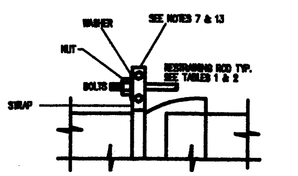
0–50 PSI TEST PRESSURE NUMBER & SIZE OF RESTRAINING RODS						50–100 PSI TEST PRESSURE NUMBER & SIZE OF RESTRAINING RODS						100–150 PSI TEST PRESSURE NUMBER & SIZE OF RESTRAINING RODS					
NOMINAL PIPE DIAMETER	DEAD END	90° BEND	45° BEND	22 1/2° BEND	11 1/4° BEND	NOMINAL PIPE DIAMETER	DEAD END	90° BEND	45° BEND	22 1/2° BEND	11 1/4° BEND	NOMINAL PIPE DIAMETER	DEAD END	90° BEND	45° BEND	22 1/2° BEND	11 1/4° BEND
4	(2) 3/4"	(2) 3/4"	(2) 3/4"	(2) 3/4"	(2) 3/4"	4	(2) 3/4"	(2) 3/4"	(2) 3/4"	(2) 3/4"	(2) 3/4"	4	(2) 3/4"	(2) 3/4"	(2) 3/4"	(2) 3/4"	(2) 3/4"
6	(2) 3/4"	(2) 3/4"	(2) 3/4"	(2) 3/4"	(2) 3/4"	6	(2) 3/4"	(2) 3/4"	(2) 3/4"	(2) 3/4"	(2) 3/4"	6	(2) 3/4"	(2) 3/4"	(2) 3/4"	(2) 3/4"	(2) 3/4"
8	(2) 3/4"	(2) 3/4"	(2) 3/4"	(2) 3/4"	(2) 3/4"	8	(2) 3/4"	(2) 3/4"	(2) 3/4"	(2) 3/4"	(2) 3/4"	8	(2) 3/4"	(2) 3/4"	(2) 3/4"	(2) 3/4"	(2) 3/4"
10	(2) 3/4"	(2) 3/4"	(2) 3/4"	(2) 3/4"	(2) 3/4"	10	(2) 3/4"	(2) 3/4"	(2) 3/4"	(2) 3/4"	(2) 3/4"	10	(4) 3/4"	(4) 3/4"	(2) 3/4"	(2) 3/4"	(2) 3/4"
12	(2) 3/4"	(2) 3/4"	(2) 3/4"	(2) 3/4"	(2) 3/4"	12	(4) 3/4"	(4) 3/4"	(2) 3/4"	(2) 3/4"	(2) 3/4"	12	(4) 3/4"	(4) 3/4"	(2) 3/4"	(2) 3/4"	(2) 3/4"
16	(4) 3/4"	(4) 3/4"	(4) 3/4"	(4) 3/4"	(4) 3/4"	16	(6) 3/4"	(6) 3/4"	(4) 3/4"	(4) 3/4"	(4) 3/4"	16	(6) 3/4"	(6) 3/4"	(4) 3/4"	(4) 3/4"	(4) 3/4"



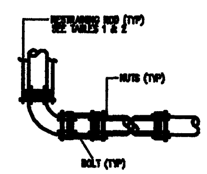
MECHANICAL JOINT
SCALE: NOT TO SCALE



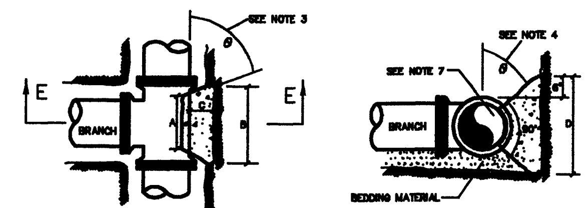
SOLID SLEEVE
SCALE: NOT TO SCALE



STRAPPING DETAIL
SCALE: NOT TO SCALE



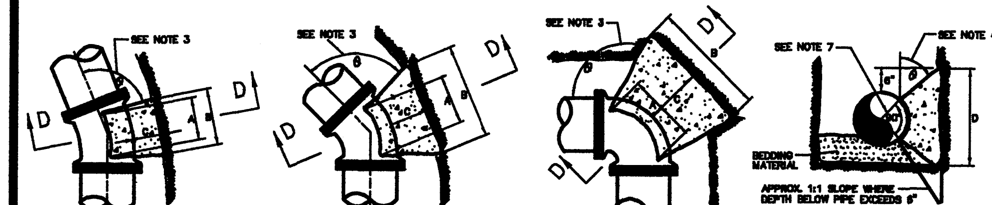
RESTRAINING ROD DETAIL FOR MECHANICAL JOINT PIPE
SCALE: NOT TO SCALE



PLAN
SCALE: NOT TO SCALE

SECTION E - E
SCALE: NOT TO SCALE

THRUST BLOCK DETAILS (TEES)



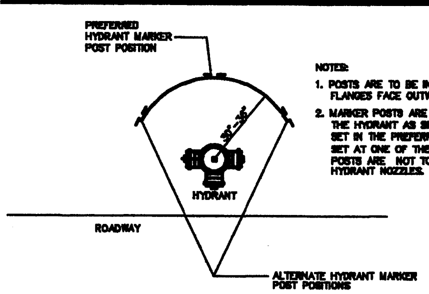
PLAN
11 1/4° & 22 1/2° BENDS

PLAN
45° BEND

PLAN
90° BEND

SECTION D - D

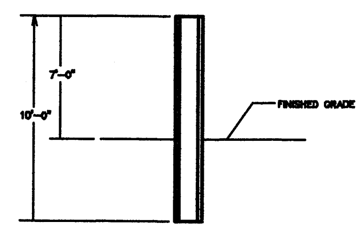
THRUST BLOCK DETAILS (BENDS)



NOTES:

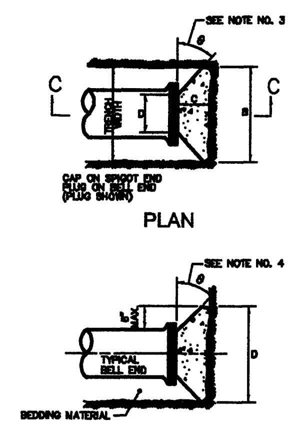
1. POSTS ARE TO BE INSTALLED SO THAT THE EDGE FLANGES FACE OUTWARD AS SHOWN.
2. MARKER POSTS ARE TO BE SET DIRECTLY BEHIND THE HYDRANT AS SHOWN. IF POSTS CANNOT BE SET IN THE PREFERRED LOCATION THEY MAY BE SET AT ONE OF THE ALTERNATE POSITIONS SHOWN. POSTS ARE NOT TO BE PLACED IN FRONT OF HYDRANT NOZZLES.

PLAN



ELEVATION

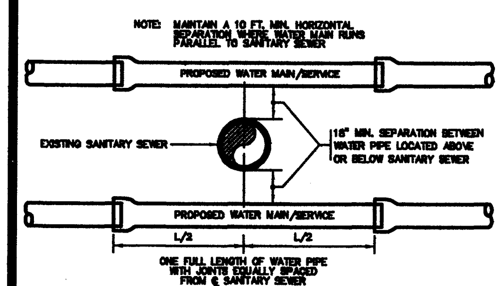
HYDRANT MARKER POST
SCALE: NOT TO SCALE



PLAN

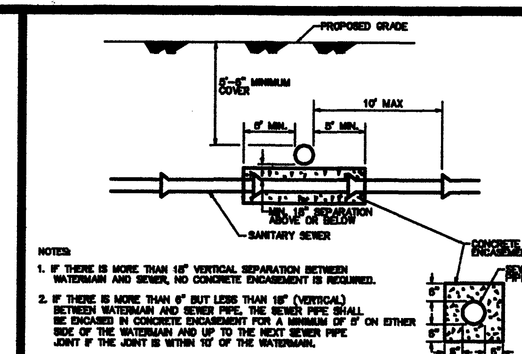
SECTION C-C

THRUST BLOCK DETAIL FOR DEAD END



TYPICAL WATER / SANITARY SEWER CROSSING
SCALE: NOT TO SCALE

NOTE:
WHERE 18" VERTICAL SEPARATION IS NOT POSSIBLE THE CONTRACTOR SHALL REFER TO THE CONCRETE ENCASEMENT DETAIL.



NOTES:

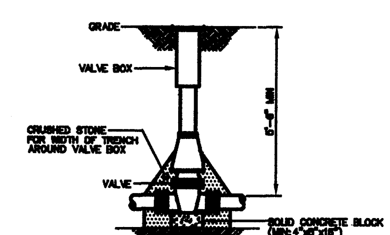
1. IF THERE IS MORE THAN 18" VERTICAL SEPARATION BETWEEN WATERMAIN AND SEWER, NO CONCRETE ENCASEMENT IS REQUIRED.
2. IF THERE IS MORE THAN 6" BUT LESS THAN 18" (VERTICAL) BETWEEN WATERMAIN AND SEWER PIPE, THE SEWER PIPE SHALL BE ENCASED IN CONCRETE ENCASEMENT FOR A MINIMUM OF 5' ON EITHER SIDE OF THE WATERMAIN AND UP TO THE NEXT SEWER PIPE JOINT IF THE JOINT IS WITHIN 10' OF THE WATERMAIN.

SECTION VIEW

WATER MAIN / SANITARY SEWER CROSSING CONCRETE ENCASEMENT
SCALE: NOT TO SCALE

WATER NOTES:

1. WHERE A HORIZONTAL BEND IS MADE, THE PIPING SHALL BE RESTRAINED BY MEANS OF A THRUST BLOCK AS DETAILED ON THIS SHEET. WHERE VERTICAL OFFSETS ARE MADE , THE TOP BEND SHALL BE RESTRAINED BY RESTRAINING RODS AND STRAPS, CONCRETE THRUST ANCHOR BLOCKS AND RESTRAINING RODS, OR A COMBINATION OF BOTH. THE BOTTOM BENDS SHALL BE RESTRAINED BY CONCRETE THRUST BLOCKS AS DETAILED.
2. "A", "B" AND "D" DIMENSIONS SHALL BE AS LARGE AS POSSIBLE WITHOUT INTERFERING WITH THE MECHANICAL JOINTS OR THE BOLTS.
3. "C" DIMENSIONS SHALL BE LARGE ENOUGH TO MAKE ANGLE EQUAL TO OR LARGER THAN 45°.
4. ANGLE θ SHALL BE EQUAL TO OR LARGER THAN 45°.
5. "B" AND "D" DIMENSIONS SHALL PROVIDE REQUIRED BLOCKING AREA AS LISTED IN TABLE 1. REFER TO THE SPECIFICATIONS FOR THE PRESSURE RATING OF THE PIPING SYSTEMS.
6. CONCRETE SHALL BEAR ON THE CONCRETE QUADRANT OF PIPE AS A MINIMUM. SEE DETAIL THIS SHEET.
7. WHERE THRUST BLOCKS ARE NOT POSSIBLE BECAUSE OF POOR SOIL CONDITIONS OR LACK OF ROOM, STRAPPING SHALL BE PERMITTED. THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER FOR REVIEW & APPROVAL A LIST OF RESTRAINT MATERIAL, DETAILS OF THE RESTRAINT & METHODS OF CONSTRUCTION, AND SIZES OF ALL RESTRAINT MEMBERS HE DESIRES TO USE FOR THRUST ANCHOR BLOCKS, RESTRAINING RODS AND STRAPS. REFER TO THE SPECIFICATIONS FOR THE PRESSURE RATING OF THE PIPING SYSTEMS.
8. THE THRUST BLOCK AREAS SHOWN IN TABLE 1 ARE CALCULATED USING A SOIL BEARING CAPACITY OF 2000 psf. IF GREATER SOIL BEARING CAPACITY IS AVAILABLE, THE CONTRACTOR MAY, AFTER REVIEW AND APPROVAL BY THE ENGINEER, REDUCE THE THRUST BLOCK AREAS SHOWN ON TABLE 1. THE THRUST BLOCK AREA SHALL BE INCREASED IF THE SOIL IS NOT CAPABLE OF PROVIDING 2000 psf SOIL BEARING CAPACITY.
9. THE CONCRETE FOR BUTTRESSES SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 3000 psi.
10. IF THE CONTRACTOR DESIRES TO USE ALTERNATE METHODS OF RESTRAINT, HE SHALL SUBMIT A RESTRAINT SCHEDULE TO THE ENGINEER FOR REVIEW & APPROVAL, DETAILING THE SYSTEM HE PROPOSES TO USE.
11. RESTRAINT RODS FOR BOTH INTERIOR AND EXTERIOR PIPING SYSTEMS SHALL BE INSTALLED IN ACCORDANCE WITH THE NUMBER & SIZE LISTED IN TABLE 1 AND/OR TABLE 2. THE NUMBER & SIZE OF RESTRAINING RODS IN TABLES 1 & 2 ARE CALCULATED USING ASTM A307 STEEL. THE RESTRAINT RODS SHALL BE ANCHORED TO PROVIDE A RIGID PIPING SYSTEM. THE CONTRACTOR SHALL SUBMIT DETAILS OF THE SYSTEM TO THE ENGINEER FOR REVIEW & APPROVAL. ALL RESTRAINING RODS SHALL BE EQUALLY SPACED AROUND THE CIRCUMFERENCE OF THE PIPE. INTERIOR RESTRAINING RODS SHALL BE PAINTED THE SAME PAINTING SYSTEM SPECIFIED FOR THE PIPING SYSTEM. EXTERIOR RESTRAINING RODS AND MISCELLANEOUS STEEL MATERIALS SHALL BE COATED WITH A BITUMASTIC PAINT SUCH AS KOPPERS NO. 505, MOBILE, OR APPROVED EQUAL.
12. THE CONTRACTOR SHALL SIZE ALL STRAPS, BOLTS, AND WASHERS TO BE COMPATIBLE WITH THE STRENGTH OF THE RESTRAINING RODS AND THE DETAILS SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW AND APPROVAL.
13. THE CONTRACTOR SHALL REFER TO THE LATEST EDITION OF "A GUIDE FOR THE INSTALLATION OF DUCTILE IRON PIPE" PUBLISHED BY THE CAST IRON PIPE RESEARCH ASSOCIATION FOR DESIGN AND INSTALLATION OF RESTRAINT SYSTEM.
14. ALL FITTINGS SHALL BE MECHANICAL JOINT WITH RETAINER GLANDS, TYPE 1.
15. WHERE SHOWN ON THE PLANS ALL DUCTILE IRON PIPING, FITTINGS ETC. SHALL BE POLYETHYLENE ENCASED IN ACCORDANCE WITH THE LATEST STANDARDS OF THE AWWA.
16. THE CONTRACTOR SHALL INSTALL BRASS WEDGES IN ACCORDANCE WITH THE LATEST STANDARDS OF THE AWWA.



NOTES:
1. VALVE BOX SHALL BE CENTERED ON VALVE AND SET ON COMPACTED BACKFILL.
2. VALVE SHALL NOT SUPPORT VALVE BOX.

VALVE
SCALE: NOT TO SCALE

CONCEPT PLAN

DELAWARE ENGINEERING, P.C.
28 Madison Avenue Extension
Albany, New York 12203
Phone 518-452-1290
FAX 518-452-1335

WATER DETAILS

BIG INDIAN PLATEAU

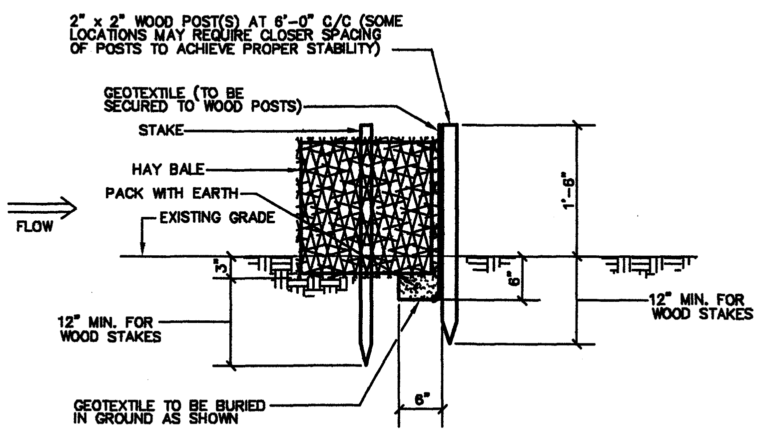
JANUARY 2002

SHEET 10

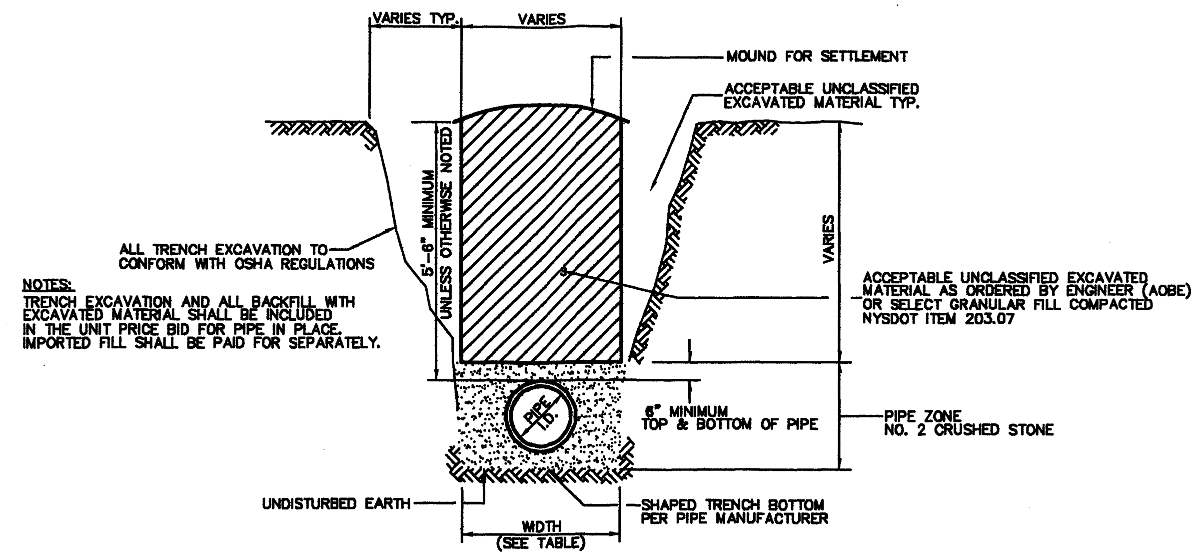
CONSTRUCTION NOTES FOR FABRICATED SILT FENCE

1. WOVEN WIRE FENCE TO BE FASTENED SECURELY TO FENCE POSTS WITH WIRE TIES OR STAPLES.
2. FILTER CLOTH TO BE FASTENED SECURELY TO WOVEN WIRE FENCE WITH TIES SPACED EVERY 24" AT TOP AND MID SECTION.
3. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER THEY SHALL BE OVERLAPPED BY SIX INCHES AND FOLDED.
4. MAINTENANCE SHALL BE PERFORMED AS NEEDED AND MATERIAL REMOVED WHEN "BULGES" DEVELOP IN THE SILT FENCE.

POSTS: STEEL EITHER "T" OR "U" TYPE OR 2" HARDWOOD
FENCE: WOVEN WIRE, 14 6" MAX. MESH OPENING
FILTER CLOTH: FILTER X, MIRAFI 100X, STABILINKA T140N OR APPROVED EQUAL.
PREFABRICATED UNIT: GEOFAB, ENVIROFENCE OR APPROVED EQUAL.



SILT FENCE / HAY BALE DETAIL
SCALE: NOT TO SCALE



TYPICAL TRENCH IN WET AREAS
SCALE: NOT TO SCALE

PIPE SIZE I.D. INCHES	MIN. SUGGESTED TRENCH WIDTH FOR AMPLE WORKING SPACE (I.D. PLUS 27 INCHES)	MAX. TRENCH WIDTH ALLOWED = MAX. PAY LIMITS (I.D. PLUS 36 INCHES)
I.D.	W MIN.	W MAX.
2" OR LESS	29	38
3	30	39
4	31	40
6	33	42
8	35	44
10	37	46
12	39	48
15	42	51
18	45	54
21	48	57
24	51	60

SOIL EROSION & SEDIMENT CONTROL NOTES

1) DURING THE COURSE OF CONSTRUCTION, THE CONTRACTOR SHALL CONDUCT HIS OPERATIONS TO PREVENT OR REDUCE TO A MINIMUM ANY DAMAGE TO THE STREAM FROM POLLUTION BY DEBRIS, SEDIMENT OR OTHER FOREIGN MATERIALS OR FROM THE MANIPULATION OF EQUIPMENT AND/OR MATERIALS IN OR NEAR THE STREAM. THE CONTRACTOR SHALL NOT RETURN DIRECTLY TO THE STREAM OR TO A DITCH IMMEDIATELY FLOWING INTO THE STREAM ANY WATER WHICH HAS BEEN USED FOR WASH PURPOSES OR SIMILAR OPERATIONS WHICH CAUSES THIS WATER TO BECOME POLLUTED WITH SAND, SILT, CEMENT, OIL, OR OTHER IMPURITIES. WATER PUMPED FROM WITHIN COFFERDAMS, FORMS, AND/OR DEWATERING PITS SHALL NOT BE DIRECTLY DISCHARGED INTO THE STREAM BUT RATHER SHALL BE FILTERED THROUGH DIRT BAGS OR USING HAYBALES AND GEOTEXTILE FABRIC. THE FILTERING SYSTEM SHALL BE OF SUFFICIENT CAPACITY TO HANDLE THE DISCHARGE OF THE PUMPS SUCH THAT WATER RETURNING TO THE STREAM IS AS CLEAR AS WATER RUNNING IN THE STREAM.

2) ALL EXCAVATED MATERIAL SHALL BE DISPOSED OF ON AN UPLAND SITE AND BE SUITABLY STABILIZED SO THAT IT CANNOT REENTER ANY WATERBODY AREA.

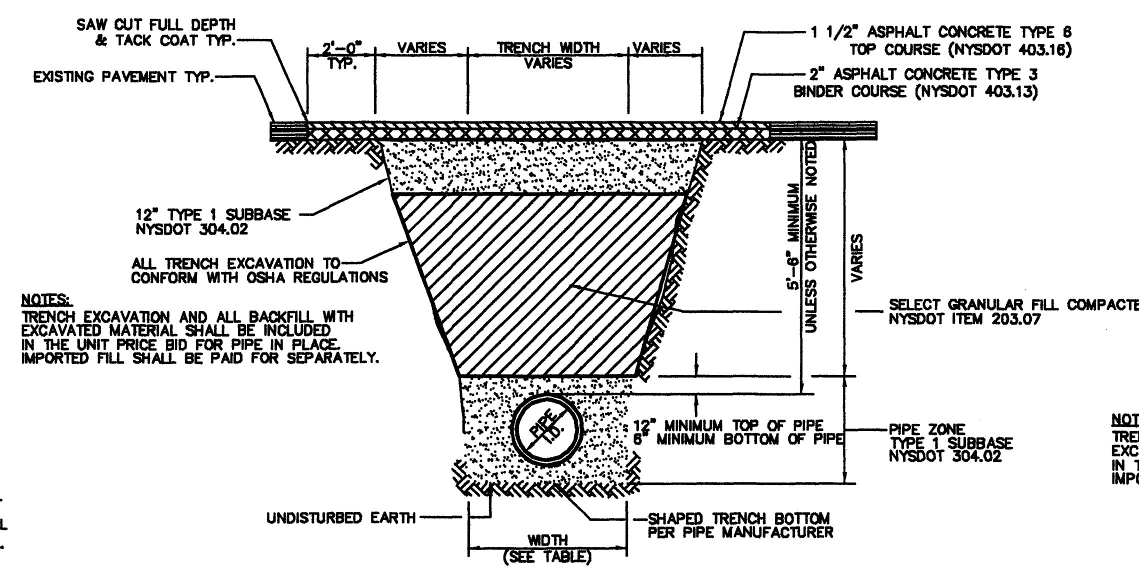
3) USE TEMPORARY MULCH, HAY BALE BARRIERS OR SILT FENCING AS NECESSARY TO PREVENT ANY DISTURBED AREAS FROM ERODING INTO ANY WATERBODY.

4) ALL EROSION CONTROL MEASURES SHALL BE IN PLACE BEFORE COMMENCING WORK ON PROJECT SITE. CONTRACTOR SHALL MAINTAIN ALL EROSION CONTROL MEASURES DURING THE ENTIRE CONSTRUCTION PROJECT.

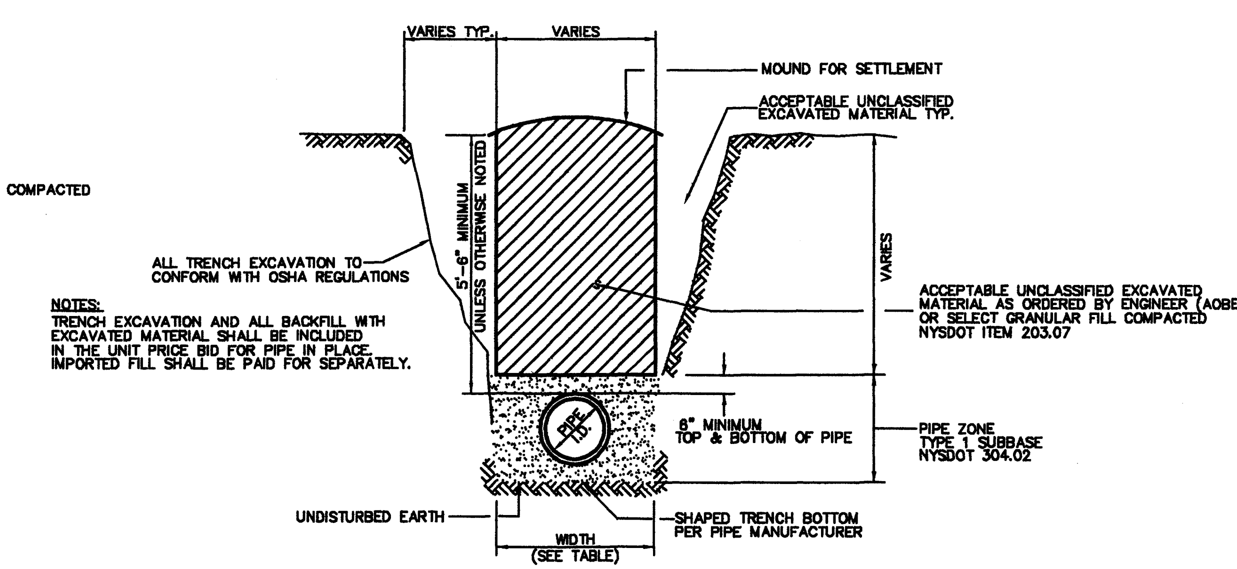
5) EROSION CONTROL MEASURES SHALL BE REMOVED UPON ESTABLISHMENT OF PERMANENT SURFACE STABILIZATION. COMPLETE STABILIZATION (TEMPORARY OR PERMANENT) SHALL COMMENCE WITHIN 7 CALENDAR DAYS FOLLOWING COMPLETION OF WORK IN GIVEN AREA.

6) WETLAND AREAS DISTURBED DUE TO CONSTRUCTION SHALL BE RETURNED TO THEIR ORIGINAL STATE. EXCESS SOIL SHALL BE REMOVED AND DISPOSED OF OUTSIDE THE WETLANDS.

7) THE CONTRACTOR SHALL REMOVE FROM THE PROJECT SITE ALL TRASH & DEBRIS IN A TIMELY MANNER.



TYPICAL TRENCH IN ROADWAY
SCALE: NOT TO SCALE



TYPICAL TRENCH IN EARTH OR ROCK
SCALE: NOT TO SCALE

CONCEPT PLAN

DELAWARE ENGINEERING, P.C.
28 Madison Avenue Extension
Albany, New York 12203
Phone 518-452-1290
FAX 518-452-1335

WATER DETAILS
BIG INDIAN PLATEAU
JANUARY 2002

SHEET 11

FILENAME: RIDGE_MISC_DETAILS_SMALL.DWG

WATER CONSERVATION PROGRAM FORM

DEPARTMENT OF ENVIRONMENTAL CONSERVATION

WATER CONSERVATION PROGRAM FORM

(Revised - June 1998)

TO BE COMPLETED AND SUBMITTED AS PART OF A NYSDEC WATER SUPPLY PERMIT APPLICATION
***SEE PAGE 6 FOR FURTHER INTRODUCTION AND INSTRUCTION REGARDING THIS FORM ***

If your water system already has its own written water conservation program, please feel free to submit it as a supplement to this WCPF. If your system is new, please indicate the water conservation measures that will be taken when the system is completed (e.g. All sources of supply and customers will be 100% metered)

I. GENERAL SYSTEM INFORMATION

Name of Applicant: Big Indian Water Works Corp.		**DEC No.**
Street Address: P.O. Box 267, Andrew Lane Rd.		**WSA No.**
Post Office: Mt. Tremper	**County:** Ulster	**State & ZIP:** New York 12457
Name & Title of Contact: Dean Gitter		
Street Address: Same as above		
Post Office: Same as above	**State & ZIP:** Same as above	
Applicant's Telephone: 845-688-7740	**Contact's Telephone:**	

II. SOURCES OF WATER SUPPLY

Please give amounts in gallons per minute (**gpm**), per day (**gpd**) or million gallons per day (**mgd**).

Source Type: **S** = Surface supply, **G** = Ground supply, **P** = Purchased supply
Source Status: **R** = Regular use, **S** = Standby use, **E** = Emergency use

Name of Source	Source Type	Source Status	Tested Capacity	Actual Current Withdrawal	Start-up Year
Rosenthal Well #2	G	R	118,080	0	2002
Silo A Spring	G	R	99,792	0	2002

Name of Applicant:	WSA No.

III. WATER USAGE AND METERING

The water production data requested in this section should be available from the monthly "Water System Operation Reports" required by the State or Local Department of Health.

For unmetered systems, please provide your best estimates for water production and/or consumption.

Are all sources of supply (including major interconnections) equipped with master meters?			
What percentage of your system is metered? %		How often are they read?	
Number of service connections?		Total population served?	
How many meters are recalibrated and/or replaced each year?			
Water Production for calendar year ____		**Water Consumption for calendar year ____**	
Total metered water production :		Total metered water consumption:	
Average day production (total/365):		Average day consumption (total/365):	
Peak day production (largest single day):		Per capita usage per day (avg. day/pop. served):	(gpcd)

What are your future goals and schedule for water system metering? All sources of supply and connections will be 100% metered. Master meters and service meters will be tested and calibrated annually and replaced at least once every 15 years.

Recommendations:

* 100% metering of all water system connections, including public buildings.

* Master meters should be tested and calibrated annually.

* Customer meters should be recalibrated or replaced at least once every 15 years or in accordance with an optimum meter replacement schedule developed using the American Water Works Association (AWWA) Manual M6.

* Quarterly meter reading and prompt billing with rates that reflect amount of water used.

Name of Applicant:	WSA No.

IV. WATER SUPPLY AUDIT

Do you conduct a system water audit at least once each year? ________.
If yes, please submit a copy of your latest audit in addition to completing the following section.

** Water Supply Audit for Calendar Year _____

				% of Total
Total metered water production (from previous section)		Total		
Total metered water consumed (from previous section)		subtract		
Authorized unmetered usage		subtract		
e.g. Unmetered public bldgs. Firefighting & training Main flushing Street cleaning		subtract		
		subtract		
		subtract		
Water lost to leaks that have since been repaired		subtract		
TOTAL UNACCOUNTED-FOR WATER		Sub-total		
Unaccounted-for water breakdown	Meter under-registration	subtract		
	Unrepaired leakage	subtract		
	Other:	subtract		
** Water measurement and accounting techniques are available in NYSDEC's January 1989, (re-printed February 1998) Water Conservation Manual.			0	

What are your future goals for water system auditing? Once a year a system audit will be conducted using metered water production and consumption data. Estimates will be recorded for authorized unmetered use.

Recommendations:

* At least once each year, a system water audit should be conducted using metered water production and consumption data to determine unaccounted-for water.

* Quantify all authorized water uses by consumption categories (e.g. residential, industrial, municipal etc.).

* Keep accurate estimates of authorized unmetered water use (e.g. firefighting, main flushing, etc.).

Name of Applicant:	WSA No.

V. LEAK DETECTION AND REPAIR

Do you regularly survey your system for leaks with listening equipment?

Total miles of distribution pipe	Percent of system surveyed each year	Miles of pipe surveyed each year	Listening equipment used	Year of last survey	Number of leaks found	Number of leaks repaired

Do you have a regular water system rehabilitation program? _____.
If yes, give details: ____

What are your future goals for water system leak detection and repair? A third of the water distribution system will be checked for leaks each year. Leaks will be fixed as soon as possible after detection. A rehabilitation program will be developed.

Recommendations:

* Check at least one third of your water distribution system for leaks each year.

* Fix every detectable leak as soon as possible.

* Have an on-going system rehabilitation program.

Name of Applicant:	WSA No.

VI. WATER USE REDUCTION

Have you distributed information to residential customers on household water saving devices and ways to reduce water use? _____.

Have you distributed water conservation information to industrial and commercial customers that promotes recycling and reuse? ____.

Do you have a program to retrofit public buildings with water savings fixtures and encourage the private sector to do the same? _____.

Do you have lawn sprinkling time restrictions during the summer or periods of peak demand?____.
If yes, please describe: ____

Do you have a plan that takes progressive steps to further reduce outdoor water use during drought conditions with a procedure to assure compliance? ____. If yes, please describe:

____

What are your future goals for reducing water usage? The club membership units and resort facilities will be fitted with water saving fixtures. During times of drought, irrigation will be restricted to the greens and tees of the golf course.

Recommendations:

* Carry out a public information program that promotes water conservation practices by all categories of water users (e.g. residential, commercial, industrial, etc.).

* Retrofit public buildings with water saving fixtures and encourage the private sector to do the same.

* Use lawn sprinkling time restrictions (e.g. Odd/even days, morning and evening hours) during the summer and outdoor water use bans during times of drought.

* Adopt a procedure to be followed in times of drought that calls for a progression of restrictions on water use specifying: who will reduce, how, and by how much, along with actions to be taken to assure compliance.

Name of Applicant:	WSA No.

VII. CERTIFICATION OF WATER CONSERVATION PROGRAM:

To be signed by the owner or official of the municipality or corporation operating this water system.

I hereby affirm that the information provided on this form is true to the best of my knowledge and belief. False statements made herein are punishable as a Class A misdemeanor pursuant to Section 210.45 of the Penal Law. Date:________ Signature:____________________ Title:__________

***DISCUSSION*:**

Effective January 1, 1989, New York State Environmental Conservation Law (ECL 15-1501) has required that all new applications for a NYSDEC Public Water Supply Permit include a water conservation program. This Water Conservation Program Form (WCPF) is intended to be a guide in completing this requirement.

The WCPF has been set up to cover the following basic elements of a water conservation program: Source Water Inventory, Water Usage and Metering, Water Supply Auditing, Leak Detection/Repair and Water Use Reduction. The recommended actions listed at the bottom of each page represent DEC water conservation policy objectives and should be factored into your program development. Additional water conservation measures such as increasing block water rate structuring, non-residential water use reduction or water efficient landscaping may also play an important role in your system's program and should certainly be considered when applicable.

Water supply permit applicants can consult the NYSDEC publication entitled, "Water Conservation Manual For Development of a Water Conservation Plan", January, 1989 (Re-printed February 1998) for details regarding the development of these water conservation practices. Copies of this manual can be obtained through your DEC Regional Offices.

The American Water Works Association (AWWA) is also an excellent source of information regarding water conservation and public water supply systems in general. Information ranging from technical manuals to public education bill stuffers are available from AWWA at reasonable cost by calling 1-800-926-7337.

As a final note, the old "Bureau of Water Resources" has been incorporated into the "Bureau of Water Permits" and can now be contacted at (518) 457-1157.

COPY OF FULL ENVIRONMENTAL ASSESSMENT FORM (October 1999)

See Appendix 1, SEQRA Documentation

COPY OF BUILDING-STRUCTURE INVENTORY FORM (April 2000)

See Appendix 23, Cultural Resources Investigation Phase 1B

COPY OF JOINT APPLICATION FOR PERMIT

95-19-3 (8/00) pfp

JOINT APPLICATION FOR PERMIT

New York State
United States Army Corps of Engineers

Applicable to agencies and permit categories listed in Item 1. **Please** read all instructions on back. Attach additional information as needed. Please print legibly or type.

1. Check permits applied for:

NYS Dept. of Environmental Conservation
- [ ] Stream Disturbance (Bed and Banks)
- [ ] Navigable Waters (Excavation and Fill)
- [ ] Docks, Moorings or Platforms (Construct or Place)
- [ ] Dams and Impoundment Structures (Construct, Reconstruct or Repair)
- [ ] Freshwater Wetlands
- [ ] Tidal Wetlands
- [ ] Coastal Erosion Control
- [ ] Wild, Scenic and Recreational Rivers
- [ ] 401 Water Quality Certification
- [x] Potable Water Supply
- [ ] Long Island Wells
- [ ] Aquatic Vegetation Control
- [ ] Aquatic Insect Control
- [ ] Fish Control

NYS Office of General Services
(State Owned Lands Under Water)
- [ ] Lease, License, Easement or other Real Property Interest
  Utility Easement (pipelines, conduits, cables, etc.)
- [ ] Docks, Moorings or Platforms (Construct or Place)

Adirondack Park Agency
- [ ] Freshwater Wetlands Permit
- [ ] Wild, Scenic and Recreational Rivers

Lake George Park Commission
- [ ] Docks (Construct or Place)
- [ ] Moorings (Establish)

US Army Corps of Engineers
- [ ] Section 404 (Waters of the United States)
- [ ] Section 10 (Rivers and Harbors Act)
- [ ] Nationwide Permit (s)
  Identify Number(s)

For Agency Use Only:
DEC APPLICATION NUMBER

US ARMY CORPS OF ENGINEERS

2. Name of Applicant (Use full name)
Crossroads Ventures, LLC (TBD Transportation Corp.)
Telephone Number (daytime) 845-688-7740

Mailing Address
P.O. Box 267

Post Office Mount Tremper | **State** NY | **Zip Code** 12457

3. Taxpayer ID (If applicant is not an individual)
14-1813052

4. Applicant is a/an: (check as many as apply)
[x] Owner [ ] Operator [ ] Lessee [ ] Municipality / Governmental Agency

5. If applicant is not the owner, identify owner here - otherwise, you may provide Agent/Contact Person information.
Owner or Agent/Contact Person [x] Owner [ ] Agent /Contact Person
Dean Gitter
Telephone Number (daytime) 845-688-7740

Mailing Address
P.O. Box 267

Post Office Mount Tremper | **State** NY | **Zip Code** 12457

6. Project / Facility Location (mark location on map, see instruction 1a.)
County: Ulster/Delaw
Town/City/Village: Shandaken/Middletown
Tax Map Section/ Block /Lot Number:

Location (including Street or Road)
See attached location map
Telephone Number (daytime)

Post Office | **State** | **Zip Code**

7. Name of Stream or Waterbody (on or near project site)

8. Name of USGS Quad Map:
Shandaken/Fleischmanns
Location Coordinates:
NYTM-E NYTM-N 4

9. Project Description and Purpose: (Category of Activity e.g. new construction/installation, maintenance or replacement; Type of Structure or Activity e.g. bulkhead, dredging, filling, dam, dock, taking of water; Type of Materials and Quantities; Structure and Work Area Dimensions; Need or Purpose Served)

The project involves the taking of water for potable water supply to the Big Indian Plateau and Wildacres Resort. The water supply for the Big Indian Plateau is to be drawn from one bedrock well and one spring. The water supply for the Wildacres Resort is to be purchased from Village of Fleischmanns water system consisting of three bedrock wells and one spring source. Average day demand at full occupancy is 140,000 gpd and 115,000 gpd for Wildacres and Big Indian, respectively, without consideration to water saving plumbing fixtures.

10. Proposed Use: [x] Private [ ] Public [ ] Commercial

11. Will Project Occupy State Land? [ ] Yes [x] No

12. Proposed Start Date: +/- 7/03

13. Estimated Completion Date: +/- 8/03

14. Has Work Begun on Project? (If yes, attach explanation of why work was started without permit.) [ ] Yes [x] No

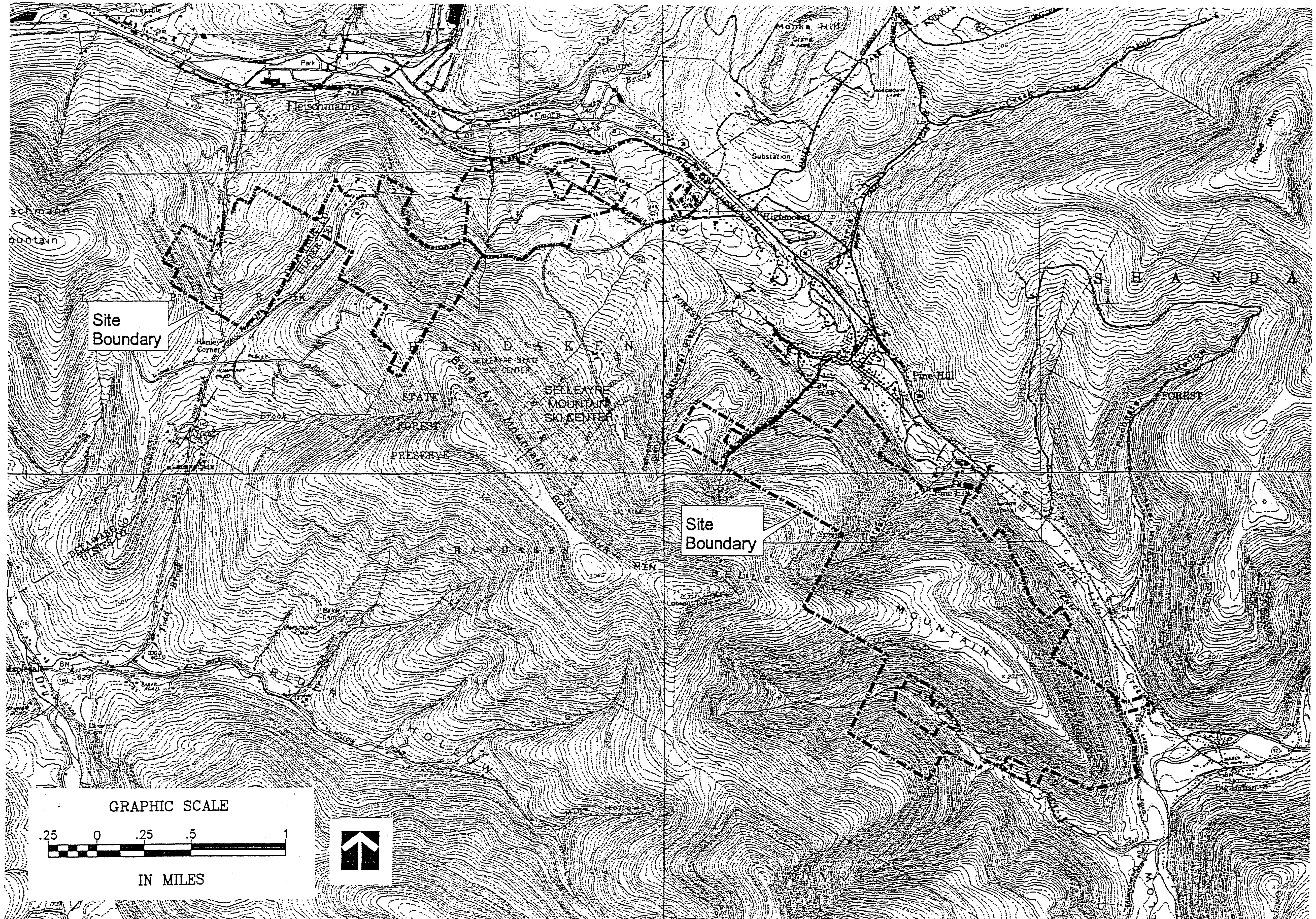
15. List Previous Permit / Application Numbers and Dates: (If Any)

16. Will this Project Require Additional Federal, State, or Local Permits? [x] Yes [ ] No If Yes, Please List: See attached

17. If applicant is not the owner, both must sign the application
I hereby affirm that information provided on this form and all attachments submitted herewith is true to the best of my knowledge and belief. False statements made herein are punishable as a Class A misdemeanor pursuant to Section 210.45 of the Penal Law. Further, the applicant accepts full responsibility for all damage, direct or indirect, of whatever nature, and by whomever suffered, arising out of the project described herein and agrees to indemnify and save harmless the State from suits, actions, damages and costs of every name and description resulting from said project. In addition, Federal Law, 18 U.S.C., Section 1001 provides for a fine of not more than $10,000 or imprisonment for not more than 5 years, or both where an applicant knowingly and willingly falsifies, conceals, or covers up a material fact; or knowingly makes or uses a false, ficticious or fraudulent statement.

The Silk Road Organization, Inc. Managing Member
Date 2/12/03 Signature of Applicant by Dean L. Gitter, Title President

The Silk Road Organization, Inc. Managing Member
Date 2/12/03 Signature of Owner by Dean L. Gitter Title President



the LA group
Landscape Architecture and Engineering, P.C.
40 Long Alley
Saratoga Springs
New York 12866
518/587-8100
Telefax 518/587-0180

BELLEAYRE RESORT AT CATSKILL PARK

DRAFT ENVIRONMENTAL IMPACT STATEMENT

SITE LOCATION MAP

Project: 00052
Date:
Figure

Table 1-1 - Permits and Approvals

Local

Town of Shandaken
- Special Use Permit
- Site Plan Approval
- Subdivision Approval

Town of Middletown
- Special Use Permit
- Site Plan Approval
- Subdivision Approval

Ulster and Delaware County

Health Department (Ulster only)
- water supply
- wastewater disposal
- food service
- hotels
- swimming pools
- subdivisions

Bridges and Highways
- road improvements and driveways

Planning Department
- comments and recommendations to local Boards

Regional

NYCDEP
- Wastewater Treatment Plant and Subsurface Disposal
- Stormwater Pollution Prevention and Impervious Surface

State

NYSDEC
- Streambank disturbance
- wastewater disposal
- water supply, Big Indian Plateau and Wildacres Resort
- SPDES Stormwater Discharge From Construction
- SPDES Industrial Discharge from Operations
- Petroleum Bulk Storage
- Chemical Bulk Storage
- Water Quality Certification
- Public Water Supply Permit modification for Village of Fleischmanns

Table 1-1 Continued

NYSDOH
- water supply
- wastewater disposal
- food service for Delaware County portion
- hotels
- swimming pools
- subdivisions

NYSDOT
- NY Route 28 improvements

NYS Office of Parks Recreation and Historic Preservation
- Cultural Resources Consultation

<u>Federal</u>

US Army Corps of Engineers
- federal wetlands (Issued July 18, 2003)

APPLICATION FOR PUBLIC WATER SUPPLY PERMIT

Wildacres Resort
Towns of Shandaken and Middletown
Ulster and Delaware Counties

February 2003

Prepared for:

New York State Department of Environmental Conservation
Bureau of Water Resources
625 Broadway
Albany, NY 12207

Prepared by:

Delaware Engineering, P.C.
28 Madison Avenue Extension
Albany, NY 12203

Application for Public Water Supply Permit
Wildacres Resort
Delaware and Ulster Counties, New York

Table of Contents

Public Water Supply Permit Application and Project Justification

Engineering Report

PUBLIC WATER SUPPLY PERMIT APPLICATION

95-19-4 (JULY 2000)

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
ALBANY, NEW YORK, 12233-0001

WATER SUPPLY APPLICATION
Supplement W-1 for Public Water Supply Permit

READ THE INSTRUCTIONS ON PAGE 2 BEFORE COMPLETING THIS FORM

FOR DEPARTMENT USE ONLY
APPLICATION NUMBER
WSA NUMBER

PLEASE TYPE OR PRINT CLEARLY IN INK

1. PROJECT DESCRIPTION

Wildacres Resort and Highmount Golf Club Water Supply

2. PROJECT PURPOSE

Potable water supply for the Wildacres Resort and Highmount Golf Club, Towns of Middletown and Shandaken, Delaware and Ulster Counties

3. THIS PROJECT INVOLVES: (Check all that apply and, for each item checked, provide a brief description or identification)

- ☐ ACQUISITION of existing facilities
- ☑ INSTALLATION of new facilities New transmission, treatment, storage &distribution
- ☐ CHANGES in capacities of existing facilities
- ☐ ABANDONMENT of existing facilities

4. This project will involve the taking of up to 140,000 gallons of water (per minute) (per day) from Village of Fleischmanns (Name of source)

Figure given represents ○ increase in taking or ◉ total taking.

5. If certain exhibits are omitted or reduced in scope because of reference to documents submitted with prior applications, list the exhibits so affected, identify the prior application (by Water Supply Application Number and name of applicant) and specify the document(s) to be referenced.

EXHIBIT	WSA NO.	APPLICANT'S NAME	REFERENCED DOCUMENT(S)

6. PROJECT AUTHORIZATION
This application must be accompanied by proof of adequate authorization for the proposed project. List below all exhibits documenting such authorization, such as resolutions, certificates of incorporation, contracts, referendum results, etc. (See *Public Water Supply Program, Applicant's Guide* for further details) :

7. PROJECT JUSTIFICATION
By the act of signing this application, the applicant certifies that each of the following statutory conditions is or will be satisfied, AND that a proper justification for each is given in the specified exhibits attached to this application:

A. The proposed project is justified by the public necessity . . . See Exhibit(s) Attached
B. The proposed project takes proper consideration of other sources of supply that are or may become available. . . . See Exhibit(s) "
C. All work and construction connected with the proposed project will be proper and safe . . . See Exhibit(s) "
D. The supply will be adequate . . . See Exhibit(s) "
E. There will be proper protection of the supply and watershed or proper treatment of any additional supply . . . See Exhibit(s) "
F. The proposed project is just and equitable to all affected municipalities and their inhabitants and in particular with regard to their present and future needs for sources of water supply . . . See Exhibit(s) "
G. There is provision for fair and equitable determinations of and payments of any direct and indirect legal damages to persons or property that will result from the acquisition of any lands in connection with the proposed project or from the execution of the proposed project . . . See Exhibit(s) "
H. The applicant has developed and implemented a water conservation program in accordance with local water resource needs and conditions . . . See Exhibit(s) "

8. SEQR STATUS

9. SIGNATURE The Silk Road Organization, Inc., Managing Member
L. Gitter, President

10 DATE 2/12/03

Reset

APPLICATION FOR PUBLIC WATER SUPPLY

ITEM #7- PROJECT JUSTIFICATION

A. The plans proposed by the applicant are justified by public necessity.

The area to be serviced by the new water system is presently without water. This area is proposed for development as a four-season recreation destination. Development plans include a mixture of recreational, hotel, lodging, residential and limited commercial facilities. The availability of water from the new system will permit this area to be developed and enhance the viability of the development. The new water system would provide a primary and backup source and the necessary fire protection.

B. The plans take proper consideration of other sources of supply, which are or may become available.

A number of water supply options were reviewed, including the use of on-site wells, various springs, and becoming 'out of district users' of the Village of Fleischmanns. The availability of significant quantities of either raw or potable water from the Village of Fleischmanns and the opportunity to provide a much-needed revenue to the Village from the sale of water resulted in the selection of water supply from the Village to the Development.

C. The plans provide for proper and safe construction of all work connected therewith.

Engineering plans for the project have been prepared by a firm licensed to practice engineering in the State of New York. The planned construction will be undertaken in a safe manner. All services in connection with the planning and construction of this project will be carried out by professionals thoroughly experienced and qualified to undertake such work.

D. The plans provide for the proper sanitary control of the watershed and proper protection of the supply.

All parts of the water system facilities will be owned, operated and maintained by the Transportation Corporation. This includes transmission and distribution mains, service laterals and connections, hydrants and valves, the storage tank, pump stations, and treatment units, as well as monitoring and recording equipment. Source protection will be provided by the Village of Fleischmanns with assistance from the Transportation Corporation as necessary. All components of the system will be constructed and operated in accordance with standards set forth by the New York State Department of Conservation, Ulster County and New York State Departments of Health.

E. The plans provide for an adequate water supply.

Alpha Geoscience (Alpha) of Latham, NY conducted 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 Wildacres Resort development. Alpha evaluated the water supplies by collecting baseline water quality data and quantified the available yields from the on-site springs/wells. In addition, Alpha conducted a thorough investigation of the wells and springs owned and operated by the Village of Fleischmanns.

The result of this assessment was that the most efficient and environmentally sensitive water supply for the Wildacres Resort is the Village of Fleischmanns. Using the water resources of the Village eliminates the need to construct or secure additional points for the taking of water (e.g. wells) and provides greater regulatory control over the water supplies in the area by providing only one entity that is withdrawing water and two that provide water (the Village and the Transportation Corporation).

Based on a required flow values for the Wildacres Resort, the existing water resources of the Village are adequate to supply water to both the Village residents and the development.

F. The plans make fair and equitable provisions for the determination and payment of any and all damages to persons and property, both direct and indirect, which will result from the acquisition of said lands or the execution of said plans.

The contractor performing the work will be required to obtain the proper insurance bonds to pay the cost of damages to persons and property resulting from his actions.

H. The plans, in accordance with local water resources needs and conditions, include a description of an adequate near term and long range water conservation program.

See attached Water Conservation Program Form.

ENGINEERING REPORT

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

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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

DELAWARE ENGINEERING
28 Madison Ave. Ext.
Albany, NY 12203

PROJECT: CROSSROADS
DESCRIPTION: Leach Water Demands

DATE [illegible]
SHEET 1 OF 3
BY MTD Ck'ed

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
Required 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 DEMANDS — @ 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. 16-1

(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 - 32,000
5. CLUBHOUSE - 15,000
6. CHAPEL - 5,000
7. MAINT BLDG - 5,000
8. REC. / STORAGE - 2,500
9. Mohawk 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. $F = 18(.8)(32{,}000)^{0.5} \cdot 0.25(0.75) = 468 \rightarrow 500$
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

$= 18(0.8)(32{,}000+\ldots)^{0.5} \cdot 0.75 \cdot 0.25$
Combined
~ 1500 gpm reg'd

Wildacres Hotel / Conference Center HAD HIGHEST DEMAND
ASSUME 1 FIRE AT A TIME. Vol of fire water needed
$1500\text{ gpm} \cdot 60\text{ min} \cdot 2$ (Table 16-4) (FIRE DURATION) $= 180{,}000$ gal.

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D. STORAGE TANK NEEDS:
→ FIRE VOLUME (GAL) + AVE. DAILY DEMAND (gal)

= 180,000 + 127,581 (ave. dmd - 25% (water saving fixtures))

= 281,000

E. PIPING - NEEDS TO BE SIZED TO CARRY GREATEST DEMAND - @ Wildacres FIRE FLOW OF 1,500 gpm is greatest
(POTABLE & FIRE)

PIPING - NON-POTABLE - 208.33 gpm

* [illegible] Highmount Estates + [illegible] + Activity Center

[illegible]

= 180,000 + 112,913 (20% reduction of potable demand)

= 292,913 gallons ⇐ fire + potable (day)

[illegible] ⇒ [illegible] 19 [illegible] 53 [illegible] 319,000 gal g requiring pressure reducers in service con- and undue stress is placed on mains in the Pipe and fittings used in ordinary water distri- ystems are designed for a maximum working of 150 psi.

UNICIPAL FIRE PROTECTION REMENTS

urance Services Office (ISO)[1] has developed a l schedule for the grading of municipalities with o their fire defenses and physical conditions. Fire are weighted for evaluation on the basis of 39 for water supply, 39 percent for fire department, ent for fire safety control, and 9 percent for fire communications. In the evaluation of a munici- deficiency points are assigned for deviations from eria published by the Insurance Services Office.[2] lity and adequacy of the following major water items are considered in the schedule: water supply pumping capacity, power supply, water supply distribution mains, spacing of valves, and location hydrants. These are all essential components for fire g facilities of a municipality.

red Fire Flow

the rate of flow needed for fire fighting purposes to e a major fire to the buildings within a block or group complex. Determination of this flow depends e, construction, occupancy, and exposure of build- ithin and surrounding the block or group complex. equired fire flow is computed at appropriate loca- in each section of the city. The minimum amount is om, and the maximum for a single fire is 12,000 gpm. e local conditions indicate that consideration must ven to simultaneous fires, an additional 2000 to gpm is required. A municipality will have domestic commercial water demands at the time fires occur; fore, an adequate system must be able to deliver the red fire flow for the specified duration with icipal consumption at the maximum daily rate. The imum 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

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

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

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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

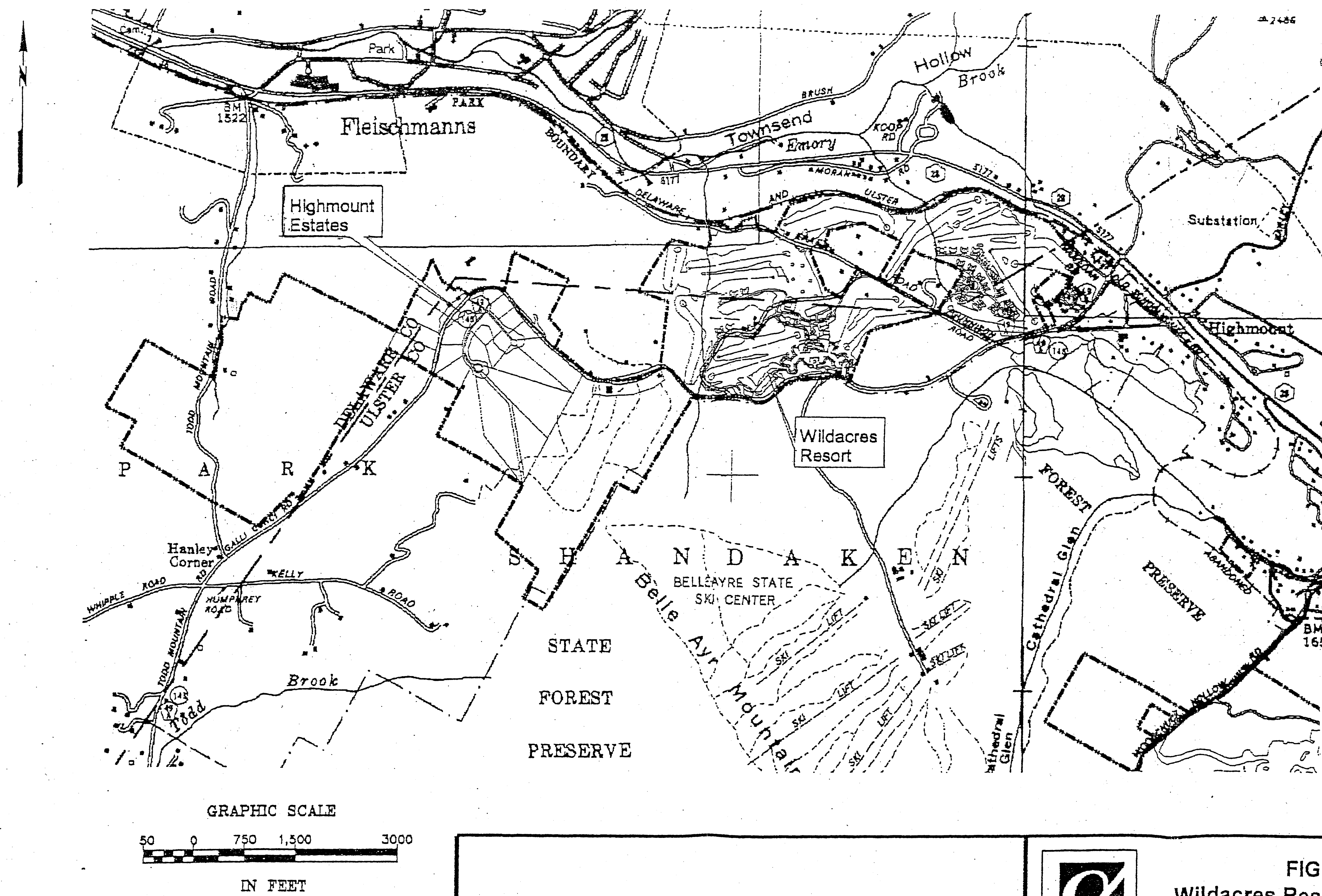
In evaluating a system, the ability to maintain the maximum daily consumption rate plus fire flow in the municipality, at minimum pressure, is considered with one or two pumps out of service. To have no insurance grading deficiency, the capacity remaining with the two most important pumps out of service, 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 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 C

Spring and Stream Flow Measurements



the LA group
Landscape Architecture
and Engineering, P.C.

40 Long Alley
Saratoga Springs
New York 12866
518/587-8100

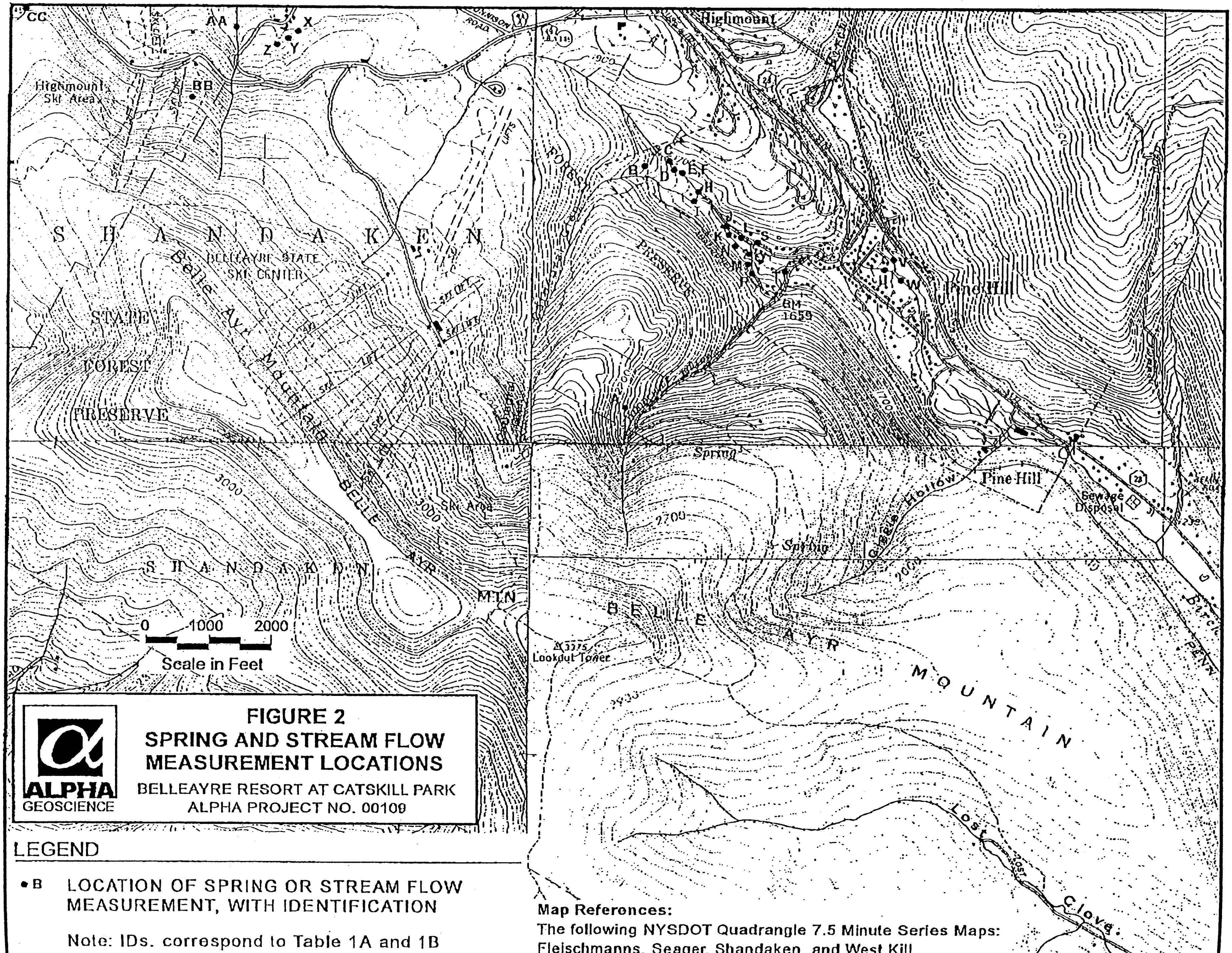
Map adapted from The LA Group, P.C.

ALPHA GEOSCIENCE

FIGURE 1
Wildacres Resort Location Map

Belleayre Resort at Catskill Park
Highmount, New York

Alpha Project No. 02129



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.

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
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_20 Supply (meter)	0	NM	118	118	0	118	114	114	112	112	113	NM
F	Pine Hill H_20 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	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	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_20 Supply (meter)	113	113.5	113.4	119	113.4	112	80	102.5	NM	NM	NM
F	Pine Hill H_20 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

See Appendix 7

Water Supply Reports

The Wildacres Resort and Highmount Golf Club/ Highmount Estates
Water Supply, Treatment and Distribution

Exhibit D

Alpha GeoScience's Report

Water Supply Evaluation
Village of Fleischmanns

Exhibit E

Water Budget Analysis

See Appendix 7

Water Supply Reports

The Wildacres Resort and Highmount Golf Club/ Highmount Estates
Water Supply, Treatment and Distribution

Exhibit E

Alpha Geoscience's Report

Water Budget Analysis
Wildacres Resort

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

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

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

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.

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

Dean Gitter -2-

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

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 llc@usa.net

STATE OF NEW YORK
DEPARTMENT OF HEALTH

ice 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

March 2, 2001

MAR 09 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

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% reversion 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

$$0.3 \text{ gal @ } 100\% \times \frac{1 \text{ gal NaOCL}}{15\% \text{ CL by vol}} = \boxed{2 \text{ gal/day NaOCL}}$$

② @ peak flow

2 ppm CL x 0.4 MGD = 0.8 gal CL

$$0.8 \text{ gal} \times \frac{1 \text{ gallon NaOCL}}{15\% \text{ by vol CL}} = \boxed{5.3 \text{ gal/day NaOCL}}$$

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

$$1.0 \cdot \frac{1}{15\%} = 6.7 \text{ gal/day NaOCL}$$

$$6.7 \frac{\text{gal}}{\text{day}} \times \frac{1 \text{ day}}{24 \text{ hr}} \cdot 30 \text{ hr storage} = 8.3 \text{ gallon/day}$$

Tank $\boxed{\approx 10 \text{ gall}}$

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 ... 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.

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.

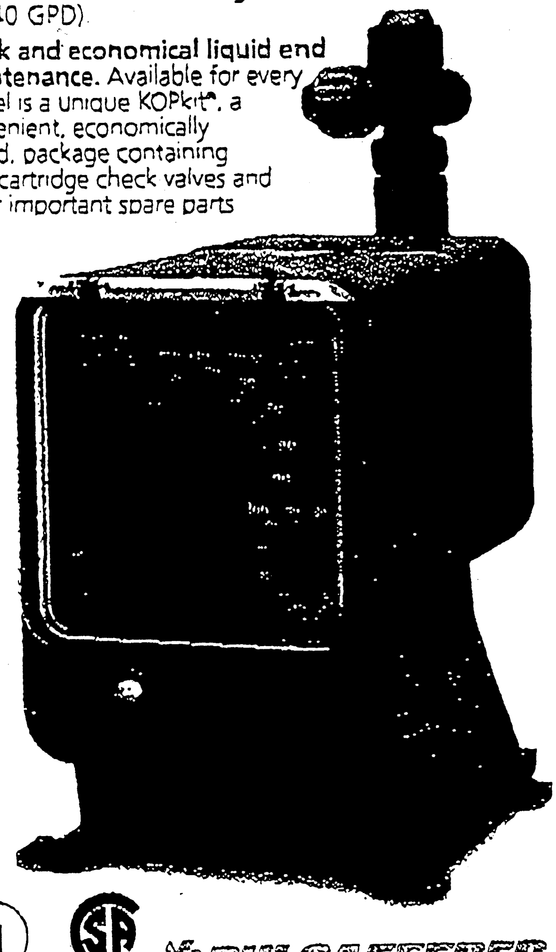
System Compatibility

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

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

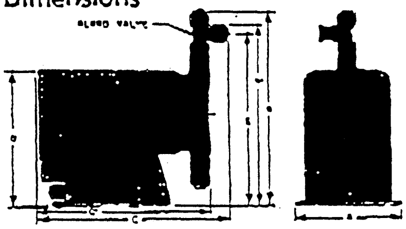
Capacity, nominal																			
GPD	3	5	6	11	12	14	20	21	24	40	42	44	60	75	94	120	190	240	500
GPH	13	0 20	0 25	0 45	0 50	58	0 83	0.87	1 0	1 66	1 75	1 83	2 5	3 17	3 91	5 00	8 00	10 00	20 00
LPH	49	79	95	1 73	1 89	2.20	3 15	3 31	3 78	6.31	6 62	6 94	9 5	11 83	14 82	18 93	29 96	37 85	78 85
Pressure, 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



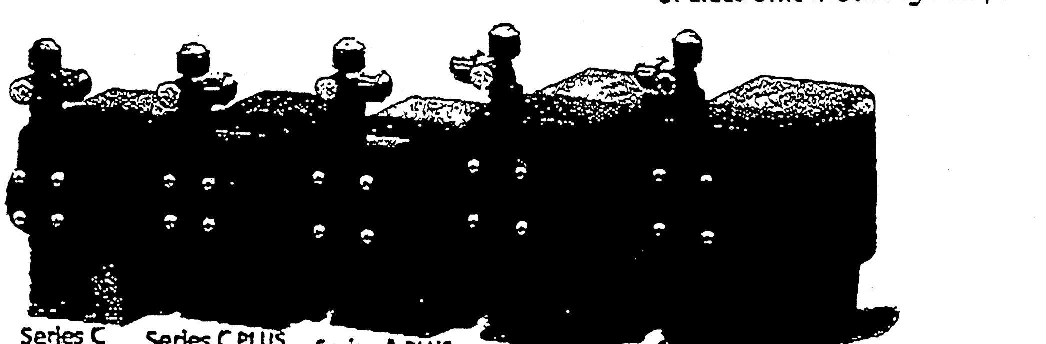
Series E PLUS Dimensions (inches)								
Model No.	A	B	B'	C	C'	D	E	Shipping Weight (Lbs.)
LPA2	5 4	10 3	—	10 8		7 5	9 0	13
LPA3	5 4	10 6	—	10 7	—	7 5	9 2	13
LPB2	5 4	10 3	—	10 8	-	7 5	9 0	13
LPB3	5 4	10 6	—	10 7	—	7 5	9 2	13
LPB4	5 4	10 6	—	10 7	-	7 5	9 2	13
LPD3	5 4	10 6	—	11 7	—	7 5	9 2	15
LPD4	5 4	10 5		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	18
LPG4	5 4	10 6	—	11 7	—	7 5	9 2	18
LPG5	5 4	11 0	—	11 7	—	7 5	9 5	19
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	9 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 5	19
LPK7	6 2	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
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Printed in U.S.A. 3/94

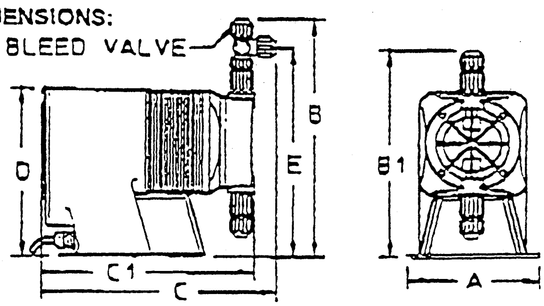
SERIES E PLUS SPECIFICATIONS

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	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.

'MENSIONS:

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 9	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 9	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

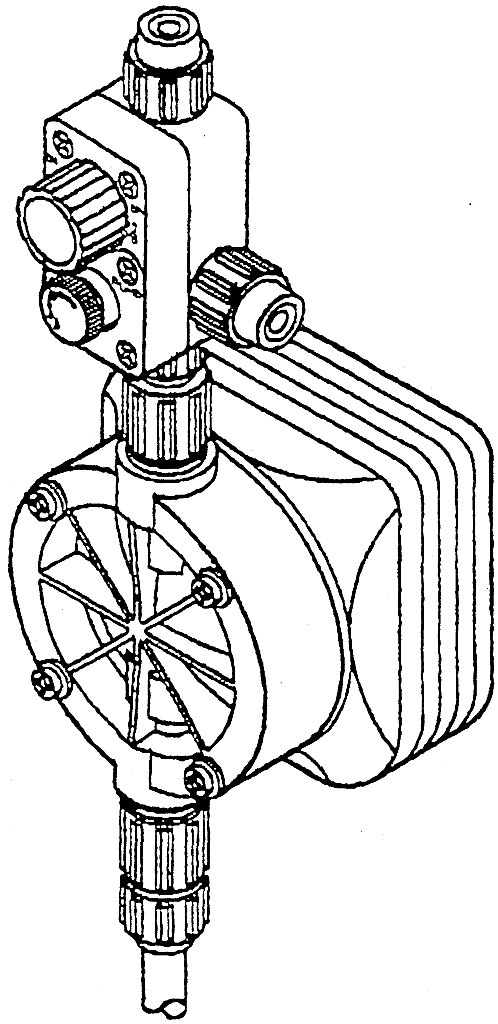
07/98 EMP-040

Accessories

FULSAFEEDER
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 ... valve ...

IDEX CORPORATION

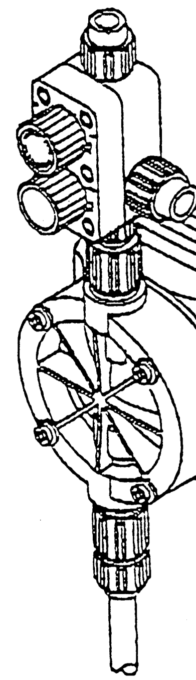
PULSAFEEDER
A Unit of IDEX Corporation

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.

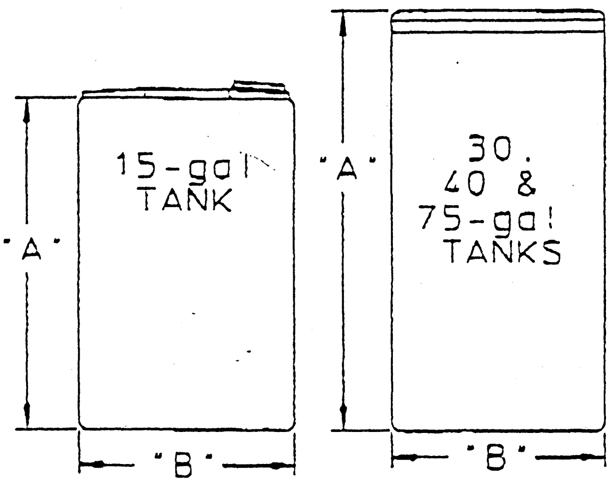
Connections	- 1/4" X 3/8" tubing - 3/8" X 1/2" tubing - 1/4" MNPT
Relief Port	- 1/4" X 3/8" tubing - 1/4" MNPT (with NPT connection only)

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

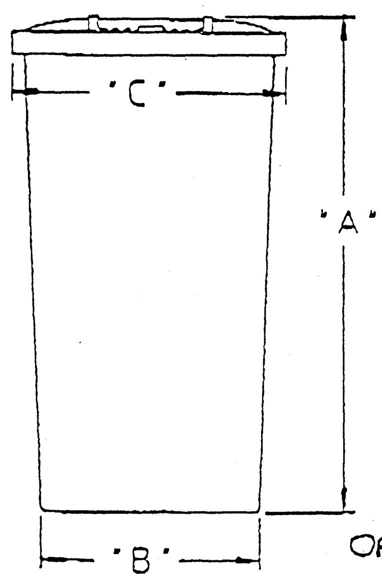


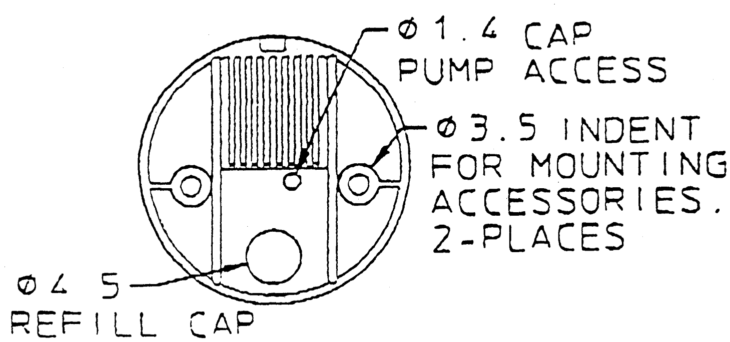
Model	Size Gallon	Wall	Dimensions (in.) A	B
40375	15	0.078	25	14.5
40360	30	0.094	32	18.5
40361	40	0.094	41.25	18.5
40362	*75	0.125	41.75	24.25

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
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

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

FROM TABLES BASED ON T.D.S, Ca, Alk, & Temp

LSI = pH − pHs
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 α₀→α₁	α Final @ 9.86	x.26 meq/L
α_0	.0413	.01	∅	0	0
α_1	.9537	.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 · 8.34#/MG = 7#/day
.5 soln ppm

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: Lindsey 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

I Na C
12571 (-30)

0873 NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER FOR LABORATORIES AND RESEARCH

PAGE 1 RESULTS OF EXAMINATION FINAL REPORT

Rec √

SAMPLE ID: 921002682 SAMPLE RECEIVED:92/12/23/11 CHARGE: 6.27
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-I 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

LOCATION:607 432 0089 RX TIME 11/30 '00 15:15

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER FOR LABORATORIES AND RESEARCH

PAGE 1

RESULTS OF EXAMINATION FINAL REPO

SAMPLE ID. 851000313 SAMPLE RECEIVED: 85/12/20/1? CHARGE: 6.5?
PROGRAM: 100: MUNICIPAL WATER SUPPLIES
SOURCE ID. 451000 DRAINAGE BASIN: 14
POLITICAL SUBDIVISION: FLEISCHMANNS V. GAZETTEER CODE: 1230
LATITUDE. LONGITUDE: COUNTY: DELAWARE
LOCATION: FLEISCHMANNS V. Z DIRECTION:
DESCRIPTION: RESERVOIR OVERFLOW SPRING WATER
REPORTING LAB: 10: LABORATORY OF INORGANIC ANALYTICAL CHEMISTRY - ALBA
TEST PATTERN: 10-03 (NSS-1 SAFE DRINKING WATER ACT
SAMPLE TYPE: 01: 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
21LEAD	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
01LANGELR	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), FR(0), INFO-R(0), INFO-L(0)

NEW YORK STATE DEPARTMENT OF HEALTH
ONEONTA DISTRICT OFFICE
PO BOX 510
ONEONTA, N.Y. 1382? SUBMITTED BY: FRANCS

LOCATION:607 432 0089 RX TIME 11/30 '00 15:15

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

FLEISCHMANNS
WELL NO. 2 4/04/03

LANGELIER INDEX FOR:

DATE:

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.	= 2.23	(From Table B)

pH_s = (9.30 + 0.13 + 2.23) - (1.15 + 1.59)
= 8.97
=

S.I. = 6.9 - 9.0 = -2.1

ALKALINITY (D)

	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

	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	[illegible]	[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.

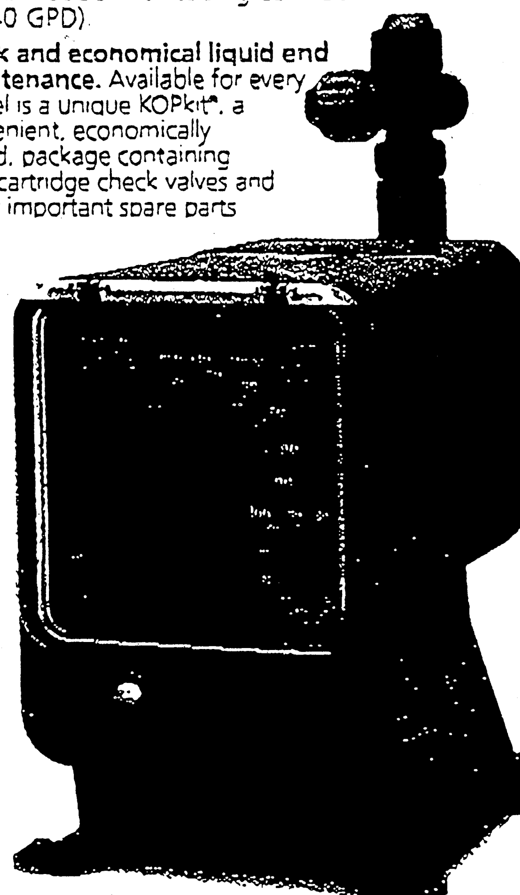
System Compatibility

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



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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-021

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

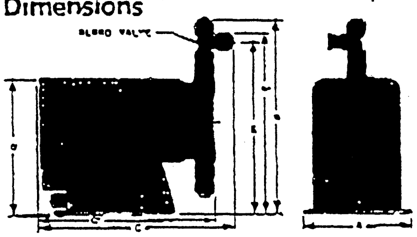
Capacity, nominal																				
	GPD	3	5	6	11	12	14	20	21	24	40	42	44	60	75	94	120	190	240	500
	GPH	13	0 20	0 25	0 45	0 50	58	0 83	0.87	1 0	1 66	1 75	1 83	2 5	3 17	3 91	5 00	8 00	10 00	20 00
	LPH	49	79	95	1 73	1 89	2.20	3 15	3 31	3 78	6 31	6 62	6 94	9 5	11 83	14 82	18 93	29 96	37 85	78 85
Pressure, 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



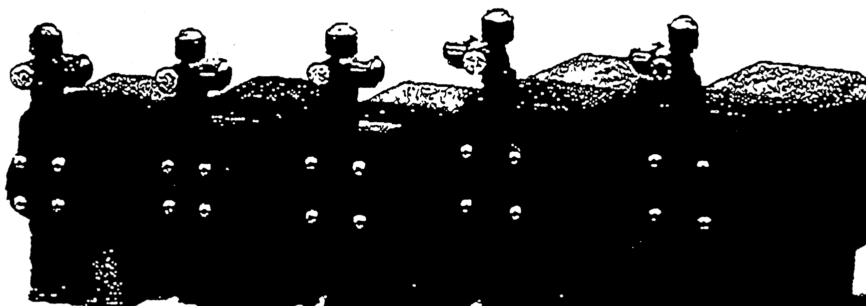
Series E PLUS Dimensions (inches)								
Model No.	A	B	B'	C	C'	D	E	Shipping Weight (Lbs.)
LPA2	5 4	10 3	—	10 8		7 5	9 0	13
LPA3	5 4	10 6	—	10 7	—	7 5	9 2	13
LPB2	5 4	10 3	—	10 8	-	7 5	9 0	13
LPB3	5 4	10 6	—	10 7	—	7 5	9 2	13
LPB4	5 4	10 6	—	10 7	-	7 5	9 2	13
LPD3	5 4	10 6	—	11 7	—	7 5	9 2	15
LPD4	5 4	10 6	·	11 7	—	7 5	9 2	15
LPE4	5 4	10 6		11 7	—	7 5	9 2	15
[illegible]	5 4	10 6		11 7	—	7 5	9 2	[illegible]
LPG4	5 4	10 6	—	11 7	—	7 5	9 7	18
LPG5	5 4	11 0	—	11 7	—	7 5	9 6	19
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	[illegible]	—	[illegible]	—	8 2	10 3	21
LPH8*	6 1	—	10 9	—	10 5	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	19
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
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Printed in U.S.A. 3/94

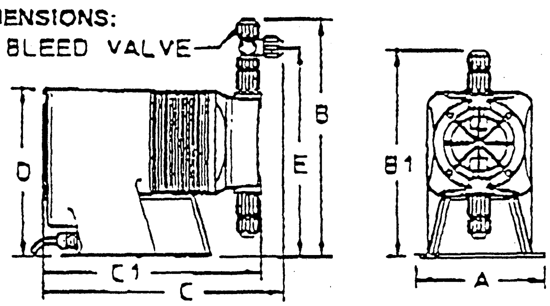
SERIES E PLUS SPECIFICATIONS

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	3.31	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	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

Accessories

PULSAFEEDER®
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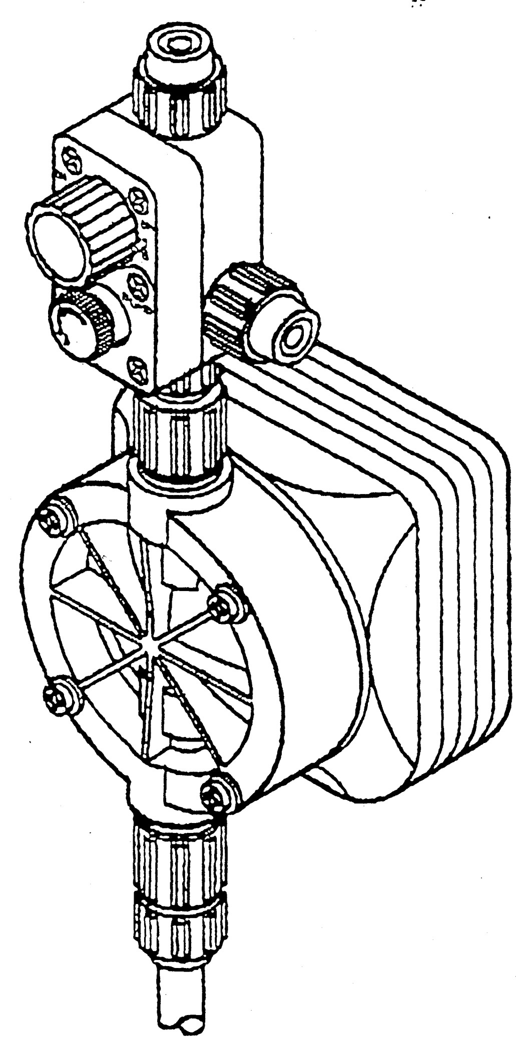
DG/5FV
Five Function Valve with De-Gas

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]) on the [illegible] valve [illegible]

IDEX
IDEX CORPORATION

PULSAFEEDER
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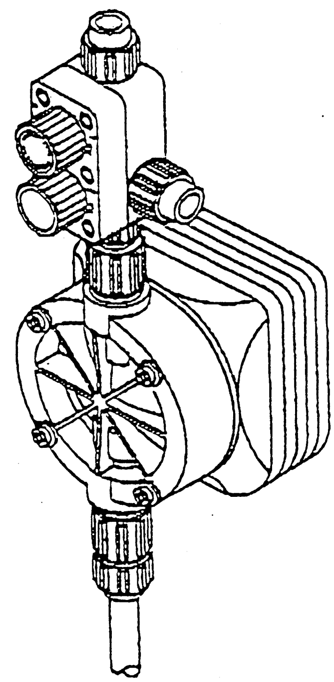
5 - FUNCTION VALVE

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

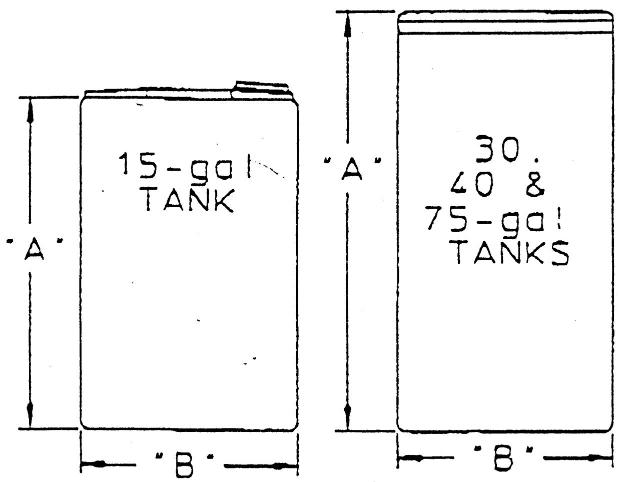
__Relief Port__
- 1/4" X 3/8" tubing
- 1/4" MNPT (with NPT connection only)

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

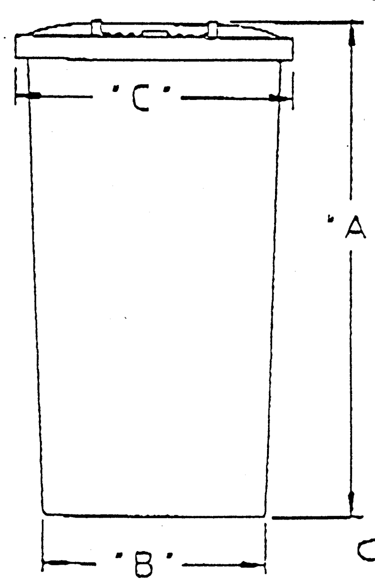


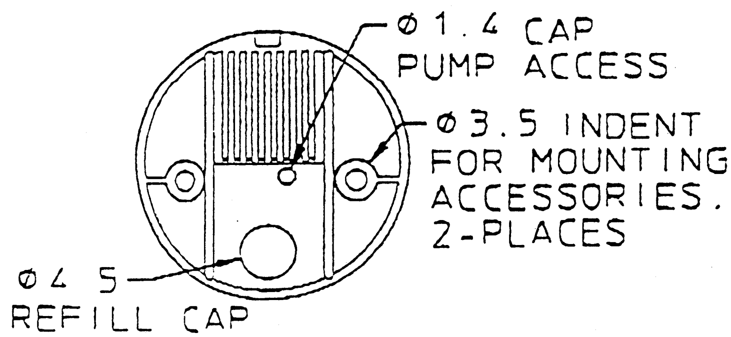
Model	Size Gallon	Wall	Dimensions (in.) A	Dimensions (in.) B
40375	15	0.078	25	14.5
40360	30	0.094	32	18.5
40361	40	0.094	41.25	18.5
40362	*75	0.125	41.75	24.25

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	Dimensions (in.) B	Dimensions (in.) 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

WATER CONSERVATION PROGRAM FORM

DEPARTMENT OF ENVIRONMENTAL CONSERVATION

WATER CONSERVATION PROGRAM FORM

(Revised - June 1998)

TO BE COMPLETED AND SUBMITTED AS PART OF A NYSDEC WATER SUPPLY PERMIT APPLICATION
***SEE PAGE 6 FOR FURTHER INTRODUCTION AND INSTRUCTION REGARDING THIS FORM ***

If your water system already has its own written water conservation program, please feel free to submit it as a supplement to this WCPF. If your system is new, please indicate the water conservation measures that will be taken when the system is completed (e.g. All sources of supply and customers will be 100% metered)

I. GENERAL SYSTEM INFORMATION

Name of Applicant: Crossroads Ventures, LLC (TBD Transp. Corp.)		**DEC No.**
Street Address: P.O. Box 267		**WSA No.**
Post Office: Mount Tremper	**County:** Ulster	**State & ZIP:** NY 12457

Name & Title of Contact: Dean Gitter, Managing Partner	
Street Address: P.O. Box 267	
Post Office: Mount Tremper	**State & ZIP:** NY 12457
Applicant's Telephone: 845-688-7740	**Contact's Telephone:** same

II. SOURCES OF WATER SUPPLY

Please give amounts in gallons per minute (**gpm**), per day (**gpd**) or million gallons per day (**mgd**).

Source Type: **S** = Surface supply, **G** = Ground supply, **P** = Purchased supply
Source Status: **R** = Regular use, **S** = Standby use, **E** = Emergency use

Name of Source	Source Type	Source Status	Tested Capacity	Actual Current Withdrawal	Start-up Year
Village of Fleischmanns	G	R	572,640 gpd	250,000 gpd	

Name of Applicant: Crossroads Ventures, LLC (TBD Transp. Corp.)	WSA No.

III. WATER USAGE AND METERING

The water production data requested in this section should be available from the monthly "Water System Operation Reports" required by the State or Local Department of Health.

For unmetered systems, please provide your best estimates for water production and/or consumption.

Are all sources of supply (including major interconnections) equipped with master meters? Y			
What percentage of your system is metered? 100 %		How often are they read? semi-annually	
Number of service connections? 180		Total population served? 700	
How many meters are recalibrated and/or replaced each year? NA			
Water Production for calendar year 2004		**Water Consumption for calendar year 2004**	
Total metered water production :	51,100,000	Total metered water consumption:	51,100,000
Average day production (total/365):	140,000	Average day consumption (total/365):	140,000
Peak day production (largest single day):	225,000	Per capita usage per day (avg. day/pop. served):	200 (gpcd)

What are your future goals and schedule for water system metering?

Entire system will be metered when constructed.

Recommendations:

* 100% metering of all water system connections, including public buildings.

* Master meters should be tested and calibrated annually.

* Customer meters should be recalibrated or replaced at least once every 15 years or in accordance with an optimum meter replacement schedule developed using the American Water Works Association (AWWA) Manual M6.

* Quarterly meter reading and prompt billing with rates that reflect amount of water used.

Name of Applicant: Crossroads Ventures, LLC (TBD Transp. Corp.)	WSA No.

IV. WATER SUPPLY AUDIT

Do you conduct a system water audit at least once each year? _________.
If yes, please submit a copy of your latest audit in addition to completing the following section.

** Water Supply Audit for Calendar Year _____

Total metered water production (from previous section)		Total	51,100,000	% of Total
Total metered water consumed (from previous section)		subtract	51,100,000	100
Authorized unmetered usage		subtract	0	
e.g. Unmetered public bldgs. Firefighting & training Main flushing Street cleaning		subtract	0	
		subtract	0	
		subtract	0	
Water lost to leaks that have since been repaired		subtract	0	
TOTAL UNACCOUNTED-FOR WATER		Sub-total	0	
Unaccounted-for water breakdown	Meter under-registration	subtract	0	
	Unrepaired leakage	subtract	0	
	Other:	subtract	0	
** Water measurement and accounting techniques are available in NYSDEC's January 1989, (re-printed February 1998) Water Conservation Manual.			0	

What are your future goals for water system auditing?

Recommendations:

* At least once each year, a system water audit should be conducted using metered water production and consumption data to determine unaccounted-for water.

* Quantify all authorized water uses by consumption categories (e.g. residential, industrial, municipal etc.).

* Keep accurate estimates of authorized unmetered water use (e.g. firefighting, main flushing, etc.).

Name of Applicant: Crossroads Ventures, LLC (TBD Transp. Corp.)	WSA No.

V. LEAK DETECTION AND REPAIR

Do you regularly survey your system for leaks with listening equipment?

Total miles of distribution pipe	Percent of system surveyed each year	Miles of pipe surveyed each year	Listening equipment used	Year of last survey	Number of leaks found	Number of leaks repaired
7000 LF	new	new	NA	new	NA	NA

Do you have a regular water system rehabilitation program? no

If yes, give details: new system

What are your future goals for water system leak detection and repair?

new system

Recommendations:

* Check at least one third of your water distribution system for leaks each year.

* Fix every detectable leak as soon as possible.

* Have an on-going system rehabilitation program.

Name of Applicant: Crossroads Ventures, LLC (TBD Transp. Corp.)	**WSA No.**

VI. WATER USE REDUCTION

Have you distributed information to residential customers on household water saving devices and ways to reduce water use? NA

Have you distributed water conservation information to industrial and commercial customers that promotes recycling and reuse? NA

Do you have a program to retrofit public buildings with water savings fixtures and encourage the private sector to do the same? NA

Do you have lawn sprinkling time restrictions during the summer or periods of peak demand? NA
If yes, please describe:

Do you have a plan that takes progressive steps to further reduce outdoor water use during drought conditions with a procedure to assure compliance? yes If yes, please describe:

Outdoor watering will be controlled by the development management.

What are your future goals for reducing water usage?

Recommendations:

* Carry out a public information program that promotes water conservation practices by all categories of water users (e.g. residential, commercial, industrial, etc.).

* Retrofit public buildings with water saving fixtures and encourage the private sector to do the same.

* Use lawn sprinkling time restrictions (e.g. Odd/even days, morning and evening hours) during the summer and outdoor water use bans during times of drought.

* Adopt a procedure to be followed in times of drought that calls for a progression of restrictions on water use specifying: who will reduce, how, and by how much, along with actions to be taken to assure compliance.

Name of Applicant: Crossroads Ventures, LLC (TBD Transp. Corp.)	WSA No.

VII. CERTIFICATION OF WATER CONSERVATION PROGRAM:

To be signed by the owner or official of the municipality or corporation operating this water system.

I hereby affirm that the information provided on this form is true to the best of my knowledge and belief. False statements made herein are punishable as a Class A misdemeanor pursuant to Section 210.45 of the Penal Law.

The Silk Road Organization, Inc — Managing Member

Date: 2/12/03 Signature: [signature] Title President

DISCUSSION:

Effective January 1, 1989, New York State Environmental Conservation Law (ECL 15-1501) has required that all new applications for a NYSDEC Public Water Supply Permit include a water conservation program. This Water Conservation Program Form (WCPF) is intended to be a guide in completing this requirement.

The WCPF has been set up to cover the following basic elements of a water conservation program: Source Water Inventory, Water Usage and Metering, Water Supply Auditing, Leak Detection/Repair and Water Use Reduction. The recommended actions listed at the bottom of each page represent DEC water conservation policy objectives and should be factored into your program development. Additional water conservation measures such as increasing block water rate structuring, non-residential water use reduction or water efficient landscaping may also play an important role in your system's program and should certainly be considered when applicable.

Water supply permit applicants can consult the NYSDEC publication entitled, "Water Conservation Manual For Development of a Water Conservation Plan", January, 1989 (Re-printed February 1998) for details regarding the development of these water conservation practices. Copies of this manual can be obtained through your DEC Regional Offices.

The American Water Works Association (AWWA) is also an excellent source of information regarding water conservation and public water supply systems in general. Information ranging from technical manuals to public education bill stuffers are available from AWWA at reasonable cost by calling 1-800-926-7337.

As a final note, the old "Bureau of Water Resources" has been incorporated into the "Bureau of Water Permits" and can now be contacted at (518) 402-8110.

COPY OF FULL ENVIRONMENTAL ASSESSMENT FORM (October 1999)

See Appendix 1, SEQRA Documentation

COPY OF BUILDING-STRUCTURE INVENTORY FORM (April 2000)

See Appendix 23, Cultural Resources Investigation Phase 1B

COPY OF JOINT APPLICATION FOR PERMIT

95-19-3 (8/00) pfp

JOINT APPLICATION FOR PERMIT

New York State
United States Army Corps of Engineers

Applicable to agencies and permit categories listed in Item 1. **Please** read all instructions on back. Attach additional information as needed. Please print legibly or type.

1. Check permits applied for:

NYS Dept. of Environmental Conservation

- ☐ Stream Disturbance (Bed and Banks)
- ☐ Navigable Waters (Excavation and Fill)
- ☐ Docks, Moorings or Platforms (Construct or Place)
- ☐ Dams and Impoundment Structures (Construct, Reconstruct or Repair)
- ☐ Freshwater Wetlands
- ☐ Tidal Wetlands
- ☐ Coastal Erosion Control
- ☐ Wild, Scenic and Recreational Rivers
- ☐ 401 Water Quality Certification
- ☑ Potable Water Supply
- ☐ Long Island Wells
- ☐ Aquatic Vegetation Control
- ☐ Aquatic Insect Control
- ☐ Fish Control

NYS Office of General Services
(State Owned Lands Under Water)

- ☐ Lease, License, Easement or other Real Property Interest
  Utility Easement (pipelines, conduits, cables, etc.)
- ☐ Docks, Moorings or Platforms (Construct or Place)

Adirondack Park Agency

- ☐ Freshwater Wetlands Permit
- ☐ Wild, Scenic and Recreational Rivers

Lake George Park Commission

- ☐ Docks (Construct or Place)
- ☐ Moorings (Establish)

US Army Corps of Engineers

- ☐ Section 404 (Waters of the United States)
- ☐ Section 10 (Rivers and Harbors Act)
- ☐ Nationwide Permit (s)
  Identify Number(s)

For Agency Use Only:
DEC APPLICATION NUMBER

US ARMY CORPS OF ENGINEERS

2. Name of Applicant (Use full name)
Crossroads Ventures, LLC (TBD Transportation Corp.)

Telephone Number (daytime)
845-688-7740

Mailing Address
P.O. Box 267

Post Office	**State**	**Zip Code**
Mount Tremper	NY	12457

3. Taxpayer ID (If applicant is not an individual)
14-1813052

4. Applicant is a/an: (check as many as apply)
☑ Owner ☐ Operator ☐ Lessee ☐ Municipality / Governmental Agency

5. If applicant is not the owner, identify owner here - otherwise, you may provide Agent/Contact Person information.

Owner or Agent/Contact Person ☑ Owner ☐ Agent /Contact Person
Dean Gitter

Telephone Number (daytime)
845-688-7740

Mailing Address
P.O. Box 267

Post Office	**State**	**Zip Code**
Mount Tremper	NY	12457

6. Project / Facility Location (mark location on map, see instruction 1a.)

County:	Town/City/Village:	Tax Map Section/ Block /Lot Number:
Ulster/Delaw	Shandaken/Middletown	

Location (including Street or Road)
See attached location map

Telephone Number (daytime)

Post Office	**State**	**Zip Code**

7. Name of Stream or Waterbody (on or near project site)

8. Name of USGS Quad Map:
Shandaken/Fleischmanns

Location Coordinates:
NYTM-E NYTM-N 4

9. Project Description and Purpose: (Category of Activity e.g. new construction/installation, maintenance or replacement; Type of Structure or Activity e.g. bulkhead, dredging, filling, dam, dock, taking of water; Type of Materials and Quantities; Structure and Work Area Dimensions; Need or Purpose Served)

The project involves the taking of water for potable water supply to the Big Indian Plateau and Wildacres Resort. The water supply for the Big Indian Plateau is to be drawn from one bedrock well and one spring. The water supply for the Wildacres Resort is to be purchased from Village of Fleischmanns water system consisting of three bedrock wells and one spring source. Average day demand at full occupancy is 140,000 gpd and 115,000 gpd for Wildacres and Big Indian, respectively, without consideration to water saving plumbing fixtures.

10. Proposed Use: ☑ Private ☐ Public ☐ Commercial

11. Will Project Occupy State Land? ☐ Yes ☑ No

12. Proposed Start Date: +/- 7/03

13. Estimated Completion Date: +/- 8/03

14. Has Work Begun on Project? (If yes, attach explanation of why work was started without permit.) ☐ Yes ☑ No

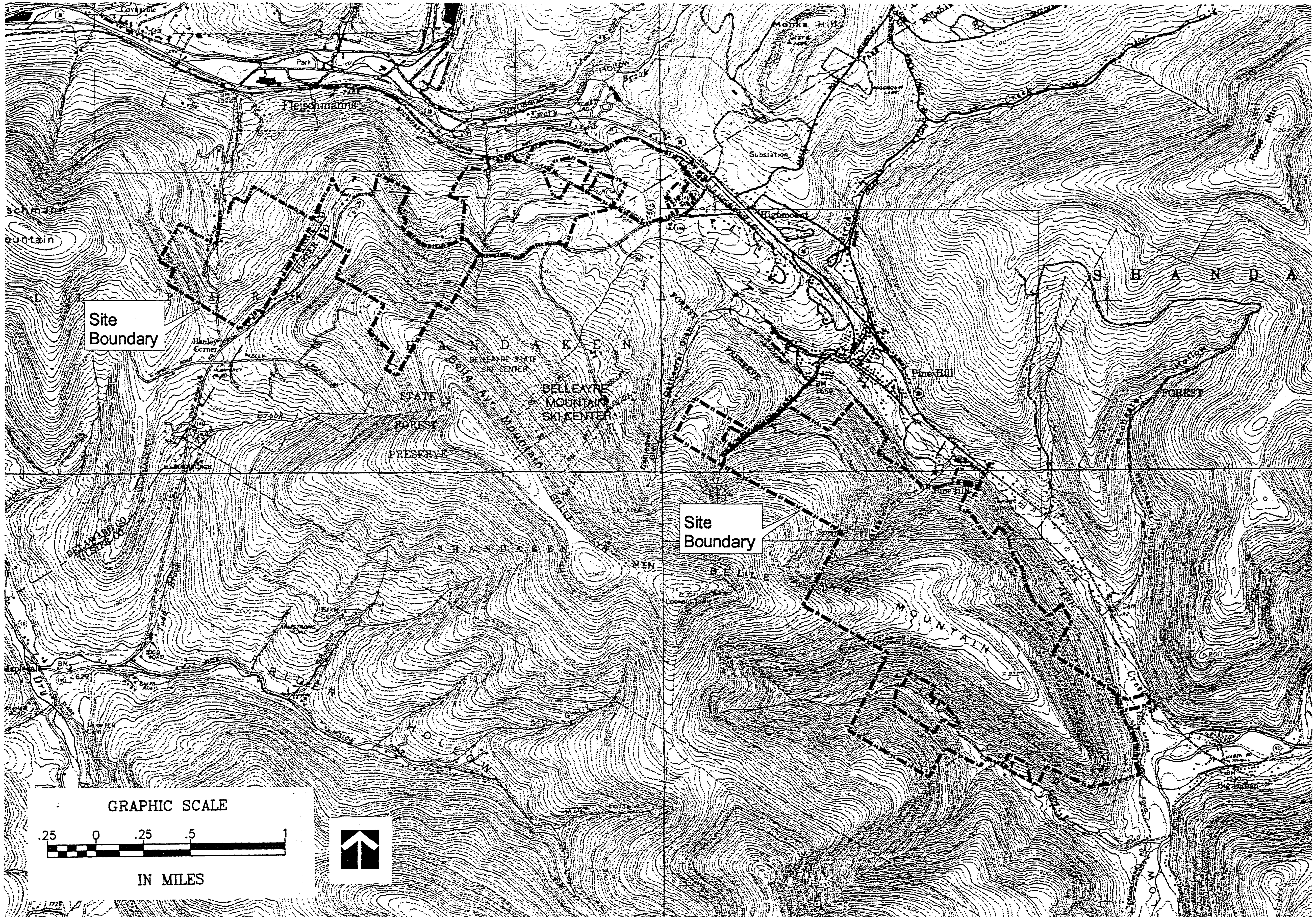
15. List Previous Permit / Application Numbers and Dates: (If Any)

16. Will this Project Require Additional Federal, State, or Local Permits? ☑ Yes ☐ No If Yes, Please List: See attached

17. If applicant is not the owner, both must sign the application
I hereby affirm that information provided on this form and all attachments submitted herewith is true to the best of my knowledge and belief. False statements made herein are punishable as a Class A misdemeanor pursuant to Section 210.45 of the Penal Law. Further, the applicant accepts full responsibility for all damage, direct or indirect, of whatever nature, and by whomever suffered, arising out of the project described herein and agrees to indemnify and save harmless the State from suits, actions, damages and costs of every name and description resulting from said project. In addition, Federal Law, 18 U.S.C., Section 1001 provides for a fine of not more than $10,000 or imprisonment for not more than 5 years, or both where an applicant knowingly and willingly falsifies, conceals, or covers up a material fact; or knowingly makes or uses a false, ficticious or fraudulent statement.

The Silk Road Organization, Inc. Managing Member
Date 2/12/03 Signature of Applicant by Dean L. Gitter Title President

The Silk Road Organization, Inc. Managing Member
Date 2/12/03 Signature of Owner by Dean L. Gitter Title President



the LA group
Landscape Architecture and Engineering, P.C.

40 Long Alley
Saratoga Springs
New York 12866
518/587-8100
Telefax 518/587-0180

BELLEAYRE RESORT AT CATSKILL PARK

DRAFT ENVIRONMENTAL IMPACT STATEMENT

SITE LOCATION MAP

Project: 00052
Date:

Figure

Table 1-1 - Permits and Approvals

Local

Town of Shandaken
- Special Use Permit
- Site Plan Approval
- Subdivision Approval

Town of Middletown
- Special Use Permit
- Site Plan Approval
- Subdivision Approval

Ulster and Delaware County

Health Department (Ulster only)
- water supply
- wastewater disposal
- food service
- hotels
- swimming pools
- subdivisions

Bridges and Highways
- road improvements and driveways

Planning Department
- comments and recommendations to local Boards

Regional

NYCDEP
- Wastewater Treatment Plant and Subsurface Disposal
- Stormwater Pollution Prevention and Impervious Surface

State

NYSDEC
- Streambank disturbance
- wastewater disposal
- water supply, Big Indian Plateau and Wildacres Resort
- SPDES Stormwater Discharge From Construction
- SPDES Industrial Discharge from Operations
- Petroleum Bulk Storage
- Chemical Bulk Storage
- Water Quality Certification
- Public Water Supply Permit modification for Village of Fleischmanns

Table 1-1 Continued

NYSDOH
- water supply
- wastewater disposal
- food service for Delaware County portion
- hotels
- swimming pools
- subdivisions

NYSDOT
- NY Route 28 improvements

NYS Office of Parks Recreation and Historic Preservation
- Cultural Resources Consultation

<u>Federal</u>

US Army Corps of Engineers
- federal wetlands (Issued July 18, 2003)

STATE POLLUTANT DISCHARGE ELIMINATION SYSTEM (SPDES) PERMIT APPLICATION

Big Indian Plateau
Town of Shandaken, Ulster County

December 2002

Prepared for:

New York State Department of Environmental Conservation
625 Broadway
Albany, NY 12207

Prepared by:

Delaware Engineering, P.C.
28 Madison Avenue Extension
Albany, NY 12203

SPDES Permit Application
Big Indian Plateau
Ulster County, New York

Table of Contents

SPDES PERMIT APPLICATION

91-19-1 (2/85)

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

APPLICATION FORM "D"
for a State Pollutant Discharge Elimination System (SPDES) Permit

(A SPDES Application When Signed by a Permit Issuing Official Becomes a SPDES Permit)

PLEASE PRINT OR TYPE

APPLICATION TYPE: [X] New [ ] Renewal [ ] Modification
IF RENEWAL OR MODIFICATION, GIVE PREVIOUS NUMBER: NY --

OWNER'S NAME (Corporate, Partnership, Individual): Big Indian Plateau Sewer Works Corp.
TYPE OF OWNERSHIP: [X] Corporate [ ] Individual [ ] Partnership [ ] Public

OWNER'S MAILING ADDRESS (Street, City, State, Zip Code): P.O. Box 267, Andrew Lane Road, Mt. Tremper, NY 12457

REFER ALL CORRESPONDENCE TO: (Name, Title and Address): Dean Gitter
TELEPHONE NUMBER: (845)688-7740

FACILITY NAME: Big Indian Plateau
FACILITY LOCATION (Street or Road): NYS Route 28
CITY, TOWN OR VILLAGE: Big Indian

COUNTY: Ulster County
GIVE EXPLICIT DIRECTIONS TO LOCATION: See attached Site Location Map

NATURE OF BUSINESS OR FACILITY: Four season club membership resort
POPULATION SERVED (See Instructions): 183 lodging units & 150 rm lodge

FREQUENCY OF DISCHARGE
All Year? [X] Yes [ ] No If No, Specify Number of Months ____
All Week? [X] Yes [ ] No If No, Specify Number of Days ____

DOES YOUR DISCHARGE CONTAIN OR IS IT POSSIBLE FOR YOUR DISCHARGE TO CONTAIN ONE OR MORE OF THE FOLLOWING SUBSTANCES ADDED AS A RESULT OR YOUR OPERATIONS, ACTIVITIES OR PROCESSES?
Please Check [ ] Aluminum [ ] Ammonia [ ] Beryllium [ ] Cadmium [X] Chlorine [ ] Chromium [ ] Copper [ ] Cyanide
[X] Grease [ ] Lead [ ] Mercury [ ] Nickel [X] Oil [ ] Phenols [ ] Selenium [ ] Zinc [ ] None of These

DISCHARGE DATA (Use additional forms, if necessary) (See Instructions)

OUTFALL NO. 001 — [X] Proposed [ ] Existing [ ] Replacement [ ] Expansion
TYPE OF WASTE: Sanitary
TYPE OF TREATMENT: Filtration/disinfection
DESIGN FLOW: 86,772 Gal/Day
SURFACE DISCHARGE: [X] Yes [ ] No — If YES, Name of Receiving Waters: Birch Creek — Classification: B(T) — Waters Index Number: H-171-52
SUBSURFACE DISCHARGE: [ ] Yes [X] No — If YES, Name of nearest surface waters: — Distance: Ft. — SOIL TYPE: — Depth of Water Table:

OUTFALL NO. 002 — [X] Proposed [ ] Existing [ ] Replacement [ ] Expansion
TYPE OF WASTE: Sanitary
TYPE OF TREATMENT: Filtration/disinfection
DESIGN FLOW: 86,722 Gal/Day
SURFACE DISCHARGE: [ ] Yes [X] No — If YES, Name of Receiving Waters: — Classification: — Waters Index Number:
SUBSURFACE DISCHARGE: [X] Yes [ ] No — If YES, Name of nearest surface waters: Birch Creek — Distance: 3,200 Ft. — SOIL TYPE: Silty loam — Depth of Water Table: >6'

OUTFALL NO. 003 — [X] Proposed [ ] Existing [ ] Replacement [ ] Expansion
TYPE OF WASTE: Sanitary
TYPE OF TREATMENT: Septic tank/leach field
DESIGN FLOW: 75 Gal/Day
SURFACE DISCHARGE: [ ] Yes [X] No — If YES, Name of Receiving Waters: — Classification: — Waters Index Number:
SUBSURFACE DISCHARGE: [X] Yes [ ] No — If YES, Name of nearest surface waters: Birch Creek — Distance: 750 Ft. — SOIL TYPE: Silty loam — Depth of Water Table: >6'

I hereby affirm under penalty of perjury that the information provided on this form and any attached supplemental forms is true to the best of my knowledge and belief. False statements made herein are punishable as a Class A misdemeanor pursuant to section 210.45 of the Penal Law.

APPLICANTS SIGNATURE (see instructions): [signature]
DATE: 12/11/02
PRINTED NAME: DEAN GITTER
TITLE: PRES., MANAGING MEMBER

PERMIT VALIDATION SECTION
(Department of Environmental Conservation Use Only)

This SPDES permit is issued in compliance with Title 8 of Article 17 of the Environmental Conservation Law of New York State and in compliance with the provisions of the Federal Water Pollution Control Act, as amended by the Federal Water Pollution Control Act Amendments of 1972, P.L. 92-500, October 18, 1972 (33 U.S.C. §1251 et. seq.) (hereinafter referred to as "the Act"), and subject to the attached conditions.

APPLICATION NUMBER: NY --
EFFECTIVE DATE:
EXPIRATION DATE:
ATTACHMENTS:

Signature of Permit Issuing Agent ______ Date ______

CARD	Type Est. 66	Type Own 68	SIC CODE 70	# Out Falls 74	Dis. Class 76	CARD	Region 71	County 72	Major Basin 74	Sub Basin 76	Compact Area 78	CARD	Latitude 53	Longitude 59	CARD	Lim Ind 57
1						3						6			7	

Table 1:

***Big Indian Plateau* Estimated Hydraulic Loading**

Facility Type	Units	Number	Daily Flow [1] (gal/unit/day)	Flow [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	Seats	40	20	800
** Sauna/Steam Rooms	Patrons	75	5	375
Restaurant (2 rest; 225 seats total; 4 seatings)	Seats	225	35	7,875
50 Seat Beverage Lounge	Seats	50	20	1,000
Spa with 15 Treatment Rooms and Lap Pool	Patrons	150	12	1,800
Ballroom	Seats	200	3	600
Offices/Meeting Space	SF	22,300	0.1	2,230
35-4 Bdrm Club Membership Units	4-Bedrooms	35	475	16,625
60-3 Bdrm Club Membership Units	3-Bedrooms	60	400	24,000
**20 Triplex Buildings				
Golf Maintenance	SF	8,500	0.1	850
Satellite Golf Maintenance	SF	1,500	0.1	150
			Subtotal	78,155
Belleayre Highlands				
Club Membership Units (88-2 Bdrm)	2-Bedrooms	88	300	26,400
Caretakers Offices	SF	100	0.1	10
Brisbane Mansion Clubhouse	Members	88	25	2,200
** w/ 25 Seat Snack Bar, Pool, and	Seats	25	20	500
Cabana Buildind w/ Lockers and Showers	Swimmers	60	10	600
Reception/ Sales/ Operational Offices	SF	6,000	0.1	600
			Subtotal	30,310
Gate House	SF	750	0.1	75
			Total (w/o Gate House)	108,465
			Total (w/ Gate House)	108,540

[1] All hydraulic loading rates taken from *Design Standards for Wastewater Treatment Works Intermediate Sized Sewage Facilities-1988 (A NYSDEC Div. of Water Publication)-Table 3*
[2] Flow (gpd)='Number' Value *Daily Flow (gal/unit/day)

Table 2:

Big Indian Plateau Estimated Organic Loading

Facility Type	Persons	No. Persons	BOD Rate [1] (lb/dy/cap)	SS Rate [2] (lb/dy/cap)	BOD [3] (lb/dy)	SS [4] (lb/dy)
Big Indian Resort and Spa/ Big Indian Country Club						
Hotel	Patrons	300	0.2	0.24	60	72
	Employees	15	0.1	0.12	1.5	1.8
Restaurant (2 Rest; 225 Seats; 4 Seatings)	Patrons [5]	900	0.07	0.084	63	75.6
	Employees	45	0.1	0.12	4.5	5.4
50 Seat Beverage Lounge (3 Seatings)	Patrons [5]	150	0.07	0.084	10.5	12.6
	Employees	5	0.1	0.12	0.5	0.6
Golf Course Clubhouse [6]	Patrons	150	0.04	0.048	6	7.2
	Employees	8	0.1	0.12	0.8	0.96
Snack Bar (40 Seats; 4 seatings)	Patrons [5]	160	0.07	0.084	11.2	13.44
	Employees	6	0.1	0.12	0.6	0.72
Sauna/ Steam Rooms [6]	Patrons	75	0.04	0.048	3	3.6
	Employees	5	0.1	0.12	0.5	0.6
Spa with 15 Treatment Rooms and Lap Pool [6]	Patrons	150	0.04	0.048	6	7.2
	Employees	18	0.1	0.12	1.8	2.16
Ballroom	Seats	200	0.02	0.048	4	9.6
Offices/Community Areas	Persons	200	0.05	0.06	10	12
Club Membership Units -(35, 4 bdrm)	Residents	175	0.2	0.24	35	42
-(60, 3 bdrm)		240	0.2	0.24	48	57.6
				Subtotal	**266.9**	**325.1**
Belleayre Highlands						
Brisbane Mansion Clubhouse [6]	Patrons	88	0.04	0.048	3.52	4.224
-Pool and Cabana Bldg w/ Lockers & Showers	Employees	10	0.1	0.12	1	1.2
Snack Bar (25 Seats; 2 seatings)	Patrons [5]	50	0.07	0.084	3.5	4.2
	Employees	5	0.1	0.12	0.5	0.6
Caretakers House	Residents	4	0.2	0.24	0.8	0.96
-(1, 3 bdrm)						
Club Membership Units	Residents	264	0.2	0.24	52.8	63.36
-(88, 2 bdrm)						
Reception/ Sales/ Operational Offices	Persons	5	0.05	0.06	0.25	0.3
				Subtotal	**62.4**	**74.8**
				Total	**329.3**	**399.9**
					BOD [7] (mg/l)	**SS [8] (mg/l)**
		@ est. ave. flow [9] (gpd)	**108,465**		**364.0**	**442.1**

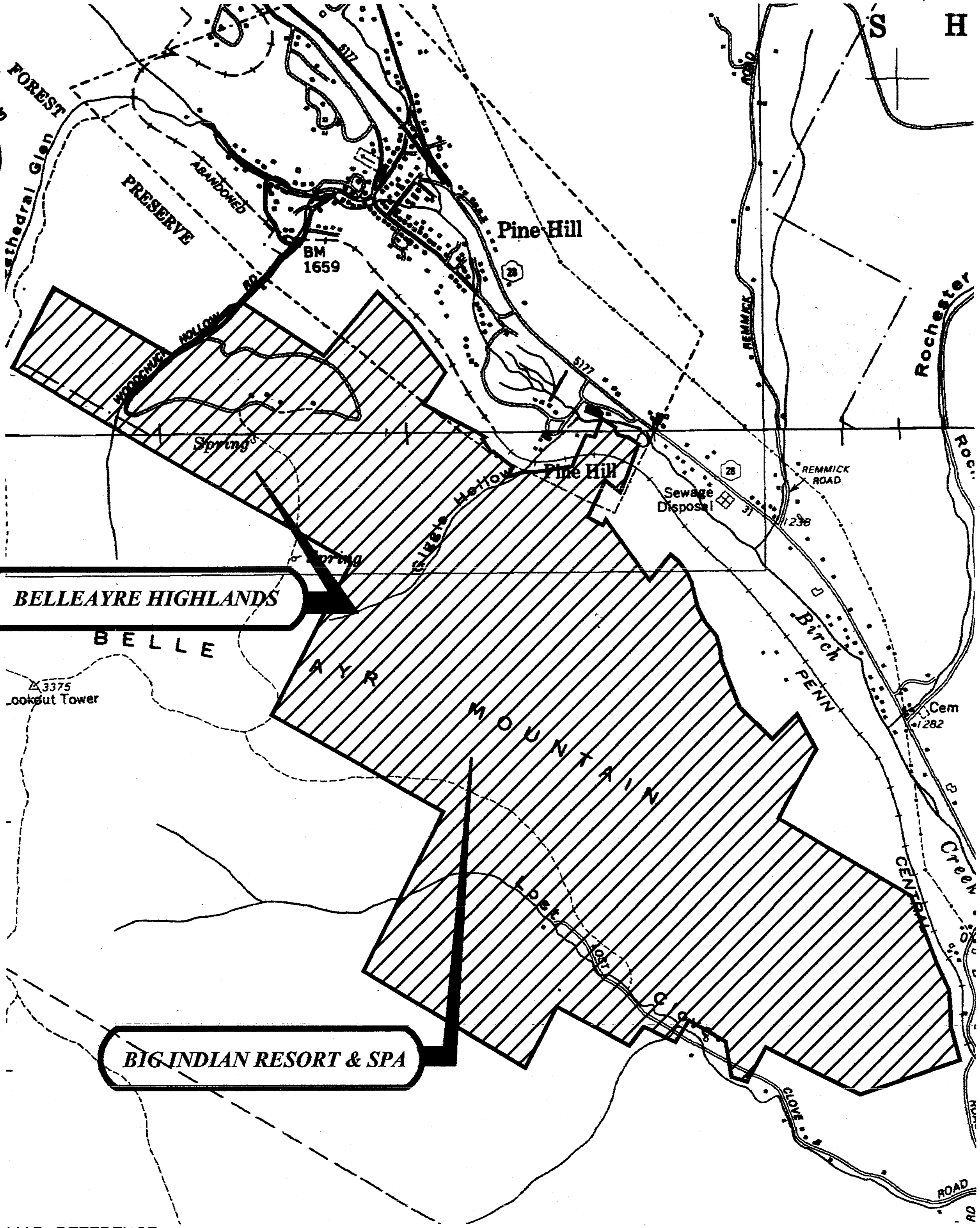
[1] All BOD Rates taken from *Water and Wastewater Technology Second Edition* by Mark Hammer-*Table 9-1*
[2] SS Rate (lb/dy/cap) is typically 1.2*BOD Rate
[3] BOD (lb/dy)=BOD Rate (lb/dy/cap)*'No. Persons' Value
[4] SS Rate (lb/dy)=SS Rate (lb/dy/cap)*'No. Persons' Value
[5] BOD and SS Rates for Restaurant Patrons combine the patron value and the meal served value.
[6] The BOD and SS Rates for Restaurants are assumed to be the same for Club Houses/Spas/Retail Stores.
[7] BOD (mg/l)=Total BOD Rate (lb/dy)/(Flow (mil gpd)*8.34)
[8] SS (mg/l)=Total SS Rate (lb/dy)/(Flow (mil gpd)*8.34)
[9] Average Flow value is the 'Total' hydraulic loading value from Table 1 (this document).

Table 3:

Big Indian Plateau
Absorption System Sizing

Facilities/ Lodging Served	Hydraulic Load (gpd)	Grease Trap Sizing (gal)	Septic Tank Sizing (gal)	Area of Absorption Fields (SF)	# of Fields Required	Lateral/ Piping Details*
Main Entrance Gatehouse	75	NA	900	85	1- 85 SF Field; 100% Reserve	(2) 10 ft laterals

LOCATION MAP



MAP REFERENCE:
SHANDAKEN & WEST KILL
QUADRANGLE–NYSDOT 7.5 MIN.

SITE LOCATION PLAN

0' 2000'

FIGURE 1

DELAWARE ENGINEERING, P.C.

28 Madison Avenue Extension
Albany, New York 12203

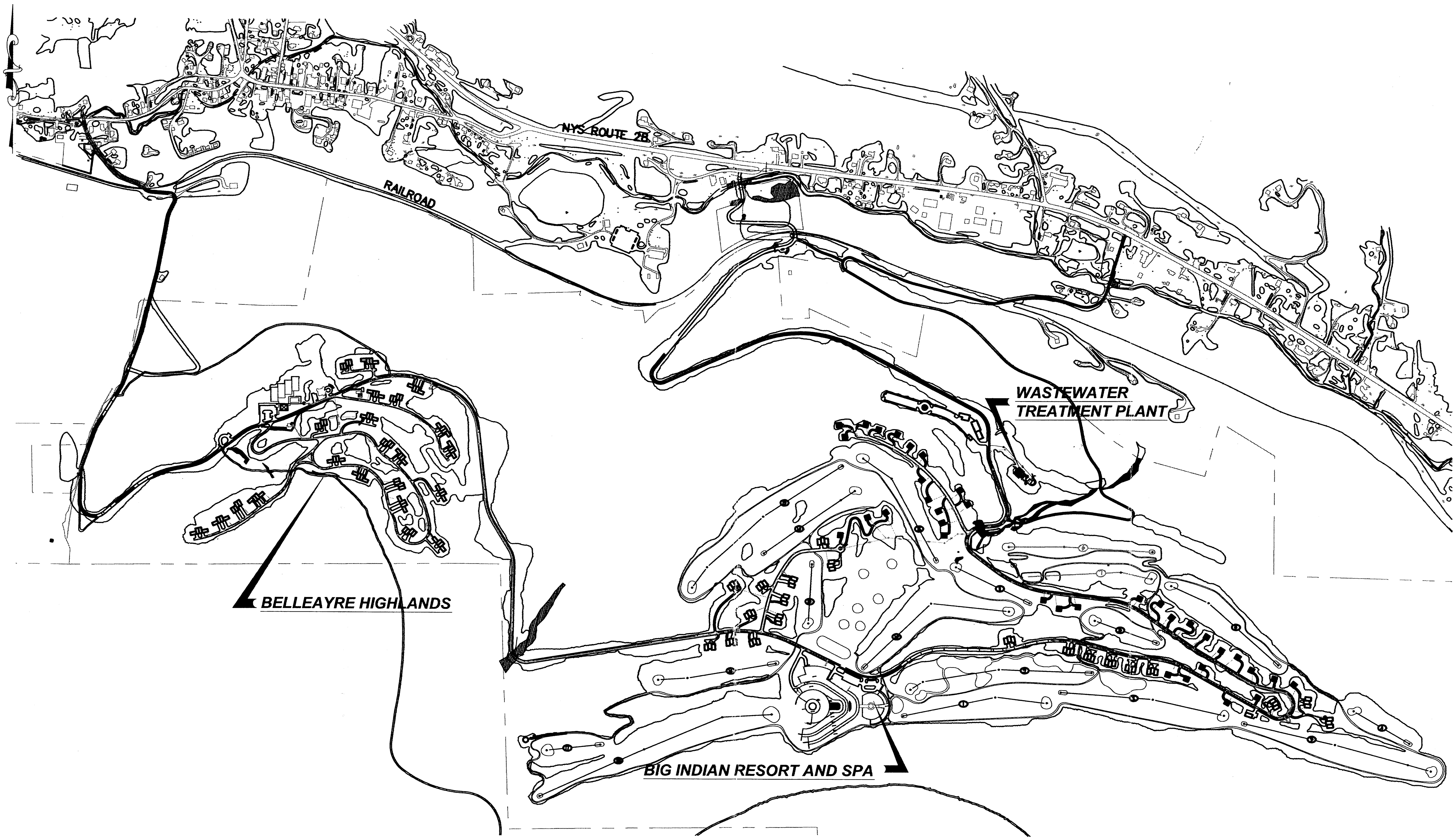
Phone 518–452–1290
FAX 518–452–1335

BIG INDIAN PLATEAU / BELLEAYRE HIGHLANDS

DECEMBER 2002

FILENAME: CROSSROADS/NYSDEC.DWG

SITE PLANS



BIG INDIAN PLATEAU DEVELOPMENT

CONCEPT PLAN

DELAWARE ENGINEERING, P.C.
28 Madison Avenue Extension
Albany, New York 12203
Phone 518-452-1290
FAX 518-452-1335

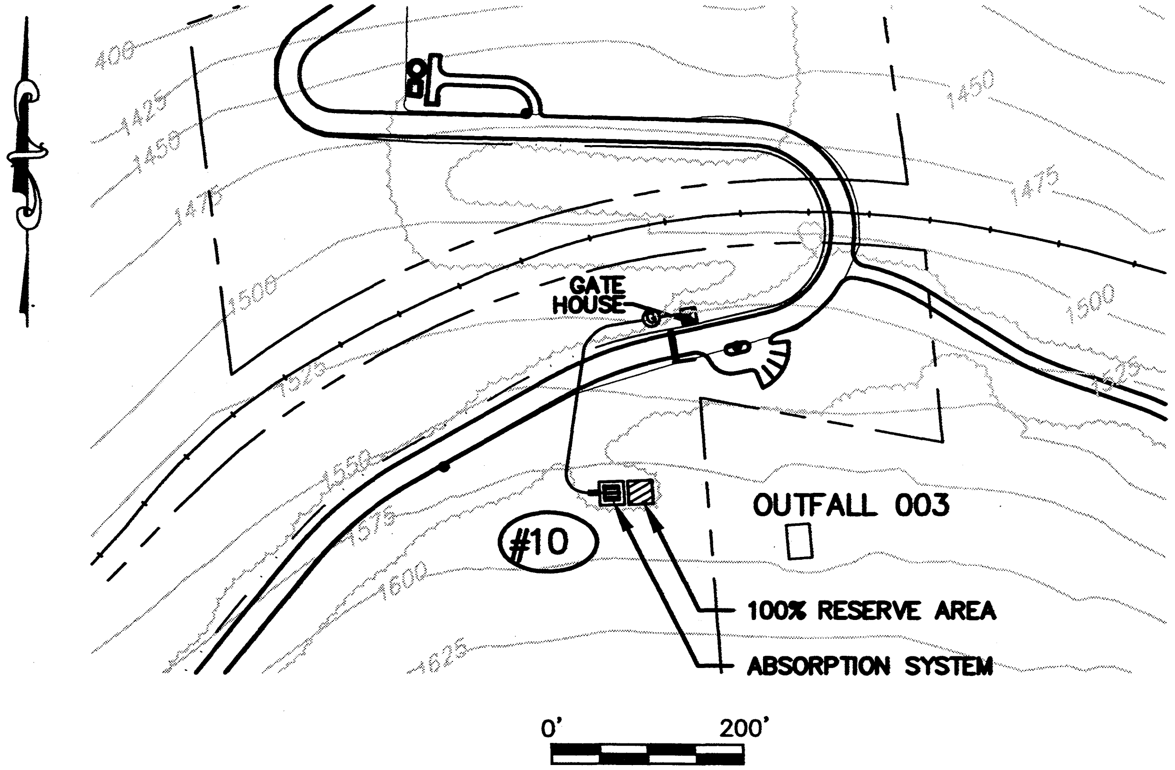
LOCATION MAP FOR WASTEWATER DISPOSAL SYSTEM

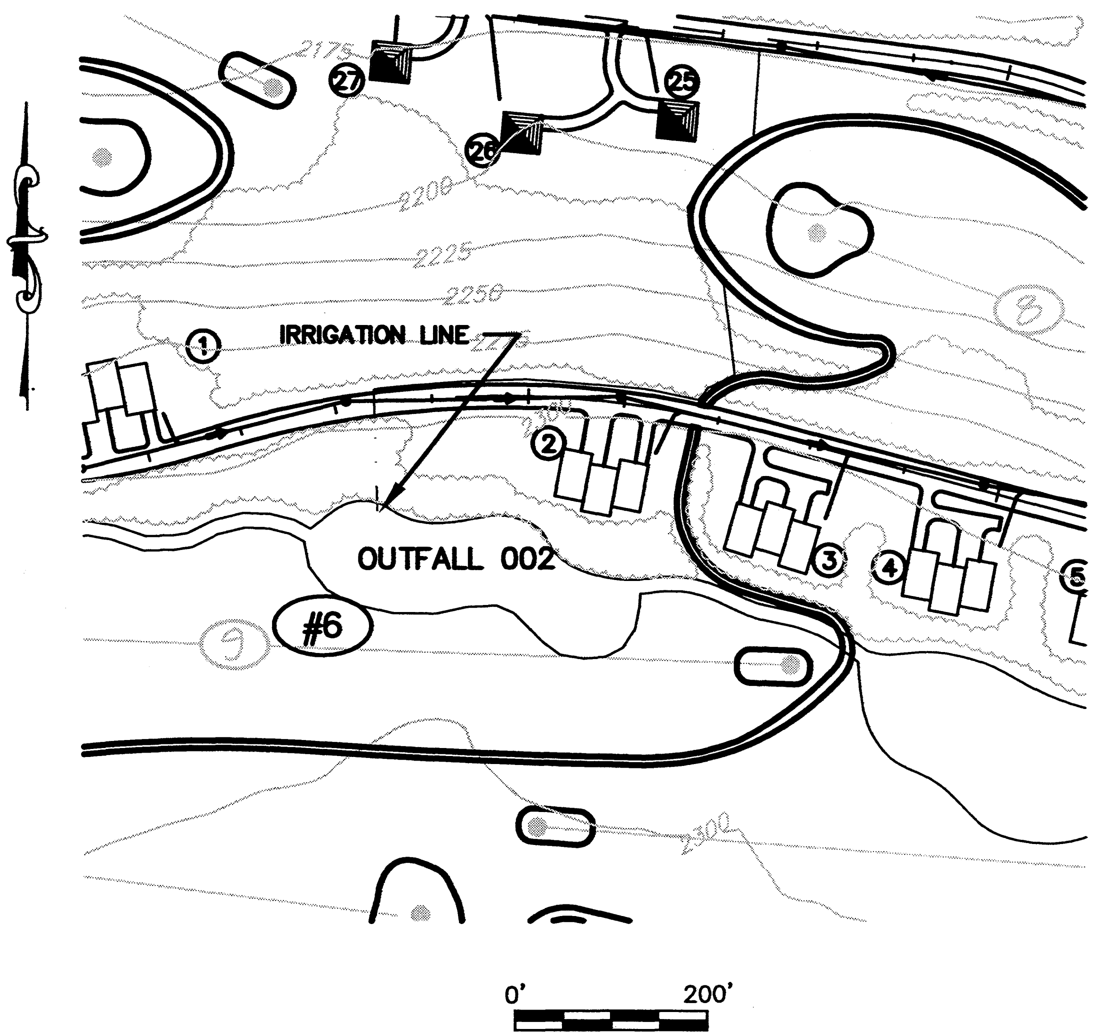
BIG INDIAN PLATEAU

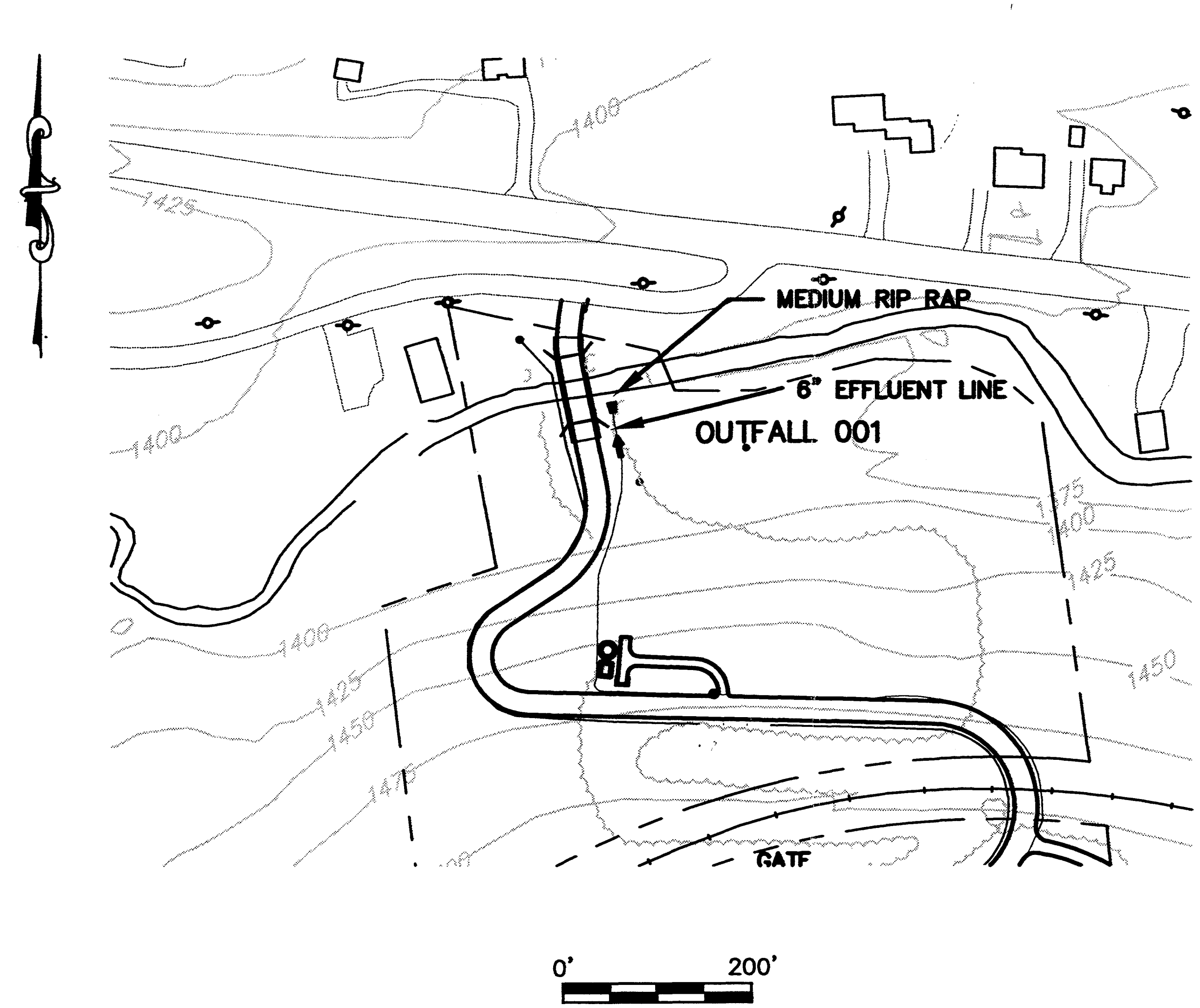
DECEMBER 2002

SHEET 1

FILENAME: S_PLOT_TURNER20.DWG







FILENAME: S_PLOT_TURNER13.DWG

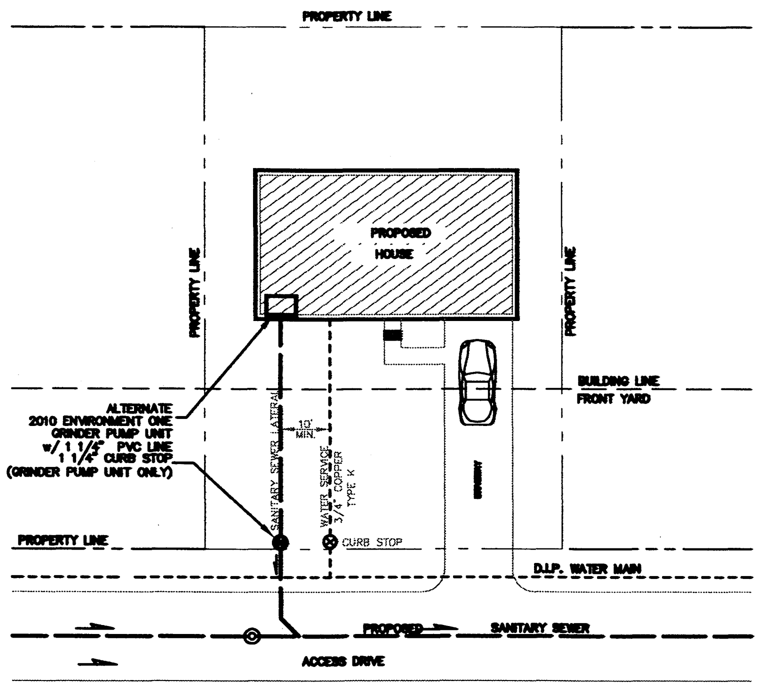
CONCEPT PLAN

DELAWARE ENGINEERING, P.C.
28 Madison Avenue Extension
Albany, New York 12203
Phone 518-452-1290
FAX 518-452-1335

WASTEWATER DISPOSAL SYSTEM
BIG INDIAN PLATEAU /
BIG INDIAN RESORT AND SPA

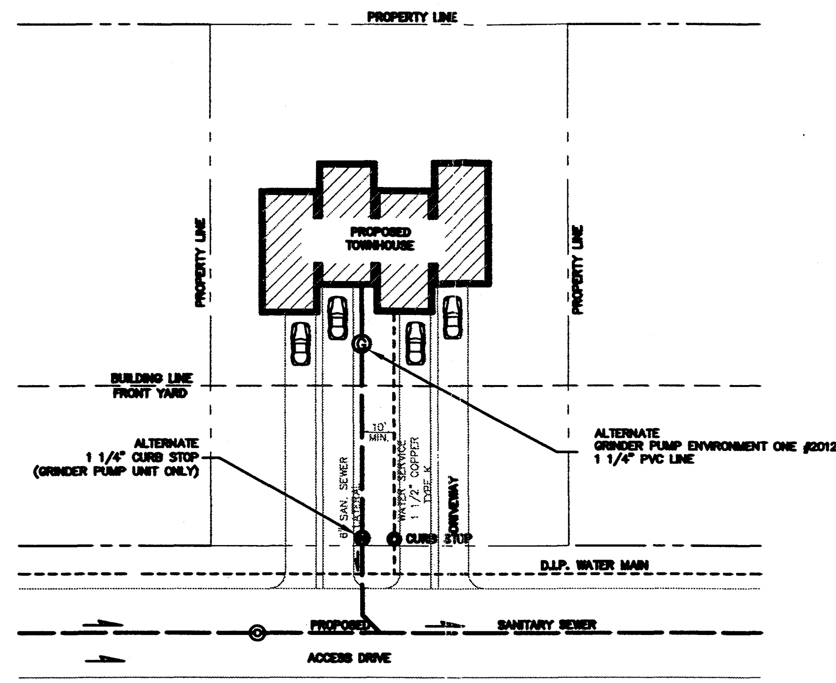
DECEMBER 2002

SHEET 2



TYPICAL SINGLE FAMILY UTIILITY LAYOUT

SCALE: NOT TO SCALE



TYPICAL MULTI - FAMILY UTIILITY LAYOUT

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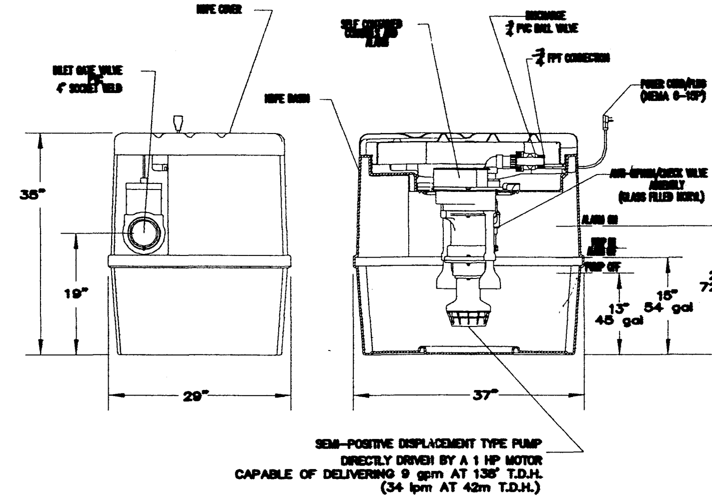
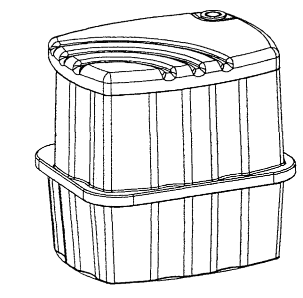
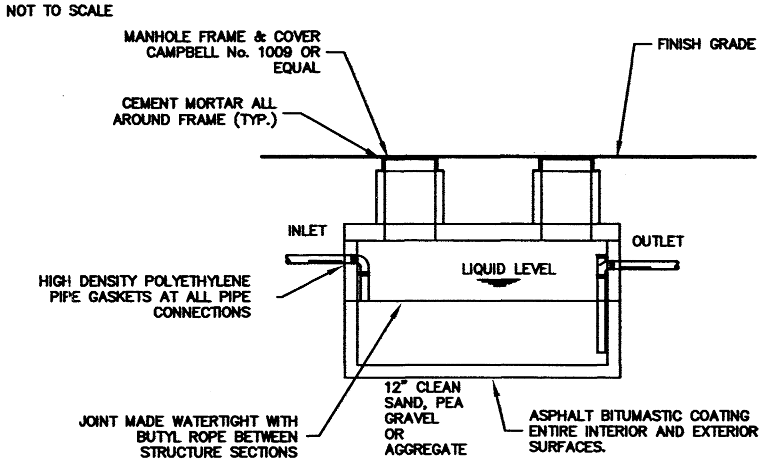




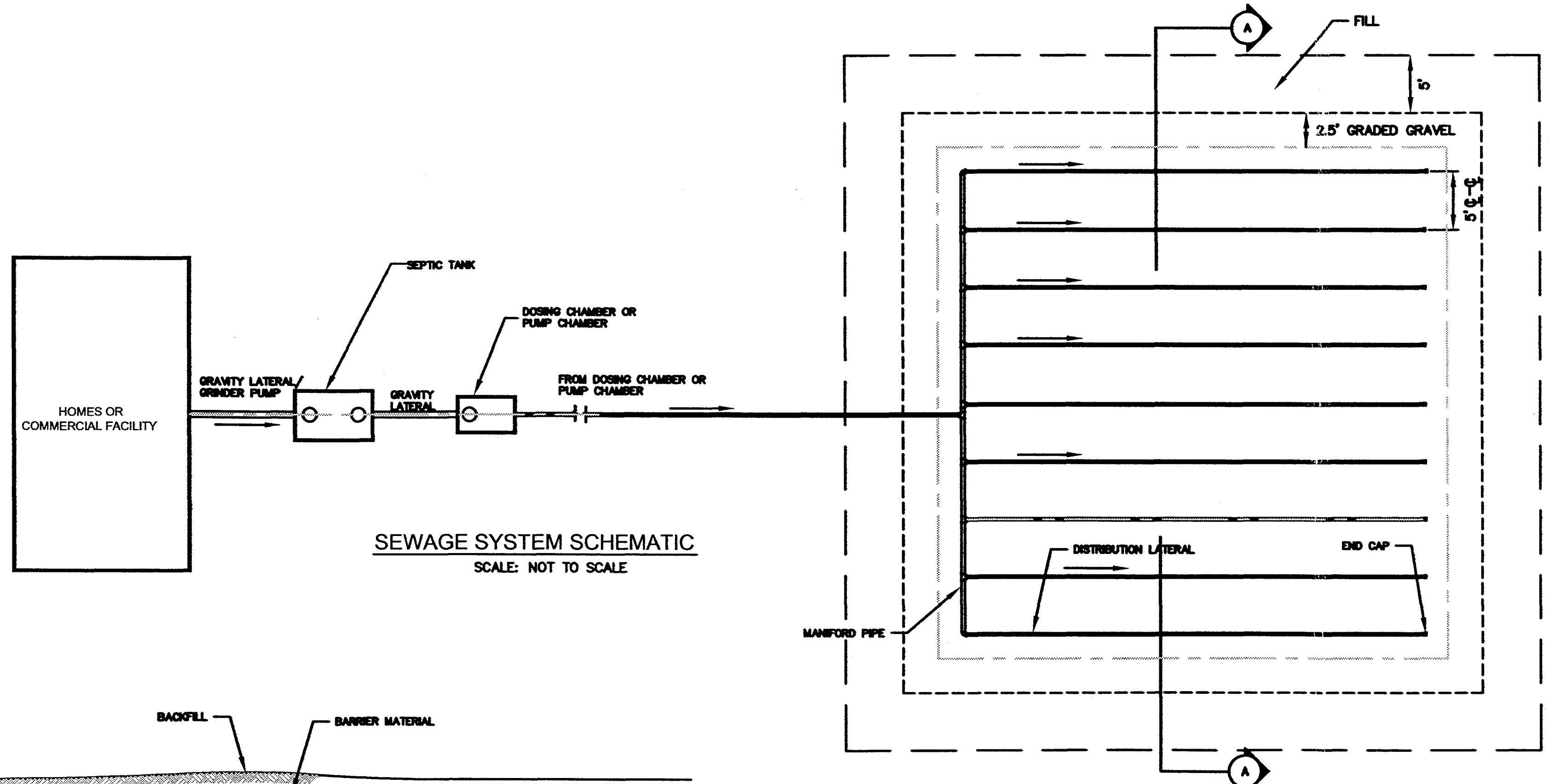
TYPICAL GRINDER PUMP - INDOOR UNIT

SCALE: NOT TO SCALE



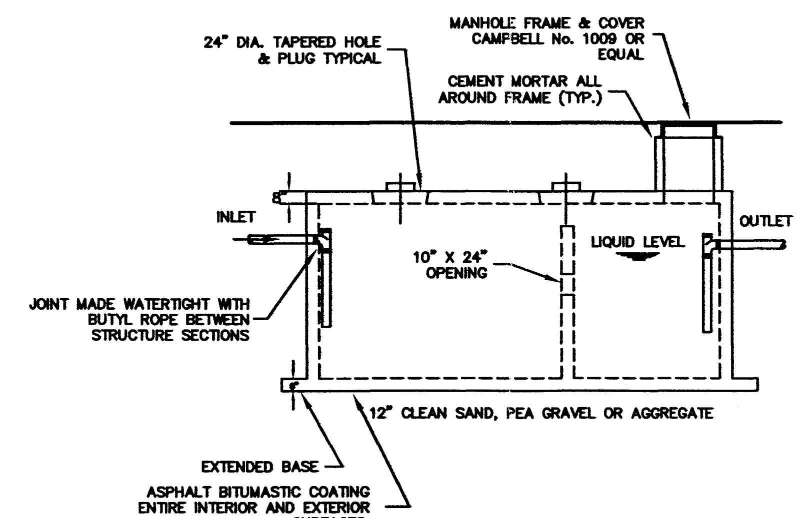
TYPICAL GREASE TRAP

NOT TO SCALE



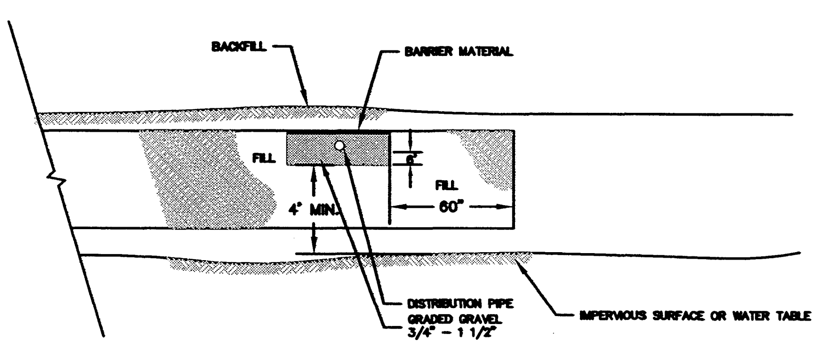
SEWAGE SYSTEM SCHEMATIC

SCALE: NOT TO SCALE



TYPICAL SEPTIC TANK

NOT TO SCALE



SECTION "A-A"

SCALE: NOT TO SCALE

NOTES:

Concrete Septic Tank exterior shall be coated with bituminous coating.

Contractor to minimize use of 90° elbows and tee connections.
Use 45° bends and wye connection wherever possible.

CONCEPT PLAN

DELAWARE ENGINEERING, P.C.

28 Madison Avenue Extension
Albany, New York 12203

Phone 518-452-1290
FAX 518-452-1335

PROPOSED ABSORPTION SYSTEM DETAILS

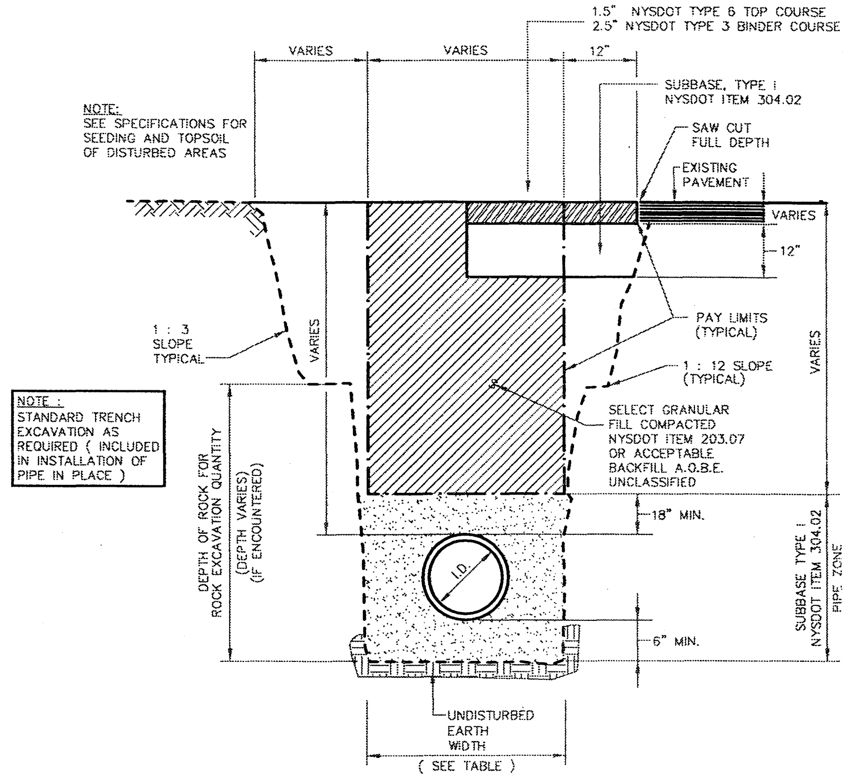
BIG INDIAN PLATEAU

DECEMBER 2002

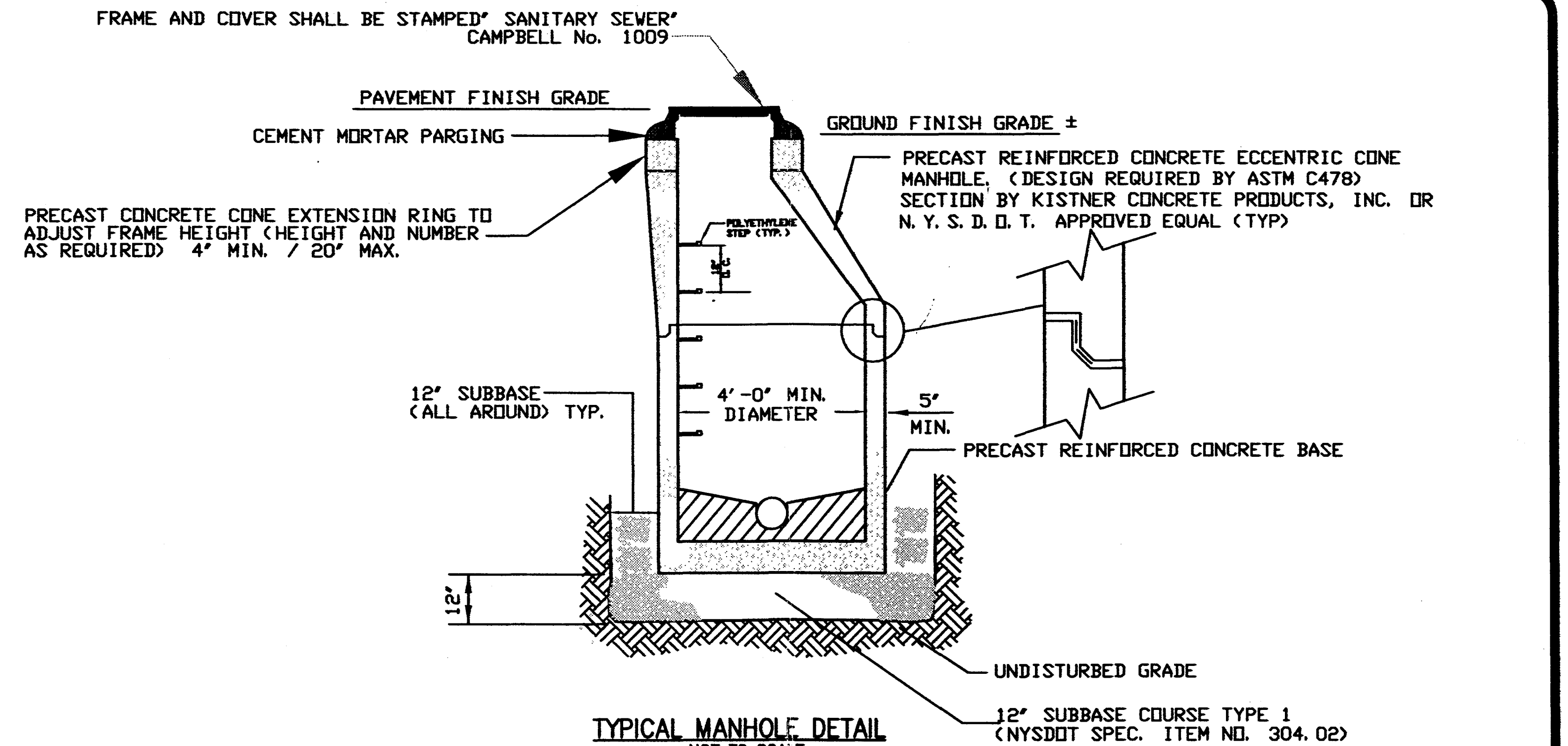
SHEET 3

FILENAME: RIDGE_SAN_DETAILS_SMALL.DWG

PIPE SIZE I.D. INCHES	MIN. SUGGESTED TRENCH WIDTH FOR AMPLE WORKING SPACE (I.D. PLUS 24 INCHES)	MAX. TRENCH WIDTH ALLOWED = MAX. PAY LIMITS (I.D. PLUS 36 INCHES)
I.D.	W MIN.	W MAX.
2" OR LESS	26	38
3	27	39
4	28	40
6	30	42
8	32	44
10	34	46
12	36	48
15	39	51
18	42	54
21	45	57
24	48	60



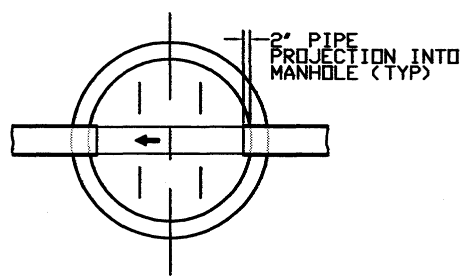
TYPICAL TRENCH DETAIL
NTS



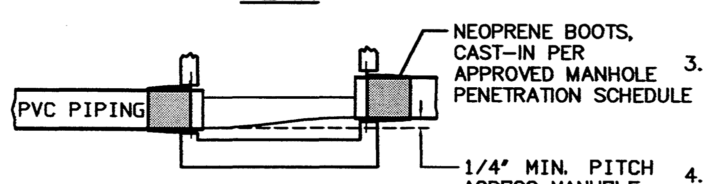
TYPICAL MANHOLE DETAIL
NOT TO SCALE

NOTES: PRECAST CONCRETE SUPPLIERS SHALL BE ON THE NYSDOT APPROVED LIST
PLUG ALL LIFTING HOLES WITH CEMENT MORTAR
PRECAST REINFORCED CONCRETE MANHOLE SECTIONS 4000 P. S. I. AT 28 DAYS, 5% AIR ENTRAINED, ASTM-A497 REINFORCING STEEL ASTM A615-A497 AASHTO H-20 LOADING WITH 30% IMPACT AND 30 P. S. F. SOIL PRESSURE

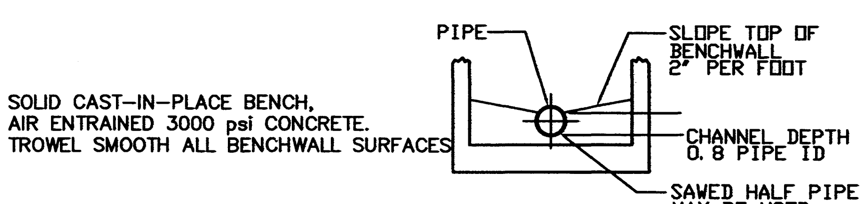
FOR PRECAST REINFORCED CONCRETE MANHOLE SECTIONS JOINT SEAL WITH FLEXIBLE BUTYL ROPE
4' I. D. MANHOLE - 1" WIDE
5' I. D. MANHOLE - 1 1/2" WIDE
6' I. D. MANHOLE AND LARGER - 2" WIDE



ONE-WAY INVERT PLAN



STANDARD INVERT



SECTION

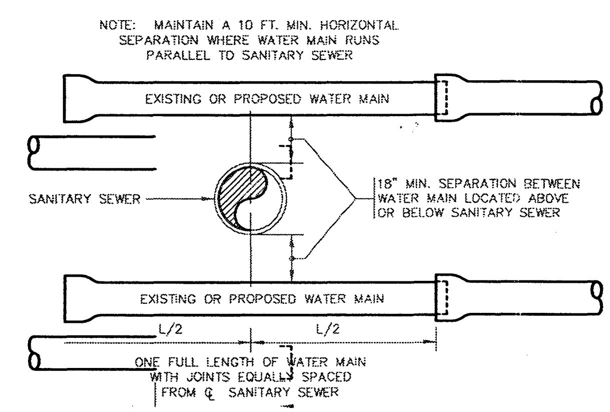
INVERT, CHANNEL AND BENCHWALL DETAILS
SCALE: NOT TO SCALE

GENERAL PRECAST NOTES

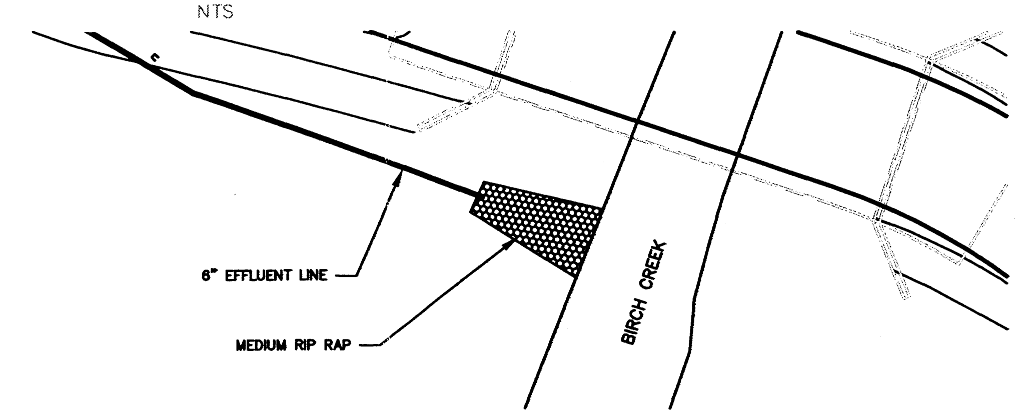
1. PRECAST REINFORCED CONCRETE MANHOLE SECTIONS 4000 P.S.I. AT 28 DAYS, 5% AIR ENTRAINED, ASTM-A497 REINFORCING STEEL, ASTM A615-A497 AASHTO H-20 LOADING WITH 30% IMPACT AND 30 P.S.I. SOIL PRESSURE.
2. PRECAST CONCRETE CONE EXTENSION RING TO ADJUST FRAME HEIGHT (HEIGHT AND NUMBER AS REQUIRED) 4" MIN/20" MAX. SOLID CONCRETE BLOCKS MAY BE USED FOR FRAME ADJUSTMENT. BLOCKS SHALL BE SET 1/2" BACK FROM OPENING AND COATED WITH 1/2" CEMENT MORTAR INSIDE AND OUT.
3. PRECAST REINFORCED CONCRETE ECCENTRIC CONE SECTION AS MANUFACTURED BY KISTNER CONCRETE PRODUCTS, INC. OR APPROVED EQUAL. MANHOLE DESIGN SPECIFICATION CONFORM TO LATEST ASTM SECTIONS FOR PRECAST REINFORCED CONCRETE MANHOLE SECTIONS.
4. PRECAST REINFORCED CONCRETE BOTTOM SECTION WITH INTERGRAL BASE AS MANUFACTURED BY KISTNER CONCRETE PRODUCTS, INC. OR APPROVED EQUAL.

UTILITY NOTES

1. LOCATION OF UTILITIES, PUBLIC AND/OR PRIVATE, INDICATED AS EXISTING AND/OR TO BE CONSTRUCTED AS SHOWN ON THE PLANS ARE APPROXIMATE ONLY. THEIR EXACT LOCATION SHALL BE DETERMINED IN THE FIELD. ADDITIONAL UTILITY LINES, WHETHER ABANDONED OR IN SERVICE, MAY EXIST AND IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO CONDUCT HIS OPERATIONS AND TAKE THE NECESSARY PRECAUTIONS TO PREVENT INTERFERENCE WITH, OR DAMAGE TO, THESE OR OTHER FACILITIES DURING THE COURSE OF CONSTRUCTION.
2. IN THE EVENT THE CONTRACTOR DAMAGES AN EXISTING UTILITY SERVICE CAUSING AN INTERRUPTION IN SAID SERVICE, HE SHALL IMMEDIATELY COMMENCE WORK TO RESTORE SERVICE AND MAY NOT RESUME HIS WORK OPERATION UNTIL SERVICE IS RESTORED.



TYPICAL WATER MAIN & SANITARY SEWER CROSSING
NTS



OUTFALL DETAIL
NTS

CONCEPT PLAN

DELAWARE ENGINEERING, P.C.
28 Madison Avenue Extension
Albany, New York 12203
Phone 518-452-1290
FAX 518-452-1335

MISCELLANEOUS DETAILS
BIG INDIAN PLATEAU
DECEMBER 2002
SHEET 4

FILENAME: RIDGE_TRENCH_DETAILS_SMALL.DWG

COPY OF FULL ENVIRONMENTAL ASSESSMENT FORM (October 1999)

See Appendix 1, SEQRA Documentation

COPY OF BUILDING-STRUCTURE INVENTORY FORM (April 2000)

See Appendix 23, Cultural Resources Investigation Phase 1B

DRAFT ENVIRONMENTAL IMPACT STATEMENT (Submitted Concurrently Under Separate Cover)

STATE POLLUTANT DISCHARGE ELIMINATION SYSTEM (SPDES) PERMIT APPLICATION

Wildacres Resort
Town of Shandaken, Ulster County
Town of Middletown, Delaware County

December 2002

Prepared for:

New York State Department of Environmental Conservation
625 Broadway
Albany, NY 12207

Prepared by:

Delaware Engineering, P.C.
28 Madison Avenue Extension
Albany, NY 12203

SPDES Permit Application
Wildacres Resort
Ulster County, New York
Delaware County, New York

Table of Contents

SPDES PERMIT APPLICATION

91-19-1 (2/85)

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

APPLICATION FORM "D"
for a State Pollutant Discharge Elimination System (SPDES) Permit

(A SPDES Application When Signed by a Permit Issuing Official Becomes a SPDES Permit)

PLEASE PRINT OR TYPE

APPLICATION TYPE: [X] New [ ] Renewal [ ] Modification
IF RENEWAL OR MODIFICATION, GIVE PREVIOUS NUMBER: NY —

OWNER'S NAME (Corporate, Partnership, Individual): Wildacres Resort Sewer Works Corp.
TYPE OF OWNERSHIP: [X] Corporate [ ] Individual [ ] Partnership [ ] Public

OWNER'S MAILING ADDRESS (Street, City, State, Zip Code): P.O. Box 267, Andrew Lane Road, Mt. Tremper, NY 12457

REFER ALL CORRESPONDENCE TO: (Name, Title and Address): Dean Gitter
TELEPHONE NUMBER: (845 688-7740

FACILITY NAME: Wildacres Resort
FACILITY LOCATION (Street or Road): NYS Route 28
CITY, TOWN OR VILLAGE: Shandaken/Middletown

COUNTY: Delaware
GIVE EXPLICIT DIRECTIONS TO LOCATION: Attached

NATURE OF BUSINESS OR FACILITY: Four season recreational resort
POPULATION SERVED (See Instructions): 21 single family homes; 168 lodging units; 250 room hotel

FREQUENCY OF DISCHARGE
All Year? [X] Yes [ ] No If No, Specify Number of Months ______
All Week? [X] Yes [ ] No If No, Specify Number of Days ______

DOES YOUR DISCHARGE CONTAIN OR IS IT POSSIBLE FOR YOUR DISCHARGE TO CONTAIN ONE OR MORE OF THE FOLLOWING SUBSTANCES ADDED AS A RESULT OF YOUR OPERATIONS, ACTIVITIES OR PROCESSES?

Please Check [ ] Aluminum [ ] Ammonia [ ] Beryllium [ ] Cadmium [X] Chlorine [ ] Chromium [ ] Copper [ ] Cyanide
[X] Grease [ ] Lead [ ] Mercury [ ] Nickel [X] Oil [ ] Phenols [ ] Selenium [ ] Zinc [ ] None of These

DISCHARGE DATA (Use additional forms, if necessary) (See Instructions)

OUTFALL NO.: 002 [X] Proposed [ ] Existing [ ] Replacement [ ] Expansion
TYPE OF WASTE: Sanitary
TYPE OF TREATMENT: Filtration, phosphorus & disinfection
DESIGN FLOW: 112,348 Gal/Day

SURFACE DISCHARGE: [ ] Yes [X] No
If YES, Name of Receiving Waters:
Classification:
Waters Index Number:

SUBSURFACE DISCHARGE: [X] Yes [ ] No
If YES, Name of nearest surface waters: spray irrigation Emory Brook
Distance: Ft.
SOIL TYPE: Silty loam
Depth of Water Table: >6'

OUTFALL NO.: 001 [X] Proposed [ ] Existing [ ] Replacement [ ] Expansion
TYPE OF WASTE: Sanitary
TYPE OF TREATMENT: Filtration, phosphorus, & disinfection
DESIGN FLOW: 112,348 Gal/Day

SURFACE DISCHARGE: [X] Yes [ ] No
If YES, Name of Receiving Waters: Unnamed
Classification: B
Waters Index Number: D-70-80-12-3

SUBSURFACE DISCHARGE: [ ] Yes [X] No
If YES, Name of nearest surface waters:
Distance: Ft.
SOIL TYPE:
Depth of Water Table:

OUTFALL NO.: [ ] Proposed [ ] Existing [ ] Replacement [ ] Expansion
TYPE OF WASTE:
TYPE OF TREATMENT:
DESIGN FLOW: Gal/Day

SURFACE DISCHARGE: [ ] Yes [ ] No
If YES, Name of Receiving Waters:
Classification:
Waters Index Number:

SUBSURFACE DISCHARGE: [ ] Yes [ ] No
If YES, Name of nearest surface waters:
Distance: Ft.
SOIL TYPE:
Depth of Water Table:

I hereby affirm under penalty of perjury that the information provided on this form and any attached supplemental forms is true to the best of my knowledge and belief. False statements made herein are punishable as a Class A misdemeanor pursuant to section 210.45 of the Penal Law.

APPLICANTS SIGNATURE (see instructions)	DATE	PRINTED NAME	TITLE
Dean L. Gitter	9/19/03	DEAN L. GITTER	President, Managing Member

PERMIT VALIDATION SECTION
(Department of Environmental Conservation Use Only)

This SPDES permit is issued in compliance with Title 8 of Article 17 of the Environmental Conservation Law of New York State and in compliance with the provisions of the Federal Water Pollution Control Act, as amended by the Federal Water Pollution Control Act Amendments of 1972, P.L. 92-500, October 18, 1972 (33 U.S.C. §1251 et. seq.) (hereinafter referred to as "the Act"), and subject to the attached conditions.

APPLICATION NUMBER: NY --
EFFECTIVE DATE:
EXPIRATION DATE:
ATTACHMENTS:

Signature of Permit Issuing Agent ______ Date ______

CARD	Type Est. 55	Type Own 56	SIC CODE 70	# Out Falls 74	Dis. Class 76	CARD	Region 71	County 72	Major Basin 74	Sub Basin 76	Compact Area 78	CARD	Latitude 53	Longitude 59	CARD	Lim Ind 57
1						3						6			7	

Table 1:

Wildacres Resort and Highmount Golf Club/ Highmount Estates Estimated Hydraulic Loading

Facility Type	Units	Number	Daily Flow [1] (gal/unit/day)	Flow [2] (gpd)
<u>Wildacres Resort and Highmount Golf Club</u>				
Hotel	Rooms	250	120	30000
Restaurant (3 rest; 600 seats; 4 seatings)	Seats	600	35	21000
** (2 rest. in Hotel, 1 at Marlowe Mansion)				
** 100 Seat Beverage Lounge	Seats	100	20	2000
Retail Stores (10)	SF	20000	0.1	2000
** Public Bathrooms	Toilets	4	400	1600
Indoor Pool	Swimmers	250	10	2500
Spa	Patrons	150	10	1500
** w/ 15 Treatment Rooms and Lap Pool				
Offices/Meeting Space (Total in Wildacres)	SF	5500	0.1	550
Lodging Units (168-2 Bdrm)	2-Bedrooms	168	300	50400
Lodging Unit Clubhouse--				
Pool/Health Club	Swimmers	168	10	1680
40 Seat Snack Bar	Seats	40	20	800
Conference Center	SF	30000	0.1	3000
-Ballroom/Auditorium	Seats	700	3	2100
Golf Course Clubhouse	Members	250	25	6250
** w/ 40 Seat Snack Bar	Seats	40	20	800
Interfaith Chapel	Seats	250	3	750
Maintenance Shops/Storage Areas/Children's Center	SF	13300	0.1	1330
			Total	128260
<u>Highmount Estates</u>				
Single-Family Home (21-4 Bdrm)	4-Bedrooms	21	475	9975
<u>Wilderness Activity Center</u>				
Café with Lounge and Library	Seats	20	20	400
Locker Rooms	Toilets	4	400	1600
Sauna/ Steam Room/ Jacuzzi	Patrons	60	10	600
			Combined Total	140835

[1] All hydraulic loading rates taken from *Design Standards for Wastewater Treatment Works Intermediate Sized Sewage Facilities-1988 (A NYSDEC Div. of Water Publication)-Table 3*
[2] Flow (gpd)='Number' Value *Daily Flow (gal/unit/day)

Table 2:

Wildacres Resort and Highmount Golf Club/ Highmount Estates Estimated Organic Loading

Facility Type	Persons	No. Persons	BOD Rate [1] (lb/dy/cap)	SS Rate [2] (lb/dy/cap)	BOD [3] (lb/dy)	SS [4] (lb/dy)
Wildacres Resort and Highmount Golf Club						
Hotel	Patrons	500	0.2	0.24	100	120
	Employees	25	0.1	0.12	2.5	3
Restaurant (3 Rest; 600 Seats; 4 Seatings)	Patrons [5]	2400	0.07	0.084	168	201.6
	Employees	75	0.1	0.12	7.5	9
100 Seat Beverage Lounge (3 Seatings)	Patrons [5]	300	0.07	0.084	21	25.2
	Employees	18	0.1	0.12	1.8	2.16
Retail Shops [7]	Customers	500	0.04	0.048	20	24
	Employees	25	0.1	0.12	2.5	3
Indoor Pool [6]	Patrons	250	0.05	0.06	12.5	15
	Employees	12	0.1	0.12	1.2	1.44
Spa with 15 Treatment Rooms and Lap Pool [6]	Patrons	150	0.04	0.048	6	7.2
	Employees	18	0.1	0.12	1.8	2.16
Offices/Community Areas	Persons	200	0.05	0.06	10	12
Lodging Units -(168, 2 bdrm)	Residents	504	0.2	0.2	100.8	100.8
Lodging Unit Clubhouse--					0	0
Pool/Health Club [6]	Patrons	168	0.05	0.06	8.4	10.08
	Employees	8	0.1	0.12	0.8	0.96
Snack Bar (40 Seats; 2 seatings)	Patrons [5]	80	0.07	0.084	5.6	6.72
	Employees	4	0.1	0.12	0.4	0.48
Golf Course Clubhouse [6]	Patrons	250	0.04	0.048	10	12
	Employees	12	0.1	0.12	1.2	1.44
Snack Bar (40 Seats; 4 seatings)	Patrons [5]	160	0.07	0.084	11.2	13.44
	Employees	8	0.1	0.12	0.8	0.96
Conference Center/Ballroom/Auditorium	Seats	700	0.02	0.048	14	33.6
				Total	508	608.24
Highmount Estates						
Single-Family Homes -(21, 4 bdrm)	Residents	84	0.2	0.24	16.8	20.16
Wildacres Activity Center						
Community Area	Persons	300	0.05	0.06	15	18
				Combined Total	539.8	644.4
					BOD [8] (mg/l)	SS [9] (mg/l)
		@ est. ave. flow (combined) [10] (gpd)	140835		459.574826	548.629155

[1] All BOD Rates taken from *Water and Wastewater Technology Second Edition* by Mark Hammer-*Table 9-1*
[2] SS Rate (lb/dy/cap) is typically 1.2*BOD Rate
[3] BOD (lb/dy)=BOD Rate (lb/dy/cap)*'No. Persons' Value
[4] SS Rate (lb/dy)=SS Rate (lb/dy/cap)*'No. Persons' Value
[5] BOD and SS Rates for Restaurant Patrons combine the patron value and the meal served value
[6] The BOD and SS Rates for Restaurants are assumed to be the same for Club Houses/Spas
[7] The BOD and SS Rates for Offices are assumed to be the same for Retail Shops
[8] BOD (mg/l)=Total BOD Rate (lb/dy)/(Flow (mil gpd)*8.34)
[9] SS (mg/l)=Total SS Rate (lb/dy)/(Flow (mil gpd)*8.34)
[10] Average Flow value is the 'Total' hydraulic loading values of Wildacres and Leach from Table 1 (this document).

LOCATION MAP

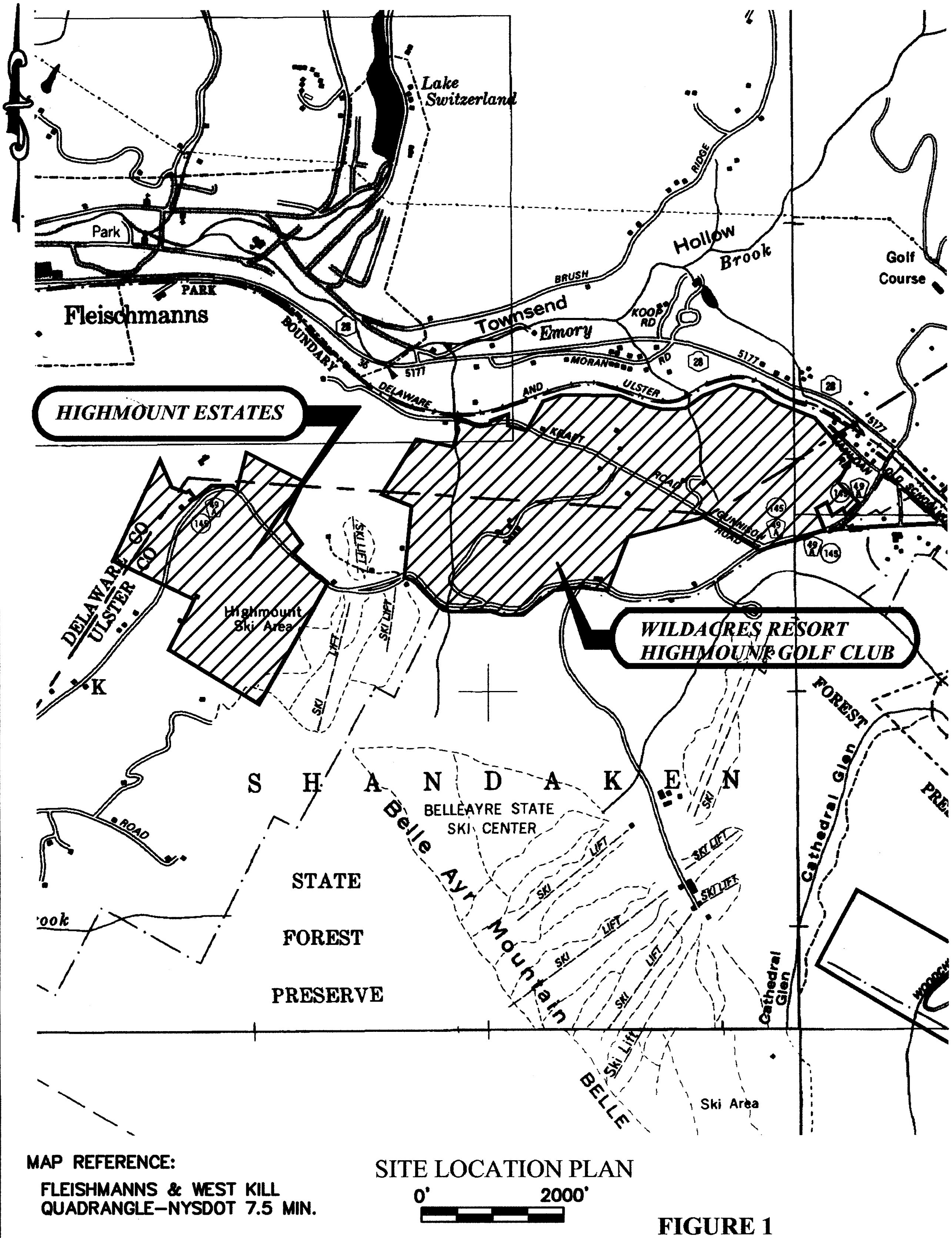


FIGURE 1

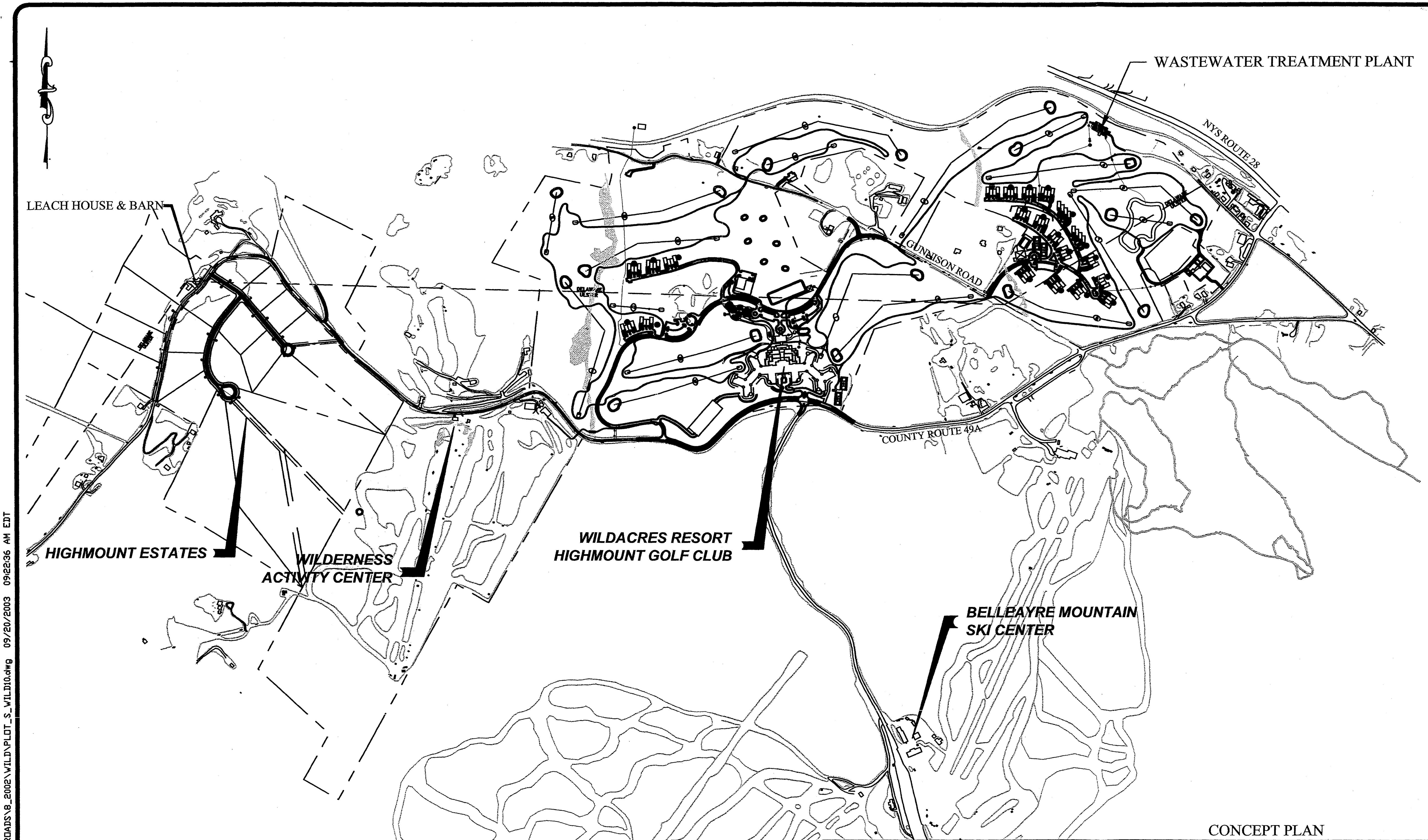
DELAWARE ENGINEERING, P.C.
28 Madison Avenue Extension
Albany, New York 12203
Phone 518-452-1290
FAX 518-452-1335

WILDACRES RESORT / HIGHMOUNT GOLF COURSE / HIGHMOUNT ESTATES

DECEMBER 2002

FILENAME: CROSSROADS/NYSDEC.DWG

SITE PLANS



CONCEPT PLAN

DELAWARE ENGINEERING, P.C.
28 Madison Avenue Extension
Albany, New York 12203
Phone 518-452-1290
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LOCATION MAP FOR
WASTEWATER DISPOSAL SYSTEM
WILDACRES RESORT / HIGHMOUNT GOLF COURSE /
HIGHMOUNT ESTATES

SEPT. 2003

SHEET 1

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LOCATION OF PROPOSED ABSORPTION BEDS & TREATMENT PLANT

0' 75' 150'

CONCEPT PLAN

DELAWARE ENGINEERING, P.C.
28 Madison Avenue Extension
Albany, New York 12203
Phone 518-452-1290
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WASTEWATER DISPOSAL SYSTEM

WILDACRES RESORT / HIGHMOUNT GOLF COURSE / HIGHMOUNT ESTATES

SEPT. 2003

SHEET 2

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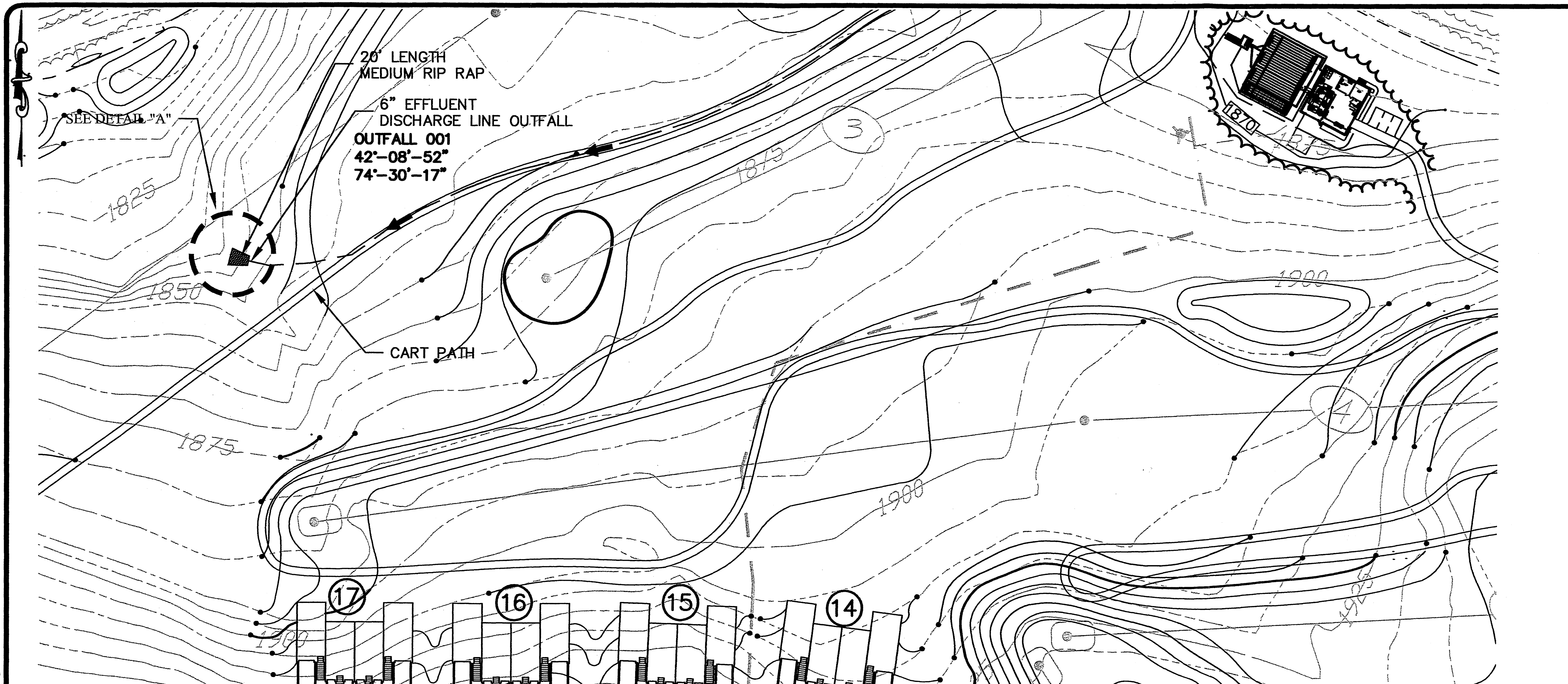
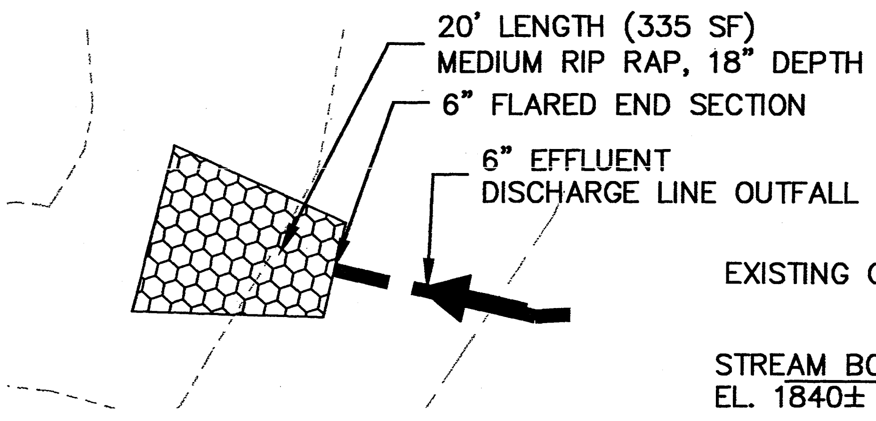
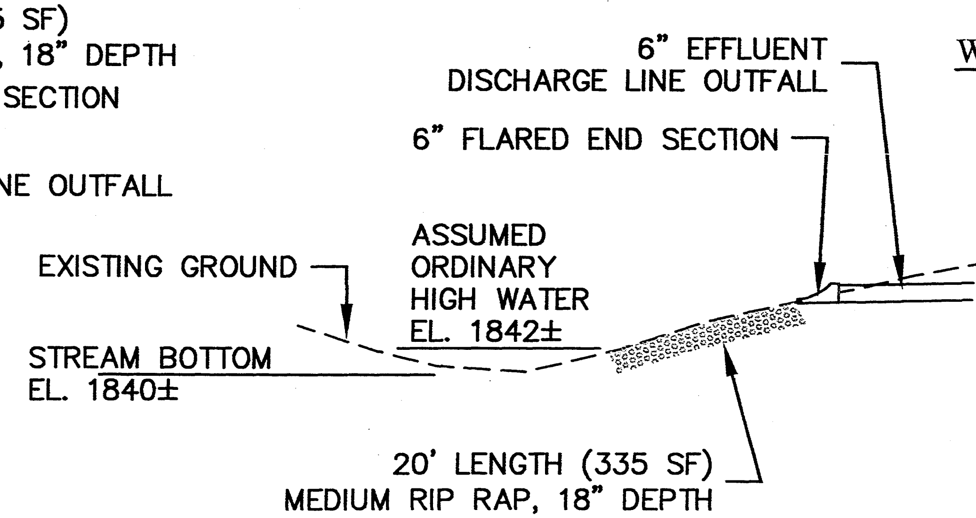


LOCATION OF ALTERNATE
WASTEWATER TREATMENT PLANT
EFFLUENT LINE

0' 50' 100'



DETAIL "A"



SECTION OF OUTFALL

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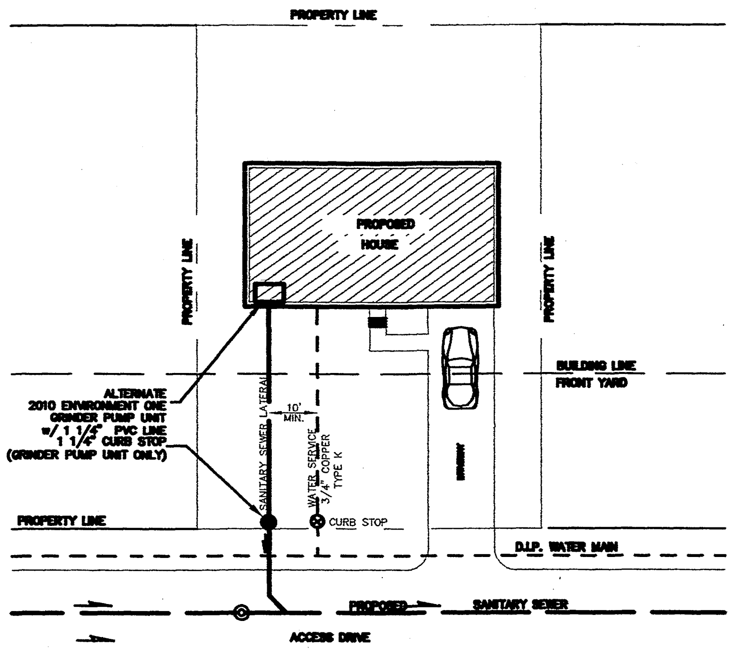
28 Madison Avenue Extension
Albany, New York 12203
Phone 518-452-1290
FAX 518-452-1335

CONCEPT PLAN
WASTEWATER DISPOSAL SYSTEM
WILDACRES RESORT / HIGHMOUNT GOLF COURSE / HIGHMOUNT ESTATES
SEPT. 2003
SHEET 3



TYPICAL SINGLE FAMILY UTIILITY LAYOUT

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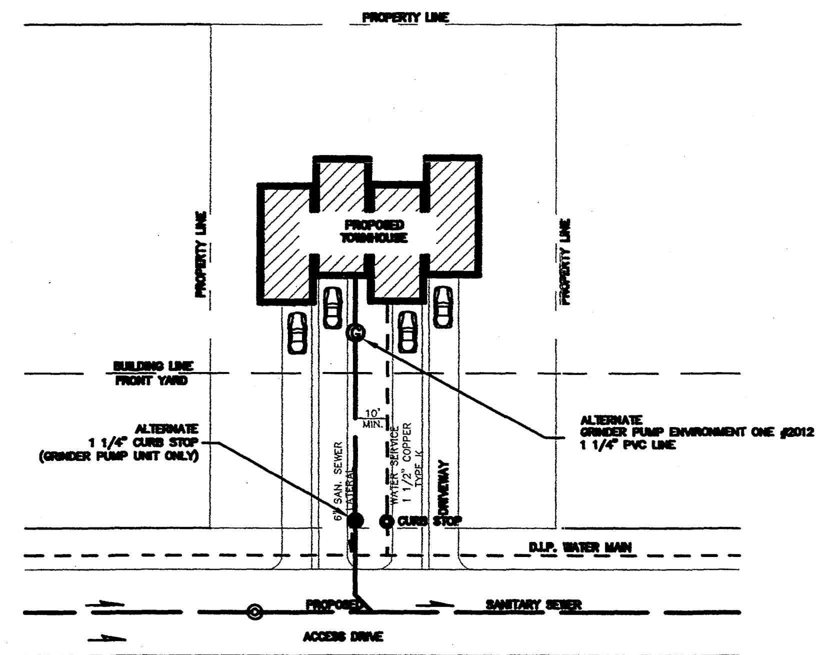

TYPICAL MULTI - FAMILY UTIILITY LAYOUT

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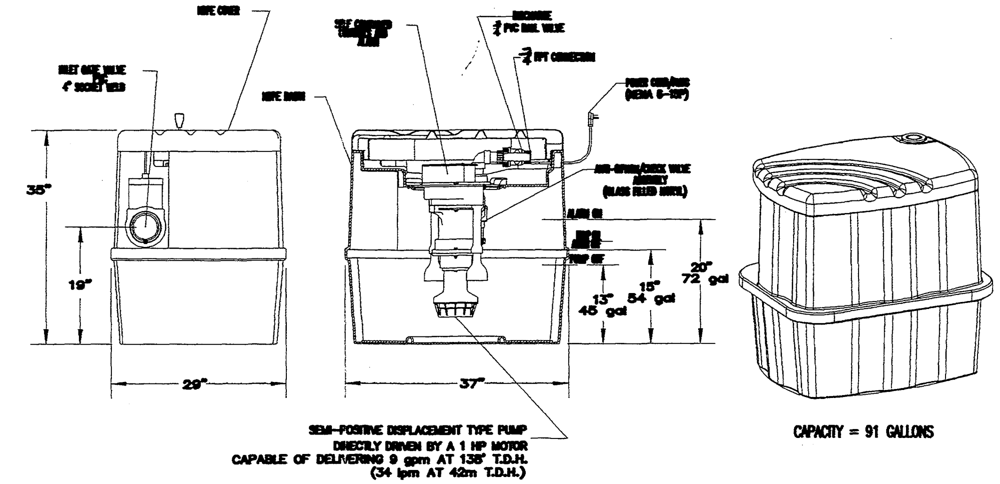
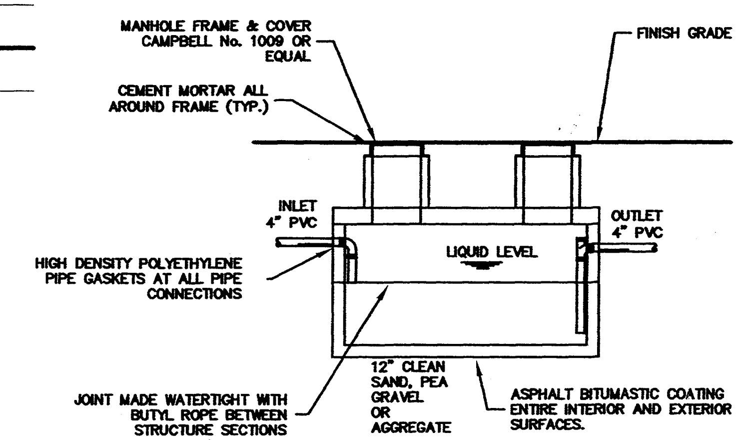


TYPICAL GRINDER PUMP - INDOOR UNIT

SCALE: NOT TO SCALE



TYPICAL GREASE TRAP

NOT TO SCALE

CONCEPT PLAN

DELAWARE ENGINEERING, P.C.

28 Madison Avenue Extension
Albany, New York 12203

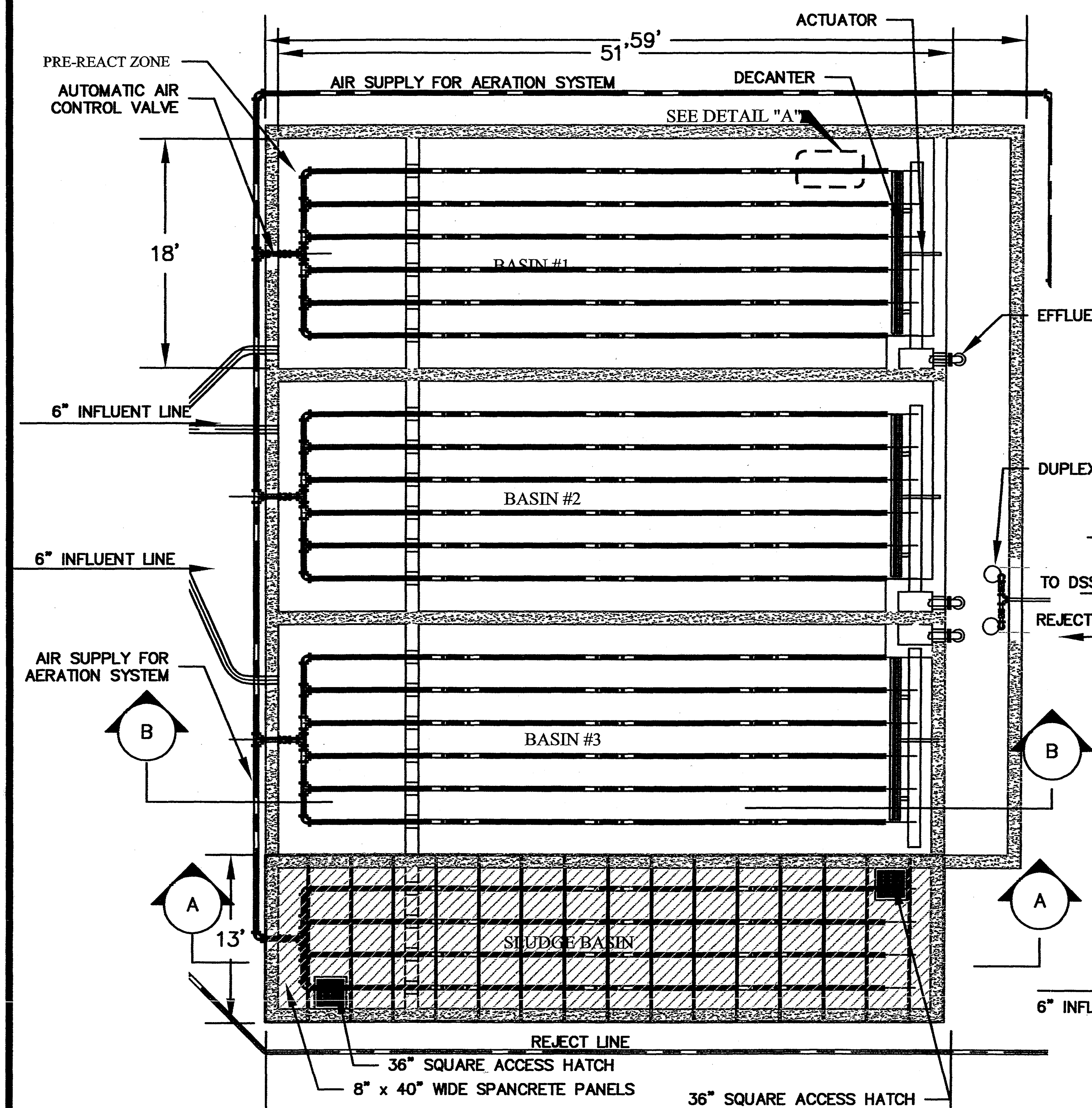
Phone 518-452-1290
FAX 518-452-1335

PROPOSED ABSORPTION SYSTEM DETAILS

WILDACRES RESORT / HIGHMOUNT GOLF COURSE / HIGHMOUNT ESTATES

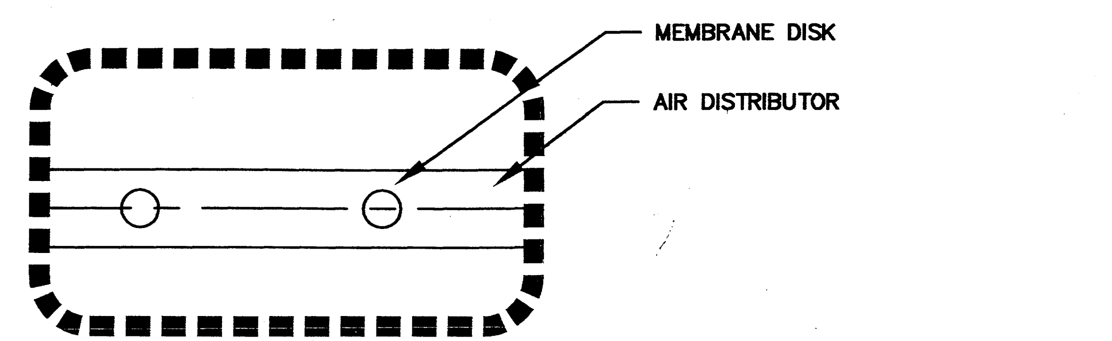
SEPT. 2003

SHEET 4

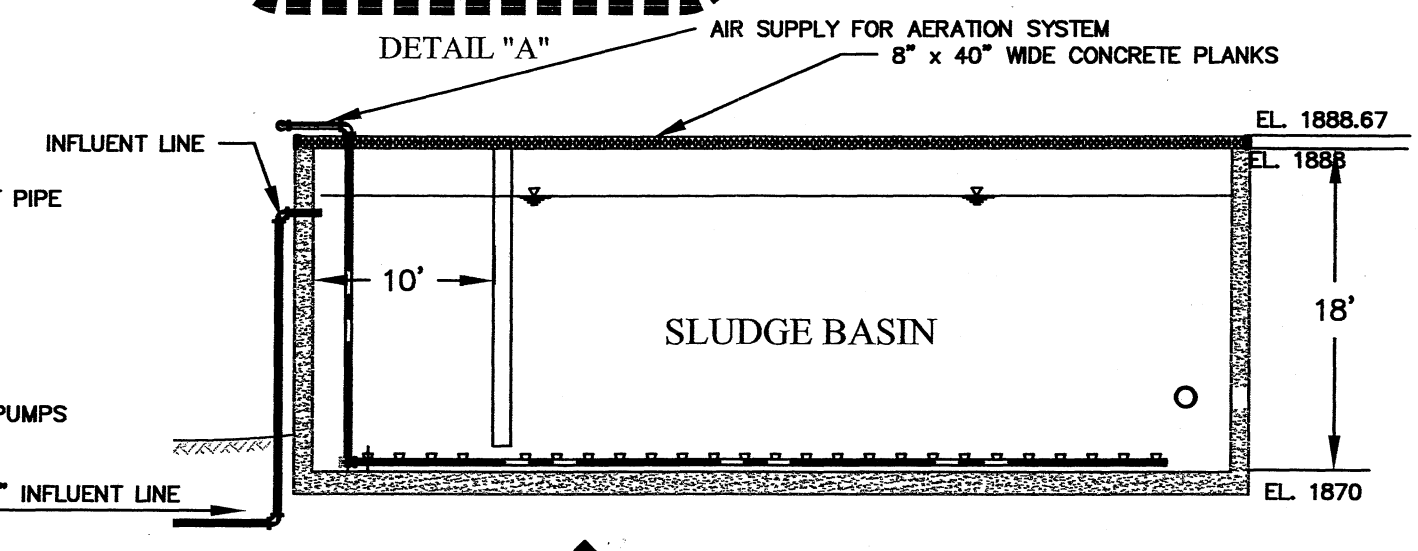


PLAN OF AERATION SYSTEM

SCALE: 3/32" = 1'–0"

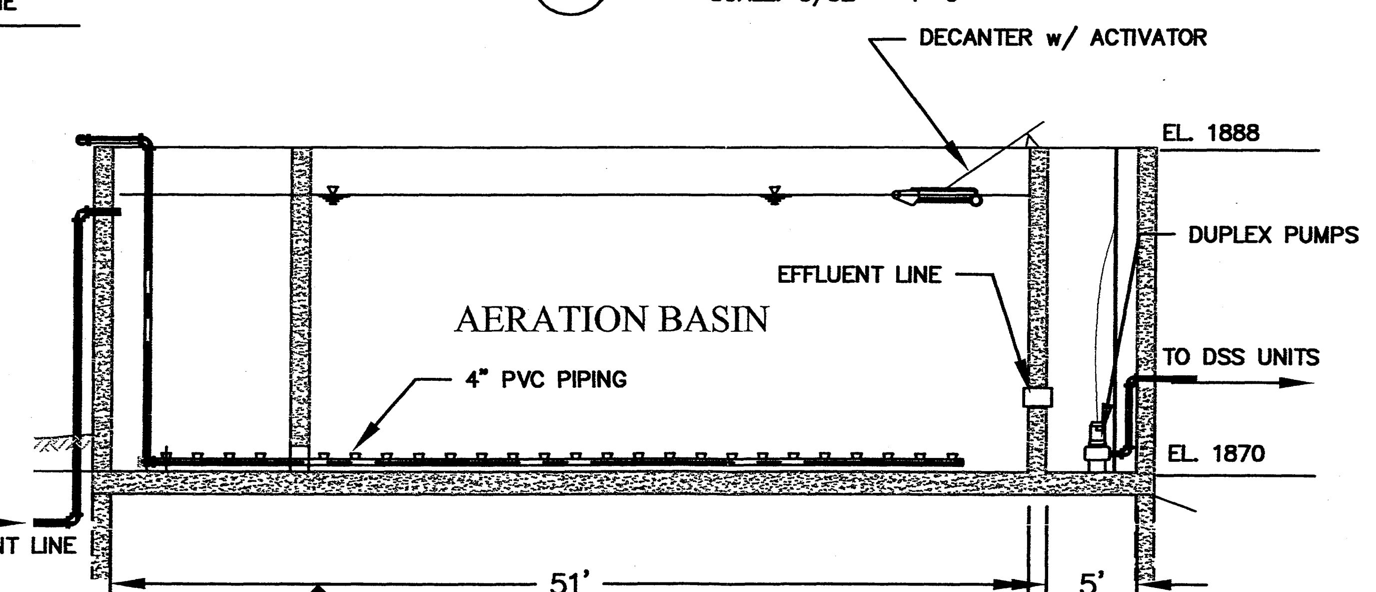


DETAIL "A"



SECTION "A-A"

SCALE: 3/32" = 1'–0"



SECTION "B-B"

SCALE: 3/32" = 1'–0"

CONCEPT PLAN

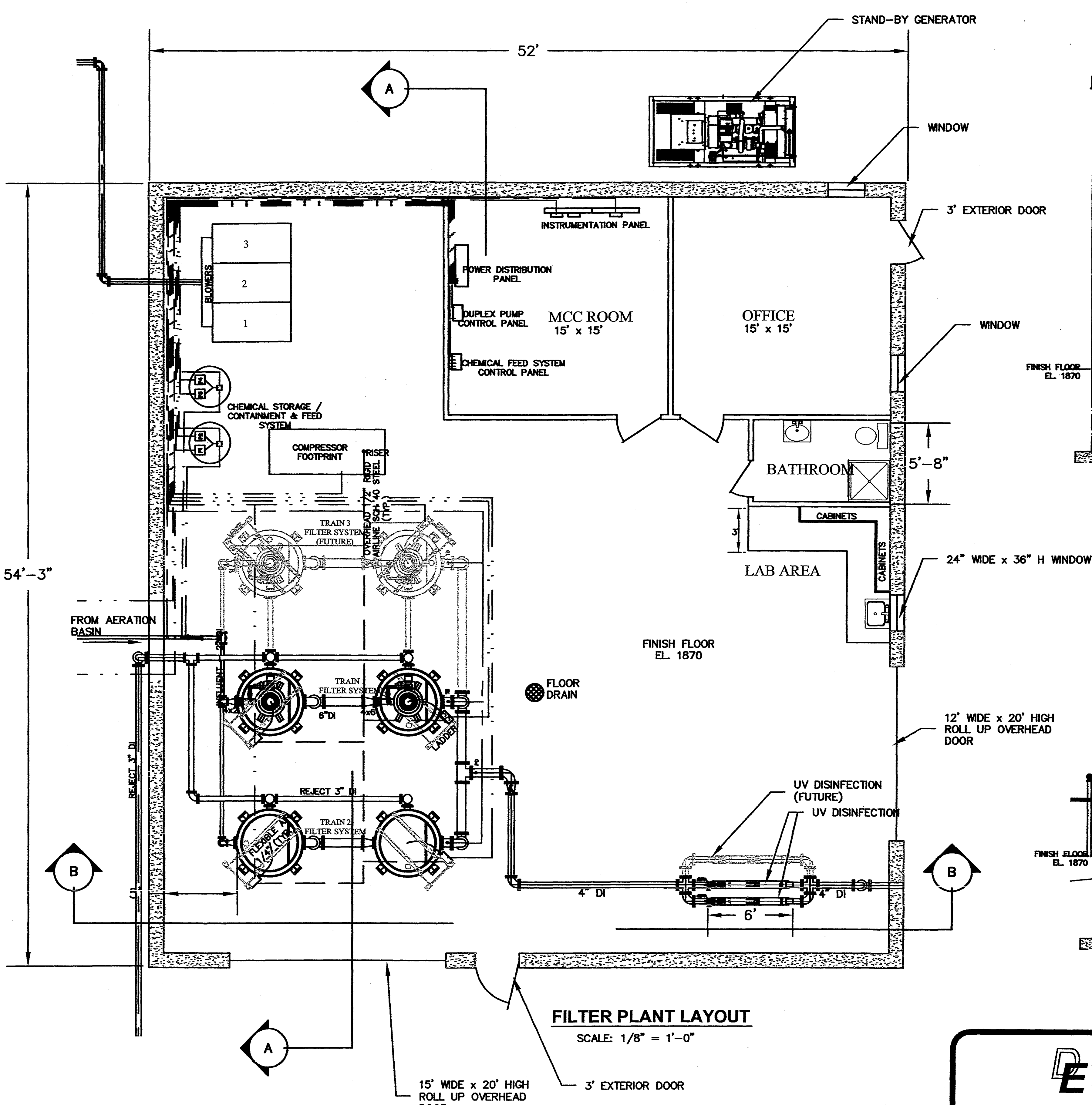
DELAWARE ENGINEERING, P.C.
28 Madison Avenue Extension
Albany, New York 12203
Phone 518–452–1290
FAX 518–452–1335

WASTEWATER TREATMENT PLANT - AERATION SYSTEM PLAN & SECTIONS

WILDACRES RESORT/
HIGHMOUNT GOLF COURSE /
HIGHMOUNT ESTATES

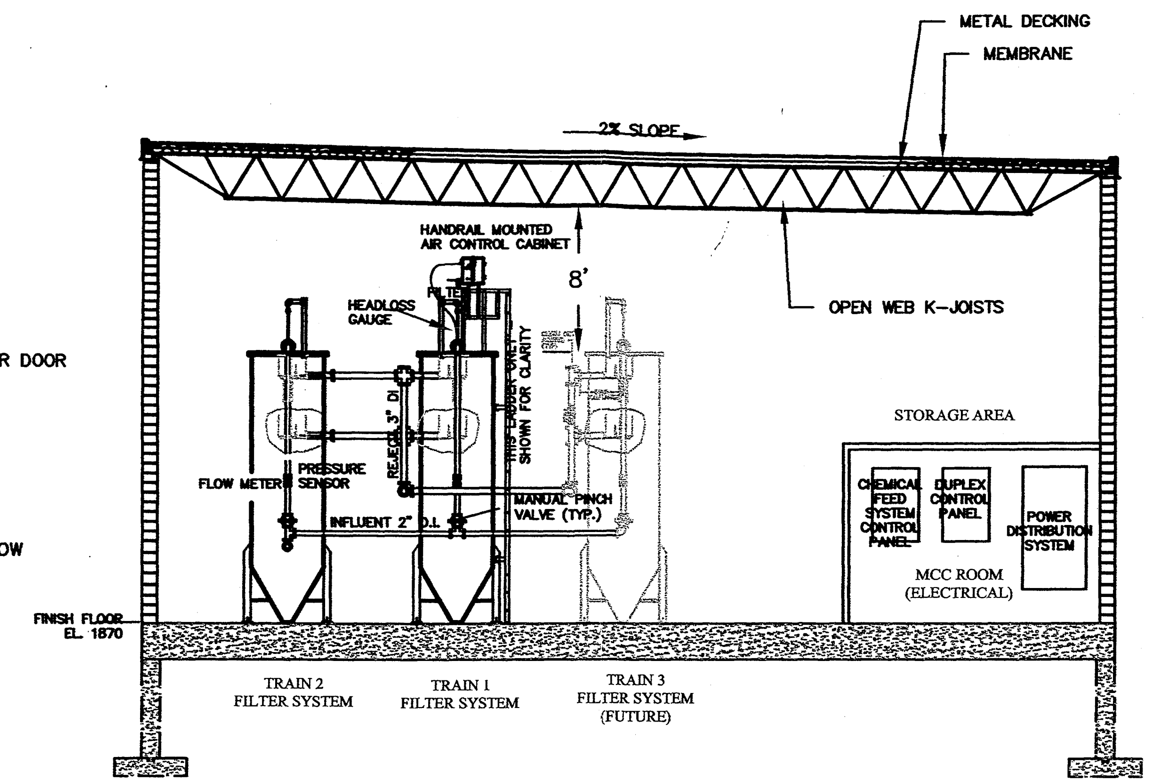
SEPT. 2003

SHEET 5



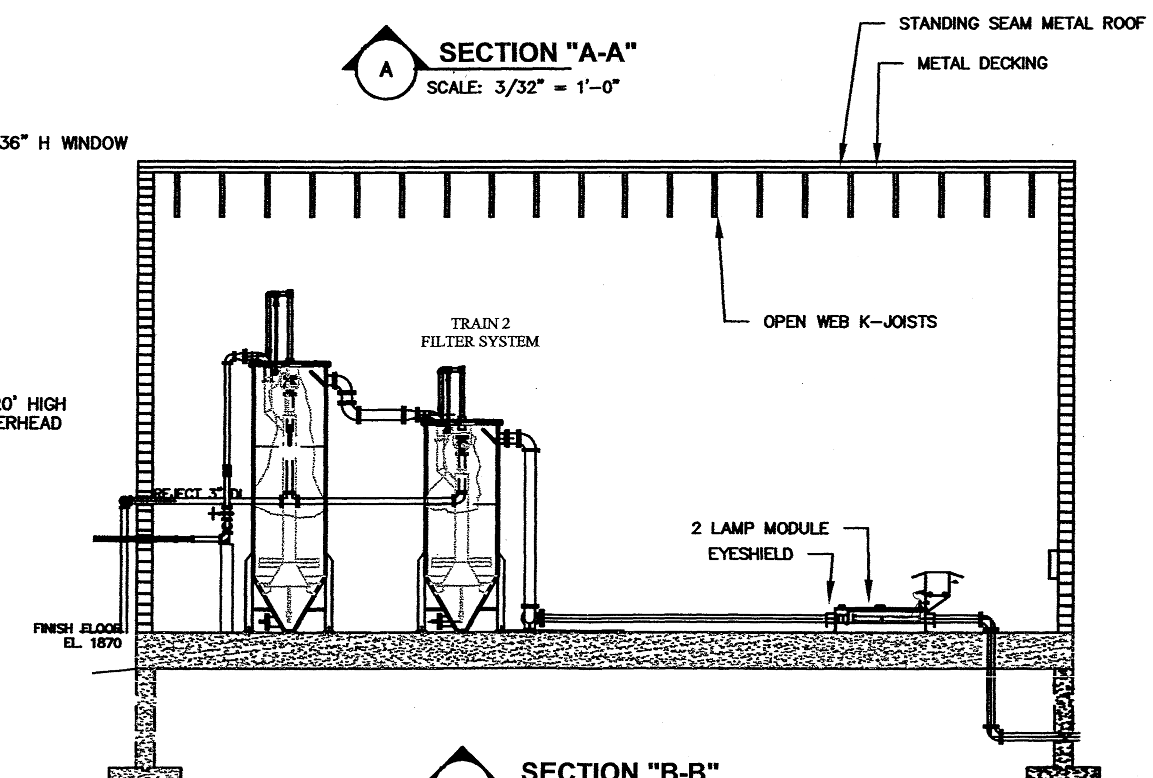
FILTER PLANT LAYOUT

SCALE: 1/8" = 1'-0"



SECTION "A-A"

SCALE: 3/32" = 1'-0"



SECTION "B-B"

SCALE: 3/32" = 1'-0"

CONCEPT PLAN

DELAWARE ENGINEERING, P.C.
28 Madison Avenue Extension
Albany, New York 12203
Phone 518-452-1290
FAX 518-452-1335

WASTEWATER TREATMENT
FILTER PLANT PLAN & SECTIONS
WILDACRES RESORT/
HIGHMOUNT GOLF COURSE /
HIGHMOUNT ESTATES
SEPT. 2003

SHEET 6

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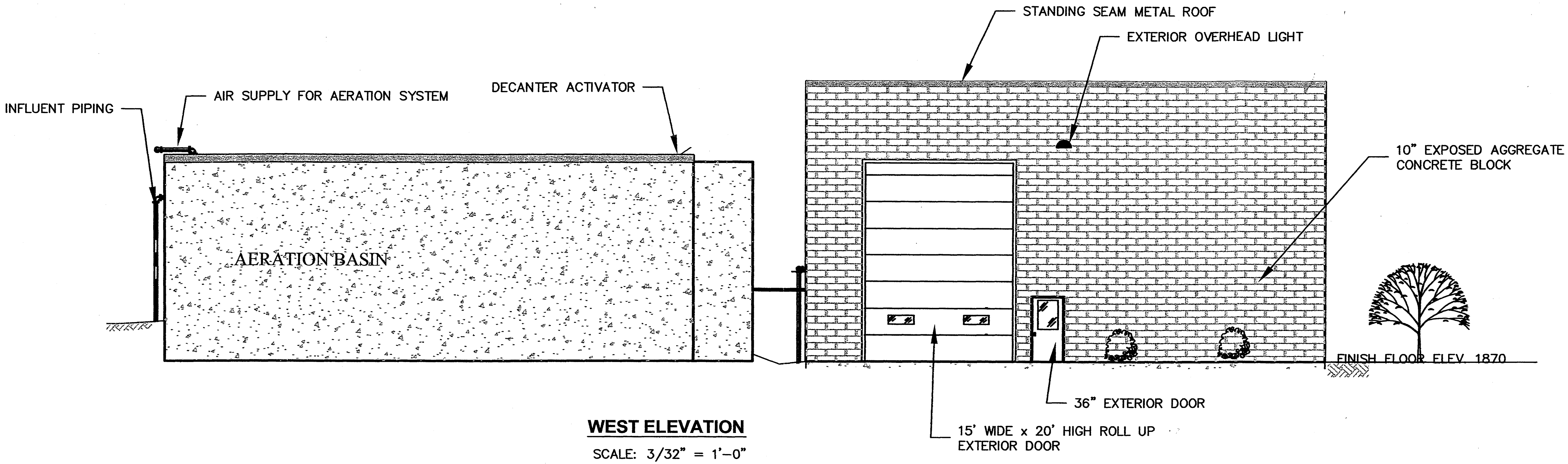
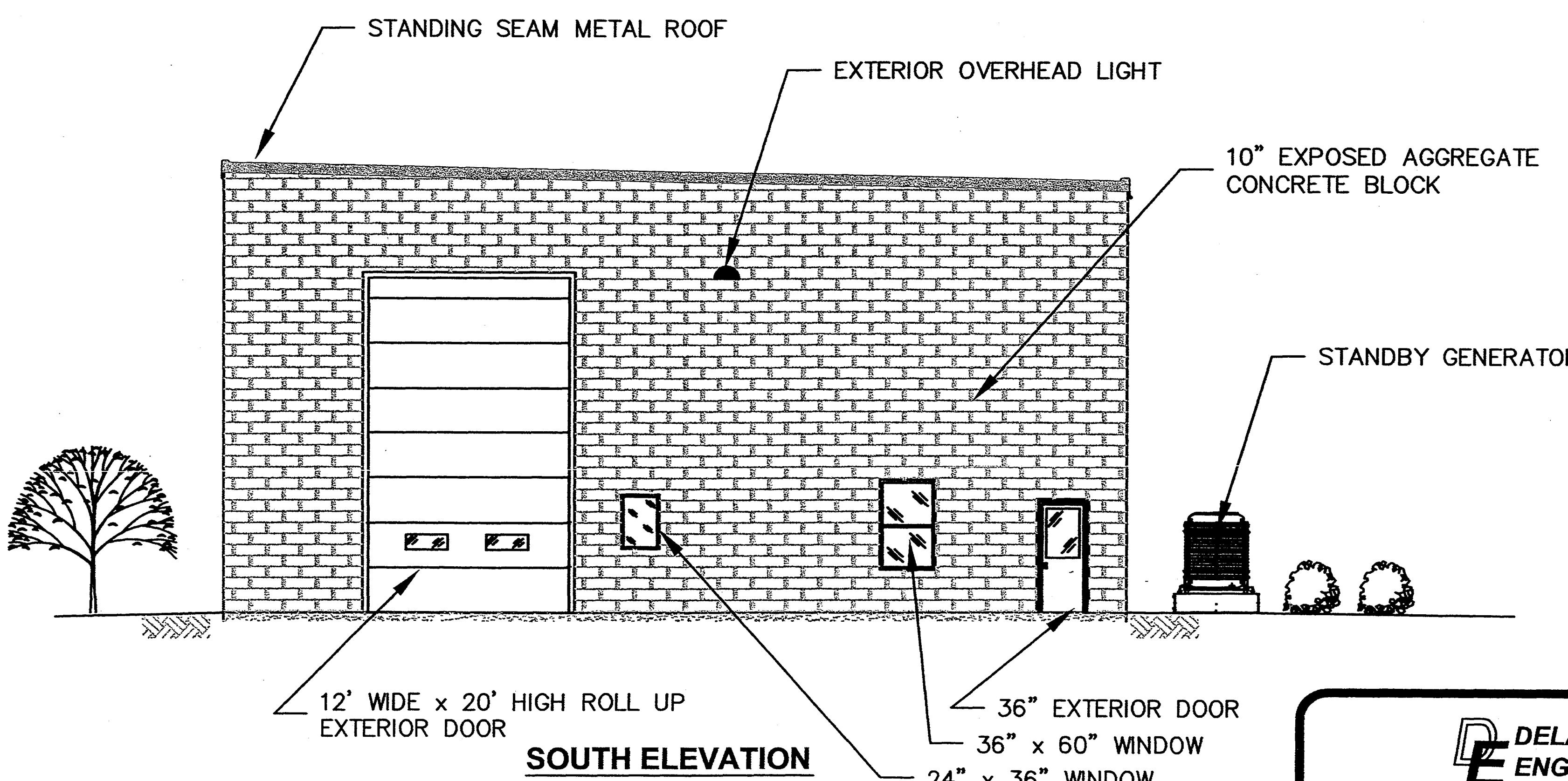


WEST ELEVATION

SCALE: 3/32" = 1'-0"



SOUTH ELEVATION

SCALE: 3/32" = 1'-0"

CONCEPT PLAN

DELAWARE ENGINEERING, P.C.
28 Madison Avenue Extension
Albany, New York 12203
Phone 518-452-1290
FAX 518-452-1335

WASTEWATER TREATMENT
EXTERIOR ELEVATIONS
WILDACRES RESORT/
HIGHMOUNT GOLF COURSE /
HIGHMOUNT ESTATES
SEPT. 2003

SHEET 7

COPY OF FULL ENVIRONMENTAL ASSESSMENT FORM (October 1999)

See Appendix 1, SEQRA Documentation

COPY OF BUILDING-STRUCTURE INVENTORY FORM (April 2000)

See Appendix 23, Cultural Resources Investigation Phase 1B

DRAFT ENVIRONMENTAL IMPACT STATEMENT (Submitted Concurrently Under Separate Cover)

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION

DIVISION OF WATER

APPLICATION FORM NY-2C
for
Industrial Facilities

This form must be completed by all persons applying for a new SPDES permit OR a modification of an existing SPDES permit for the discharge of industrial wastewater to the waters of New York State.

SEE GENERAL INSTRUCTIONS INSIDE COVER

STATE POLLUTANT DISCHARGE ELIMINATION SYSTEM (SPDES)

Find this Document at: www.dec.state.ny.us/website/dcs/permits/olpermits/interface.html

GENERAL INSTRUCTIONS

NOTE: Form NY-2C replaces existing EPA Forms 1, 2C, 2D and associated supplemental forms for new and modified SPDES Permit applications in New York State. Use NYSDEC Form 91-20-5, ANOTICE/RENEWAL APPLICATION/PERMIT,@ for routine SPDES permit renewals where no significant changes to your facility=s operations have occurred.

1. New permits and new process discharges - Some of the requirements in this application associated with effluent data are not pertinent to new discharges. Substitute, where appropriate, effluent data from a similar facility or your best estimate. When effluent data from a similar facility is used, indicate such on the application.

2. If you are filing this application to obtain a new permit or modification of an existing permit, it must be filed with the Regional Permit Administrator for the DEC Region in which the discharge is located. The correct address and telephone number are listed on the facing page.

   If you are filing this application in response to an Information Request under the Environmental Benefit Permit Strategy (EBPS), please follow the filing instructions contained within the request.

3. Federal and state laws require that you obtain a permit to discharge any of the Priority Pollutants listed in Table 6. If you know or have reason to believe that any of the pollutants listed in Table 6 are present in the discharges from this facility, you must submit test results (for each identified parameter) conducted on at least one representative sample (grab or 24 hour composite) taken within the last three years.

4. Actual measured values of all positive analytical results obtained above the Method Detection Limit (MDL)[1], or the matrix specific MDL, whichever is greater, for all monitored parameters shall be recorded and reported, as required by this application. Samples shall be taken from as close as practicable to the proposed monitoring locations listed in this application, or from locations as required under applicable regulations.

5. Applications for certain modifications of a SPDES permit do not require all sections of this application to be completed. Exceptions are determined on an individual basis related to the applicability of the information required by this form to the requested modification, or the Department's need to evaluate the current permit for deficiencies. All applications for a permit modification must include a letter or other document describing (as applicable) the changes or planned changes in the nature of the discharge, a description and justification for any requested permit modification, and the reason why an exemption should be granted from completing and filing any or all sections in this application form. You will be informed of what (if any) additional information must be provided. Questions regarding sections to be completed by a particular industry, or regarding technical aspects of the application, should be directed to either the appropriate Regional Water Engineer at the address listed on the following page or the Bureau of Water Permits at (518)402-8111.

6. Applications filed in response to an Information Request under EBPS do not require all sections of this application to be completed. Complete any items in the application for which changes have been made or information has been discovered since your last previously submitted full application form, any items that are specifically referenced for completion in the Information Request, and Section III (Sampling Information) for all outfalls at your facility. For any items that have not changed since your last previously submitted full application form, indicate ANo Changes@ in that portion of the form.

7. The Federal Clean Water Act of 1977 (P.L. 95-217), as amended, Section 309(c)(4), states: "Any person who knowingly makes false material statement, representation, or certification in any application, record, report, plan, or other document filed or required to be maintained under this act or who knowingly falsifies, tampers with, or renders inaccurate any monitoring device or method required to be maintained under this act, shall upon conviction, be punished by a fine not more than $10,000, or by imprisonment for not more than 2 years, or by both. If a conviction of a person is for a violation committed after a first conviction of such person under this paragraph, punishment shall be a fine of not more than $20,000 per day of violation, or by imprisonment of not more than 4 years, or by both.

8. Any and all information submitted as part of this SPDES application shall be considered public information and is therefore subject to Freedom of Information Law requests. Any information that the applicant wishes to remain confidential, such as information requested on the Industrial Chemical Survey form, must be submitted under separate cover. Those sections of this application which are eligible for confidentiality are noted in the appropriate sections of these instructions. The Department will treat each request for confidentiality individually.

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1 The Method Detection Limit (MDL) is the level at which the analytical procedure referenced is capable of determining with a 99% probability that the substance is present. This value is determined in distilled water with no interfering substances present.

FILING LOCATIONS FOR SPDES APPLICATIONS

MODIFICATIONS, NEW APPLICATIONS and other questions concerning your SPDES permit: Follow instructions below.

The Filing Location depends on the county in which the discharge is located. To determine the mailing address for the proper Filing Location, find the county in which the discharge is located in the table below. Use the letter in the "KEY" column to the right of the county name to find the proper mailing address in the list at the right. All applications for new permits, permittee-requested modifications, and modification of SPDES permits under the Environmental Benefit Permit Strategy (EBPS) must be mailed to the appropriate New York State Department of Environmental Conservation (NYSDEC) Regional or Sub-Regional office listed below.

Discharge Location			Discharge Location			Discharge Location			Discharge Location		
County	Region	KEY	County	Region	KEY	County	Region	KEY	County	Region	KEY
Albany	4	D	Fulton	5	G	Orange	3	C	Sullivan	3	C
Allegany	9	L	Genesee	8	K	Orleans	8	K	Tioga	7	J
Broome	7	J	Greene	4	D	Oswego	7	J	Tompkins	7	J
Cattaraugus	9	L	Hamilton	5	F	Otsego	4	E	Ulster	3	C
Cayuga	7	J	Herkimer	6	I	Putnam	3	C	Warren	5	G
Chautauqua	9	L	Jefferson	6	H	Rensselaer	4	D	Washington	5	G
Chemung	8	K	Lewis	6	H	Rockland	3	C	Wayne	8	K
Chenango	7	J	Livingston	8	K	St. Lawrence	6	H	Westchester	3	C
Clinton	5	F	Madison	7	J	Saratoga	5	G	Wyoming	9	L
Columbia	4	D	Monroe	8	K	Schenectady	4	D	Yates	8	K
Cortland	7	J	Montgomery	4	D	Schoharie	4	E	Bronx	2	B
Delaware	4	E	Nassau	1	A	Schuyler	8	K	Kings	2	B
Dutchess	3	C	Niagara	9	L	Seneca	8	K	New York	2	B
Erie	9	L	Oneida	6	I	Steuben	8	K	Queens	2	B
Essex	5	F	Onondaga	7	J	Suffolk	1	A	Richmond	2	B
Franklin	5	F	Ontario	8	K						

REGIONAL FILING ADDRESSES AND TELEPHONE NUMBERS

KEY	Mailing Address: Mail Application to "*Division of Environmental Permits*"	Regional Permit Administrator Telephone	Regional Water Engineer Telephone
A	NYSDEC REGION 1, Building 40 SUNY, Stony Brook, NY 11790-2356	(631) 444-0355	(631) 444-0405
B	NYSDEC REGION 2, One Hunters Point Plaza, 47-40 21st St, Long Island City, NY 11101-5407	(718) 482-4997	(718) 482-4933
C	NYSDEC REGION 3, 21 South Putt Corners Rd., New Paltz, NY 12561-1696	(845) 256-3059	--
	NYSDEC REGION 3 SUB-OFFICE, 200 White Plains Rd., Tarrytown, NY 10591-5805	--	(914) 332-1835
D	NYSDEC REGION 4, 1150 North Westcott Road., Schenectady, NY 12306-2014	(518) 357-2069	(518) 357-2045
E	NYSDEC REGION 4 SUB-OFFICE, Route 10, Jefferson Road, Stamford, NY 12167-9503	(607) 652-7364	--
F	NYSDEC REGION 5, Route 86, PO Box 296, Ray Brook. NY 12977-0296	(518) 897-1234	--
G	NYSDEC REGION 5 SUB-OFFICE, Hudson St., Warrensburg, NY 12885-0220	(518) 623-3671	(518) 623-3671
H	NYSDEC REGION 6, State Office Bldg.,317 Washington St., Watertown, NY 13601-2245	(315) 785-2245	--
I	NYSDEC REGION 6 SUB-OFFICE, State Office Building., 207 Genesee St., Utica NY 13501-2885	(315) 793-2555	(315) 793-2554
J	NYSDEC REGION 7, 615 Erie Boulevard West, Syracuse, NY 13204-2400	(315) 426-7438	(315) 426-7500
K	NYSDEC REGION 8, 6274 East Avon-Lima Rd., Avon, NY 14414-9519	(585) 226-2466	(585) 226-2466
L	NYSDEC REGION 9, 270 Michigan Ave., Buffalo, NY 14203-2999	(716) 851-7165	(716) 851-7070

CONTACT THE ABOVE D.E.P. OFFICES FOR QUESTIONS CONCERNING APPLICATION SUBMITTAL.

RENEWALS *ONLY*: NYSDEC - Environmental Permits, Permit and Registration Services, 625 Broadway, 4h Floor, Albany, NY 12233-1750
For questions, call: **(518) 402-9170**

State Pollutant Discharge Elimination System (SPDES)

INDUSTRIAL APPLICATION FORM NY-2C

For New Permits and Permit Modifications

APPLICATION INSTRUCTIONS

SECTION I - PERMITTEE AND FACILITY INFORMATION

Complete one copy of this section for your facility. This section applies to all outfalls and processes at your facility. Base your answers on actual data whenever available; otherwise use your best estimate. For new facilities to be built, use proposed design and production estimates. Applicants applying for modification of existing permits should complete information pertaining to changes made or information discovered since your last previously submitted full application form, and for any items that are specifically referenced for completion in the EBPS Information Request.

1. **Current Permit Information:** Provide the seven-digit SPDES Number and the fifteen-digit (formerly sixteen digit; the final digit is no longer required) DEC Number as they appear on page 1 of your existing SPDES permit. Leave this section blank if you are applying for a new proposed discharge or an existing unpermitted discharge.

2. **Permit Action Requested:** Indicate what type of permit action is being requested by checking the appropriate box(es). If an increase in the quantity of water discharged is being requested, describe the reason for the increase.

3. **Permittee name and mailing address:** For corporate or partnership owned facilities, provide the parent company name and the division name. For facilities owned by an individual, provide the owner's name and who they are doing business as. For Federal, State, and Municipally owned facilities, provide the Department name and the Division or Bureau name. For publicly owned facilities, identify the authority or other ownership of the facility and their mailing address.

4. **Facility Name, Address, and Location:** Enter the name, address, and location of the facility or plant. The street address should be the physical location of the facility. If no street address exists for your facility, include a brief location narrative. The mailing address for the facility, where applicable, should include the P.O. Box and the ZIP+4 code. Enter the NYTM coordinates of the main plant site [these may be determined from United States Geological Survey 7.5 minute Quadrangles or NYSDOT topographic or planimetric maps]. Enter the tax map information for all lots occupied by the facility or plant if your facility is located within New York City, Nassau County or Suffolk County.

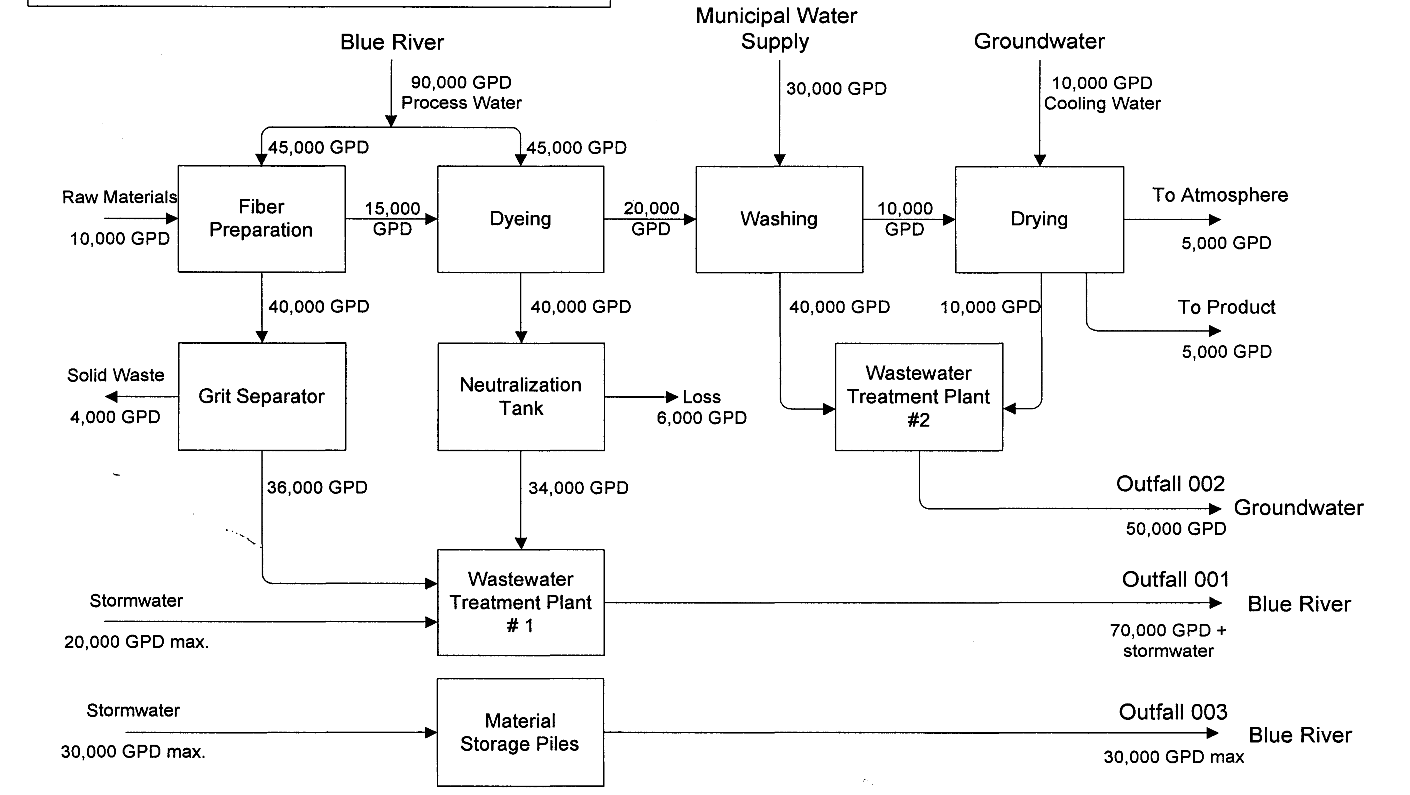
5. **Facility Contact Person:** Enter the name, title, address, and telephone number of the facility's authorized contact person. This person should be thoroughly familiar with the facts reported on these forms and the associated discharges in the event that contact regarding the permit application must be made.

6. **Discharge Monitoring Report (DMR) Mailing Address:** Enter the address where the DMR forms should be sent. Include the name, signature, and telephone number of the person responsible for signing and submitting DMRs in accordance with the DMR authorization requirements listed on page 13 of these Instructions.

7. **Outfall Summary:** Summarize the outfalls which are present at the facility. Include all outfalls containing process discharges, internal monitoring points delineated in an existing permit, storm water associated with industrial activity, process wastewater discharges to publicly owned treatment works (POTWs), and those that discharge only sanitary wastewater directly to onsite septic systems or leach fields. For two or more substantially similar outfalls, you may group the outfalls for purposes of this summary. If more than 10 outfalls are present at the facility, attach the information for the remaining outfalls to the application on a separate 82 X 11 sheet of paper. For discharges within sole source aquifers as shown on Figure 2 at the back of these instructions, complete the information requested on Supplement B, ADISCHARGES WITHIN SOLE SOURCE AQUIFERS.@

8. **Map of Facility and Discharge Locations:** Provide a detailed map showing the location of the existing or proposed facility, including all buildings or structures present at the facility, wastewater discharge system(s), outfall location(s) into receiving waters, nearby surface water bodies, nearby drinking water supply wells, and groundwater monitoring wells. Also submit proof, either by indication on the map or other documentation, that a right of way for the discharges exists from the facility property to a public right of way. Copies of the site survey map with the above information added are generally acceptable. Geographic information system (GIS) coverages showing your facility, property lines and outfalls may be included at your option if such a coverage is available. Indicate the type of GIS system used to develop the coverage and include a printout of the coverage with the disk containing the coverage.

Figure 1 : Sample Water Flow Diagram



9. **Water Flow Diagram:** An example of an acceptable line drawing is shown on Figure 1 on the opposite page. Show all sources of wastewater, including process and production areas, sanitary flows, cooling water flows, and storm water runoff. The water balance should show daily average flow rates at intake and discharge points and approximate daily flow rates between treatment units, including influent and treatment rates. Use actual measurements whenever available; otherwise, use your best estimate. All processes which contribute wastewater to one or more outfalls, including treatment units, processes and bypass piping, should be identified. Estimate all significant losses of water to products, discharge, and atmosphere. Include any existing or proposed connections to a publicly or privately owned treatment works.

10. **Nature of business:** Briefly describe the nature of your business. Include information on products produced or services provided, and when your facility commenced operations.

11. **SIC Codes:** List, in descending order of significance, the four 4-digit standard industrial classification (SIC) codes and associated descriptions which best describe your facility in terms of the principal products or services you produce or provide. These codes may differ from the SIC codes for those processes contributing to the discharges from your facility.

12. **Primary industry:** List the industrial categories and EPA Parts and subparts which apply to your facility in the provided table if your facility's operations are included among those industries listed in Table 1 on the following page. Note that the primary industrial categories listed below require the submittal of industry-specific production information. Complete the appropriate application supplement if your facility is one of the industries listed below. Copies of these supplements are available from the regional NYSDEC addresses listed on page ii of these instructions.

Application supplements required for specific industries					
G:	Beverage Industry	J:	Iron and Steel Manufacturing	M:	Pulp and Paper Mills
H:	Dairy Processors	K:	Meat Processors	N:	Seafood Processors
I:	Fruit and Vegetable Processors	L:	Organic Chemicals, Plastics, & Synthetic Fibers	O:	Steam Electric Generating Facility

13. **Genetic information:** Answer AYes@ to this question if your facility manufactures, handles, or discharges recombinant-DNA, pathogenic or other potentially infectious or dangerous organisms, or other genetic engineering organisms. Attach a detailed explanation of your facility=s activities, including organisms present, to this application if you answered AYes@ to this question. You may submit this information under separate cover if you want this information to remain confidential. Sewage treatment plants treating typical sewage and sanitary wastes, and industrial facilities using biological wastewater treatment systems to treat typical industrial and sanitary wastes, should answer ANo@ to this question.

TABLE 1

TESTING REQUIREMENTS FOR ORGANIC TOXIC POLLUTANTS INDUSTRY CATEGORY

Note: Testing for Metals, Cyanide, and Total Phenolics is required for all categories listed below.

Federal Register (FR) reference: 48 FR 14153, Apr. 1, 1983, as amended at 49 FR 38050, Sept. 26, 1984; 50 FR 6940, February 19, 1985

INDUSTRIAL CATEGORY	Categorical 40 CFR Part[1]	GC/MS FRACTION[2]			
		Volatile	Acid	Base/Neutral	Pesticide
Adhesive and sealants		X	X	X	-
Aluminum forming	467	X	X	X	-
Auto and other laundries		X	X	X	X
Battery manufacturing	461	X	-	X	-
Coal mining	434	X	X	X	X
Coil coating	465	X	X	X	-
Copper forming	468	X	X	X	-
Electric and Electronic components	469	X	X	X	X
Electroplating	413	X	X	X	-
Explosives manufacturing	457	X	X	X	-
Gum and wood chemicals (except as noted below)	454	X	X	-	-
-- Tall Oil Rosin Subcategory (Subpart D) and Rosin-Based Derivatives Subcategory (Subpart F) of the Gum and Wood Chemicals Industry (40 CFR Part 454)	454	X	X	X	-
Inorganic Chemicals manufacturing	415	X	X	X	-
Iron and Steel manufacturing	420	X	X	X	-
Leather tanning and finishing	425	X	X	X	-
Mechanical products manufacturing		X	X	X	-
Metal Molding and Casting	464	X	X	X	-
Nonferrous metals manufacturing	433	X	X	X	-
Nonferrous metals manufacturing	421	X	X	X	X
Ore mining (except Base & Precious Metals Subcategory)	440	-	-	-	-
-- Ore mining (Base & Precious Metals Subcategory, Subpart B)	440	-	X	-	-
Organic chemicals manufacturing	414	X	X	X	X
Paint & ink formulation	446, 447	X	X	X	-
Pesticides	455	X	X	X	X
Petroleum refining	419	X	-	-	-
Pharmaceutical preparations	439	X	X	X	-
Photographic equipment and supplies	459	X	X	X	-
Plastic and synthetic materials manufacturing	414	X	X	X	X
Plastic processing	463	X	-	-	-
Porcelain enameling	466	-	-	-	-
Printing and publishing		X	X	X	X
Pulp and paperboard mills (except as noted below)	430	X	X	X	X
-- Paperboard Sulfite Subcategories (Subpart J and U)	430	X	X	X	-
-- Deink (Subpart Q), Dissolving Kraft (Subpart F), and paperboard from Wastepaper (Subpart E)	430	X	X	-	-
-- BCT Bleached Kraft (Subpart H), Semi-Chemical (Subparts B and C) and Non Integrated Fine Papers (Subpart R)	430	-	X	-	-
-- Fine Bleached Kraft (Subpart I), Dissolving Sulfite Pulp (Subpart K), Groundwood-Fine Papers (Subpart O), Market Bleached Kraft (Subpart G), Tissue from Wastepaper (Subpart T), and Non Integrated Tissue Papers (Subpart S)	430	X	-	-	-
Rubber Processing	428	X	X	X	-
Soap and detergent manufacturing	417	X	X	X	-
Steam electric power plants (except as noted below)	423	X	X	X	-
-- Once-Through Cooling Water, Fly Ash and Bottom Ash Transport Water Process Waste Streams	423	X	X	-	-
Textile mills (except Greige Mills Subcategory)	410	X	X	X	-
-- Greige Mills Subcategory (Subpart C - Low water use processing of 40 CFR Part 410)	410	-	-	-	-
Timber Products Processing	429	X	X	X	X

1 40 CFR Parts are listed for those industries with promulgated categorical effluent limitations. For the pulp and paperboard category, use the designations that were effect prior to April 15, 1998.

2 The pollutants in each fraction are listed in Tables 6 and 7. Requirements as listed in 40CFR Part 122 Appendix D.

Note: "X" = Testing Required; "-" = Testing Not Required, but sampling results should be included if believed present in the discharge.

14. Material storage area runoff: Complete this section if your facility discharges storm water runoff from a material storage area to either surface or ground waters. Material storage areas include coal piles, raw materials stockpiles, finished product stockpiles, active/inactive waste disposal areas, and operations and maintenance stockpiles such as road salt storage areas. List the size of the material storage area, type(s) and quantity of material stored, and whether any controls (covers, berms, sediment control devices, etc.) are maintained on the discharge from the material storage areas.

15. Facility Ownership: Indicate which type of ownership your facility operates under, and whether or not any of the discharges applied for in this application occur on Indian lands.

16. Other environmental permits: Provide the requested information for and status of any other type of federal, state, or local environmental permits that this facility has received or applied for, including but not limited to permits issued under any of the following programs: Air Pollution Control, Radiation Control, Solid Waste Management, Hazardous Waste Management, Oil, Gas, or Solution Salt Mining, Long Island Well, Wetlands Protection, and other SPDES permits. Indicate whether these permits are active (currently in effect), applied for (awaiting issuance) or inactive (deleted, suspended, revoked, etc.). Attach any additional information that you want to include on 8 2" x 11" paper as an addendum to this application.

17. Laboratory Certification: Complete this section if any of the chemical or biological analyses reported in Sections II or III of this application were performed by a contract laboratory or consulting firm.

18. Certification: The certification must be signed by one of the following individuals:

A. For *corporations*, a principal officer of at least the level of vice president. However, for those facilities whose only activities are the production of oil and/or natural gas from underground sources via wells, the officer may authorize a person having responsibility for the overall operations of the well or well field to sign the certification. In that case, the authorization must be written and submitted to the Department as an attachment to this application.

B. For *sole proprietorships* or *partnerships*, a general partner or the proprietor, respectively.

C. For *municipalities, State, Federal*, or *other* publicly owned facilities, a principal executive officer or ranking elected official.

19. Industrial Chemical Survey: Complete all information on this table for any substances listed in Tables 6 through 10 that your facility has used, produced, stored, distributed or otherwise disposed of in significant quantity in the past five years. ASignificant quantity@ is defined as more than 1,000 gallons per year of a substance or more than 10,000 pounds per year of a substance or, if your facility uses less than the above quantities of materials on an annual basis, the three process substances that your facility uses the greatest quantity of on an annual basis. Also complete all information on this table for any quantity of chemicals for which FDA fish flesh limits exist, chemicals identified as Bioaccumulative Chemicals of Concern (BCCs), or restricted pesticide products as listed in Part 326, Section 2 of the ECL. These chemicals are indicated by Footnote 1 in Tables 6-10. Restricted pesticides also include those products whose labeling bears the statement ARestricted Use Pesticide.@ Indicate "Yes" in the "Present in Discharge" column for any of the substances listed that are used in a manner which would cause them to come into contact with a wastewater that is ultimately discharged to the waters of the State through an outfall controlled by this permit application. Include sampling results in Section III for any of the substances listed in Tables 6 through 8 that may be present in the discharge from one or more outfalls for each of the affected outfalls. Do not include those chemicals that are present in less than de minimis concentrations as listed on the MSDS sheets for that substance. List all appropriate "Purpose of Use" codes as shown in Table 2 below. You may submit this information under separate cover if you want this information to remain confidential.

Table 2
Codes for "PURPOSE OF USE" column on ICS form

Code	Description	Code	Description	Code	Description
PRO	Produced	DEG	Degreasing	COT	Used in closed system
REA	Reacted	RAD	R&D chemical	WTC	Water Treatment chemical
BAS	Blended & used as solvent	LAB	Laboratory use	NLU	No Longer Used
PKG	Packaged/Distributed	PES	Pesticide	OTH	Other (specify)
CLN	Cleaning	HER	Herbicide		

This concludes the information required for Section I. The instructions for Section II, which requests outfall specific information, begin on the following page.

State Pollutant Discharge Elimination System (SPDES)
INDUSTRIAL APPLICATION FORM NY-2C
For New Permits and Permit Modifications
APPLICATION INSTRUCTIONS

SECTION II - OUTFALL INFORMATION

Make copies of the blank forms for this section and complete this section for each outfall. Base your answers on actual data whenever available; otherwise use your best estimate. Be sure to enter the facility name, outfall number, and SPDES number (if applicable) at the top of each page. Applicants applying for modification of existing permits should complete information pertaining to changes made or information discovered since your last previously submitted full application form, and for any items that are specifically referenced for completion in the EBPS Information Request.

1. **Outfall Number and Location:** Enter the outfall number, latitude and longitude, and the name of the receiving water. For final effluent discharge points, use the following format: 001, 002, 003, etc. For internal monitoring points, such as sampling points located after a categorical process prior to the admixture of other wastewaters, use the following format: 01A, 01B, 01C, etc., where the first two digits correspond to the last two digits of the final effluent discharge point (e.g. 02A and 02B are internal monitoring locations for wastewaters tributary to the discharge from outfall 002). You may use the map you provided for Section I, Item 8 to determine the latitude and longitude of the discharge point. Latitudes and longitudes should be accurate to within 2 seconds if possible.

2. **Type of discharge and discharge rate:** Identify each of the water sources which contribute to this outfall and provide the average flow rates in the spaces provided. Where flow data is unavailable, use your best estimates. If more than four different types of process wastewater discharges contribute to a given outfall, list the remaining process wastewater discharges under the "Other" category, or as an attachment.

3. **Process information:** This information is used to determine the applicable federal regulations for this discharge. The information required to be reported is dependent on the type of facility and process contributing to the discharge. Enter the requested information for each of the process wastewater discharges identified in Item 2 above. All industries should provide the name of each process, description of each process, USEPA category/subcategory of each process (where applicable), and the SIC code for the process. Measures of production shall be provided by all facilities whose operations are listed in Table 1 of these instructions. Table 3 on the following page contains an abbreviated list of various industries and the types of information that each should report in this section of the application. Identify the flows from each process area if your facility is subject to OCPSF or metal finishing categoricals. If more than four different types of process wastewater discharges contribute to a given outfall, list process information on additional copies of this sheet.

4. **Discharge Flow Rates:** This item requests detailed information regarding expected and/or measured flows from each outfall at the facility. Provide current (from the last 12 months) or expected flow rate information as requested. When reporting the Maximum Design Flow Rate, provide the design flow for this specific outfall (e.g. batch treatment system flow, package treatment system flow, or other finite treatment system flow). For storm water discharges, the Maximum Design Flow Rate shall be based on the hydraulic capacity of the discharge structure at the outfall.

5. **Seasonal or Intermittent Discharges:** *Complete this section if the outfall discharges are seasonal or intermittent.* If the treatment facility or process discharges from one to seven days per week throughout the year, check NO and continue with Item 6. If the outfall discharges a few weeks or months per year, check YES and complete the information requested. Each discharge event should be considered one Abatch@ for non-process discharges. Report the highest daily value for flow rate and total volume in the "Daily Max" columns. Report the average of all daily values measured during days when discharge occurred within the past 12 months in the "LTA" (Long Term Average) columns.

6. **Water supply source:** List all water sources and provide average flow rates. The volume may be estimated from water supply meter readings, pump capacities, etc. Provide the name of the source where applicable (e.g. Hudson River, Lake Ontario, City Water Supply, private groundwater well). Indicate the units of measure in the box following the volume. If necessary, a written description may be provided as an attachment on 8 2" x 11" paper.

7. **Outfall configuration:** *This section does not have to be completed for discharges to groundwater.* Describe the physical configuration of the discharge point of this outfall, including the distance to the outfall from shore and its location with respect to the receiving water. Use your best estimate for any dimensional information required for which you do not already have accurate measurements. For discharges to estuaries, complete the mixing zone analysis requirements listed on Supplement C: MIXING ZONE REQUIREMENTS FOR DISCHARGES TO ESTUARIES. All stream information should be provided based on low flow conditions. If a diffuser is used, attach a plan drawing of the diffuser as well as the configuration (e.g. number of diffuser ports, height from the bottom of channel, construction material, etc.) of the diffuser.

TABLE 3
Summary of Information to be Reported by Industry Type

Tabulate actual production data specified below for each month in the last 5 years and include the requested data as an attachment. Please check categorical regulations for your specific industry type for a complete listing of the information to be reported in this application.

40 CFR 405 - Dairy Products Processing: Report mass of raw materials (milk equivalent or fluid raw whey) and mass of BOD5 input of raw materials. If your facility is regulated under Subparts K or L of this category also report total suspended solids of the raw materials. Complete applicable information on Supplement H.

40 CFR 406 - Grain Mills: Report volume of final product per volume of raw material in standard bushels or mean standard bushels (for corn or wheat); hundredweight (rice), or; volume per volume on a weight basis (for cereal or wheat flour as raw material).

40 CFR 407 - Canned and Preserved Fruits and Vegetables Processing: Facilities regulated under Subparts A-G report volume per volume (weight basis) of raw materials. Facilities regulated under Subpart H report volume per volume (weight basis) of final product. Complete applicable information on Supplement I.

40 CFR 408 - Canned and Preserved Seafood Processing: Report pounds of seafood to be processed. Complete applicable information on Supplement O.

40 CFR 409 - Sugar Processing: Facilities regulated under Subpart A report volume per volume (weight basis) of final product (crystallized refined sugar). Facilities regulated under Subparts 8 and C report pounds per ton of melt, where melt is the amount of raw material (sugar) combined within an aqueous solution at the beginning of the process for production of refined sugar cane.

40 CFR 410 - Textiles: Facilities regulated under Subpart A report pounds of wool. Facilities regulated under Subpart B report pounds of fiber. All other subparts report pounds of product.

40 CFR 411 - Cement Manufacturing: Facilities regulated under Subpart A report pounds of final product. Facilities regulated under Subpart B report pounds of dust leached.

40 CFR 414 - Organic Chemicals. Plastics and Synthetic Fibers (OCPSF): Report (1) flow rates of individual process wastewater streams; (2) flow rates of individual metal-bearing or cyanide-bearing wastewater streams; (3) pounds of product generated per year for each product; and (4) indicate if end-of-pipe biological treatment exists. Complete applicable information on Supplement L.

40 CFR 415 - Inorganic Chemicals Manufacturing: Report pounds of product.

40 CFR 417 - Soap and Detergent Manufacturing: Report pounds of anhydrous product.

40 CFR 419 - Petroleum Refining: Report volume of feedstock (number of barrels) and volume of flow

40 CFR 420 - Iron and Steel Manufacturing: Report pounds of product. If air or vent scrubbers are used at the facility, describe the operations they are used in and indicate the number of scrubbers in use. Complete applicable information on Supplement J.

40 CFR 421 - Nonferrous Metals Manufacturing: Report weight of product produced, cast, or material recovered (see individual subparts for specific materials regulated) and provide a description of each specific process that produces a wastewater stream.

40 CFR 423 - Steam Electric Power Generating: Report volume of flow from process wastewater streams including contact cooling, cooling tower blowdown, and any other wastewaters including noncontact cooling water. Report total rating of electric generating capacity. Complete applicable information on Supplement M.

40 CFR 424 - Ferroalloy Manufacturing: Report (1) megawatt hour(s) of electrical energy consumed in the smelting process (for electric furnaces only), (2) weight of product (for non electric furnaces only and other if appropriate). and (3) weight of raw material processed.

40 CFR 425 - Leather Tanning and Finishing: Report weight of raw material.

40 CFR 426 - Glass Manufacturing: Facilities regulated under Subparts D & E report pounds of product. Facilities regulated under Subparts F & L report pounds of furnace pull. Subpart L facilities also report pounds of product frosted.

40 CFR 428 - Rubber Manufacturing: Report (1) weight of raw material or raw material equivalent and (2) weight of gross production.

40 CFR 429 - Timber Products Processing: Report (1) weight per volume of production and (2) weight of gross production.

40 CFR 430 - Pulp, Paper and Paperboard: Report (1) weight of product, and (2) provide a statement certifying that chlorophenolic containing biocides are not being used at the facility. Complete applicable information on Supplement N.

40 CFR 431 - Builder=s Paper and Board Mills: Report pounds of product.

40 CFR 432 - Meat Products: Report (1) weight of raw material (raw material measured in live weight killed or equivalent live weight killed), (2) weight of finished product, and if the facility is regulated under Subparts E-J, (3) the manufacturing rate for individual products. Complete applicable information on Supplement K.

40 CFR 433 - Metal Finishing: Report flow rates of individual processes generating wastewater streams.

40 CFR 436 - Mineral Mining and Processing: If the facility uses HF flotation as a treatment process report weight of total product.

40 CFR 439 - Pharmaceutical Manufacturing: Report long term daily average raw waste (i.e. pre-treatment system) content of BOD5 and COD.

40 CFR 440 - Ore Mining and Dressing: Report (1) treatment or milling technique(s) employed and (2) if the facility is regulated under Subparts F-H or J, report tons of product.

40 CFR 461 - Battery Manufacturing: Report weight of raw materials used, applied, deposited, or processed and (2) weight of cells, powder, or other material produced.

40 CFR 463 - Plastics Molding and Forming: Report average process wastewater usage flow rates for each individual process.

40 CFR 464 - Metal Molding and Casting: Report (1) weight of material poured (casted) and (2) if air scrubbers are used, report volume of air scrubbed. If the facility is regulated under Subpart C report (1) the weight of sand reclaimed (if applicable) and (2) the weight of metal poured annually (if applicable).

40 CFR 465 - Coil Coating: Report (1) the total surface are of the material processed and (2) H the facility is regulated under Subpart D, report the number of cans manufactured.

40 CFR 466 - Porcelain Enameling: Report the total surface area of raw material processed or coated.

40 CFR 467 - Aluminum Forming: Report the weight of raw material (aluminum) processed including rolling, casting, forging, quenching, drawing, extruding, cleaning and etching operations.

40 CFR 468 - Copper Forming: Report weight of raw material (copper) processed including rolling, drawing, heat treating, extruding, annealing, cleaning, pickling, tumbling, burnishing, coating and forming operations.

40 CFR 471 - Nonferrous Metals Forming and Metals Powders: Report weight of raw material processed for various operations (see guidelines for descriptions of processes).

Beverage Industry (SIC Codes 2082, 2084, 2086) : Complete application information on Supplement G.

8. **Discharge temperature:** Complete this section only if your facility is a steam electric power generator, dairy, pulp/paper mill, or has a cooling water discharge (SIC code 9999) and the discharge temperature of this outfall exceeds the temperature of the receiving water by more than three (3) degrees Fahrenheit at any time. Assume a temperature of 60°F for groundwater discharges. If thermal data is unavailable, use your best estimates. Provide a description of the discharge configuration, such as "Discharge via effluent diffuser to subsurface of Hudson River.@ Submit specifics on the

intake and discharge configuration in plan and profile (including location, design, operation, construction, and/or capacity) and indicate the disposition of any screened materials if either of the following is applicable to your facility:

a. The discharge is to a Lake, Impoundment, or Coastal Water, and the flow is greater than 5 MGD; or

b. The discharge is to a River, Stream, or Estuary, and the flow of the discharge is greater than the MA7CD10 of the receiving water.

MA7CD10 flow data for the receiving water may be obtained from the NYSDEC Bureau of Watershed Management, Quality Allocation Section, 4th Floor, 625 Broadway, Albany NY 12233-3508, telephone (518) 402-8250.

9. **Water treatment chemicals:** Indicate if the water or wastewater is treated with any additives prior to discharge. These additives include, but are not limited to, conditioners, corrosion or scale inhibitors, flocculants, biocides, fungicides, molluscides, and sequestrants. If no additives are used to treat the water or wastewater from this outfall prior to discharge, check the "No" box and go to Item 10. For <u>each</u> water treatment additive used, provide the product name and manufacturer of the additive, and complete attached Form WTCFX, AWater Treatment Chemical (WTC) Usage Notification Requirements for SPDES Permittees.@

10. **Biological testing:** Indicate whether any biological test for acute or chronic toxicity has been made on the discharge from this outfall, or on the receiving water in relation to the discharge from this outfall, in the past 3 years. Describe the type of testing performed in this table. Do not submit any information previously submitted as part of a toxicity testing program required by this Department, or otherwise submitted to the Division of Water. Indicate the date of submittal of any biological testing results previously submitted to the Department.

11. **Treatment:** Provide the requested information for the treatment system(s), if any, that are used to treat the effluent from this outfall. Include the applicable treatment code(s) from Table 4 on the following page for each treatment process. The design flow rate should be based on the treatment system design capacity, with units (e.g. GPD, etc.).

12. **Facility Improvements:** Indicate whether your facility has either a compliance agreement with a regulating agency or planned production changes which will materially alter the quantity and/or quality of the discharge from this outfall. Compliance agreements include, but are not limited to, agreements with any Federal, State, or local authority to meet an implementation schedule for the construction, upgrading, or operation of wastewater treatment equipment or practices, or for any other environmental programs, via permit conditions, administrative or enforcement orders, enforcement compliance schedule letters, stipulations, court orders, and/or grant or loan conditions. Planned production changes include, but are not limited to, increases or decreases in production due to demand, plant consolidation or shutdown, and/or change in plant processes which will result in an increase or decrease in the quantity or nature of wastewater discharged. For existing permits, attach plans for any treatment system or other physical changes in the discharge process which will change the nature of the discharge from this outfall as an addendum to this application.

This concludes the information required for Section II. Instructions for Section III, which requests outfall specific sampling information, begin on Page 11 following Table 4.

TABLE 4
TREATMENT CODES AND PROCESSES

1. PHYSICAL TREATMENT PROCESSES

1-A Ammonia Stripping
1-B Dialysis
1-C Diatomaceous Earth Filtration
1-D Distillation
1-E Electrodialysis
1-F Evaporation
1-G Flocculation
1-H Flotation
1-I Foam Fractionation
1-J Freezing
1-K Gas-Phase Separation
1-L Grinding (Comminutors)
1-M Grit Removal
1-N Microstraining
1-O Mixing
1-P Moving Bed Filters
1-Q Multimedia Filtration
1-R Rapid Sand Filtration
1-S Reverse Osmosis (Hyperfiltration)
1-T Screening
1-U Sedimentation (Skimming)
1-V Slow Sand Filtration
1-W Solvent Extraction
1-X Sorption
1-Y Air Stripping
1-Z Steam Stripping

2. CHEMICAL TREATMENT PROCESSES

2-A Carbon Adsorption
2-B Chemical Oxidation
2-C Chemical Precipitation
2-D Coagulation
2-E Dechlorination
2-F Disinfection (Chlorine)
2-G Disinfection (Ozone)
2-H Disinfection (Other)
2-I Electrochemical Treatment
2-J Ion Exchange
2-K Neutralization
2-L Reduction
2-M Oxidation (UV)
2-N Thermal Destruction

3. BIOLOGICAL TREATMENT PROCESSES

3-A Activated Sludge
3-B Aerated Lagoons
3-C Anaerobic Treatment
3-D Nitrification-Denitrification
3-E Preaeration
3-F Spray Irrigation./Land Application
3-G Stabilization Ponds
3-H Trickling Filtration
3-I Rotating Biological Contactor (RBC)

4. POLLUTION PREVENTION MEASURES AND OTHER PROCESSES

4-A Inspection, Maintenance & Repair
4-B Sensor/Controller
4-C Reuse/Recycle of Treated Effluent
4-D Underground Injection
4-E Product Substitution
4-F Discharge to Surface Water
4-G Ocean Discharge Through Outfall

5. SLUDGE TREATMENT AND DISPOSAL PROCESSES

5-A Aerobic Digestion
5-B Anaerobic Digestion
5-C Belt Filtration
5-D Centrifugation
5-E Chemical Conditioning
5-F Chlorine Treatment
5-G Composting
5-H Drying Beds
5-I Elutriation
5-J Flotation Thickening
5-K Freezing
5-L Gravity Thickening
5-M Heat Drying
5-N Heat Treatment
5-O Incineration
5-P Land Application
5-Q Landfill
5-R Pressure Filtration
5-S Pyrolysis
5-T Sludge Lagoons
5-U Vacuum Filtration
5-V Vibration
5-W Wet Oxidation

6. OTHER PROCESSES NOT LISTED ABOVE

6-A Unlisted Process (Describe)

State Pollutant Discharge Elimination System (SPDES)
INDUSTRIAL APPLICATION FORM NY-2C
For New Permits and Permit Modifications
APPLICATION INSTRUCTIONS

SECTION III - SAMPLING AND REPORTING INFORMATION

Make copies of the blank forms for this section and complete this section for each outfall. Base your answers on actual data whenever available; otherwise use your best estimate. Be sure to enter the facility name, outfall number, and SPDES number (if applicable) at the top of each page. Applicants applying for modification of existing permits should complete all information in this section, whether or not changes have occurred to a wastewater discharge stream or its associated processes.

1. Sampling Information - Conventional Pollutants:

A. Definitions:

i. Grab sample: An individual sample of at least 100 milliliters (ml) collected at a randomly selected time over a period not exceeding 15 minutes.

ii. Composite sample: A combination of at least 8 sample aliquots of at least 100 ml total volume, collected at periodic intervals during the discharging hours of a facility over a finite (generally 24 hour) period. The composite must be flow proportional; either the time interval between each aliquot or the volume of each aliquot must be proportional to either the stream flow at the time of sampling or the total stream flow since the collection of the previous aliquot. Aliquots may be collected manually or automatically.

B. General Requirements: Report all data on the Sampling Information - Conventional Parameters table (Section III Forms, Item 1), indicating the units and the sample types as specified below. Actual data must be provided for existing discharges, and expected or estimated data provided for proposed discharges. The unit are as follows: µg/l = micrograms per liter; mg/l = milligrams per liter; °F = degrees Fahrenheit; °C = degrees Celsius. Monthly and long term average data should be based on the actual operating hours of the facility and the duration of the discharge, where applicable. For long term average data, use the equivalent of three years of monthly sampling, or the maximum amount of data available for the production process as it exists at the time of application.

This item requires all dischargers to sample for pollutants *a.* through *l.* listed in the Sampling Information - Conventional Parameters table, but allows the possibility of a waiver from this requirement. The outfall categories specified in Table 5 below have received waivers for the pollutants listed. If an outfall category or pollutants are not specified in Table 5, you may request waivers on a case by case basis.

TABLE 5
CONVENTIONAL POLLUTANT SAMPLING WAIVERS FOR SPECIFIC DISCHARGE CATEGORIES

Category	Pollutant Waiver
Noncontact cooling waters without the admixture of other wastes (food and paper products manufacturers)	COD & Ammonia (as N)
Noncontact cooling waters without the admixture of other wastes and without the use of water treatment chemicals	BOD & COD
Discharges to groundwater	Temperature (winter), Temperature (summer)
Cement Plants, Salt Companies, Petroleum Storage Facilities (but not refineries), Potable or Process Water Treatment Plants	BOD, COD, & Ammonia (as N)
Sewage without the admixture of industrial or other wastes	COD
Stormwater (food and paper products manufacturers)	COD, Ammonia (as N), Temperature (winter), Temperature (summer)
Stormwater (all other wastes)	BOD, COD, Temperature (winter), Temperature (summer)

Grab samples shall be used to analyze for pH, temperature, total phosphorus, total residual chlorine, oil and grease, and fecal coliform unless other frequency-sample type analyses are available. 24-hour composite samples shall be used to analyze for 5-day BOD, COD, TOC, ammonia nitrogen and total suspended solids unless other frequency-sample type analyses are available. For existing discharges, sampling data from the previous 12 months that are considered representative of your current discharge may be used for completing this section.

B. General Requirements: (ctd)
For two or more substantially identical outfalls, permission may be requested from the Regional Water Engineer to sample and analyze only one outfall and submit the results of the analysis for other substantially identical outfalls. If the request is granted by the Regional Water Engineer, identify which outfall was sampled and describe, on a separate sheet attached to the application form, why the outfalls which were not sampled are substantially identical to the outfall which was sampled.

C. Reporting of intake data: Applicants are not required to report intake water data unless they are attempting to demonstrate eligibility for "net" effluent limitations for one or more pollutants. A "net" effluent limitation is determined by subtracting the average level of the pollutant(s) present in the intake waters from the levels remaining in the effluent after treatment. SPDES regulations allow net limitations only in certain circumstances (see 40 CFR Part 122.45(9)). To demonstrate eligibility, report the average concentration and/or mass of the results of the analyses on the intake water. If the intake water is treated prior to use, report the intake concentrations and/or mass after treatment. In addition to the analytical results, the following information must be submitted for each parameter:

i) A statement of the extent to which the level of the pollutant in the intake water is reduced by treatment of the wastewater. Be sure to specify the type and capacity of any intake water treatment equipment (e.g. screening, filtration, etc.) in the table in Section II Forms, Item 10.

ii) When applicable (for example, when the pollutant represents a class of compounds, e.g., BOD_5, TSS, etc.), a demonstration of the extent to which the pollutants in the intake vary physically, chemically and biologically from the pollutants contained in the discharge.

2. Sampling Information - Priority Pollutants, Toxic Pollutants, and Hazardous Substances:

A. General Requirements:
i. New discharges: Report all data on the Projected Effluent Quality Table (Section III Forms, Item 3), indicating units and sample types. Base your answers on actual data whenever available; otherwise use your best estimate. For new facilities to be built, use proposed design and production estimates. Indicate the units as follows: µg/l = micrograms per liter; mg/l = milligrams per liter; °F = degrees Fahrenheit; °C = degrees Celsius. See Item 1.A. above for definitions of grab and composite sampling. Monthly and long term average data should be based on the actual operating hours of the facility and the duration of the discharge, where applicable and available.

ii. Existing discharges: Report the monitoring results from this outfall for the past three (3) years, or for the time period representative of the current discharge from this outfall if less than three years. Include sample date, reported concentration, flow, and units for each parameter monitored from this outfall. It is not necessary to include data that has previously been submitted on Discharge Monitoring Reports (DMRs). Indicate the units as follows: µg/l = micrograms per liter; mg/l = milligrams per liter; °F = degrees Fahrenheit; °C = degrees Celsius. Provide the monitoring results on a CD-ROM (or other secure, read-only personal computer media) in Windows-compatible spreadsheet format. Use the data format as shown on the Existing Effluent Quality table (Section III Forms, Item 4). You may alternatively report all data in hardcopy format using the Existing Effluent Quality table or other table of similar format, indicating units and sample types, if you do not have access to the computer media listed above.

iii. All discharges: Grab samples shall be used to analyze for total phenols and cyanide unless other frequency-sample type analyses are available. 24-hour composite samples shall be used to analyze for all other parameters unless other frequency-sample type analyses are available. For existing discharges, sampling data from the previous 12 months that are considered representative of your current discharge should be used for completing this section. If your facility discharges any of the parameters identified in Tables 6 - 10 as Bioaccumulative Chemicals of Concern (BCCs), complete the information requested on Application Supplement A, ABCC ANTIDEGRADATION DEMONSTRATION,@ and attach the form to this application.

If sampling data are available for other parameters not listed in Tables 6 - 10 or in other parts of this application, the applicant should report the sampling data for this outfall in the table after all other required data, or attach the information to this application on 8 2 x 11 paper.

For two or more substantially identical outfalls, permission may be requested from the Regional Water Engineer to sample and analyze only one outfall and submit the results of the analysis for other substantially identical outfalls. If the request is granted by the Regional Water Engineer, identify which outfall was sampled and describe, on a separate sheet attached to the application form, why the outfalls that were not sampled are substantially identical to the outfall which was sampled.

iii. All discharges:(ctd) All surface water discharge applicants who use or manufacture 2,4,5 trichlorophenoxy acetic acid (2,4,5-T); 2(2,4,5-trichlorophenoxy) propanoic acid (Silvex, 2,4,5,TP); 2-(2,4,5-trichlorophenoxy)ethyl 2,2-dichloroproprionate (Erbon); 0,0-Dimethyl 0-(2,4,5Trichlorophenyl) Phosphorothioate (Ronnel); 2,4,5-trichlorophenol (TCP); or Hexachlorophene (HCP); or knows or has reason to believe that TCDD is or may be present in their discharge must report qualitative data, generated using a screening procedure not calibrated with analytical standards, for 2,3,7,8-Tetrachlorodibenzo-P-Dioxin (TCDD). All data must be generated using standard calibration procedures.

B. Primary Industries: Complete this item only if the facility is a primary industry as indicated in Section I Forms, Item 12. If it is not a primary industry continue with Section C. below.

i. Process Wastewater: If the discharge from this outfall contains any process wastewater, check the YES box and continue with item ii. below. If the discharge from this outfall does not contain any process wastewater, check NO and continue with item C.

ii. Sampling Data: Indicate which GC/MS (Gas Chromatograph/Mass Spectroscopy) fraction(s) must be tested for. Refer to Table 1 of the instructions for a list of industrial categories and the respective GC/MS testing requirements. Check all that apply. Provide analytical data for each parameter of the GC/MS fraction checked above. Metals sampling, using the most sensitive approved method (i.e. graphite furnace atomic absorption (GFAA) or other equally sensitive method), is required for all industrial categories listed in Table 1 of the instructions. Refer to Tables 6 and 7 on the following pages for the parameters in each GC/MS fraction. Provide copies of the analytical results or record the information as directed in items 2.A.i. and ii. above. Additionally, all primary industries that discharge process wastewater must provide quantitative data on the appropriate Effluent Quality table for the parameters indicated, based on actual or projected flow rates as listed in Section II Item 4. above. Permittees are not required to analyze for 2,3,7,8-TCDD (Dioxin) unless they believe it is present in the discharge.

C. Additional Information: All applicants must complete this section.

i. Required pollutant analyses: If you know or have reason to believe that any of the pollutants listed in Tables 6, 7 and 8 are present in the discharge from this outfall, check "Yes" and provide qualitative and quantitative data as directed in items 2.A.i. and ii. above. Both concentration and mass data must be provided for these pollutants. If you do not know or have reason to believe any of the pollutants in Tables 6, 7, or 8 are present in the discharge, check "No".

ii. Other pollutants: If you know or have reason to believe that any of the pollutants listed in Table 9 are present in the discharge from this outfall, regardless of the type of discharge, check "Yes" and describe reasons for the pollutant being present and provide available quantitative data as an attachment to this application. If you know or have reason to believe that any of the pollutants listed in Table 10, or any other toxic, harmful, or injurious chemical substances not listed in Tables 6-10, are present in the discharge from this outfall, regardless of the type of discharge, check "Yes," describe reasons the pollutant is believed to be present, and estimate the concentration expected in the discharge. If you do not know or have reason to believe any of the pollutants in Tables 9 or 10 are present in the discharge, check "No".

3. Reporting Information: Discharge Monitoring Report (DMR) Authorization

The DMRs for your facility must be signed as follows:

A. For *corporations*, by a responsible corporate official. For purposes of this section, a responsible corporate official means (i) a president, secretary, treasurer, or a vice president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision making function for the corporation, or (ii) the manager of one or more manufacturing, production, or operating facilities employing more than 250 persons or having annual sales or expenditures exceeding $25 million (in second quarter 1980 dollars), if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.

B. For a *partnership* or *sole proprietorship*: by a general partner or the proprietor, respectively.

C. For a *municipality, state, federal*, or *other* public agency: by either a principal or executive officer or ranking elected official. A principal executive officer of a federal agency includes: (i) the chief executive officer of the agency, or (ii) a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency.

D. A duly authorized representative of the person described in items (A), (B) or (C). A person is a duly authorized representative only if (i) the authorization is made in writing by a person described in paragraph (A), (B) or (C); (ii) the authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity such as the position of plant manager, operator of a well or well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company, and (iii) the written authorization is submitted to the Department.

Changes to authorization: If an authorization is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements above must be submitted to the Department in letter format prior to or together with any reports to be signed by an authorized representative.

This completes the instructions for Industrial Application Form NY-2C.

TABLE 6
PRIORITY POLLUTANTS (From: 40CFR Part 122, Appendix D)

Include monitoring results for any of the pollutants listed below that are believed present in the discharge from any outfall at your facility.

GC/MS Volatile fraction compounds:

CAS #	Pollutant Name
00107-02-8	Acrolein[1]
00107-13-1	Acrylonitrile[1]
00071-43-2	Benzene
00075-25-2	Bromoform
00056-23-5	Carbon Tetrachloride
00108-90-7	Chlorobenzene
00124-48-1	Chlorodibromomethane
00075-00-3	Chloroethane
00110-75-8	2-Chloroethylvinyl ether
00067-66-3	Chloroform
00075-27-4	Dichlorobromomethane
00075-34-3	1,1-Dichloroethane
00107-06-2	1,2-Dichloroethane
00075-35-4	1,1-Dichloroethylene
00078-87-5	1,2-Dichloropropane
00542-75-6	1,3-Dichloropropylene
00100-41-4	Ethylbenzene
00074-83-9	Methyl Bromide[1]
00074-87-3	Methyl Chloride
00075-09-2	Methylene Chloride
00079-34-5	1,1,2,2-Tetrachloroethane
00127-18-4	Tetrachloroethylene
00108-88-3	Toluene
00156-60-5	1,2-trans-Dichloroethylene
00071-55-6	1,1,1-Trichloroethane
00079-00-5	1,1,2-Trichloroethane
00079-01-6	Trichloroethene
00075-01-4	Vinyl Chloride

GC/MS Acid Fraction Compounds:

CAS #	Pollutant Name
00095-57-8	2-Chlorophenol
00120-83-2	2,4-Dichlorophenol
00105-69-7	2,4-Dimethylphenol
00534-52-1	4,6-Dinitro-o-cresol[1]
00051-28-5	2,4-Dinitrophenol
00088-75-5	2-Nitrophenol
00100-02-7	4-Nitrophenol
00059-50-7	p-Chloro-m-cresol
00087-86-5	Pentachlorophenol[1]
00108-95-2	Phenol
00088-06-2	2,4,6-Trichlorophenol

GC/MS Base/Neutral fraction compounds

CAS #	Pollutant Name
00083-32-9	Acenaphthene
00208-96-8	Acenaphthylene
00120-12-7	Anthracene[1]
00092-87-5	Benzidine
00056-55-3	Benz(a)anthracene[1]
00050-32-8	Benzo(a)pyrene[1]
00205-99-4	3,4-Benzofluoranthene[1]
00191-24-2	Benzo(ghi)perylene[1]
00207-08-9	Benzo(k)fluoranthene
00111-91-1	Bis(2-chloroethoxy)methane
00111-44-4	Bis(2-chloroethyl)ether
00102-60-1	Bis(2-chloroisopropyl)ether
00117-81-7	Bis(2-ethylhexyl)phthalate
00101-55-3	4-Bromophenyl phenyl ether[1]
00085-68-7	Butylbenzyl phthalate
00091-58-7	2-Chloronaphthalene
07005-72-3	4-Chlorophenyl phenyl ether[1]
00218-01-9	Chrysene[1]
00053-70-3	Dibenz(a,h)anthracene[1]
00095-50-1	1,2-Dichlorobenzene
00541-73-1	1,3-Dichlorobenzene
00106-46-7	1,4-Dichlorobenzene
00091-94-1	3,3'-Dichlorobenzidine
00084-66-2	Diethyl phthalate
00131-11-3	Dimethyl phthalate
00084-74-2	Di-n-butyl phthalate
00606-20-2	2,6-Dinitrotoluene
00117-84-0	Di-n-octyl phthalate
00122-66-7	1,2-Diphenylhydrazine
00206-44-0	Fluroranthene[1]
00086-73-7	Fluorene
00118-74-1	Hexachlorobenzene[1]
00087-68-3	Hexachlorobutadiene[1]
00077-47-4	Hexachlorocyclopentadiene
00067-72-1	Hexachloroethane[1]
00193-39-5	Indeno(1,2,3-cd)pyrene[1]
00078-59-1	Isophorone
00091-20-3	Naphthalene
00098-95-3	Nitrobenzene
00062-75-9	N-nitrosodimethylamine
00621-64-7	N-nitrosodi-n-propylamine
00086-30-6	N-nitrosodiphenylamine
00085-01-8	Phenanthrene[1]
00129-00-0	Pyrene[1]
00120-82-1	1,2,4-Trichlorobenzene[1]

GC/MS Pesticides fraction compounds:

CAS #	Pollutant Name
00309-00-2	Aldrin[1]
00319-84-6	alpha-BHC[1]
00319-85-7	beta-BHC[1]
00058-89-9	gamma-BHC (Lindane)[1]
00319-86-8	delta-BHC[1]
00057-74-9	Chlordane[1]
00050-29-3	4,4'-DDT[1]
00072-55-9	4,4'-DDE[1]
00072-54-8	4,4'-DDD[1]
00060-57-1	Dieldrin[1]
00959-98-8	alpha-Endosulfan[1]
33213-65-9	beta-Endosulfan
01031-07-8	Endosulfan sulfate
00072-20-8	Endrin[1]
07421-93-4	Endrin aldehyde
00076-44-8	Heptachlor[1]
01024-57-3	Heptachlor epoxide[1]
53469-21-9	PCB-1242[1]
11097-69-1	PCB-1254[1]
11104-28-2	PCB-1221[1]
11141-16-5	PCB-1232[1]
12672-29-6	PCB-1248[1]
11096-82-5	PCB-1260[1]
12674-11-2	PCB-1016[1]
08001-35-2	Toxaphene[1]

Dioxin:

CAS #	Pollutant Name
01764-01-6	2,3,7,8-Tetrachlorodibenzo-p-dioxin[1,2]

Metals and Other Toxic Pollutants:

CAS #	Pollutant Name
07440-36-0	Antimony, Total
07440-38-2	Arsenic, Total
07440-41-7	Beryllium, Total
07440-43-9	Cadmium Total
07440-47-3	Chromium, Total
07440-50-8	Copper, Total
07439-92-1	Lead, Total
07439-97-6	Mercury, Total[1]
07440-02-0	Nickel, Total
07782-49-2	Selenium, Total
07440-22-4	Silver, Total
07440-28-0	Thallium, Total[1]
07440-66-6	Zinc, Total
00057-12-5	Cyanide, Total
	Phenols, Total[3]
01332-21-4	Asbestos

Notes: 1. These pollutants either have FDA fish flesh concentration limits, are identified as Bioaccumulative Chemicals of Concern (BCCs), or are restricted pesticides. Any quantity of these chemicals used, produced, stored, distributed or otherwise disposed of by your facility must be reported on the ICS Form. See Item 19 on page 6 of these instructions for more information.

2. Dioxin is not listed in Part 122, Appendix D, but is a priority pollutant.

3. Phenols, Total is not a Priority Pollutant but is considered a Toxic Substance for permit classification purposes.

TABLE 7

Other Significant Pollutants with NYSDEC Standards/Guidance Values and USEPA/NYSDEC Promulgated Analytical Methods

Include monitoring results for any of the pollutants listed below that are believed present in the discharge from any outfall at your facility.

A. Base/Neutral/Acid Compounds:

CAS Number	Parameter Name
00092-67-1	4-Aminobiphenyl
00062-53-3	Aniline
00140-57-8	Aramite
00106-47-8	4-Chloroaniline
00119-93-7	3,3'-Dimethylbenzidine
00122-09-8	α,α-Dimethylphenethylamine
00099-65-0	1,3-Dinitrobenzene
00122-39-4	Diphenylamine
00070-30-4	Hexachlorophene
01888-71-7	Hexachloropropene
00099-55-8	5-Nitro-o-toluidine
00088-74-4	2-Nitroaniline
00099-09-2	3-Nitroaniline
00100-01-6	4-Nitroaniline
00608-93-5	Pentachlorobenzene[1]
00106-50-3	1,4-Phenylenediamine
00298-02-2	Phorate
00095-94-3	1,2,4,5-Tetrachlorobenzene[1]
00095-53-4	o-Toluidine
00099-35-4	1,3,5-Trinitrobenzene, sym-

B. Conventional Compounds and Metals:

CAS Number	Parameter Name
07664-41-7	Ammonia/ammonium
24959-67-9	Bromide
	Chloride
	Color
	Coliform, Fecal
	Coliform, Total
16984-48-8	Fluoride
	Nitrogen, Nitrate
	Nitrogen, Nitrite
	Methylene Blue Active Substances
07723-14-0	Phosphorus (as P), Total
	Radioactivity
	Alpha, Total
	Beta, Total
	Radium, Total
	Radium 226, Total
	Solids, Settleable
14808-79-8	Sulfate (as SO4)
	Sulfide (as S)
14265-45-3	Sulfite (as SO3)
	Cyanide, Amenable to Chlorination
07440-47-3	Chromium, Hexavalent
07439-90-5	Aluminum, Total
07440-39-3	Barium, Total
07440-42-8	Boron, Total
07440-48-4	Cobalt, Total
07439-89-6	Iron, Total
07439-95-4	Magnesium, Total
07439-98-7	Molybdenum, Total
07439-96-5	Manganese, Total
07440-23-5	Sodium, Total
07440-31-5	Tin, Total
07440-32-6	Titanium, Total
07440-62-2	Vanadium, Total

C. Volatile Organic Compounds:

CAS Number	Parameter Name
00067-64-1	Acetone
00107-05-1	Allyl chloride
00126-99-8	Chloroprene
00074-95-3	Dibromomethane
00110-57-6	trans-1,4-Dichloro-2-butene
00075-71-8	Dichlorodifluoromethane
00156-59-2	cis-1,2-Dichloroethylene
10061-01-5	cis-1,3-Dichloropropene
10061-02-6	trans-1,3-Dichloropropene
00106-93-4	Ethylene dibromide (EDB)
00107-21-1	Ethylene glycol
00591-78-6	2-Hexanone
00126-98-7	Methacrylonitrile
00078-93-3	Methyl ethyl ketone
00074-88-4	Methyl iodide (Iodomethane)
00080-62-6	Methyl methacrylate
00076-01-7	Pentachloroethane
00110-86-1	Pyridine
00100-42-5	Styrene
00630-20-6	1,1,1,2-Tetrachloroethane
00075-69-4	Trichlorofluoromethane
00096-18-4	1,2,3-Trichloropropane
00095-47-6	Xylene, Ortho- (1,2-)
00108-38-3	Xylene, Meta- (1,3-)
00106-42-3	Xylene, Para- (1,4-)

D. Pesticides:

CAS Number	Parameter Name
15972-60-8	Alachlor
00116-06-3	Aldicarb
00834-12-8	Ametryn
02032-59-9	Aminocarb (Metacil)
01610-17-9	Atraton
01912-24-9	Atrazine
00086-50-0	Azinphosmethyl
00101-27-9	Barban
01861-40-1	Benefin
00314-40-9	Bromacil
23184-66-9	Butachlor
00133-06-2	Captan
00063-25-2	Carbaryl
01563-66-2	Carbofuran[1]
00075-99-0	Dalapon
00298-03-3	Demeton (-o)
00126-75-0	Demeton (-S)[1]
00333-41-5	Diazinon
00096-12-8	1,2- Dibromo-3-chloropropane
01918-00-9	Dicamba
00094-75-7	2,4-Dichlorophenoxyacetic acid (2,4-D)[1]
00088-85-7	Dinoseb[1]
00298-04-4	Disulfoton
14484-64-1	Ferbam
02164-17-2	Fluometuron
01071-83-6	Glyphosate (Roundup)[1]
00608-73-1	Hexachlorocyclohexanes
51235-04-2	Hexazinone
00465-73-6	Isodrin
33820-53-0	Isopropalin
00143-50-0	Kepone[1]
00121-75-5	Malathion
08018-01-7	Mancozeb
12427-38-2	Maneb
16752-77-5	Methomyl[1]
00072-43-5	Methoxychlor[1]
00298-00-0	Methyl parathion[1]
00094-74-6	2-Methyl-4-chloro-phenoxyacetic acid; MCPA
21087-64-9	Metribuzin
02385-85-5	Mirex (Hexachloropentadiene)[1]
00142-59-6	Nabam
23135-22-0	Oxamyl[1]
00056-38-2	Parathion[1]
00082-68-8	Pentachloronitrobenzene
01610-18-0	Prometon
01918-16-7	Propachlor
00139-40-2	Propazine
00122-42-9	Propham
00122-34-9	Simazine[1]
05902-51-2	Terbacil
13071-79-9	Terbufos[1]
00093-76-5	2,4,5-Trichlorophenoxyacetic acid[1]
01582-09-8	Trifluralin
12122-67-7	Zineb
00137-30-4	Ziram

Notes: 1. These pollutants either have FDA fish flesh concentration limits, are identified as Bioaccumulative Chemicals of Concern (BCCs), or are restricted pesticides. Any quantity of these chemicals used, produced, stored, distributed or otherwise disposed of by your facility must be reported on the ICS Form. See Item 19 on page 6 of these instructions for more information.

TABLE 8

Other Significant Pollutants with USEPA/NYSDEC Promulgated Analytical Methods

Include monitoring results for any of the pollutants listed below that are believed present in the discharge from any outfall at your facility.

CAS Number	Pollutant Name	CAS Number	Pollutant Name
	AOP (Ambam oxidation product)	02032-65-7	Methyl carbamate; methiocarb[1]
00075-05-8	Acetonitrile	00066-27-3	3-Methyl methanesulfonate
00098-86-2	Acetophenone	00953-17-3	Methyl trithion
17804-35-2	Benomyl	00108-10-1	4-Methyl-2-pentanone; Methyl isobutyl ketone
25057-89-0	Bentazon	00056-49-5	3-Methylcholanthrene
00100-51-6	Benzyl alcohol	00091-57-6	2-Methylnaphthalene
00100-44-7	Benzyl chloride	00095-48-7	2-Methylphenol; o-Cresol
35400-43-2	Bolstar (Sulprofos)	00108-39-4	3-Methylphenol; m-Cresol
51026-28-9	Busan 40	00106-44-5	4-Methylphenol; p-Cresol
00128-03-0	Busan 85	07786-34-7	Mevinphos
07440-70-2	Calcium, Total	00315-18-4	Mexacarbate[1]
00128-04-1	Carbam S	00150-68-5	Monuron
10605-21-7	Carbendazim	00140-41-0	Monuron-TCA
00075-15-0	Carbon disulfide[1]	10595-95-6	N-Nitrosomethylethylamine
00786-19-6	Carbophenothion (Trithion)[1]	00059-89-2	N-Nitrosomorpholine
03734-48-3	Chlordene	00100-75-4	N-Nitrosopiperidine
00093-65-2	2-(4-Chloro-2-methylphenoxy)propionic acid; MCPP	00930-55-2	N-Nitrosopyrrolidine
00510-15-6	Chlorobenzilate	00300-76-5	Naled
00101-21-3	Chloropropham	00134-32-7	1-Naphthylamine
05836-10-2	Chloropropylate	00091-59-8	2-Naphthylamine
02921-88-2	Chlorpyrifos[1]	00130-15-4	1,4-Napthoquinone
05598-13-0	Chlorpyrifos methyl	00555-37-3	Neburon
00056-72-4	Coumaphos	15339-36-3	Niacaide
21725-46-2	Cyanazine	00056-57-5	4-Nitroquinoline-1-oxide
00094-82-6	2,4-DB	07440-04-2	Osmium, Total
00134-62-3	DEET	07440-05-3	Palladium, Total
02303-16-4	Diallate	00072-56-0	Perthane
00132-64-9	Dibenzofuran	00062-44-2	Phenacetin
00097-17-6	Dichlofenthion		Phosphorus, Orthophosphate
00099-30-9	Dichloran	00109-06-8	Picoline, alpha-
00087-65-0	2,6-Dichlorophenol	07440-06-4	Platinum, Total
00062-73-7	Dichlorvos[1]	07440-09-7	Potassium, Total
00115-32-2	Dicofol	26399-36-0	Profluralin
00297-97-2	o,o-Diethyl-o-2-pyrazinyl phosphorothioate (Thionazin)	07287-19-6	Prometryn
00060-51-5	Dimethoate	23950-58-5	Pronamide
00057-97-6	7,12-Dimethylbenz(a)anthracene	00107-12-0	Propionitrile
00123-91-1	1,4-Dioxane; diethylene dioxide	00114-26-1	Propoxur
00078-34-2	Dioxathion[1]	07440-15-5	Rhenium
00330-54-1	Diuron	07440-16-6	Rhodium, Total
55283-68-6	Ethalfluralin	00299-84-3	Ronnel
00563-12-2	Ethion[1]	07440-18-8	Ruthenium, Total
00097-63-2	Ethyl methacrylate	00094-59-7	Safrole
00062-50-0	Ethyl methane sulfonate	26259-45-0	Secbumeton
02593-15-9	Etridiazole	01982-49-6	Siduron
00052-85-7	Famphur[1]	07631-86-9	Silica, Dissolved
68876-78-8	Fecal Streptococci	01014-70-6	Simetrin
00115-90-2	Fensulfothion	00961-11-5	Stirofos
00055-38-9	Fenthion (Baytex)[1]	08001-50-1	Strobane[1]
00101-42-8	Fenuron	01918-18-9	Swep
04482-55-7	Fenuron-TCA	05915-41-3	Terbuthylazine
00050-00-0	Formaldehyde	00886-50-0	Terbutryn
07440-57-5	Gold, Total	00058-90-2	2,3,4,6-Tetrachlorophenol
03389-71-7	Hexachlorobicycloheptadiene	03689-24-5	Tetraethyl dithiopyrophosphate
07439-88-5	Iridium, Total	43121-43-3	Triadimefon
00078-83-1	Isobutyl alcohol	00327-98-0	Trichloronate
00120-58-1	Isosafrole	00095-95-4	2,4,5-Trichlorophenol
00128-03-0	KN Methyl	32534-95-5	2,4,5-Trichlorophenoxyacetic acid, isooctyl ester
00330-55-2	Linuron	41814-78-2	Tricyclazole
26544-20-7	MCPA isooctyl ester	00126-68-1	o,o,o-Triethylphosphorothioate
00950-10-7	Mephosfolan	00108-05-4	Vinyl acetate
00137-42-8	Metham	38714-47-5	ZAC (Zinc ammonium carbonates, etc)

Notes: 1. These pollutants either have FDA fish flesh concentration limits, are identified as Bioaccumulative Chemicals of Concern (BCCs), or are restricted pesticides. Any quantity of these chemicals used, produced, stored, distributed or otherwise disposed of by your facility must be reported on the ICS Form. See Item 19 on page 6 of these instructions for more information.

TABLE 9
Other Significant Pollutants with NYSDEC Standards/Guidance Values

Identify any of the pollutants listed below that are believed present in the discharge from any outfall at your facility on the Industrial Chemical Survey form. No USEPA/NYSDEC analytical methods have been promulgated for the pollutants in Table 9. Provide analytical results, if available, as directed in Section III Items 2.A.i. and ii. of the instructions or as an attachment to this application.

CAS Number	Pollutant Name
00079-06-1	Acrylamide
00079-10-7	Acrylic acid
01646-88-4	Aldicarb sulfone
01646-87-3	Aldicarb sulfoxide
68391-01-5	Alkyl dimethyl benzyl ammonium chloride
	Alkyl diphenyl oxide sulfonates
00095-84-1	2-Amino-para-cresol
02835-99-6	4-Amino-meta-cresol
02835-95-2	5-Amino-ortho-cresol
	Aminomethylene phosphonic acid salts
26445-05-6	Aminopyridine
00504-29-0	2-Aminopyridines
00462-08-8	3-Aminopyridines
00504-24-5	4-Aminopyridines
00108-44-1	3-Aminotoluene
00106-49-0	4-Aminotoluene
00100-66-3	Anisole
	Aryltriazoles
00103-33-3	Azobenzene
00098-87-3	Benzal chloride
00271-61-4	Benzisothiazole
00098-07-7	Benzoic trichloride
25973-55-1	2-(2-hydroxy-3,5-di-tert-pentylphenyl)Benzotriazole
00092-52-4	1,1'-Biphenyl
00542-88-1	Bis(chloromethyl)ether
	Boric acid, Borates and Metaborates
00108-86-1	Bromobenzene
00074-97-5	Bromochloromethane
31600-69-8	4-(1-methylethoxy)-1-Butanol
15798-64-8	cis-2-Butenal
00123-73-9	trans-2-Butenal
01190-76-7	cis-2-Butenenitrile
00627-26-9	trans-2-Butenenitrile
00112-34-5	Butoxyethoxyethanol
05131-66-8	Butoxypropanol
	Butyl isopropyl phthalate
02008-41-5	Butylate
00104-51-8	n-Butylbenzene
00135-98-8	sec-Butylbenzene
00098-06-6	tert-Butylbenzene
05234-68-4	Carboxin
00133-90-4	Chloramben
00118-75-2	Chloranil
	Chlorinated dibenzofurans
00460-35-5	3-Chloro-1,1,1-trifluoropropane
00095-69-2	4-Chloro-o-toluidine
00095-79-4	5-Chloro-o-toluidine
00095-51-2	2-Chloroaniline
00108-42-9	3-Chloroaniline
00098-56-6	4-Chlorobenzotrifluoride
00109-69-3	1-Chlorobutane
00107-30-2	Chloromethyl methyl ether
00088-73-3	2-Chloronitrobenzene
00121-73-3	3-Chloronitrobenzene
00100-00-5	4-Chloronitrobenzene
01897-45-6	Chlorothalonil
00095-49-8	2-Chlorotoluene
00108-41-8	3-Chlorotoluene
00106-43-4	4-Chlorotoluene
00506-68-3	Cyanogen bromide
00506-77-4	Cyanogen chloride
13560-89-9	Dechlorane Plus [1]
08065-48-3	Demeton (Systox)
00103-23-1	Di(2-ethylhexyl)adipate
10222-01-2	2,2-Dibromo-3-nitrilopropionamide
03252-43-5	Dibromoacetonitrile
00583-53-9	1,2-Dibromobenzene
00108-36-1	1,3-Dibromobenzene
00106-37-6	1,4-Dibromobenzene
00594-18-3	Dibromodichloromethane
01476-11-5	cis-1,4-Dichloro-2-butene
00328-84-7	3,4-Dichlorobenzotrifluoride
00075-71-8	Dichlorodifluoromethane
00075-43-4	Dichlorofluoromethane
00078-99-9	1,1-Dichloropropanes
00142-28-9	1,3-Dichloropropanes
00594-20-7	2,2-Dichloropropanes
00563-58-6	1,1-Dichloropropene
00098-87-3	α,α-Dichlorotoluene
32768-54-0	2,3-Dichlorotoluenes
00095-73-8	2,4-Dichlorotoluenes
19398-61-9	2,5-Dichlorotoluenes
00118-69-4	2,6-Dichlorotoluenes
00095-75-0	3,4-Dichlorotoluenes
25186-47-4	3,5-Dichlorotoluenes
00076-12-0	1,2-Difluoro-1,1,2,2-tetrachloroethane
00100-18-5	1,4-Diisopropyl benzene
00577-55-9	1,2-Diisopropylbenzene
00099-62-7	1,3-Diisopropylbenzene
00121-69-7	N,N-Dimethyl aniline
01861-32-1	Dimethyl tetrachloroterephthalate
00087-59-2	2,3-Dimethylaniline
00095-68-1	2,4-Dimethylaniline
00095-78-3	2,5-Dimethylaniline
00087-62-7	2,6-Dimethylaniline
00095-64-7	3,4-Dimethylaniline
00108-69-0	3,5-Dimethylaniline
01875-92-9	Dimethylbenzylammonium chloride
00538-39-6	4,4'-Dimethylbibenzyl
04957-14-6	4,4'-Dimethyldiphenylmethane
05197-80-8	Dimethylethylbenzylammonium chloride
00068-12-2	Dimethylformamide
25321-14-6	Dinitrotoluene (mixed isomers)
00602-01-7	2,3-Dinitrotoluene
00619-15-8	2,5-Dinitrotoluene
00610-39-9	3,4-Dinitrotoluene
00618-85-9	3,5-Dinitrotoluene
00957-51-7	Diphenamid
00530-50-7	1,1-Diphenylhydrazines
00085-00-7	Diquat dibromide
02439-10-3	Dodecylguanidine acetate
13590-97-1	Dodecylguanidine hydrochloride
00479-18-5	Dyphilline
00145-73-3	Endothall
53494-70-5	Endrin ketone
00107-07-3	Ethylene chlorohydrin
00075-21-8	Ethylene oxide
00096-45-7	Ethylenethiourea
00133-07-3	Folpet
00093-14-1	Guaifenesin
06108-10-7	Hexachlorocyclohexanes (epsilon)
00302-01-2	Hydrazine
07783-06-4	Hydrogen sulfide
00123-31-9	Hydroquinone
02809-21-4	1-Hydroxyethylidene-1,1-diphosphonic acid
29761-21-5	Isodecyl diphenyl phosphate

TABLE 9

Other Significant Pollutants with NYSDEC Standards/Guidance Values (continued)

00098-82-8	Isopropylbenzene
00527-84-4	2-Isopropyltoluene
00535-77-3	3-Isopropyltoluene
00099-87-6	4-Isopropyltoluene
	Isothiazolones, total
	Linear alkylbenzene sulfonates
00149-30-4	Mercaptobenzothiazole
00079-41-4	Methacrylic acid
04013-34-7	[1-Methoxyethyl]benzene
03558-60-9	[2-Methoxyethyl]benzene
	Methylbenz(a)anthracenes
06217-18-6	Methylene bisthiocyanate
00101-14-4	4,4'-Methylene-bis-(2-chloroaniline)
00101-61-1	4,4'-Methylene-bis-(N,N'-dimethyl)aniline
01807-55-2	4,4'-Methylene-bis-(N-methyl)aniline
00126-39-6	2-Methylethyl-1,3-dioxolane
00611-15-4	2-Methylstyrene
00100-80-1	3-Methylstyrene
00622-97-9	4-Methylstyrene
00098-83-9	α-Methylstyrene
00100-61-8	N-Methylaniline
00098-92-0	Niacinamide
04726-14-1	Nitralin
00139-13-9	Nitrilotriacetic acid
00088-72-2	2-Nitrotoluene
00099-08-1	3-Nitrotoluene
00099-99-0	4-Nitrotoluene
04685-14-7	Paraquat
40487-42-1	Pendimethalin
00101-84-8	Phenyl ether
00637-50-3	3-Phenyl-1-propene
00766-90-5	cis-1-Phenyl-1-propene
00873-66-5	trans-1-Phenyl-1-propene
00095-54-5	1,2-Phenylenediamine
00108-45-2	1,3-Phenylenediamine
00100-63-0	Phenylhydrazine
14838-15-4	Phenylpropanolamine
01918-02-1	Picloram
59536-65-1	Polybrominated biphenyls (PBBs)
00709-98-8	Propanil
00103-65-1	n-Propylbenzene
	Quaternary ammonium compounds
07440-24-6	Strontium 90
34014-18-1	Tebuthiuron
00634-66-2	1,2,3,4-Tetrachlorobenzenes[1]
00634-90-2	1,2,3,5-Tetrachlorobenzenes
02136-79-0	Tetrachloroterephthalic acid
05216-25-1	α,α,α,4-Tetrachlorotoluene
00109-99-9	Tetrahydrofuran
00058-55-9	Theophylline
00137-26-8	Thiram
00095-80-7	Toluene-2,4-diamine
00095-70-5	Toluene-2,5-diamine
00823-40-5	Toluene-2,6-diamine
29385-43-1	Tolyltriazole
00615-54-3	1,2,4-Tribromobenzene
00056-35-9	Tributyltin oxide
00634-93-5	2,4,6-Trichloroaniline
00087-61-6	1,2,3-Trichlorobenzenes
00108-70-3	1,3,5-Trichlorobenzenes
00075-69-4	Trichlorofluoromethane
00093-72-1	2,4,5-Trichlorophenoxypropionic acid (Silvex)[1]
00598-77-6	1,1,2-Trichloropropane
13116-57-9	cis-1,2,3-Trichloropropene
13116-58-0	trans-1,2,3-Trichloropropene
07359-72-0	2,3,4-Trichlorotoluene
56961-86-5	2,3,5-Trichlorotoluene
02077-46-5	2,3,6-Trichlorotoluene
06639-30-1	2,4,5-Trichlorotoluene
23749-65-7	2,4,6-Trichlorotoluene
00098-07-7	α,α,α-Trichlorotoluene
00088-66-4	α,α,2-Trichlorotoluene
00094-99-5	α,2,4-Trichlorotoluene
13940-94-8	α,α,4-Trichlorotoluene
02014-83-7	α-2,6-Trichlorotoluene
00102-47-6	α-3,4-Trichlorotoluene
26523-64-8	Trichlorotrifluoroethanes
00354-58-5	1,1,1-Trichloro-2,2,2-trifluoroethane
00076-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane
00108-67-8	Trimethylbenzenes
00526-73-8	1,2,3-Trimethylbenzenes
00095-63-6	1,2,4-Trimethylbenzenes
00108-67-8	1,3,5-Trimethylbenzenes
25551-13-7	Trimethylbenzenes (mixed isomers)
01463-84-6	2,3,6-Trimethylpyridines
00108-75-8	2,4,6-Trimethylpyridines
00602-29-9	2,3,4-Trinitrotoluene
18292-97-2	2,3,6-Trinitrotoluene
00610-25-3	2,4,5-Trinitrotoluene
00118-96-7	2,4,6-Trinitrotoluene
00603-15-6	3,4,5-Trinitrotoluene
00115-86-6	Triphenyl phosphate
10028-17-8	Tritium
	Uranyl Ion

For discharges to groundwater, also include any substances to which the Principal Organic Contaminant (POC) groundwater standard applies. The POC groundwater standard includes the following classes of compounds: (1) Halogenated alkanes (includes those compounds identified by *Freon, Genatron, Halon, CFC-* and *HCFC-* prefixes in their product names); (2) Halogenated ethers; (3) Halobenzenes and substituted halobenzenes; (4) Benzene and alkyl- or nitrogen-substituted benzenes; (5) Substituted unsaturated hydrocarbons (i.e. straight or branched chain unsaturated hydrocarbon containing one of the following: halogen, aldehyde, nitrile, amide); (6) Halogenated non-aromatic cyclic hydrocarbons. See 6NYCRR Section 700.1 for additional information.

Notes: 1. These pollutants either have FDA fish flesh concentration limits, are identified as Bioaccumulative Chemicals of Concern (BCCs), or are restricted pesticides. Any quantity of these chemicals used, produced, stored, distributed or otherwise disposed of by your facility must be reported on the ICS Form. See Item 19 on page 6 of these instructions for more information.

TABLE 10

Other Pollutants and Hazardous Substances Required to be Identified in ICS by Applicants if Present at Facility in Significant Levels

Abamectin [Avermectin B1]
Acephate
Acetic Acid
Acetic anhydride
Acetone cyanohydrin
Acetyl bromide
Acetyl chloride
Acid Compounds
Acifluorfen, sodium salt
Adipic acid
Alkalinity, Carbonate, as CaCO3
d-trans-Allethrin
Allyl alcohol
Allylamine
Aluminum oxide (fibrous form)
Aluminum phosphide[1]
Aluminum sulfate
1-Amino-2-methylanthraquinone
2-Aminoanthraquinone
4-Aminoazobenzene
Amitraz
Amitrole
Ammonium acetate
Ammonium benzoate
Ammonium bicarbonate
Ammonium bichromate
Ammonium bifluoride
Ammonium bisulfite
Ammonium carbamate
Ammonium carbonate
Ammonium chloride
Ammonium chromate
Ammonium citrate
Ammonium fluoride
Ammonium fluoroborate
Ammonium hydroxide
Ammonium nitrate (solution)
Ammonium oxalate
Ammonium silicofluoride
Ammonium sulfamate
Ammonium sulfate (solution)
Ammonium sulfide
Ammonium sulfite
Ammonium tartrate
Ammonium thiocyanate
Ammonium thiosulfate
Amyl acetate
Anilazine
ortho-Anisidine hydrochloride
ortho-Anisidine
para-Anisidine
Antimony pentachloride
Antimony potassium tartrate
Antimony tribromide
Antimony trichloride
Antimony trifluoride
Antimony trioxide
Arsenic disulfide
Arsenic pentoxide
Arsenic trichloride
Arsenic trioxide
Arsenic trisulfide
Avitrol[1]
Azodrin[1]
1-(3-Chloroallyl)-3,5,7-triaza-1-Azoniaadamantane chloride
Bandane[1]
Barium cyanide
Bendiocarb
Bentazon
Benzaldehyde
Benzamide
Benzeneacetic acid
1,2-Benzenedicarboxaldehyde
Benzenepropanoic acid
Benzo(e)pyrene
Benzo(j)fluoranthene
Benzo(rst)pentaphene
Benzoic acid
Benzoic acid
Benzoic acid, ammonium salt
Benzonitrile
2-(Thiocyanomethyltrio)Benzothiazole
Benzoyl chloride
Benzoyl peroxide
Beryllium chloride
Beryllium fluoride
Beryllium nitrate
Bidrin[1]
Bifenthrin
Bis(2-chloro-1-methylethyl)ether
1,3-Bis(methylisocyanate)cyclohexane
1,4-Bis(methylisocyanate)cyclohexane
Bis(pentabromophenyl)ether
Bismuth, Total
Bomyl[1]
Boron trichloride
Boron trifluoride
Brodifacoum (Talon)[1]
Bromacil, lithium salt
Bromadialone (Maki)[1]
Bromethalin[1]
Bromine
1-Bromo-1-(bromomethyl)-1,3-propane dicarbonitrile
Bromophos
Bromoxynil
Bromoxynil octanoate
Bronopol
Brucine
1,3-Butadiene
1-Butanol
Butyl acrylate
sec-Butyl alcohol
Butylacetate
Butylamine
N-Butylbenzene sulfonamide
4,4-Butyldenebis-(6-T-butyl-M-cresol)
1,2-Butylene oxide
N-Butylphthalate
Butyraldehyde
Butyric acid
4-(4-Chloro-2-methylphenoxy) Butyric
C.I. Acid Green 3
C.I. Acid Red 114
C.I. Basic Green 4
C.I. Basic Red 1
C.I. Direct Black 38
C.I. Direct Blue 218
C.I. Direct Blue 6
C.I. Direct Brown 95
C.I. Disperse Yellow 3
C.I. Food Red 15
C.I. Food Red 5
C.I. Solvent Orange 7
C.I. Solvent Yellow 14
C.I. Solvent Yellow 3
C.I. Solvent Yellow 34 (Auramine)
C.I. Vat Yellow 4
Cacodylic acid
Cadmium acetate
Cadmium bromide
Cadmium chloride
Calcium arsenate
Calcium arsenite
Calcium carbide
Calcium chromate
Calcium cyanamide
Calcium cyanide[1]
Calcium dodecvlbenzenesulfonate
Calcium hypochlorite
Caprolactam
Captafol
Carbamates
Carbazole
Carbonyl sulfide
Catechol
Chinomethionat
Chloral
Chlorendic Acid
Chlorfenvinphos (Birlane)[1]
Chlorimuron ethyl
Chlorine
Chlorine dioxide
3-Chloro-2-methyl-1-propene
4-Chloro-3,5-dimethylphenol
Chloroacetic acid
2-Chloroacetophenone
4-Chlorobenzoic acid
Chlorophacinone (Rozol)[1]
para-Chlorophenyl isocyanate
Chloropicrin[1]
3-Chloropropionitrile
Chlorosulfonic acid
Chlorotetrafluoroethane
Chlorothymol
Chlorsulfuron
Cholecalciferol (Quintox)[1]
Chromic acetate
Chromic acid
Chromic sulfate
Chromous chloride
Cimectacarb
Clopyralid
Cobaltous bromide
Cobaltous formate
Cobaltous sulfamate
Creosote
para-Cresidine
Crotonaldehyde
Cupferron
Cupric acetate
Cupric acetoarsenite
Cupric chloride
Cupric nitrate
Cupric oxalate
Cupric sulfate
Cupric sulfate ammoniated
Cupric tartrate
Cyanogen chloride
Cycloate
Cyclohexamide (Actidone)[1]
Cyclohexane
1,4-Cyclohexane diisocyanate
Cyclohexanol
Cyclohexanone
Cyclohexanone oxime
Cyclohexene
Cyclohexylamine
Cyclopentanone
Cyclotrimethylenetrinitramine
Cyfluthrin
Cyhalothrin
2,4-DP
Daminozide (Alar)[1]
Dasanit[1]
Dazomet
Dazomet, sodium salt
Decanal
2,4-Diaminoanisole sulfate
2,4-Diaminoanisole
4,4'-Diaminodiphenyl ether
Diaminotoluene (mixed isomers)
Dibenz(a,h)acridine
Dibenz(a,j)acridine
Dibenzo(a,e)fluoranthene
Dibenzo(a,e)pyrene
Dibenzo(a,h)pyrene
Dibenzo(a,l)pyrene
Dibenzo(c,g)carbazole, 7H-
Dibutyltin chloride
Dibutyltin dilaurate
Dichlobenil
Dichlone
2,3-Dichloro-1,4-napthoquinone (Dichlone)
1,4-Dichloro-2-butene
3,3'-Dichlorobenzidine dihydrochloride
3,3'-Dichlorobenzidine sulfate
1,4-Dichlorobutane
Dichlorophene
2,3-Dichlorophenol
2,4-Dichlorophenoxyacetic acid (2,4-D),
2,4-Dichlorophenoxyacetic acid (2,4-D),
2,4-Dichlorophenoxyacetic acid (2,4-D),
2,4-Dichlorophenoxyacetic acid (2,4-D),
2,4-Dichlorophenoxyacetic acid (2,4-D),
2,4-Dichlorophenoxyacetic acid (2,4-D),
2,4-Dichlorophenoxyacetic acid (2,4-D),
2,4-Dichlorophenoxyacetic acid (2,4-D),
2,4-Dichlorophenoxyacetic acid (2,4-D),
2,3-Dichloropropene
2,2-Dichloropropionic acid
Dichlorotetrafluoroethane (CFC-114)
α,α-Dichlorotoluene
Diclofop methyl
Dicyclohexylamine
Dicyclopentadiene
Diepoxybutane
Diethanolamine
Diethatyl ethyl
Diethyl formamide
Diethyl maleate
Diethyl mercury
Diethyl sulfate
Diethylamine
Diethylaminoethanol
Diethyldiisocyanatobenzene
Diethylene glycol
Diethylene glycol monoethyl ether
Diethylhexylphthalate isomer
Diethyltin dycaprylate
Diflubenzuron[1]
Diglycidyl resorcinol ether
2,3-Dihydro-1,6-dimethyl-1H-indene
2,3-Dihydro-1-methyl-1H-indene
Dihydrosafrole
4,4'-Diisocyanatodiphenyl ether
2,4'-Diisocyanatodiphenyl sulfide
Diisopropyl ether
Diisopropylamine
Dimethipin
3,3'-Dimethoxybenzidine dihydrochloride,
3,3'-Dimethoxybenzidine hydrochloride,
3,3'-Dimethoxybenzidine,
3,3'-Dimethoxybenzidine-4,4'-diisocyanate
Dimethyl chlorothiophosphate
trans-1,4-Dimethyl cyclohexane
Dimethyl sulfate
2,2-Dimethyl-2,3-Dihydro-7-Benzofuranol
3,3'- Dimethyl-4,4'-diphenylene diisocyanate
Dimethylamine
Dimethylamine dicamba
3,3'- Dimethylbenzidine dihydrochloride
3,3'-Dimethylbenzidine dihydrofluoride
Dimethylcarbamyl chloride
Dimethyldichlorosilane
Dimethyldioxane
3,3'-Dimethyldiphenylmethane-4,4'-diisocyanate
Dimethyldithiocarbamate
2,5-Dimethylfuran
1,1-Dimethylhydrazine
1,2-Dimethylhydrazine
2,6-Dimethylphenol
Dimethylphenylcarbinol
Dimethylterephthalate
ortho-Dinitrobenzene
para-Dinitrobenzene
Dinitrophenol[1]
Dinocap
Diphacinone[1]
Dipotassium endothall
Dipropyl isocinchomeronate
Diquat
Disodium cyanodithioimidocarbonate
Di-Syston[1]
2,4-Dithiobiuret
Dithiocarbamate
Dodecanoic acid

2-ethylhexyl ester

TABLE 10 (Ctd.)

Other Pollutants and Hazardous Substances Required to be Identified in ICS by Applicants if Present at Facility in Significant Levels

Dodecene-4
Dodecylbenzesulfonic acid
Dyphonate[1]
EDTA
EDTA, Ammoniated
EPN[1]
Epichlorohydrin
Ethoprop[1]
2-Ethoxyethanol
2-Ethoxyethanol acetate
Ethyl acetate
Ethyl acrylate
Ethyl chloroformate
Ethyl di-n-propylthiocarbamate (EPTC)
Ethyl ether
Ethyl mercuric chloride
Ethylene
Ethylene cyanohydrin
Ethylene dichloride
Ethylene glycol dinitrate
Ethylenediamine
Ethyleneimine (Aziridine)
Fenamiphos[1]
Fenarimol
Fenbutatin oxide
Fenoxaprop ethyl
Fenoxycarb
Fenpropathrin
Fenvalerate
Ferric ammonium citrate
Ferric ammonium oxalate
Ferric chloride
Ferric fluoride
Ferric nitrate
Ferric sulfate
Ferricyanide
Ferrocyanide
Ferrous ammonium sulfate
Ferrous sulfate
Ferrous chloride
Fluazifop butyl
Fluoride, Complex
Fluoride, Free
Fluorine
Fluoroborates
Fluorouracil
Fluvalinate
Fomesafen
Formetanate hydrochloride (Carazol SP)[1]
Formic acid
Fumaric acid
Fumarin[1]
Furan
Furazolidone
Furfural
Furium
Glycidaldehyde
Guthion[1]
n-Heptane
1-Heptanol
2-Heptanol
3-Heptanol
4-Heptanol
Hexachloronaphthalene
Hexamethyl benzene
Hexamethylene diamine
Hexamethylene-1,6-diisocyanate
Hexamethylphosphoramide
Hexanate
n-Hexane
3-Hexanone
Hydramethylnon
Hydrazine sulfate
Hydrochloric acid
Hydrofluoric acid
Hydrogen cyanide
Hydrogen fluoride
Hydrogen peroxide
α-Hydroxy-α-methylbenzeneacetic acid
3-Hydroxycarbofuran
1-Hydroxyethylidene
Hydroxyquinoline, total
Imazalil
Iodide (as I)

3-Iodo-2-propynyl butylcarbamate
Iron pentacarbonyl
1,3-Isobenzofurandione
1,(3H)-Isobenzofuranone
Isobutyraldehyde
Isofenphos[1]
Isophorone diisocyanate
Isoprene
Isopropanolamine
dodecylbenzenesulfonate
Isopropyl alcohol
Isopropylamine
Isopropylbenzene hydroperoxide
4,4'-Isopropylidenediphenol
Karbutilate
Kelthane
Lactofen
Lanthanum, Total
Lead acetate
Lead arsenate
Lead chloride
Lead flourite
Lead fluoborate
Lead iodide
Lead nitrate
Lead stearate
Lead sulfate
Lead sulfide
Lead thiocyanate
Lethane 384[1]
Lithium carbonate
Lithium chromate
Lithium, Total
2,5-Lutidine
Magnesium phosphide[1]
Maleic anhydride
Maleic hydrazide
Malononitrile
Mercaptodimethur
Mercuric cyanide
Mercuric nitrate
Mercuric sulfate
Mercuric thiocyanate
Mercurous nitrate
Merphos
Methacrylamide
Methacrylate
Methanol
Methazole
Methoprene1
Methoxone sodium salt
2-Methoxy-5-nitroaniline
2-Methoxyethanol acetate
2-Methoxyethanol
Methoxypropylamine
Methyl acetate
2-Methyl benzene sulfonamide
Methyl chlorocarbonate
Methyl isobutyl ketone
Methyl isocyanate
Methyl isothiocyanate
Methyl mercaptan
Methyl mercury
Methyl tert-butyl ether
2-Methyl-2-propanol
1-Methyl-4-(1-methyethenyl)cyclohexene
Methylamine
2-Methylanthracene
9-Methylanthracene
2-Methylbenzaldehyde
3-Methylbenzaldehyde
4-Methylbenzaldehyde
4-Methylbenzene sulfonamide
4-Methylbenzenemethanol
2-Methylbenzoic acid
3-Methylbenzoic acid
5-Methylchrysene
Methylcyclopentane
4-Methyldiphenylmethane-3,4-
diisocyanate
1,1-Methylene
bis(4-isocyanatocyclohexane)
Methylenebis(phenylisocyanate) (MDI)
4,4'-Methylenedianiline

1-Methylnaphthalene
Methylolmethacrylamide
Methylphthalate
Methyltrichlorosilane
Metiram
Metolachlor
Michler's ketone
Molinate
Molybdenum trioxide
Monitor[1]
Monochlorobenzyl trifluoride
Monoethylamine
Monomethylamine
Mustard gas
(1,1'-thiobis[2-chloro-]Ethane)
Myclobutanil
N-Methyl-2-pyrrolidone
N-Methylolacrylamide
N-Nitroso-N-methyl urea
N-Nitrosodi-N-butylamine
N-Nitrosodiethylamine
N-Nitrosomethylvinylamine
N-Nitrosonornicotine
1,5-Naphthalene diisocyanate
Naphthenic acid
α-Naphthyl thiourea[1]
Nickel ammonium sulfate
Nickel chloride
Nickel hydroxide
Nickel nitrate
Nickel sulfate
Nicotine alkaloid[1]
Nitrapyrin
Nitric acid
4-Nitrobiphenyl
Nitrocyclohexane
Nitrofen
Nitrofurans
Nitrofurantoin
Nitrofurazone
Nitrogen dioxide
Nitrogen mustard
Nitroglycerin
2-Nitropropane
1-Nitropyrene
para-Nitrosodiphenylamine
Nonanal
1-Nonanol
Norflurazon
Octachlorocyclopentene
Octachloronaphthalene
Octachlorostyrene[1]
Octamethylpyrophosphoramine
Oryzalin
Osmium tetroxide
Oxalic acid, benzyl ester
Oxydemeton methyl
Oxydiazon
Oxyfluorfen
Ozone
Paraformeldehyde
Paraldehyde
Paraquat dichloride
Pebulate
Pentac
Pentanate
Pentobarbital sodium
Peracetic acid
Perchloromethyl mercaptan
Permethrin[1]
Phenothrin
1,3-Phenylene diisocyanate
1,4-Phenylene diisocyanate
1,2-Phenylenediamine dihydrochloride
1,4-Phenylenediamine dihydrochloride
Phenylmercuric acetate
2-Phenylphenol
4-Phenylphenol
Phenytoin
Phosdrin[1]
Phosgene
Phosphamidon[1]
Phosphate, Ortho
Phosphate, as PO4

Phosphine
Phosphoric acid
Phosphorus oxychloride
Phosphorus pentasulfide
Phosphorus trichloride
Photomirex[1]
Phthalate Esters
Picric acid
Piperonyl butoxide
Pirimiphos methyl
Pival[1]
Polybutene(1-propene, 2-methyl
homopolymer)
Polymeric diphenylmethane diisocyanate
Polymethacrylic Acid
Potassium N-methyldithiocarbamate
Potassium arsenate
Potassium arsenite
Potassium bichromate
Potassium bromate
Potassium chromate
Potassium cyanide
Potassium hydroxide
Potassium permanganate
Prodiamine
Profenofos
Propane sultone
1-Propanol
Propargite
Propargyl alcohol
1-Propene
Propetamphos
Propiconazole
β-Propiolactone
Propionaldehyde
Propionic acid
Propionic anhydride
Propylene glycol
Propylene glycol monoethyl ether
Propylene glycol monomethyl ether
Propylene oxide
Propyleneimine
Pyrethrins
Quinoline
Quinone
1,4-Quinone dioxide
Quizalofop ethyl
Randox[1]
Reserpine
Resmethrin
Resorcinol
Rhodamine WT
Rotenone
Saccharin (manufacturing)
Schradan[1]
Selenium oxide
Sethoxydim
Sevin
Silver nitrate
Sodium
Sodium Molybdate
Sodium Nitrite
Sodium Sulfate
Sodium adipate, disodium salt
Sodium arsenate
Sodium arsenite
Sodium azide
Sodium bichromate
Sodium bifluoride
Sodium bisulfite
Sodium chromate
Sodium cyanide
Sodium dicamba
Sodium diethyldithiocarbamate
Sodium dodecylbenzenesulfonate
Sodium fluoride
Sodium fluoroacetate[1]
Sodium hydrosulfide
Sodium hydroxide
Sodium hypochlorite

TABLE 10 (Ctd.)

Other Pollutants and Hazardous Substances Required to be Identified in ICS by Applicants if Present at Facility in Significant Levels

Sodium methylate
Sodium nitrite
Sodium o-phenylphenoxide
Sodium pentachlorophenate
Sodium phosphate (tribasic)
Sodium selenite
Sodum phosphate (dibasic)
Strontium chromate
Strychnine[1]
Styrene oxide
Sulfotepp[1]
Sulfur moriochloride
Sulfuric acid
Sulfuryl fluoride (Vikane)[1]
Supracide[1]
Tellurium, Total
Temephos
Tetrachlorodiphenyl ethane (TDE)
Tetracycline hydrochloride
Tetraethyl leadTetraethyl pyrophosphate[1]
Tetraethyl tin
Tetramethrin
1,2,4,5-Tetramethylbenzene
Thallium sulfate
2-(4-Thiazolyl)-1H-benzimidazole
Thioacetamide
Thiobencarb
Thiocyanate
4,4'-Thiodianiline
Thiodicarb
Thiofanox
Thiophanate ethyl
Thiophanate methyl
Thiosemicarbazide
Thiourea
Thorium dioxide
Titanium tetrachloride
Toluene diisocyanate
Toluene-2,6-diisocyanate
ortho-Toluidine hydrochloride
Tri-N-butyl phosphate
Triallate
Tribenuron methyl
Tributyltin[1]
Tributyltin fluoride
Tributyltin methacrylate
S,S,S-Tributyltrithiophosphate (DEF)
Trichlorfon
Trichloroacetyl chloride
Trichlorofon
2,4,5-Trichlorophenoxy acetic acid,
2,4,5-Trichlorophenoxy acetic acid salts
Trichlorophenoxy propanoic acid
(2,4,5-TP), esters
α,α,α-Trichlorotoluene
Triclopyr triethylammonium salt
Triethanolamine
dodecylbenzenesulfonate
Triethylamine
Triforine
Trimethyl phosphate
Trimethylamine
1,3,5-Trimethylbenzene
Trimethylchlorosilane
3,3,5-Trimethylcyclohexanone
2,2,4-Trimethylhexamethylene
diisocyanate
2,4,4-Trimethylhexamethylene
diisocyanate
2,3,5-Trimethylphenyl methylcarbamate
Triphenyltin chloride
Tris(2,3-dibromopropyl) phosphate
Trypan blue
Uranyl acetate
Uranyl nitiate
Urethane (Ethyl carbamate)
Valone (PMP)[1]
Vanadium pentoxide
Vernolate
Vinclozolin
Vinylidene chloride
Vinyl bromide
Vinyl fluoride
Vanadyl sulfate
Warfarin[1]
Zinc acetate
Zinc ammonium chloride
Zinc borate
Zinc bromide
Zinc carbonate
Zinc chloride
Zinc fluoride
Zinc formate
Zinc hydrosulfite
Zinc nitrate
Zinc phenolsulfonate
Zinc phosphide[1]
Zinc silicofluoride
Zinc sulfate
Zirconium nitrate
Zirconium potassium flouride
Zirconium sulfate
Zirconium tetrachloride
Zinc cyanide
Zinophos[1]

Notes: 1. These pollutants either have FDA fish flesh concentration limits, are identified as Bioaccumulative Chemicals of Concern (BCCs), or are restricted pesticides. Any quantity of these chemicals used, produced, stored, distributed or otherwise disposed of by your facility must be reported on the ICS Form. See Item 19 on page 6 of these instructions for more information.

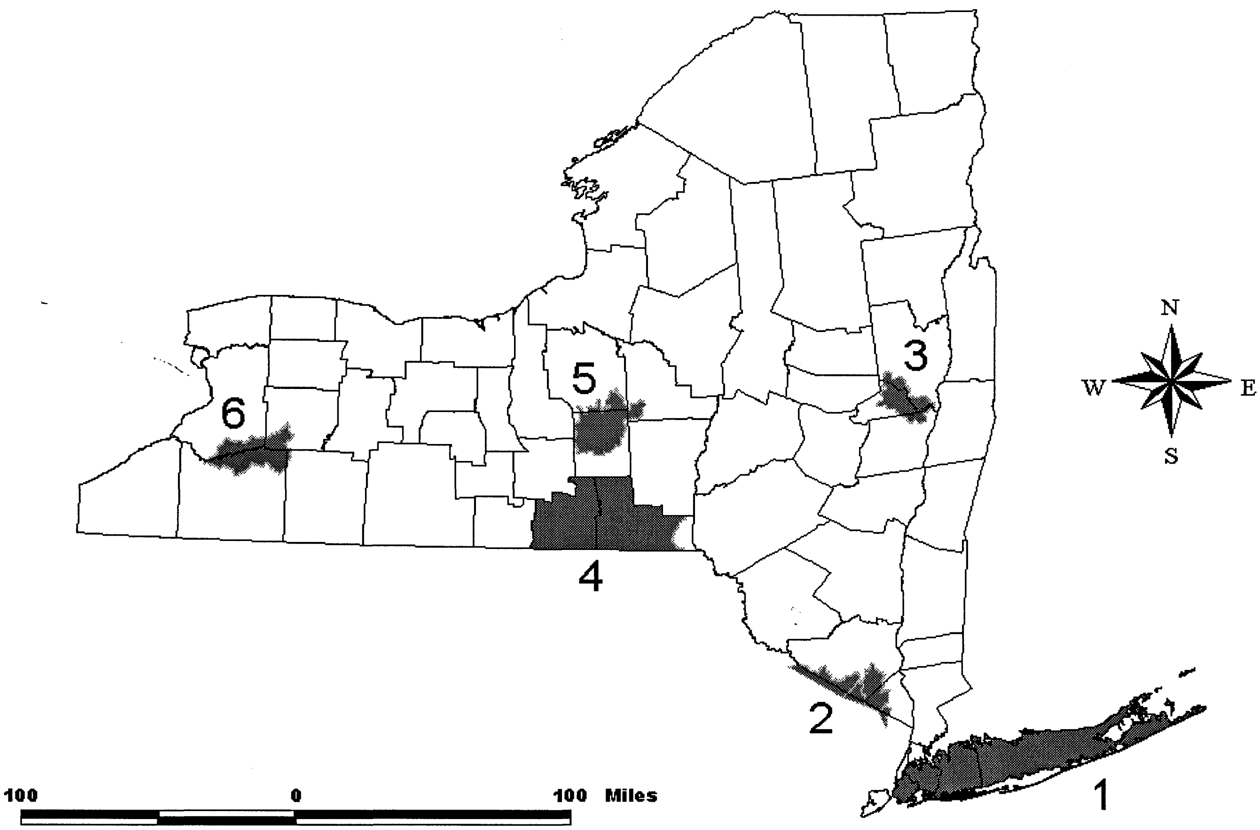


Figure 2

Locations and Identifying Citation Numbers of USEPA Designated Sole Source Aquifers Within New York State

Code	DEC Region(s)	Sole Source Aquifer Name	Located in All or Part of these counties:	Federal Register Citation Reference	Publication Date
1	2	Brooklyn/Queens Aquifer System	Kings (all), Queens (all)	49FR2950	1/24/1984
1	1	Nassau/Suffolk Aquifer System	Nassau (all), Suffolk (all)	43FR26611	6/21/1978
2	3	Highlands Aquifer System	Orange (part)	52FR37213	10/05/1987
2	3	Northwest New Jersey Fifteen Basin Aquifer System	Orange (part)	53FR23685	6/23/1998
2	3	Ramapo River Basin Aquifer Systems	Orange (part), Rockland (part)	57FR39201	8/28/1992
2	3	Ridgewood Area Aquifer System	Rockland (part)	49FR2943	1/24/1984
3	4,5	Schenectady/Niskayuna Aquifer System	Albany (part), Saratoga (part), Schenectady (part)	50FR2022	1/14/1985
4	7	Clinton Street - Ballpark Aquifer System	Broome (part), Tioga (all)	50FR2025	9/25/1987
5	7	Cortland-Homer-Preble Aquifer System	Cortland (part), Madison (part), Onondaga (part)	53FR22045	6/13/1998
6	9	Cattaragus Creek Aquifer System	Allegany (part), Cattaragus (part), Erie (part), Wyoming (part)	52FR36100	9/25/1987

More detailed information concerning the areal extent of the above sole source aquifers can be obtained from:
USEPA Region 2, 290 Broadway, New York, NY 10007-1866 or via the Internet at www.epa.gov/region02/water/ssamap.htm

Section I - Permittee and Facility Information

Please type or print the requested information.

1. Current Permit Information (leave blank if for new discharge)

SPDES Number:	DEC Number:

2. Permit Action Requested: (Check applicable box)

- [X] A **NEW** proposed discharge
- [ ] An **EBPS INFORMATION REQUEST** response
- [ ] A **RENEWAL** of an existing SPDES permit
- [ ] A **MODIFICATION** of the existing permit
- [ ] An **EXISTING** discharge currently without permit

Does this request include an increase in the quantity of water discharged from your facility to the waters of the State?

- [ ] **YES** - Describe the increase:
- [ ] **NO** - Go to Item 3. below.

3. Permittee Name and Address

Name CROSSROADS VENTURES, LLC		Attention DEAN GITTER, PRESIDENT
Street Address 72 ANDREWS LANE ROAD, PO BOX 267		
City or Village MT. TREMPER	State NY	ZIP Code 12457

4. Facility Name, Address and Location

Name BELLEAYRE RESORT AT CATSKILL PARK				
Street Address NYS RTE. 28 AND CO. RTE. 49A			P.O. Box 200	
City or Village Highmount		State NY	ZIP Code 12441	
Town SHANDAKEN & MIDDLETOWN		County	ULSTER & DELAWARE	
Telephone 845/688-7740	FAX 845/688-6887		NYTM - E	NYTM - N 4
Tax Map Info (New York City, Nassau County and Suffolk County only)				
Section	Block	Subblock		Lot

5. Facility Contact Person

Name DEAN GITTER, CROSSROADS VENTURES, LLC		Title PRESIDENT	
Street Address 72 ANDREWS LANE ROAD			P.O. Box 267
City or Village MT. TREMPER		State NY	ZIP Code 12457
Telephone 845/688-7740	FAX 845/688-6887	E-Mail or Internet	

6. Discharge Monitoring Report (DMR) Mailing Address

Mailing Name CROSSROADS VENTURES, LLC			
Street Address 72 ANDREWS LANE ROAD			P.O. Box 267
City or Village MT. TREMPER		State NY	ZIP Code 12457
Telephone 845/688-7740	FAX 845-688-6887	E-Mail or Internet	
Name and Title of person responsible for signing DMRs DEAN GITTER, PRESIDENT		Signature	

INDUSTRIAL APPLICATION FORM NY-2C
Section I - Permittee and Facility Information

Facility Name: BELLEAYRE RESORT AT CATSKILL PARK	SPDES Number:

7. Summarize the outfalls present at the facility: SEE ATTACHED SPREADSHEET ENTITLED "BELLEAYRE RESORT STORMWATER BASIN DISCHARGE ROUTES" THAT ACCOMPANIES AN OCTOBER 7, 2003 LETTER TO NYSDEC

Outfall Number	Receiving Water	Type of discharge
SEE SPREADSHEET	TRIB 2 EMORY BROOK	STORMWATER
SEE SPREADSHEET	GROUNDWATER	STORMWATER

8. Map of Facility and Discharge Locations:

Provide a detailed map showing the location of the facility, all buildings or structures present, wastewater discharge systems, outfall locations into receiving waters, nearby surface water bodies, water supply wells, and groundwater monitoring wells, and attach it to this application. Also submit proof, either by indication on the map or other documentation, that a right of way for the discharges exists from the facility property to a public right of way.

SEE ATTACHED FIGURE 1 ENTITLED "INDUSTRIAL SPDES PERMIT APPLICATION OUTFALL LOCATIONS" FOR PROJECT SITE BOUNDARIES AND LOCATIONS OF SURFACE WATER OUTFALLS AND DESIGN POINT LOCATIONS.

ALSO SEE PROJECT DRAWING SETS (2); SITE PLAN DRAWINGS BY THE LA GROUP AND WATER AND SEWER PLANS BY DELAWARE ENGINEERING.

the LA group
Landscape Architecture
and Engineering, P.C.

40 Long Alley
Saratoga Springs
New York 12866
518/587-8100
Telefax 518/587-0180

October 7, 2003

VIA OVERNIGHT DELIVERY

Mr. William Mirabile
NYSDEC Central Office Division of Water
625 Broadway, 4th Floor
Albany, NY 12233-3505

Mr. Alexander F. Ciesluk
NYSDEC Region 3 Division of Environmental Permits
21 South Putt Corners Road
New Paltz, NY 12561-1696

Re: Belleayre Resort at Catskill Park
SPDES No.s 027-0661 & 027-0679

Dear Messrs. Mirabile and Ciesluk;

Attached herewith is a table that is being submitted as an addendum to the above referenced SPDES permit application.

The table is a listing of the stormwater micropool extended detention basins and their discharges.

Please contact me if you have any questions.

Sincerely,

Kevin J. Franke
For
The LA Group, P.C.

Enc.

cc. (w/Enc.) Ken Graham
Terresa Bakner

Belleayre Resort Stormwater Basin Discharge Routes

Wildacres				
pond #	SD sheet	SG sheet	discharges to	design point
pond 13	2	1	pond 2, pond 1, overland to roadside ditch, overland to RR ditch, trib 2 Emory Brook	1
pond 2	2	1	pond 1, overland to roadside ditch, overland to RR ditch, trib 2 Emory Brook	1
pond 1	2	1	overland to roadside ditch, overland to RR ditch, trib 2 Emory Brook	1
pond 22	2	1	surface (D-70-80-12-2) unnamed trib to Emory Brook	1
pond 14	2	1	surface (D-70-80-12-2) unnamed trib to Emory Brook	1
pond 10	2	1	surface (D-70-80-12-2) unnamed trib to Emory Brook	1
pond 17	2	1	pond 20, overland to RR ditch, trib 2 Emory Brook	1
pond 15	2	1	overland, roadside ditch, pond 20, overland to RR ditch, trib 2 Emory Brook	1
pond 24	2	1	overland, pond 23, roadside ditch, pond 20, overlanfd to RR ditch, trib 2 Emory Brook	1
pond 23	2	1	roadside ditch, pond 20, overland to RR ditch, trib 2 Emory Brook	1
pond 20	2	1	overland to RR ditch, trib 2 Emory Brook	1
pond 110	2	1	overland to RR ditch, trib 2 Emory Brook	1
pond 109	2	1	overland to RR ditch, trib 2 Emory Brook	1
pond 108	2	1	overland to RR ditch, trib 2 Emory Brook	1
pond 21	2	2	pond 11, overland to RR ditch, trib 2 Emory Brook	1
pond 11	2	2	overland to RR ditch, trib 2 Emory Brook	1
pond 5	2	2	irrigation pond - no discharge	
pond 7	2	2	overland to RR ditch, trib 2 Emory Brook	2
pond 12	2	2	overland to RR ditch, trib 2 Emory Brook	2
pond 16	2	2	overland to RR ditch, trib 2 Emory Brook	2

Highmount Estates				
pond #	SD sheet	SG sheet	discharges to	design point
pond 1	4	4	overland to roadside ditch	1
pond 6	4	4	pond 3, roadside ditch, pond 4, roadside ditch, Rt 49A culvert	2
pond 3	4	4	pond 4, roadside ditch, Rt 49A culvert	2
pond 4	4	4	roadside ditch, Rt 49A culvert	2

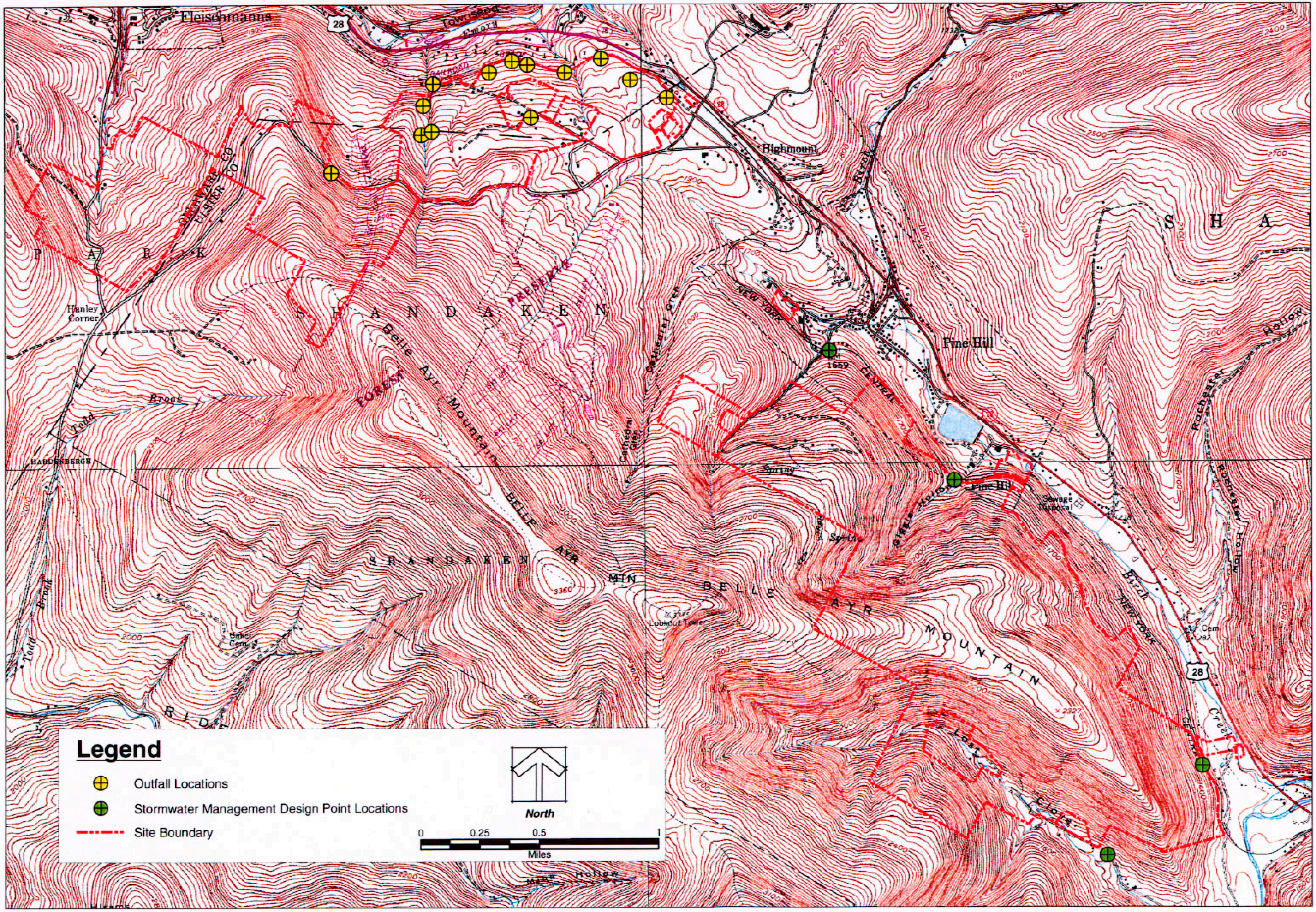
Big Indian Plateau				
pond #	SD sheet	SG sheet	discharges to	design point
pond 12	6	5	overland, roadside ditch, pond 9, pond 13, overland	3
pond 4	6	5	pond 9, pond 13, overland	3
pond 1	6	5	pond 9, pond 13, overland	3

Belleayre Resort Stormwater Basin Discharge Routes

Big Indian Plateau (cont.)				
pond #	SD sheet	SG sheet	discharges to	design point
pond 9	6	5	pond 13, overland	3
pond 13	6	6	overland	3
pond 17	6	5	overland	3
pond 5	6	5	pond 6, overland	2
pond 6	6	5	overland	2
pond 7	6	5	overland	2
pond 16	6	5	overland	2
pond 21	6	8	overland	2
pond 20	6	8	overland, pond 19, pond 18, roadside ditch, pond 22, overland, pond 15, overland	2
pond 19	6	8	pond 18, roadside ditch, pond 22, overland, pond 15, overland	2
pond 18	7	8	pond 22, overland, pond 15, overland	2
pond 22	7	8	overland, pond 15, overland	2
pond 15	6	8	overland	2
pond 36	7	9	overland	4
pond 37	7	9	overland	4
pond 38	7	9	overland	4
pond 1	7	9	irrigation pond - no discharge	
pond 101	7	9	irrigation pond - no discharge	
pond 102	7	9	irrigation pond - no discharge	
pond 5	7	9	pond 3, pond 4, pond 7, pond 9, pond 28, pond 25, overland, RR ditch, pond 100, overland	1
pond 3	7	9	pond 4, pond 7, pond 9, pond 28, pond 25, overland, RR ditch, pond 100, overland	1
pond 4	7	9	pond 7, pond 9, pond 28, pond 25, overland, RR ditch, pond 100, overland	1
pond 7	7	9	pond 7, pond 9, pond 28, pond 25, overland, RR ditch, pond 100, overland	1
pond 9	7	9	pond 28, pond 25, overland, RR ditch, pond 100, overland	1
pond 28	7	9	pond 25, overland, RR ditch, pond 100, overland	1
pond 25	7	9	overland, RR ditch, pond 100, overland	1
pond 6	7	9	pond 7, pond 9, pond 28, pond 25, overland, RR ditch, pond 100, overland	1
pond 11	7	9	pond 25, overland, RR ditch, pond 100, overland	1
pond 31	7	8	pond 26, pond 22, pond 21, pond 27, RR ditch, pond 100, overland	1
pond 26	7	8&9	pond 22, pond 21, pond 27, RR ditch, pond 100, overland	1
pond 22	7	9	pond 21, pond 27, RR ditch, pond 100, overland	1
pond 21	7	7	pond 27, RR ditch, pond 100, overland	1
pond 27	7	6	RR ditch, pond 100, overland	1
pond 8	7	9	pond 10, pond 22, pond 21, pond 27, RR ditch, pond 100, overland	1
pond 10	7	9	pond 22, pond 21, pond 27, RR ditch, pond 100, overland	1

Belleayre Resort Stormwater Basin Discharge Routes

Big Indian Plateau (cont.)				
pond #	SD sheet	SG sheet	discharges to	design point
pond 12	7	9	pond 21, pond 27, RR ditch, pond 100, overland	1
pond 40	7	6&7	pond 21, pond 27, RR ditch, pond 100, overland	1
pond 100	7	10	overland	1
pond 13	7	6	pond 14, overland	1
pond 14	7	6	overland	1



the LA group
Landscape Architecture and Engineering, P.C.

40 Long Alley
Saratoga Springs
New York 12866
518/587-8100
Telefax 518/587-0180

BELLEAYRE RESORT AT CATSKILL PARK

INDUSTRIAL SPDES PERMIT APPLICATION

OUTFALL LOCATIONS

Project: 00052
Date: 12/13/02
Figure: 1

9. Water Flow Diagram:

SEE ATTACHED FLOW CHARTS (2) ENTITLED "BELLEAYRE RESORT – ASHOKAN RESERVOIR DISCHARGES" AND "BELLEAYRE RESORT – PEPACTON RESERVOIR DISCHARGES" THAT ACCOMPANY AN OCTOBER 17, 2003 COVER LETTER TO NYSDEC.

the LA group
Landscape Architecture
and Engineering, P.C.

40 Long Alley
Saratoga Springs
New York 12866
518/587-8100
Telefax 518/587-0180

October 17, 2003

VIA OVERNIGHT DELIVERY

Mr. Alexander F. Ciesluk
NYSDEC Region 3
21 South Putt Corners Road
New Paltz, NY 12561-1696

Mr. William P. Mirabile
NYSDEC Central Office
625 Broadway, 4th Floor
Albany, NY 12233-3505

Re: Belleayre Resort, SPDES NY 027 0661 & NY 027 0679

Dear Messrs. Ciesluk and Mirabile;

Attached are two flow charts submitted for the above-referenced project.

The attached charts are revised versions of charts that were originally submitted as attachments to our NY-2C SPDES application included in Appendix 2 of the DEIS.

The revised charts reflect recent discussions with Central Office Division of Water, and now include designated SPDES outfalls and identification of discharges to surface waters versus non-point discharges.

Please contact me if you have any questions regarding this matter.

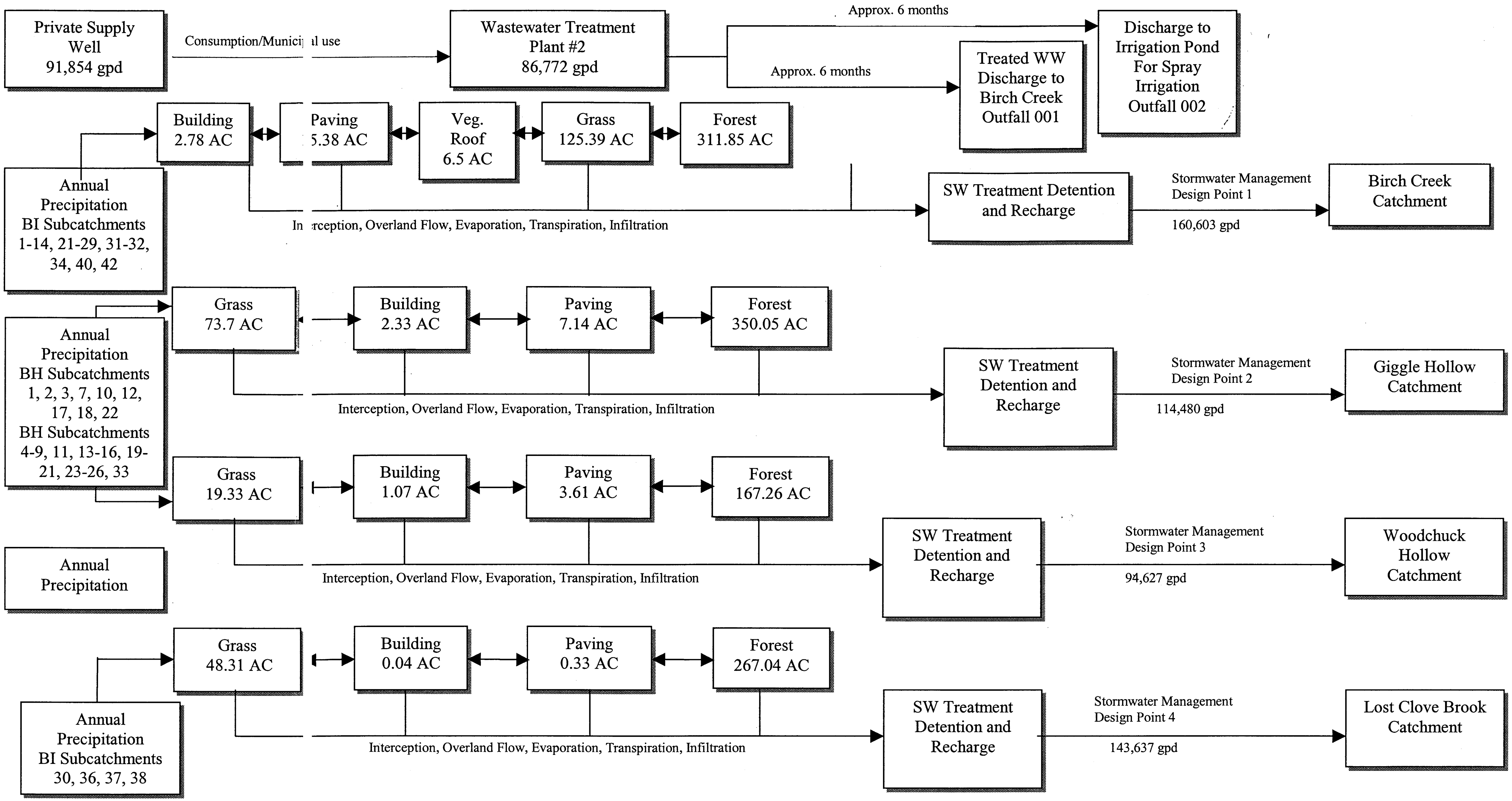
Sincerely,

Kevin J. Franke
For
The LA Group, P.C.

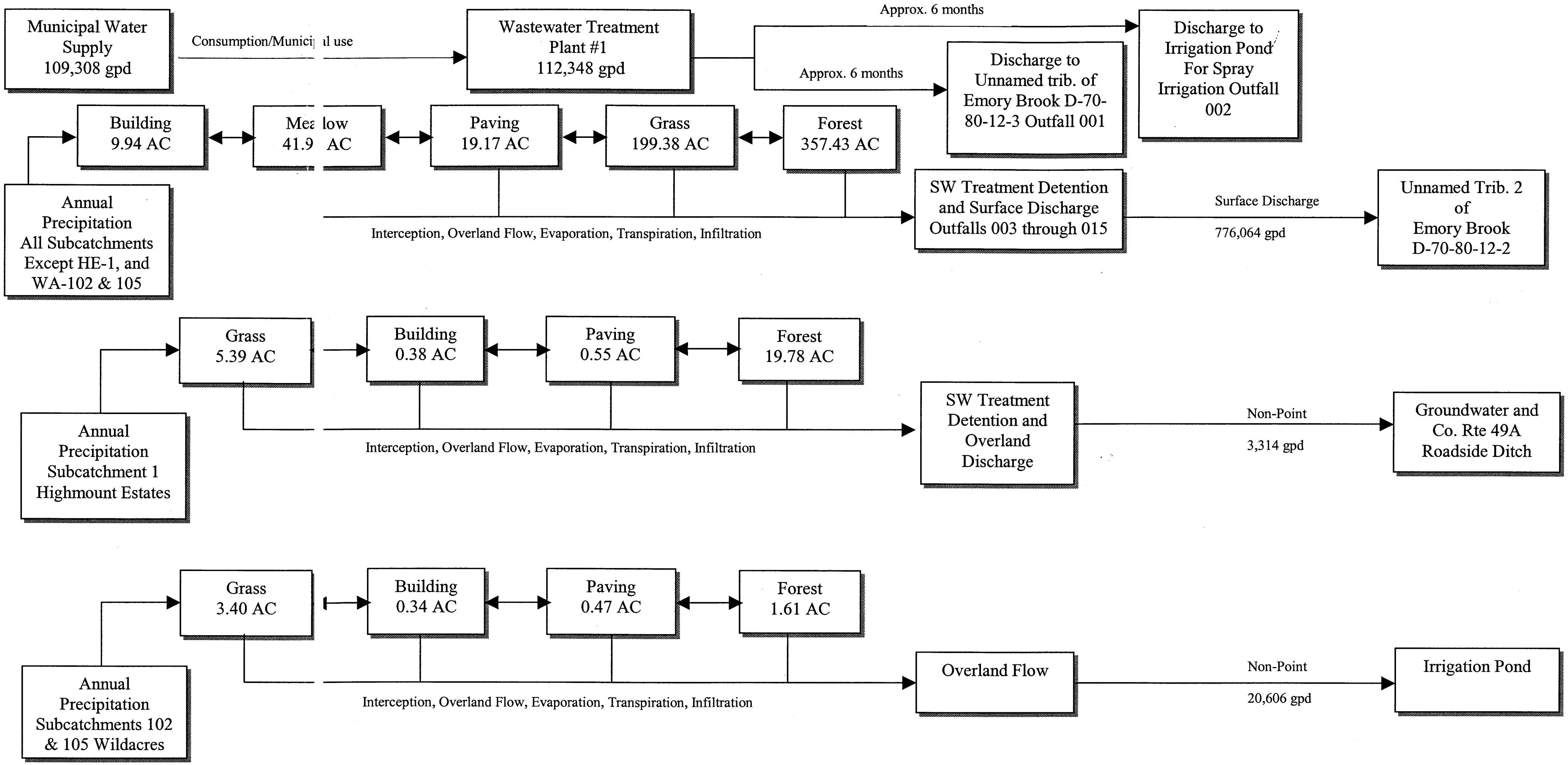
Enc.

cc. (no enc.) Ken Graham
Terresa Bakner

Belleayre Resort – Ashokan Reservoir Discharges



Belleayre Resort - Pepacton Reservoir Discharges



INDUSTRIAL APPLICATION FORM NY-2C
Section I - Permittee and Facility Information

Facility Name: BELLEAYRE RESORT AT CATSKILL PARK	SPDES Number:

10. Nature of business: (Describe the activities at the facility and the date(s) that operation(s) at the facility commenced)

A RESORT DEVELOPMENT THAT CONSISTS OF TWO HOTELS WITH DETACHED LODGING UNITS, TWO GOLF COURSES AND A LIMITED NUMBER OF PRIVATE SINGLE FAMILY LOTS.

APPROXIMATELY 1,242 ACRES WITH FOUR DESIGN POINTS AND STORMWATER DISCHARGES TO GROUNDWATER ARE IN THE ASHOKAN WATERSHED.

THE REMAINING 718 ACRES ARE IN THE PEPACTON WATERSHED WITH 12 POINTS (OUTFALLS) EITHER DIRECTLY INTO TRIB 2 EMORY BROOK OR INDIRECTLY BY DITCHES.

11. List the 4-digit SIC codes which describe your facility in order of priority:

Priority 1 1|5|2|2	Description: GENERAL CONTRACTORS, RESIDENTIAL BUILDINGS.	Priority 3 7|2|1|1	Description: HOTEL
Priority 2 1|6|2|9	Description: HEAVY CONSTRUCTION – NOT ELSEWHERE CLASS	Priority 4 7|1|3|91	Description: GOLF

12. Is your facility a primary industry as listed in Table 1 of the instructions?

[ ] **YES** - Complete the following table

[X] **NO** - Go to Item 13 below

Industrial Category	40 CFR		Industrial Category	40 CFR	
	Part	Subpart		Part	Subpart

13. Does this facility manufacture, handle, or discharge recombinant-DNA, pathogens, or other potentially infectious or dangerous organisms?

[ ] **YES** - Attach a detailed explanation to this application.

[X] **NO** - Go to Item 14 below.

14. Is storm runoff or leachate from a material storage area discharged by your facility?

[ ] **YES** - Complete the following table and show the location of the stockpile(s) and discharge point(s) on the diagram in Item 9

[X] **NO** - Go to Item 15 on the following page

Size of area (include units)	Type(s) of material stored	Quantity of material stored (include units)	Runoff control devices

Section I - Permittee and Facility Information

Facility Name: BELLEAYRE RESORT AT CATSKILL PARK	SPDES Number:

15. Facility Ownership: (Place an "X" in the appropriate box)

Corporat [X] Sole Proprietorship [ ] Partnership [ ] Municipal [ ] State [ ] Federa [ ] Other [ ]

Are any of the discharges applied for in this application on Indian lands? Yes [ ] No [X]

16. List information on any other environmental permits for this facility: SEE ATTACHED LIST OF ALL PERMITS

Issuing Agency	Permit Type	Permit Number	Permit Status		
			Active	Applied for	Inactive
NYSDEC	PART 608			1/2002	
NYSDEC SPDES	PART 608			1/2002	
NYSDEC WATER SUPPLY	PART 601			1/2002	
NYSDEC WQC	PART 608			1/2002	
NYSDOH WATER SUPPLY	PART 5			1/2002	
NYSDOH WASTEWATER	PART 75			1/2002	
TOWN OF SHANDAKEN	SITE PLAN			1/2002	
TOWN OF MIDDLETOWN	SITE PLAN			1/2002	

17. Laboratory Certification:

Were any of the analyses reported in Section III of this application performed by a contract laboratory or a consulting firm?

[X] **YES** - Complete the following table.

[ ] **NO** - Go to Item 18 below.

Name of laboratory or consulting firm	Address	Telephone (area code and number)	Pollutants analyzed
TABLES IN SECTION 3 PREPARED BY THE LA GROUP, P.C.	40 LONG ALLEY, SARATOGA SPRINGS, NY, 12866	(518) 587-8100	SEE SPREADSHEETS IN SECTION 3

18. Certification

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

Name and official title (type or print) Dean Gitter		Date signed November 24, 2003
Signature Dean L. Gitter	Telephone number 845-688-7740	FAX number 845-688-6887

Table 1-1 - Permits and Approvals

Local

Town of Shandaken
- Special Use Permit
- Site Plan Approval
- Subdivision Approval

Town of Middletown
- Special Use Permit
- Site Plan Approval
- Subdivision Approval

Ulster and Delaware County

Health Department (Ulster only)
- water supply
- wastewater disposal
- food service
- hotels
- swimming pools
- subdivisions

Bridges and Highways
- road improvements and driveways

Planning Department
- comments and recommendations to local Boards

Regional

NYCDEP
- Wastewater Treatment Plant and Subsurface Disposal
- Stormwater Pollution Prevention and Impervious Surface

State

NYSDEC
- stream crossing
- wastewater disposal
- water supply, Big Indian Plateau
- SPDES Stormwater Discharge From Construction
- SPDES Industrial Discharge from Operations
- Petroleum Bulk Storage
- Chemical Bulk Storage
- Water Quality Certification
- Public Water Supply Permit modification for Village of Fleischmanns

NYSDOH
- water supply
- wastewater disposal
- food service for Delaware County portion
- hotels
- swimming pools

Table 1-1 Continued

subdivisions

NYSDOT
NY Route 28 improvements

NYS Office of Parks Recreation and Historic Preservation
Cultural Resources Consultation

Federal

US Army Corps of Engineers
federal wetlands (Issued July 18, 2003)

INDUSTRIAL APPLICATION FORM NY-2C
Section I - Permittee and Facility Information

Facility Name: BELLEAYRE RESORT AT CATSKILL PARK	SPDES Number:

19. Industrial Chemical Survey (ICS)

Complete all information for those substances your facility has used, produced, stored, distributed, or otherwise disposed of in the past five (5) years at or above the threshold values listed in the instructions. Include substances manufactured at your facility, as well as any substances that you have reason to know or believe present in materials used or manufactured at your facility. Do not include chemicals used only in analytical laboratory work, or small quantities of routine household cleaning chemicals. Enter the name and CAS number for each of the chemicals listed in Tables 6-10 of the instructions, and the table number which lists the chemical. You may use ranges (e.g. 10-100 lbs., 100-1000 lbs., 1000-10000 lbs., etc.) to describe the quantities used on an annual basis as well as for the amount presently on hand. For those chemicals listed in Tables 6, 7, or 8 which are indicated as being potentially present in the discharge from one or more outfalls at the facility, indicate which outfalls may be affected in the appropriate column below, and include sampling results in Section III of this application for each of the potentially affected outfalls. Make additional copies of this sheet if necessary.

Name of Substance	Table	CAS Number	Average Annual Usage	Amount Now On Hand	Units (gallons, lbs, etc)	Purpose of Use (see codes in Table 2 of instructions)	Present in Discharge? (Outfall(s)?)
2,4-D	7	00094-75-7	VARIABLE			HER	ALL
2,4-DP	10	120-36-5	VARIABLE			HER	ALL
ACEPHATE	10	30560-19-1	VARIABLE			PES	ALL
BENDIOCARB	10	22781-23-3	VARIABLE			PES	ALL
BENEFIN	7	01861-40-1	VARIABLE			HER	ALL
BENSULIDE	N/A	741-58-2	VARIABLE			HER	ALL
BENTAZON	8,10	25057-89-0	VARIABLE			HER	ALL
BIFENTHRIN	10	82567-04-3	VARIABLE			PES	ALL
CHLORONEB	N/A	2675-77-6	VARIABLE			PES	ALL
DITHIOPYR	N/A	97886-45-8	VARIABLE			HER	ALL
ETHOFUMESATE	N/A	26259-45-0	VARIABLE			HER	ALL
ETHOPROP	10	13194-48-4	VARIABLE			PES	ALL
ETRIDIAZOLE	8	02593-15-9	VARIABLE			PES	ALL
FENOXAPROP	10	73519-55-8	VARIABLE			HER	ALL
FLUTALONIL	N/A	6632-96-5	VARIABLE			PES	ALL
FOSETYL-AL	N/A	39148-24-8	VARIABLE			PES	ALL
GLYPHOSATE	7	01071-83-6	VARIABLE			HER	ALL
HALOSULFURON	N/A	100784-20-1	VARIABLE			HER	ALL
LAMBDA CYHALOTHRON	10	91465-08-6	VARIABLE			PES	ALL
MCPA	7	94-74-6	VARIABLE			HER	ALL
MCPP	8	7085-19-0	VARIABLE			HER	ALL
MEFENOXAM	N/A	70630-17-0	VARIABLE			PES	ALL
CHEMICALS TO BE USED							

This completes Section I of the SPDES Industrial Application Form NY-2C. Section II, which requires specific information for each of the outfalls at your facility, and Section III, which requires sampling information for each of the outfalls at your facility, must also be completed and submitted with this application.

INDUSTRIAL APPLICATION FORM NY-2C
Section I - Permittee and Facility Information

Facility Name: BELLEAYRE RESORT AT CATSKILL PARK	SPDES Number:

19. Industrial Chemical Survey (ICS)

Complete all information for those substances your facility has used, produced, stored, distributed, or otherwise disposed of in the past five (5) years at or above the threshold values listed in the instructions. Include substances manufactured at your facility, as well as any substances that you have reason to know or believe present in materials used or manufactured at your facility. Do not include chemicals used only in analytical laboratory work, or small quantities of routine household cleaning chemicals. Enter the name and CAS number for each of the chemicals listed in Tables 6-10 of the instructions, and the table number which lists the chemical. You may use ranges (e.g. 10-100 lbs., 100-1000 lbs., 1000-10000 lbs., etc.) to describe the quantities used on an annual basis as well as for the amount presently on hand. For those chemicals listed in Tables 6, 7, or 8 which are indicated as being potentially present in the discharge from one or more outfalls at the facility, indicate which outfalls may be affected in the appropriate column below, and include sampling results in Section III of this application for each of the potentially affected outfalls. Make additional copies of this sheet if necessary.

Name of Substance	Table	CAS Number	Average Annual Usage	Amount Now On Hand	Units (gallons, lbs, etc)	Purpose of Use (see codes in Table 2 of instructions)	Present in Discharge? (Outfall(s)?)
MSMA	N/A	2163-80-6	VARIABLE			HER	ALL
OXADIAZON	10	19666-30-9	VARIABLE			HER	ALL
PRODIAMINE	10	290991-21-2	VARIABLE			HER	ALL
PROPAMOCARB	NL	24579-73-5	VARIABLE			PES	ALL
PROPICONAZOLE	10	60207-90-1	VARIABLE			PES	ALL
PCNB	7	00082-68-8	VARIABLE			PES	ALL
SIDURON	8	01982-49-6	VARIABLE			HER	ALL
TRICLOPYR	10	55335-06-3	VARIABLE			HER	ALL
TRIFLOXYSTROBIN	N/A	141517-21-7	VARIABLE			PES	ALL
TRIFLURALIN	7	01582-09-8	VARIABLE			HER	ALL
VINCLOZOLIN	10	50471-44-8	VARIABLE			PES	ALL
NITROGEN, NITRATE	7						
PHOSPHORUS, TOTAL	7	07723-14-0					
CHEMICALS TO BE USED							

This completes Section I of the SPDES Industrial Application Form NY-2C. Section II, which requires specific information for each of the outfalls at your facility, and Section III, which requires sampling information for each of the outfalls at your facility, must also be completed and submitted with this application.

State Pollutant Discharge Elimination System (SPDES)

INDUSTRIAL APPLICATION FORM NY-2C

For New Permits and Permit Modifications to Discharge Industrial Wastewater and Storm Water

Section II - Outfall Information

Please type or print the requested information.

Facility Name: BELLEAYRE RESORT AT CATSKILL PARK	SPDES Number:

1. Outfall Number and Location

Outfall No.: POND 1		
Latitude 42 ° 8' 46.72" N	Longitude 74 ° 30' 31.17" W	Receiving Water TRIB 2 EMORY BROOK

2. Type of Discharge and Discharge Rate (List all information applicable to this outfall)

	Volume/Flow	Units MGD	GPM	Other (specify)		Volume/Flow	Units M^3/ANNUAL MGD	GPM	Other (sp
a. Process Wastewater					f. Noncontact Cooling Water				
b. Process Wastewater					g. Remediation System Discharge				
c. Process Wastewater					h. Boiler Blowdown				
d. Process Wastewater					i. Storm Water X	AVG. 776,064 GPD FOR ALL OUTFALLS			
e. Contact Cooling Water					j. Sanitary Wastewater				
k. Other discharge (specify):									
l. Other discharge (specify):									

3. List process information for the Process Wastewater streams identified in 2.a-d above:

a. Name of the process contributing to the discharge			Process SIC code:
Describe the contributing process	Category Subcategory	Quantity per day	Units of measure
b. Name of the process contributing to the discharge			Process SIC code:
Describe the contributing process	Category Subcategory	Quantity per day	Units of measure
c. Name of the process contributing to the discharge			Process SIC code:
Describe the contributing process	Category Subcategory	Quantity per day	Units of measure
d. Name of the process contributing to the discharge			Process SIC code:
Describe the contributing process	Category Subcategory	Quantity per day	Units of measure

4. Expected or Proposed Discharge Flow Rates for this outfall:

a. Total Annual Discharge	b. Daily Minimum Flow	c. Daily Average Flow	d. Daily Maximum Flow	e. Maximum Design flow rate
23.67 MG	0 MGD	0.06 MGD	4.08 MGD	4.08 MGD

State Pollutant Discharge Elimination System (SPDES)

INDUSTRIAL APPLICATION FORM NY-2C

For New Permits and Permit Modifications to Discharge Industrial Wastewater and Storm Water

Section II - Outfall Information

Please type or print the requested information.

Facility Name: BELLEAYRE RESORT AT CATSKILL PARK	SPDES Number:

1. Outfall Number and Location

Outfall No.: **POND 22**		
Latitude 42 8' 43.12" N	Longitude 74 ° 31' 3.69" W	Receiving Water TRIB 2 EMORY BROOK

2. Type of Discharge and Discharge Rate (List all information applicable to this outfall)

	Volume/Flow	Units: MGD	GPM	Other (specify)		Volume/Flow	Units M³/ANNUA: MGD	GPM	Other
a. Process Wastewater					f. Noncontact Cooling Water				
b. Process Wastewater					g. Remediation System Discharge				
c. Process Wastewater					h. Boiler Blowdown				
d. Process Wastewater					i. Storm Water X	AVG. 776,064 GPD FOR ALL OUTFALLS			
e. Contact Cooling Water					j. Sanitary Wastewater				
k. Other discharge (specify):									
l. Other discharge (specify):									

3. List process information for the Process Wastewater streams identified in 2.a-d above:

a. Name of the process contributing to the discharge			Process SIC code:
Describe the contributing process	Category / Subcategory	Quantity per day	Units of measure
b. Name of the process contributing to the discharge			Process SIC code:
Describe the contributing process	Category / Subcategory	Quantity per day	Units of measure
c. Name of the process contributing to the discharge			Process SIC code:
Describe the contributing process	Category / Subcategory	Quantity per day	Units of measure
d. Name of the process contributing to the discharge			Process SIC code:
Describe the contributing process	Category / Subcategory	Quantity per day	Units of measure

4. Expected or Proposed Discharge Flow Rates for this outfall:

a. Total Annual Discharge	b. Daily Minimum Flow	c. Daily Average Flow	d. Daily Maximum Flow	e. Maximum Design flow rate
0.65 MG	0 MGD	0.0018 MGD	2.02 MGD	2.02 MGD

State Pollutant Discharge Elimination System (SPDES)

INDUSTRIAL APPLICATION FORM NY-2C

For New Permits and Permit Modifications to Discharge Industrial Wastewater and Storm Water

Section II - Outfall Information

Please type or print the requested information.

Facility Name: BELLEAYRE RESORT AT CATSKILL PARK	SPDES Number:

1. Outfall Number and Location

Outfall No.: POND 10		
Latitude 42 ° 8' 43.81" N	Longitude 74 ° 31' 0.53" W	Receiving Water TRIB 2 EMORY BROOK

2. Type of Discharge and Discharge Rate (List all information applicable to this outfall)

	Volume/Flow	Units MGD	Units GPM	Units Other (specify)		Volume/Flow	Units M³/ANNUAL MGD	GPM	Other (spec
a. Process Wastewater					f. Noncontact Cooling Water				
b. Process Wastewater					g. Remediation System Discharge				
c. Process Wastewater					h. Boiler Blowdown				
d. Process Wastewater					i. Storm Water X	AVG. 776,064 GPD FOR ALL OUTFALLS			
e. Contact Cooling Water					j. Sanitary Wastewater				
k. Other discharge (specify):									
l. Other discharge (specify):									

3. List process information for the Process Wastewater streams identified in 2.a-d above:

a. Name of the process contributing to the discharge			Process SIC code:
Describe the contributing process	Category Subcategory	Quantity per day	Units of measure
b. Name of the process contributing to the discharge			Process SIC code:
Describe the contributing process	Category Subcategory	Quantity per day	Units of measure
c. Name of the process contributing to the discharge			Process SIC code:
Describe the contributing process	Category Subcategory	Quantity per day	Units of measure
d. Name of the process contributing to the discharge			Process SIC code:
Describe the contributing process	Category Subcategory	Quantity per day	Units of measure

4. Expected or Proposed Discharge Flow Rates for this outfall:

a. Total Annual Discharge	b. Daily Minimum Flow	c. Daily Average Flow	d. Daily Maximum Flow	e. Maximum Design flow rate
0.015 MG	0 MGD	0.00004 MGD	0.95 MGD	0.95 MGD

State Pollutant Discharge Elimination System (SPDES)

INDUSTRIAL APPLICATION FORM NY-2C

For New Permits and Permit Modifications to Discharge Industrial Wastewater and Storm Water

Section II - Outfall Information

Please type or print the requested information.

Facility Name: BELLEAYRE RESORT AT CATSKILL PARK	SPDES Number:

1. Outfall Number and Location

Outfall No.: POND 14		
Latitude 42 ° 8' 49.5" N	Longitude 74 ° 31' 2.97" W	Receiving Water TRIB 2 EMORY BROOK

2. Type of Discharge and Discharge Rate (List all information applicable to this outfall)

	Volume/Flow	Units				Volume/Flow	Units M³/ANNUAL		
		MGD	GPM	Other (specify)			MGD	GPM	Other (specify)
a. Process Wastewater					f. Noncontact Cooling Water				
b. Process Wastewater					g. Remediation System Discharge				
c. Process Wastewater					h. Boiler Blowdown				
d. Process Wastewater					i. Storm Water X	AVG. 776,064 GPD FOR ALL OUTFALLS			
e. Contact Cooling Water					j. Sanitary Wastewater				
k. Other discharge (specify):									
l. Other discharge (specify):									

3. List process information for the Process Wastewater streams identified in 2.a-d above:

a. Name of the process contributing to the discharge			Process SIC code:
Describe the contributing process	Category / Subcategory	Quantity per day	Units of measure
b. Name of the process contributing to the discharge			Process SIC code:
Describe the contributing process	Category / Subcategory	Quantity per day	Units of measure
c. Name of the process contributing to the discharge			Process SIC code:
Describe the contributing process	Category / Subcategory	Quantity per day	Units of measure
d. Name of the process contributing to the discharge			Process SIC code:
Describe the contributing process	Category / Subcategory	Quantity per day	Units of measure

4. Expected or Proposed Discharge Flow Rates for this outfall:

a. Total Annual Discharge	b. Daily Minimum Flow	c. Daily Average Flow	d. Daily Maximum Flow	e. Maximum Design flow rate
1.1 MG	0 MGD	0.003 MGD	0.45 MGD	0.45 MGD

State Pollutant Discharge Elimination System (SPDES)
INDUSTRIAL APPLICATION FORM NY-2C
For New Permits and Permit Modifications to Discharge Industrial Wastewater and Storm Water
Section II - Outfall Information
Please type or print the requested information.

Facility Name: BELLEAYRE RESORT AT CATSKILL PARK	SPDES Number:

1. Outfall Number and Location

Outfall No.: POND 20		
Latitude 42 ° 8' 54.29" N	Longitude 74 ° 31 0.06" W	Receiving Water TRIB 2 EMORY BROOK

2. Type of Discharge and Discharge Rate (List all information applicable to this outfall)

	Volume/Flow	Units MGD	GPM	Other (specify)		Volume/Flow	Units M^3/ANNUAL MGD	GPM	Other (specify)
a. Process Wastewater					f. Noncontact Cooling Water				
b. Process Wastewater					g. Remediation System Discharge				
c. Process Wastewater					h. Boiler Blowdown				
d. Process Wastewater					i. Storm Water X	AVG. 776,064 GPD FOR ALL OUTFALLS			
e. Contact Cooling Water					j. Sanitary Wastewater				
k. Other discharge (specify):									
l. Other discharge (specify):									

3. List process information for the Process Wastewater streams identified in 2.a-d above:

a. Name of the process contributing to the discharge			Process SIC code:
Describe the contributing process	Category / Subcategory	Quantity per day	Units of measure
b. Name of the process contributing to the discharge			Process SIC code:
Describe the contributing process	Category / Subcategory	Quantity per day	Units of measure
c. Name of the process contributing to the discharge			Process SIC code:
Describe the contributing process	Category / Subcategory	Quantity per day	Units of measure
d. Name of the process contributing to the discharge			Process SIC code:
Describe the contributing process	Category / Subcategory	Quantity per day	Units of measure

4. Expected or Proposed Discharge Flow Rates for this outfall:

a. Total Annual Discharge	b. Daily Minimum Flow	c. Daily Average Flow	d. Daily Maximum Flow	e. Maximum Design flow rate
3.15 MG	0 MGD	0.009 MGD	6.90 MGD	6.90 MGD

State Pollutant Discharge Elimination System (SPDES)

INDUSTRIAL APPLICATION FORM NY-2C

For New Permits and Permit Modifications to Discharge Industrial Wastewater and Storm Water

Section II - Outfall Information

Please type or print the requested information.

Facility Name: BELLEAYRE RESORT AT CATSKILL PARK	SPDES Number:

1. Outfall Number and Location

Outfall No.: POND 110		
Latitude 42 ° 8' 58.25" N	Longitude 74 ° 30' 32.10" W	Receiving Water TRIB 2 EMORY BROOK

2. Type of Discharge and Discharge Rate (List all information applicable to this outfall)

	Volume/Flow	Units				Volume/Flow	Units M^3/ANNUAL		
		MGD	GPM	Other (specify)			MGD	GPM	Other (specify)
a. Process Wastewater					f. Noncontact Cooling Water				
b. Process Wastewater					g. Remediation System Discharge				
c. Process Wastewater					h. Boiler Blowdown				
d. Process Wastewater					i. Storm Water X	AVG. 776,064 GPD FOR ALL OUTFALLS			
e. Contact Cooling Water					j. Sanitary Wastewater				
k. Other discharge (specify):									
l. Other discharge (specify):									

3. List process information for the Process Wastewater streams identified in 2.a-d above:

a. Name of the process contributing to the discharge			Process SIC code:
Describe the contributing process	Category / Subcategory	Quantity per day	Units of measure
b. Name of the process contributing to the discharge			Process SIC code:
Describe the contributing process	Category / Subcategory	Quantity per day	Units of measure
c. Name of the process contributing to the discharge			Process SIC code:
Describe the contributing process	Category / Subcategory	Quantity per day	Units of measure
d. Name of the process contributing to the discharge			Process SIC code:
Describe the contributing process	Category / Subcategory	Quantity per day	Units of measure

4. Expected or Proposed Discharge Flow Rates for this outfall:

a. Total Annual Discharge	b. Daily Minimum Flow	c. Daily Average Flow	d. Daily Maximum Flow	e. Maximum Design flow rate
0.1 MG	0 MGD	0.0003 MGD	0.57 MGD	0.57 MGD

State Pollutant Discharge Elimination System (SPDES)

INDUSTRIAL APPLICATION FORM NY-2C

For New Permits and Permit Modifications to Discharge Industrial Wastewater and Storm Water

Section II - Outfall Information

Please type or print the requested information.

Facility Name: BELLEAYRE RESORT AT CATSKILL PARK	SPDES Number:

1. Outfall Number and Location

Outfall No.: POND 109		
Latitude 42 ° 8' 59.06" N	Longitude 74 ° 30' 36.61" W	Receiving Water TRIB 2 EMORY BROOK

2. Type of Discharge and Discharge Rate (List all information applicable to this outfall)

	Volume/Flow	Units MGD	Units GPM	Units Other (specify)		Volume/Flow	Units M³/ANNUAL MGD	GPM	Other (specify)
a. Process Wastewater					f. Noncontact Cooling Water				
b. Process Wastewater					g. Remediation System Discharge				
c. Process Wastewater					h. Boiler Blowdown				
d. Process Wastewater					i. Storm Water X	AVG. 776,064 GPD FOR ALL OUTFALLS			
e. Contact Cooling Water					j. Sanitary Wastewater				
k. Other discharge (specify):									
l. Other discharge (specify):									

3. List process information for the Process Wastewater streams identified in 2.a-d above:

a. Name of the process contributing to the discharge			Process SIC code:
Describe the contributing process	Category / Subcategory	Quantity per day	Units of measure
b. Name of the process contributing to the discharge			Process SIC code:
Describe the contributing process	Category / Subcategory	Quantity per day	Units of measure
c. Name of the process contributing to the discharge			Process SIC code:
Describe the contributing process	Category / Subcategory	Quantity per day	Units of measure
d. Name of the process contributing to the discharge			Process SIC code:
Describe the contributing process	Category / Subcategory	Quantity per day	Units of measure

4. Expected or Proposed Discharge Flow Rates for this outfall:

a. Total Annual Discharge	b. Daily Minimum Flow	c. Daily Average Flow	d. Daily Maximum Flow	e. Maximum Design flow rate
1.03 MG	0 MGD	0.003 MGD	0.57 MGD	0.57 MGD

State Pollutant Discharge Elimination System (SPDES)

INDUSTRIAL APPLICATION FORM NY-2C

For New Permits and Permit Modifications to Discharge Industrial Wastewater and Storm Water

Section II - Outfall Information

Please type or print the requested information.

Facility Name: BELLEAYRE RESORT AT CATSKILL PARK	SPDES Number:

1. Outfall Number and Location

Outfall No.: POND 108		
Latitude 42 ° 8' 56.69" N	Longitude 74 ° 30' 43.4" W	Receiving Water TRIB 2 EMORY BROOK

2. Type of Discharge and Discharge Rate (List all information applicable to this outfall)

	Volume/Flow	Units MGD	Units GPM	Units Other (specify)		Volume/Flow	Units M^3/ANNUAL MGD	GPM	Other (specify)
a. Process Wastewater					f. Noncontact Cooling Water				
b. Process Wastewater					g. Remediation System Discharge				
c. Process Wastewater					h. Boiler Blowdown				
d. Process Wastewater					i. Storm Water X	AVG. 776,064 GPD FOR ALL OUTFALLS			
e. Contact Cooling Water					j. Sanitary Wastewater				
k. Other discharge (specify):									
l. Other discharge (specify):									

3. List process information for the Process Wastewater streams identified in 2.a-d above:

a. Name of the process contributing to the discharge			Process SIC code:
Describe the contributing process	Category / Subcategory	Quantity per day	Units of measure
b. Name of the process contributing to the discharge			Process SIC code:
Describe the contributing process	Category / Subcategory	Quantity per day	Units of measure
c. Name of the process contributing to the discharge			Process SIC code:
Describe the contributing process	Category / Subcategory	Quantity per day	Units of measure
d. Name of the process contributing to the discharge			Process SIC code:
Describe the contributing process	Category / Subcategory	Quantity per day	Units of measure

4. Expected or Proposed Discharge Flow Rates for this outfall:

a. Total Annual Discharge	b. Daily Minimum Flow	c. Daily Average Flow	d. Daily Maximum Flow	e. Maximum Design flow rate
3.52 MG	0 MGD	0.01 MGD	1.74 MGD	1.74 MGD

State Pollutant Discharge Elimination System (SPDES)

INDUSTRIAL APPLICATION FORM NY-2C

For New Permits and Permit Modifications to Discharge Industrial Wastewater and Storm Water

Section II - Outfall Information

Please type or print the requested information.

Facility Name: BELLEAYRE RESORT AT CATSKILL PARK	SPDES Number:

1. Outfall Number and Location

Outfall No.: POND 11		
Latitude 42 ° 8' 56.54" N	Longitude 74 ° 30' 21.03" W	Receiving Water TRIB 2 EMORY BROOK

2. Type of Discharge and Discharge Rate (List all information applicable to this outfall)

	Volume/Flow	Units MGD	Units GPM	Units Other (specify)		Volume/Flow	Units M³/ANNUAL MGD	GPM	Other (specify)
a. Process Wastewater					f. Noncontact Cooling Water				
b. Process Wastewater					g. Remediation System Discharge				
c. Process Wastewater					h. Boiler Blowdown				
d. Process Wastewater					i. Storm Water X	AVG. 776,064 GPD FOR ALL OUTFALLS			
e. Contact Cooling Water					j. Sanitary Wastewater				
k. Other discharge (specify):									
l. Other discharge (specify):									

3. List process information for the Process Wastewater streams identified in 2.a-d above:

a. Name of the process contributing to the discharge			Process SIC code:
Describe the contributing process	Category Subcategory	Quantity per day	Units of measure
b. Name of the process contributing to the discharge			Process SIC code:
Describe the contributing process	Category Subcategory	Quantity per day	Units of measure
c. Name of the process contributing to the discharge			Process SIC code:
Describe the contributing process	Category Subcategory	Quantity per day	Units of measure
d. Name of the process contributing to the discharge			Process SIC code:
Describe the contributing process	Category Subcategory	Quantity per day	Units of measure

4. Expected or Proposed Discharge Flow Rates for this outfall:

a. Total Annual Discharge	b. Daily Minimum Flow	c. Daily Average Flow	d. Daily Maximum Flow	e. Maximum Design flow rate
2.59 MG	0 MGD	0.07 MGD	4.20 MGD	4.20 MGD

State Pollutant Discharge Elimination System (SPDES)

INDUSTRIAL APPLICATION FORM NY-2C

For New Permits and Permit Modifications to Discharge Industrial Wastewater and Storm Water

Section II - Outfall Information

Please type or print the requested information.

Facility Name: BELLEAYRE RESORT AT CATSKILL PARK	SPDES Number:

1. Outfall Number and Location

Outfall No.: POND 16		
Latitude 42 ° 8' 56.51" N	Longitude 74 ° 30' 10.26" W	Receiving Water TRIB 2 EMORY BROOK

2. Type of Discharge and Discharge Rate (List all information applicable to this outfall)

	Volume/Flow	Units MGD	Units GPM	Units Other (specify)		Volume/Flow	Units M^3/ANNUAL MGD	GPM	Other (specify)
a. Process Wastewater					f. Noncontact Cooling Water				
b. Process Wastewater					g. Remediation System Discharge				
c. Process Wastewater					h. Boiler Blowdown				
d. Process Wastewater					i. Storm Water X	AVG. 776,064 GPD FOR ALL OUTFALLS			
e. Contact Cooling Water					j. Sanitary Wastewater				
k. Other discharge (specify):									
l. Other discharge (specify):									

3. List process information for the Process Wastewater streams identified in 2.a-d above:

a. Name of the process contributing to the discharge			Process SIC code:
Describe the contributing process	Category / Subcategory	Quantity per day	Units of measure
b. Name of the process contributing to the discharge			Process SIC code:
Describe the contributing process	Category / Subcategory	Quantity per day	Units of measure
c. Name of the process contributing to the discharge			Process SIC code:
Describe the contributing process	Category / Subcategory	Quantity per day	Units of measure
d. Name of the process contributing to the discharge			Process SIC code:
Describe the contributing process	Category / Subcategory	Quantity per day	Units of measure

4. Expected or Proposed Discharge Flow Rates for this outfall:

a. Total Annual Discharge	b. Daily Minimum Flow	c. Daily Average Flow	d. Daily Maximum Flow	e. Maximum Design flow rate
0.03 MG	0 MGD	0.00008 MGD	1.16 MGD	1.16 MGD

State Pollutant Discharge Elimination System (SPDES)

INDUSTRIAL APPLICATION FORM NY-2C

For New Permits and Permit Modifications to Discharge Industrial Wastewater and Storm Water

Section II - Outfall Information

Please type or print the requested information.

Facility Name: BELLEAYRE RESORT AT CATSKILL PARK	SPDES Number:

1. Outfall Number and Location

Outfall No.: POND 12		
Latitude 42 ° 8' 54.83" N	Longitude 74 ° 30' 1.70" W	Receiving Water TRIB 2 EMORY BROOK

2. Type of Discharge and Discharge Rate (List all information applicable to this outfall)

	Volume/Flow	Units				Volume/Flow	Units M^3/ANNUAL		
		MGD	GPM	Other (specify)			MGD	GPM	Other (specify)
a. Process Wastewater					f. Noncontact Cooling Water				
b. Process Wastewater					g. Remediation System Discharge				
c. Process Wastewater					h. Boiler Blowdown				
d. Process Wastewater					i. Storm Water X	AVG. 776,064 GPD FOR ALL OUTFALLS			
e. Contact Cooling Water					j. Sanitary Wastewater				
k. Other discharge (specify):									
l. Other discharge (specify):									

3. List process information for the Process Wastewater streams identified in 2.a-d above:

a. Name of the process contributing to the discharge			Process SIC code:
Describe the contributing process	Category Subcategory	Quantity per day	Units of measure
b. Name of the process contributing to the discharge			Process SIC code:
Describe the contributing process	Category Subcategory	Quantity per day	Units of measure
c. Name of the process contributing to the discharge			Process SIC code:
Describe the contributing process	Category Subcategory	Quantity per day	Units of measure
d. Name of the process contributing to the discharge			Process SIC code:
Describe the contributing process	Category Subcategory	Quantity per day	Units of measure

4. Expected or Proposed Discharge Flow Rates for this outfall:

a. Total Annual Discharge	b. Daily Minimum Flow	c. Daily Average Flow	d. Daily Maximum Flow	e. Maximum Design flow rate
0.003 MG	0 MGD	0.000008 MGD	0.36 MGD	0.36 MGD

State Pollutant Discharge Elimination System (SPDES)

INDUSTRIAL APPLICATION FORM NY-2C

For New Permits and Permit Modifications to Discharge Industrial Wastewater and Storm Water

Section II - Outfall Information

Please type or print the requested information.

Facility Name: BELLEAYRE RESORT AT CATSKILL PARK	SPDES Number:

1. Outfall Number and Location

Outfall No.: POND 7		
Latitude 42 ° 8' 50.89" N	Longitude 74 ° 29' 50.89" W	Receiving Water TRIB 2 EMORY BROOK

2. Type of Discharge and Discharge Rate (List all information applicable to this outfall)

	Volume/Flow	Units				Volume/Flow	Units M³/ANNUAL		
		MGD	GPM	Other (specify)			MGD	GPM	Other (specify)
a. Process Wastewater					f. Noncontact Cooling Water				
b. Process Wastewater					g. Remediation System Discharge				
c. Process Wastewater					h. Boiler Blowdown				
d. Process Wastewater					i. Storm Water X	AVG. 776,064 GPD FOR ALL OUTFALLS			
e. Contact Cooling Water					j. Sanitary Wastewater				
k. Other discharge (specify):									
l. Other discharge (specify):									

3. List process information for the Process Wastewater streams identified in 2.a-d above:

a. Name of the process contributing to the discharge			Process SIC code:
Describe the contributing process	Category Subcategory	Quantity per day	Units of measure
b. Name of the process contributing to the discharge			Process SIC code:
Describe the contributing process	Category Subcategory	Quantity per day	Units of measure
c. Name of the process contributing to the discharge			Process SIC code:
Describe the contributing process	Category Subcategory	Quantity per day	Units of measure
d. Name of the process contributing to the discharge			Process SIC code:
Describe the contributing process	Category Subcategory	Quantity per day	Units of measure

4. Expected or Proposed Discharge Flow Rates for this outfall:

a. Total Annual Discharge	b. Daily Minimum Flow	c. Daily Average Flow	d. Daily Maximum Flow	e. Maximum Design flow rate
0.002 MG	0 MGD	0.000006 MGD	0.34 MGD	0.34 MGD

State Pollutant Discharge Elimination System (SPDES)

INDUSTRIAL APPLICATION FORM NY-2C

For New Permits and Permit Modifications to Discharge Industrial Wastewater and Storm Water

Section II - Outfall Information

Please type or print the requested information.

Facility Name: BELLEAYRE RESORT AT CATSKILL PARK	SPDES Number:

1. Outfall Number and Location

Outfall No.: POND 4		
Latitude 42 ° 8' 34.98" N	Longitude 74 ° 31' 30.31" W	Receiving Water TRIB 2 EMORY BROOK

2. Type of Discharge and Discharge Rate (List all information applicable to this outfall)

	Volume/Flow	Units MGD	Units GPM	Units Other (specify)		Volume/Flow	Units M³/ANNUAL MGD	GPM	Other (specify)
a. Process Wastewater					f. Noncontact Cooling Water				
b. Process Wastewater					g. Remediation System Discharge				
c. Process Wastewater					h. Boiler Blowdown				
d. Process Wastewater					i. Storm Water X	AVG. 776,064 GPD FOR ALL OUTFALLS			
e. Contact Cooling Water					j. Sanitary Wastewater				
k. Other discharge (specify):									
l. Other discharge (specify):									

3. List process information for the Process Wastewater streams identified in 2.a-d above:

a. Name of the process contributing to the discharge			Process SIC code:
Describe the contributing process	Category / Subcategory	Quantity per day	Units of measure
b. Name of the process contributing to the discharge			Process SIC code:
Describe the contributing process	Category / Subcategory	Quantity per day	Units of measure
c. Name of the process contributing to the discharge			Process SIC code:
Describe the contributing process	Category / Subcategory	Quantity per day	Units of measure
d. Name of the process contributing to the discharge			Process SIC code:
Describe the contributing process	Category / Subcategory	Quantity per day	Units of measure

4. Expected or Proposed Discharge Flow Rates for this outfall:

a. Total Annual Discharge	b. Daily Minimum Flow	c. Daily Average Flow	d. Daily Maximum Flow	e. Maximum Design flow rate
0.5 MG	0 MGD	0.001 MGD	4.76 MGD	4.76 MGD

Outfall No.:	
Facility Name: BELLEAYRE RESORT AT CATSKILL PARK	SPDES Number:

5. Is this a seasonal discharge?

[ ] YES - Complete the following table

[X] NO - Go to Item 6 below

Operations contributing flow (list)	Discharge frequency		Flow				
	Batches per year	Duration per batch	Flow rate per day		Total volume per discharge	Units	Duration (Days)
			LTA	Daily Max			

6. Water Supply Source (indicate all that apply)

	Name or owner of water supply source	Volume or flow rate	Units (check one)		
Municipal Supply	FLEISHMANNS	109,308	MGD	**GPD**	GPM
Private Surface Water Source			MGD	GPD	GPM
Private Supply Well	BIG INDIAN RESORT	91,854	MGD	**GPD**	GPM
Other (specify)			MGD	GPD	GPM

7. Outfall configuration: (Surface water discharges only)

A. Where is the discharge point located with respect to the receiving water?

In the streambank: [X]

In the stream: [ ]

Within a lake or ponded water: [ ]

Within an estuary: [ ] Attach Supplement C, MIXING ZONE REQUIREMENTS FOR DISCHARGES TO ESTUARIES.

Discharge is equipped with diffuser: [ ] Attach description, including configuration and plan drawing of diffuser, if used.

B. If located in a stream, approximately what percentage of stream width from shore is the discharge point located?

10% [ ] **25%** [ ] **50%** [ ] **Other:** [ ]

C. If located in a stream, describe the stream geometry in the general vicinity of the discharge point, under low flow conditions:

Stream width	Stream depth	Stream velocity
Feet	**Feet**	**Feet/Sec**

Are the results of a mixing/diffusion study attached? [ ] **YES** [X] **NO**

INDUSTRIAL APPLICATION FORM NY-2C
Section II - Outfall Information

Facility Name: BELLEAYRE RESORT AT CATSKILL PARK	Outfall No.:
	SPDES Number:

8. Thermal Discharge Criteria

Is your facility one of the applicable types of facilities listed in the instructions, and does the temperature of this discharge exceed the receiving water temperature by greater than three (3) degrees Fahrenheit?

[ ] **YES -** Complete the following table.

[X] **NO -** Go to Item 9. below.

[ ] **Information on the intake and discharge configuration of this outfall is attached.**

Discharge Temperature, deg. F			Duration of maximum discharge		Dates of maximum discharge		Maximum	Discharge configuration (e.g. subsurface, surface,
Average change in temperature (delta T)	Maximum change in temperature (delta T)	Maximum temperature	hours per day	days per year	From	To	MGD	

9. Are any water treament chemicals or additives that are used by your facility subsequently discharged through this outfall?

[ ] **YES -** Complete the following table and complete pages 1 of 3 and 2 of 3 of Form WTCFX for each water treatment chemical listed.

[X] **NO -** Go to Item 10. below.

Manufacturer	WTC trade name	Manufacturer	WTC trade name

10. Has any biological test for acute or chronic toxicity been performed on this outfall or on the receiving water in relation to this outfall in the past three (3) years?

[ ] **YES -** Complete the following table.

[X] **NO -** Go to Item 11. on the following page.

Water tested	Purpose of test	Type of test	Chronic or Acute?	Subject species	Testing date(s)		Submitted? (Date)
					Start	Finish	

INDUSTRIAL APPLICATION FORM NY-2C
Section II - Outfall Information

	Outfall No.:
Facility Name: BELLEAYRE RESORT AT CATSKILL PARK	SPDES Number:

11. Is the discharge from this outfall treated to remove process wastes, water treatment additives, or other pollutants?

[ ] **YES** - Complete the following table. Treatment codes are listed in Table 4.

[X] **NO** - Go to Item 12 below.

Treatment process	Treatment Code(s)	Treatment used for the removal of:	Design Flow Rate (include units)

12. Does this facility have either a compliance agreement with a regulating agency, or have planned changes in production, which will materially alter the quantity and/or quality of the discharge from this outfall?

[ ] **YES** - Complete the following table.

[X] **NO** - Go to Section III on the following page.

Description of project	Subject to Condition or Agreement in existing permit or consent order? (List)	Change due to production increase?	Completion Date(s)	
			Required	Projected

This completes Section II of the SPDES Industrial Application Form NY-2C. Section I, which requires general information regarding your facility, and Section III, which requires sampling information for each of the outfalls at your facility, must also be completed and submitted with this application.

INDUSTRIAL APPLICATION FORM NY-2C
Section III - Sampling Information

Facility Name: BELLEAYRE RESORT AT CATSKILL PARK	SPDES No.:	Outfall No.:

1. Sampling Information - Conventional Parameters

Provide the analytical results of at least one analysis for every pollutant in this table. If this outfall is subject to a waiver as listed in Table 5 of the instructions for one or more of the parameters listed below, provide the results for those parameters which are required for this type of outfall.

PLEASE PRINT OR TYPE IN THE UNSHADED AREAS ONLY. You may report some or all of this information on separate sheets (using the same format) instead of completing this page.

Pollutant	Effluent data							Units		Intake data (optional)		
	a. Maximum daily value		b. Maximum 30 day value		c. Long term average		d. Number of analyses	a. Concentration	b. Mass	a. Long term average value		b. Number of analyses
	1.	2. Mass	1.	2. Mass	1. Concentration	2. Mass				1.	2. Mass	
a. Biochemical Oxygen Demand, 5 day (BOD)												
b. Chemical Oxygen Demand (COD)												
c. Total Suspended Solids (TSS)												
d. Total Dissolved Solids (TDS)												
e. Oil & Grease												
f. Chlorine, Total Residual (TRC)												
g. Total Organic Nitrogen (TON)												
h. Ammonia (as N)												
i. Flow	Value		Value		Value					Value		
j. Temperature, winter	Value		Value		Value			DEGREES CELSIUS		Value		
k. Temperature, summer	Value		Value		Value			DEGREES CELSIUS		Value		
l. pH	Minimum	Maximum	Minimum	Maximum				STANDARD UNITS		Minimum	Maximum	

2. Sampling Information - Priority Pollutants, Toxic Pollutants, and Hazardous Substances

a. Primary Industries:

i. Does the discharge from this outfall contain process wastewater?

☐ **Yes** - Go to Item **ii.** below.
☐ **No** - Go to Item **b.** below.

ii. Indicate which GC/MS fractions have been tested for: Volatiles: ☐ Acid: ☐ Base/Neutral: ☐ Pesticide: ☐

b. All applicants:

i. Do you know or have reason to believe that any of the pollutants listed in Tables 6, 7, or 8 of the instructions are present in the discharge from this outfall?

☐ **Yes** - Concentration and mass data attached.
☐ **No** - Go to Item **ii.** below.

ii. Do you know or have reason to believe that any of the pollutants listed in Table 9 or Table 10 of the instructions, or any other toxic, harmful, or injurious chemical substances not listed in Tables 6-10, are present in the discharge from this outfall?

☐ **Yes** - Source or reason for presence in discharge attached
☐ **Yes** - Quantitative or qualitative data attached
☐ **No**

INDUSTRIAL APPLICATION FORM NY-2C
Section III - Sampling Information

Facility Name: BELLEAYRE RESORT AT CATSKILL PARK	SPDES No.:	Outfall No.:

3. Projected Effluent Quality - Priority Pollutants, Toxic Pollutants, and Hazardous Substances

Provide analytical results of at least one analysis for each pollutant that you know or have reason to believe is present in this discharge, as well as for any GC/MS fractions and metals required to be sampled from Section III Forms, Item 2.a on the preceding page.

List the name and CAS number for each pollutant that you know or have reason to believe is present in the discharge from this outfall. For each pollutant listed from Tables 6, 7, or 8, provide the results of at least one analysis for that pollutant, and determine the mass discharge based on the flow rate reported in Item 1.i. For each pollutant listed from Table 9, or any other toxic pollutant not listed in Tables 6-10, you must provide concentration and mass data (if available) and/or an explanation for their presence in the discharge. Make as many copies of this table as necessary for each outfall.

Page of

Pollutant and CAS Number	Effluent data							Units		Intake data (optional)			Believed present, no sampling results available
	a. Maximum daily value		b. Maximum 30 day value *(if available)*		c. Long term average value *(if available)*		d. Number of analyses	a. Concen-tration	b. Mass	a. Long term average value		d. Number of analyses	
	(1)Concen-tration	(2) Mass	(1)Concen-tration	(2) Mass	(1)Concen-tration	(2) Mass				(1)Concen-tration	(2) Mass		
CAS Number:													
CAS Number:													
CAS Number:													
CAS Number:													
CAS Number:													
CAS Number:													
CAS Number:													
CAS Number:				SEE ATTACHED WORKSHEETS									
CAS Number:													
CAS Number:													
CAS Number:													
CAS Number:													
CAS Number:													

WILDACRES RESORT

DESIGN POINT 1 (D-70-80-PD2)

SUB-CATCH#	AREAS GRASS	FOREST	BUILDING	PAVING	OPEN WATER	VEG. ROOF	TOTAL AREA	100 YR Vol	PRE CONTROL VOLUME (M^3)	POST CONTROL VOLUME (M^3)	TP (mg/l)	TKN (mg/l)	NO_3 (mg/l)	TS (mg/l)	TP (lb/yr)	TKN (lb/yr)	NO_3 (lb/yr)
1	1.17	0	0.47	0.05	0	0	1.69	2085	52585	52585	0.21	1.24	2.60	760.00	24.25	146.20	306.90
2	0.02	0	0.22	0.1	0	0	0.34	419									
3	0.02	0	0.22	0.1	0	0	0.34	419									
4	0.84	0	0.47	0.18	0	0	1.49	1838									
5	3.4	1.61	0.34	0.47	0	0	5.82	7179	37039	3351	0.36	1.35	4.86	618.00	29.44	111.80	403.70
6	6.87	21.59	0.21	1.04	0	0	29.71	36647	25081	25081	0.44	1.68	1.20	791.00	24.45	94.63	67.55
7	4.58	2.07	0	0.58	0	0	7.23	8918									
8	1.61	0	0	0.46	0	0	2.07	2553									
9	1.19	0	0.9	0.51	0	0	2.6	3207									
10	3.03	0	1.26	1.06	0	0	5.35	6599									
11	2.62	0.02	0	0.18	0	0	2.82	3478									
12	16.63	5.08	0.12	0.52	0	0	22.35	27568									
13	2	5.41	0.09	0.26	0	0	7.76	9572	9643	3357	0.50	0.47	1.67	754.00	5.09	28.13	36.15
14	4.57	1.35	0	0	0	0	5.92	7302	4158	4158	0.55	1.54	1.28	858.00	5.15	14.34	11.92
15	8.27	0.92	0.29	0.44	0	0	9.92	12236	7602	1400	0.85	1.70	0.21	752.00	8.45	26.06	27.60
16	5.98	0.71	0.21	0.1	0	0	7	8634	4916	4916	0.56	1.54	1.78	858.00	6.14	16.95	19.58
17	2.38	1.2	0	0.24	0	0.94	4.76	5871									
18	7.96	0	0	0.21	0	0	8.17	10078									
20	8.87	4.3	0.42	1.21	0	0	14.8	18256	13335	57	0.58	0.00	0.00	652.00	9.43	40.18	81.52
21	8.72	10.42	0	0.36	0	0	19.5	24053	14330	2442	0.23	0.35	0.18	809.00	9.64	43.94	39.24
22	11.3	0.76	0.25	0.39	0	0	12.7	15665	10528	1502	0.31	0.30	0.22	733.00	11.31	34.87	56.92
23	2.1	2.41	0	0	0	0	4.51	5563									
24	0.5	6.85	0	0	0	0	7.35	9066	5162	787	0.29	0.83	1.25	847.00	1.05	14.58	14.80
25	1.15	15.76	0.03	0.6	0	0	17.54	21635	84866	84866	0.17	1.79	1.28	835.00	31.90	337.10	242.40
55	0	0	0	0.1	0	0	0.1	123									
66	0.11	0	0	0.09	0	0	0.2	247									
77	0	0	0	0.09	0	0	0.09	111									
88	0	0	0	0.14	0	0	0.14	173									
101	2.04	2.17	0	0.16	0	0	4.37	5390									
108	9.97	6.61	0.1	0.57	0	0	17.25	21278	13356	13356	0.37	1.41	1.57	764.00	11.00	42.29	47.03
109	4.11	1.42	0	0	0	0	5.53	6821	3884	3884	0.58	1.56	1.28	857.00	5.07	13.56	11.14
110	5.1	1.38	0.04	0.11	0	0	6.63	8178	4656	390	0.57	1.76	1.28	858.00	5.08	15.60	13.35
111	6.24	6.84	0.06	0.17	0	0	13.31	16418	9789	9789	0.31	1.35	1.56	809.00	6.73	29.55	34.20
121	7.56	8.5	0.81	0.94	0	0	17.81	21968	15975	15975	0.28	1.29	3.79	648.00	10.03	46.12	135.80
200	0	100	0	0	0	0	100	123348									
300	0	42.2	0	0	0	0	42.2	52053									
TOTAL (avg)	140.91	249.58	6.51	11.43	0	0.94	409.37	504950	316903	227895	0.42	1.19	1.53	776.65	204.21	1055.90	1549.80

WILDACRES RESORT

DESIGN POINT 2 (D-70-80-PD1)

SUB-CATCH#	AREAS GRASS	FOREST	BUILDING	PAVING	OPEN WATER	VEG. ROOF	TOTAL AREA	100 YR Vol	PRE CONTROL VOLUME (M^3)	POST CONTROL VOLUME (M^3)	TP (mg/l)	TKN (mg/l)	NO_3 (mg/l)	TS (mg/l)	TP (lb/yr)	TKN (lb/yr)	NO_3 (lb/yr)
40	8.95	6.79	0.73	2.58	0	0	19.05	23498	29591	29591	0.54	1.52	2.60	568.00	35.59	100.80	172.40
41	1.16	6.66	0.19	0.25	0	0	8.26	10189								64.73	
42	0.48	1.63	0	0	0	0	2.11	2603									
102	1.25	0.51	0.18	0.26	0	0	2.2	2714	20360	20360	0.42	1.42	3.57	671.00	19.01	64.73	162.80
103	0.66	0.15	0.18	0.95	0	0	1.94	2393	19624	113	0.96	1.72	0.09	551.00	15.13	61.18	122.00
104	1.96	0	0.49	0.58	0	0	3.03	3737									
105	14.06	2.19	0.76	0.84	3.21	0	21.06	25977									
106	11.49	1.56	0.47	0.78	0	0	14.3	17639									
107	3.76	2.04	0	0	0	0	5.8	7154	4073	10	1.25	2.09	1.28	856.00	3.63	13.00	11.68
112	6.76	0.42	0	0	0	0	7.18	8856	5043	14	0.00	0.56	1.28	860.00	6.47	17.75	14.46
TOTAL (avg)	50.53	21.95	3	6.24	3.21	0	84.93	104760	78691	50088	0.63	1.46	1.76	701.20	79.83	322.19	483.34

DESIGN POINT 1 (HIGHMOUNT ESTATES) (CR 49A-PD3)

SUB-CATCH#	AREAS GRASS	FOREST	BUILDING	PAVING	OPEN WATER	VEG. ROOF	TOTAL AREA	100 YR Vol (M^3)	PRE CONTROL VOLUME (M^3)	POST CONTROL VOLUME (M^3)	TP (mg/l)	TKN (mg/l)	NO_3 (mg/l)	TS (mg/l)	TP (lb/yr)	TKN (lb/yr)	NO_3 (lb/yr)
1	5.39	19.78	0.38	0.55	0	0	26.1	11385	12224	3274	0.57	2.41	1.22	798.00	4.20	39.90	33.18
TOTAL (avg)	5.39	19.78	0.38	0.55	0	0	26.1	11385	12224	3274	0.57	2.41	1.22	798.00	4.20	39.90	33.18

DESIGN POINT 2 (HIGHMOUNT ESTATES) (CR49A-PD4)

SUB-CATCH#	AREAS GRASS	FOREST	BUILDING	PAVING	MEADOW	VEG. ROOF	TOTAL AREA	100 YR Vol	PRE CONTROL VOLUME (M^3)	POST CONTROL VOLUME (M^3)	TP (mg/l)	TKN (mg/l)	NO_3 (mg/l)	TS (mg/l)	TP (lb/yr)	TKN (lb/yr)	NO_3 (lb/yr)
2	2.81	23.23	0.4	0.74	2.27	0	29.45	12915	14362	5311	0.26	0.14	1.18	768.00	3.13	39.50	37.79
3	0	57.59	0.14	0.23	39.69	0	97.65	41679	44373	44373	0.19	1.91	1.27	837.00	18.39	188.90	125.60
4	4.92	4.72	0.17	0.57	0	0	10.38	901	8564	8564	0.53	1.60	1.02	655.00	10.20	30.60	19.53
5	0.88	0		0.26	0	0	1.14	1233	998	0	0.00	0.00	0.00	0.00	0.70	4.00	1.60
6	2.06	1.97	0.06	0.5	0	0	4.59	2146									
TOTAL (avg)	10.67	87.51	0.77	2.3	41.96	0	143.21	58875	68298	58249	0.33	1.22	1.16	753.33	32.42	263.00	184.52

Blank cells are NOT omitted, rather the nutrient exports have been assessed relative to detention ponds, which capture runoff from several subcatchments

Design Point 3 (BELLEAYRE HIGHLANDS) (H-171-52-AD5)

SUB-CATCH#	AREAS GRASS	FOREST	BUILDING	PAVING	OPEN WATER	GRAVEL ROAD/OTHER SURFACE	TOTAL AREA	100 YR Vol	PRE CONTROL VOLUME (M^3)	POST CONTROL VOLUME (M^3)	TP (mg/l)	TKN (mg/l)	NO_3 (mg/l)	TS (mg/l)	TP (lb/yr)	TKN (lb/yr)	NO_3 (lb/yr)
1	4.83	102.95	0	1.21	0	1.59	110.58	46774	67167.924	67167.924	0.30	1.91	1.33	823.00	44.60	44.60	44.60
2	2.5	29.62	0.13	0.27	0	0.18	32.70	14000									
3	1.55	15.53	0.14	0.04	0	0	17.26	7376	9055.97482	9055.97482	0.15	1.79	1.36	831.00	3.10	3.10	3.10
7	1.65	0.88	0.11	0.23	0	0	2.87	1369									
10	2.09	0.53	0.1	0.45	0	0	3.17	1542	4785.62963	4785.62963	0.71	1.66	1.07	575.00	7.60	7.60	7.60
12	1.45	2.3	0	0.31	0	0	4.06	1863									
17	2.19	0.15	0.07	0.61	0	0.98	4.00	2208	2162.59761	2162.59761	0.45	1.55	1.28	647.00	2.20	2.20	2.20
18	0.2	4.22	0	0	0	0	4.42	1850	3104.25113	3104.25113	0.05	1.15	1.28	847.00	0.30	0.30	0.30
22	2.87	11.08	0.52	0.49	0	0	14.96	6698	7214.20882	7214.20882	0.14	1.21	1.74	758.00	52.30	52.30	52.30
TOTAL (avg)	19.33	167.26	1.07	3.61	0	2.75	194.02	83679	93491	93491	0.30	1.55	1.34	746.83	110.10	110.10	110.10

BIG INDIAN PLATEAU

Design Point 1 (H-171-52-AD1)

SUB-CATCH#	AREAS GRASS	FOREST	BUILDING	PAVING	OPEN WATER	VEG. ROOF	TOTAL AREA	100 YR Vol (M^3)	PRE CONTROL VOLUME (M^3)	POST CONTROL VOLUME (M^3)	TP (mg/l)	TKN (mg/l)	NO_3 (mg/l)	TS (mg/l)	TP (lb/yr)	TKN (lb/yr)	NO_3 (lb/yr)
1	2.07	0	0	0	3.66	0	5.73	3380	11008.347	11008.347	0.42	1.02	1.02	636.00	10.40	37.90	25.10
2	0.57	1.28	0	0.28	0	0	2.13	999	1990.00549	1990.00549	0.19	1.36	0.96	608.00	0.80	6.10	4.30
3	3.6	1.6	0.52	0.75	0	0	6.47	3219	5030.68495	5030.68495	0.25	1.25	6.46	470.00	2.80	14.10	72.80
4	1.06	0.21	0.04	0.21	0	0	1.52	740	1496.72335	1496.72335	0.36	1.46	2.37	570.00	1.20	4.90	8.00
5	6.26	133.83	0.1	0.11	0	0	140.30	58504	133741.191	102903.978	0.16	1.67	1.24	795.00	36.20	499.50	371.80
6	1.13	0.91	0.14	0.44	0	0	2.62	1307	2804.3741	2804.3741	0.24	1.33	3.57	506.00	1.50	8.40	22.40
7	2.43	0.51	0.09	0.18	0	0	3.21	1505	2642.37254	2642.37254	0.43	1.44	2.95	702.00	2.50	8.50	17.50
8	2.73	2.62	0.04	0.58	0	0	5.97	2800	5275.00403	375.171933	0.35	1.40	1.43	651.00	3.00	16.30	16.90
9	7.22	1.77	0.2	0.45	0	0	9.64	4515	4841.13095	4841.13095	0.48	1.51	1.46	742.00	5.10	16.30	15.80
10	7.54	3.6	0.21	0.74	0	0	12.09	5662	6730.10139	1637.23231	0.61	1.58	1.29	676.00	6.10	22.20	19.50
11	1.24	1	0	0.22	0	0	2.46	1147	2115.87456	2115.87456	0.33	1.45	1.04	674.00	1.60	6.90	4.90
12	6.66	2.63	0.34	0.79	0	0	10.42	4983	5373.57551	5373.57551	0.39	1.46	1.58	701.00	4.70	17.50	19.00
13	3.06	1.45	0.04	0	0	0	4.55	2048	3289.52926	193.68828	0.67	1.23	1.91	829.00	3.00	10.40	14.10
14	1.61	0	0	0	0	0	1.61	740	1130.72613	1130.72613	0.61	1.60	1.28	861.00	1.50	4.10	3.20
21	1.32	3.33	0.07	0.44	0	0	5.16	2368	4459.13462	4459.13462	0.17	1.54	1.29	734.00	1.80	12.80	18.90
22	3.42	41.77	0	1.29	0	0	46.48	19871									
23	1.26	8.49	0.03	0.55	0	0	10.33	4527	15892.0384	4708.83393	0.13	1.47	2.87	715.00	13.90	54.80	101.80
24	5.43	12.12	0.48	1.47	0	0	19.50	8943									
25	18.16	2.49	0.04	0.39	0	0	21.08	9670	10633.2884	722.253402	0.71	1.22	1.18	764.00	11.60	36.60	28.20
26	10.06	3.86	0	0.31	0	0	14.23	6389	7027.00514	905.917464	0.03	1.16	1.18	780.00	6.50	23.10	18.50
27	3.67	0.13	0	0.08	0	0	3.88	1776	1906.92341	1906.92341	0.58	1.60	1.83	787.00	2.80	6.80	5.00
28	0.83	1.81	0	0	0	0	2.64	1135	1854.02726	1854.02726	0.28	0.50	1.28	851.00	0.80	5.20	5.30
29	3.42	0.46	0	1.31	0	0	5.19	2677									
31	16.64	3.07	0.26	0.92	0	0	20.89	9794	9821.41165	401.110305	0.11	1.34	1.41	792.00	10.40	33.10	30.90
32	8.66	81.09	0.14	3.62	0	0	93.51	39693									
34	0	0	0	0	0	6.5	6.50	666									
40	3.6	0.37	0	0	0	0	3.97	1826	3795.41246	174.007965	0.87	1.83	1.22	750.00	3.40	12.50	7.70
42	1.74	1.45	0.04	0.25	0	0	3.48	1591									
TOTAL (avg)	125.39	311.85	2.78	15.38	3.66	6.5	465.56	202476	242859	158676	0.38	1.38	1.86	708.82	131.60	858.00	831.60

Blank cells are NOT omitted, rather the nutrient exports have been assessed relative to detention ponds, which capture runoff from several subcatchments

BIG INDIAN PLATEAU

Design Point 4 (H-171-53-AD1)

SUB-CATCH#	AREAS GRASS	FOREST	BUILDING	PAVING	OPEN WATER	VEG. ROOF	TOTAL AREA	100 YR Vol	PRE CONTROL VOLUME (M^3)	POST CONTROL VOLUME (M^3)	TP (mg/l)	TKN (mg/l)	NO_3 (mg/l)	TS (mg/l)	TP (lb/yr)	TKN (lb/yr)	NO_3 (lb/yr)
30	26.32	266.95	0	0.32	0	0	293.59	120104	131957.22	131957.22	0.27	1.79	1.28	847.00	79.80	527.10	377.10
36	9.48	0	0	0	0	0	9.48	4354	4264.82337	4264.82337	0.71	2.12	1.28	861.00	6.70	20.20	12.20
37	6.65	0	0	0	0	0	6.65	3047	2991.66273	2991.66273	0.64	1.94	1.28	861.00	4.30	13.00	8.60
38	5.86	0.09	0.04	0.01	0	0	6.00	2751	2699.20476	2699.20476	0.68	1.63	1.27	855.00	4.10	9.80	7.70
TOTAL (avg)	48.31	267.04	0.04	0.33	0	0	315.72	130256	141913	141913	0.58	1.87	1.28	856.00	94.90	570.10	405.60

Design Point 2 (BELLEAYRE HIGHLANDS) (H-171-83-3-AD4)

SUB-CATCH#	AREAS GRASS	FOREST	BUILDING	PAVING	OPEN WATER	GRAVEL ROAD/OTHER SURFACE	TOTAL AREA	100 YR Vol	PRE CONTROL VOLUME (M^3)	POST CONTROL VOLUME (M^3)	TP (mg/l)	TKN (mg/l)	NO_3 (mg/l)	TS (mg/l)	TP (lb/yr)	TKN (lb/yr)	NO_3 (lb/yr)
4	0.48	4.33	0	0.24	0	0	5.05	2208	4948.39575	4948.39575	0.20	1.38	1.38	610.00	2.20	15.20	15.30
5	1.7	0.72	0.26	0.4	0	0	3.08	1530									
6	1.17	0.39	0.09	0.16	0	0	1.81	863	5029.60891	5029.60891	0.15	1.28	1.40	834.00	1.70	14.40	15.30
8	3.13	2.69	0.29	0.34	0	0	6.45	3022	13434.321	2374.6353	0.20	1.75	1.43	687.00	10.50	43.80	15.80
9	1.86	0.66	0.09	0.28	0	-0	2.89	1381	3519.23676	3519.23676	0.38	1.49	1.75	572.00	3.00	11.80	42.80
11	1.63	0.5	0.28	0.46	0	0	2.87	1456									
13	2.48	2.94	0.32	0.69	0	0	6.43	3071									
14	3.63	7.9	0	0.43	0	0	11.96	5242									
15	12.08	1.28	0.16	0.55	0	0	14.07	6599	7297.88556	20.529825	0.17	1.54	1.29	734.00	7.70	37.60	21.10
16	1.72	0	0.21	0.37	0	0	2.30	1184	1317.05199	1317.05199	0.42	1.51	2.18	571.00	1.30	7.50	6.40
19	4.29	0.91	0	0	0	0	5.20	2331	2339.43727	2339.43727	0.55	1.54	1.28	858.00	2.90	8.10	6.70
20	3.44	0	0	0	0	0	3.44	1579	1547.609	1547.609	0.63	1.61	1.28	861.00	2.20	5.60	4.40
21	24.94	315.62	0.12	2.39	0	0	343.07	140728	89226.867	89226.867	0.26	1.91	1.25	758.00	52.30	381.30	249.20
23	0.76	8.61	0	0	0	0	9.37	3910									
24	4.29	2.48	0.15	0.29	0	0	7.21	3306	4342.01551	364.015035	0.39	1.53	1.78	727.00	3.50	13.80	17.30
25	1.29	0.1	0.15	0.25	0	0	1.79	913	1680.3591	89.028648	0.65	1.24	5.79	559.00	1.30	5.00	21.80
26	3.71	0.92	0	0.1	0	0	4.73	2171	2329.58296	2329.58296	0.03	1.51	1.18	783.00	2.40	7.90	6.10
33	1.1	0	0.21	0.19	0	0	1.50	777									
TOTAL (avg)	73.7	350.05	2.33	7.14	0	0	433.22	182272	137012	113106	0.34	1.52	1.83	712.83	91.00	552.00	422.20

INDUSTRIAL APPLICATION FORM NY-2C
Section III - Sampling Information

Facility Name: BELLEAYRE RESORT AT CATSKILL PARK	SPDES No.:	**Outfall No.:**

4. Existing Effluent Quality - Priority Pollutants, Toxic Pollutants, and Hazardous Substances

Provide analytical results for the last three (3) years for each pollutant that you know or have reason to believe present in this discharge from this outfall, as well as for any GC/MS fractions and metals required to be sampled from Section III Forms, Item 2.a for this discharge.

Make as many copies of this table as necessary for each outfall. You can list the results from 24 sampling dates on each copy of this page.		Parameter name:	Parameter name:	Parameter name:	Parameter name:	Parameter name:	Parameter name:	Parameter name:
Page Of		CAS Number:	CAS Number:	CAS Number:	CAS Number:	CAS Number:	CAS Number:	CAS Number:
Date	Flow rate	Concentration	Concentration	Concentration	Concentration	Concentration	Concentration	Concentration
	Units:	Units:	Units:	Units:	Units:	Units:	Units:	Units:

the LA group
Landscape Architecture
and Engineering, P.C.

40 Long Alley
Saratoga Springs
New York 12866
518/587-8100
Telefax 518/587-0180

December 19, 2002

Mr. Alec Ciesluk
NYSDEC Region 3
21 South Putt Corners Road
New Paltz, NY 12561

Re: Stormwater Application Form NY-2C for Industrial Facilities for Belleayre Resort at Catskill Park

Dear Mr. Ciesluk:

Enclosed is the above referenced application and necessary materials for the application.

This application consists of the form NY-2C for a total of eight discharges in the Ashokan and Pepacton Reservoir watersheds. In the Ashokan Watershed, there will be four discharge points and the remaining four discharge points are in the Pepacton Watershed.

The Big Indian Resort, which is located in the Ashokan Reservoir watershed, will include four discharges either in proximity to or into Birch Creek, Woodchuck Hollow, and Lost Clove Brook.

The Wildacres Resort is located in the Pepacton Reservoir watershed and will have four discharge points, two to Emory Brook and two to roadside ditches along County Route 49A.

To prepare this application and establish a permit fee, three different approaches to estimating stormwater flows were developed and the results compared.

- Estimation of Annual Fee – The annual fee is assessed based on daily discharges, yet most of stormwater analysis is based on storm event planning. To obtain a daily discharge estimate, the Rational Equation was utilized. The Rational Equation provided a means to create a site runoff values for the project (C-Value) and to prepare an average daily flow. The average daily flow was estimated by using average annual runoff volumes from the United States Geological Survey and by dividing that number by 365 days to obtain an average daily flow. These terms (C-Value and average daily flow) were used in the Rational Equation for the entire acreage under construction including golf courses, landscaping, buildings and pavement.

- Stormwater Quantity – The DEIS relied upon HydroCAD for estimate of storm event runoff from the project. This model is a TR-20 SCS based model for event-driven stormwater runoff. To prepare this application, the HydroCAD estimates for the 100-year event (8.3 inches in 24 hours) were utilized for both the Daily Maximum Flow and Maximum Design flow rate. Project component land use values for the project were based on the HydroCAD data files.

- Stormwater Quality – The DEIS contains estimate of stormwater runoff quality using WINSLAMM V8.4 (Pitt and Voorhees, 2000).

  Runoff water quality estimate for each of the eight discharge points are the sum of the discharges of the individual stormwater reaches within the individual watershed of the discharge point.

  The WINSLAMM provides an estimate of average annual runoff based on a selected model year. The model year selected was 1993. This year had the most complete data set for the weather station closest to the project located at Tannersville.

  WINSLAMM also provided the estimates of stormwater quality for some of the selected parameters. The selected parameters were obtained from Tables 6, 7, 8, 9 and 10.

  WINSLAMM simulates the stormwater quality for the portion of the years with non-frozen precipitation. To convert the WINSLAMM estimates to daily loading, the non-frozen precipitation season of March 15th-November 30th was selected which is 261 days.

  The "Operational Phase Stormwater Quality Management Plan", Appendix 10A of the DEIS provides effective measures to mitigate the stormwater discharge quality from the Belleayre Resort at Catskill Park. The levels of nutrient and Total Suspended Solids (TSS) exports from the project are not anticipated to have a significant impact on the reservoir waters or the surrounding watershed. The following Stormwater Effluent Standards are proposed for the Pepacton and Ashokan Reservoirs and based on the predicted nutrient exports plus a 10% Margin of Safety (MOS).

  Pepacton Reservoir
  - Total Phosphorus - Not to exceed 470 lb/yr from the project assemblages in the Pepacton Watershed.
  - Nitrogen (NO_3) - Not to exceed 1950 lb/yr from the project assemblages in the Pepacton Watershed.
  - Total Suspended Solids (TSS) - Not to exceed an average concentration of 832 mg/l for the project assemblages in the Pepacton Watershed.

  Ashokan Reservoir
  - Total Phosphorus - Not to exceed 353 lb/yr from the project assemblages in the Ashokan Watershed.
  - Nitrogen (NO_3) - Not to exceed 2288 lb/yr from the project assemblages in the Ashokan Watershed.
  - Total Suspended Solids (TSS) – Not to exceed an average concentration of 833 mg/l for the project assemblages in the Ashokan Watershed.

- Pesticides – The pesticide and herbicides in stormwater runoff were determined by predictions made by the Leachem and CREAMS model.

Sincerely,

Kevin J. Franke
For the LA Group

Enc.

2017wl03.doc

the LA group
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518/587-8100
Telefax 518/587-0180

MEMO

TO: **CEASERE MANFREDI, NYSDEC**
KEN STEVENS, NYSDEC
KEN GRIGGS, NYSDEC
DOMINIC CORDISCO, NYSDEC

FROM: **DEAN R. LONG** Dean R. Long

DATE: **MAY 14, 2002**

RE: **AVERAGE DAILY RUNOFF FROM CROSSROADS RESORT AT BELLEAYRE**

I was asked to evaluate stormwater flows to be discharged in connection with the construction and operation of a commercial resort project that includes two golf courses, housing, hotel, resorts and support facilities. The following runoff analysis provides estimates of daily average flows in order to evaluate the existing regulatory fee that would be imposed for an individual SPDES permit. The fee structure is based on the average daily flow and range of fee runs from $100-$37,500 annually. The mid-range fees for 10,000 gpd (gallons per day) - 99,999 gpd is $1,250, and for 100,000 gpd - 499,999 gpd a fee of $3,750.

Two evaluations have been completed to estimate the construction site runoff. The rational method is typically used for rain events of a certain return frequency. These are common 2 and 10 year events. To use the Rational Method for annual runoff it is necessary to establish a runoff volume.

Rational Equation

Q	=	CiA
C	=	runoff, coefficient value
i	=	intensity 2.25 ft. annual runoff
A	=	area (acres)

The "C" is a factor that can be obtained from standard charts or created for a site, based on the mix of land uses. A bare soil "C" for soils that vary from coarse sand to clay ranges from 0.15 to 0.75. A value of 0.4 is selected and utilized for the entire site that will be graded of 573 acres. During construction the largest single phase of construction at both portions of the site approximately 192 acres will be graded; therefore, the actual "C" value will be lower than the estimated value.

To establish "i" for the project the average annual runoff as estimated by the United States Geological Survey will be utilized. This will account for all the storms that do not necessarily produce runoff. The "i" variable is typically a depth of rainfall, therefore, it can also be used for an annual rainfall provided that it is converted to a daily flow by dividing by 365 days per year. The project includes stormwater management facilities that will control runoff rates and volume, therefore, it is appropriate to utilize the average annual runoff rate rather than the rainfall amount.

"i" = Intensity – to make this for annual runoff, the annual average runoff from the USGS will be utilized 27" = 2.25 ft.

Bare Soil "C" of 0.4 for 573 Acres

Q = CiA
C = 0.30, unimproved site
i = 2.25'
A = 573 ac bare soil
Q = (.4)(2.25')(573 ac)
Q = 516 ac. ft.
Q = (516 ac. ft.)(3.259 X 10^5) ÷ 365 days/yr.
Q = 460,724 gpd

Crossroads total by Rational Method = 460,724 gpd which could be assessed at a maximum annual fee of $3,750.

Developed Condition

The developed condition for the resort will consist of 71 acres of roof tops and pavements. The 71 acres includes 23 acres of porous pavement but does not include the roof top of the Big Indian hotel planted with vegetation or all the underground parking. The golf course greens, tees, and fairway will cover 281 acres.

A blended "C" value that accounts for runoff from the 71 acres of impervious surfaces and 281 acres of turf is found below:

$$\text{Blended "C"} \quad (0.80)\left[\frac{71}{352}\right] + (0.35)\left[\frac{281}{352}\right]$$

$$(0.80)(.20) \quad + (0.35)(0.79)$$

$$0.16 + 0.27$$

Blended "C" 0.43

Q = CiA
Q = (0.46)(2.25 ft)(352 ac)
Q = 364 ac. ft.
Q = 364 x 3.259 X 10^5 ÷ 365 days/year
Q = 325,007 gpd

The average daily runoff of 250,005 gpd includes runoff from turf and impervious surfaces expected to occur during operation. This runoff volume equates to an annual fee if and when applicable of $3,750.

Please call me if you have any questions regarding these calculations and estimated annual fee.

cc: Terresa Bakner, Esq.
Ken Graham
Dean Gitter
Dan Ruzow, Esq.

2017wm04.doc

COPY OF FULL ENVIRONMENTAL ASSESSMENT FORM (October 1999)

See Appendix 1, SEQRA Documentation

COPY OF BUILDING-STRUCTURE INVENTORY FORM (April 2000)

See Appendix 23, Cultural Resources Investigation Phase 1B

DRAFT ENVIRONMENTAL IMPACT STATEMENT (Submitted Concurrently Under Separate Cover)

crossroads ventures llc

DRAFT
Environmental Impact Statement

Appendix 11

Draft Construction Stormwater Pollution Plan

This Appendix is the draft of the project's pollution prevention plan prepared in accordance with NYSDEC's General Permit for stormwater discharges associated with construction activities.

The Belleayre Resort at Catskill Park

Form WTCFX (2/02)

NYSDEC - Division of Water

Water Treatment Chemical (WTC) Usage Notification Requirements for SPDES Permittees

Instructions Page

Note: All requested information must be supplied. Incomplete submissions will not be reviewed.

Applicability

New or increased use of a WTC requires prior DEC review and authorization. At a minimum, the permittee must notify the DEC in writing of its intent to change WTC use. The DEC will review that submittal and determine if a formal SPDES permit modification is necessary or whether WTC review and authorization may proceed outside of the formal permit administrative process. **The majority of WTC authorizations do not require formal SPDES permit modification.** Notification requirements are summarized below. WTCs which are used in closed systems and cannot be discharged or those which are discharged to municipal STP do not require DEC review. Examples of WTCs include, biocides, coagulants, conditioners, corrosion inhibitors, defoamers, flocculants, scale inhibitors, sequestrants, and settling aids. DEC staff may also direct you to use this form for review and authorization of substances, other than WTCs, which could be present in wastewater, e.g. process chemicals.

Notification Requirements and Instructions

For **each** new or increased use of a WTC, please **complete items 1a, and 2 - 14 on the attached 3 page form, entitled WTC Usage Notification Requirements for SPDES Permittees.** *Alternatively*, the permittee may, at a minimum, complete items 1a, 2 - 9 and 14 then forward the form to the WTC manufacturer who must then complete the remaining items (10 - 13) and items 1b and 15. The manufacturer must then send the completed form directly to the permit writer. This alternative method may be necessary because the WTC manufacturer may be reluctant to reveal trade secret product formulations to the permittee.[1] **Fax or Mail the completed form to:**

Permit writer:	Telephone:	Fax:
Address:		

Outfall WTC Concentration - *In general,* when completing item 7b, the average mg/l should be determined by dividing the average dosage in 6a by the average flow in 7a and then dividing by 8.34; the maximum mg/l should be determined by dividing the maximum dosage in 6a by the average flow in 7a and then dividing by 8.34. *However*, for blowdowns which are highly intermittent or are not tributary to a treatment system or some form of equalization, it may be appropriate to factor in the information in item 8 when completing item 7b.

Toxicity Information - When completing item 13, please ensure that the tests were conducted in accordance with the EPA Toxicity Manual and that the results are for the appropriate receiving water (i.e. fresh water or salt water).[2] In general, submissions which do not include any toxicity information will not be authorized. Submissions containing incomplete toxicity information will be reviewed using conservative safety factors which may prevent authorization or result in the permit being modified to include routine whole effluent toxicity testing or other monitoring.

Phosphorus - The permittee must demonstrate that the use and discharge of any WTCs containing phosphorus, tributary to the Great Lakes Basin or other ponded waters, is necessary and that no acceptable alternatives exist. Please note that in some cases your permit may require modification to regulate phosphorus.

After reviewing the submission, **the permit writer will complete items 16 and 17** and fax or mail a copy of the completed form to the person identified in item 2.c and, if appropriate, to the facility inspector.

Common Reasons Which Prevent Letter Authorization of a WTC

- Submission of incomplete or inaccurate information.
- High WTC toxicity compared to available receiving stream dilution or other predicted water quality contravention.
- Department review indicates that a SPDES permit modification is necessary.

Footnotes:

(1) If requested, the Department will restrict access to trade secret information to the extent authorized by law.

(2) **Submission of both acute (48 or 96 hour LC50 or EC50) and chronic (NOEC) test results for at least one vertebrate and one invertebrate species are required.** Refer to the following three manuals: EPA/600/4-90/027F (1993); EPA/600/4-91/002 (1994); EPA/600/4-91/003 (1994); or their replacements.

Form WTCFX (2/02)

NYSDEC - Division of Water

Water Treatment Chemical (WTC) Usage Notification Requirements for SPDES Permittees

Note: All requested information must be supplied. Incomplete submissions will not be reviewed.

Permittee completes items 1a and 2 - 14. Alternatively, the permittee may complete items 1a, 2 - 9 and 14 if the WTC manufacturer completes items 1b, 10 - 13 and 15. See instructions page.

1.a. Date Signed by Permittee - 12/18/02 | 1.b. Date Signed by WTC Manufacturer - 12/18/02

2.a. Permittee Name - Crossroads Ventures LLC | 2.b. SPDES No. - NY N/A proposed project

2.c. Contact Name - Dean L. Gitter

3.a. WTC Name - Chitosan (Storm Klear)

3.b. WTC Manufacturer - Vanson, Inc.

4. WTC Function - Stormwater flocculant

5. Affected Outfall(s) - outfalls H-171-53 (Lost Clove Brook), Birch creek H-171-52, Giggle Hollow Brook H-171-52-3, Emory Brook tribs D-70-80-12-2 and D-70-80-12-3

6.a. WTC Daily Dosage: average lbs/day = 0.1 , maximum lbs/day = 0.2

6.b. Dosage Frequency: minutes/day = 240 maximum, weather dependant , days/week = 7 maximum, weather dependant

7.a. Outfall Flow Rate: average MGD = 3.3 , maximum MGD = 4.4

7.b. Outfall WTC Concentration: average mg/l = 1.0 , maximum mg/l = 2.0

8.a. System Blowdown Flow Rate: average gpm = N/A , maximum gpm = N/A

8.b. System Blowdown Frequency: minutes/day = N/A , days/week = N/A

9. List measures in place to ensure that excessive levels of WTC are not used and subsequently discharged -
Each stormwater basin to which the Chitosan flocculant will be applied will be equipped with a staff gauge, and a ratings table will be prepared for each basin that will include gauge reading, pond volume, and chitosan dosing rate.

10.a. WTC Composition - Ingredients/Impurities (note: ingredients/impurities must total to 100%)	10.b. %	10.c. CAS#	10.d. Outfall Concentration
Chitosan	1	9012-76-4	1 mg/l
Acetic Acid	5	64-19-7	5 mg/l
Water	94	7732-18-5	94 mg/l
			mg/l
			mg/l
			mg/l
			mg/l

10.e. Intermediate/Final Degradation Products - See attached: "Biochemical Degradation of Chitin and Chitosan"

NYSDEC - Division of Water

WTC Usage Notification Requirements for SPDES Permittees

1.a. Date Signed by Permittee - 12/18/02	1.b. Date Signed by WTC Manufacturer - 12/18/02
2.b. SPDES No. - N/A New Project NY	3.a. WTC Name - Chitosan
11. WTC BOD and COD ~~(lb/lb)~~ - 1,000 – 10,000 mg/l	
12.a. Is WTC a NYS registered biocide? NO	12.b. Registration Number - N/A

13. WTC Toxicity Info (most sensitive species) - Attach description of endpoint for each EC50 and LOEC

13.a. Vertebrate Species	LC50	EC50	NOEC	LOEC	Other -
Fathead Minnow	812 mg/l	mg/l	500 mg/l	mg/l	
13.b. Vertebrate Species	LC50	EC50	NOEC	LOEC	Other -
Rainbow Trout	112 mg/l	mg/l	62.5 mg/l	mg/l	
13.c. Invertebrate Species	LC50	EC50	NOEC	LOEC	Other -
Daphnia Pulex	1369 mg/l	mg/l	1000 mg/l	mg/l	
13.d. Invertebrate Species	LC50	EC50	NOEC	LOEC	Other -
	mg/l	mg/l	mg/l	mg/l	
13.e. Species	LC50	EC50	NOEC	LOEC	Other -
	mg/l	mg/l	mg/l	mg/l	

14. Permittee Certification - I certify under penalty of law that this notification and all attachments are, to the best of my knowledge and belief, true, accurate and complete. The generic WTC usage requirements noted below will be adhered to.

PRINT NAME - DEAN L. GITTER	SIGNATURE - Dean L. Gitter
TITLE/COMPANY - Crossroads Ventures, LLC	Managing Member
TELEPHONE - (845) 688-7740	FAX - (845) 688-6887

15 WTC Manufacturer Certification - I certify under penalty of law that this notification and all attachments are, to the best of my knowledge and belief, true, accurate and complete.

PRINT NAME - John Macpherson	SIGNATURE - John Macpherson
TITLE/COMPANY - Chief Scientist	Natural Site Solutions
TELEPHONE - 425-861-9499	FAX - 425-861-8848

Form WTCFX (2/02)

NYSDEC - Division of Water

WTC Usage Notification Requirements for SPDES Permittees

1,a. Date Signed by Permittee - 12/18/02	1.b. Date Signed by WTC Manufacturer - 12/18/02
2.b. SPDES No. - NY N/A, proposed project	2.c. Contact Name - John MacPherson
3.a.. WTC Name - Chitosan	6.a. Avg/Max Daily Dosage = 0.1 / 0.2 lbs/day

Generic WTC Usage Requirements

A. WTC use shall not exceed the rate reported by the permittee or authorized below, whichever is less.

B. The discharge shall not cause or contribute to a violation of water quality or an exceedance of AWQC.

C. **The permittee must maintain a logbook** of all WTC use, noting for each WTC the date, time, exact location,and amount of each dosage, and, the name of the individual applying or measuring the chemical. The logbook must also document that adequate process controls are in place to ensure that excessive levels of WTCs are not used and subsequently discharged through outfalls. The permittee shall retain the logbook data for a period of at least 3 years. This period may be extended by request of the DEC.

D. **The permittee shall provide an annual report**, attached to the December DMR, containing the following information for each outfall: the current list of WTCs authorized for use and discharge by the DEC, for each WTC the amount in pounds used during the year, identification of authorized WTCs the permittee no longer uses, and any other pertinent information.

Items 16 - 17 must be completed by NYSDEC permit writer.

16. Review Decision (check the appropriate box). *Fax or mail a copy of the completed form to the person identified in item 2.c and, if appropriate, to the facility inspector.*

☐ The proposed WTC usage may proceed as proposed without permit modification subject to the conditions noted above.

☐ The proposed WTC usage may not proceed for one of the following three reasons:

- ☐ As noted below, the information provided is insufficient to complete our review.
- ☐ As noted below, the SPDES permit must first be modified to add new requirements.
- ☐ As noted below, the proposed use is prohibited.

17. Permit Writer Information:

PRINT NAME -	SIGNATURE -
TITLE -	DATE -
ADDRESS -	
TELEPHONE -	FAX -

BIOCHEMICAL DEGREDATION OF CHITIN AND CHITOSAN

CHITIN

↓ ← **CHITINASE** (natural enzyme)

CHITOSAN

↓ ← **CHITOSANASE** (natural enzyme)

GLUCOSAMINYL-GLUCOSAMINIDE

↓ ← **GLUCOSAMINIDASE** (natural enzyme)

GLUCOSAMINE

↓ ← **BACTERIOLOGIC DEGREDATION** (aerobic)

GLUCOSE → CO2 + Water

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March 17, 2003

Via Overnight Delivery
Mr. Patrick Ferracane
NYSDEC Region 3
200 White Plains Road – 5th Floor
Tarrytown, NY 10591-5805

Via Overnight Delivery
Mr. Edward Kuzia
NYSDEC Central Office
Division of Water
625 Broadway Albany, NY 12233

Re: Belleayre Resort at Catskill Park
WTC Usage Notification for Chitosan (Storm Klear Liqui-Floc)

Dear Messrs Ferracane and Kuzia;

On February 20, 2003 I received via e-mail Mr. Kuzia's comments regarding the Chitosan WTC Usage Notification submitted by Crossroads Ventures. This letter and attached laboratory toxicity testing reports are submitted in response to the four comments contained in Mr. Kuzia's e-mail. Responses below are provided in the same order of the four comments.

1. Attached are copies of two toxicity testing reports prepared by AMEC Earth & Environmental Northwest Bioassay Laboratories. The first report is dated December 2002 and is entitled "Toxicity Evaluation of Chitosan-based Products: Liqui-Floc and Gel-Floc." The second enclosed report is dated March 2003, also produced by AMEC Earth and Environmental, and entitled "Toxicity Evaluation of Two Chitosan Based Products Using Rainbow Trout, Liqui-Floc and Gel-Floc." The toxicity testing in both reports was performed on the whole formulation of the treatment chemicals and not just the active ingredient.

2. The five outfalls listed in Item 5 of the WTC form (Lost Clove Brook, Birch Creek, Giggle Hollow Brook and 2 tributaries of Emory Brook) are not conventional outfalls. Chitosan (liqui-floc)-treated stormwater will not be discharged directly to any of these streams. Instead, liqui-floc-treated stormwater will be discharged to long sections (hundreds of feet) of perforated pipes acting as level spreaders. These level spreaders

will be located in wooded areas well uphill of these five streams. Turbid stormwater collected in stormwater basins will be dosed with liqui-floc, allowed to flocculate and settle, and the resultant treated water will be pumped to the level spreaders.

Total Outfall Flow Rate

The outfall flow rate listed in Item 7.A of the submitted form is a very conservative estimate for the annual runoff for entire site ("total outfall") and not for any one particular "outfall".

The 3.3 MGD listed in Item 7.A was derived by using the rainfall from an average year (25.86 inches in 1993) over the entire 1,960 acre site and averaging this over 365 days;

$$\frac{25.86 \text{ inches/yr} * (1 \text{ foot}/12 \text{ inches}) * 1{,}960 \text{ acres} * (43{,}560 \text{ ft2/acre}) * 7.48 \text{ gal/ft3}}{365 \text{ days/yr}}$$

= 3.77 MGD

Conservatively assuming approximately 10% loss due to interception, infiltration, etc. (0.4 MGD) produced the estimate of 3.3 MGD in Item 7.A.

Under the detailed construction phasing plan developed for the project, it is proposed that no more than a total of 50 acres of disturbance (25 acres on each of the two golf courses) occur at any one time. Since liqui-floc will be used to treat the stormwater coming from disturbed areas, a more precise estimate of the total outfall flow rate can be derived using this total of 50 acres of disturbance:

$$\frac{25.86 \text{ inches/yr} * (1 \text{ foot}/12 \text{ inches}) * 50 \text{ acres} * (43{,}560 \text{ ft2/acre}) * 7.48 \text{ gal/ft3}}{365 \text{ days/yr}}$$

= 96,186 gpd

= 0.096 MGD

Since construction will likely be occurring over a 7 month (210 day) period instead of year round it may be more appropriate to estimate the total outfall flow rate of 0.167 MGD.

Individual "Outfall" Flow Rates

The location of active construction areas will change throughout the multi-year buildout of the project. The proposed construction sequencing purposefully spreads out the areas of construction into the different drainages ("outfalls"). Therefore, the amount of liqui-floc-treated water that is discharged within the drainages of the five streams listed will also vary during the construction process.

The maximum amount of area that could be under construction in a given drainage ("outfall") is 25 acres. Using the total outfall flow estimates calculated for the 7 month construction season and a total of 50 acres of construction, the maximum outfall flow rate in any of the drainages ("outfalls") is 0.084 MGD. (half of the 0.167 total outfall calculated above)

3. It is known that enough chitosan will be applied to the stormwater basins to produce an initial 1.0 mg/l concentration (possibly as high as a 2.0 mg/l initial concentration) in the stormwater basins. As the flocculent binds to sediment and settles out in the basin, chitosan concentration in solution will be reduced.

In order to be very conservative in the WTC form, it was assumed that the outfall concentration would be the same as the initial 1.0 to 2.0 mg/l dosing concentration in the sediment basin. Hence the 1.0 mg/l average concentration and 2.0 mg/l maximum concentration in Item 7.B (Outfall Concentration).

Field studies conducted by the manufacturer at construction sites have found that 95% to 99% of the chitosan is taken out of solution during the flocculating process. Using a more conservative reduction rate of 90% as a result of flocculation would result in the initial dosing concentrations of 1.0 to 2.0 mg/l in the stormwater basin being reduced to 0.1 to 0.2 mg/l before pumping to the level spreader "outfalls".

Using the 0.096 MGD (96,186 gpd) total outfall flow rate for the overall 50 acres of disturbance, and the maximum 0.2 mg/l outfall concentration from above would produce the following Daily Dosage (Item 6.A) for the entire project:

Daily Dosage (Total) = 96,186 gpd * 3.785 l/gal * 0.2 mg/l * (1 lb/453,492 mg)
= 0.16 lb/day

Similarly, for the maximum 25 acres of construction in any drainage ("outfall") the maximum Daily Dosage for any of the drainages ("outfalls") would be half of the total, or 0.08 lb/day.

These data presented above are for an annual basis and for a year with average annual rainfall. Years with higher precipitation amounts will require the use of more liqui-floc. However, dosing concentrations in the stormwater basins will remain the same, 1 mg/l and possibly as high as 2 mg/l, and "outfall" concentrations will also be the same, conservatively estimated as 0.1 to 0.2 mg/l.

4. The following toxicity data is included in the two reports referenced in Item 1 above.

December 2002 Report

	LC50	NOEC (mg/l)
Fathead minnow	643 mg/l	500
Daphnia pulex	1,369 mg/l	1,000
Rainbow trout	110 mg/l	10

March 2003 Report

The March 2003 report is enlightening from the standpoint that it contains test results from liqui-floc product dissolved in standard dilution water as well as dilution water prepared to a standardized turbidity (simulated stormwater).

For the standard dilution water testing toxicity for liqui-floc was found to be slightly lower than for the December 2002 report listed above;

Rainbow Trout LC50 = 434.7 mg/l (versus 110 mg/l form December 2002)
Rainbow Trout NOEC = 100 mg/l (versus 10 mg/l from December 2002)

Including the dose response testing utilizing the simulated stormwater test solutions illustrates the flocculation and solution concentration dissipation that can be expected prior to discharge discussed previously. The acute survival data using the simulated stormwater solutions produced the following results;

Rainbow Trout LC50 = >10,000 mg/l
Rainbow Trout EC50 = 10,000 mg/l

Synopsis

Extrapolating the results from the two sets of data demonstrates how significantly liqui-floc concentrations decrease due to the flocculation process and removal from solution.

Based on the two sets of LC50 data, liqui-floc concentrations were reduced by more than 95.7% (1- (434.7 mg/l / >10,000 mg/l)).

Based on the two sets of EC50 data, liqui-floc concentrations were reduced by 99% (1- (100 mg/l / 10,000 mg/l)).

Recalling that the initial stormwater pond dosing rate will be sufficient to produce an initial concentration of 1.0 mg/l and at most 2.0 mg/l, even only a 90% reduction prior to discharge will result in discharge levels of 0.1 to 0.2 mg/l. Given the NOEC of 100 mg/l for "clean" test water, still produces a 500 to 1,000 difference between the NOEC concentration and the "outfall" concentration. This does not even take into account the possibility that should any liqui-floc even end up reaching any of the five streams in the identified drainages, that concentrations could conceivably be lowered even more given the background turbidity in the receiving water.

Use of chitosan products as stormwater flocculants in the State of Washington, where the protection of anadromous salmonid stocks is if paramount importance, is testimony to the safety of these products for use in coldwater fisheries in the Central Catskills and elsewhere in New York State.

I trust that this addresses your previous questions. If you should have any additional questions please contact me.

Sincerely,

Kevin J. Franke
For
The LA Group, P.C.

Enc.

cc. (via 1st Class, no Enc) Alec Ciesluk, NYSDEC New Paltz
Ken Graham, Crossroads Ventures
Terresa Bakner, Whiteman Osterman and Hanna

Toxicity Evaluation of Chitosan-based Products:
Liqui-Floc and Gel-Floc

Prepared for
Natural Site Solutions
16541 Redmond Way
405-C
Redmond, WA 98052

Prepared by
AMEC Earth & Environmental
Northwest Bioassay Laboratory
5009 Pacific Hwy. E., Suite 2
Fife, WA 98424
253-922-4296

December 2002

amec

BIOASSAY REPORT

December 2002

Prepared for

Natural Site Solutions
16541 Redmond Way, 405-C
Redmond, WA 98052

Liqui-Floc
Gel-Floc

Prepared by

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Submitted: 3 January 2003

INTRODUCTION

Acute toxicity testing was conducted using the test organisms *Pimephales promelas* (Fathead minnow), *Daphnia pulex*, and *Oncorhynchus mykiss* (Rainbow trout) to determine LC_{50} values for the chitosan-based products Liqui-Floc and Gel-Floc. Tests followed EPA and Washington State Department of Ecology testing guidelines and were conducted at AMEC Earth & Environmental's Northwest Bioassay Laboratory located in Fife, Washington (AMEC).

MATERIALS AND METHODS

Samples of Liquid-Floc and Gel-Floc were received at AMEC on 18 November 2002 for toxicity testing.

Range finding tests were conducted with each of the three test species (Fathead minnow, *Daphnia pulex*, and Rainbow trout) to obtain an approximate LC_{50} value for the each of the two products. Definitive acute toxicity tests were then conducted using concentrations bracketing both the estimated LC_{50} value and the intended use concentration of 1 mg/L.

Liqui-Floc was a clear, viscous liquid and Gel-Floc is a solid flake material. Fresh stock solutions of the products were prepared prior to each test. Liqui-Floc and Gel-Floc were measured, added to laboratory water, and stirred on a magnetic stir plate for a minimum of 6 hours prior to mixing dilutions.

Test Conditions are summarized in Tables 1 through 3.

Table 1. Summary of Test Conditions – 96-hr Fathead minnow Acute Survival

Test Type:	Static 96-hour test with renewal at 48 hours
Test Initiation Date & Time	
Liqui-Floc:	12/17/2002; 1515
Gel-Floc:	12/17/2002; 1645
Test Termination Date & Time	
Liqui-Floc:	12/17/2002; 1500
Gel-Floc:	12/17/2002; 1645
Endpoint:	Mortality or 96-hours
Test Animal:	*Pimephales promelas*
Animal Source:	Aquatox; Hot Springs, AR
Animal Age:	4 days post hatch
Feeding:	*Artemia* nauplii 2 hours before test initiation and solution renewal at 48 hours
Test Chamber:	250 milliliter polypropylene cup
Test Solution Volume:	200 milliliters
Test Temperature:	25°C
Dilution Water:	Moderately Hard Synthetic Water
Test Concentrations (mg/L):	
Liqui-Floc:	2000,1000, 750, 500, 250, 10, 1.0, 0.5, 0 (control)
Gel-Floc:	100, 50, 25, 12.5, 6.25, 1.0, 0.1, 0 (control)
Number of Organisms/ Chamber:	10
Number of Replicates/Conc.:	3
Photoperiod:	16 hours light/ 8 hours dark
Aeration:	None
Deviations:	None
Statistical Software:	ToxCalc 5.0
Test Protocol:	EPA/600/4-90/027F
Test Acceptability:	$\geq$ 90% control survival

Table 2. Summary of Test Conditions – 48-hr *Daphnia pulex* Acute Survival

Test Type:	Static 48-hour test; no renewal
Test Initiation Date & Time	
Liqui-Floc:	12/6/2002; 1700
Gel-Floc:	12/6/2002; 1600
Test Termination Date & Time	
Liqui-Floc:	12/8/2002; 1600
Gel-Floc:	12/8/2002; 1500
Endpoint:	Mortality or 48-hours
Test Animal:	*Daphnia pulex*
Animal Source:	In-house culture
Animal Age:	< 24 hours
Feeding:	50:50 YTC:Selenastrum mixture before test initiation
Test Chamber:	30 milliliter polypropylene cup
Test Solution Volume:	25 milliliters
Test Temperature:	25°C
Dilution Water:	Moderately Hard Synthetic Water
Test Concentrations (mg/L):	
Liqui-Floc:	3000, 2000,1000, 500, 250, 125, 10, 1.0, 0.1, 0 (control)
Gel-Floc:	300, 200, 100, 50, 25, 12.5, 6.25, 1.0, 0.1, 0 (control)
Number of Organisms/Chamber:	5
Number of Replicates/Conc.:	4
Photoperiod:	16 hours light/ 8 hours dark
Aeration:	None
Deviations:	None
Statistical Software:	ToxCalc 5.0
Test Protocol:	EPA/600/4-90/027F
Test Acceptability:	≥ 90% control survival

Table 3. Summary of Test Conditions – 96-hr Rainbow trout Acute Survival

Test Type:	Static 96-hour test; no renewal
Test Initiation Date & Time	
Liqui-Floc:	12/30/2002; 1000
Gel-Floc:	12/30/2002; 1000
Test Termination Date & Time	
Liqui-Floc:	1/3/2003; 1000
Gel-Floc:	1/3/2003; 1000
Endpoint:	Mortality or 96-hours
Test Animal:	*Oncorhynchus mykiss* (Rainbow trout)
Animal Source:	Thomas Fish Co., Anderson, CA
Acclimation Time:	7 days
Animal Age:	29 days from swim up
Feeding:	Trout chow fed to cultures, no feeding 12 hours prior to test initiation or throughout duration of test
Test Chamber:	2.5-gallon glass tank
Test Solution Volume:	4 liters
Test Temperature:	12°C
Dilution Water:	Carbon filtered tap water
Test Concentrations (mg/L):	
Liqui-Floc:	500, 250, 125, 62.5 10, 1.0, 0.5, 0 (control)
Gel-Floc:	100, 50, 10, 1.0, 0.5, 0 (control)
Number of Organisms/ Chamber:	10
Number of Replicates/Conc.:	3
Photoperiod:	16 hours light/ 8 hours dark
Aeration:	None
Deviations:	None
Statistical Software:	ToxCalc 5.0
Test Protocol:	EPA/600/4-90/027F
Test Acceptability:	$\geq$90% control survival

RESULTS

Range-finding tests conducted with the three species indicated approximate LC_{50} values as follows:

Species	Liqui-Floc	Gel-Floc
Fathead minnow	1400 mg/L	31 mg/L
Daphnia pulex	406 mg/L	24 mg/L
Rainbow trout	<100 mg/L	<10 mg/L

Results for the definitive acute toxicity tests are shown in Tables 4 and 5 for Liqui-Floc and Gel-Floc, respectively.

Table 4. Acute Toxicity Results – Liqui-Floc

Species	Concentration (mg/L)	Percent Survival	NOEC[a] (mg/L)	LC_{50}
Fathead minnow	0	100	500	**643 mg/L**
	0.5	97		
	1.0	93		
	10	93		
	250	93		
	500	93		
	750	63		
	1000	7		
	2000	0		
Daphnia pulex	0	95	1000	**1369 mg/L**
	0.1	95		
	1.0	95		
	10	95		
	125	85		
	250	90		
	500	75		
	1000	80		
	2000	70		
	3000	0		
Rainbow trout	0	100	10	**110 mg/L**
	0.5	100		
	1.0	100		
	10	100		
	62.5	90		
	125	43		
	250	0		
	500	0		

[a] No Observed Effect Concentration

Table 5. Acute Toxicity Results – Gel-Floc

Species	Concentration (mg/L)	Percent Survival	NOEC[a] (mg/L)	LC_{50}
Fathead minnow	0	93	12.5	**23 mg/L**
	0.1	87		
	1.0	97		
	6.25	90		
	12.5	90		
	25	30		
	50	7		
	100	0		
Daphnia pulex	0	95	100	**93 mg/L**
	0.1	95		
	1.0	95		
	6.25	85		
	12.5	85		
	25	90		
	50	75		
	100	85		
	200	5		
	300	0		
Rainbow trout	0	100	1.0	**3 mg/L**
	0.5	100		
	1.0	97		
	10	0		
	50	0		
	100	0		

[a] No Observed Effect Concentration

Test data and individual statistical summaries for each test are contained in the appendices.

Quality Assurance

Results for the acute reference toxicant tests used to monitor laboratory performance and assess organism health are summarized in Table 6. The results are acceptable based on control charting for the laboratory. The coefficients of variation (CV) for the tests are also shown in the table.

Table 6. Acute Reference Toxicant Results

Species	Test ID	LC_{50}	CV (%)
Fathead minnow	RA121702PP	36.4 µg/L $CuCl_2$	35
Daphnia pulex	RA120302DP	8.17 µg/L $CuCl_2$	35
Rainbow trout	RT120202OM	186 µg/L $CuSO_4$	32.5

REFERENCES

EPA. 1993. Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms. C.I. Weber. EPA/600/4-90/027F, August 1993.

Tidepool Scientific Software. 1992-1994. TOXCALC Comprehensive Toxicity Data Analysis and Database Software, Version 5.0.

WADOE. 2001. Laboratory Guidance and Whole Effluent Toxicity Test Review Criteria. Washington State Department of Ecology. Water Quality Program. Publication number: WQ-R-95-80, Revised December 2001.

Appendix A

Acute Toxicity Tests

Liqui-Floc

Pimephales promelas

Acute Fish Test-96 Hr Survival

Start Date:	12/17/02	Test ID:	0212-71NW	Sample ID:	Natural Site Solutions
End Date:	12/21/02	Lab ID:	WAAEE-AMEC NW Bioassa	Sample Type:	Liqui-Floc
Sample Date:		Protocol:	EPAF 93-EPA Acute	Test Species:	PP-Pimephales promelas
Comments:					

Conc-mg/L	1	2	3
D-Control	1.0000	1.0000	1.0000
0.5	0.9000	1.0000	1.0000
1	0.9000	0.9000	1.0000
10	1.0000	0.9000	0.9000
250	1.0000	0.9000	0.9000
500	1.0000	0.9000	0.9000
750	0.5000	0.8000	0.6000
1000	0.0000	0.1000	0.1000
2000	0.0000	0.0000	0.0000

			Transform: Arcsin Square Root						1-Tailed		Number	Total
Conc-mg/L	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD	Resp	Number
D-Control	1.0000	1.0000	1.4120	1.4120	1.4120	0.000	3				0	30
0.5	0.9667	0.9667	1.3577	1.2490	1.4120	6.930	3	0.705	2.580	0.1989	1	30
1	0.9333	0.9333	1.3034	1.2490	1.4120	7.219	3	1.410	2.580	0.1989	2	30
10	0.9333	0.9333	1.3034	1.2490	1.4120	7.219	3	1.410	2.580	0.1989	2	30
250	0.9333	0.9333	1.3034	1.2490	1.4120	7.219	3	1.410	2.580	0.1989	2	30
500	0.9333	0.9333	1.3034	1.2490	1.4120	7.219	3	1.410	2.580	0.1989	2	30
*750	0.6333	0.6333	0.9262	0.7854	1.1071	17.770	3	6.303	2.580	0.1989	11	30
*1000	0.0667	0.0667	0.2674	0.1588	0.3218	35.184	3	14.849	2.580	0.1989	28	30
*2000	0.0000	0.0000	0.1588	0.1588	0.1588	0.000	3	16.259	2.580	0.1989	30	30

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.94083	0.894	0.4278	-0.3143
Equality of variance cannot be confirmed				

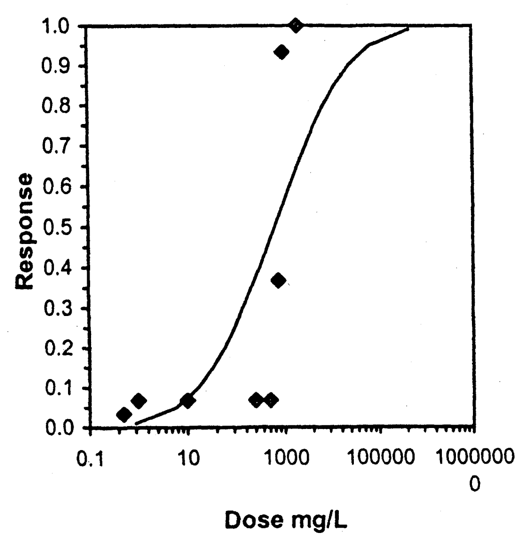
Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU	MSDu	MSDp	MSB	MSE	F-Prob	df
Dunnett's Test	500	750	612.372		0.09755	0.10005	0.71365	0.00891	1.7E-12	8, 18

Maximum Likelihood-Probit

Parameter	Value	SE	95% Fiducial Limits		Control	Chi-Sq	Critical	P-value	Mu	Sigma	Iter
Slope	0.81328	0.45557	-0.3015	1.92802	0	78.7428	12.5916	6.5E-15	2.80792	1.2296	5
Intercept	2.71638	1.23636	-0.3089	5.74165							
TSCR											

Point	Probits	mg/L	95% Fiducial Limits
EC01	2.674	0.88605	
EC05	3.355	6.10124	
EC10	3.718	17.0661	
EC15	3.964	34.1609	
EC20	4.158	59.302	
EC25	4.326	95.1861	
EC40	4.747	313.624	
EC50	5.000	642.574	
EC60	5.253	1316.55	
EC75	5.674	4337.83	
EC80	5.842	6962.69	
EC85	6.036	12087	
EC90	6.282	24194.3	
EC95	6.645	67675	
EC99	7.326	466005	

Significant heterogeneity detected (p = 6.50E-15)

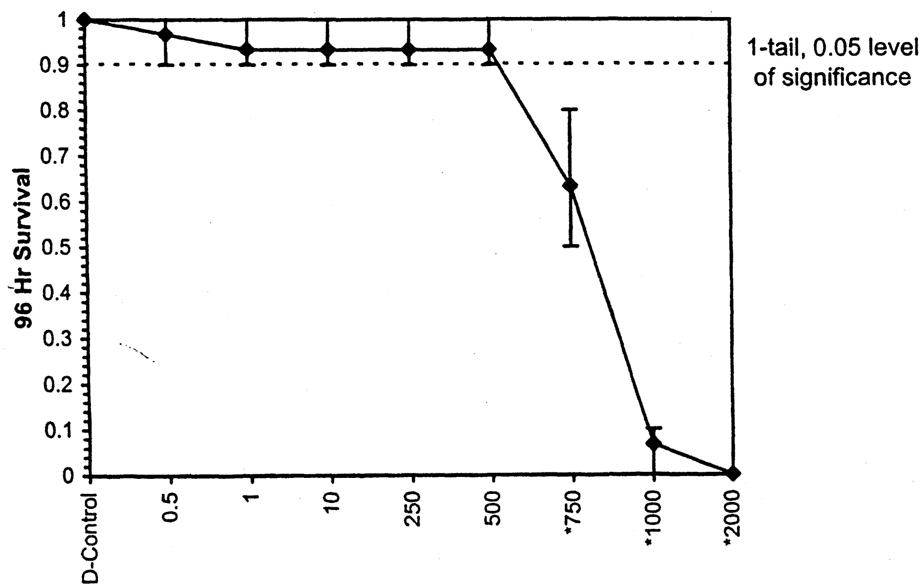


ToxCalc v5.0.23
Reviewed by: [signature]

Acute Fish Test-96 Hr Survival

Start Date:	12/17/02	Test ID:	0212-71NW	Sample ID:	Natural Site Solutions
End Date:	12/21/02	Lab ID:	WAAEE-AMEC NW Bioassay	Sample Type:	Liqui-Floc
Sample Date:		Protocol:	EPAF 93-EPA Acute	Test Species:	PP-Pimephales promelas
Comments:					

Dose-Response Plot



ToxCalc v5.0.23

Reviewed by:

AMEC Earth Environmental
Northwest Bioassay Lab
5009 Pacific Hwy. E. Suite 2-0
Fife, WA 98424

96 Hour Toxicity Test Data Sheet
Freshwater 96-hr Acute with Renewal

Client: Natural Site Solutions
Sample ID: Liqui-Floc
Contact:
Test #: 0212-71NW

Start Date & Time: 12/17/02 15:15
End Date & Time: 12/21/02 1500
Test Organism: P. promelas
Test Protocol: "

Sample Conc. or %	D.O. (mg/L)						pH ~~(mg/L)~~					
	Init.		Fin.	Init.		Fin.	Init.		Fin.	Init.		Fin.
mg/L	0	24	48	48	72	96	0	24	48	48	72	96
0	8.2	7.3	6.7	7.8	7.7	7.2	7.74	7.77	7.82	7.83	7.93	7.77
0.5	8.3	7.5	6.9	7.6	7.6	7.7	7.79	7.83	7.87	7.82	7.93	7.82
1.0	8.4	7.2	6.9	7.6	7.6	7.6	7.83	7.89	7.87	7.87	7.93	7.84
10	8.5	7.5	7.1	7.2	7.3	6.9	7.85	7.91	7.89	7.92	7.94	7.93
250	8.5	7.3	6.8	7.3	7.2	7.3	7.76	7.87	7.96	7.74	7.94	7.79
500	8.6	7.3	6.7	7.3	7.4	7.0	7.58	7.85	7.93	7.61	7.93	7.81

Sample Conc. or %	Conductivity µS/cm				Test Temperature (°C)					
	Init.	Fin.	Init.	Fin.	Init.		Fin.	Init.		Fin.
mg/L	0	48	48	96	0	24	48	48	72	96
0	288	305	288	308	25.6	24.9	25.5	24.2	25.3	25.2
0.5	289	307	289	307	25.0	24.8	25.3	24.3	25.1	25.1
1.0	289	311	290	310	25.0	25.1	25.2	24.5	25.0	25.1
10	289	308	289	304	25.0	25.6	25.0	24.5	25.6	25.1
250	289	309	288	314	25.6	25.3	25.4	24.2	25.1	25.3
2500	289	308	288	307	25.0	24.7	25.1	24.4	25.1	25.0

Conc.	Alkalinity* *(mg/L as CaCo3)	Hardness*	Chlorine Resid. (mg/L)	Ammonia (mg/L)
control	60	96	–	–
highest conc.	60	96	–	–

Comments:

Analysts:

mg/L Sample Conc. or %	Rep #	Cont #	Number of Live Organisms 0	24	48	72	96
0	1	1	10	10	10	10	10
	2	2	10	10	10	10	10
	3	3	10	10	10	10	10
0.5	1	4	10	10	10	10	~~9~~ 10
	2	5	10	10	10	10	10
	3	6	10	10	10	10	10
1.0	1	7	10	9	9	9	9
	2	8	10	10	9	9	9
	3	9	10	10	10	10	10
10	1	10	10	10	10	10	10
	2	11	10	10	9	9	9
	3	12	10	10	9	9	9
250	1	13	10	10	10	10	10
	2	14	10	9	9	9	9
	3	15	10	10	10	9	9
500	1	16	10	10	10	10	10
	2	17	10	10	9	9	9
	3	18	10	10	10	10	9
Tech. Initials			Et	Et	Et	Et	ML

Sample Description:

Animal Source: Aquatox
Date Received: 12/17/02
Date of Hatch: 12/13/02

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page 2

96 Hour Toxicity Test Data Sheet
Freshwater 96-hr Acute with Renewal

Client: Natural Site Solutions
Sample ID: Liqui-Floc
Contact:
Test #: 0212-71NW

Start Date & Time: 12/17/02 1515
End Date & Time: 12/21/02 1500
Test Organism: P. promelas
Test Protocol:

Sample Conc. or %	D.O. (mg/L) Init.		Fin.	Init.		Fin.	pH (mg/L) Init.		Fin.	Init.		Fin.
mg/L	0	24	48	48	72	96	0	24	48	48	72	96
750	8.2	7.1	6.5	7.2	7.3	6.5	7.38	7.80	7.85	7.42	7.85	7.86
1000	8.2	7.6	6.5	7.1	7.3	6.5	7.18	7.78	7.95	7.39	7.80	7.72
2000	8.1	5.5					7.09	7.58				

Sample Conc. or %	Conductivity µS/cm Init.	Fin.	Init.	Fin.	Test Temperature (°C) Init.		Fin.	Init.		Fin.
mg/L	0	48	48	96	0	24	48	48	72	96
750	289	309	289	305	25.6	24.8	25.3	24.8	25.0	25.1
1000	289	310	288	306	25.0	24.7	25.2	24.5	25.2	25.[illegible]
2000	291				25.0	24.9				

Conc.	Alkalinity* *(mg/L as CaCo3)	Hardness*	Chlorine Resid. (mg/L)	Ammonia (mg/L)
control	60	96	–	–
highest conc.	60	96	–	–

Comments:

Analysts:

mg/L Sample Conc. or %	Rep #	Cont #	Number of Live Organisms 0	24	48	72	96
750	1	19	10	10	9	8	5
	2	20	10	10	8	8	8
	3	21	10	10	8	7	6
1000	1	22	10	5	3	0	0
	2	23	10	7	5	2	1
	3	24	10	9	6	2	1
2000	1	25	10	0			
	2	26	10	0			
	3	27	10	0			
	1		10				
	2		10				
	3		10				
	1		10				
	2		10				
	3		10				
	1		10				
	2		10				
	3		10				
Tech. Initials							

Sample Description:

Animal Source: Aquatox
Date Received: 12/17/02
Date of Hatch: 12/13/02

Daphnia pulex

Acute Daphnia Test-48 Hr Survival

Start Date:	12/6/02	Test ID:	0212-27NW	Sample ID:	Natural Site Solutions
End Date:	12/8/02	Lab ID:	WAAEE-AMEC NW Bioassay	Sample Type:	Liqui-Floc
Sample Date:		Protocol:	EPAF 93-EPA Acute	Test Species:	DP-Daphnia pulex
Comments:					

Conc-mg/L	1	2	3	4
D-Control	0.8000	1.0000	1.0000	1.0000
0.1	0.8000	1.0000	1.0000	1.0000
1	0.8000	1.0000	1.0000	1.0000
10	1.0000	1.0000	1.0000	0.8000
125	0.8000	0.8000	1.0000	0.8000
250	1.0000	0.8000	1.0000	0.8000
500	0.8000	0.8000	0.8000	0.6000
1000	0.8000	1.0000	0.8000	0.6000
2000	0.6000	0.8000	0.8000	0.6000
3000	0.0000	0.0000	0.0000	0.0000

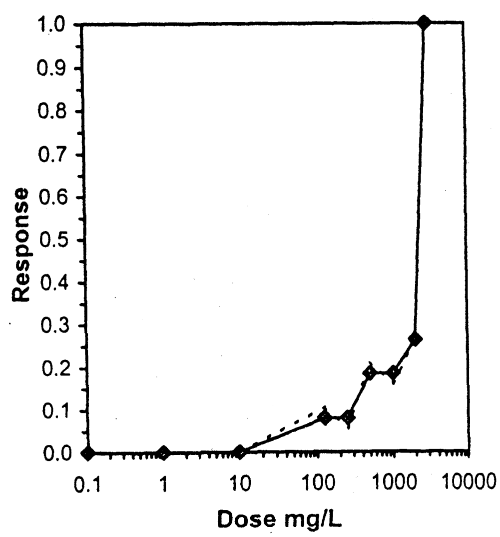
			Transform: Arcsin Square Root						1-Tailed		Number	Total
Conc-mg/L	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD	Resp	Number
D-Control	0.9500	1.0000	1.2857	1.1071	1.3453	9.261	4				1	20
0.1	0.9500	1.0000	1.2857	1.1071	1.3453	9.261	4	0.000	2.513	0.2321	1	20
1	0.9500	1.0000	1.2857	1.1071	1.3453	9.261	4	0.000	2.513	0.2321	1	20
10	0.9500	1.0000	1.2857	1.1071	1.3453	9.261	4	0.000	2.513	0.2321	1	20
125	0.8500	0.8947	1.1667	1.1071	1.3453	10.206	4	1.290	2.513	0.2321	3	20
250	0.9000	0.9474	1.2262	1.1071	1.3453	11.212	4	0.645	2.513	0.2321	2	20
*500	0.7500	0.7895	1.0519	0.8861	1.1071	10.508	4	2.533	2.513	0.2321	5	20
1000	0.8000	0.8421	1.1114	0.8861	1.3453	16.874	4	1.888	2.513	0.2321	4	20
*2000	0.7000	0.7368	0.9966	0.8861	1.1071	12.807	4	3.131	2.513	0.2321	6	20
3000	0.0000	0.0000	0.2255	0.2255	0.2255	0.000	4				20	20

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.01)	0.90357	0.912	-0.3588	-0.7211
Bartlett's Test indicates equal variances (p = 1.00)	1.26889	20.0902		

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU	MSDu	MSDp	MSB	MSE	F-Prob	df
Dunnett's Test	1000	2000	1414.21		0.16533	0.17953	0.05058	0.01705	0.01615	8, 27

Trimmed Spearman-Karber

Trim Level	EC50	95% CL	
0.0%	1369.13	1022.46	1833.32
5.0%	1649.08	1241.68	2190.16
10.0%	1865.11	1449.98	2399.08
20.0%	2216.92	1831.45	2683.52
Auto-0.0%	1369.13	1022.46	1833.32



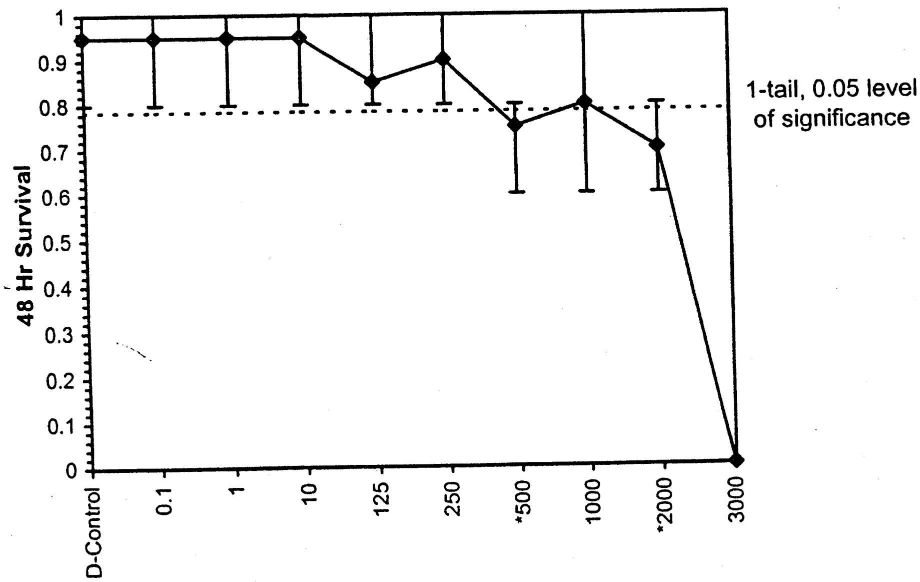
ToxCalc v5.0.23

Reviewed by: KS

Acute Daphnia Test-48 Hr Survival

Start Date:	12/6/02	Test ID:	0212-27NW	Sample ID:	Natural Site Solutions
End Date:	12/8/02	Lab ID:	WAAEE-AMEC NW Bioassay	Sample Type:	Liqui-Floc
Sample Date:		Protocol:	EPAF 93-EPA Acute	Test Species:	DP-Daphnia pulex
Comments:					

Dose-Response Plot



ToxCalc v5.0.23

Reviewed by: KS

Freshwater Acute
48 Hour Toxicity Test Data Sheet
Northwest Bioassay Lab

Client: NSS /
Sample ID: Liquid Floc
Contact:
Test #: 0212-27NW

Start Date & Time: 12/6/02 1700
End Date & Time: 12/8/02 1600
Test Organisms: D. pulex

Conc. or %	Cont. #	Rep. #	Number of Live Organisms 0	24	48	Dissolved Oxygen (mg/L) 0	24	48	pH (units) 0	24	48	Cond uhom-cm 0	48	Temperature (°C) 0	24	48	Mean Percent Survival
C	23	1	5	5	4	8.0	7.8	7.5	7.95	7.90	7.87	268	305	25.3	24.0	25.7	
	18	2	5	5	~~4~~ 5												
	22	3	5	5	5												
	25	4	5	5	5												95%
0.1	9	1	5	5	4	8.1	7.6	7.4	7.64	7.94	7.93	264	308	25.5	24.0	25.6	
	8	2	5	5	~~4~~ 5												
	27	3	5	5	5												
	16	4	5	5	5												95%
1	31	1	5	5	4	8.2	7.6	7.0	7.69	7.92	7.91	266	306	25.3	24.0	25.7	
	1	2	5	5	5												
	17	3	5	5	5												
	28	4	5	5	~~4~~ 5												95%
10	4	1	5	5	5	7.9	7.6	*	7.75	7.91	*	266	*	25.1	24.0	*	
	7	2	5	5	5												
	11	3	5	4	~~4~~ 5												
	5	4	5	4	4												95%
125	32	1	5	5	~~3~~ 4	8.0	7.6	7.3	7.79	7.90	7.91	267	308	25.1	14.0	25.4	
	14	2	5	4	~~3~~ ~~4~~ 4												
	10	3	5	5	5												
	12	4	5	4	4												85%
250	19	1	5	5	5	7.9	7.6	7.4	7.81	7.91	7.94	267	308	25.3	24.0	25.6	
	30	2	5	4	4												
	15	3	5	~~4~~ 5	5												
	29	4	5	~~4~~ 4	~~4~~ 4												90%
Technician Initials			m	MF	mw												

Conc.	Alkalinity (mg/L)	~~Chlorine~~ Hardness (mg/L)	Ammonia (mg/L)
control	60	80	—
highest conc.	60	80	—

Sample Description:

Analyst Initials: MF

Comments:
0 hrs:
24 hrs.
48 hrs. mold spores found in some cups including two control cups.
* chemistry cup dropped 12/8/02 mr

AMEC Earth & Environmental
Northwest Bioassay Laboratory
5009 Pacific Hwy. E. Suite 2-0
Fife, WA 98424
(253) 922-4296

Freshwater Acute
48 Hour Toxicity Test Data Sheet
Northwest Bioassay Lab

Client: NSS
Sample ID: Liquid Floc
Contact:
Test #: 0212-27 NW

Start Date & Time: 12/6/02 1700
End Date & Time: 12/8/02 1600
Test Organisms: D. pulex

Conc. or %	Cont. #	Rep. #	Number of Live Organisms 0	24	48	Dissolved Oxygen (mg/L) 0	24	48	pH (units) 0	24	48	Cond uhom-cm 0	48	Temperature (°C) 0	24	48	Mean Percent Survival
500	6	1	5	4	4	7.9	7.7	7.5	7.81	7.95	7.93	265	304	25.1	24.0	25.5	
	24	2	5	4	4												
	26	3	5	4	4												
	3	4	5	5	3												75%
1000	13	1	5	5	4	8.1	7.6	7.1	7.73	7.90	7.89	266	305	25.1	24.0	25.6	
	20	2	5	5	5												
	2	3	5	5	4												
	21	4	5	5	3												80%
2000	33	1	5	4	3	8.0	7.2	7.0	7.58	7.90	7.92	271	306	25.1	24.0	25.6	
	34	2	5	5	4												
	35	3	5	5	4												
	36	4	5	5	3												70%
3000	37	1	5	4	0	8.0	7.1	7.0	7.42	7.92	7.93	271	308	25.1	24.0	25.6	
	38	2	5	5	0												
	39	3	5	4	0												
	40	4	5	3	0												0
		1															
		2															
		3															
		4															
		1															
		2															
		3															
		4															
Technician Initials			~	MF	m												

Conc.	Alkalinity (mg/L)	~~Chlorine~~ Hardness (mg/L)	Ammonia (mg/L)
control	60	80	–
highest conc.	60	80	–

Sample Description:

Analyst Initials: ~ MF

Comments: 0 hrs:
24 hrs.
48 hrs.

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Northwest Bioassay Laboratory
5009 Pacific Hwy. E. Suite 2-0
Fife, WA 98424
(253) 922-4296

Appendix B

Acute Toxicity Tests

Gel-Floc

Oncorhynchus mykiss

Acute Fish Test-96 Hr Survival

Start Date:	12/30/02	Test ID:	0212-73NW	Sample ID:	Natural Site Solutions
End Date:	1/3/02	Lab ID:	WAAEE-AMEC NW Bioassa)	Sample Type:	Liqui-Floc
Sample Date:		Protocol:	EPAF 93-EPA Acute	Test Species:	OM-Oncorhynchus mykiss
Comments:					

Conc-mg/L	1	2	3
D-Control	1.0000	1.0000	1.0000
0.5	1.0000	1.0000	1.0000
1	1.0000	1.0000	1.0000
10	1.0000	1.0000	1.0000
62.5	1.0000	0.8000	0.9000
125	0.4000	0.5000	0.4000
250	0.0000	0.0000	0.0000
500	0.0000	0.0000	0.0000

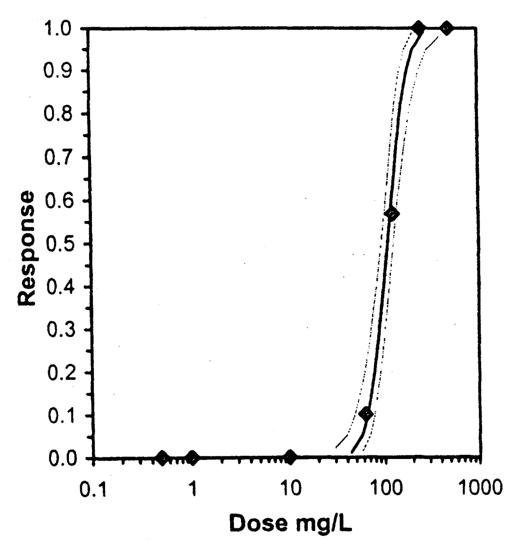
			Transform: Arcsin Square Root						1-Tailed		Number	Total
Conc-mg/L	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD	Resp	Number
D-Control	1.0000	1.0000	1.4120	1.4120	1.4120	0.000	3				0	30
0.5	1.0000	1.0000	1.4120	1.4120	1.4120	0.000	3	0.000	2.560	0.1206	0	30
1	1.0000	1.0000	1.4120	1.4120	1.4120	0.000	3	0.000	2.560	0.1206	0	30
10	1.0000	1.0000	1.4120	1.4120	1.4120	0.000	3	0.000	2.560	0.1206	0	30
*62.5	0.9000	0.9000	1.2561	1.1071	1.4120	12.145	3	3.309	2.560	0.1206	3	30
*125	0.4333	0.4333	0.7183	0.6847	0.7854	8.093	3	14.720	2.560	0.1206	17	30
*250	0.0000	0.0000	0.1588	0.1588	0.1588	0.000	3	26.593	2.560	0.1206	30	30
*500	0.0000	0.0000	0.1588	0.1588	0.1588	0.000	3	26.593	2.560	0.1206	30	30

Auxiliary Tests					Statistic		Critical		Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.01)					0.59604		0.884		0.30447	8.19331
Equality of variance cannot be confirmed										
Hypothesis Test (1-tail, 0.05)	**NOEC**	**LOEC**	**ChV**	**TU**	**MSDu**	**MSDp**	**MSB**	**MSE**	**F-Prob**	**df**
Dunnett's Test	10	62.5	25		0.05107	0.05238	0.95949	0.00333	1.3E-15	7, 16

Maximum Likelihood-Probit

Parameter	Value	SE	95% Fiducial Limits		Control	Chi-Sq	Critical	P-value	Mu	Sigma	Iter
Slope	5.81653	0.98048	3.89478	7.73828	0	1.27421	11.0705	0.94	2.04171	0.17192	5
Intercept	-6.8757	2.01386	-10.823	-2.9285							
TSCR											

Point	Probits	mg/L	95% Fiducial Limits	
EC01	2.674	43.8287	26.8645	56.9314
EC05	3.355	57.4016	39.7578	70.494
EC10	3.718	66.2803	48.8268	79.2764
EC15	3.964	73.0341	55.9532	86.0178
EC20	4.158	78.8894	62.2262	91.9674
EC25	4.326	84.2855	68.0353	97.5849
EC40	4.747	99.5766	84.236	114.597
EC50	5.000	110.081	94.785	127.561
EC60	5.253	121.694	105.681	143.3
EC75	5.674	143.772	124.366	177.05
EC80	5.842	153.606	132.038	193.467
EC85	6.036	165.921	141.244	215.047
EC90	6.282	182.828	153.326	246.318
EC95	6.645	211.107	172.506	302.368
EC99	7.326	276.483	213.696	447.289



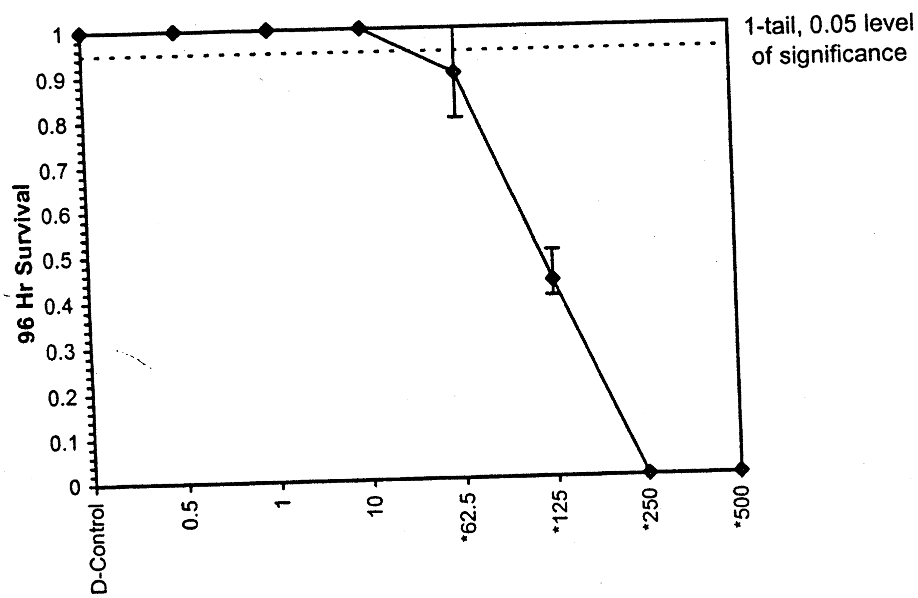
ToxCalc v5.0.23

Reviewed by: KS

Acute Fish Test-96 Hr Survival

Start Date:	12/30/02	Test ID:	0212-73NW	Sample ID:	Natural Site Solutions
End Date:	1/3/02	Lab ID:	WAAEE-AMEC NW Bioassay	Sample Type:	Liqui-Floc
Sample Date:		Protocol:	EPAF 93-EPA Acute	Test Species:	OM-Oncorhynchus mykiss
Comments:					

Dose-Response Plot



ToxCalc v5.0.23

Reviewed by:

AMEC Earth Environmental
Northwest Bioassay Lab
5009 Pacific Hwy. E. Suite 2
Fife, WA 98424

Client: Natural Site Solutions
Sample ID: Liqui-Floc
Contact:
Test #: 0212-873NW
w

96 Hour Toxicity Test Data Sheet
Freshwater 96-hr Acute with Renewal

Start Date & Time: 12/30/02 1000
End Date & Time: 1/3/02 1000
Test Organism: O. mykiss
Test Protocol:

Sample Conc. or %	D.O. (mg/L) Init.		Fin.	Init.		Fin.	pH Init.		Fin.	Init.		Fin.
mg/L	0	24	48	48	72	96	0	24	48	48	72	96
0	9.0	8.9	8.9		9.4	9.6	7.28	7.63	7.63		7.69	7.75
0.5	8.7	9.0	9.1		9.1	9.5	7.32	7.61	7.62		7.71	7.77
1.0	8.4	8.8	8.9		9.3	9.6	7.33	7.61	7.63		7.72	7.78
10	8.7	8.7	8.7		9.0	9.4	7.37	7.66	7.59		7.68	7.78
62.5	8.6	9.6	9.0		9.1	9.5	7.37	7.60	7.64		7.73	7.80
125	8.8	8.7	8.8		9.2	9.3	7.38	7.60	7.65		7.72	7.80

Sample Conc. or %	Conductivity µS/cm Init.	Fin.	Init.	Fin.	Test Temperature (°C)		Fin.	Init.		
mg/L	0	48	48	96	0	24	48	48	72	96
0	166			186	11.9	12.2	12.1		12.0	11.8
0.5	172			187	12.1	12.1	11.9		12.2	11.7
1.0	176			183	12.0	12.5	11.8		12.2	11.1
10	167			182	12.3	12.0	11.8		12.1	11.1
62.5	166			183	11.7	12.1	11.9		12.6	11.2
125	166			182	12.2	12.1	11.9		11.9	11.1

Conc.	Alkalinity* *(mg/L as CaCo3)	Hardness*	Chlorine Resid. (mg/L)	Ammonia (mg/L)
control	60	68	–	–
highest conc.	60	68	–	–

Comments:

Analysts:

mg/L Sample Conc. or %	Rep #	Cont #	Number of Live Organisms 0	24	48	72	96
0	1	127	10	10	10	10	10
	2	117	10	10	10	10	10
	3	301	10	10	10	10	10
0.5	1	201	10	10	10	10	10
	2	128	10	10	10	10	10
	3	120	10	10	10	10	10
1.0	1	312	10	10	10	10	10
	2	313	10	10	10	10	10
	3	124	10	10	10	10	10
10	1	~~224~~ 225	10	10	10	10	10
	2	314	10	10	10	10	10
	3	228	10	10	10	10	10
62.5	1	115	10	10	10	10	10
	2	216	10	10	8	8	8
	3	119	10	9	9	9	9
125	1	315	10	10	8	7	4
	2	316	10	10	6	5	5
	3	202	10	10	7	4	4
Tech. Initials			KS	Et	Et	Et	MC

Sample Description:

Animal Source: Thomas Fish Co
Date Received: 12/23/02
Date of Hatch: 11/17/02

DSU 12/1/02
Date of Swim Up

Chain of Custody

amec Earth & Environmental
AMEC Northwest Bioassay Laboratory
5009 Pacific Highway East, Suite 2
Fife, WA 98424
253-922-4296

Date 11/18/02 Page 1 of 1

COMPANY Natural Site Solutions
ADDRESS 16541 Redmond Way 405C
CITY Redmond STATE WA ZIP 98052
PHONE NO.

John Macpherson
PROJECT MANAGER

SAMPLERS (SIGNATURE)

PHONE NUMBER

SAMPLE ID	DATE	TIME	MATRIX	CONTAINER TYPE	ANALYSIS REQUIRED: Acute Toxicity Test	CONCENTRATIONS/COMMENTS	NUMBER OF CONTAINERS
Storm-Klear Liqui-Floc 1% Chitosan Acetate	11/18		L		✓		1
Storm-Klear Gel-Floc	11/18		S		✓		1

PROJECT INFORMATION	
CLIENT	
P.O. NO.	
SHIPPED VIA:	Client

SPECIAL INSTRUCTIONS/COMMENTS:

SAMPLE RECEIPT	
TOTAL NO. OF CONTAINERS	2
CHAIN OF CUSTODY SEALS	
RECEIPT TEMP	
CONFORMS TO RECORD	

RELINQUISHED BY
(Signature) (Time)
(Printed Name) (Date)
(Company)

RELINQUISHED BY
Rebecca LeMaster 9:45
(Signature) (Time)
11-18-02
(Printed Name) (Date)
(Company)

RECEIVED BY
(Signature) (Time)
(Printed Name) (Date)
(Company)

RECEIVED BY (LABORATORY)
Karen B 0945
(Signature) (Time)
Karen Bergmann 11/18/02
(Printed Name) (Date)
AMEC Bioassay Lab Log-in No.

Additional disposal charges may apply.

DISTRIBUTION: WHITE, CANARY - AMEC Bioassay Lab, PINK - Originator

AMEC Earth Environmental
Northwest Bioassay Lab
5009 Pacific Hwy. E. Suite 2
Fife, WA 98424

Client: Natural Site Solutions
Sample ID: Lignu-Hol
Contact:
Test #: 0212-73NW
W

96 Hour Toxicity Test Data Sheet
Freshwater 96-hr Acute with Renewal

Start Date & Time: 12/30/02 1000
End Date & Time: 1/3/02 1000
Test Organism: O. mykiss
Test Protocol:

Sample Conc. or %	D.O. (mg/L)						pH					
	Init.		Fin.	Init.		Fin.	Init.		Fin.	Init.		Fin.
mg/L	0	24	48	48	72	96	0	24	48	48	72	96
250	8.8	8.4	8.6	|	8.7	9.1	7.38	7.63	7.60	|	7.75	7.74
500	8.6	8.9	8.8	|	8.6	9.5	7.39	7.61	7.62	|	7.74	7.79

Sample Conc. or %	Conductivity µS/cm				Test Temperature (°C)					
	Init.	Fin.	Init.	Fin.			Fin.	Init.		
mg/L	0	48	48	96	0	24	48	48	72	96
250	167			184	12.2	12.2	11.9	|	12.1	11.3
500	169			182	12.0	12.1	12.0	|	12.2	11.1

	Alkalinity*	Hardness*	Chlorine Resid.	Ammonia
Conc.	*(mg/L as CaCo3)		(mg/L)	(mg/L)
control	60	68	—	—
highest conc.	60	68	—	—

Comments:

Analysts:

mg/L Sample Conc. or %	Rep #	Cont #	Number of Live Organisms 0	24	48	72	96
250	1	205	10	1	1	0	
	2	206	10	1	0	0	
	3	207	10	2	0	0	
500	1	208	10	0	0		
	2	209	10	0	0		
	3	~~210~~ 211	10	0	0		
	1						
	2						
	3						
	1						
	2						
	3						
	1						
	2						
	3						
	1						
	2						
	3						
Tech. Initials			KB	Et	Et	Et	ML

Sample Description:

Animal Source: Thomas Fish Co.
Date Received: 12/23/02
Date of Hatch: 11/17/02

Pimephales promelas

Acute Fish Test-96 Hr Survival

Start Date:	12/17/02	Test ID:	0212-72NW	Sample ID:	Natural Site Solutions
End Date:	12/21/02	Lab ID:	WAAEE-AMEC NW Bioassay	Sample Type:	Gel-Floc
Sample Date:		Protocol:	EPAF 93-EPA Acute	Test Species:	PP-Pimephales promelas
Comments:					

Conc-mg/L	1	2	3
D-Control	0.9000	0.9000	1.0000
0.1	0.9000	0.9000	0.8000
1	1.0000	1.0000	0.9000
6.25	0.8000	1.0000	0.9000
12.5	1.0000	0.9000	0.8000
25	0.3000	0.4000	0.2000
50	0.0000	0.2000	0.0000
100	0.0000	0.0000	0.0000

			Transform: Arcsin Square Root						1-Tailed		Number	Total
Conc-mg/L	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD	Resp	Number
D-Control	0.9333	1.0000	1.3034	1.2490	1.4120	7.219	3				2	30
0.1	0.8667	0.9286	1.2017	1.1071	1.2490	6.817	3	1.042	2.560	0.2497	4	30
1	0.9667	1.0357	1.3577	1.2490	1.4120	6.930	3	-0.557	2.560	0.2497	1	30
6.25	0.9000	0.9643	1.2561	1.1071	1.4120	12.145	3	0.485	2.560	0.2497	3	30
12.5	0.9000	0.9643	1.2561	1.1071	1.4120	12.145	3	0.485	2.560	0.2497	3	30
*25	0.3000	0.3214	0.5760	0.4636	0.6847	19.198	3	7.457	2.560	0.2497	21	30
*50	0.0667	0.0714	0.2604	0.1588	0.4636	67.593	3	10.692	2.560	0.2497	28	30
*100	0.0000	0.0000	0.1588	0.1588	0.1588	0.000	3	11.734	2.560	0.2497	30	30

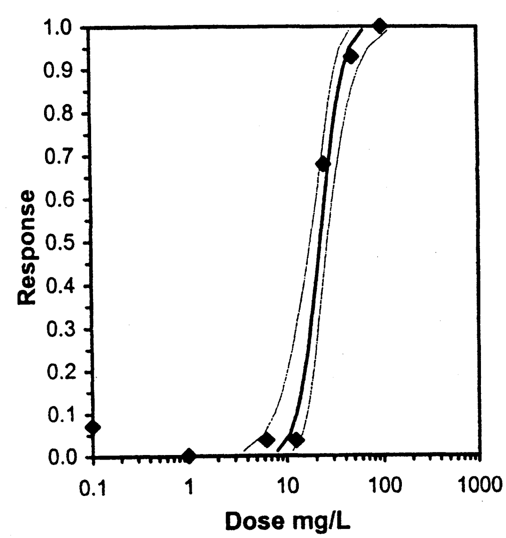
Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.95359	0.884	0.31201	-0.6917
Equality of variance cannot be confirmed				

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU	MSDu	MSDp	MSB	MSE	F-Prob	df
Dunnett's Test	12.5	25	17.6777		0.17459	0.1877	0.76143	0.01427	6.6E-10	7, 16

Maximum Likelihood-Probit

Parameter	Value	SE	95% Fiducial Limits		Control	Chi-Sq	Critical	P-value	Mu	Sigma	Iter
Slope	5.14074	1.03136	3.11928	7.16219	0.06667	4.82382	11.0705	0.44	1.35798	0.19452	8
Intercept	-1.981	1.46289	-4.8483	0.88626							
TSCR	0.07759	0.02453	0.02952	0.12567							

Point	Probits	mg/L	95% Fiducial Limits	
EC01	2.674	8.04351	3.6325	11.578
EC05	3.355	10.9147	5.94615	14.5624
EC10	3.718	12.8435	7.70943	16.506
EC15	3.964	14.3339	9.16715	17.9984
EC20	4.158	15.6409	10.5018	19.3134
EC25	4.326	16.8567	11.7811	20.5519
EC40	4.747	20.3561	15.574	24.2913
EC50	5.000	22.8022	18.2139	27.167
EC60	5.253	25.5423	21.0378	30.7635
EC75	5.674	30.8448	25.9066	39.0338
EC80	5.842	33.2425	27.8688	43.316
EC85	6.036	36.2735	30.1905	49.153
EC90	6.282	40.4828	33.1982	57.9577
EC95	6.645	47.6367	37.9247	74.5586
EC99	7.326	64.6412	48.0508	121.157



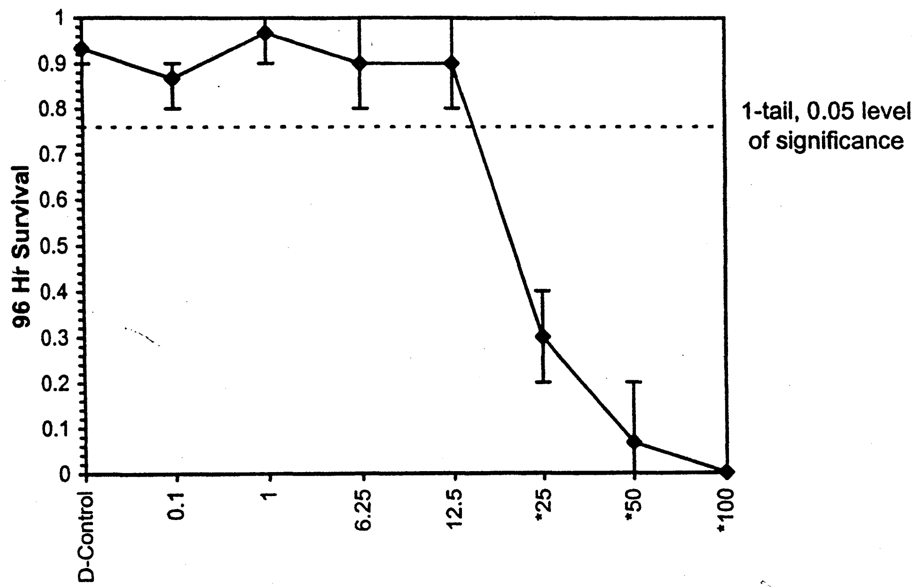
ToxCalc v5.0.23

Reviewed by: [signature]

Acute Fish Test-96 Hr Survival

Start Date:	12/17/02	Test ID:	0212-72NW	Sample ID:	Natural Site Solutions
End Date:	12/21/02	Lab ID:	WAAEE-AMEC NW Bioassay	Sample Type:	Gel-Floc
Sample Date:		Protocol:	EPAF 93-EPA Acute	Test Species:	PP-Pimephales promelas
Comments:					

Dose-Response Plot



ToxCalc v5.0.23

Reviewed by:

AMEC Earth Environmental
Northwest Bioassay Lab
5009 Pacific Hwy. E. Suite 2
Fife, WA 98424

Client: Natural Site Solutions
Sample ID: Gel-Floc
Contact:
Test #: 0212-72 NW
w

96 Hour Toxicity Test Data Sheet
Freshwater 96-hr Acute with Renewal

Start Date & Time: 12/17/02 16:45
End Date & Time: 12/21/02 16:45
Test Organism: P. promelas
Test Protocol:

Sample Conc. or %	D.O. (mg/L)						pH					
	Init.		Fin.	Init.		Fin.	Init.		Fin.	Init.		Fin.
mg/L	0	24	48	48	72	96	0	24	48	48	72	96
0	8.0	7.6	6.9	7.3	7.7	7.3	7.80	7.94	7.80	7.88	7.88	7.92
0.1	8.1	7.5	6.8	7.2	7.8	7.6	7.79	7.94	7.83	7.91	7.98	7.80
1.0	7.9	7.6	7.0	7.3	7.8	7.6	7.83	7.97	7.87	7.91	7.95	8.03
6.25	8.1	7.7	6.5	7.3	7.8	7.3	7.79	7.96	7.84	7.83	7.95	8.03
12.5	8.1	7.3	6.6	7.4	7.7	7.7	7.71	7.95	7.81	7.75	7.96	8.01
25	8.3	7.4	6.2	7.5	7.1	7.6	7.53	7.90	7.66	7.55	7.88	8.01

Sample Conc. or %	Conductivity µS/cm				Test Temperature (°C)					
	Init.	Fin.	Init.	Fin.			Fin.	Init.		
mg/L	0	48	48	96	0	24	48	48	72	96
0	288	326	288	307	25.1	25.2	25.5	25.0	25.1	24.8
0.1	290	314	289	309	25.1	25.1	25.5	25.1	25.3	24.9
1.0	290	315	289	314	24.8	25.4	25.3	25.0	25.1	25.0
6.25	291	313	290	306	24.8	25.1	25.4	25.0	25.0	25.0
12.5	292	312	291	323	24.7	25.0	25.7	25.2	25.2	25.0
25	295	321	293	322	24.9	25.1	25.1	25.1	25.1	24.9

Conc.	Alkalinity* *(mg/L as CaCo3)	Hardness* *(mg/L as CaCo3)	Chlorine Resid. (mg/L)	Ammonia (mg/L)
control	60	96	-	-
highest conc.	60	96	-	-

Comments:

Analysts: Et Th Mc

mg/L Sample Conc. or %	Rep #	Cont #	Number of Live Organisms 0	24	48	72	96
0	1	1	10	10	10	10	9
	2	2	10	10	10	10	9
	3	3	10	10	10	10	10
0.1	1	4	10	9	9	9	9
	2	5	10	10	9	9	9
	3	6	10	10	9	9	8
1.0	1	7	10	10	10	10	10
	2	8	10	10	10	10	10
	3	9	10	9	9	9	9
6.25	1	10	10	10	8	8	8
	2	11	10	10	10	10	10
	3	12	10	10	9	9	9
12.5	1	13	10	10	10	10	10
	2	14	10	10	9	9	9
	3	15	10	10	8	8	8
25	1	16	10	10	4	4	3
	2	17	10	10	6	5	4
	3	18	10	10	3	2	2
Tech. Initials			Et	Et	Et	Et	Mc

Sample Description:

Animal Source: Aquatox
Date Received: 12/17/02
Date of Hatch: 12/13/02

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Northwest Bioassay Lab
5009 Pacific Hwy. E. Suite 2
Fife, WA 98424

Page 2

96 Hour Toxicity Test Data Sheet
Freshwater 96-hr Acute with Renewal

Client: Natural Site Solutions
Sample ID: Gel-Floc
Contact:
Test #: 0212-72NW
w

Start Date & Time: 12/17/02 16:45
End Date & Time: 12/21/02 1645
Test Organism: P. promelas
Test Protocol:

Sample Conc. or %	D.O. (mg/L)						pH					
	Init.		Fin.	Init.		Fin.	Init.		Fin.	Init.		Fin.
mg/L	0	24	48	48	72	96	0	24	48	48	72	96
50	8.1	6.4	6.1	7.1	7.5	7.2	7.44	7.69	7.69	7.47	7.87	7.95
100	8.0	6.1					7.14	7.56				

Sample Conc. or %	Conductivity µS/cm				Test Temperature (°C)					
	Init.	Fin.	Init.	Fin.			Fin.	Init.		
mg/L	0	48	48	96	0	24	48	48	72	96
50	306	329	298	329	25.0	25.2	25.4	25.1	25.2	24.5
100	310				25.1	25.2				

Conc.	Alkalinity* *(mg/L as CaCo3)	Hardness* *(mg/L as CaCo3)	Chlorine Resid. (mg/L)	Ammonia (mg/L)
control	60	96	—	—
highest conc.	60	96	—	—

Comments:

Analysts:

mg/L Sample Conc. or %	Rep #	Cont #	Number of Live Organisms 0	24	48	72	96
50	1	19	10	0			
	2	20	10	3	2	2	2
	3	21	10	0			
100	1	22	10	0			
	2	23	10	0			
	3	24	10	0			
	1						
	2						
	3						
	1						
	2						
	3						
	1						
	2						
	3						
	1						
	2						
	3						
Tech. Initials			ET	ET	ET	ET	WLC

Sample Description:

Animal Source: Aquatox
Date Received: 12/17/02
Date of Hatch: 12/13/02

Daphnia pulex

Acute Daphnia Test-48 Hr Survival

Start Date:	12/6/02	Test ID:	0212-28NW	Sample ID:	Natural Site Solutions
End Date:	12/8/02	Lab ID:	WAAEE-AMEC NW Bioassa)	Sample Type:	Gel-Floc
Sample Date:		Protocol:	EPAF 93-EPA Acute	Test Species:	DP-Daphnia pulex
Comments:					

Conc-mg/L	1	2	3	4
D-Control	0.8000	1.0000	1.0000	1.0000
0.1	1.0000	1.0000	1.0000	0.8000
1	1.0000	1.0000	0.8000	1.0000
6.25	0.8000	0.8000	1.0000	0.8000
12.5	1.0000	1.0000	0.8000	0.6000
25	0.8000	1.0000	1.0000	0.8000
50	0.6000	0.8000	0.8000	0.8000
100	0.6000	0.8000	1.0000	1.0000
200	0.2000	0.0000	0.0000	0.0000
300	0.0000	0.0000	0.0000	0.0000

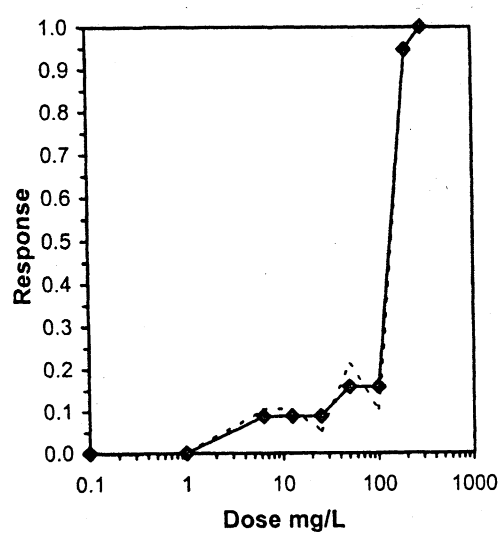
			Transform: Arcsin Square Root						1-Tailed		Number	Total
Conc-mg/L	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD	Resp	Number
D-Control	0.9500	1.0000	1.2857	1.1071	1.3453	9.261	4				1	20
0.1	0.9500	1.0000	1.2857	1.1071	1.3453	9.261	4	0.000	2.513	0.2645	1	20
1	0.9500	1.0000	1.2857	1.1071	1.3453	9.261	4	0.000	2.513	0.2645	1	20
6.25	0.8500	0.8947	1.1667	1.1071	1.3453	10.206	4	1.131	2.513	0.2645	3	20
12.5	0.8500	0.8947	1.1709	0.8861	1.3453	18.840	4	1.091	2.513	0.2645	3	20
25	0.9000	0.9474	1.2262	1.1071	1.3453	11.212	4	0.566	2.513	0.2645	2	20
50	0.7500	0.7895	1.0519	0.8861	1.1071	10.508	4	2.222	2.513	0.2645	5	20
100	0.8500	0.8947	1.1709	0.8861	1.3453	18.840	4	1.091	2.513	0.2645	3	20
*200	0.0500	0.0526	0.2850	0.2255	0.4636	41.771	4	9.509	2.513	0.2645	19	20
300	0.0000	0.0000	0.2255	0.2255	0.2255	0.000	4				20	20

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.91387	0.912	-0.4697	-0.5147
Bartlett's Test indicates equal variances (p = 0.88)	3.76476	20.0902		

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU	MSDu	MSDp	MSB	MSE	F-Prob	df
Dunnett's Test	100	200	141.421		0.19372	0.21035	0.40016	0.02215	5.6E-09	8, 27

Trimmed Spearman-Karber

Trim Level	EC50	95% CL	
0.0%	92.70	71.22	120.66
5.0%	109.67	84.08	143.04
10.0%	126.03	102.65	154.73
20.0%	135.03	123.46	147.69
Auto-0.0%	92.70	71.22	120.66

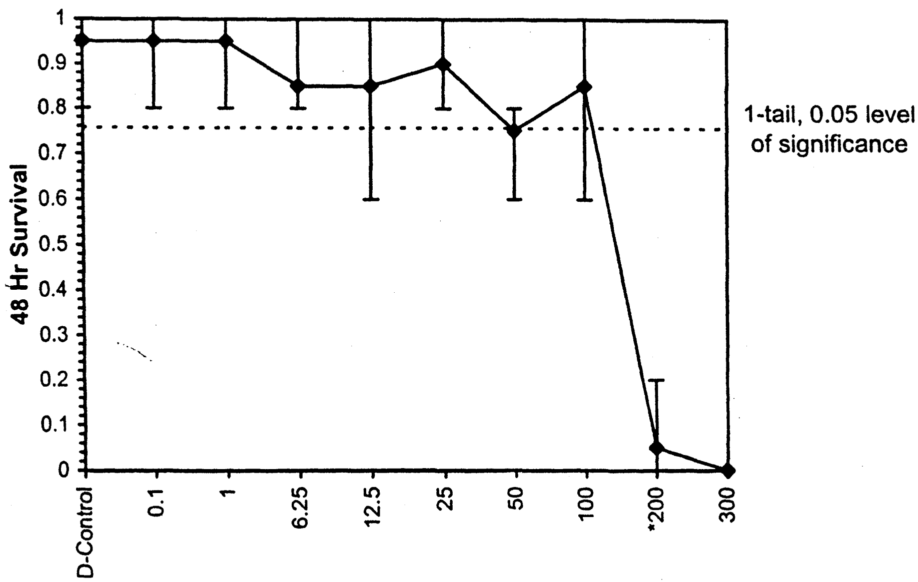


 ToxCalc v5.0.23 Reviewed by: B

Acute Daphnia Test-48 Hr Survival

Start Date:	12/6/02	Test ID:	0212-28NW	Sample ID:	Natural Site Solutions
End Date:	12/8/02	Lab ID:	WAAEE-AMEC NW Bioassay	Sample Type:	Gel-Floc
Sample Date:		Protocol:	EPAF 93-EPA Acute	Test Species:	DP-Daphnia pulex
Comments:					

Dose-Response Plot



Reviewed by: KB

Freshwater Acute
48 Hour Toxicity Test Data Sheet
Northwest Bioassay Lab

Client: NSS / Gel Floc
Sample ID: Gel Floc
Contact:
Test #: 0212 - 28NW

Start Date & Time: 12/6/02 1600
End Date & Time: 12/8/02 1500
Test Organisms: ~~D. pfz~~ mc D. pulex

Conc. or mg/L %	Cont. #	Rep. #	Number of Live Organisms 0	24	48	Dissolved Oxygen (mg/L) 0	24	48	pH (units) 0	24	48	Cond uhom-cm 0	48	Temperature (°C) 0	24	48	Mean Percent Survival
0	17	1	5	4	4	8.0	7.8	7.2	7.45	7.89	7.96	268	303	25.3	24.0	25.7	
	7	2	5	5	5												
	3	3	5	5	5												
	19	4	5	5	5												95%
.1	32	1	5	5	5	7.5	7.7	7.2	7.72	7.86	7.94	286	301	24.9	24.0	25.5	
	31	2	5	5	5												
	30	3	5	5	5												
	6	4	5	4	4												95%
1	27	1	5	5	~~3~~ 5	7.9	7.6	7.3	7.81	7.92	7.99	270	303	25.6	24.0	25.0	
	16	2	5	5	5												
	11	3	5	5	~~5~~ 4												
	2	4	5	5	5												95%
6.25	26	1	5	5	4	7.9	7.8	7.4	7.81	7.90	7.95	275	304	25.3	24.0	25.5	
	10	2	5	4	4												
	25	3	5	5	5												
	8	4	5	5	4												85%
12.5	15	1	5	5	5	7.9	7.8	7.4	7.83	7.89	7.96	282	310	25.4	24.0	25.7	
	22	2	5	5	5												
	5	3	5	5	4												
	24	4	5	5	3												85%
25	4	1	5	5	4	8.0	7.4	7.2	7.82	7.84	7.94	277	310	25.5	24.0	25.9	
	12	2	5	5	5												
	1	3	5	5	5												
	9	4	5	5	4												90%
Technician Initials			mn	MF	mn												

Conc.	Alkalinity (mg/L)	~~Chlorine~~ Hardness (mg/L)	Ammonia (mg/L)
control	60	80	—
highest conc.	60	80	—

Sample Description:

Analyst Initials: mc MF

Comments:
0 hrs:
24 hrs. Most animals caught in material at 6.25% and above
48 hrs.

AMEC Earth & Environmental
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Fife, WA 98424
(253) 922-4296

Freshwater Acute
48 Hour Toxicity Test Data Sheet
Northwest Bioassay Lab

Client: NSS / Gel Floc
Sample ID: Gel Floc
Contact:
Test #: 0212-28 NW

Start Date & Time: 12/6/02 1600
End Date & Time: 12/8/02 1500
Test Organisms: D. pulex

Conc. or %	Cont. #	Rep. #	Number of Live Organisms 0	24	48	Dissolved Oxygen (mg/L) 0	24	48	pH (units) 0	24	48	Cond uhom-cm 0	48	Temperature (°C) 0	24	48	Mean Percent Survival
50	23	1	5	5	3	8.5	7.5	7.2	7.77	7.82	7.90	281	~~290~~ 321	25.0	24.0	25.7	
	29	2	5	5	4												
	21	3	5	4	4 ~~2~~												
	18	4	5	5	4												75%
100	28	1	5	4	3	8.5	7.5	7.1	7.65	7.74	7.78	302	338	25.1	24.0	25.8	
	20	2	5	5	4												
	13	3	5	5	5												
	14	4	5	5	5												85%
200	33	1	5	5	1	8.5	8.0	7.9	7.54	7.74	7.80	300	321	25.0	24.8	25.7	
	34	2	5	5	0												
	35	3	5	4	0												
	36	4	5	5	0												0
360	37	1	5	4	0	8.5			7.48	~~7.74~~ 7.78		249		25.1	24.9		
	38	2	5	4	0												
	39	3	5	3	0												
	40	4	5	3	0												0
		1															
		2															
		3															
		4															
		1															
		2															
		3															
		4															
Technician Initials			mw	NF (mw)													

Conc.	Alkalinity (mg/L)	~~Chlorine~~ Hardness (mg/L)	Ammonia (mg/L)
control	60	80	–
highest conc.	60	80	–

Sample Description:

Analyst Initials: mw NF

Comments: 0 hrs:
24 hrs. most animals caught in material at 6.25% and above
48 hrs.

AMEC Earth & Environmental
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(253) 922-4296

Oncorhynchus mykiss

Acute Fish Test-96 Hr Survival

Start Date:	12/30/02	Test ID:	0212-67NW	Sample ID:	Natural Site Solutions
End Date:	1/3/03	Lab ID:	WAAEE-AMEC NW Bioassay	Sample Type:	Gel-Floc
Sample Date:		Protocol:	EPAF 93-EPA Acute	Test Species:	OM-Oncorhynchus mykiss
Comments:					

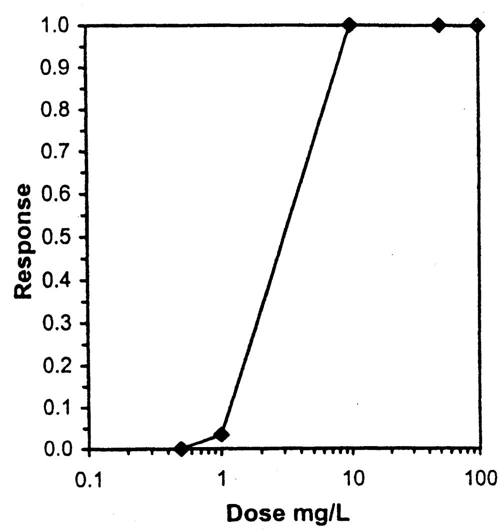
Conc-mg/L	1	2	3
D-Control	1.0000	1.0000	1.0000
0.5	1.0000	1.0000	1.0000
1	1.0000	0.9000	1.0000
10	0.0000	0.0000	0.0000
50	0.0000	0.0000	0.0000
100	0.0000	0.0000	0.0000

			Transform: Arcsin Square Root						1-Tailed		Number	Total
Conc-mg/L	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD	Resp	Number
D-Control	1.0000	1.0000	1.4120	1.4120	1.4120	0.000	3				0	30
0.5	1.0000	1.0000	1.4120	1.4120	1.4120	0.000	3	0.000	2.500	0.0784	0	30
1	0.9667	0.9667	1.3577	1.2490	1.4120	6.930	3	1.732	2.500	0.0784	1	30
*10	0.0000	0.0000	0.1588	0.1588	0.1588	0.000	3	39.958	2.500	0.0784	30	30
*50	0.0000	0.0000	0.1588	0.1588	0.1588	0.000	3	39.958	2.500	0.0784	30	30
*100	0.0000	0.0000	0.1588	0.1588	0.1588	0.000	3	39.958	2.500	0.0784	30	30

Auxiliary Tests					Statistic		Critical		Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.01)					0.53467		0.858		-1.8937	8.5
Equality of variance cannot be confirmed										
Hypothesis Test (1-tail, 0.05)	**NOEC**	**LOEC**	**ChV**	**TU**	**MSDu**	**MSDp**	**MSB**	**MSE**	**F-Prob**	**df**
Dunnett's Test	1	10	3.16228		0.03021	0.03099	1.37417	0.00148	4.2E-15	5, 12

Trimmed Spearman-Karber

Trim Level	EC50	95% CL	
0.0%	3.0083	2.7270	3.3186
5.0%	3.0392	2.8034	3.2948
10.0%	3.0392	2.8034	3.2948
20.0%	3.0392	2.8034	3.2948
Auto-0.0%	3.0083	2.7270	3.3186

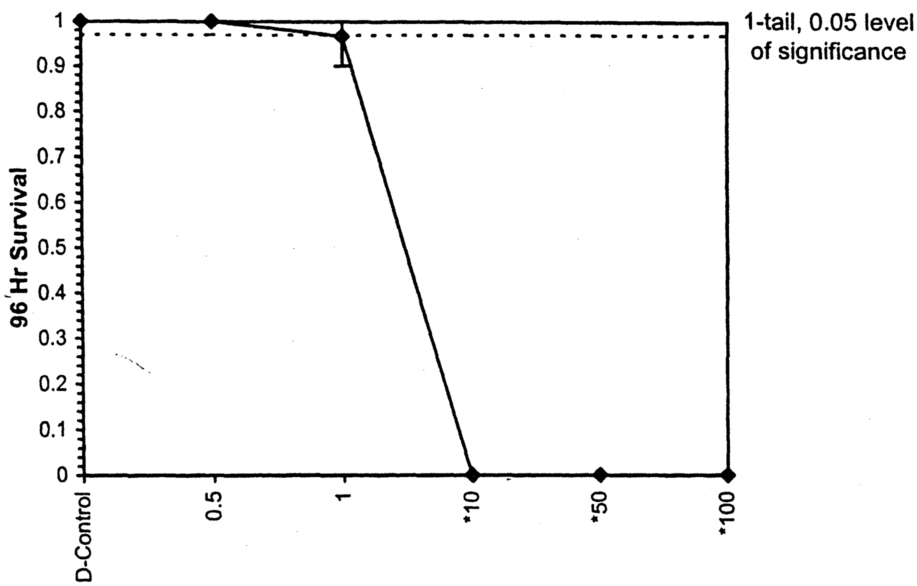


 ToxCalc v5.0.23 Reviewed by: KB

Acute Fish Test-96 Hr Survival

Start Date:	12/30/02	Test ID:	0212-67NW	Sample ID:	Natural Site Solutions
End Date:	1/3/03	Lab ID:	WAAEE-AMEC NW Bioassay	Sample Type:	Gel-Floc
Sample Date:		Protocol:	EPAF 93-EPA Acute	Test Species:	OM-Oncorhynchus mykiss
Comments:					

Dose-Response Plot



 ToxCalc v5.0.23 Reviewed by: _____

AMEC Earth Environmental
Northwest Bioassay Lab
5009 Pacific Hwy. E. Suite 2-0
Fife, WA 98424

Client: Natural Site Solutions
Sample ID: Gel-Floc
Contact:
Test #: 0212-67NW

96 Hour Toxicity Test Data Sheet
Freshwater 96-hr Acute with Renewal

Start Date & Time: ~~12/30/02~~ 12/30/02 ~~1400~~ 1000
End Date & Time: 1/3/02 1000
Test Organism: O. mykiss
Test Protocol:

Sample Conc. or %	D.O. (mg/L)						pH (mg/L)					
	Init.		Fin.	Init.		Fin.	Init.		Fin.	Init.		Fin.
mg/L	0	24	48	48	72	96	0	24	48	48	72	96
0	8.3	8.8	8.6		8.8	8.7	7.33	7.61	7.45		7.54	7.67
0.5	7.8	8.6	8.4		8.6	8.6	7.34	7.55	7.46		7.55	7.69
1.0	8.5	8.9	8.6		8.5	8.4	7.38	7.61	7.54		7.54	7.70
10.0	8.2	8.9					7.38	7.62				
50	8.7	9.0					7.37	7.55				
100	8.3	9.2					7.32	7.53				

Sample Conc. or %	Conductivity µS/cm				Test Temperature (°C)					
	Init.	Fin.	Init.	Fin.	Init.		Fin.	Init.		Fin.
	0	48	48	96	0	24	48	48	72	96
0	122	131			12.3	12.0	12.2		12.2	12.0
0.5	119	127			11.7	11.9	11.8		11.9	11.9
1.0	122	130			11.6	11.8	11.8		11.9	11.9
10	128				11.8	11.9				
50	149				11.7	12.0				
100	168				11.8	12.1				

Conc.	Alkalinity*	Hardness*	Chlorine Resid.	Ammonia
	*(mg/L as CaCo3)		(mg/L)	(mg/L)
control	60	68	—	—
highest conc.	60	68	—	—

Sample Conc. or %	Rep #	Cont #	Number of Live Organisms 0	24	48	72	96	
								4000 ml
0	1	127	10	10	10	10	10	
	2	117	10	10	10	10	10	
	3	301	10	10	10	10	10	
	~~4~~		~~10~~					
0.5	1	118	10	10	10	10	10	
	2	302	10	10	10	10	10	5ml
	3	303	10	10	10	10	10	
	~~4~~		~~10~~					
1.0	1	220	10	10	10	10	10	
	2	304	10	10	10	9	9	10 ml
	3	222	10	10	10	10	10	
	~~4~~		~~10~~					
10	1	305	10	0				
	2	306	10	0				100 ml
	3	307	10	0				
	~~4~~		~~10~~					
50	1	308	10	0				
	2	309	10	0				500
	3	210	10	0				
	~~4~~		~~10~~					
100	1	224	10	0				
	2	214	10	0				1000
	3	310	10	0				
	~~4~~		~~10~~					
Tech. Initials			VH	VH	MF			

Comments:

Analysts: VH MF

Animal Source: Thomas Fish Co
Date Received: 12/23/02
Date of Hatch: 11/17/02
PSU: 12/1/02

AMEC Earth Environmental
Northwest Bioassay Lab
5009 Pacific Hwy. E. Suite 2-0
Fife, WA 98424

96 Hour Toxicity Test Data Sheet
Freshwater 96-hr Acute with Renewal

Client: Natural Site Solutions
Sample ID: Gel-Floc
Contact:
Test #: 0212-67NW

Start Date & Time: ~~12/30/02~~ 12/30/02 ~~1400~~ 1000
End Date & Time: 1/3/02 1000
Test Organism: O. mykiss
Test Protocol:

Sample Conc. or %	D.O. (mg/L) Init.		Fin.	Init.		Fin.	pH (mg/L) Init.		Fin.	Init.		Fin.
mg/L	0	24	48	48	72	96	0	24	48	48	72	96
0	8.3	8.8	8.6		8.8	8.7	7.33	7.61	7.45		7.54	7.67
0.5	7.8	8.6	8.4		8.6	8.6	7.34	7.55	7.46		7.55	7.69
1.0	8.5	8.9	8.6		8.5	8.4	7.38	7.61	7.54		7.54	7.70
10.0	8.2	8.9					7.36	7.62				
50	8.7	9.0					7.37	7.55				
100	8.3	9.2					7.32	7.53				

Sample Conc. or %	Conductivity µS/cm Init.	Fin.	Init.	Fin.	Test Temperature (°C) Init.		Fin.	Init.		Fin.
	0	48	48	96	0	24	48	48	72	96
0	122	131			12.3	12.0	12.2		12.2	12.0
0.5	119	127			11.7	11.9	11.8		11.9	11.9
1.0	122	130			11.6	11.8	11.8		11.9	11.9
10	128				11.8	11.9				
50	149				11.7	12.0				
100	168				11.8	12.1				

Conc.	Alkalinity* *(mg/L as CaCo3)	Hardness*	Chlorine Resid. (mg/L)	Ammonia (mg/L)
control	60	68	—	—
highest conc.	60	68	—	—

Sample Conc. or %	Rep #	Cont #	Number of Live Organisms 0	24	48	72	96	
0	1	127	10	10	10	10	10	4000 ml
	2	117	10	10	10	10	10	
	3	301	10	10	10	10	10	
	4		~~10~~					
0.5	1	118	10	10	10	10	10	5ml
	2	302	10	10	10	10	10	
	3	303	10	10	10	10	10	
	4		~~10~~					
1.0	1	220	10	10	10	10	10	10ml
	2	304	10	10	10	9	9	
	3	222	10	10	10	10	10	
	4		~~10~~					
10	1	305	10	0				100ml
	2	306	10	0				
	3	307	10	0				
	4		~~10~~					
50	1	308	10	0				500
	2	309	10	0				
	3	210	10	0				
	4		~~10~~					
100	1	224	10	0				1000
	2	214	10	0				
	3	310	10	0				
	4		~~10~~					
Tech. Initials			VH	VH	MF			

Comments:

Animal Source: Thomas Fish Co
Date Received: 12/23/02
Date of Hatch: 11/17/02
PSU 12/1/02

Analysts: VH MF

Toxicity Evaluation of Two Chitosan-Based Products using Rainbow Trout

Liqui-Floc and Gel-Floc

Prepared for
Natural Site Solutions
16541 Redmond Way
Suite 405-C
Redmond, WA 98052

Prepared by
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Northwest Bioassay Laboratory
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Fife, WA 98424
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March 2003

INTRODUCTION

Seven-day chronic toxicity tests were conducted using the test organism *Oncorhynchus mykiss* (Rainbow trout) to determine NOEC and EC_{50} values for the chitosan-based products Liqui-Floc and Gel-Floc. The products were evaluated for toxicity in clean, laboratory water and in simulated stormwater. Tests followed EPA test methods and were conducted at AMEC Earth & Environmental's Northwest Bioassay Laboratory located in Fife, Washington (AMEC).

MATERIALS AND METHODS

Test Materials

Samples of Liqui-Floc and Gel-Floc were provided to AMEC by Natural Site Solutions located in Redmond, Washington. Liqui-Floc is a 1% chitosan acetate solution and Gel-Floc is a flake material of 90% chitosan lactate.

Test concentrations were determined in consultation with Natural Site Solutions and ranged from the intended use concentration for each product up to 100 times those concentrations.

Fresh dilutions were prepared daily by measuring the appropriate amount of Liqui-Floc and Gel-Floc and adding each product directly to the dilution water. In the simulated stormwater tests, dirty water of standardized turbidity was prepared by adding sodium bentonite clay (1 g/L) to laboratory water (MHSW). Turbidity was measured and recorded on the bench sheet daily. The appropriate amount of Liqui-Floc and Gel-Floc for each concentration was then measured, added to the turbid water, and mixed for 20 minutes. While the mixtures were stirring, the pH of each concentration was measured and adjusted to approximately 7 units with sodium bicarbonate. In the clean water tests, the appropriate amount of each product was added directly to laboratory water and mixed for 20 minutes. All concentrations for both types of tests were filtered through a coarse paper filter prior to use in the test.

Organism Procurement and Handling

Oncorhynchus mykiss (Rainbow trout) juveniles were obtained from Thomas Fish Company in Anderson, California. Organisms were received in plastic bags filled with oxygen-saturated water that were shipped by overnight delivery service in an insulated ice chest. Upon arrival at AMEC, organism receipt information was recorded, animal condition specified, and physical parameters including pH, dissolved oxygen (DO) conductivity, and temperature were measured. The organisms were acclimated to test conditions in order to promote and confirm animal health prior to test initiation. During the acclimation period, animals were fed finely ground trout food and observed for any indications of stress (abnormal swimming behavior, discoloration) or significant mortality (>10%). Fish larvae were 15-20 days old post-hatch and 2-6 days post swim-up (actively feeding) prior to test initiation.

Test Procedure

Test conditions are summarized in Table 1. Fresh test solutions were prepared daily, as described above. Test solutions were equilibrated to 15°C in an environmental chamber prior to use. The control consisted of laboratory water (MHSW). A turbid water control consisting of standardized turbid water without product added was included in the test design.

Table 1. Summary of Test Conditions – Rainbow Trout Survival and Growth

Test Type:	Static-renewal
Test Duration:	7-days
Test Organism:	*Oncorhynchus mykiss*
Organism Source:	Thomas Fish; Anderson, CA
Organism Age:	15-20 days post-hatch and 2-6 days post swim-up
Feeding:	0.5 ml concentrated *Artemia* nauplii twice daily
Test Chamber:	1-Liter polypropylene beaker
Test Solution Volume:	500 milliliters
Test Temperature:	15°C
Dilution Water:	Moderately Hard Synthetic Water (MHSW)
Test Concentrations (mg/L)	
Liqui-Floc in MHSW:	10000, 5000, 2500, 1250, 500, 100, 0 (control)
Liqui-Floc in Turbid Water:	10000, 5000, 2500, 1250, 500, 100, 0 (control)
Gel-Floc in MHSW:	1000, 500, 250, 125, 50, 1.0, 0 (control)
Gel-Floc in Turbid Water:	300, 150, 75, 38, 18.75, 1.0, 0 (control)
Number of Organisms/ Chamber:	5
Number of Replicates/Conc.:	4
Photoperiod:	16 hours light/ 8 hours dark
Aeration:	None
Endpoint:	Mortality & growth
Test Acceptability:	≥ 90% control survival, minimum control growth 1.5x initial dry weight

The fish were fed brine shrimp nauplii twice daily, once in the morning and again in the afternoon after test solution renewal. No food was added to test chambers on the day of test termination. An 80 percent solution renewal was conducted daily and the number of fish in each test chamber was counted and recorded. Temperature, pH, DO, and conductivity were measured and recorded in spent and renewal solutions daily.

At test termination, the contents of each test chamber were gently mixed and carefully poured through a fine mesh screen. The fish were quickly killed by shocking them in hot water, rinsed with deionized water, and transferred to dried, tared weigh pans. The fish were then dried in an oven for 24 hours at 60°C and weighed.

Bioassay Protocol

Chronic *Oncorhynchus mykiss* bioassays were conducted in accordance with USEPA protocols outlined in "Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms," Fourth Edition (EPA-821-R-02-013, 2002) with modifications in development by EPA for use with Rainbow trout.

Statistical Analyses

Statistical analyses were performed using Toxcalc Comprehensive Toxicity Data Analyses and Database Software, Version 5.0.

RESULTS

A summary of results for the Rainbow trout chronic toxicity test with Liqui-Floc and Gel-Floc in clean water and simulated stormwater is contained in Table 2 and Appendix A. Laboratory bench sheets containing water quality data and daily survival are located in Appendix B along with summary sheets detailing the statistical analyses for each test. In addition to the 7-day survival and growth endpoints, acute survival after 96 hours of exposure was evaluated from the chronic test data (Table 2, Appendix C).

Mean Rainbow trout control survival was greater than 90 percent in each test. In addition, mean fish growth in the control test chambers was greater than 1.5 times the initial dry weight of the fish.

The NOEC for Liqui-Floc in clean, laboratory water was 100 mg/L for survival and growth. When Liqui-Floc was added to simulated stormwater, the NOEC for survival and growth was the highest concentration tested (10,000 mg/L).

Table 2. Summary of Test Results

Sample ID	Rainbow Trout Chronic Results Survival (mg/L)		Rainbow Trout Chronic Results Growth (mg/L)		Rainbow Trout 96-hr Acute Survival[b] (mg/L)	
	NOEC[a]	LC_{50}	NOEC	EC_{50}	NOEC	LC_{50}
Liqui-Floc in Clean Water	100	434.7	100	404.2	100	434.7
Liqui-Floc in Simulated Stormwater	10,000	>10,000	2,500	>10,000	10,000	>10,000
Gel-Floc in Clean Water	1.0	25.5	1.0	39.5	1.0	25.5
Gel-Floc in Simulated Stormwater	37.5	52.7	37.5	56.1	75	105.6

[a]No Observed Effect Concentration, [b]96-hour survival evaluated from the chronic test data

The NOEC for Gel-Floc in clean, laboratory water was 1.0 mg/L for survival and growth. Gel-Floc applied to simulated stormwater produced an NOEC of 37.5 mg/L for survival and growth.

The 96-hour acute LC_{50} values for the two products applied to turbid water was greater than 10,000 mg/L for Liqui-Floc and 105.6 mg/L for Gel-Floc.

REFERENCE TOXICANT TESTS

A reference toxicant test was conducted in conjunction with the product tests to assess the health of test organisms and soundness of procedures. Results are summarized in Table 3. The results are acceptable based on control charting for the laboratory (Appendix D).

Table 3. Reference Toxicant Test Results

Species Endpoint	Test ID	LC_{50} (µg/L $CuSO_4$)	CV (%)
Rainbow trout	RC030303OM		
Survival		89	36.8
Growth		95	34.3

REFERENCES

EPA. 1994. Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms. Third Edition, EPA/600/4-91/003.

Tidepool Scientific Software. 1992-1994. TOXCALC Comprehensive Toxicity Data Analysis and Database Software, Version 5.0.

WADOE. 2001. Laboratory Guidance and Whole Effluent Toxicity Test Review Criteria. Washington State Department of Ecology. Water Quality Program. Publication number: WQ-R-95-80, Revised December 2001.

APPENDIX A

Summary of Results

Liqui-Floc in Clean Water

Appendix Table A1. Rainbow Trout Chronic Survival & Growth
Natural Site Solutions
Liqui-Floc in Clean Water (Test ID: 0301-24NW)
Test Initiation: 23 January 2003

Concentration		Survival			Weight				Growth [b]
mg/L	Replicate	# Alive	% Survival	Mean % Survival	Tare Weight (mg)	Total Weight mg	Weight per Fish [a] (mg)	Mean Weight (mg)	(mg)
Control	1	5	100	95	509.87	668.99	31.8	35.9	13.6
	2	4	80		534.12	694.57	40.1		
	3	5	100		500.24	692.01	38.4		
	4	5	100		521.13	687.58	33.3		
100	1	5	100	95	512.68	676.83	32.8	31.8	9.5
	2	4	80		497.81	610.90	28.3		
	3	5	100		550.31	726.86	35.3		
	4	5	100		515.57	668.99	30.7		
500	1	3	60	50	509.34	576.77	22.5	26.3	4.0
	2	3	60		509.88	594.22	28.1		
	3	3	60		507.22	579.03	23.9		
	4	1	20		516.95	547.80	30.8		
1,250	1	0	0	0	-	-	-	-	-
	2	0	0		-	-	-		
	3	0	0		-	-	-		
	4	0	0		-	-	-		
2,500	1	0	0	0	-	-	-	-	-
	2	0	0		-	-	-		
	3	0	0		-	-	-		
	4	0	0		-	-	-		
5,000	1	0	0	0	-	-	-	-	-
	2	0	0		-	-	-		
	3	0	0		-	-	-		
	4	0	0		-	-	-		
10,000	1	0	0	0	-	-	-	-	-
	2	0	0		-	-	-		
	3	0	0		-	-	-		
	4	0	0		-	-	-		

[a]- Weight per fish evaluated using survival number of fish.
[b]- Initial weight of a subsample of fish was 22.3 mg.

Liqui-Floc in Simulated Stormwater

Natural Site Solutions
Liqui-Floc in Turbid Water (Test ID: 0302-58NW)
Test Initiation: 26 February 2003

Concentration mg/L	Replicate	Survival			Weight				Growth [b]
		# Alive	% Survival	Mean % Survival	Tare Weight (mg)	Total Weight (mg)	Weight per Fish [a] (mg)	Mean Weight (mg)	(mg)
Control	1	5	100	100	534.96	705.98	34.2	38.0	14.8
	2	5	100		490.38	693.36	40.6		
	3	5	100		513.60	704.81	38.2		
	4	5	100		492.80	688.36	39.1		
Turbid Control	1	5	100	95	499.49	645.53	29.2	32.3	9.1
	2	4	80		528.26	675.57	36.8		
	3	5	100		537.84	696.29	31.7		
	4	5	100		517.19	673.92	31.3		
100	1	5	100	95	518.11	714.60	39.3	39.0	15.8
	2	5	100		522.55	691.66	33.8		
	3	5	100		531.49	735.30	40.8		
	4	4	80		514.05	681.81	41.9		
500	1	5	100	100	504.65	702.54	39.6	36.9	13.7
	2	5	100		505.29	683.93	35.7		
	3	5	100		517.07	681.16	32.8		
	4	5	100		503.15	699.53	39.3		
1,250	1	5	100	95	522.22	702.51	36.1	34.7	11.5
	2	5	100		517.68	681.62	32.8		
	3	4	80		512.07	652.04	35.0		
	4	5	100		500.64	674.57	34.8		
2,500	1	5	100	95	511.38	683.65	34.5	35.3	12.1
	2	4	80		522.78	660.44	34.4		
	3	5	100		509.95	675.40	33.1		
	4	5	100		529.78	725.31	39.1		
5,000	1	5	100	100	510.48	668.79	31.7	33.1	9.9
	2	5	100		536.05	692.22	31.2		
	3	5	100		525.60	694.01	33.7		
	4	5	100		526.82	705.97	35.8		
10,000	1	5	100	100	514.64	675.00	32.1	30.8	7.6
	2	5	100		518.81	658.35	27.9		
	3	5	100		479.97	634.22	30.9		
	4	5	100		528.91	689.98	32.2		

[a]- Weight per fish evaluated using surving number of fish.
[b]- Initial weight of a subsample of fish was 23.2 mg.

Gel-Floc in Clean Water

Natural Site Solutions
Rainbow trout Chronic Survival & Growth
Gel-Floc in Clean Water (Test ID: 0301-22NW)
Test Initiation: 23 January 2003

Concentration mg/L	Replicate	Survival: # Alive	Survival: % Survival	Survival: Mean % Survival	Weight: Tare Weight mg	Weight: Total Weight mg	Weight: Weight per Fish [a] (mg)	Weight: Mean Weight (mg)	Growth [b] (mg)
Control	1	5	100	100	509.36	689.60	36.0	34.8	12.5
	2	5	100		515.85	696.80	36.2		
	3	5	100		518.69	682.63	32.8		
	4	5	100		509.55	681.09	34.3		
1	1	5	100	100	500.38	692.22	38.4	36.4	14.1
	2	5	100		498.25	689.61	38.3		
	3	5	100		503.90	672.88	33.8		
	4	5	100		503.90	680.29	35.3		
50	1	0	0	0	-	-	-	-	-
	2	0	0		-	-	-		
	3	0	0		-	-	-		
	4	0	0		-	-	-		
125	1	0	0	0	-	-	-	-	-
	2	0	0		-	-	-		
	3	0	0		-	-	-		
	4	0	0		-	-	-		
250	1	0	0	0	-	-	-	-	-
	2	0	0		-	-	-		
	3	0	0		-	-	-		
	4	0	0		-	-	-		
500	1	0	0	0	-	-	-	-	-
	2	0	0		-	-	-		
	3	0	0		-	-	-		
	4	0	0		-	-	-		
1000	1	0	0	0	-	-	-	-	-
	2	0	0		-	-	-		
	3	0	0		-	-	-		
	4	0	0		-	-	-		

[a]- Weight per fish evaluated using survival number of fish.
[b]- Initial weight of a subsample of fish subtracted from mean weight per surviving number of fish. Mean initial weight was 22.3 mg.

Gel-Floc in Simulated Stormwater

Natural Site Solutions
Rainbow trout Chronic Survival & Growth
Gel-Floc in Turbid Water (Test ID: 0302-57NW)
Test Initiation: 28 February 2003

Concentration mg/L	Replicate	Survival: # Alive	Survival: % Survival	Survival: Mean % Survival	Weight: Tare Weight (mg)	Weight: Total Weight (mg)	Weight: Weight per Fish [a] (mg)	Weight: Mean Weight (mg)	Growth [b] (mg)
Control	1	5	100	100	510.88	728.78	43.6	42.2	19.0
	2	5	100		479.47	694.37	43.0		
	3	5	100		517.76	734.88	43.4		
	4	5	100		514.91	708.31	38.7		
Turbid Control	1	4	80	95	529.29	696.73	41.9	37.7	14.5
	2	5	100		518.00	692.01	34.8		
	3	5	100		504.59	680.19	35.1		
	4	5	100		506.18	701.42	39.0		
1	1	4	80	95	497.32	658.70	40.3	40.8	17.6
	2	5	100		504.90	718.43	42.7		
	3	5	100		526.94	731.89	41.0		
	4	5	100		522.94	718.42	39.1		
18.75	1	5	100	100	518.60	725.81	41.4	44.0	20.8
	2	5	100		516.20	745.77	45.9		
	3	5	100		516.44	755.17	47.7		
	4	5	100		496.22	700.96	40.9		
38	1	5	100	100	535.78	749.70	42.8	41.9	18.7
	2	5	100		506.88	732.03	45.0		
	3	5	100		494.07	694.63	40.1		
	4	5	100		517.75	716.32	39.7		
75	1	0	0	0	-	-	-	-	-
	2	0	0		-	-	-		
	3	0	0		-	-	-		
	4	0	0		-	-	-		
150	1	0	0	0	-	-	-	-	-
	2	0	0		-	-	-		
	3	0	0		-	-	-		
	4	0	0		-	-	-		
300	1	0	0	0	-	-	-	-	-
	2	0	0		-	-	-		
	3	0	0		-	-	-		
	4	0	0		-	-	-		

[a]- Weight per fish evaluated using surviving number of fish.
[b]- Initial weight of a subsample of fish was 23.2 mg.

APPENDIX B

Test Data and Statistical Summaries

Liqui-Floc in Clean Water

Larval Fish Growth and Survival Test-7-day Survival

Start Date:	1/23/03	Test ID:	0301-24NWG	Sample ID:	NSS-Natural Site Solutions
End Date:	1/30/03	Lab ID:	WAAEE-AMEC NW Bioassa	Sample Type:	OTH-Other sample type
Sample Date:	1/23/03	Protocol:	EPAF 94-EPA Freshwater	Test Species:	OM-Oncorhynchus mykiss
Comments:	Liqui-Floc in MHSW				

Conc-mg/L	1	2	3	4
D-Control	1.0000	0.8000	1.0000	1.0000
100	1.0000	0.8000	1.0000	1.0000
500	0.6000	0.6000	0.6000	0.2000
1250	0.0000	0.0000	0.0000	0.0000
2500	0.0000	0.0000	0.0000	0.0000
5000	0.0000	0.0000	0.0000	0.0000
10000	0.0000	0.0000	0.0000	0.0000

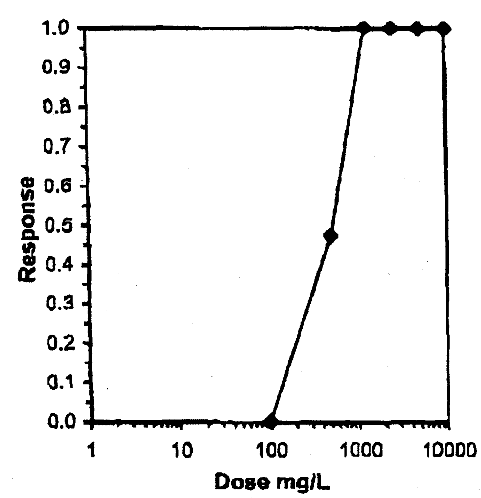
			Transform: Arcsin Square Root					Rank	1-Tailed	Number	Total
Conc-mg/L	Mean	N-Mean	Mean	Min	Max	CV%	N	Sum	Critical	Resp	Number
D-Control	0.9500	1.0000	1.2857	1.1071	1.3453	9.261	4			1	20
100	0.9500	1.0000	1.2857	1.1071	1.3453	9.261	4	18.00	10.00	1	20
*500	0.5000	0.5263	0.7805	0.4636	0.8861	27.063	4	10.00	10.00	10	20
*1250	0.0000	0.0000	0.2255	0.2255	0.2255	0.000	4	10.00	10.00	20	20
*2500	0.0000	0.0000	0.2255	0.2255	0.2255	0.000	4	10.00	10.00	20	20
*5000	0.0000	0.0000	0.2255	0.2255	0.2255	0.000	4	10.00	10.00	20	20
*10000	0.0000	0.0000	0.2255	0.2255	0.2255	0.000	4	10.00	10.00	20	20

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.01)	0.70709	0.896	-2.0979	5.47594
Equality of variance cannot be confirmed				

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU
Steel's Many-One Rank Test	100	500	223.607	

Trimmed Spearman-Karber

Trim Level	EC50	95% CL	
0.0%	434.66	327.85	576.25
5.0%	443.72	323.98	607.73
10.0%	452.97	316.70	647.89
20.0%	472.01	286.65	777.25
Auto-0.0%	434.66	327.85	576.25



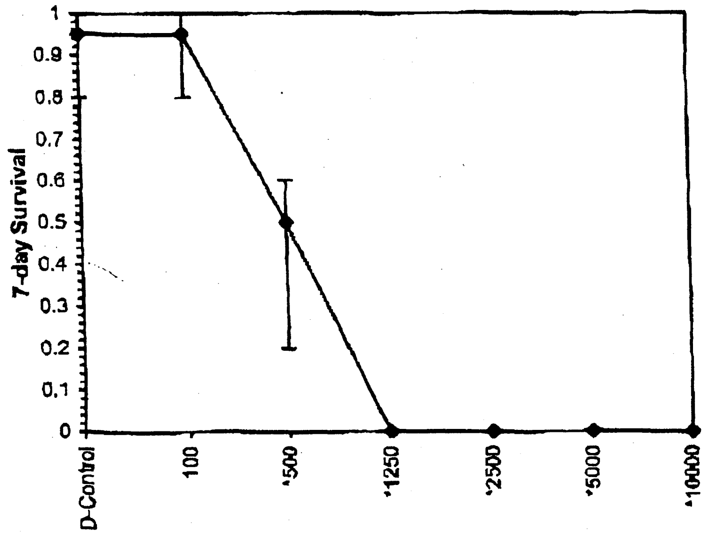
ToxCalc v5.0.23

Reviewed by: KS

Larval Fish Growth and Survival Test-7-day Survival

Start Date:	1/23/03	Test ID:	0301-24NWG	Sample ID:	NSS-Natural Site Solutions
End Date:	1/30/03	Lab ID:	WAAEE-AMEC NW Bioassay	Sample Type:	OTH-Other sample type
Sample Date:	1/23/03	Protocol:	EPAF 94-EPA Freshwater	Test Species:	OM-Oncorhynchus mykiss
Comments:	Liqui-Floc in MHSW				

Dose-Response Plot



ToxCalc v5.0.23

Reviewed by: KB

Larval Fish Growth and Survival Test-Weight

Start Date:	1/23/03	Test ID:	0301-24NWG	Sample ID:	NSS-Natural Site Solutions
End Date:	1/30/03	Lab ID:	WAAEE-AMEC NW Bioassay	Sample Type:	OTH-Other sample type
Sample Date:	1/23/03	Protocol:	EPAF 94-EPA Freshwater	Test Species:	OM-Oncorhynchus mykiss
Comments:	Liqui-Floc in MHSW				

Conc-mg/L	1	2	3	4
D-Control	31.824	32.090	38.354	33.290
100	32.830	22.618	35.310	30.684
500	13.486	16.868	14.362	6.170
1250	0.000	0.000	0.000	0.000
2500	0.000	0.000	0.000	0.000
5000	0.000	0.000	0.000	0.000
10000	0.000	0.000	0.000	0.000

			Transform: Untransformed					Rank	1-Tailed	Isotonic	
Conc-mg/L	Mean	N-Mean	Mean	Min	Max	CV%	N	Sum	Critical	Mean	N-Mean
D-Control	33.890	1.0000	33.890	31.824	38.354	8.982	4			33.890	1.0000
100	30.361	0.8959	30.361	22.618	35.310	18.105	4	15.00	10.00	30.361	0.8959
*500	12.722	0.3754	12.722	6.170	16.868	36.134	4	10.00	10.00	12.722	0.3754
*1250	0.000	0.0000	0.000	0.000	0.000	0.000	4	10.00	10.00	0.000	0.0000
*2500	0.000	0.0000	0.000	0.000	0.000	0.000	4	10.00	10.00	0.000	0.0000
*5000	0.000	0.0000	0.000	0.000	0.000	0.000	4	10.00	10.00	0.000	0.0000
*10000	0.000	0.0000	0.000	0.000	0.000	0.000	4	10.00	10.00	0.000	0.0000

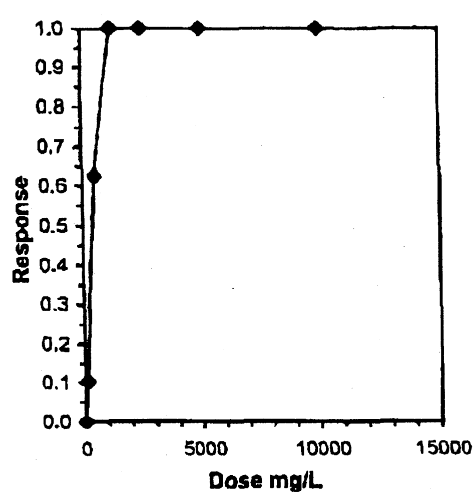
Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.01)	0.77217	0.896	-1.0469	3.57483
Equality of variance cannot be confirmed				

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU
Steel's Many-One Rank Test	100	500	223.607	

Linear Interpolation (200 Resamples)

Point	mg/L	SD	95% CL(Exp)		Skew
IC05*	48.02	37.92	0.64	189.13	0.6272
IC10*	96.03	41.03	1.27	219.34	0.1434
IC15	135.25	44.37	7.19	254.83	-0.0833
IC20	173.68	46.84	13.58	290.79	-0.3523
IC25	212.10	46.74	19.97	326.60	-0.5919
IC40	327.38	41.02	208.04	434.88	-0.5688
IC50	404.23	41.12	288.19	522.64	-0.1521

* indicates IC estimate less than the lowest concentration



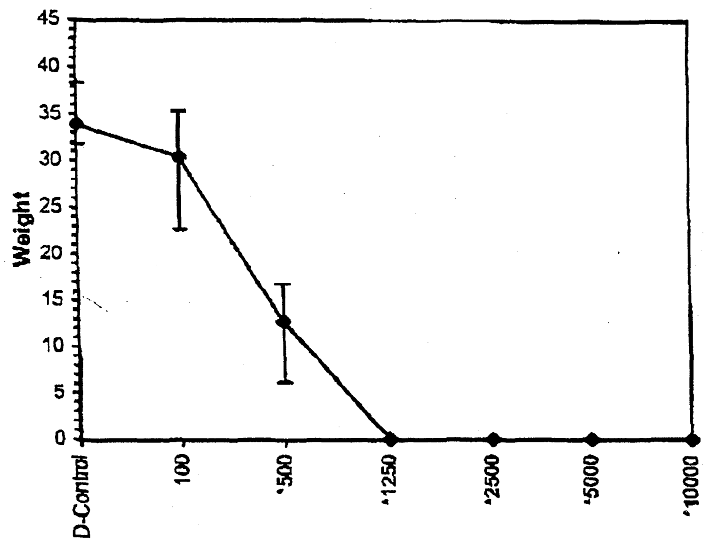
ToxCalc v5.0.23

Reviewed by: KB

Larval Fish Growth and Survival Test-Weight

Start Date:	1/23/03	Test ID:	0301-24NWG	Sample ID:	NSS-Natural Site Solutions
End Date:	1/30/03	Lab ID:	WAAEE-AMEC NW Bioassay	Sample Type:	OTH-Other sample type
Sample Date:	1/23/03	Protocol:	EPAF 94-EPA Freshwater	Test Species:	OM-Oncorhynchus mykiss
Comments:	Liqui-Floc in MHSW				

Dose-Response Plot



Reviewed by: KS

AMEC Earth & Environmental
Northwest Bioassay Lab

Test Species: O. mykiss
Client: Natural Site Solutions
Sample ID. Lignu-Hoc MHSW

Initial and Final Chemistries
Seven Day Chronic Freashwater Bioassay

Start Date & Time: 1/23/03 1730
Stop Date & Time: 1/30/03 16:00
Test No: 0301-24NW

Concentration MHSW	Days 0 init.	0 final	1 init.	1 final	2 init.	2 final	3 init.	3 final	4 init.	4 final	5 init.	5 final	6 init.	6 final
pH	7.89	7.18	7.46	7.43	7.71	7.31	7.41	7.17	7.86	7.21	7.72	7.23	7.85	7.23
DO (mg/l)	8.4	6.8	8.9	6.1	9.2	5.9	8.9	5.6	8.6	6.0	8.4	5.6	8.3	6.2
Cond. (µmhos-cm)	277	246	237	242	223	244	242	269	243	249	254	270	253	273
Temperature (°C)	15.0	15.4	15.0	15.0	14.0	14.9	15.0	15.3	15.0	14.8	15.3	15.0	15.0	15.3

Concentration 100 mg/L	Days 0 init.	0 final	1 init.	1 final	2 init.	2 final	3 init.	3 final	4 init.	4 final	5 init.	5 final	6 init.	6 final
pH	7.81	7.18	7.55	7.37	7.68	7.36	7.19	7.22	7.84	7.23	7.81	7.28	7.85	7.25
DO (mg/l)	9.2	6.4	8.8	5.8	8.9	6.5	8.8	5.6	8.4	4.9	8.4	5.7	8.4	4.8
Cond. (µmhos-cm)	252	240	236	241	233	240	245	273	244	252	257	267	248	272
Temperature (°C)	15.0	15.0	15.0	14.9	14.0	14.9	14.7	15.2	15.0	14.6	15.5	15.0	14.2	15.0

Concentration 500 mg/L	Days 0 init.	0 final	1 init.	1 final	2 init.	2 final	3 init.	3 final	4 init.	4 final	5 init.	5 final	6 init.	6 final
pH	7.63	7.30	7.54	7.36	7.66	7.34	7.90	7.26	7.80	7.27	7.75	7.31	7.70	7.33
DO (mg/l)	8.9	7.1	8.5	6.1	9.3	5.7	8.7	5.3	8.8	6.4	8.7	5.8	8.5	6.3
Cond. (µmhos-cm)	252	249	238	242	237	244	245	270	236	247	247	267	249	272
Temperature (°C)	15.0	15.0	15.0	15.0	14.0	14.9	14.9	15.2	14.2	14.5	14.8	15.0	14.6	15.1

Concentration 1250 mg/L	Days 0 init.	0 final	1 init.	1 final	2 init.	2 final	3 init.	3 final	4 init.	4 final	5 init.	5 final	6 init.	6 final
pH	7.31	7.38												
DO (mg/l)	9.0	8.8												
Cond. (µmhos-cm)	251	253												
Temperature (°C)	15.0	15.0												

Concentration 2500 mg/L	Days 0 init.	0 final	1 init.	1 final	2 init.	2 final	3 init.	3 final	4 init.	4 final	5 init.	5 final	6 init.	6 final
pH	6.96	7.39												
DO (mg/l)	8.9	9.1												
Cond. (µmhos-cm)	252	252												
Temperature (°C)	15.0	15.1												

Concentration 5000 mg/L	Days 0 init.	0 final	1 init.	1 final	2 init.	2 final	3 init.	3 final	4 init.	4 final	5 init.	5 final	6 init.	6 final
pH	7.05*	7.38												
DO (mg/l)	8.9	8.8												
Cond. (µmhos-cm)	307	305												
Temperature (°C)	15.0	15.1												

	Control			
Hardness*	88			
Alkalinity*	60			
Initial Chlorine†	–			
Ammonia †	–			

* mg/L as CaCO3; † mg/L; ND: no chlorine detected

Analysts: [illegible]
Reviewed: [illegible]

Sample Description:
Animal Source: Trout Lodge
Date Received: 1/20/03
Comments:

* pH adjusted

AMEC Earth & Environmental
Northwest Bioassay Lab

Test Species: O. mykiss
Client: NSS
Sample ID. Ligui-Floc M HSW

Initial and Final Chemistries
Seven Day Chronic Freashwater Bioassay

page 2

Start Date & Time: 1/23/03 1730
Stop Date & Time: 1/30/03 1600
Test No: 0301-24NW

Concentration	Days 0		1		2		3		4		5		6	
10,000 mg/L	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final
pH	7.00	7.45	X											
DO (mg/l)	9.0	8.5												
Cond. (µmhos-cm)	394	385												
Temperature (°C)	15.0	15.0												

Concentration	Days 0		1		2		3		4		5		6	
	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final
pH														
DO (mg/l)														
Cond. (µmhos-cm)														
Temperature (°C)														

Concentration	Days 0		1		2		3		4		5		6	
	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final
pH														
DO (mg/l)														
Cond. (µmhos-cm)														
Temperature (°C)														

Concentration	Days 0		1		2		3		4		5		6	
	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final
pH														
DO (mg/l)														
Cond. (µmhos-cm)														
Temperature (°C)														

Concentration	Days 0		1		2		3		4		5		6	
	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final
pH														
DO (mg/l)														
Cond. (µmhos-cm)														
Temperature (°C)														

Concentration	Days 0		1		2		3		4		5		6	
	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final
pH														
DO (mg/l)														
Cond. (µmhos-cm)														
Temperature (°C)														

	Control			
Hardness*	88			
Alkalinity*	60			
Initial Chlorine†	–			
Ammonia †	–			

* mg/L as CaCO3; † mg/L; ND: no chlorine detected

Analysts:

Reviewed:

Sample Description:
Animal Source: Trout lodge
Date Received: 1/20/03
Comments: DOH: ~~T~~ 12/31/02 Swimup 1/17/03

AMEC Earth & Environmental
Northwest Bioassay Lab
5009 Pacific Hwy. E. Suite 2
Fife, WA 98424

Raw Data Sheet
Rainbow Trout
Oncorhynchus mykiss
Survival and Growth Test

Client Name: Natural Site Solutions **Test Date:** 1/23/03

Sample ID: Liqui-Floc MHSW **Test No.:** 0301-24 NW
*pans labeled LF

mg/L Conc.	Cont.	Rep.	Days 0	1	2	3	4	5	6	7	Percent Survival	Average Survival
CON	4	1	5	5	5	5	5	5	5	5		
	26	2	5	5	5	5	5	4	4	4		
	18	3	5	5	5	5	5	5	5	5		
	21	4	5	5	5	5	5	5	5	5		95%
100	28	1	5	5	5	5	5	5	5	5		
	1	2	5	5	5	5	5	5	5	4		
	24	3	5	5	5	5	5	5	5	5		
	17	4	5	5	5	5	5	5	5	5		95%
500	8	1	5	5	5	4	4	4	3	3		
	14	2	5	5	5	5	5	4	3	3		
	12	3	5	5	5	5	4	4	3	3		
	16	4	5	5	5	4	4	3	1	1		50%
1250	9	1	5	0								
	20	2	5	0								
	11	3	5	0								
	25	4	5	0								
2500	2	1	5	0								
	15	2	5	0								
	7	3	5	0								
	13	4	5	0								
5000	5	1	5	0								
	27	2	5	0								
	22	3	5	0								
	6	4	5	0								
10000	10	1	5	0								
	3	2	5	0								
	23	3	5	0								
	19	4	5	0								
		1										
		2										
		3										
		4										
Tech Initials			mL	mm	mm	lm	Sm	Et	Sm	Et		

Feeding Times: 0 ___ 1700 1 ~~0900~~ 0900 1500 2 ~~0800~~ 0830 mm 1600 3 ~~0830~~ mm0930 1430 4 8:30 16:30 5 8:30 15:30 6 8:15 15:15

Comments: ______

Analysts: mm Sm

AMEC Earth & Environmental
Northwest Bioassay Lab
5009 Pacific Hwy., E. Suite 2-0
Fife, WA 98424

Raw Data Sheet
Fish Weights
Seven Day Chronic Bioassay

Client: Natural Site Solutions

Test Date: 1/23/03

Sample ID: Liqui-Floc MHSW
*pans labeled LF

Species: *O. mykiss*

Test No: 0301-24NW

Conc.	cont #	rep #	pan wt. (gm)	pan + fish (gm)	fish wt. (mg)	# fish	avg. per fish (mg)	avg. per conc. (mg)
CON	4	1	0.50987	.66899		5		
	26	2	0.53412	.69457		4		
	18	3	0.50024	.69201		5		
	21	4	0.52113	.68758		5		
100	28	1	0.51268	.67683		5		
	1	2	0.49781	.61090		4		
	24	3	0.55031	.72686		5		
	17	4	0.51557	.66899		5		
500	8	1	0.50934	.57677		3		
	14	2	0.50988	.59422		3		
	12	3	0.50722	.57903		3		
	16	4	0.51695	.54780		1		
1250	9	1						
	20	2						
	11	3						
	25	4						
2500	2	1						
	15	2						
	7	3						
	13	4						
5000	5	1						
	27	2						
	22	3						
	6	4						
10000	10	1						
	3	2						
	23	3						
	19	4						

Tare: Et
Total: Bm

Date/Time in: 1/30/03 16:00
Date/Time out: 1/31/03 1600
Oven temp. (°C): 65

Liqui-Floc in Simulated Stormwater

Larval Fish Growth and Survival Test-7 Day Survival

Start Date:	2/26/03	Test ID:	0302-58NW	Sample ID:	NSS-Natural Site Solutions
End Date:	3/5/03	Lab ID:	WAAEE-AMEC NW Bioassay	Sample Type:	EFF2-Industrial
Sample Date:		Protocol:	EPA METHOD	Test Species:	OM-Oncorhynchus mykiss

Comments: Liqui-Floc in Turbid Water

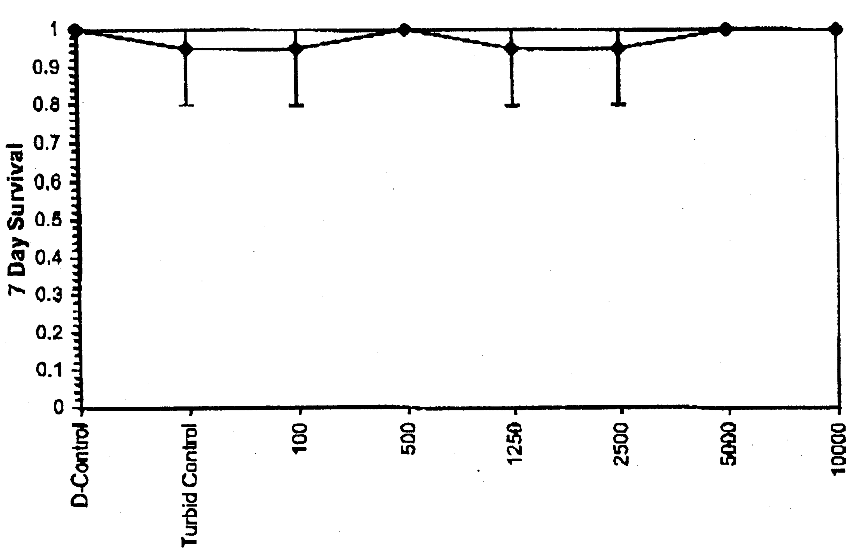
Conc-mg/L	1	2	3	4
D-Control	1.0000	1.0000	1.0000	1.0000
Turbid Control	1.0000	0.8000	1.0000	1.0000
100	1.0000	1.0000	1.0000	0.8000
500	1.0000	1.0000	1.0000	1.0000
1250	1.0000	1.0000	0.8000	1.0000
2500	1.0000	0.8000	1.0000	1.0000
5000	1.0000	1.0000	1.0000	1.0000
10000	1.0000	1.0000	1.0000	1.0000

			Transform: Arcsin Square Root					Rank	1-Tailed
Conc-mg/L	Mean	N-Mean	Mean	Min	Max	CV%	N	Sum	Critical
D-Control	1.0000	1.0526	1.3453	1.3453	1.3453	0.000	4		
Turbid Control	0.9500	1.0000	1.2857	1.1071	1.3453	9.261	4		
100	0.9500	1.0000	1.2857	1.1071	1.3453	9.261	4	16.00	10.00
500	1.0000	1.0526	1.3453	1.3453	1.3453	0.000	4	18.00	10.00
1250	0.9500	1.0000	1.2857	1.1071	1.3453	9.261	4	16.00	10.00
2500	0.9500	1.0000	1.2857	1.1071	1.3453	9.261	4	16.00	10.00
5000	1.0000	1.0526	1.3453	1.3453	1.3453	0.000	4	18.00	10.00
10000	1.0000	1.0526	1.3453	1.3453	1.3453	0.000	4	18.00	10.00

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.01)	0.65146	0.896	-1.8653	3.19385
Equality of variance cannot be confirmed				
The control means are not significantly different (p = 0.36)	1	2.44691		

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU
Steel's Many-One Rank Test	10000	>10000		

Dose-Response Plot



 ToxCalc v5.0.23 Reviewed by: KB

Larval Fish Growth and Survival Test-Growth-Weight

Start Date:	2/26/03	Test ID:	0302-58NW	Sample ID:	NSS-Natural Site Solutions
End Date:	3/5/03	Lab ID:	WAAEE-AMEC NW Bioassa	Sample Type:	EFF2-Industrial
Sample Date:		Protocol:	EPA METHOD	Test Species:	OM-Oncorhynchus mykiss
Comments:	Liqui-Floc In Turbid Water				

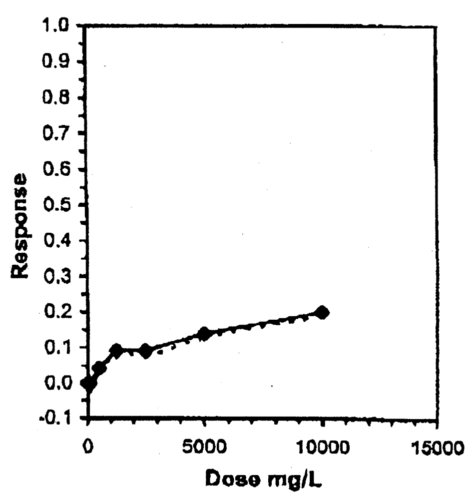
Conc-mg/L	1	2	3	4
D-Control	34.204	40.596	38.242	39.112
Turbid Control	29.208	36.828	31.690	31.346
100	39.298	33.822	40.762	41.940
500	39.578	35.728	32.818	39.276
1250	36.058	32.788	34.993	34.786
2500	34.454	34.415	33.090	39.106
5000	31.662	31.234	33.682	35.830
10000	32.072	27.908	30.856	32.214

			Transform: Untransformed						1-Tailed		Isotonic	
Conc-mg/L	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD	Mean	N-Mean
D-Control	38.039	1.1788	38.039	34.204	40.596	7.190	4				38.497	1.0000
Turbid Control	32.268	1.0000	32.268	29.208	36.828	10.016	4					
100	38.956	1.2073	38.956	33.822	41.940	9.213	4	-0.496	2.451	4.534	38.497	1.0000
500	36.850	1.1420	36.850	32.818	39.578	8.701	4	0.643	2.451	4.534	36.850	0.9572
1250	34.656	1.0740	34.656	32.788	36.058	3.937	4	1.829	2.451	4.534	34.961	0.9082
2500	35.266	1.0929	35.266	33.090	39.106	7.478	4	1.499	2.451	4.534	34.961	0.9082
*5000	33.102	1.0259	33.102	31.234	35.830	6.371	4	2.669	2.451	4.534	33.102	0.8599
*10000	30.763	0.9533	30.763	27.908	32.214	6.496	4	3.934	2.451	4.534	30.763	0.7991

Auxiliary Tests					Statistic		Critical		Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)					0.96724		0.896		-0.4519	-0.4189
Bartlett's Test indicates equal variances (p = 0.81)					2.99787		16.8119			
The control means are significantly different (p = 0.03)					2.72599		2.44691			
Hypothesis Test (1-tail, 0.05)	**NOEC**	**LOEC**	**ChV**	**TU**	**MSDu**	**MSDp**	**MSB**	**MSE**	**F-Prob**	**df**
Dunnett's Test	2500	5000	3535.53		4.5343	0.1192	32.7068	6.84245	0.00322	6, 21

Linear Interpolation (200 Resamples)

Point	mg/L	SD	95% CL(Exp)		Skew
IC05	610.327	486	0	3785.87	2.9391
IC10	2922.08	1442.48	0	6980.98	0.6111
IC15	5811.18				
IC20	9924.98				
IC25	>10000				
IC40	>10000				
IC50	>10000				

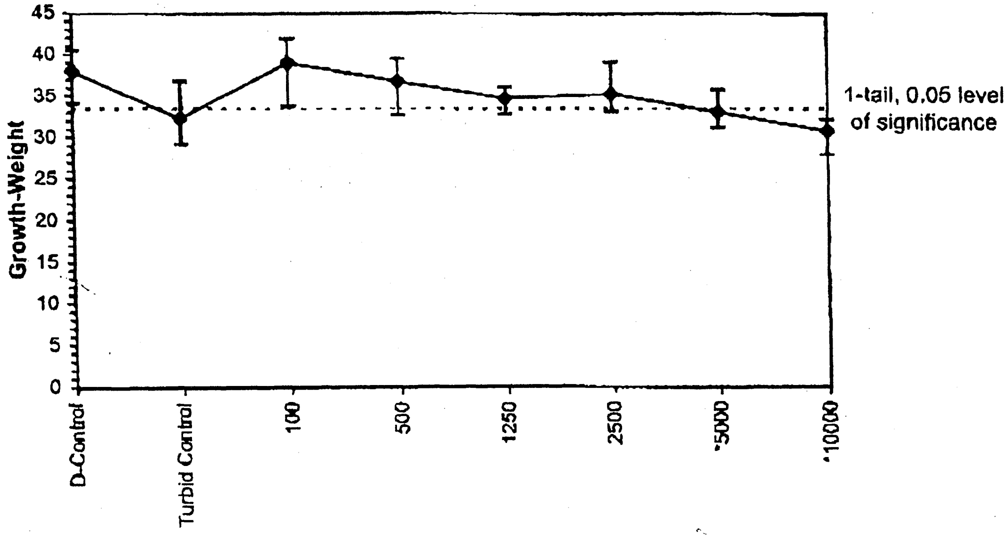


 ToxCalc v5.0.23 Reviewed by: KB

Larval Fish Growth and Survival Test-Growth-Weight

Start Date:	2/28/03	Test ID:	0302-58NW	Sample ID:	NSS-Natural Site Solutions
End Date:	3/5/03	Lab ID:	WAAEE-AMEC NW Bioassa	Sample Type:	EFF2-Industrial
Sample Date:		Protocol:	EPA METHOD	Test Species:	OM-Oncorhynchus mykiss
Comments:	Liqui-Floc in Turbid Water				

Dose-Response Plot



 ToxCalc v5.0.23 Reviewed by: [signature]

AMEC Earth & Environmental
Northwest Bioassay Lab

Initial and Final Chemistries
Seven Day Chronic Freshwater Bioassay

page 1

Test Species: ~~NSS~~ O. mykiss
Client: NSS
Sample ID. ~~Mg~~ Liqu.-Floc in Turbid Water

Start Date & Time: 2/26/03 17:00
Stop Date & Time: 3/5/03 15:30
Test No: 0302-55 NW

Concentration C	Day 0 init.	Day 0 final (5.9)	Day 1 init.	Day 1 final	Day 2 init.	Day 2 final	Day 3 init.	Day 3 final	Day 4 init.	Day 4 final	Day 5 init.	Day 5 final	Day 6 init.	Day 6 final
pH	7.82	7.22	7.90	6.92	7.75	6.93	7.85	6.98	7.80	7.53	7.35	7.21	7.92	7.15
DO (mg/l)	8.2	~~264~~	8.3	7.3	8.3	7.1	8.4	6.5	8.3	6.1	8.4	5.8	7.9	4.5
Cond. (µmhos-cm)	267	264	232	254	264	255	265	251	264	262	254	281	266	263
Temperature (°C)	15.5	15.9	15.9	15.4	15.8	15.8	15.9	15.5	15.8	15.7	15.5	16.7	16.0	16.1

Concentration Turbid C	Day 0 init.	Day 0 final	Day 1 init.	Day 1 final	Day 2 init.	Day 2 final	Day 3 init.	Day 3 final	Day 4 init.	Day 4 final	Day 5 init.	Day 5 final	Day 6 init.	Day 6 final
pH	7.46	7.27	7.57	7.08	7.75	7.09	7.82	7.03	7.77	7.49	7.70	7.27	8.05	7.24
DO (mg/l)	8.4	6.0	8.7	6.4	8.3	6.2	8.2	6.1	8.3	6.3	8.4	5.8	7.9	6.0
Cond. (µmhos-cm)	245	244	225	273	263	262	264	263	259	311	285	283	282	281
Temperature (°C)	15.7	15.8	15.9	15.9	15.4	15.5	15.5	15.5	15.9	15.8	15.7	16.5	16.0	15.8

Concentration 100	Day 0 init.	Day 0 final	Day 1 init.	Day 1 final	Day 2 init.	Day 2 final	Day 3 init.	Day 3 final	Day 4 init.	Day 4 final	Day 5 init.	Day 5 final	Day 6 init.	Day 6 final
pH	7.59	7.24	7.42	7.13	7.60	7.15	7.67	7.14	7.71	7.47	7.91	7.23	7.76	7.29
DO (mg/l)	8.0	6.2	9.1	5.6	8.3	5.8	8.4	6.0	8.3	5.7	8.4	5.6	8.1	4.6
Cond. (µmhos-cm)	277	254	260	280	262	285	261	285	265	293	276	281	275	281
Temperature (°C)	15.5	15.8	14.5	15.4	15.7	15.5	15.6	15.6	15.5	15.8	15.7	16.0	15.5	15.9

Concentration 500	Day 0 init.	Day 0 final	Day 1 init.	Day 1 final	Day 2 init.	Day 2 final	Day 3 init.	Day 3 final	Day 4 init.	Day 4 final	Day 5 init.	Day 5 final	Day 6 init.	Day 6 final
pH	7.60	7.32	7.44	7.22	7.59	7.23	7.65	7.19	7.67	7.42	7.73	7.56	7.73	7.30
DO (mg/l)	8.5	5.4	9.1	6.4	8.3	6.2	8.4	6.3	8.2	4.9	8.5	4.6	7.9	4.0
Cond. (µmhos-cm)	288	293	263	287	291	286	287	286	290	286	280	454	278	310
Temperature (°C)	15.5	15.9	15.2	14.9	15.9	15.1	15.7	15.5	15.5	15.6	15.6	15.8	16.0	15.8

Concentration 1250	Day 0 init.	Day 0 final	Day 1 init.	Day 1 final	Day 2 init.	Day 2 final	Day 3 init.	Day 3 final	Day 4 init.	Day 4 final	Day 5 init.	Day 5 final	Day 6 init.	Day 6 final
pH	7.57	7.24	7.51	7.21	7.60	7.23	7.62	7.24	7.65	7.34	7.70	7.30	7.48	7.28
DO (mg/l)	8.0	5.8	8.8	5.2	8.2	5.7	8.2	5.5	9.2	5.0	8.4	4.9	8.1	4.9
Cond. (µmhos-cm)	294	289	265	277	300	279	289	287	290	288	282	278	284	278
Temperature (°C)	15.6	15.8	15.4	15.5	15.7	15.5	15.5	15.7	15.7	15.9	15.2	15.8	15.0	15.7

Concentration 2500	Day 0 init.	Day 0 final	Day 1 init.	Day 1 final	Day 2 init.	Day 2 final	Day 3 init.	Day 3 final	Day 4 init.	Day 4 final	Day 5 init.	Day 5 final	Day 6 init.	Day 6 final
pH	7.43	7.27	7.56	7.28	7.51	7.24	7.53	7.28	7.55	7.36	7.61	7.35	7.68	7.31
DO (mg/l)	7.7	5.3	8.9	4.5	8.3	5.1	8.1	5.2	8.3	4.8	8.4	5.4	8.3	4.9
Cond. (µmhos-cm)	301	284	279	289	340	278	335	302	337	307	343	326	307	296
Temperature (°C)	15.3	15.7	15.1	15.3	15.4	15.9	15.6	15.7	15.6	15.9	15.5	16.0	16.0	15.8

	Control			
Hardness*	84			
Alkalinity*	56			
Initial Chlorine†	–			
Ammonia †	–			

* mg/L as CaCO3; † mg/L; ND: no chlorine detected

Analysts: nw EF SM
Reviewed: [illegible]

Sample Description:
Animal Source: Thomas Fish Co.
Date Received: 2/25/03 DOH: 2/10/03 DOSU: 2/24/03
Comments:

Day 0 turbidity 498
Day 1 turbidity 409
Day 2 turbidity 906
Day 3 turbidity 653
Day 4 turbidity 759
Day 5 " 491
Day 6 " 532

AMEC Earth & Environmental
Northwest Bioassay Lab

Initial and Final Chemistries
Seven Day Chronic Freashwater Bioassay

page 2

Test Species: O. mykiss
Client: NSS
Sample ID. Liqui-Floc in Turbid Water
Start Date & Time: 2/26/03 1700
Stop Date & Time: 3/5/03 1530
Test No: 0302-58NW

Concentration	Days													
	0		1		2		3		4		5		6	
5000	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final
pH	7.40	7.24	7.55	7.24	7.30	7.25	7.33	7.31	731	7.42	7.73	7.31	7.45	7.36
DO (mg/l)	8.3	5.0	8.3	4.4	8.4	48	8.3	4.9	8.2	4.3	8.5	5.1	8.0	4.2
Cond. (µmhos-cm)	235	319	276	311	299	312	308	313	310	327	508	285	334	301
Temperature (°C)	15.8	15.6	15.1	15.7	15.7	15.9	~~15.0~~ 15.7	15.5	15.3	15.7	15.7	15.7	16.0	15.9

Concentration	Days													
	0		1		2		3		4		5		6	
10000	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final
pH	7.45	7.20	7.52	7.24	7.22	7.28	7.21	7.30	7.20	7.48	7.57	7.80	742	7.48
DO (mg/l)	8.5	5.0	8.5	4.5	8.0	4.8	8.3	4.9	8.2	4.2	8.5	4.10	7.9	4.1
Cond. (µmhos-cm)	392	368	362	362	354	365	357	367	355	362	663	577	392	394
Temperature (°C)	15.7	15.8	15.8	15.8	15.5	159	15.7	15.5	15.7	15.9	15.7	16.0	16.0	16.0

Concentration	Days													
	0		1		2		3		4		5		6	
	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final
pH														
DO (mg/l)														
Cond. (µmhos-cm)														
Temperature (°C)														

Concentration	Days													
	0		1		2		3		4		5		6	
	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final
pH														
DO (mg/l)														
Cond. (µmhos-cm)														
Temperature (°C)														

Concentration	Days													
	0		1		2		3		4		5		6	
	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final
pH														
DO (mg/l)														
Cond. (µmhos-cm)														
Temperature (°C)														

Concentration	Days													
	0		1		2		3		4		5		6	
	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final
pH														
DO (mg/l)														
Cond. (µmhos-cm)														
Temperature (°C)														

	Control			
Hardness*				
Alkalinity*				
Initial Chlorine†				
Ammonia †				

* mg/L as CaCO3; † mg/L; ND: no chlorine detected

Analysts: SM
Reviewed: KB

Sample Description:
Animal Source:
Date Received:
Comments:

AMEC Earth & Environmental
Northwest Bioassay Lab
5009 Pacific Hwy. E. Suite 2
Fife, WA 98424

Raw Data Sheet
Rainbow Trout
Oncorhynchus mykiss
Survival and Growth Test

Client Name: NSS Liqui-Floc

Test Date: 2/26/03

Sample ID: mg/L Liqui-Floc

Test No.: 0302-58NW

g/L Conc.	Cont.	Rep.	Days 0	1	2	3	4	5	6	7	Percent Survival	Average Survival
C	21	1	5	5	5	5	5	5	5	5		
	8	2	5	5	5	5	5	5	5	5		
	20	3	5	5	5	5	5	5	5	5		
	1	4	5	5	5	5	5	5	5	5		100%
Turbid C	13	1	5	5	5	5	5	5	5	5		
	9	2	5	4	4	4	4	4	4	4		
	14	3	5	5	5	5	5	5	5	5		
	18	4	5	5	5	5	5	5	5	5		95%
100	4	1	5	5	5	5	5	5	5	5		
	16	2	5	5	5	5	5	5	5	5		
	10	3	5	5	5	5	5	5	5	5		
	2	4	5	5	4	4	4	4	4	4		95%
500	12	1	5	5	5	5	5	5	5	5		
	5	2	5	5	5	5	5	5	5	5		
	22	3	5	5	5	5	5	5	5	5		
	6	4	5	5	5	5	5	5	5	5		100%
1250	3	1	5	5	5	5	5	5	5	5		
	32	2	5	5	5	5	5	5	5	5		
	15	3	5	5	5	5	5	5	5	4		
	25	4	5	5	5	5	5	5	5	5		95%
2500	24	1	5	5	5	5	5	5	5	5		
	28	2	5	5	4	4	4	4	4	4		
	27	3	5	5	5	5	5	5	5	5		
	7	4	5	5	5	5	5	5	5	5		95%
5000	23	1	5	5	5	5	5	5	5	5		
	29	2	5	5	5	5	5	5	5	5		
	30	3	5	5	5	5	5	5	5	5		
	19	4	5	5	5	5	5	5	5	5		100%
10000	31	1	5	5	5	5	5	5	5	5		
	17	2	5	5	5	5	5	5	5	5		
	11	3	5	5	5	5	5	5	5	5		
	26	4	5	5	5	5	5	5	5	5		100%
Tech Initials			Et	Im	mv	Et	Et	Et	SM	Et		

Feeding Times: 0 ~~1400~~ 1200 1 0800 1615 2 0830 1600 3 0830 1700 4 0830 1600 5 0830 1600 6 0830 1515

Comments:

Analysts: SM, Et

AMEC Earth & Environmental
Northwest Bioassay Lab
5009 Pacific Hwy., E. Suite 2
Fife, WA 98424

Raw Data Sheet
Fish Weights
Seven Day Chronic Bioassay

Client: NSS

Test Date: 2/26/03

Sample ID: mg/L L. [illegible] Floc

Species: *O. mykiss*

Test No: 0302-58Nw

Conc.	cont #	rep #	pan wt. (gm)	pan + fish (gm)	fish wt. (mg)	# fish	avg. per fish (mg)	avg. per conc. (mg)
C	21	1	.53496	.70598		5		
	8	2	.49038	.69336		5		
	20	3	.51360	.70481		5		
	1	4	.49280	.68836		5		
Turbid C	13	1	.49949	.64553		5		
	9	2	.52826	.67557		4		
	14	3	.53784	.69629		5		
	18	4	.51719	.67392		5		
100	4	1	.51811	.71460		5		
	16	2	.52255	.69166		5		
	10	3	.53149	.73530		5		
	2	4	.51405	.68181		4		
500	12	1	.50465	.70254		5		
	5	2	.50529	.68393		5		
	22	3	.51707	.68166		5		
	6	4	.50315	.69953		5		
1250	3	1	.52222	.70251		5		
	32	2	.51768	.68162		5		
	15	3	.51207	.65204		5		
	25	4	.50064	.67457		5		
2500	24	1	.51138	.68365		5		
	28	2	.52278	~~.6~~ .66044		4		
	27	3	.50995	.67540		5		
	7	4	.52978	.72531		5		
5000	23	1	.51048	.66879		5		
	29	2	.53605	.69222		5		
	30	3	.52560	.69401		5		
	19	4	.52683	.70597		5		

Tare: mm
Total: SM

Date/Time in: 15:30 3/5/03
Date/Time out: 3/6/03 1530
Oven temp. (°C): 62

AMEC Earth & Environmental
Northwest Bioassay Lab
5009 Pacific Hwy., E. Suite 2
Fife, WA 98424

Raw Data Sheet
Fish Weights
Seven Day Chronic Bioassay

Client: NSS

Test Date: 2/26/03

Sample ID: mg/L Liqui - Flock in Turbiwater

Species: *O. mykiss*

Test No: 0302-58 New

Conc.	cont #	rep #	pan wt. (gm)	pan + fish (gm)	fish wt. (mg)	# fish	avg. per fish (mg)	avg. per conc. (mg)
10000	31	1	.51464	.67500		5		
	17	2	.51881	.65835		5		
	11	3	.47794	.63422		5		
	26	4	.52891	.68998		5		
		1						
		2						
		3						
		4						
		1						
		2						
		3						
		4						
		1						
		2						
		3						
		4						
		1						
		2						
		3						
		4						
		1						
		2						
		3						
		4						
		1						
		2						
		3						
		4						

Tare: MM
Total: SM

Date/Time in: 3/5/03 1530
Date/Time out: 3/6/03 1530
Oven temp. (°C): 62

AMEC Earth & Environmental
Northwest Bioassay Lab
5009 Pacific Hwy., E. Suite 2-0
Fife, WA 98424

pH Adjustment Sheet

Client : NSS

Sample ID: Liqui Flo

Test No: 0382-58NW

Test Date: 2/26/03

Test Type: 7-day Chronic

Test Species: O. mykiss

C																
100												7.57				
500												7.45				
1250												7.24				
2500	7.08	7.08	6.82	7.30	6.73	7.36	6.73	7.44	6.70	7.70	6.79 ~~6.98~~	7.30	6.67	7.39		
5000	6.41	7.05	6.47	6.97	6.41	7.18	6.35	7.30	6.49	7.41	6.26	7.40	6.33	7.09		
10000	5.69	7.26	5.75	6.95	5.79	7.05	5.77	6.98	5.68	7.05	5.40	7.13	5.59	6.98		

Comments:

Analysts: KB AM

Reviewed: KB

Gel-Floc in Clean Water

Larval Fish Growth and Survival Test-7 Day Survival

Start Date:	1/23/03	Test ID:	0301-22NW	Sample ID:	NSS-Natural Site Solutions
End Date:	1/30/03	Lab ID:	WAAEE-AMEC NW Bioassay	Sample Type:	OTH-Other sample type
Sample Date:	1/23/03	Protocol:	EPAF 94-EPA Freshwater	Test Species:	OM-Oncorhynchus mykiss
Comments:	Gel-Floc In MHSW				

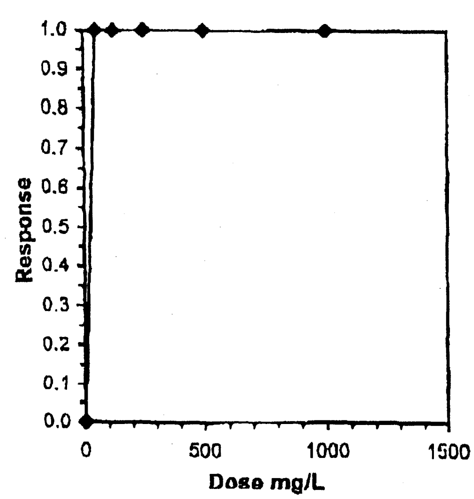
Conc-mg/L	1	2	3	4
D-Control	1.0000	1.0000	1.0000	1.0000
1	1.0000	1.0000	1.0000	1.0000
50	0.0000	0.0000	0.0000	0.0000
125	0.0000	0.0000	0.0000	0.0000
250	0.0000	0.0000	0.0000	0.0000
500	0.0000	0.0000	0.0000	0.0000
1000	0.0000	0.0000	0.0000	0.0000

			Transform: Arcsin Square Root					Rank	1-Tailed	Isotonic	
Conc-mg/L	Mean	N-Mean	Mean	Min	Max	CV%	N	Sum	Critical	Mean	N-Mean
D-Control	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	4			1.0000	1.0000
1	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	4	18.00	10.00	1.0000	1.0000
*50	0.0000	0.0000	0.2255	0.2255	0.2255	0.000	4	10.00	10.00	0.0000	0.0000
*125	0.0000	0.0000	0.2255	0.2255	0.2255	0.000	4	10.00	10.00	0.0000	0.0000
*250	0.0000	0.0000	0.2255	0.2255	0.2255	0.000	4	10.00	10.00	0.0000	0.0000
*500	0.0000	0.0000	0.2255	0.2255	0.2255	0.000	4	10.00	10.00	0.0000	0.0000
*1000	0.0000	0.0000	0.2255	0.2255	0.2255	0.000	4	10.00	10.00	0.0000	0.0000

Auxiliary Tests					Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)					1	0.896		
Equality of variance cannot be confirmed								
Hypothesis Test (1-tail, 0.05)	**NOEC**	**LOEC**	**ChV**	**TU**				
Steel's Many-One Rank Test	1	50	7.07107					

Linear Interpolation (200 Resamples)

Point	mg/L	SD	95% CL(Exp)		Skew
IC05	3.450	0.000	3.450	3.450	-1.0076
IC10	5.900	0.000	5.900	5.900	1.0076
IC15	8.350	0.000	8.350	8.350	1.0076
IC20	10.800	0.000	10.800	10.800	1.0076
IC25	13.250	0.000	13.250	13.250	#DIV/0!
IC40	20.600	0.000	20.600	20.600	1.0076
IC50	25.500	0.000	25.500	25.500	#DIV/0!

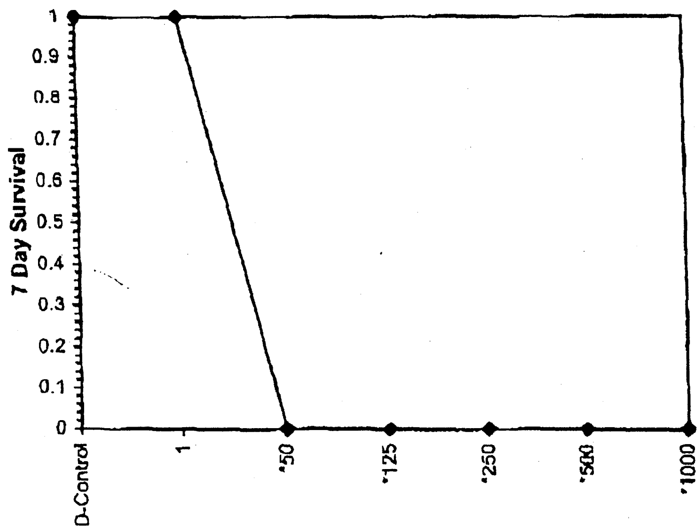


 ToxCalc v5.0.23 Reviewed by: KB

Larval Fish Growth and Survival Test-7 Day Survival

Start Date:	1/23/03	Test ID:	0301-22NW	Sample ID:	NSS-Natural Site Solutions
End Date:	1/30/03	Lab ID:	WAAEE-AMEC NW Bioassa	Sample Type:	OTH-Other sample type
Sample Date:	1/23/03	Protocol:	EPAF 94-EPA Freshwater	Test Species:	OM-Oncorhynchus mykiss
Comments:	Gel-Floc in MHSW				

Dose-Response Plot



ToxCalc v5.0.23

Reviewed by:

Larval Fish Growth and Survival Test-Growth-Weight

Start Date:	1/23/03	Test ID:	0301-22NW	Sample ID:	NSS-Natural Site Solutions
End Date:	1/30/03	Lab ID:	WAAEE-AMEC NW Bioassay	Sample Type:	OTH-Other sample type
Sample Date:	1/23/03	Protocol:	EPAF 94-EPA Freshwater	Test Species:	OM-Oncorhynchus mykiss
Comments:	Gel-Floc in MHSW				

Conc-mg/L	1	2	3	4
D-Control	36.048	36.190	32.788	34.308
1	38.368	38.272	33.796	35.278
50	0.000	0.000	0.000	0.000
125	0.000	0.000	0.000	0.000
250	0.000	0.000	0.000	0.000
500	0.000	0.000	0.000	0.000
1000	0.000	0.000	0.000	0.000

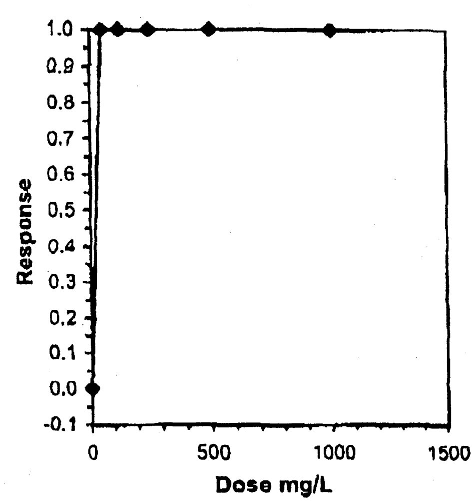
			Transform: Untransformed					Rank	1-Tailed	Isotonic	
Conc-mg/L	Mean	N-Mean	Mean	Min	Max	CV%	N	Sum	Critical	Mean	N-Mean
D-Control	34.834	1.0000	34.834	32.788	36.190	4.622	4			35.631	1.0000
1	36.429	1.0458	36.429	33.796	38.368	6.222	4	21.00	10.00	35.631	1.0000
*50	0.000	0.0000	0.000	0.000	0.000	0.000	4	10.00	10.00	0.000	0.0000
*125	0.000	0.0000	0.000	0.000	0.000	0.000	4	10.00	10.00	0.000	0.0000
*250	0.000	0.0000	0.000	0.000	0.000	0.000	4	10.00	10.00	0.000	0.0000
*500	0.000	0.0000	0.000	0.000	0.000	0.000	4	10.00	10.00	0.000	0.0000
*1000	0.000	0.0000	0.000	0.000	0.000	0.000	4	10.00	10.00	0.000	0.0000

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.01)	0.74122	0.896	-0.5323	2.82137
Equality of variance cannot be confirmed				

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU
Steel's Many-One Rank Test	1	50	7.07107	

Linear Interpolation (200 Resamples)

Point	mg/L	SD	95% CL(Exp)		Skew
IC05	3.450	0.317	1.742	3.450	-4.9591
IC10	5.900	0.304	4.282	5.900	-5.0620
IC15	8.350	0.287	6.822	8.350	-5.0620
IC20	10.800	0.270	9.362	10.800	-5.0620
IC25	13.250	0.253	11.902	13.250	-5.0620
IC40	20.600	0.203	19.521	20.600	-5.0620
IC50	25.500	0.169	24.601	25.500	-5.0620

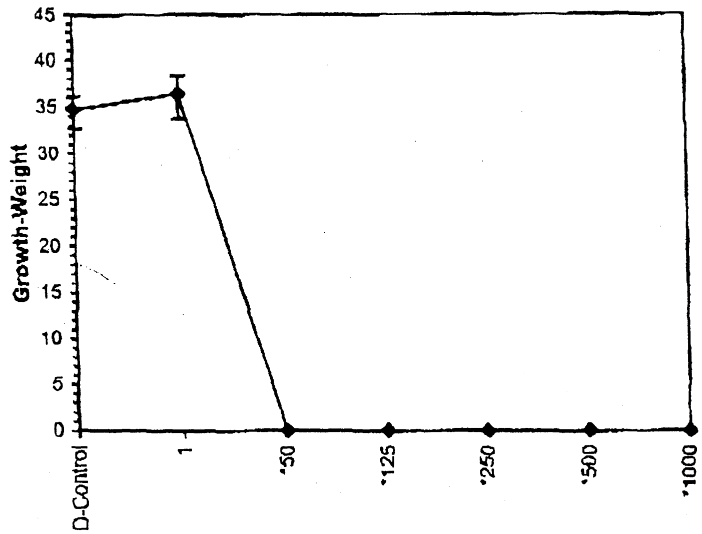


 ToxCalc v5.0.23 Reviewed by: KB

Larval Fish Growth and Survival Test-Growth-Weight

Start Date:	1/23/03	Test ID:	0301-22NW	Sample ID:	NSS-Natural Site Solutions
End Date:	1/30/03	Lab ID:	WAAEE-AMEC NW Bioassa	Sample Type:	OTH-Other sample type
Sample Date:	1/23/03	Protocol:	EPAF 94-EPA Freshwater	Test Species:	OM-Oncorhynchus mykiss
Comments:	Gel-Floc in MHSW				

Dose-Response Plot



ToxCalc v5.0.23

Reviewed by:

page 1

AMEC Earth & Environmental
Northwest Bioassay Lab

Test Species: O. mykiss
Client: Natural Site Solutions
Sample ID. Gel-Floc - MHSW only

Initial and Final Chemistries
Seven Day Chronic Freashwater Bioassay
Start Date & Time: 1/23/03 18:15
Stop Date & Time: 1/30/03 1615
Test No: 0301-22NW

Concentration MHSW	Days 0 init.	0 final	1 init.	1 final	2 init.	2 final	3 init.	3 final	4 init.	4 final	5 init.	5 final	6 init.	6 final
pH	7.89	7.36	7.82	7.08	7.71	7.32	7.91	7.17	7.86	7.01	7.81	7.28	7.91	7.20
DO (mg/l)	8.3	6.1	8.2	5.7	9.2	6.2	8.9	4.8	8.6	5.5	8.3	5.4	8.2	4.9
Cond. (µmhos-cm)	270	251	257	250	223	244	242	259	243	247	255	263	253	271
Temperature (°C)	15.7	15.0	14.3	15.1	14.0	14.8	14.2	14.8	15.1	14.8	15.6	~~15.6~~ 14.9	15.6	15.4

Concentration 1 mg/L	Days 0 init.	0 final	1 init.	1 final	2 init.	2 final	3 init.	3 final	4 init.	4 final	5 init.	5 final	6 init.	6 final
pH	7.89	7.36	7.87	7.13	7.67	7.30	7.91	7.23	7.94	7.18	7.82	7.22	7.93	7.23
DO (mg/l)	8.4	6.0	8.2	5.0	9.3	5.7	8.7	5.3	8.4	5.5	8.1	5.5	8.3	5.0
Cond. (µmhos-cm)	263	253	254	242	227	241	246	256	239	248	258	261	255	270
Temperature (°C)	15.5	15.2	14.4	15.0	14.0	14.7	14.4	14.9	15.3	14.7	15.7	14.9	15.5	15.6

Concentration 50	Days 0 init.	0 final	1 init.	1 final	2 init.	2 final	3 init.	3 final	4 init.	4 final	5 init.	5 final	6 init.	6 final
pH	7.37	7.47												
DO (mg/l)	8.4	8.4												
Cond. (µmhos-cm)	273	275												
Temperature (°C)	15.5	14.9												

Concentration 125	Days 0 init.	0 final	1 init.	1 final	2 init.	2 final	3 init.	3 final	4 init.	4 final	5 init.	5 final	6 init.	6 final
pH	7.03	7.35												
DO (mg/l)	8.3	8.3												
Cond. (µmhos-cm)	288	297												
Temperature (°C)	14.9	14.8												

Concentration 250	Days 0 init.	0 final	1 init.	1 final	2 init.	2 final	3 init.	3 final	4 init.	4 final	5 init.	5 final	6 init.	6 final
pH	6.67	7.12												
DO (mg/l)	8.6	8.7												
Cond. (µmhos-cm)	319	325												
Temperature (°C)	15.3	14.8												

Concentration 500	Days 0 init.	0 final	1 init.	1 final	2 init.	2 final	3 init.	3 final	4 init.	4 final	5 init.	5 final	6 init.	6 final
pH	7.0*	7.31												
DO (mg/l)	8.2	9.0												
Cond. (µmhos-cm)	377	466												
Temperature (°C)	15.6	14.9												

	Control			
Hardness*	88			
Alkalinity*	60			
Initial Chlorine†	–			
Ammonia †	–			

* mg/L as CaCO3; † mg/L; ND: no chlorine detected

Analysts: [illegible]
Reviewed: [illegible]

Sample Description:
Animal Source: Trout Lodge
Date Received: 1/20/03
Comments: DOH: 12/31/02 DOSU: 1/17/03

*pH adjusted

page 2

AMEC Earth & Environmental
Northwest Bioassay Lab
Test Species: O. mykiss
Client: Natural Site Solutions
Sample ID. Gel-Floc - MK only

Initial and Final Chemistries
Seven Day Chronic Freashwater Bioassay
Start Date & Time: 1/23/03 1815
Stop Date & Time: 1/30/03 1615
Test No: 0301-22NW

Concentration	Days													
	0		1		2		3		4		5		6	
1000 mg/L	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final
pH	7.05*	7.37												
DO (mg/l)	8.1	8.9												
Cond. (µmhos-cm)	495	755												
Temperature (°C)	15.5	15.1												

Concentration	Days													
	0		1		2		3		4		5		6	
	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final
pH														
DO (mg/l)														
Cond. (µmhos-cm)														
Temperature (°C)														

Concentration	Days													
	0		1		2		3		4		5		6	
	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final
pH														
DO (mg/l)														
Cond. (µmhos-cm)														
Temperature (°C)														

Concentration	Days													
	0		1		2		3		4		5		6	
	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final
pH														
DO (mg/l)														
Cond. (µmhos-cm)														
Temperature (°C)														

Concentration	Days													
	0		1		2		3		4		5		6	
	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final
pH														
DO (mg/l)														
Cond. (µmhos-cm)														
Temperature (°C)														

Concentration	Days													
	0		1		2		3		4		5		6	
	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final
pH														
DO (mg/l)														
Cond. (µmhos-cm)														
Temperature (°C)														

	Control			
Hardness*				
Alkalinity*				
Initial Chlorine†				
Ammonia †				

* mg/L as $CaCO_3$; † mg/L; ND: no chlorine detected

Analysts: SM
Reviewed: KB

Sample Description:
Animal Source: Troutlodge
Date Received: 1/20/03
Comments: OBH: 12/31/02 Swim-up: 1/17/03

*PH adjusted

AMEC Earth & Environmental
Northwest Bioassay Lab
5009 Pacific Hwy. E. Suite 2
Fife, WA 98424

Raw Data Sheet
Rainbow Trout
Oncoryhnchus mykiss
Survival and Growth Test

Client Name: Natural Site Solutions **Test Date:** 1/23/03

Sample ID: Gel- Floc MHSW **Test No.:** 0301-22 NW

Conc.	Cont.	Rep.	Days 0	1	2	3	4	5	6	7	Percent Survival	Average Survival
CON	23	1	5	5	5	5	5	5	5	5		
	13	2	5	5	5	5	5	5	5	5		
	22	3	5	5	5	5	5	5	5	5		
	19	4	5	5	5	5	5	5	5	5		100%
1	7	1	5	5	5	5	5	5	5	5		
	10	2	5	5	5	5	5	5	5	5		
	20	3	5	5	5	5	5	5	5	5		
	27	4	5	5	5	5	5	5	5	5		100%
50	28	1	5	0								
	12	2	5	0								
	6	3	5	0								
	2	4	5	0								0%
125	4	1	5	0								
	21	2	5	0								
	14	3	5	0								
	25	4	5	0								0%
250	18	1	5	0								
	17	2	5	0								
	15	3	5	0								
	1	4	5	0								0%
500	8	1	5	0								
	9	2	5	0								
	11	3	5	0								
	16	4	5	0								0%
1000	5	1	5	0								
	26	2	5	0								
	24	3	5	0								
	3	4	5	0								0%
		1										
		2										
		3										
		4										
Tech Initials			Et	Et	jm	jm	Et	Et	Et	SM		

Feeding Times: 0 ___ 1100 1 0900 1500 2 0830 1600 3 0930 1636 4 0830 1630 5 0830 1530 6 0815 1515

Comments: ______________________________ **Analysts:** jm Et SM

AMEC Earth & Environmental
Northwest Bioassay Lab
5009 Pacific Hwy., E. Suite 2-0
Fife, WA 98424

Raw Data Sheet
Fish Weights
Seven Day Chronic Bioassay

Client: Natural Site Solutions

Test Date: 1/23/03

Sample ID: Gel-Floc MHSW

* pans labeled GF

Species: *O. mykiss*

Test No: 0301-22NW

Conc.	cont #	rep #	pan wt. (gm)	pan + fish (gm)	fish wt. (mg)	# fish	avg. per fish (mg)	avg. per conc. (mg)
CON	23	1	.50936	.68960		5		
	13	2	.51585	.69680		5		
	22	3	.51869	.68263		5		
	19	4	.50955	.68109		5		
1	7	1	.50038	.69222		5		
	10	2	.49825	.68961		5		
	20	3	.50390	.67288		5		
	27	4	.50390	.68029		5		
50	28	1						
	12	2						
	6	3						
	2	4						
125	4	1						
	21	2						
	14	3						
	25	4						
250	18	1						
	17	2						
	15	3						
	1	4						
500	8	1						
	9	2						
	11	3						
	16	4						
1000	5	1						
	26	2						
	24	3						
	3	4						

Tare: SM
Total: SM

Date/Time in: 1/30/03 1615
Date/Time out: 1/31/03 1600
Oven temp. (°C): 60°

Gel-Floc in Simulated Stormwater

Larval Fish Growth and Survival Test-7 Day Survival

Start Date:	2/28/03	Test ID:	0302-57NW	Sample ID:	NSS-Natural Site Solutions
End Date:	3/7/03	Lab ID:	WAAEE-AMEC NW Bioassay	Sample Type:	OTH-Other sample type
Sample Date:	2/28/03	Protocol:	EPAF 94-EPA Freshwater	Test Species:	OM-Oncorhynchus mykiss

Comments: Gel-Floc in Turbid Water

Conc-mg/L	1	2	3	4
D-Control	1.0000	1.0000	1.0000	1.0000
Turbid Control	0.8000	1.0000	1.0000	1.0000
1	0.8000	1.0000	1.0000	1.0000
18.75	1.0000	1.0000	1.0000	1.0000
37.5	1.0000	1.0000	1.0000	1.0000
75	0.0000	0.0000	0.0000	0.0000
150	0.0000	0.0000	0.0000	0.0000
300	0.0000	0.0000	0.0000	0.0000

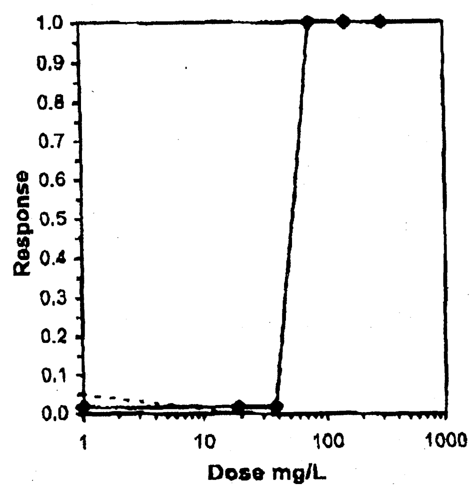
			Transform: Arcsin Square Root					Rank	1-Tailed	Number	Total
Conc-mg/L	Mean	N-Mean	Mean	Min	Max	CV%	N	Sum	Critical	Resp	Number
D-Control	1.0000	1.0526	1.3453	1.3453	1.3453	0.000	4			0	20
Turbid Control	0.9500	1.0000	1.2857	1.1071	1.3453	9.261	4				
1	0.9500	1.0000	1.2857	1.1071	1.3453	9.261	4	16.00	10.00	1	20
18.75	1.0000	1.0526	1.3453	1.3453	1.3453	0.000	4	18.00	10.00	0	20
37.5	1.0000	1.0526	1.3453	1.3453	1.3453	0.000	4	18.00	10.00	0	20
*75	0.0000	0.0000	0.2255	0.2255	0.2255	0.000	4	10.00	10.00	20	20
*150	0.0000	0.0000	0.2255	0.2255	0.2255	0.000	4	10.00	10.00	20	20
*300	0.0000	0.0000	0.2255	0.2255	0.2255	0.000	4	10.00	10.00	20	20

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.01)	0.55437	0.904	-2.4246	7.66092
Equality of variance cannot be confirmed				
The control means are not significantly different (p = 0.36)	1	2.44691		

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU
Steel's Many-One Rank Test	37.5	75	53.033	

Trimmed Spearman-Karber

Trim Level	EC50	95% CL	
0.0%			
5.0%	52.722	51.652	53.815
10.0%	52.722	51.652	53.815
20.0%	52.722	51.652	53.815
Auto-1.7%	52.722	51.652	53.815



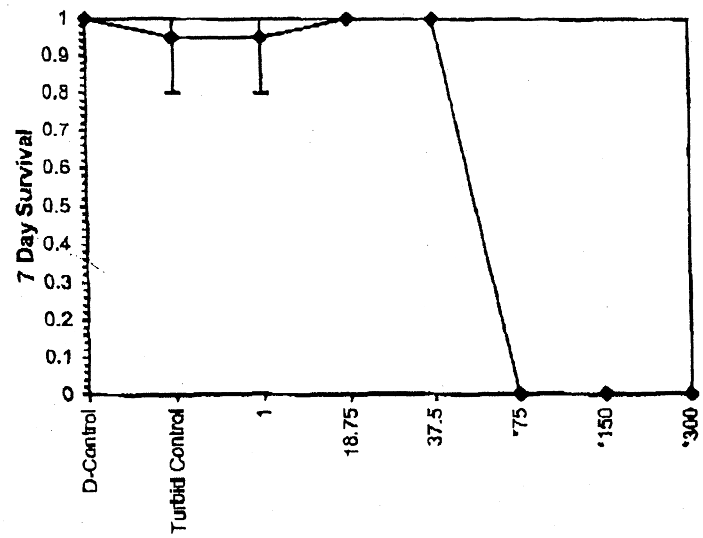
ToxCalc v5.0.23

Reviewed by: [signature]

Larval Fish Growth and Survival Test-7 Day Survival

Start Date:	2/28/03	Test ID:	0302-57NW	Sample ID:	NSS-Natural Site Solutions
End Date:	3/7/03	Lab ID:	WAAEE-AMEC NW Bioassay	Sample Type:	OTH-Other sample type
Sample Date:	2/28/03	Protocol:	EPAF 94-EPA Freshwater	Test Species:	OM-Oncorhynchus mykiss
Comments:	Gel-Floc in Turbid Water				

Dose-Response Plot



Larval Fish Growth and Survival Test-Growth-Weight

Start Date:	2/28/03	Test ID:	0302-57NW	Sample ID:	NSS-Natural Site Solutions
End Date:	3/7/03	Lab ID:	WAAEE-AMEC NW Bioassay	Sample Type:	OTH-Other sample type
Sample Date:	2/28/03	Protocol:	EPAF 94-EPA Freshwater	Test Species:	OM-Oncorhynchus mykiss

Comments: Gel-Floc in Turbid Water

Conc-mg/L	1	2	3	4
D-Control	43.580	42.978	43.424	38.680
Turbid Control	41.860	34.802	35.122	39.048
1	40.345	42.706	40.990	39.096
18.75	41.442	45.914	47.746	40.948
37.5	42.784	45.030	40.112	39.714
75	0.000	0.000	0.000	0.000
150	0.000	0.000	0.000	0.000
300	0.000	0.000	0.000	0.000

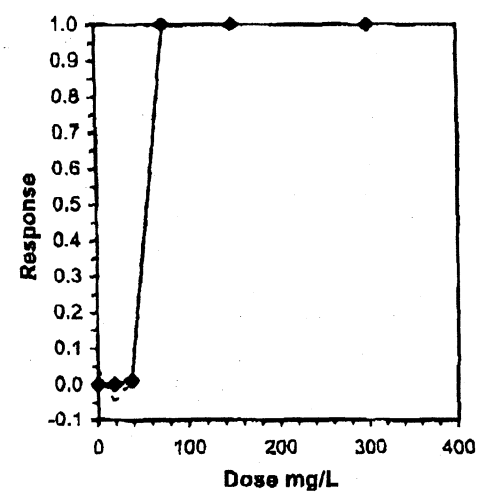
			Transform: Untransformed					Rank	1-Tailed	Isotonic	
Conc-mg/L	Mean	N-Mean	Mean	Min	Max	CV%	N	Sum	Critical	Mean	N-Mean
D-Control	42.166	1.1182	42.166	38.680	43.580	5.544	4			42.321	1.0000
Turbid Control	37.708	1.0000	37.708	34.802	41.860	8.950	4				
1	40.784	1.0816	40.784	39.096	42.706	3.688	4	14.00	10.00	42.321	1.0000
18.75	44.013	1.1672	44.013	40.948	47.746	7.599	4	20.00	10.00	42.321	1.0000
37.5	41.910	1.1114	41.910	39.714	45.030	5.934	4	17.00	10.00	41.910	0.9903
*75	0.000	0.0000	0.000	0.000	0.000	0.000	4	10.00	10.00	0.000	0.0000
*150	0.000	0.0000	0.000	0.000	0.000	0.000	4	10.00	10.00	0.000	0.0000
*300	0.000	0.0000	0.000	0.000	0.000	0.000	4	10.00	10.00	0.000	0.0000

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.92541	0.896	-0.0599	0.47208
Equality of variance cannot be confirmed				
The control means are not significantly different (p = 0.07)	2.17158	2.44691		

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU
Steel's Many-One Rank Test	37.5	75	53.033	

Linear Interpolation (200 Resamples)

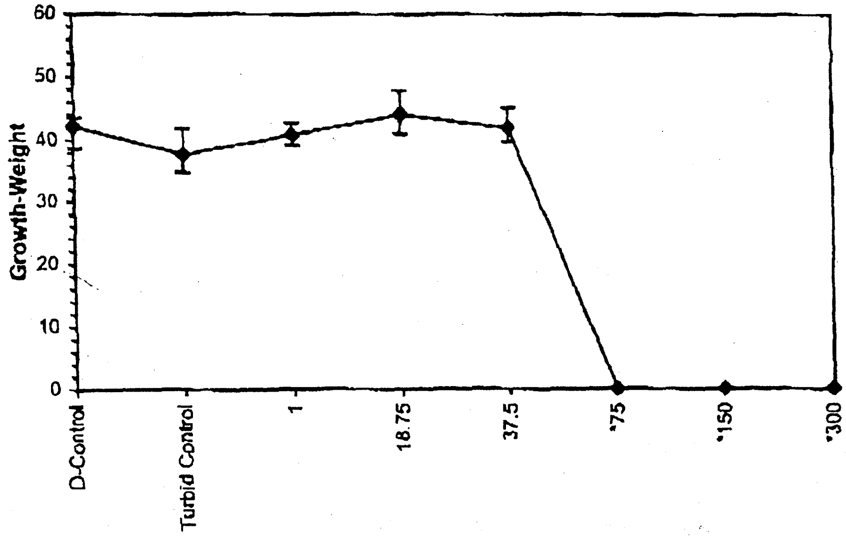
Point	mg/L	SD	95% CL(Exp)		Skew
IC05	39.026	6.109	15.222	39.584	-4.9311
IC10	40.919	0.748	37.713	41.448	-0.7068
IC15	42.813	0.707	39.784	43.312	-0.7068
IC20	44.706	0.665	41.856	45.176	-0.7068
IC25	46.599	0.623	43.927	47.040	-0.7068
IC40	52.279	0.499	50.142	52.632	-0.7068
IC50	56.066	0.416	54.285	56.360	-0.7068



 ToxCalc v5.0.23 Reviewed by: [signature]

Larval Fish Growth and Survival Test-Growth-Weight					
Start Date:	2/28/03	Test ID:	0302-57NW	Sample ID:	NSS-Natural Site Solutions
End Date:	3/7/03	Lab ID:	WAAEE-AMEC NW Bioassay	Sample Type:	OTH-Other sample type
Sample Date:	2/28/03	Protocol:	EPAF 94-EPA Freshwater	Test Species:	OM-Oncorhynchus mykiss
Comments:	Gel-Floc in Turbid Water				

Dose-Response Plot



ToxCalc v5.0.23

Reviewed by: [signature]

AMEC Earth & Environmental
Northwest Bioassay Lab

Test Species: O. mykiss
Client: NSS
Sample ID. Gel-Floc in Turbid Water

Initial and Final Chemistries
Seven Day Chronic Freashwater Bioassay
Start Date & Time: 2/28/03 1545
Stop Date & Time: 3/7/03 1515
Test No: 0302-57NW

pg 1

Concentration C	Day 0 init.	Day 0 final	Day 1 init.	Day 1 final	Day 2 init.	Day 2 final	Day 3 * init.	Day 3 * final	Day 4 init.	Day 4 final	Day 5 init.	Day 5 final	Day 6 init.	Day 6 final
pH	7.86	7.07	7.78	7.07	7.81	6.93	7.85	7.27	7.92	7.47	7.91	7.05	7.91	7.21
DO (mg/l)	8.6	5.6	8.2	5.2	8.3	4.8	8.4	6.0	7.9	5.3	8.6	4.5	8.0	4.7
Cond. (µmhos-cm)	237	248	234	248	236	260	254	266	266	265	248	260	260	[illegible]
Temperature (°C)	15.9	15.8	15.8	15.6	15.7	15.8	15.5	16.5	16.0	15.9	15.8	15.9	15.5	~~14~~ 15.0

Concentration Turbid C	Day 0 init.	Day 0 final	Day 1 init.	Day 1 final	Day 2 init.	Day 2 final	Day 3 init.	Day 3 final	Day 4 init.	Day 4 final	Day 5 init.	Day 5 final	Day 6 init.	Day 6 final
pH	7.88	7.14	7.90	7.13	7.97	7.10	7.87	7.34	8.05	7.47	8.04	7.17	8.03	7.30
DO (mg/l)	8.4	5.8	8.3	5.5	8.3	5.6	8.5	6.7	7.9	5.8	8.3	4.9	8.3	5.5
Cond. (µmhos-cm)	263	276	260	277	259	285	265	292	282	286	268	283	283	291
Temperature (°C)	15.6	15.7	15.8	15.5	15.5	15.9	15.7	16.7	16.0	16.1	15.7	16.0	15.4	15.2

Concentration 1 mg/L	Day 0 init.	Day 0 final	Day 1 init.	Day 1 final	Day 2 init.	Day 2 final	Day 3 init.	Day 3 final	Day 4 init.	Day 4 final	Day 5 init.	Day 5 final	Day 6 init.	Day 6 final
pH	7.85	7.20	7.91	7.21	8.01	7.13	7.87	7.33	8.04	7.41	8.00	7.23	8.07	7.28
DO (mg/l)	8.3	5.0	8.8	5.2	8.2	5.1	8.7	6.2	8.3	5.1	8.4	4.7	8.2	5.0
Cond. (µmhos-cm)	256	289	261	288	259	285	263	289	276	276	270	273	277	277
Temperature (°C)	15.9	15.7	15.9	15.5	15.4	15.6	15.8	16.6	15.3	15.8	15.7	16.0	15.5	14.5

Concentration 18.75 mg/L	Day 0 init.	Day 0 final	Day 1 init.	Day 1 final	Day 2 init.	Day 2 final	Day 3 init.	Day 3 final	Day 4 init.	Day 4 final	Day 5 init.	Day 5 final	Day 6 init.	Day 6 final
pH	7.86	7.24	7.84	7.24	7.99	7.13	7.85	7.26	8.00	7.37	7.94	7.23	7.85	7.22
DO (mg/l)	8.4	5.2	8.7	5.0	8.5	5.1	8.4	5.8	8.2	5.0	8.4	4.9	8.4	4.4
Cond. (µmhos-cm)	259	284	264	289	260	284	269	290	279	279	272	277	279	280
Temperature (°C)	15.5	15.5	15.8	15.2	15.1	15.6	15.7	16.7	15.0	15.9	15.6	15.9	15.7	14.5

Concentration 37.5 mg/L	Day 0 init.	Day 0 final	Day 1 init.	Day 1 final	Day 2 init.	Day 2 final	Day 3 init.	Day 3 final	Day 4 init.	Day 4 final	Day 5 init.	Day 5 final	Day 6 init.	Day 6 final
pH	7.88	7.22	7.81	7.23	7.97	7.19	7.77	7.23	7.93	7.35	7.89	7.19	7.73	7.24
DO (mg/l)	8.1	4.9	8.6	4.8	8.6	4.7	8.4	5.2	8.4	5.0	8.2	4.5	8.3	4.1
Cond. (µmhos-cm)	266	279	267	283	265	284	274	290	288	286	274	282	285	286
Temperature (°C)	15.8	15.7	15.7	15.7	15.6	15.6	15.7	15.9	14.9	15.9	15.7	15.0	15.7	14.5

Concentration 75 mg/L	Day 0 init.	Day 0 final	Day 1 init.	Day 1 final	Day 2 init.	Day 2 final	Day 3 init.	Day 3 final	Day 4 init.	Day 4 final	Day 5 init.	Day 5 final	Day 6 init.	Day 6 final
pH	7.83	7.25	7.79	7.26	7.95	7.16	7.74	7.23	7.84	7.28	7.80	7.19	7.64	7.13
DO (mg/l)	8.3	4.9	8.8	4.7	8.8	4.5	8.4	6.2	8.1	4.6	8.5	4.3	8.1	3.5
Cond. (µmhos-cm)	269	278	269	284	268	284	280	295	289	284	274	281	287	310
Temperature (°C)	15.9	15.8	15.9	15.3	15.1	15.6	15.9	16.0	15.0	16.0	15.8	15.8	15.6	14.5

	Control			
Hardness*	84			
Alkalinity*	56			
Initial Chlorine†	—			
Ammonia †				

* mg/L as CaCO3; † mg/L; ND: no chlorine detected

Analysts: SM et NF
Reviewed: KB

Sample Description:
Animal Source: Thomas Fish Co.
Date Received: 2/25/03 DOH: 2/10/03 DOSU: 2/24/03
Comments: *Temperature of incubator reduced.

Day 0 Turbidity 906
Day 1 651
Day 2 759
Day 3 491
Day 4 532
Day 5 509

AMEC Earth & Environmental
Northwest Bioassay Lab

Test Species: O. mykiss
Client: NSS
Sample ID. Gel Floc in Turbid Water

Initial and Final Chemistries
Seven Day Chronic Freashwater Bioassay

page 2

Start Date & Time: 2/28/03 1545
Stop Date & Time: 3/7/03 1515
Test No: 0302-57NW

Concentration 150 mg/L	Days													
	0		1		2		3		4		5		6	
	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final
pH	7.78	7.22	7.74	7.25	7.84	7.19	7.50	7.11						
DO (mg/l)	8.2	4.7	8.4	4.9	8.4	4.3	8.7	4.2						
Cond. (µmhos-cm)	277	288	244	287	279	293	293	334						
Temperature (°C)	15.9	15.9	15.7	15.1	15.0	15.4	15.5	16.5						

Concentration 300 mg/L	Days													
	0		1		2		3		4		5		6	
	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final
pH	7.62	7.25	7.68											
DO (mg/l)	8.3	7.3	8.7											
Cond. (µmhos-cm)	300	325	293											
Temperature (°C)	15.4	15.7	15.9											

Concentration	Days													
	0		1		2		3		4		5		6	
	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final
pH														
DO (mg/l)														
Cond. (µmhos-cm)														
Temperature (°C)														

Concentration	Days													
	0		1		2		3		4		5		6	
	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final
pH														
DO (mg/l)														
Cond. (µmhos-cm)														
Temperature (°C)														

Concentration	Days													
	0		1		2		3		4		5		6	
	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final
pH														
DO (mg/l)														
Cond. (µmhos-cm)														
Temperature (°C)														

Concentration	Days													
	0		1		2		3		4		5		6	
	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final
pH														
DO (mg/l)														
Cond. (µmhos-cm)														
Temperature (°C)														

	Control			
Hardness*				
Alkalinity*				
Initial Chlorine†				
Ammonia †				

* mg/L as CaCO3; † mg/L; ND: no chlorine detected

Analysts:

Reviewed:

Sample Description:
Animal Source:
Date Received:
Comments:

AMEC Earth & Environmental
Northwest Bioassay Lab
5009 Pacific Hwy. E. Suite 2
Fife, WA 98424

Raw Data Sheet
Rainbow Trout
Oncorhynchus mykiss
Survival and Growth Test

Client Name: NSS

Test Date: 2/28/03 1500

Sample ID: Gel-Floc

Test No.: 6302-57NW

mg/L Conc.	Cont.	Rep.	Day 0	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Percent Survival	Average Survival
C	25	1	5	5	5	5	5	5	5	5		
	26	2	5	5	5	5	5	5	5	5		
	7	3	5	5	5	5	5	5	5	5		
	29	4	5	5	5	5	5	5	5	5		100%
Turbid C	11	1	5	4	4	4	4	4	4	4		
	32	2	5	5	5	5	5	5	5	5		
	10	3	5	5	5	5	5	5	5	5		
	27	4	5	5	5	5	5	5	5	5		95%
1	23	1	5	4	4	4	4	4	4	4		
	3	2	5	5	5	5	5	5	5	5		
	9	3	5	5	5	5	5	5	5	5		
	17	4	5	5	5	5	5	5	5	5		95%
18.75	28	1	5	5	5	5	5	5	5	5		
	2	2	5	5	5	5	5	5	5	5		
	22	3	5	5	5	5	5	5	5	5		
	19	4	5	5	5	5	5	5	5	5		100%
37.5	12	1	5	5	5	5	5	5	5	5		
	5	2	5	5	5	5	5	5	5	5		
	24	3	5	5	5	5	5	5	5	5		
	18	4	5	5	5	5	5	5	5	5		100%
75	16	1	5	5	5	5	5	5	5	0		
	15	2	5	5	5	5	5	5	5	0		
	20	3	5	5	5	5	5	5	5	0		
	31	4	5	5	5	5	5	5	5	0		0
150	8	1	5	5	5	5	0					
	4	2	5	5	5	5	0					
	1	3	5	5	5	5	0					
	13	4	5	5	5	5	0					0
300	21	1	5	0								
	6	2	5	0								
	30	3	5	0								
	14	4	5	0								0
Tech Initials			KS	Et	Et	El	Sm	Et	Et	M		

Feeding Times: 0 1600 1 0830 / 1700 2 0830 / 1600 3 0830 / 1600 4 0830 / 1515 5 0830 / 1600 6 0830 / 1600

Comments: ______

Analysts: KS M Sm

AMEC Earth & Environmental
Northwest Bioassay Lab
5009 Pacific Hwy., E. Suite 2
Fife, WA 98424

Raw Data Sheet
Fish Weights
Seven Day Chronic Bioassay

Client: NSS

Test Date: 2/28/03

Sample ID: Gel-Floc

Species: *O. mykiss*

Test No: 0302-52NW

Conc.	cont #	rep #	pan wt. (gm)	pan + fish (gm)	fish wt. (mg)	# fish	avg. per fish (mg)	avg. per conc. (mg)
C	25	1	.51088	.72878		5		
	26	2	.47947	.69436		5		
	7	3	~~.511~~ .51776 min	.73488		5		
	29	4	.51491	.70831		5		
Turbid C	11	1	.52929	.69673		4		
	32	2	.51800	.69201		5		
	10	3	.50458	.68019		5		
	27	4	.50618	.70142		5		
1	23	1	.49732	.65870		4		
	3	2	.50490	.71843		5		
	9	3	.52694	.73189		5		
	17	4	.52294	.71842		5		
18.75	28	1	.51860	.72581		5		
	2	2	.51620	.74577		5		
	22	3	.51644	.75517		5		
	19	4	.49622	.70096		5		
37.5	12	1	.53578	.74970		5		
	5	2	.50688	.73203		5		
	24	3	.49407	.69463		5		
	18	4	.51775	.71632		5		
75	16	1	.52231					
	15	2	.56577					
	20	3	.50680					
	31	4	.50411					
150	8	1	.52589					
	4	2	.55120					
	1	3	.49522					
	13	4	.54408					

Tare: MM
Total: SM

Date/Time in: 3/7/03 1515
Date/Time out: 3/9/03 0900
Oven temp. (°C): 63.6

AMEC Earth & Environmental
Northwest Bioassay Lab
5009 Pacific Hwy., E. Suite 2
Fife, WA 98424

Raw Data Sheet
Fish Weights
Seven Day Chronic Bioassay

Client: NSS

Test Date: 2/28/03

Sample ID: Gel-Floc

Species: *O. mykiss*

Test No: 0302-57

Conc.	cont #	rep #	pan wt. (gm)	pan + fish (gm)	fish wt. (mg)	# fish	avg. per fish (mg)	avg. per conc. (mg)
300	21	1	.50039					
	6	2	.52633					
	30	3	.52496					
	14	4	.52825					
		1						
		2						
		3						
		4						
		1						
		2						
		3						
		4						
		1						
		2						
		3						
		4						
		1						
		2						
		3						
		4						
		1						
		2						
		3						
		4						
		1						
		2						
		3						
		4						

Tare: mm
Total: SM

Date/Time in: 3/7/03 1515
Date/Time out: 3/9/03 0900
Oven temp. (°C): 63.6

APPENDIX C

96-Hour Survival

Liqui-Floc in Simulated Stormwater

Acute Fish Test-96 Hr Survival

Start Date:	2/26/03	Test ID:	0302-58NW	Sample ID:	NSS-Natural Site Solutions
End Date:	3/5/03	Lab ID:	WAAEE-AMEC NW Bioassa	Sample Type:	EFF2-Industrial
Sample Date:		Protocol:	EPA 02-EPA Acute	Test Species:	PP-Pimephales promelas
Comments:	Liqui-Floc in Turbid Water				

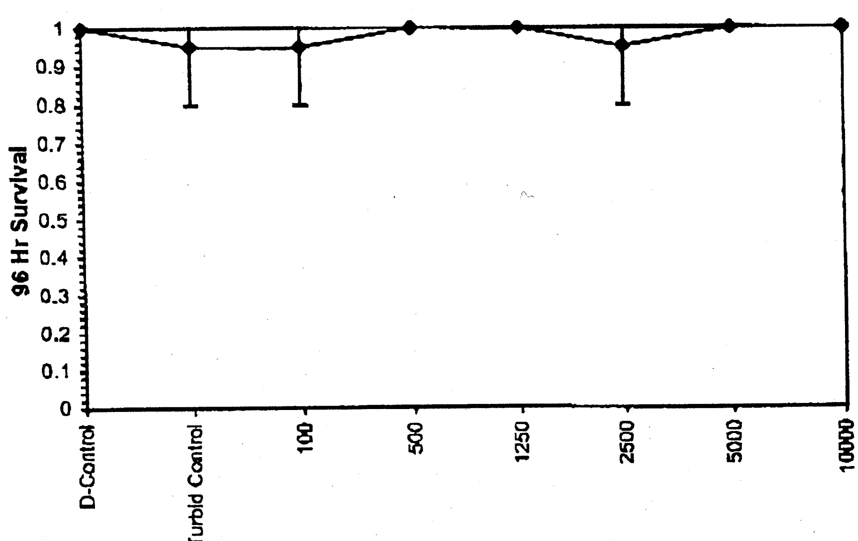
Conc-mg/L	1	2	3	4
D-Control	1.0000	1.0000	1.0000	1.0000
Turbid Control	1.0000	0.8000	1.0000	1.0000
100	1.0000	1.0000	1.0000	0.8000
500	1.0000	1.0000	1.0000	1.0000
1250	1.0000	1.0000	1.0000	1.0000
2500	1.0000	0.8000	1.0000	1.0000
5000	1.0000	1.0000	1.0000	1.0000
10000	1.0000	1.0000	1.0000	1.0000

			Transform: Arcsin Square Root					Rank	1-Tailed
Conc-mg/L	Mean	N-Mean	Mean	Min	Max	CV%	N	Sum	Critical
D-Control	1.0000	1.0526	1.3453	1.3453	1.3453	0.000	4		
Turbid Control	0.9500	1.0000	1.2857	1.1071	1.3453	9.261	4		
100	0.9500	1.0000	1.2857	1.1071	1.3453	9.261	4	16.00	10.00
500	1.0000	1.0526	1.3453	1.3453	1.3453	0.000	4	18.00	10.00
1250	1.0000	1.0526	1.3453	1.3453	1.3453	0.000	4	18.00	10.00
2500	0.9500	1.0000	1.2857	1.1071	1.3453	9.261	4	16.00	10.00
5000	1.0000	1.0526	1.3453	1.3453	1.3453	0.000	4	18.00	10.00
10000	1.0000	1.0526	1.3453	1.3453	1.3453	0.000	4	18.00	10.00

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.01)	0.58279	0.896	-2.2845	6.47308
Equality of variance cannot be confirmed				
The control means are not significantly different (p = 0.36)	1	2.44691		

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU
Steel's Many-One Rank Test	10000	>10000		

Dose-Response Plot



ToxCalc v5.0.23

Reviewed by: KG

Gel-Floc in Simulated Stormwater

Acute Fish Test-96 Hr Survival

Start Date:	2/28/03	Test ID:	0302-57NW	Sample ID:	NSS-Natural Site Solutions
End Date:	3/7/03	Lab ID:	WAAEE-AMEC NW Bioassay	Sample Type:	OTH-Other sample type
Sample Date:	2/28/03	Protocol:	EPAF 93-EPA Acute	Test Species:	OM-Oncorhynchus mykiss

Comments: Gel-Floc in Turbid Water

Conc-mg/L	1	2	3	4
D-Control	1.0000	1.0000	1.0000	1.0000
Turbid Control	0.8000	1.0000	1.0000	1.0000
1	0.8000	1.0000	1.0000	1.0000
18.75	1.0000	1.0000	1.0000	1.0000
37.5	1.0000	1.0000	1.0000	1.0000
75	1.0000	1.0000	1.0000	1.0000
150	0.0000	0.0000	0.0000	0.0000
300	0.0000	0.0000	0.0000	0.0000

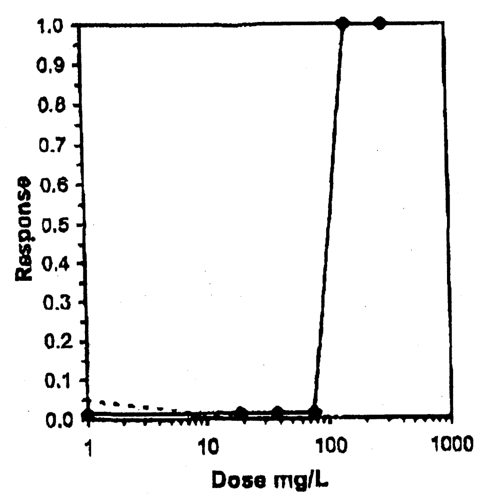
			Transform: Arcsin Square Root					Rank	1-Tailed	Number	Total
Conc-mg/L	Mean	N-Mean	Mean	Min	Max	CV%	N	Sum	Critical	Resp	Number
D-Control	1.0000	1.0526	1.3453	1.3453	1.3453	0.000	4			0	20
Turbid Control	0.9500	1.0000	1.2857	1.1071	1.3453	9.261	4				
1	0.9500	1.0000	1.2857	1.1071	1.3453	9.261	4	16.00	10.00	1	20
18.75	1.0000	1.0526	1.3453	1.3453	1.3453	0.000	4	18.00	10.00	0	20
37.5	1.0000	1.0526	1.3453	1.3453	1.3453	0.000	4	18.00	10.00	0	20
75	1.0000	1.0526	1.3453	1.3453	1.3453	0.000	4	18.00	10.00	0	20
*150	0.0000	0.0000	0.2255	0.2255	0.2255	0.000	4	10.00	10.00	20	20
*300	0.0000	0.0000	0.2255	0.2255	0.2255	0.000	4	10.00	10.00	20	20

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution ($p <= 0.01$)	0.43373	0.896	-3.2308	16.3108
Equality of variance cannot be confirmed				
The control means are not significantly different ($p = 0.36$)	1	2.44691		

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU
Steel's Many-One Rank Test	75	150	106.066	

Trimmed Spearman-Karber

Trim Level	EC50	95% CL	
0.0%			
5.0%	105.60	103.75	107.48
10.0%	105.60	103.75	107.48
20.0%	105.60	103.75	107.48
Auto-1.3%	105.60	103.75	107.48



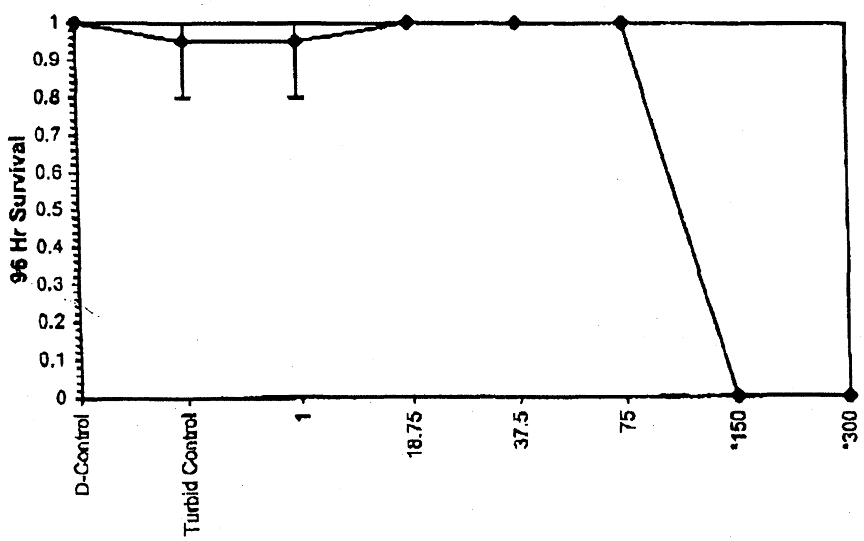
ToxCalc v5.0.23

Reviewed by: KB

Acute Fish Test-96 Hr Survival

Start Date:	2/28/03	Test ID:	0302-57NW	Sample ID:	NSS-Natural Site Solutions
End Date:	3/7/03	Lab ID:	WAAEE-AMEC NW Bioassay	Sample Type:	OTH-Other sample type
Sample Date:	2/28/03	Protocol:	EPAF 93-EPA Acute	Test Species:	OM-Oncorhynchus mykiss
Comments:	Gel-Floc in Turbid Water				

Dose-Response Plot

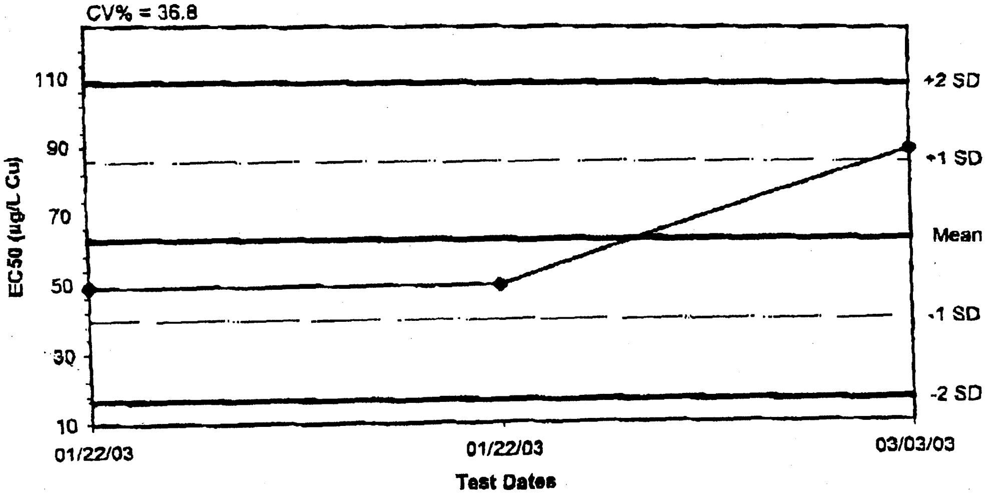


 ToxCalc v5.0.23 Reviewed by: [signature]

APPENDIX D

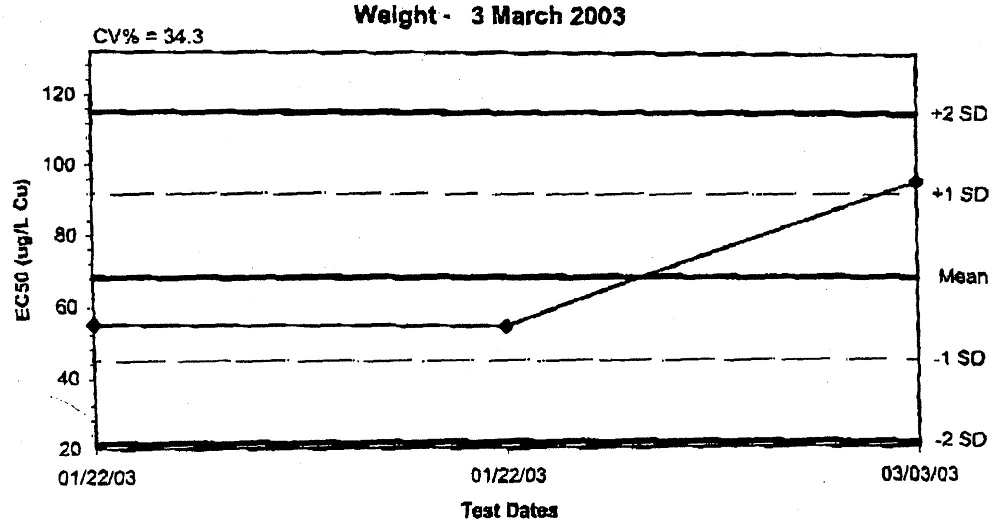
Reference Toxicant Test

Reference Toxicant Control Chart - Rainbow Trout 7 Day Survival - 3 March 2003



Dates	Values	Mean	-1 SD	-2 SD	+1 SD	+2 SD
01/22/03	49.0272	62.5686	39.5122	16.4558	85.6250	108.6814
01/22/03	49.4881	62.5686	39.5122	16.4558	85.6250	108.6814
03/03/03	89.1905	62.5686	39.5122	16.4558	85.6250	108.6814

Reference Toxicant Control Chart - Rainbow Trout 7 Day Growth-Weight - 3 March 2003



Dates	Values	Mean	-1 SD	-2 SD	+1 SD	+2 SD
01/22/03	55.0794	68.2824	44.8277	21.3730	91.7371	115.1919
01/22/03	54.4050	68.2824	44.8277	21.3730	91.7371	115.1919
03/03/03	95.3628	68.2824	44.8277	21.3730	91.7371	115.1919

Larval Fish Growth and Survival Test-7 Day Survival					
Start Date:	3/3/03	Test ID: RC030303OM		Sample ID:	REF-REFERENCE TOXICANT
End Date:	3/10/03	Lab ID: WAAEE-AMEC NW Bioassa		Sample Type:	CUSO-Copper sulfate
Sample Date:	3/3/03	Protocol: EPAF 94-EPA Freshwater		Test Species:	OM-Oncorhynchus mykiss
Comments:					

Conc-ug/L	1	2	3	4
D-Control	1.0000	1.0000	1.0000	1.0000
18.75	1.0000	1.0000	1.0000	1.0000
37.5	1.0000	1.0000	1.0000	1.0000
75	0.6000	0.4000	1.0000	1.0000
150	0.0000	0.0000	0.0000	0.0000
300	0.0000	0.0000	0.0000	0.0000

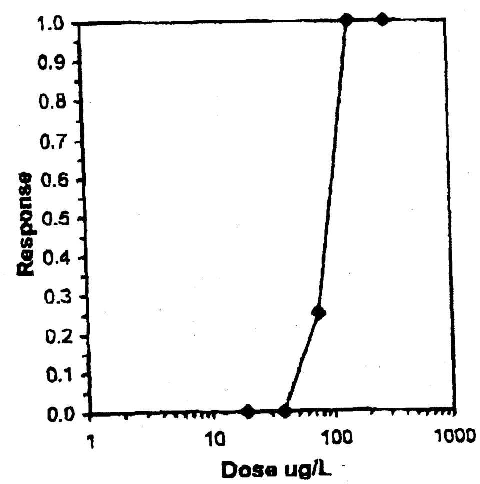
			Transform: Arcsin Square Root					Rank	1-Tailed	Number	Total
Conc-ug/L	Mean	N-Mean	Mean	Min	Max	CV%	N	Sum	Critical	Resp	Number
D-Control	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	4			0	20
18.75	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	4	18.00	10.00	0	20
37.5	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	4	18.00	10.00	0	20
75	0.7500	0.7500	1.0653	0.6847	1.3453	31.308	4	14.00	10.00	5	20
*150	0.0000	0.0000	0.2255	0.2255	0.2255	0.000	4	10.00	10.00	20	20
*300	0.0000	0.0000	0.2255	0.2255	0.2255	0.000	4	10.00	10.00	20	20

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution ($p <= 0.01$)	0.57759	0.884	-0.462	5.7642
Equality of variance cannot be confirmed				

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU
Steel's Many-One Rank Test	75	150	106.066	

Trimmed Spearman-Karber

Trim Level	EC50	95% CL	
0.0%	89.191	77.987	102.003
5.0%	90.691	77.919	105.557
10.0%	92.070	76.925	110.196
20.0%	94.131	70.622	125.466
Auto-0.0%	89.191	77.987	102.003



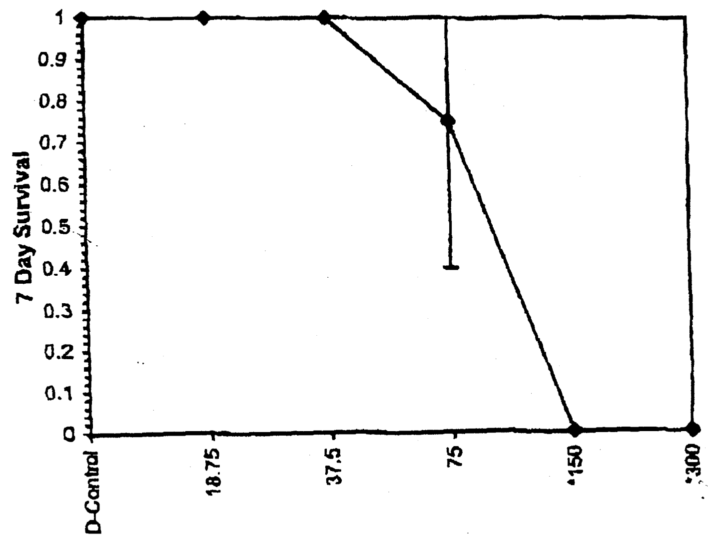
ToxCalc v5.0.23

Reviewed by: WB

Larval Fish Growth and Survival Test-7 Day Survival

Start Date:	3/3/03	Test ID:	RC030303OM	Sample ID:	REF-REFERENCE TOXICANT
End Date:	3/10/03	Lab ID:	WAAEE-AMEC NW Bioassay	Sample Type:	CUSO-Copper sulfate
Sample Date:	3/3/03	Protocol:	EPAF 94-EPA Freshwater	Test Species:	OM-Oncorhynchus mykiss
Comments:					

Dose-Response Plot



ToxCalc v5.0.23

Reviewed by: [signature]

Larval Fish Growth and Survival Test-7 Day Survival

Start Date:	3/3/03	Test ID:	RC030303OM	Sample ID:	REF-REFERENCE TOXICANT
End Date:	3/10/03	Lab ID:	WAAEE-AMEC NW Bioassa	Sample Type:	CUSO-Copper sulfate
Sample Date:	3/3/03	Protocol:	EPAF 94-EPA Freshwater	Test Species:	OM-Oncorhynchus mykiss

Comments:

Conc-ug/L	1	2	3	4
D-Control	1.0000	1.0000	1.0000	1.0000
18.75	1.0000	1.0000	1.0000	1.0000
37.5	1.0000	1.0000	1.0000	1.0000
75	0.6000	0.4000	1.0000	1.0000
150	0.0000	0.0000	0.0000	0.0000
300	0.0000	0.0000	0.0000	0.0000

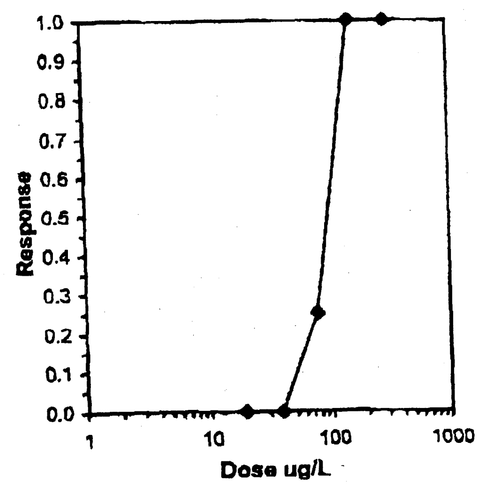
			Transform: Arcsin Square Root					Rank	1-Tailed	Number	Total
Conc-ug/L	Mean	N-Mean	Mean	Min	Max	CV%	N	Sum	Critical	Resp	Number
D-Control	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	4			0	20
18.75	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	4	18.00	10.00	0	20
37.5	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	4	18.00	10.00	0	20
75	0.7500	0.7500	1.0653	0.6847	1.3453	31.308	4	14.00	10.00	5	20
*150	0.0000	0.0000	0.2255	0.2255	0.2255	0.000	4	10.00	10.00	20	20
*300	0.0000	0.0000	0.2255	0.2255	0.2255	0.000	4	10.00	10.00	20	20

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution ($p <= 0.01$)	0.57759	0.884	-0.462	5.7642
Equality of variance cannot be confirmed				

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU
Steel's Many-One Rank Test	75	150	106.066	

Trimmed Spearman-Karber

Trim Level	EC50	95% CL	
0.0%	89.191	77.987	102.003
5.0%	90.691	77.919	105.557
10.0%	92.070	76.925	110.196
20.0%	94.131	70.622	125.466
Auto-0.0%	89.191	77.987	102.003



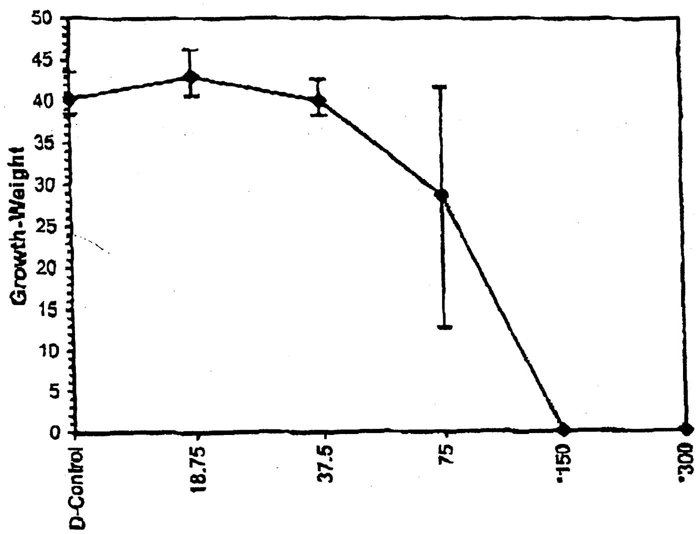
ToxCalc v5.0.23

Reviewed by: WB

Larval Fish Growth and Survival Test-Growth-Weight

Start Date:	3/3/03	Test ID:	RC030303OM	Sample ID:	REF-REFERENCE TOXICANT
End Date:	3/10/03	Lab ID:	WAAEE-AMEC NW Bioassay	Sample Type:	CUSO-Copper sulfate
Sample Date:	3/3/03	Protocol:	EPAF 94-EPA Freshwater	Test Species:	OM-Oncorhynchus mykiss
Comments:					

Dose-Response Plot



ToxCalc v5.0.23

Reviewed by: KB

AMEC Earth & Environmental
Northwest Bioassay Lab

Initial and Final Chemistries
Seven Day Chronic Freashwater Bioassay

Test Species:	Oncorhynchus mykiss	**Start Date & Time:**	3/3/03 1335
Client:	Ref Tox	**Stop Date & Time:**	3/10/03 13:00
Sample ID.	300 ug/L CuSO4	**Test No:**	RC0303030M

Concentration CON	Day 0		Day 1		Day 2		Day 3		Day 4		Day 5		Day 6	
pH	7.49	7.11	7.85	7.18	7.81	7.10	7.78	7.20	8.00	7.34	7.97	7.18	7.97	7.23
DO (mg/l)	8.6	4.3	8.6	5.9	8.3	4.8	8.4	4.8	9.0	6.4	8.5	5.9	8.7	6.8
Cond. (µmhos-cm)	245	274	232	259	232	253	238	310	262	281	267	259	258	264
Temperature (°C)	15.3	16.0	14.8	15.8	15.1	15.7	15.2	15.4	14.5	15.0	15.0	15.1	15.8	15.4

6.0

7.975

Concentration 18.75	Day 0		Day 1		Day 2		Day 3		Day 4		Day 5		Day 6	
pH	7.70	7.13	7.88	7.20	7.88	7.13	8.04	7.18	8.06	7.35	~~7.97~~	7.24	8.10	7.24
DO (mg/l)	8.7	4.2	8.8	4.8	8.6	4.6	8.3	4.6	8.9	6.7	8.8	4.8	8.4	5.1
Cond. (µmhos-cm)	242	270	231	265	230	258	240	261	229	274	264	265	258	274
Temperature (°C)	~~14.0~~ 15.4	16.0	14.8	15.8	14.7	15.9	15.0	15.2	14.4	15.0	15.0	15.1	15.8	15.5

Concentration 37.5	Day 0		Day 1		Day 2		Day 3		Day 4		Day 5		Day 6	
pH	7.69	7.16	7.93	7.25	7.90	7.17	8.05	7.19	8.05	7.33	7.98	7.25	8.12	7.32
DO (mg/l)	8.9	4.1	8.7	5.7	8.9	4.6	8.4	4.6	9.1	5.5	8.5	5.7	8.3	6.1
Cond. (µmhos-cm)	241	273	231	257	227	252	242	258	230	275	267	257	258	263
Temperature (°C)	15.0	16.0	14.5	15.9	14.3	15.6	14.8	15.3	14.4	15.1	15.0	15.0	15.6	15.5

Concentration 75	Day 0		Day 1		Day 2		Day 3		Day 4		Day 5		Day 6	
pH	7.73	7.18	7.95	7.23	7.92	7.20	8.07	7.20	8.08	7.24	8.03	7.23	8.08	7.28
DO (mg/l)	8.9	4.5	8.3	5.2	8.8	5.1	8.4	4.6	9.0	5.2	8.4	5.2	8.7	4.5
Cond. (µmhos-cm)	240	275	233	254	228	251	242	261	228	280	264	254	257	264
Temperature (°C)	15.1	17.0	14.9	15.9	14.3	15.9	15.1	15.7	14.6	15.0	14.9	14.9	15.7	15.3

Concentration 150	Day 0		Day 1		Day 2		Day 3		Day 4		Day 5		Day 6	
pH	7.72	7.19	7.94	7.25	7.94	7.19	8.07	7.21	8.05	7.27	8.03	7.25	8.09	7.21
DO (mg/l)	9.0	4.6	8.4	4.7	8.7	4.9	8.6	4.8	9.1	5.8	8.7	4.7	8.6	5.6
Cond. (µmhos-cm)	238	278	233	260	232	254	239	258	229	276	262	260	259	261
Temperature (°C)	15.2	17.2	14.4	15.8	14.9	15.9	15.3	15.3	14.5	15.1	14.9	15.0	15.6	15.2

Concentration 300	Day 0		Day 1		Day 2		Day 3		Day 4		Day 5		Day 6	
pH	7.66	7.21	7.90	7.21	7.90	7.35	8.00	7.34	8.05					
DO (mg/l)	9.0	4.4	8.5	4.5	8.7	5.9	8.5	7.3	9.0					
Cond. (µmhos-cm)	240	285	232	260	231	245	242	252	229					
Temperature (°C)	15.0	17.0	14.2	15.9	14.8	15.9	15.2	15.3	14.3					

	Control			
Hardness*	80			
Alkalinity*	60			
Initial Chlorine†	-			
Ammonia †	-			

* mg/L as CaCO3; † mg/L; ND: no chlorine detected

Analysts: NF, ST, SM, KS

Reviewed:

Sample Description:

Animal Source: Thomas Fish

Date Received: 2/25/03

Comments: DOH: 2/10/03 DSU: 2/24/03

AMEC Earth & Environmental
Northwest Bioassay Lab
5009 Pacific Hwy. E. Suite 2
Fife, WA 98424

Raw Data Sheet
Rainbow Trout
Oncorhynchus mykiss
Survival and Growth Test

Client Name: Rf-Tox

Test Date: 3/3/03

Sample ID: 300 ug/L CuSO4

Test No.: RC0303030M

Conc.	Cont.	Rep.	Days								Percent Survival	Average Survival
CON	21	1	5	5	5	5	5	5	5	5		
	17	2	5	5	5	5	5	5	5	5		
	16	3	5	5	5	5	5	5	5	5		
	9	4	5	5	5	5	5	5	5	5		100%
18.75	1	1	5	5	5	5	5	5	5	5		
	19	2	5	5	5	5	5	5	5	5		
	2	3	5	5	5	5	5	5	5	5		
	3	4	5	5	5	5	5	5	5	5		100%
37.5	23	1	5	5	5	5	5	5	5	5		
	20	2	5	5	5	5	5	5	5	5		
	12	3	5	5	5	5	5	5	5	5		
	7	4	5	5	5	5	5	5	5	5		100%
75	11	1	5	5	5	5	4	4	3	3		
	18	2	5	5	5	5	5	4	3	2		
	5	3	5	5	5	5	5	5	5	5		
	9	4	5	5	5	5	5	5	5	5		75%
150	6	1	5	5	5	3	2	2	0			
	4	2	5	5	4	4	4	3	3 ~~2~~ KB	0		
	13	3	5	5	5	4	3	3	1	0		
	15	4	5	5	4	4	2	1	0			0
300	14	1	5	5	4	0						
	22	2	5	4	1	0						
	10	3	5	5	4	1	0					
	24	4	5	2	1	1	0					0
		1										
		2										
		3										
		4										
		1										
		2										
		3										
		4										
Tech Initials			NF	NF	PL	PL	SM	KB	KB	PL		

Feeding Times: 0 1600; 1 0830 / 1400; 2 0830 / 1645; 3 0830 / 1545; 4 0830 / 1530; 5 0830 / 1410; 6 0910 / 1400

Comments:

Analysts: NF PL SM

AMEC Earth & Environmental
Northwest Bioassay Lab
5009 Pacific Hwy., E. Suite 2-0
Fife, WA 98424

Raw Data Sheet
Fish Weights
Seven Day Chronic Bioassay

Client: Ref-Tox

Test Date: 3/3/03

Sample ID: 300 µg/L $CuSO_4$

Species: ~~P. promelas~~ O. Mykiss

Test No: RC030303OM

Conc.	cont #	rep #	pan wt. (gm)	pan + fish (gm)	fish wt. (mg)	# fish	avg. per fish (mg)	avg. per conc. (mg)
CON	21	1	.50380	.70096		5		
	17	2	.48632	.67844		5		
	16	3	.49418	.69315		5		
	8	4	.47006	.68803		5		
18.75	1	1	.49497	.71256		5		
	19	2	.48338	.68701		5		
	2	3	.51490	.72244		5		
	3	4	.48020	.71164		5		
37.5	23	1	.52609	.72491		5		
	20	2	.52235	.71879		5		
	12	3	.50454	.69525		5		
	7	4	.48502	.69812		5		
75	11	1	.52020	.64181		3		
	18	2	.50552	.56951		2		
	5	3	.49868	.70731		5		
	9	4	.49970	.67734		5		
150	6	1	.49990					
	4	2	.51628					
	13	3	.52027					
	15	4	.51386					
300	14	1	.49666					
	22	2	.53333					
	10	3	.49332					
	24	4	.50564					
		1						
		2						
		3						
		4						

Tare: SM
Total: Et

Date/Time in: 3/10/03 13:00
Date/Time out: 3/11/03 13:30
Oven temp. (°C): 60°

PERMIT APPLICATION FOR

Stream Disturbance (Bed and Banks)

and

401 Water Quality Certification

Belleayre Resort at Catskill Park
Town of Shandaken, Ulster County &
Town of Middletown, Delaware County

Prepared For:

NYSEC Region 3
21 South Putt Corners Road
New Paltz, NY 12561-1696

NYSDEC Region 4
1150 Westcott Road
Schenectady, NY 12306

Prepared By:

The LA Group, P.C.
40 Long Alley
Saratoga Springs, NY 12866

Creighton Manning Engineering, LLP
4 Automation Lane
Albany, NY 12205

Delaware Engineering, P.C.
28 Madison Avenue Extension
Albany, NY 12203

On Behalf of the Applicant:

Crossroads Ventures, LLC
PO Box 267
Mt. Tremper, NY 12457

November 2003

CONTENTS

**** For this permit application these attachments are incorporated by reference.***

I. Completed Joint Permit Application Form

The following page is a completed Joint Application for Permit form. The remaining materials in this document contain support materials for this permit application form.

95-19-3 (8/00) pfp

JOINT APPLICATION FOR PERMIT

New York State
United States Army Corps of Engineers

Applicable to agencies and permit categories listed in Item 1. **Please** read all instructions on back. Attach additional information as needed. Please print legibly or type.

1. Check permits applied for:

NYS Dept. of Environmental Conservation

- [x] Stream Disturbance (Bed and Banks)
- [ ] Navigable Waters (Excavation and Fill)
- [ ] Docks, Moorings or Platforms (Construct or Place)
- [ ] Dams and Impoundment Structures (Construct, Reconstruct or Repair)
- [ ] Freshwater Wetlands
- [ ] Tidal Wetlands
- [ ] Coastal Erosion Control
- [ ] Wild, Scenic and Recreational Rivers
- [x] 401 Water Quality Certification
- [ ] Potable Water Supply
- [ ] Long Island Wells
- [ ] Aquatic Vegetation Control
- [ ] Aquatic Insect Control
- [ ] Fish Control

NYS Office of General Services
(State Owned Lands Under Water)

- [ ] Lease, License, Easement or other Real Property Interest
Utility Easement (pipelines, conduits, cables, etc.)
- [ ] Docks, Moorings or Platforms (Construct or Place)

Adirondack Park Agency

- [ ] Freshwater Wetlands Permit
- [ ] Wild, Scenic and Recreational Rivers

Lake George Park Commission

- [ ] Docks (Construct or Place)
- [ ] Moorings (Establish)

US Army Corps of Engineers

- [ ] Section 404 (Waters of the United States)
- [ ] Section 10 (Rivers and Harbors Act)
- [x] Nationwide Permit (s)
Identify Number(s)

For Agency Use Only:
DEC APPLICATION NUMBER

US ARMY CORPS OF ENGINEERS

2. Name of Applicant (Use full name)
Crossroads Ventures, LLC

Telephone Number (daytime)
(845)688-7740

Mailing Address
PO Box 267

Post Office
Mt. Tremper

State
NY

Zip Code
12457

3. Taxpayer ID (If applicant is not an individual)
14-1813052

4. Applicant is a/an: (check as many as apply)
[x] Owner [ ] Operator [ ] Lessee [ ] Municipality / Governmental Agency

5. If applicant is not the owner, identify owner here - otherwise, you may provide Agent/Contact Person information.
Owner or Agent/Contact Person [x] Owner [ ] Agent /Contact Person
Mr. Dean Gitter

Telephone Number (daytime)
same

Mailing Address
same

Post Office | **State** | **Zip Code**

6. Project / Facility Location (mark location on map, see instruction 1a.)
County: Ulster/Delaw
Town/City/Village: Shandaken/Middletown
Tax Map Section/ Block /Lot Number: see attached

Location (including Street or Road)
See attached location maps.

Telephone Number (daytime)
same

Post Office | **State** | **Zip Code**

7. Name of Stream or Waterbody (on or near project site)
See attached application.

8. Name of USGS Quad Map:
Shandaken/Fleischmanns

Location Coordinates:
NYTM-E
NYTM-N 4

9. Project Description and Purpose: (Category of Activity e.g. new construction/installation, maintenance or replacement; Type of Structure or Activity e.g. bulkhead, dredging, filling, dam, dock, taking of water; Type of Materials and Quantities; Structure and Work Area Dimensions; Need or Purpose Served)

See attached detailed descriptions.

Construction of four bridges and two wastewater treatment plant outfalls.

A Water Quality Certificate is required for 0.09 acres of headwater wetlands fill under NWP 14 issued by USACOE July 18, 2003.

10. Proposed Use:
[ ] Private [ ] Public [x] Commercial

11. Will Project Occupy State Land?
[ ] Yes [x] No

12. Proposed Start Date:
4/04

13. Estimated Completion Date:
9/04

14. Has Work Begun on Project? (If yes, attach explanation of why work was started without permit.)
[ ] Yes [x] No

15. List Previous Permit / Application Numbers and Dates: (If Any)
USACOE 2000-00784 July 18, 2003

16. Will this Project Require Additional Federal, State, or Local Permits?
[x] Yes [ ] No
If Yes, Please List: See attached list of permits.

17. If applicant is not the owner, both must sign the application
I hereby affirm that information provided on this form and all attachments submitted herewith is true to the best of my knowledge and belief. False statements made herein are punishable as a Class A misdemeanor pursuant to Section 210.45 of the Penal Law. Further, the applicant accepts full responsibility for all damage, direct or indirect, of whatever nature, and by whomever suffered, arising out of the project described herein and agrees to indemnify and save harmless the State from suits, actions, damages and costs of every name and description resulting from said project. In addition, Federal Law, 18 U.S.C., Section 1001 provides for a fine of not more than $10,000 or imprisonment for not more than 5 years, or both where an applicant knowingly and willingly falsifies, conceals, or covers up a material fact; or knowingly makes or uses a false, ficticious or fraudulent statement.

Date 09/03/03 Signature of Applicant Dean L. Gitter Title PRES., MANAGING MEMBER

Date ________ Signature of Owner ____________________ Title ____________

II. Stream Disturbance (Bed and Banks)

II.A General

The proposed project includes four bridged crossings of regulated streams to provide access to the project site. Also included as part of the project and covered by this permit application are two outfall structures to discharge treated wastewater effluent. The project site includes lands to the east of Belleayre Mountain Ski Center (Big Indian Plateau portion) and lands to the west of the Ski Center (Wildacres Resort portion).

The Big Indian Plateau portion of the project is situated on lands to the south of NY Route 28. Birch Creek is located between NY Route 28 and the northern boundary of this portion of the project site. Two bridge crossings are proposed over Birch Creek.

- A new bridge is being proposed off of Friendship Road (a.k.a. Friendship Manor Road), in the vicinity of the Belleayre Beach at Pine Hill Lake.

- There is an existing bridge that carries Winding Mountain Road over Birch Creek. The project includes replacement of this existing bridge.

The locations of these two bridges are shown on the DEIS Figure 3-15, "Big Indian Plateau Bridges". In addition to these two proposed bridges over Birch Creek, a third bridge is proposed over the brook in Giggle Hollow. This bridge provides the connection between the Belleayre Highlands and Big Indian Country Club, Resort and Spa components of the Big Indian Plateau. The location of this bridge is also shown on DEIS Figure 3-15.

DEIS Figure 3-15A, "Wildacres Resort Bridge", shows the location of the fourth bridge proposed as part of this project. This crossing was originally proposed as a culverted stream crossing, but is now proposed as a bridged crossing. Located on the Wildacres Resort portion of the project, this bridge is part of the Resort road off of Gunnison Road that provides access to a portion of the Highmount Golf Club, most of the detached lodging units and their clubhouse area.

The locations of the four bridge crossings in relation to the project site, project components, and adjacent lands are also illustrated at 400 scale on the DEIS plan sheets MP-4 and MP-1.

The outfall for the wastewater treatment plant serving Big Indian Plateau is proposed for a location just downstream of the proposed new bridge over Birch Creek from Friendship Road. The location of the outfall is illustrated in DEIS Figure 3-15E2, "Big Indian Plateau – Effluent Outfall Location". This location was chosen because it is on lands owned by the Applicant, the pipe that outfalls into Birch Creek is located in the road shoulder at the bridge, and placing the outfall below the bridge would not affect the hydraulics used to design the bridge.

The outfall for the wastewater treatment plant serving Wildacres Resort is proposed for a location approximately 1,100 feet west of the proposed plant. The outfall to an unnamed tributary to Emory Brook is on lands owned by the Applicant. See DEIS Figure 3-15E4, "Wildacres Resort Outfall Location and Detail".

II.B Friendship Road Bridge Crossing

Name of Action: Friendship Road Bridge Crossing

Location: The location of this bridge is shown on DEIS Figure 3-15 and Plan Sheet MP-4. An access road to the Big Indian Plateau is proposed off of Friendship Road. The access road and bridge to the DEC Belleayre Beach at Pine Hill Lake is located approximately 600 feet to the west of the project access road's connection with Friendship Road. Birch Creek is located approximately 80 feet south of Friendship Road. This bridge is located in the Town of Shandaken, Ulster County.

DEC Region: 3

Stream Name/Number/Classification: Birch Creek / H-171-52 / B(TS)

Description of the Proposed Action: DEIS Figure 3-15B, "Stream Crossing Details Friendship Road Bridge Plan & Elevation", illustrates the proposed bridge and related improvements. A 70-foot span is proposed with abutments proposed on both sides of Birch Creek. Birch Creek itself is approximately 35 feet wide at the location of the proposed bridge. Stone riprap will be placed along the three sides of each of the abutments for scour protection during high discharges. See DEIS Appendix 24, "Bridge Hydraulics".

Activities Within Stream Channel (Bed): No activities are proposed within the streambed of Birch Creek. The top of bank of Birch Creek is at an elevation of approximately 1,380 feet at this location. Both bridge abutments and their protective riprap are located outside of the streambed.

Activities Within 50 feet of Top of Bank: No activities are proposed within the streambed, but there are activities proposed within 50 feet of the top of bank of Birch Creek (See DEIS Figure 3-15B). These include the bridge abutments and protective riprap. Approximately 85 cubic yards of riprap are proposed on each side of the bridge for a total of 170 cubic yards of riprap. Riprap will extend to approximately four feet below existing grade. In addition to the bridge, the abutments, and protective rip-rap, approximately 10 feet of access road connecting to both sides of the bridge are located within 50 feet of the top of the banks of Birch Creek.

Erosion and Sedimentation Control: As illustrated on DEIS Figure 3-15B, perimeter silt fence is proposed around the work area for the bridge (See DEIS Figure 3-15E1 for erosion control details). Temporary cofferdams are proposed outside of the stream channel and between the silt fence and the top of bank on either side of Birch Creek. The cofferdams will serve two purposes. In times of higher stream discharge the cofferdams will allow work behind them to proceed in the dry and protect disturbed soils behind them. The cofferdams will also provide additional structural support to the silt fences just uphill of them. Dewatering basins are proposed on both sides of Birch Creek (see DEIS Figures 3-15B and 3-15E1). Because the bridge abutments and excavation for placement of riprap may encounter shallow groundwater, pumping any encountered groundwater to the dewatering basins will allow construction to take place in the dry. There will be no need to divert the flow of Birch Creek during installation of the bridge. Work will take place outside of the streambed from either side of the creek. Operation of machinery within the streambed is strictly prohibited (See Note 1 on DEIS Figure 3-15B). Bridge construction will be inspected at least three times a day by a member of the erosion control crew, including at least once a day by the project Environmental Monitor/Erosion Control Superintendent (a Certified Professional Erosion Control Specialist). Erosion control measures at the bridge construction site will be inspected daily prior to beginning the day's work, at the end of the workday, and at some time in between. Inspection reports/checklists will be completed and maintained for each inspection. All disturbed areas not stabilized by the bridge structures, roadway, and rip-rap will be seeded and mulched as soon as practical after work is completed, but in no event longer than 14 days after establishment of final grades.

II.C Winding Mountain Road Bridge Replacement

Name of Action: Winding Mountain Bridge Replacement

Location: The location of this action is illustrated at two different scales on the attached DEIS Figure 3-15 and LA Group Plan Sheet MP-4. Winding Mountain Road is a private road off of NY Route 28. Winding Mountain Road intersects with NY Route 28 approximately 1,000 feet east of the Pine Hill wastewater treatment plant, and just to the west of The Mattress Barn. The existing bridge over Birch Creek is approximately 400 feet south of NY Route 28 on Winding Mountain Road. This bridge will be used during construction and also as an emergency ingress/egress point during operations. Maintenance vehicles may also use this bridge during the operational phase of the project. The existing bridge and its proposed replacement are located in the Town of Shandaken, Ulster County.

DEC Region: 3

Stream Name/Number/Classification: Birch Creek / H-171-52 / B(TS)

Description of the Proposed Action: The existing bridge at Winding Mountain Road is inadequate from the standpoint of weight capacity and also from the standpoint of being able to pass peak discharges in Birch Creek. See DEIS Appendix 24, "Bridge Hydraulics". The existing bridge span is 35 feet, and during high flows the area around the north end of the bridge reportedly acts as a relief channel which has historically resulted in the need for repairs to be performed on this bridge. The bridge is not supported on piles and is subject to being washed out. The south embankment was recently reinforced with heavy stone where the embankment had settled during a minor storm event.

DEIS Figure 3-15C, "Stream Crossing Details Winding Mt. Road Bridge Plan and Elevation", illustrates this proposed bridge replacement. The proposed replacement bridge has a 70-foot span over Birch Creek. Birch Creek is approximately 35 feet wide at this location. Concrete abutments with riprap protection are proposed on both sides of Birch Creek, but outside of the streambed.

Activities Within Stream Channel (Bed): The only activity proposed within the stream channel is the removal of existing gabions that are partially within the stream channel on the south side of Birch Creek. Gabions will be removed by equipment operated outside of the streambed on the south side of the creek. Gabions will be moved to an area removed from Birch Creek. All other activities associated with this bridge replacement will be outside of the streambed.

Activities Within 50 feet of Top of Bank: Activities associated with the bridge replacement that are outside of the stream channel, but still within 50 feet of the top of bank, include construction of the new bridge abutments and installation of the protective riprap. Approximately 41 cubic yards of riprap are proposed on each side of the bridge for a total of 82 cubic yards of riprap. Riprap will extend to approximately four feet below existing grade. In addition to the bridge deck, abutments, and protective rip-rap, approximately 20 feet of access road connecting to both sides of the bridge are located within 50 feet of the top of the banks of Birch Creek.

Erosion and Sedimentation Control: The erosion and sediment controls proposed for the Winding Mountain Road bridge replacement are the same as those proposed for the Friendship Road bridge crossing (see previous section, II.B). This includes a perimeter silt fence, a cofferdam between the silt fence and the top of bank of Birch Creek, and dewatering basins on both sides of the creek. Inspection protocols for the sediment and erosion control measures will be the same as those described for the Friendship Road Bridge in the previous section, including three inspections per day.

II.D Giggle Hollow Bridge Crossing

Name of Action: Giggle Hollow Bridge Crossing

Location: Giggle Hollow is a north/south ravine that bisects the Big Indian Plateau between the Belleayre Highlands portion of the project and the Big Indian Country Club, Resort and Spa portion of the project. The location of the bridge that is proposed to span the brook within Giggle Hollow is illustrated on DEIS Figure 3-15 (1,500 scale) as well as on LA Group Plan Sheet MP-4 (400 scale). The bridge is proposed to be located near the very headwaters of this small stream and it is within the Town of Shandaken, Ulster County.

DEC Region: 3

Stream Name/Number/Classification: Giggle Hollow Brook / H-171-52-3 / B(T)

Description of the Proposed Action: DEIS Figure 3-15D, "Stream Crossing Details, Giggle Hollow Road and Bridge Plan & Elevation", illustrates the proposed bridge crossing. There will be a 55 foot span over Giggle Hollow Brook, which itself is only a few feet wide at the proposed bridge location. Abutments will be constructed on either side of the brook and sheeting will be installed between the abutments and the brook. Unlike the two Birch Creek bridge crossings discussed above, riprap will not be installed at this bridge. The slopes on either side of the Giggle Hollow Bridge are steeper than the slopes at the two bridge crossings of Birch Creek. Also, Giggle Hollow Brook is a much smaller stream and the bridge is at the upper end of the brook, so scour protection of the abutments is not required. Sheet piling will be installed at the toe of the fill slope in order to lessen the horizontal extent of backfill required below the abutments.

Activities Within Stream Channel (Bed): No activities are proposed within Giggle Hollow Brook.

Activities Within 50 feet of Top of Bank: As illustrated on DEIS Figure 3-15D, the two bridge abutments, sheet piling, and approximately 50 feet of roadway will be within 50 feet of the top of bank of Giggle Hollow Brook. Riprap will not be installed at this bridge. No dewatering basins are proposed for this bridge crossing since it is very unlikely that groundwater will be encountered at the elevations of excavation being proposed. Likewise, temporary cofferdams are not necessary since the work area is high enough above the stream channel that even during high discharges the work area will not be affected by stream flows.

Erosion and Sedimentation Control: Perimeter silt fence will be installed as shown on DEIS Figure 3-15D and as detailed on DEIS Figure 3-15E1. Bridge construction will be inspected at least three times a day by a member of the erosion control crew, including at least once a day by the project Environmental Monitor (Certified Professional Erosion Control Specialist). The bridge construction site will be inspected daily prior to beginning the day's work, at the end of the workday, and at some time in between. Inspection reports/checklists will be completed and maintained for each inspection. All disturbed areas that are not otherwise stabilized will be seeded and mulched as soon as practical following completion of bridge construction, but in no event longer than 14 days after establishment of final grades.

II.E Wildacres Bridge Crossing

Name of Action: Wildacres Bridge Crossing

Location: The location of the Wildacres bridge crossing is illustrate on DEIS Figure 3-15A (1500 scale) and on LA Group Plan Sheet MP-1 (400 scale). The bridge is part of an access road into the northern portion of the Wildacres Resort site. The access road is off of Gunnison Road, approximately 1,000 feet west of its intersection with County Route 49A. This bridge is located in the Town of Middletown, Delaware County.

DEC Region: 4

Stream Name/Number/Classification: Unnamed tributary of Emory Brook / D-70-80-12-3 / B

Description of the Proposed Action: DEIS Figure 3-15E, "Stream Crossing Details, Wildacres Bridge Plan & Elevation", illustrates the proposed bridge crossing. There will be a 60 foot span over this unnamed tributary, which itself is only a few feet wide at the proposed bridge location. Abutments will be constructed on either side of the brook and sheeting will be installed between the abutments and the brook in order to lessen the horizontal extent of backfill required. Riprap will not be installed at this bridge. The slopes on either side of this brook are steeper than the slopes at the two bridge crossings of Birch Creek. Also, this brook is much smaller and the bridge is at the upper end of the brook, so scour protection of the abutments is not required. Likewise, temporary cofferdams are not necessary since the work area is high enough above the stream channel that even during high discharges the work area will not be affected by stream flows.

Activities Within Stream Channel (Bed): As illustrated on DEIS Figure 3-15E, no activities are proposed within the bed of this small, intermittent brook.

Activities Within 50 feet of Top of Bank: The bridge abutments, sheet piling, and approximately 40 feet of the access road are proposed within 50 feet of the top of bank of this brook. No dewatering basins are proposed for this bridge crossing since it is very unlikely that groundwater will be encountered at the elevations of excavation being proposed.

Erosion and Sedimentation Control: Perimeter silt fence will be installed as shown on DEIS Figure 3-15E and as detailed on DEIS Figure 3-15E1. Bridge construction will be inspected at least three times a day by a member of the erosion control crew, including at least once a day by the project Environmental Monitor (Certified Professional Erosion Control Specialist). The bridge construction site will be inspected daily prior to beginning work, at the end of the workday, and at some time in between. Inspection reports/checklists will be completed and maintained for each inspection. All disturbed areas that are not otherwise stabilized will be seeded and mulched as soon as practical following completion of bridge construction, and not longer than 14 days after establishment of final grades.

II.F Big Indian Plateau Wastewater Treatment Plant Outfall

Name of Action: Outfall from Big Indian Plateau Wastewater Treatment Plant

Location: 42°-07'-30", 74°-28'-04" The proposed outfall is located on the south bank of Birch Creek just downstream (east) of the proposed Friendship Road Bridge described previously. This location was chosen because it is on lands owned by the Applicant, the pipe that outfalls into Birch Creek is located in the road shoulder at the bridge, and placing the outfall below the bridge would not affect the stream hydraulics used in designing the bridge. See DEIS Figure 3-15E2, "Big Indian Plateau – Effluent Outfall Location".

DEC Region: 3

Stream Name/Number/Classification: Birch Creek / H-171-52 / B(TS)

Description of the Proposed Action: DEIS Figure 3-15E3, "Big Indian Plateau – Effluent Outfall Plan", illustrates the proposed outfall and protective riprap. Birch Creek itself is approximately 35 feet wide at the location of the proposed bridge. The outfall will be constructed on the south bank of Birch Creek and will consist of the six-inch effluent line with a flared end section which will discharge to a trapezoidal area of 18-inch riprap. The discharge point and the riprap to which it discharges to will be located just above the ordinary high water elevation of Birch Creek. DEIS Figure 3-15E2, "Big Indian Plateau Effluent Outfall Location", shows the outfall in relation to Birch Creek, Friendship Road and the new proposed bridge over Birch Creek, as well as NY Route 28. DEIS Figure 3-15E3, "Big Indian Plateau-Effluent Outfall Plan", provides more detail of the configuration of the outfall, the riprap, and the ordinary high water elevation of Birch Creek.

Activities Within Stream Channel (Bed): It will be necessary to excavate out a small section of the south bank of Birch Creek to install the outfall. The 6 inch outfall pipe and flared end section (level spreader) will extend out of the south bank at a point approximately five feet above the streambed. Riprap will be installed on the bank below the outfall down to the toe of the bank where it meets the streambed. Native stone material will remain undisturbed in the streambed itself.

Activities Within 50 feet of Top of Bank: Pipe leading up to the outfall will be installed in a trench leading away from the south bank.

Erosion and Sedimentation Control: As illustrated on DEIS Figure 3-15E3 the work area will be protected by silt fence and all work will be above the ordinary high water level and will take place during low flow conditions. Work will take place outside of the streambed from the south side of the creek. Operation of machinery within the streambed is strictly prohibited. Approximately 2.8 cubic yards of riprap will be placed at the outfall and provide a stabilized area for discharging effluent down to Birch Creek. Installation of the outfall will be inspected at least three times a day by a member of the erosion control crew, including at least once a day by the project Environmental Monitor/Erosion Control Superintendent (a Certified Professional Erosion Control Specialist). Erosion control measures will be inspected daily prior to beginning work, at the end of the workday, and at some time in between. Inspection reports/checklists will be completed and maintained for each inspection. All disturbed areas not stabilized by the outfall and rip rap will be seeded and mulched as soon as practical after work is completed, but in no event longer than 14 days after establishment of final grades.

II.G Wildacres Resort Wastewater Treatment Plant Outfall

Name of Action: Outfall from Wildacres Wastewater Treatment Plant

Location: 42°-08'-52", 74°-30'17" The proposed outfall is located on the east bank of an unnamed tributary to Emory Brook approximately 1,100 feet west of the treatment plant. This location is on lands owned by the Applicant in the Town of Middletown, Delaware County. See DEIS Figure 3-15E4, "Wildacres Resort Effluent Outfall Location and Detail".

DEC Region: 4

Stream Name/Number/Classification: Unnamed / D-70-80-12-3 / B

Description of the Proposed Action: DEIS Figure 3-15E4, "Wildacres Resort Effluent Outfall Location", illustrates the proposed outfall and protective riprap. The stream is approximately four feet wide near the location of the proposed outfall. The outfall will consist of the six-inch effluent line with a flared end section which will discharge to a trapezoidal area of 18-inch riprap. The discharge point and the riprap to which it discharges to will be located just above the ordinary high water elevation of the creek.

Activities within Stream Channel (Bed): It will be necessary to excavate out a small section of the east bank of the creek to install the outfall. The 6-inch outfall pipe and flared end section (level spreader) will extend out of the east bank at a point approximately five feet above the streambed. Riprap will be installed on the bank below the outfall down to the toe of the bank where it meets the streambed. Native stone material will remain undisturbed in the streambed itself.

Activities within 50 feet of Top of Bank: Pipe leading up to the outfall will be installed in a trench leading away from the east bank.

Erosion and Sedimentation Control: Since this stream is intermittent, construction will take place "in the dry". Work will take place outside of the streambed from the east side of the creek. Operation of machinery within the streambed is strictly prohibited. Silt fence will be installed as per DEIS Figure 3-15E4. Installation of the outfall will be inspected at least three times a day by a member of the erosion control crew, including at least once a day by the project environmental Monitor/Erosion Control Superintendent (a Certified Professional Erosion Control Specialist). Erosion control measures at the outfall construction site will be inspected daily prior to beginning work, at the end of the workday and at some time in between. Inspection reports/checklists will be completed and maintained for each inspection. All disturbed areas not stabilized by the outfall and rip rap will be seeded and mulched as soon as practical after work is completed, but in no event longer than 14 days after establishment of final grades.

II.H. Application of Standards (§608.8)

This section discusses how the proposed actions discussed in the previous sections (II.A through II.G) comply with the standards in §608.8.

§608.8.a the proposal is reasonable and necessary

1. Reasonable

The four proposed bridge crossings are a reasonable alternative to culverted stream crossings which would cause direct loss of aquatic habitat. For example, culverting the Giggle Hollow brook would require a box culvert approximately 100 feet in length, thus eliminating 100 feet of aquatic habitat provided by this stream. Spanning the stream crossings with bridges also allows for free movement of fishes upstream and downstream of the bridges as well as unimpeded drift of aquatic invertebrates. Avoiding installing culverts avoids the erosion, sedimentation and instream turbidity that can occur during culvert installation.

Based on electroshocking surveys conducted by the Department, including work done in September of 2000 specifically for this project, Birch Creek and Giggle Hollow Brook both contain juvenile salmonids, indicating that these waters serve as areas of trout spawning and are valuable aquatic resources. Constructing bridges instead of culverted stream crossings avoids the loss of potential spawning areas in these creeks. No trout were found in the brook that will be crossed by the Wildacres Bridge, but it is believed that trout exist further downstream in the drainage system from this unnamed tributary to Emory Brook.

Spanning all four of these crossings avoids introducing any structures, fill, or other material into any of the streams being crossed. The width of the bridges is not excessive. Three of the bridges are designed to safely convey two way vehicular access and egress to the project site. The Winding Mountain Road Bridge is one lane and the replacement will also be one lane.

Constructing an outfall for the wastewater treatment plant for Big Indian Plateau on the south bank is reasonable given the fact that Birch Creek is the largest stream in proximity to the project site. At times the treatment plant will discharge to the irrigation ponds on the Big Indian Country Club and the treated effluent will be used to irrigate the golf course. During those times when irrigation is not required, or when the irrigation pond is already full, the treated effluent will be discharged to Birch Creek. Streambed disturbance has been minimized by placing the outfall part way up the bank rather than at the bottom of the bank. Placing the outfall pipe higher up the bank avoids the need to place riprap in the streambed itself, thereby not disturbing the existing streambed substrate.

Constructing an outfall for the wastewater treatment plant for Wildacres Resort on the east bank is reasonable given the fact that this is the stream in closest proximity to the treatment plant approximately 1,100 feet to the east. At times the treatment plant will discharge to the irrigation ponds on the Highmount Golf Club and the treated effluent will be used to irrigate the golf course. During those times when irrigation is not required, or when the irrigation pond is already full, the treated effluent will be discharged to the creek. Streambed disturbance has been minimized by placing the outfall part way up the bank rather than at the bottom of the bank. Placing the outfall pipe higher up the bank avoids the needs to place riprap in the streambed itself, thereby not disturbing the existing streambed substrate.

The Rules and Regulations for the Protection from Contamination, Degradation, and Pollution of the New York City Water Supply and Its Sources require treatment to intermittent stream standards, which is achieved through design and construction of a sewer treatment plant with primary, secondary and tertiary components. Tertiary treatment, which accomplishes filtration, must be accomplished through a NYCDEP approved technology.

The following are estimated SPDES permit limits for the wastewater treatment plants. These limits are comparable to other wastewater treatment facilities of similar size and are the design basis for the proposed plants. This list was prepared in consultation with the NYSDEC.

PERMIT PARAMETER	PERMIT LIMIT
BOD5 (mg/l)	5
Suspended Solids (mg/l)	10
pH	6.5-8.5
Temperature (°F)	70
Solids, Settlable (ml/l)	0.1
Ammonia (mg/l as NH3)	1.1
Dissolved Oxygen (mg/l)	7
Phosphorus, Total (mg/l)	0.5
Turbidity (95% of the time)	0.5
Turbidity (maximum value)	5

2. Necessary

A. Big Indian Plateau Access

In order to gain access to the Big Indian Plateau in a direct manner, it is necessary to cross Birch Creek, just as it is necessary to cross Birch Creek to access the Belleayre Beach at Pine Hill Lake. In this area Birch Creek essentially runs parallel to NY Route 28. The following is a discussion of the alternative access points considered for the Big Indian Plateau portion of the Belleayre Resort project.

The Big Indian Plateau portion of the project site has alternative access points from Woodchuck Hollow Road, Friendship Road, NY Route 28 via Winding Mountain Road, NY Route 28/Lasher Road, and Lost Clove Road. Alternative access locations and routes, including the proposed access plan is illustrated in DEIS Figure 5-11 "Access Alternatives Big Indian Plateau".

Woodchuck Hollow Road is a two-lane Town of Shandaken Road that is unsurfaced and dead ends at the project site. Access to the project site via Woodchuck Hollow Road would require vehicles to pass through the hamlet of Pine Hill after turning off of NY Route 28. Woodchuck Hollow Road is proposed to be used to access the project site, but for emergency purposes only. The desire to avoid routing non-emergency traffic through the higher density residential area of the hamlet of Pine Hill precluded Woodchuck Hollow Road from being considered a preferred primary access route. Also, Woodchuck Hollow Road is used by many hikers as the starting point for the trails along Belleayre Mountain and beyond. By limiting project traffic to emergency vehicles only, potential negative hiker/vehicle interactions have been avoided.

The Big Indian Plateau portion of the project site has approximately 240 feet of frontage on Friendship Road. Friendship Road is a two-lane Town of Shandaken road that connects on either end with NY Route 28. Friendship Road near its western end provides access to Belleayre Beach at Pine Hill Lake as well as two residences. Friendship Road, near its eastern end, is the preferred alternative access point for serving the operational access needs of the project. In order to provide access to the project site a new bridge will need to be constructed to span Birch Creek. An access road of approximately 7,500 feet between Friendship Road and the Big Indian Resort and Spa building is required in order to meet Town road slope requirements. (The access road is a private road but was designed to meet Town of Shandaken Highway Department road standards.)

Having the main access point off of Friendship Road was not the original access point planned for this portion of the project site. Originally, it was planned to access the Big Indian Country Club, Resort and Spa and Belleayre Highlands from an access road off of Lasher Road. Lasher Road is also a two-lane Town of Shandaken Road with an existing bridge over Birch Creek. Lasher Road connects with NY Route 28 next to the existing Jake Moon Restaurant. The originally planned access road would have intersected Lasher Road south of the bridge over Birch Creek. An access road of approximately 8,450 feet between Friendship Road and the Big Indian Resort and Spa building is required in order to meet road slope requirements. The reason that this alternative was not selected as the preferred access location was the potential for significant visual impacts from the clearing and grading necessary to construct a road at this location. Unlike the Friendship Road access road that is located perpendicular to NY Route 28, there would be direct views into the Lasher Road access from NY Route 28 when traveling from the east through the hamlet of Big Indian. This access would also require additional impervious area since it is almost 0.2 miles longer than the alternative access from Friendship Road. As proposed, the project would use the existing Lasher Road only as an access to an employee parking area on the flat area to the south of the existing Jake Moon restaurant.

Access to the Big Indian Plateau currently exists via Winding Mountain Road. Winding Mountain Road is not surfaced and in most places is only wide enough for one-way travel. Winding Mountain Road is proposed as the main access road for the early construction phases of the project. It is also planned to have Winding Mountain Road serve as an emergency egress road during the operational phase of the project . Should conditions prohibit people from leaving the project site via Friendship Road and the bridge over Birch Creek, people will be able to leave on Winding Mountain Road by traveling on a proposed short connector road to be constructed between the proposed access road off of Friendship Road and Winding Mountain Road.

Lost Clove Road is also located adjacent to the eastern portion of the project site. Unlike the alternative access points off of Friendship Road and Winding Mountain Road, access via Lost Clove Road would be much less direct from NY Route 28. In order to access the project site at this location, one would have to travel approximately 1.75 miles on County Road 47 and Lost Clove Road, passing a number of residences along the way, before accessing the project site. Once on the site, an access drive of over 8,300 feet would be required to get to the Big Indian Resort and Spa building. Access at this location would also be adjacent to a State hiking trail trailhead parking area and would require crossing the State hiking trail on the portion of the trail located on the project site. Access for this location could also result in potentially significant visual impacts from nearby State hiking trails, including those on Balsam Mountain a short distance to the south.

Internal site access on this portion of the project requires that there be a road crossing of the intermittent stream in Giggle Hollow that connects the Big Indian Country Club, Resort and Spa and Belleayre Highlands. Road standards in the Town of Shandaken limit access roads with only a single direction of travel (i.e., cul-de-sacs) to be no more than 1,200 feet in length. Therefore, without the connection across Giggle Hollow that provides access to locations at Woodchuck Hollow Road and Friendship Road, it would only be possible to build an access road 1,200 feet into the project site from each of the existing Town roads. The proposed bridge road crossing in Giggle Hollow is located near the highest elevation on the property. This minimizes the amount of elevation change when making the crossing. An alternative location could have been selected but this would have required construction on longer, and possibly steeper, slopes. The connector road passing through Giggle Hollow also allows club members staying at

Belleayre Highlands to drive to the Big Indian Country Club, Resort and Spa without having to travel on the local public road network, including the roads through Pine Hill.

B. Wildacres Resort Access

The access off of Gunnison Road closest to County Road 49A provides access to a portion of the Highmount Golf Club and the collection of detached lodging units and their recreational amenities north of Gunnison Road. The location of this aspect of the project flows from the layout of the golf course. The proposed access location is the only one on this portion of the site that would not require the access road to cross a golf hole.

C. Discharge to Surface Waters

Wastewater generated by the project has to be disposed of in some fashion. A number of alternative disposal methods were evaluated. These alternatives include: individual subsurface disposal systems; a regional subsurface disposal system to accommodate the wastewater from both portions of the development; subsurface disposal systems with pretreatment units, wastewater treatment plant to serve specific areas of the development; a combination of the above; and installing a collection network to convey all the wastewater to the New York City owned and operated Pine Hill Wastewater Treatment Plant.

1. Alternatives

a. Alternative 1 – Individual Subsurface Disposal Systems

Subsurface disposal systems would be designed and constructed in accordance with NYCDEP regulations stated in, "Rules and Regulations for the Protection from Contamination, Degradation and Pollution of the New York City Water Supply and its Sources, NYSDEC standards set forth in Design Standards for Wastewater Treatment Works – Intermediate Sized Sewerage Facilities (1988)" as well as "Recommended Standards for Individual Sewage Systems" by the Ten States Standards. They would most likely include a grease trap (if wastewater was from a source such as restaurants), septic tank, dosing tank or distribution box and absorption trenches. These systems would vary in size based on the anticipated hydraulic loading.

b. Alternative 2 - Pre-Treatment Systems with Regional Subsurface Disposal

A number of large subsurface disposal fields could be constructed to treat and discharge wastewater from a number of proximal structures. For this project, a specific concern is the introduction of high amounts of nitrogen into the subsurface and the inability of subsurface disposal systems to adequately assimilate the nitrogen. A pre-treatment system could be required by regulatory agencies to reduce the nitrogen loading to subsurface treatment systems by using a biological process to breakdown the nitrogen to nitrates and nitrites. Preliminary treatment utilizes a variety of treatment technologies or methods to partially treat wastewater to remove specified compounds or contaminants. A pre-treatment system would be selected to supplement subsurface disposal methods. Pre-treatment systems are available in a variety of technologies and can be constructed from pre-engineered (package) systems or assembled from components.

Pre-treatment systems require regular operation and maintenance. Electric power is required to operate pumps and controls which add to the capital and operation and maintenance costs and the degree of difficulty and complexity of operation.

c. <u>Alternative 3 - Consolidated Discharge</u>

The Hamlet of Pine Hill utilizes a state-of-the-art wastewater treatment plant (WWTP) (owned and operated by the NYCDEP) to treat their wastewater. Of the 500,000-gpd permit capacity the WWTP has, Pine Hill utilizes approximately 50,000 gpd plus the Belleayre Mountain Ski Center discharging 35,000 gpd for a total seasonal discharge of 85,000 gpd. The WWTP is located 800 feet down-gradient and 2,000 feet away from the proposed Big Indian Resort and Spa/Big Indian Country Club/Belleayre Highlands development. Wildacres Resort is located approximately 2.5 miles to the west and upgradient of the Pine Hill WWTP. Given the close proximity, particularly to Big Indian Plateau, and the fact the Pine Hill WWTP is designed and permitted to treat wastewater of the same nature as would be generated by the proposed Resort developments, discharging all of the development generated wastewater to the WWTP is a viable alternative from an engineering and regulatory perspective. Sewer collection systems would be designed and constructed in accordance with NYCDEP regulations stated in, "Rules and Regulations for the Protection from Contamination, Degradation and Pollution of the New York City Water Supply and its Sources, NYSDEC standards set forth in Design Standards for Wastewater Treatment Works – Intermediate Sized Sewerage Facilities (1988) as well as Recommended Standards for Individual Sewage Systems" by the Great Lakes – Upper Mississippi River Board of State Sanitary Engineers.

d. <u>Alternative 4 - On-Site Wastewater Treatment Plants</u>

On-site wastewater treatment plants would be designed and constructed in accordance with NYCDEP regulations stated in, "Rules and Regulations for the Protection from Contamination, Degradation and Pollution of the New York City Water Supply and its Sources, NYSDEC standards set forth in Design Standards for Wastewater Treatment Works – Intermediate Sized Sewerage Facilities (1988) and the Recommended Standards for Wastewater Facilities" by the Great Lakes – Upper Mississippi River Board of State Public Health and Environmental Managers. Treatment of the wastewater through on-site wastewater treatment plants would likely involve the following processes: preliminary treatment to remove large solids and oil and grease; primary treatment to remove settleable solids; secondary or biological treatment to reduce the organic loading; tertiary treatment to remove suspended solids, phosphorus, nitrogen and pathogens; and disinfection. The size of such treatment systems would vary depending on the hydraulic loading and the level of treatment necessary would vary depending on the effluent discharge permit requirements. The options for discharge of the wastewater effluent are surface discharge to a receiving streams, subsurface discharge to an absorption fields, or surface discharges to a holding area for spray irrigation. The option selected will dictate the effluent quality as specified in the State Pollution Discharge Elimination System (SPDES) permit issued by the NYSDEC.

2. Evaluation Considerations of Alternatives

Some of the factors to consider in the evaluation and selection of an alternative for the disposal of wastewater from these developments are:

- Estimated hydraulic and organic loadings (see DEIS Appendix 8 Section 3.1.1)
- Loading fluctuations
- Influent wastewater quality
- Effluent quality requirements (see DEIS Appendix 8 Section 3.1.2)
- Surface/subsurface discharge points
- Site conditions (see also DEIS Appendix 8 Section 3.1.3)
- Constructability

The following sections provide a more detailed discussion of some of the evaluation considerations. By utilizing the information presented in these sections, the treatment alternatives can be compared and assessed for applicability.

a. *Estimated Hydraulic and Organic Loading*

Based upon the calculated estimates of the hydraulic and organic loading, the proposed wastewater treatment alternative must be capable of handling influent flow, from the Big Indian Plateau development, at a design average flow of 86,772 gpd with a design average BOD_5 of 329.3 lb./dy, and from Wildacres, at a design average flow of 140,435 gpd with a design average of 534.8 lb./dy.

b. *Estimated Effluent Quality Requirements*

The following are estimated SPDES permit limits. These limits are comparable to other wastewater treatment facilities of similar size. This list was prepared in consultation with the NYSDEC. These parameters would be the design basis if a wastewater treatment plant is proposed.

PERMIT PARAMETER	PERMIT LIMIT
Design Ave. Flow (gallons per day)	86,772
BOD5 (mg/l)	5
Suspended Solids (mg/l)	10
pH	6.5-8.5
Temperature (°F)	70
Solids, Settlable (ml/l)	0.1
Ammonia (mg/l as NH3)	1.1
Dissolved Oxygen (mg/l)	7
Phosphorus, Total (mg/l)	0.5
Turbidity (95% of the time)	0.5
Turbidity (maximum value)	5

c. *Site Conditions*

i. *Big Indian Plateau*

Big Indian Plateau is located in the Town of Shandaken. Per Shandaken Code, these lands are currently 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.

The topography of the lands that make up the proposed Big Indian Plateau has local variations in slope degree and direction. However, in general Big Indian Resort and Spa/Big Indian Country Club are 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.

Based on the soil survey conducted for this DEIS, the Big Indian Plateau site includes mostly areas of shallow and moderately deep, very stony soils formed in glacial till soils that are derived from red shale and sandstone. The Big Indian Plateau site currently contains rock outcrops. Those that are present in the Big Indian Resort and Spa/Big Indian Country Club primarily are positioned from the west to east. For further information, see the DEIS Section 3.6.

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. The upper layers of soil are made of browner glacial soils that are loamier and "perced". Deeper percolation tests revealed that the underlying soils were made of redder glacial till. These soils are derived from red shale and silt and contain more clay. Flagstone and boulders can be witnessed in the bottom of a majority of the test pits. Seasonal high groundwater elevations could be inferred in three of the twenty test pits (one on Big Indian Resort and Spa/Big Indian Country Club and two on Belleayre Highlands). The shallowest depth to groundwater measurement was 27 inches in Big Indian Resort and Spa/Big Indian Country Club.

Other conditions of the development that influence the alternatives analysis for wastewater treatments methods include the nature of the proposed development and the sources and uses of water resources.

The site layout for Big Indian Resort and Spa, the Big Indian Country Club and Belleayre Highlands encompasses 331 acres of land. The Big Indian Plateau provides a natural boundary to the primary golf-related development and the existing Brisbane (Turner) Mansion provides a location for the clustering of detached lodging units. The layout is uncluttered and is designed to follow the natural spaciousness of the plateau. Given this layout, significant green space is planned between and around the facilities

The source of water for the Big Indian Plateau is ground water, with two sources that will be owned and operated as a private water company, serving only the Resort and Spa, Country Club and Highlands. This is an important consideration in the evaluation of alternatives for wastewater treatment as some alternatives provide direct recharge to the ground water system, while others provide less direct, but equally important opportunities for reuse of treated wastewater for irrigation. With private water supplies, there are no other users of the water supply, therefore, the resources could be used for irrigation without restriction beyond the demands of the Big Indian Plateau and the NYSDEC water supply permit total taking.

ii. Wildacres Resort

The northern portion of Wildacres Resort, which encompasses 112 detached lodging units, clubhouse (including a pool, two tennis courts, 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. Pursuant to 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 portion of Wildacres Resort, which encompasses the remainder of the development, is located in Ulster County in the Town of Shandaken. Pursuant to 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. R1.5 is described in Article III Section 116-5 C3 of the Code.

The topography of the land proposed for the Wildacres Resort 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 Road 49A to 1,800 feet AMSL to the north along NY Route 28. The proposed Highmount Estates development slopes radically 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.

Based on the soil survey conducted for the DEIS, the Ulster County portion of 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. Portions of the Wildacres Resort spill over into Delaware County. The Delaware County soil survey is still not completed. Soil characteristics similar to Ulster County's can be found in the Delaware County segments of WRHGC and Highmount Estates. For further information see the DEIS Section 3.6 on Soils.

Eleven test pits and three percolation tests were conducted in November 2000 in various locations throughout the proposed WRHGC 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. The upper layers of soil are made of browner glacial soils that are loamier and "perced". Deeper percolation tests revealed that the underlying soils were made of firm layers of glacial till. These soils are derived from shale and silt and contain more clay. Bedrock was overlain by flagstone anywhere from 16 to 72 inches below ground surface. No seasonal high groundwater elevations could be inferred from the eleven test pits. Further, no groundwater was encountered during test pit procedures.

Other conditions of the development that influence the alternatives analysis for wastewater treatments methods include the nature of the proposed development and the sources and uses of water resources.

The site layout for the Wildacres Resort encompasses only 242 acres of land. The large wetland and sloped areas of the former Highmount Ski Center provide a natural boundary for the primary golf-related and detached lodging unit developments. The layout is therefore compact, with facilities in close proximity to each other, wrapped by the golf course.

The source of water for the Wildacres Resort is proposed to be ground water from the neighboring Village of Fleischmanns. The Village operates a public water supply for which excess capacity has been established. The water supply to be used by the Wildacres Resort would serve not only the Resort, but the Village as well. This is an important consideration in the evaluation of alternatives for wastewater treatment as some alternatives provide direct recharge to the ground water system, while others provide less direct, but equally important opportunities for reuse of treated wastewater for irrigation. With private water supplies, there are no other users of the water supply; therefore, the resources could be used for irrigation without restriction beyond the demands of the Resort and the NYSDEC water supply permit total taking. As with any situation where a public entity supplies water to an out-of-district user for any purpose (potable or non-potable), the public entity, through a water supply contract, may reserve the right to restrict the supply of water to out-of-district users in times of emergency or drought. Given this common contractual situation, the reuse of wastewater effluent for irrigation is further supported.

3. Subsurface Disposal Systems

To evaluate whether or not subsurface treatment was a feasible option, site reconnaissance and preliminary soil percolation tests were performed at potential absorption system locations throughout Big Indian Plateau in November 2000. The tests were conducted according to the standards of the New York State Department of Conservation (NYSDEC) and witnessed by a representative of the NYCDEP. An average percolation rate of 0.9 minutes per inch was calculated from the test results. The fastest percolation rate was 0.5 minutes per inch and the slowest was 1.5.

Based on the NYSDEC standards set forth in "Design Standards for Wastewater Treatment Works – Intermediate Sized Sewerage Facilities (1988)" and the NYCDEP regulations stated in, "Rules and Regulations for the Protection from Contamination, Degradation and Pollution of the New York City Water Supply and its Sources," the 0.9 minutes per inch of percolation rate (or even the slowest percolation rate of 1.5 minutes per inch) is too fast to be discharged to a conventional absorption system. The NYCDEP prescribes a maximum of 3 minutes per inch for conventional subsurface disposal systems. A second anomaly also exists. When deeper percolation tests were conducted at some of these same locations, percolation rates exceeding 60 minutes per inch resulted. This rate fails the minimum rate of 60 minutes per inch dictated by the NYCDEP for conventional absorption systems within the NYC watershed.

To evaluate whether or not subsurface treatment was a feasible option, site reconnaissance and preliminary soil percolation tests were performed at potential absorption system locations in the northeastern corner of WRHGC, on lands located in Delaware County, in November 2000. The tests were conducted according to the standards of the New York State Department of Health (NYSDOH) and witnessed by a representative of the NYCDEP. An average percolation rate of 7.5 minutes per inch was calculated from the test results. The fastest percolation rate was 5.5 minutes per inch and the slowest was 9.5 minutes per inch. Exhibit B of Appendix 8 contains the test pit logs and percolation test results.

Based on the NYSDEC standards set forth in "Design Standards for Wastewater Treatment Works – Intermediate Sized Sewerage Facilities (1988) and the NYCDEP regulations stated in, Rules and Regulations for the Protection from Contamination, Degradation and Pollution of the New York City Water Supply and its Sources", the range of percolation results of 5.5 to 9.5 minutes per inch fall within the allowable range set by the NYCDEP of 3 to 60 minutes per inch Soil conditions on the site vary both in terms of composition and depth. It is possible that the actual locations for the absorption systems may have less than adequate soil conditions. In this event, it would be necessary to move acceptable soil from other areas of the site or import them, which provide an acceptable percolation rate.

Many subsurface disposal systems are constructed with modifications to the conventional design to ensure proper percolation rates, such as imported soils and the construction of extended treatment zones. Given the nature of the soils encountered during the preliminary soil tests, subsurface treatment systems can be constructed on site, using proven construction methods that enhance treatment beyond conventional designs. Wastewater would be gravity or pressure fed to localized septic tanks then to dosing tanks. The wastewater would accumulate in a dosing tank until the dose volume was reached and a high level sensor activated a pump. The dosing tank pumps would distribute the wastewater to the absorption systems constructed in accordance with the capacity required by NYSDEC standards, NYCDEP regulations, and EPA guidelines.

Absorption trenches would be constructed by placing a layer of soil three-feet thick that extends beyond the field perimeter by five feet on all sides. The soil would have a percolation rate of less than 10 minutes per inch. The soil layer would be constructed by placing site soils in a manner that meets the required percolation rates. A priority is placed on using site soil to the extent possible and then to import soil. The noise and traffic impacts of the trucking of imported soil have been addressed in Appendices 22 "Sound Impact Study" and 25 "Traffic Impact Study." Prior to constructing the trenches, test pads would be prepared under controlled conditions, and a construction quality control plan developed to assure that the trenches constructed satisfy the design percolation rates.

Under this alternative, the three feet of soil under the trench and a five-foot perimeter buffer zone would act as the treatment zone. As the treated wastewater percolates downward from the bottom of the soil treatment zone it would enter the more permeable native soils beneath and enter the local groundwater system. Due to the higher permeability of the underlying soils, groundwater mounding due to disposal is very unlikely.

If the average flow of 108,465 gpd were used, a total of 120,517 square feet of primary absorption trenches would be required to treat the site wastewater by subsurface treatment. In addition to the 120,517 square feet required for the primary raised absorption trenches, an additional 120,517 square feet would be required as a reserve or back up area. The average flow and area required for absorption field can be reduced by 20 percent, since water saving plumbing fixtures will be used. It should be noted that no one field would receive more than 30,000 gpd of wastewater to avoid triggering additional treatment requirements.

Pre-treatment prior to subsurface discharge is also considered part of this alternative as it may be required by regulatory agencies. The pre-treatment for the Big Indian Plateau could consist of the installation of BioClere® or similar biological units after grease separators and septic tanks and prior to discharge to subsurface trenches. BioClere® treatment units are packaged trickling filters and would serve to breakdown nitrogen into nitrates and nitrites prior to final treatment through the subsurface fields. The fields could be designed the same as specified for disposal without pre-treatment. The pre-treatment units would add a significant level of conservatism to the wastewater treatment, and would increase the operation and maintenance costs of the overall facilities. In addition, given the potential fluctuations in seasonal flows, operational challenges would exist with maintaining any biological treatment system. The challenges would not be insurmountable as proven by the use of BioClere® units at many seasonal private camps and homes in the Adirondacks.

4. Consolidated Discharge

Another consideration is the proximity of existing publicly-owned treatment works (POTW) and the availability of treatment capacity at these facilities. The Pine Hill WWTP is located approximately 2,000 feet away and 800 feet down gradient from the Big Indian Resort and Spa/Big Indian Country Club development. The Pine Hill WWTP is designed and permitted to treat wastewater of the same nature as would be generated by the proposed Resort developments. The NYCDEP owned and operated plant discharges 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 WWTP is discharging at peak approximately 85,000 gallons per day. If the plant was to accept the design average flow of 86,772 gpd from the Big Indian Plateau, it would still have an excess capacity of approximately 328,228 gpd. Additionally, if the plant was to accept the average design flow of 112,348 gpd from the Wildacres Resort, it would still have an excess capacity of 215,880 gpd. The Pine Hill WWTP is located approximately 2.5 miles away and 600 feet downgradient from the Wildacres Resort.

Use of the Pine Hill WWTP would achieve the same results as the construction of an on-site wastewater treatment facilities, but with added benefits. Treatment and discharge of the Resort wastewater through the Pine Hill plant would eliminate the need to construct separate wastewater treatment facilities on-site and would eliminate the need for additional surface outfalls.

In addition, significant control is gained by regulators when all wastewater in an area is treated in one treatment plant. Oversight is accomplished more efficiently. Given the lack of licensed treatment plant operators in the Watershed, the operation of fewer, larger treatment plants makes the best use of the limited personnel resources.

With a design flow significantly higher than the permitted plant flow and the actual flow at less than 6 percent of the permitted flow, the additional flow from the Resort would assist the operators of the Pine Hill WWTP in operating more efficiently and in maintaining permit compliance.

Further, effluent generated by the plant could be used by Crossroads for irrigation purposes at Big Indian Country Club during the months of April through October. Although sufficient quantities of water are available to the development to serve the irrigation needs, the use of effluent from the PHWWTP for irrigation is considered an option as it offers an environmental benefit. Effluent would be pumped to a surface impoundment where it would be distributed throughout the golf course. If agreements could be reached with the operators of the Belleayre Mountain Ski Center, this effluent could also be provided to the Ski Center for snow making during the winter months. In discussions with the NYCDEP, Crossroads proposed to pay for the equipment and operation/maintenance costs to pump effluent from the City owned plant to the golf course irrigation ponds at Big Indian Plateau .

Despite the synergy between the characteristics of the wastewater from the proposed Resort, particularly Big Indian Plateau, and the treatment capabilities of the NYC-owned Pine Hill WWTP, discussions with the NYCDEP during the preparation of this report resulted in the City of New York stating that consolidation of the wastewater flow from the Crossroads development with the Pine Hill wastewater is not allowable at this time due to liability concerns. See DEIS Appendix 8, "Conceptual Design Reports for Wastewater Treatment and Disposal", Exhibit D.

5. Wastewater Treatment Plant

Construction of on-site wastewater treatment facilities is a feasible alternative for wastewater treatment. The streams within the developments are considered intermittent. Regardless of discharge to an intermittent or non-intermittent stream, the Rules and Regulations for the Protection from Contamination, Degradation, and Pollution of the New York City Water Supply and Its Sources will require treatment to intermittent stream standards, which is achieved through design and construction of sewer treatment plants with primary, secondary and tertiary components. Tertiary treatment, which accomplishes filtration, must be accomplished through a NYCDEP approved technology. Design and construction of on site treatment plants for the Big Indian Plateau and Wildacres Resort are feasible under these conditions. The treatment plants would add a new discharge to Birch Creek and a tributary to Emory Brook through outfall structures designed to achieve all regulatory standards. The construction of new point source discharges adds to the regulatory responsibilities of the state and regional agencies.

To minimize land disturbance, collection piping, and treatment equipment, single east (Big Indian Plateau) and west (Wildacres Resort) treatment systems to handle the flow from both developments is the best approach. This would also facilitate the collection of effluent for recycling as irrigation water.

6. Proposed Alternative

Given an evaluation of wastewater disposal alternatives, on-site wastewater treatment plants are offered as the preferred alternative. Weighing factors associated with effectiveness and technical implementability, this alternative is judged superior to individual on-lot septic systems and regional subsurface disposal systems and second to treatment at the PHWWTP. The PHWWTP is currently operating and has excess capacity. In addition, the construction of on-site wastewater treatment plants will require construction of both the collection systems and the plant facilities, whereas discharge to the PHWWTP requires only construction of the collection systems. Treatment of the Resort wastewater through the existing PHWWTP requires less construction, less on-going regulatory oversight, and is more cost effective.

However, the most critical and overriding factor in determining which alternative is favored is the administrative implementability, specifically the indication by the NYCDEP that discharge to the PHWWTP would not be allowed (See Exhibit D of DEIS Appendix 8). Without this approval, the implementation of the use of the PHWWTP is not possible and for this reason, on-site wastewater treatment plants is judged the most favored and is therefore the proposed alternative.

Construction and operation of on-site wastewater treatment plants is supported as the preferred wastewater disposal alternative by:

1. Collection and conveyance piping can be designed and constructed to meet regulatory requirements with a minimum of adverse construction challenges;
2. The technologies proposed for use in the treatment train are demonstrated as effective in treating wastewater with the characteristics anticipated for the resort;
3. There is adequate land controlled by Crossroads Ventures, LLC that is located downgradient from the primary development to be used as the site of the wastewater treatment facilities eliminating the need for extensive pumping and force main to convey wastewater to the treatment facilities;
4. Several outfall options are available for effluent, including a surface discharge and irrigation water storage ponds, providing operational flexibility; and
5. Although greater care, skill, and operator certification is required to operate the WWTP, effluent quality is most assured.

§608.8.b the proposal will not endanger the health safety or welfare of the people of the State of New York

1. <u>Bridges</u>

All bridges have been designed to effectively pass the streams over which they are located, and will not cause flooding. The Giggle Hollow Bridge and the Wildacres Bridge are both located at the very upper ends of intermittent streams. Both streams have steep banks on either side of the bridge crossings. The deck of the Giggle Hollow Bridge is 25 feet above the ordinary high water mark, while the Wildacres Bridge is 15 feet above the ordinary high water mark of the intermittent brook.

For the two bridge crossings of Birch Creek, Friendship Road and Winding Mountain Road, the bridges were designed to pass the 50 year storm with a minimum of two feet of freeboard and the 100 year storm with reduced freeboard. See DEIS Appendix 24, "Bridge Hydraulics Report".

2. Wastewater Outfalls

The low level of proposed discharge of an average of 60 gpm (0.13 cfs) and a maximum of 120 gpm (0.26 cfs) will not add significantly to the discharge of Birch Creek and will not cause flooding. Similarly the low level of proposed discharge of an average of 78 gpm (0.17 cfs) and a maximum of 156 gpm (0.34 cfs) will not cause flooding in the tributary to Emory Brook.

The treatment plants, that will discharge at times at the outfalls, must comply with The Rules and Regulations for the Protection from Contamination, Degradation, and Pollution of the New York City Water Supply and Its Sources, which requires treatment to intermittent stream standards, which is achieved through design and construction of sewer treatment plants with primary, secondary and tertiary components.

§608.8.c the proposal will not cause unreasonable, uncontrolled or unnecessary damage to the resources of the State, including soil, water, forests, water, fish, shellfish, crustaceans and aquatic and land-related environment.

1. Bridges

The four bridge crossings are being proposed as an alternative to culverted stream crossings that would otherwise result in the direct loss of aquatic habitat and likely have a detrimental affect on aquatic life. Avoiding any work within the stream channel avoids the potential for causing increased instream turbidity levels downstream of the work sites. The proposed erosion control measures for the bridge crossings, including the use of perimeter silt fences, coffer dams, dewatering basins, and rapid revegetation once construction is complete will protect soil resources and downslope aquatic resources. Vegetation removal for the four bridges will be limited to only those areas necessary for constructing the proposed bridges.

2. Outfalls

Construction of the outfalls will cause minimal and temporary impacts to localized vegetation, and disturbed areas will be revegetated.

The treatment plants, that will discharge at times at the outfalls, must comply with The Rules and Regulations for the Protection from Contamination, Degradation, and Pollution of the New York City Water Supply and Its Sources, which requires treatment to intermittent stream standards, which is achieved through design and construction of sewer treatment plants with primary, secondary and tertiary components. The volume of effluent discharged to Birch Creek, when added to the volume of wastewater currently discharged by New York City's Pine Hill Wastewater Treatment Plant (PHWWTP) is still well below the discharge volume currently permitted at PHWTP by an existing Department issued SPDES permit.

The proposed outfall will not alter the substrate of Birch Creek or the tributary to Emory Brook and thus will not affect the physical habitat for aquatic life in these waters.

II.I Attachments*

*The attachments in the list below are part of the stream disturbance permit application and are included in the DEIS (referenced figures are in Volume 1 of the DEIS).

1. Figure 3-15, Big Indian Plateau Bridges 1"=1,500'
2. Figure 3-15A, Wildacres Resort Bridge 1"=1,500'
3. LA Group Plan Sheet MP-4
4. LA Group Plan Sheet MP-1
5. Figure 3-15E2, Big Indian Plateau – Effluent Outfall Location"

5A. Figure 3-15E4 Wildacres Resort Effluent Outfall Location and Detail

6. Figure 3-15B, Stream Crossing Details Friendship Road Bridge Plan & Elevation
7. Figure3-15C, Stream Crossing Details Winding Mt. Road Bridge Plan & Elevation
8. Figure 3-15D Stream Crossing Details Giggle Hollow Road Bridge Plan & Elevation
9. Figure 3-15E, Stream Crossing Details Wildacres Bridge Plan & Elevation
10. Figure 3-15E1, Stream Crossing Details Erosion Control Details
11. Figure 3-15E3, Big Indian Plateau Effluent Outfall Plan
12. Figure 5-11, Access Alternatives Big Indian Plateau
13. Bridge Hydraulics Report (DEIS Appendix 24)

III. 401 Water Quality Certification

Because the project involves some limited and unavoidable impacts to federal wetlands under the jurisdiction of the US Army Corps of Engineers (USACOE), a 401 Water Quality Certification is required for the project.

III.A Description of Impacts to Federal Wetlands

Appendix 17 of the DEIS contains the Jurisdictional Determination issued by the Army Corps of Engineers for the project site.

DEIS Appendix 17A is the Preconstruction Notification filed with the Army Corps of Engineers. Included in this Appendix is a detailed description of proposed activities within federal wetlands. A summary of these impacts is described below.

All the proposed impacts to the wetlands in the Wildacres area are listed in Table 3 in Appendix 17A, "Projected Impacts to Wetlands on the Belleayre Resort Site". As indicated in that table, the proposed impacts to non-isolated wetlands include 0.0003 acre of fill and 2.31 acres of vegetation clearing. Impacts to isolated (i.e., non-jurisdictional) wetlands will include 1.08 acres of fill and 0.25 acre of vegetation clearing.

The eastern property of the Project Site, known as the Big Indian Plateau, has fewer wetlands, and consequently, fewer locations at which wetlands are impacted. Also, the total impacts are lower in each category, except for wetland fills in non-isolated wetlands, which amounts to 0.099 acre. Also proposed is 0.28 acre of clearing in non-isolated wetlands. In isolated wetlands, there will be 0.39 acre of fill and 0.01 acre of vegetation clearing.

DEIS Appendix 17A also includes a detailed description of how impacts to wetlands were avoided and minimized, as well as a discussion of measures proposed to mitigate the limited amounts of wetlands impacts being proposed.

Additional information submitted to the ACOE in May 2003 in support of the PCN can be found in Appendix 17B, "Supplemental PCN Information". The ACOE used this PCN to make their determination of compliance with the terms and conditions of the Nationwide Permits. On July 18, 2003 the ACOE issued a letter stating that an individual permit is not required for the project and that the jurisdictional activities proposed could be accomplished under Department of the Army Nationwide Permit Number 14. (See Appendix 6, Letters of Record.) No further authorizations are required from the ACOE.

III.B Stormwater Management Plan – Water Quantity

1. Construction Phase

DEIS Appendix 9, "Construction Phase Stormwater Quantity Management Plan", contains the full stormwater management plan prepared for the construction of Phase 2 of Big Indian Country Club. This level of design prepared for the construction of Phase 2 of the Big Indian Country Club will be performed for the remainder of the project, and will be submitted for review and approval prior to beginning construction of the project.

Stormwater management during construction will be achieved primarily through the use of retention basins sized to capture and hold the runoff from a 10 year design storm on bare soil. These basins will be constructed within each of the defined Subcatchments prior to initiating earthwork. Basins will remain in place until the areas they serve become stabilized. Basin construction, monitoring, dewatering, and decommissioning are discussed in detail in DEIS Appendix 11, "Draft Construction Stormwater Pollution Prevention Plan".

2. Operational Phase

DEIS Appendix 9A, "Operational Phase Stormwater Quantity Management Plan", contains the operational phase stormwater management plan for the project.

The concept for stormwater management is to control the increased volume and rate of surface runoff caused by the development of buildings, roads, parking areas, recreational facilities and the golf courses. The increased volumes and rates will be reduced to existing or predevelopment levels by using measures to slow surface runoff from developed areas and to increase infiltration.

The Design Storms studied were: the 90% rainfall event to determine the Water Quality Volume (WQ_V), the 1-year design storm to analyze Stream Protection (CP_v), the 10-year storm to study Overbank Flood Control, the 25-year storm to comply with local requirements, and the 100-year storm to determine extreme flood control. The design storms studied are 24-hour Type II storm events having rainfall totals of 3.5 (1 yr), 6.0 (10 yr), 6.3 (25 yr) and 8.0 (100 yr) inches.

For purposes of the stormwater study, the proposed project was separated into four development areas. The four areas are called; Highmount Estates, Wildacres Resort with the Highmount Golf Club, Belleayre Highlands and Big Indian Resort and Spa and Big Indian Country Club.

As detailed in DEIS Appendix 9A, stormwater runoff from the proposed development area has been reduced to predevelopment levels. Supporting calculations may be found at the end of this report. Summary tables have been included for the one (1), ten (10) and one hundred (100) year storm. Comprehensive subcatchment, reach and pond data has been included for the twenty-five (25) year storm.

Stormwater impacts, associated with clearing and grading, along with the development of golf holes, roads and buildings have been mitigated. This has been achieved through the use of devices such as swales, roadside ditches, catch basins, pipes and micropool extended detention basins. The stormwater facilities control the twenty-five (25) year, Type II storm event while withstanding the discharge from a one hundred (100) year event.

The micropool extended detention basin designs provide for stormwater control and treatment, while at the same time minimizing standing water to avoid thermal impacts. A design report describing how the proposed stormwater management system complies with the standards in the New York state Stormwater Management Design Manual (NYSDEC, October 2001) is included as Addendum 1 to Appendix 10A .

III.C Stormwater Management Plan – Water Quality

In addition to the analysis of stormwater quantity discussed in the previous section (III.B), a full separate analysis of potential water quality impacts associated with the project was prepared. The analyses and reports assess all aspects of the proposed development from a nutrient loading standpoint. Pollutant loading and stormwater quality management for construction and for operation are discussed in detail in DEIS Appendix 10, "Construction Phase Stormwater Quality Management Plan" and DEIS Appendix10A, "Operational Phase Stormwater Quality Management".

1. Construction Phase

Construction on the Big Indian Plateau is proposed to occur in four phases. The most significant impact associated with all four phases is anticipated to occur during Phase 2, (year two), when construction activity will be the most intense. Accordingly, the greatest anticipated phosphorus load is 32 kg, which constitutes 0.4% of the transferable phosphorus load to the Ashokan Reservoir. This will be an insignificant, short term and temporary impact.

Major construction at Wildacres is proposed to occur in three phases, over three years. Phosphorus export is estimated to be 40.4 kg during year one (Phase 1), 28 kg for year two (Phase 2), and 10.1 kg during year three (Phase 3) (Figure 5 in Appendix 10). The greatest anticipated phosphorus loading, during Phase 1, constitutes only 0.06% of the transferable phosphorus load to the Pepacton Reservoir. This will be an insignificant, short term and temporary impact.

See DEIS Appendix 10 for details.

2. Operational Phase

In order to perform these analyses, a computer model simulation of runoff water quality was completed using WINSLAMM (Windows Source Loading and Management Model).

Section 2 of Appendix 10A describes the model, including the conceptual framework of WINSLAMM's method of stormwater runoff water quality estimation, background data, and assumptions utilized for this report.

The potential water quality impacts have been assessed for the site both in the pre-development condition and for the property at full buildout, which provides the data to assess potential changes in water quality associated with development of the Resort.

The goal of the project's stormwater management program is to manage runoff water quality to reach the lowest possible nutrient or contaminant load, or, at a minimum, to match pre-development stormwater quality. This has been accomplished by locating stormwater management facilities throughout the project site and by maintaining a low density of development that converts only a very small portion of the site to impervious surfaces.

The WINSLAMM modeling of the proposed stormwater management system has closely examined the export of phosphorus and fine tuned the stormwater system to minimize the transport of phosphorus. This fine tuning of detention and stormwater releases balances the need to control phosphorus while minimizing the potential for thermal loading of detained stormwater.

See DEIS Appendix 10A for details.

III.D Water Quality – Golf Course Fertilizer and Pesticide Use

In addition to the stormwater quality management plan for the entire project described in the previous section (III.C), an additional analysis of potential water quality impacts from fertilizer and pesticide use on the two proposed golf courses was also done for this project. This analysis and accompanying report are included in DEIS Appendix 15, "Fertilizer and Pesticide Risk Assessment".

This report contains the results of the site-specific analyses of the potential for adverse environmental impacts that could potentially result from the use of turf fertilizers and pesticides on the proposed golf courses. The analysis was undertaken in order to address concerns pertaining specifically to the impact of golf course management practices on surface water and ground water resources both on and off the project site. Analysis of impact potential consisted of subjecting pesticide and fertilizer applications to rigorous computer modeling in order to predict overland (runoff) transport and vertical (leaching) transport of nutrients and pesticide active ingredients. Model-generated data were then compared to applicable drinking water standards, published toxicology values, and other standards. Use of conservative assumptions throughout the modeling process insured that worst case scenarios were used to generate output data and these data were used to form the basis for fertilizer and pesticide use recommendations on the proposed golf courses.

The computer modeling produced predictions of pesticide concentrations in runoff and from leaching through the modeled soil profiles. It was these "edge of field" or "bottom of profile" concentrations that were used in the Pesticide Risk Assessment. Under actual field conditions these concentrations would be greatly reduced by dilution due to mixing with the receiving surface water or groundwater resources. These dilution factors were not incorporated into the risk assessment to provide a truly worst case analysis. In essence, the risk assessment consisted of, among other things, using undiluted runoff or leachate as potable water for the human health portion of the risk assessment, and using the undiluted runoff concentrations as actual in-stream concentrations for the aquatic life portion of the risk assessment. The fact that the proposed golf courses are separated by significant distances from both potable water resources and local surface water resources was purposefully not included in the risk assessment in order to produce an extremely conservative set of factors upon which pesticide use on the proposed golf courses will be restricted.

Even with the exclusion from use of certain pesticides imposed as a result of the Risk Assessment, all potential pests can still be successfully treated, when absolutely necessary, with an effective product that can be safely used on the proposed golf courses. DEIS Appendix 14, "Integrated Turf Management Plan", describes how the results of the Fertilizer and Pesticide Risk Assessment were utilized to develop the management plans for the two proposed golf courses that is protective of local water quality.

III.E Sediment and Erosion Control

Numerous measures proposed to mitigate potential impacts from erosion and sedimentation have been incorporated into the design of the Belleayre Resort project. DEIS Appendix 11, "Draft Construction Stormwater Pollution Prevention Plan", provides a detailed description of these measures.

Proposed measures are illustrated on the Plan Sheets "Phasing and Erosion Control Plans", (PH-1 through PH-3), the Plan Sheets "Construction Phasing Plans Phase 2 Big Indian Country Club" (CP-1 through CP-18), as well on Plan Sheets "Proposed Grade Slope Analysis Maps" (SA-1 through SA-3).

Central to the construction sequencing and erosion control plan are a number of factors designed to mitigate potential impacts commonly associated with construction projects that involve large amounts of earthwork activities. Namely,

- Perimeter erosion control will be installed on a site-wide basis.

- All of the relatively small individual areas of construction and soil disturbance will have temporary sediment basins designed to capture and hold all runoff from a ten year storm.

- A plan has been developed to treat the runoff water captured in the stormwater basins with an environmentally-friendly flocculent to reduce stormwater turbidity prior to dewatering the stormwater basins. Rapid dewatering of the basins is important so that they are ready to effectively control erosion and sedimentation should storms occur in rapid succession. Reducing the turbidity of the captured stormwater prior to discharge will avoid increased turbidity in surface water resources.

- Temporary stabilization will be widely implemented during the construction process so that the amount of active construction and unstabilized soil never aggregates more than 25 acres at any given time within either reservoir watershed.

- Erosion control measures and practices will be kept in place until the areas that they serve are permanently stabilized.

An analysis of the quality of stormwater runoff entering the temporary construction retention basins was prepared to assess the feasibility of treating the stormwater runoff and to demonstrate the project will conform to discharge limits in the stormwater SPDES permit. This analysis is included DEIS Appendix 10, "Construction Phase Stormwater Quality Management Plan", as well as in DEIS Appendix 11, "Draft Construction Stormwater Pollution prevention Plan". The general permit for stormwater has the following requirements:

- **There shall be no increase in turbidity that will cause a substantial visible contrast to natural conditions**;

- There shall be no increase in suspended, colloidal and settleable solids that will cause deposition or impair the waters for their best usages;

- There shall be no residue from oil and floating substances, visible oil film, globules or grease.

A full-time environmental monitor (Erosion Control Superintendent) will be employed throughout the construction of the project to oversee proper implementation of the sediment and erosion control plans. This Superintendent will be a Professional Erosion Control Specialist certified by the International Erosion Control Association. The Superintendent will have a crew of four to six people on the Big Indian site and four to six people on the Wildacres site whose jobs it will be to constantly monitor and maintain erosion and sediment control measures, including dewatering of sediment basins, maintaining silt fences, overseeing geotextile installation, etc. The superintendent will have complete stop work authority over all contractors, as well as the authority to utilize any and all contractor equipment and manpower necessary to ensure that erosion and sediment control measures are functioning properly and are being maintained to perform as their design intends.

III.F Industrial SPDES Discharge Permit Application

A completed SPDES Industrial Discharge Permit Application for operational phase stormwater discharges is included in the previous subsection of this DEIS Appendix 2. See this application for proposed water quality monitoring locations, testing parameters, and proposed discharge limits.

III.G Attachments

The attachments on the list below are part of the 401 Water Quality Certification Application.*

1. US Army Corps of Engineers Jurisdictional Determination (DEIS Appendix 17)
2. Preconstruction Notification (DEIS Appendix 17A)

2B. Supplemental PCN Information (DEIS Appendix 17B)

3. Construction Phase Stormwater Quantity Management Plan (DEIS Appendix 9)
4. Operational Phase Stormwater Quantity Management Plan (DEIS Appendix 9A)
5. Construction Phase Stormwater Quality Management Plan (DEIS Appendix 10)
6. Operational Phase Stormwater Quality Management Plan (DEIS Appendix 10A)
7. Fertilizer and Pesticide Risk Assessment (DEIS Appendix 15)
8. Integrated Turf Management Plan (DEIS Appendix 14)
9. Draft Construction Stormwater Pollution Prevention Plan (Including NYSDEC Self-Assessment Checklist) (DEIS Appendix 11)
10. Phasing and Erosion Control Plans (LA Group Plan Sheets PH-1 through PH-3)
11. Construction Phasing Plans Phase 2 Big Indian Country Club (LA Group Plan Sheets CP-1 through CP-18)
12. Proposed Grade Slope Analysis Maps (LA Group Plan Sheets SA-1 through SA-3)
13. Individual SPDES Permit Application (Also included in DEIS Appendix 2)

* ***These attachments are incorporated by reference.***

IV. Lists of Permits Required for the Belleayre Resort Project

The following is a list of permits and approvals required for the proposed project at the local, county, regional, state and federal levels.

Local

Town of Shandaken
- Special Use Permit
- Site Plan Approval
- Subdivision Approval

Town of Middletown
- Special Use Permit
- Site Plan Approval
- Subdivision Approval

Ulster and Delaware County

Health Department (Ulster only)
- water supply
- wastewater disposal
- food service
- hotels
- swimming pools
- subdivisions

Bridges and Highways
- road improvements and driveways

Planning Department
- comments and recommendations to local Boards

Regional

NYCDEP
- Wastewater Treatment Plant and Subsurface Disposal
- Stormwater Pollution Prevention and Impervious Surfaces

State

NYSDEC
- Streambank Disturbance
- wastewater disposal
- water supply, Big Indian Plateau and Wildacres Resort
- SPDES Stormwater Discharge From Construction
- SPDES Industrial Discharge from Operations
- Petroleum Bulk Storage
- Chemical Bulk Storage
- Water Quality Certification
- Public Water Supply Permit modification for Village of Fleischmann's

NYSDOH

- water supply
- wastewater disposal
- food service for Delaware County portion
- hotels
- swimming pools
- subdivisions

NYSDOT

- NY Route 28 improvements

NYS Office of Parks Recreation and Historic Preservation

- Cultural Resources Consultation

Federal

US Army Corps of Engineers

- federal wetlands (issued July 18, 2003)

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