

**HYDROGEOLOGIC AND
WATER SUPPLY ASSESSMENT REPORT
THE KNOLLS OF DOVER DEVELOPMENT
TOWN OF DOVER, NEW YORK**

Prepared For:

Coalition For The Responsible Growth Of Dover

June 2009

Prepared By:

LEGGETTE, BRASHEARS & GRAHAM, INC.
Professional Ground-Water & Environmental Engineering Services
4 Research Drive, Suite 301
Shelton, CT 06484

TABLE OF CONTENTS

	<u>Page</u>
INTRODUCTION	1
Proposed Project	1
Water Demand Estimate	1
Groundwater Exploration	2
Well Monitoring Program	4
Discharge Water	6
Wetland/Stream Monitoring	6
Water Quality	7
Surface-Water Supply Source	9
Water Budget Analysis	12
Swamp River Base - Flow Analysis	13
Onsite Environmental Concerns	14
Water-Supply Source Adequacy	14

**HYDROGEOLOGIC AND
WATER SUPPLY ASSESSMENT REPORT
THE KNOLLS OF DOVER DEVELOPMENT
TOWN OF DOVER, NEW YORK**

INTRODUCTION

On behalf of the Coalition For The Responsible Growth Of Dover (CRGD), Leggette, Brashears & Graham, Inc. (LBG) has reviewed the Draft Environmental Impact Statement (DEIS) for the Knolls of Dover project, dated March 30, 2009. Our review is specific to the hydrogeologic and water-supply section of the DEIS.

Our summary and comments specific to the hydrogeologic and water-supply sections are as follows and are subsequent to the testimony provided at the June 3, 2009 public hearing. The summary of the statements in the DEIS is generally presented in regular type and our comments are in italics.

Proposed Project

The Knolls of Dover project as proposed, plans to develop 1,376 residential units with approximately 245,800 square feet of commercial and community service uses on the 853-acre Harlem Valley Psychiatric Center (HVPC), both in the hamlet of Wingdale and Town of Dover, New York.

Water Demand Estimate

The following summarizes the water demand estimate included in the DEIS (Section 111.0-7, Table 111.0-1). The total water demand for the residential, commercial, community and clubhouse is estimated to be 514,360 gpd (357 gpm). The irrigation for the common areas (27,150 gpd) and golf course (190,050 gpd) total about 217,200 gpd or about 151 gpm. *LBG concurs with the water demand estimates included in the DEIS, however, considering the significance of the water demand estimated, a concurrence and confirmation letter should be required by the applicant from the Dutchess County Department of Health (DCDOH) and included in the FEIS.*

The applicant is proposing to utilize graywater reuse for the golf course irrigation. This would take about 190,050 gpd of treated effluent from the Wastewater Treatment Facility. *The*

DEIS does not define if the common area irrigation demand (27,150 gpd) will be developed from the public water supply source or from graywater use. The FEIS must define the source of water for the common area irrigation. The Town should encourage graywater reuse for all irrigation demands of the project.

As proposed, if the graywater reuse is approved by the NYSDEC, the NYSDOH would require that the available water-supply source for the proposed development equal or exceed twice the average daily (peak) water demand estimate for the residential, commercial, community and clubhouse with the best well out of service. The applicant would be required to only meet the average water for the irrigation component (217,200 gpd). This would require the applicant to demonstrate 1,028,720 gpd or about 714 gpm with the best well excluded. This is not specifically defined in the DEIS and further support documents included in the DEIS contradicted this requirement. To be frank, the water-supply plan is not clearly defined.

The SSEC Aquifer Testing Protocol dated November 7, 2008 and approved by the Town states the goal of the test is to pump a combined rate at twice the average daily demand with the best well out of service for a minimum of 72 hours.

Further, the DEIS/SSEC reports indicate the project goal is to meet the peak water demand of the project. The DEIS/SSEC report the peak water demand to be 1.7 times the average water demand of the project. The DE reports the peak demands at “twice the average water demand” of the project. Present regulatory guidelines indicate unless historical water demands are available, peak water demands are assumed to be twice the estimated water demand. This must be clarified and become consistent in future documents (FEIS).

Groundwater Exploration

The groundwater exploration program completed to date by the applicant (and included in the DEIS) reports 17 test borings have been drilled of which 16 were converted into test wells. The applicant’s project team decided to exclude seven successful test wells due to the distance from the proposed water distribution system and close proximity to offsite wells (potentially resulting in offsite impacts). The groundwater supply sources are discussed in detail in the supporting document prepared by SSEC dated February 2009. To date, seven test wells have been tested as follows.

Two separate simultaneous pumping test events were conducted by SSEC in November/December 2008. The November test included Wells 4, 9, 15B and 18 and the

December test event included Wells 10A and 11A. The reported stabilized yields and drawdown are as follows:

PUMPING TEST RESULT SUMMARY				
Well	Pumping Rate (gpm)	Test Duration	Stabilization	Projected Yield (gpm)
4	40	72 hours	24 hours+	40
9	100	72 hours	8 hours	100
10A	40	72 hours	8 hours	40
11A	60	72 hours	6 hours	60
15B	400-175	72 hours	12 hours*	140*
18	250	72 hours	60 hours	250+

* Constant head test (pumping rate stabilization), yield reduced by 20 percent.

The hydrographs in the report appear to indicate the yield and drawdown had stabilized for the last 6 hours of the tests or in some wells significantly more than the 6 hours which is required by the regulators. However, the scale of the hydrographs presented in the SSEC report are small (less than page size) with no supportive water-level reading included as an appendix and, therefore, it does not allow review to determine if the conclusions in the DEIS are supported by the data. The applicant should be required to provide the reported yield and water level readings for the pumping wells during the respective test events to allow an independent review of the safe yield conclusions in the DEIS. Similarly, the recovery data of the wells appears acceptable, however, the post-test water-level readings should be provided to demonstrate that acceptable recovery data was achieved during the testing event and verify the claim that there are no storage depletion effects from the groundwater withdrawals.

The pumping test procedure for Wells 4, 9, 10A, 11A and 18 used a constant rate approach, but Well 15B used a constant-head (forced stabilization at the pump intake). The Town should request the applicant obtain concurrence of acceptance of the type of testing method from James D. Garry, Senior Engineering Geologist, NYSDEC (jdgarry@gw.dec.state.ny.us). The constant-head test appears to demonstrate a stable yield for Well 15B but the stable water level is forced under this method. It is our understanding this method does not comply with the NYSDEC guideline to demonstrate a stable yield and pumping water level for the last six hours of the test. (Recommended Pumping Test Procedures for Water Supply Applicants, NYSDEC, August 2000) The data from the pumping test on Well 15B may be inconsistent with the methodology required for the water supply permit from the NYSDEC and

thus should not be used in the FEIS, absent confirmation of acceptance of the methodology from the NYSDEC.

Wells 11A and 15B reported a significant loss in yield from the original yields reported at completion of drilling to the safe yields reported from the respective test events. Well 11A was reported to yield 200± gpm at completion of drilling and reported a safe yield of only 60 gpm; Well 15B was reported to yield about 300± gpm at completion and is reported to have a safe yield of 140 gpm. The fracture in these wells was reported to have been filled with fine sand material following drilling which plugged significant water-bearing fractures and consequently reduced the yield of the wells.

The concern is the potential for this to continue over time and further reduce the yield of these two wells and other wells completed in the Stockbridge Marble. The significant reduction in safe yield could indicate long-term issues with the sustainability of the wells. The applicant should address this concern and demonstrate that the wells are unlikely to experience further significant reductions in their safe yield capacity. To mitigate the risk, the applicant should identify the locations for future wells that may be needed in the event of loss of production from the wells. The DEIS does not include the well completion reports for the onsite test well completed to date. This should be provided as support information in the FEIS.

The NYSDOH requires a 100-radius of ownership and a 200-foot radius of sanitary control from public water-supply wells. The FEIS should demonstrate compliance with these requirements with site plans showing the buffer areas around all proposed well sites, including areas reserved for future wells. In addition, before accepting the FEIS, the Town should require the applicant to obtain a letter from the DCDOH confirming the proposed wells are acceptable as public water supplies.

Well Monitoring Program

During the two separate 72-hour pumping test events, a well monitoring program was conducted which included onsite test wells and offsite domestic wells. The SSEC report discusses the solicitation of offsite homeowners in detail. The pumping test plan was submitted to the Town for approval prior to execution. The purpose of the well monitoring program was to determine if the pumping of onsite wells at pumping rates exceeding the average water demand of the project would significantly affect water levels and/or yields of existing neighboring wells. SSEC also installed two piezometers into the Swamp River wetland feature, closest to onsite

pumping wells, to determine any hydraulic connection between the bedrock aquifer and the wetland/surface-water feature under pumping conditions.

The onsite monitoring included only four onsite wells, however, the wells were in strategic locations as follows:

- MW-16: southwest side of the property
- MW-1: north-central portion of the property
- MW-2: northern portion of the property
- MW-13: located near Well 18

The wells (MW-16, 1, 2) are located within close proximity of offsite homeowner wells with the exception of MW-13. The data presented on the hydrographs in the DEIS for MW-16, MW-1 and MW-2 indicate no discernible water-level interference effects from the pumping test events. The pumping test with the most merit to indicate the potential of offsite impacts was the first test on Wells 4, 9, 15B and 18, which pumped a combined yield of 565 gpm, about 1.6 times the average water demand (357 gpm) of the project. The second test on Wells 10A and 11A only pumped a combined yield of 100 gpm, significantly less than the average water demand of the project.

It is assumed that MW-1, MW-2 and MW-16 are completed in the bedrock aquifer, the applicant should confirm the aquifer that these wells are completed in.

Onsite MW-13 is completed in the sand and gravel aquifers located south of Well 18 and north of Well 15B. This well reported 30 feet of drawdown during the test and demonstrates a direct hydraulic interconnection between the bedrock aquifer and the sand and gravel aquifer. This would further indicate the potential impacts to wetland/surface-water feature from the proposed groundwater withdrawals (Wells 15B/18). This would be concluded from piezometer(s) installed in wetland or surface water feature within close proximity to Wells 15B and 18 and monitored for impacts during the respective tests. The FEIS must address this concern and provide support data that the wetland/surface-water feature will not be impacted within close proximity of Well 15B/18. This would require demonstration that piezometers were installed within 200-500 feet from Well 15B/18 and monitored during the respective test events. The location of the piezometers installed for the testing included in the DEIS/SSEC reports and relationship to pumping Wells 15B/18 is not discussed to eliminate potential concerns of impacts to wetland/surface water features.

Figure 1 in the SSEC report is not provided in a legible scale to locate onsite/offsite wells and determine separation distance from pumping wells. The figure should be redrafted in a clearly legible and workable scale (FEIS).

The hydrographs for the eight offsite homeowner wells indicate water-level changes from pumping for their own water use and show no discernible water-level interference effects from the pumping test events with the exception of three wells. The Hough-Evans, Stra and Yeno apartment wells indicate about 9, 5 and 3 feet of drawdown from the first pumping test event (Wells 4, 9, 15B and 18). The DEIS indicates the water-level interference effects are minimal and will not adversely impact the yield of these wells. Subject to review of the missing or illegible data, LBG generally concurs with the statement in the DEIS regarding offsite wells. However, LBG recommends:

- It is recommended that the Town require additional operational monitoring take place once the wells go online, or if additional pumping tests are conducted. This additional monitoring will include a representative number of offsite wells indicating water-level interference during recent pumping tests (2008) to determine any significant impacts, if any under normal operation of the proposed well source to meet the water demands of the project. The future monitoring program should be continued until two years following full build-out of the proposed project. LBG further recommends the applicant draft a Complaint Response and Remediation Plan to be included in the FEIS.*

Discharge Water

The DEIS does not document the discharge locations of groundwater from the wells during the test events. The FEIS should include a map and discussion of the groundwater discharge locations. This would be important to confirm if groundwater discharge effected downgradient piezometer(s) data and to confirm the groundwater discharge from the test events was not allowed to recirculate and recharge the aquifers.

Wetland/Stream Monitoring

The pumping test events included the monitoring of two piezometers in the Swamp River. High resolution data loggers were installed inside the piezometers to monitor the interior (deeper streambed water level) and one on the outside to measure the level of the steam. The

chart (hydrograph) in the DEIS does not indicate any difference between the interior and exterior water level. This would indicate a neutral gradient and indicates there is no exchange during the monitoring event. While possible, this typically does not occur in this type of geological setting.

Hand water-level measurements and the logger data should be included in the FEIS to support the findings presented. Absence of the data does not allow the DEIS to support the conclusion of no impact to wetland/surface water features from the proposed ground-water withdrawals.

Water Quality

The water-quality sample results for Wells 4, 9, 10A, 11A, 15B and 18 have been reviewed. The samples were collected from the wells near the end of the respective pumping test events for the required parameters specified by the NYSDOH Subpart 5.1 for public water supplies.

While the wells meet a majority of the NYSDOH drinking water standards, there were instances of exceedences of the standards that cannot be ignored lightly and may require filtration and treatment of the water supply. As discussed below, additional sampling should be performed to confirm or resolve the water quality concerns.

Positive total coliform results were reported in Wells 4, 9 and 15B. These wells should be disinfected and resampled.

Elevated turbidity levels were reported in Wells 9, 11A, 15B, and 18. The turbidity in Well 9 was reported to be 3.8 NTU (nephelometric turbidity units), in Well 11A turbidity was 1.7 NTU, in Well 15B turbidity was reported at 15 NTU, and in Well 18 turbidity was 18 NTU. These values are in exceedance of the monthly average MCL (maximum concentration level) of 1 NTU. These wells should be pumped for further development and resampled to determine if filtration will be required. Wells 11A and 15B were completed in Stockbridge Marble and as reported above, produce significant material from the water-bearing fractures and as noted, these features allegedly became plugged by this material following drilling, reducing the yield potential of these wells significantly.

Iron concentrations in exceedance of the MCL of 0.3 mg/l (milligrams per liter) were reported in Wells 9, 15B, and 18. The iron concentration in Well 9 was reported at 0.485 mg/l, in Well 15B at 0.361 mg/l, and in Well 18 at 1.55 mg/l. The elevated iron concentrations may be

the result of the elevated turbidity concentrations also reported for these wells. The wells should be pumped and resampled for iron to determine if filtration will be required.

Color values in exceedance of the MCL of 15 units were reported in Wells 15B and 18 at 20 units each. The color may be the result of the elevated turbidity and iron concentrations also reported in these wells. The wells should be pumped and resampled for color to determine if treatment will be required.

Elevated radium 226 and 228 was reported in the sample collected from Well 4. The MCL for combined radium 226/228 is 5 pCi/l (picocuries per liter). The combined radium 226/228 result for Well 4 was 5.04 pCi/l. Well 4 should be resampled for radium 226 and radium 228 to confirm the results.

Toluene was reported at a concentration of 1.1 ug/l (micrograms per liter) in Well 4. The presence of the toluene may be the result of the use of electrical tape in the well as part of the installation of the well pump. The result is below the MCL of 5 ug/l; however, Well 4 should be resampled for toluene prior to being placed in service to confirm the result.

Tetrachloroethene was reported at a concentration of 1.9 ug/l in Well 10A. In addition, trichloroethene was reported at a concentration of 0.4 ug/l with a qualifier from the lab that the value was estimated because it was below the quantitation limits of the analytical method. Both of these constituents, which are components of dry cleaning fluids, were reported at concentrations below the MCL of 5 ug/l. The detections may have been the result of laboratory contamination of the sample; however, potential sources of the constituents in the neighboring area of the property should be reviewed and the wells should be resampled for these constituents to confirm the results.

MPA (microscopic particulate analysis) samples were also collected from Wells 4, 9, 10A, 11A, 15B and 18. Plant debris and/or algae exhibiting chlorophyll fluorescence was reported in the samples collected from Wells 10A, 11A, and 18. In addition, the laboratory report for Wells 9 and 15B reported that "copious amounts of debris may have prohibited identification of organisms containing chlorophyll". Further, as discussed above, a monitoring well (MW-13) completed in the sand and gravel aquifer within close proximity to Wells 15B and 18 reported about 30 feet of drawdown indicating a direct hydraulic connection between the bedrock and the sand and gravel aquifer. The hydraulic interconnection and positive MPA results for Wells 15B and 18 are further evidence of the potential impacts to the wetland and surface water feature adjacent to these wells (15B/18) and higher risk concerns that these wells

are GWUDI. The presence of chlorophyll fluorescent organisms in the samples from Wells 10A, 11A and 18 are indicative of GWUDI (groundwater under the influence of surface water). LBG recommends that a GWUDI study be completed on the wells to determine if the wells are at high risk of GWUDI and if filtration will be required; or the applicant accepts the potential GWUDI designation and specifies treatment.

Additional MPA samples should be collected from Wells 9 and 15B also to provide clear results concerning the potential for GWUDI. Both wells reported elevated turbidity levels; therefore, the wells should be pumped to clear the turbidity prior to the resampling.

Based on the negative result from the MPA sample on Well 4, no additional sampling of this well is recommended.

It is assumed that since MPA samples were collected from the wells that there are surface-water features located within 200 feet to 500 feet of the wells. If this is the case, piezometers should have been installed in the surface-water features during the pumping tests for water-level measurement collection to determine potential interconnection between the surface-water feature and groundwater under pumping conditions. No piezometer water-level data was contained in the SSEC report.

In addition, if MPA samples were collected from the wells, temperature and conductivity measurements should also have been collected from the well's discharge water and surface water (Swamp River), or any other wetland/surface water features present in the vicinity of the wells during the pumping tests. The collection of temperature and conductivity measurements would be used in conjunction with the MPA data for determination of potential GWUDI, and potential impacts to the surface water and wetland features.

Corrosivity analyses were not included in the water-quality results provided for the wells. These values will be important in the design of the water system, should the water be reported as corrosive. The resampling of the wells should include corrosivity.

Surface-Water Supply Source

The existing water-supply source for the project site is developed from an onsite reservoir and treatment plant for the HVPC complex. The present water demand is low (30,000 gpd) and supplies existing building and facility as defined in the DEIS (111.0-6 and 7).

The support document in the DEIS related to the surface-water supply source and Water Treatment Facility was prepared by Delaware Engineering, P.C. (DE) and dated November 21, 2008. The following summarizes the significant findings in the report.

- The onsite surface-water supply source and treatment plant were developed in the early 1900's as a public water supply source. The dam was developed in the early 1900's to create the upland reservoir and is currently still in place. The existing water treatment facility was designed to treat approximately 1.2 mgd. The surface water supply source included taking from the reservoir and the Swamp River.
- The age/condition of the existing water treatment facility will require moderate degrees of improvements, as proposed. The improvements are detailed in the report prepared by DE.
- The timing and level of improvements as proposed by the applicant for the water treatment plant will be supported by the build-out in phases of the project and water demand requirements.
- The DE report estimates the safe yield of the reservoir to be about 0.93 mgd, under normal precipitation conditions. *The safe yield under drought conditions is not provided.*
- As discussed previously, surface-water takings to meet peak water demands of the facility includes withdrawals from the Swamp River. The DEIS/DE report discusses the potential taking from Swamp River or Tenmile River. *The applicant did not conduct a safe yield estimate for the Swamp River, however, it did provide a previous estimate from Gray, Railing and Heinsman, P.C. from a 1993 report which indicates a safe yield of 250,000 gpd and determined the volume in the Swamp River to be unreliable. No safe yield taking from the Tenmile River is included in the DEIS documents.*
- The DEIS/DE report states that hospital records indicate that during dry weather periods at full population and demands of up to 0.6 mgd without taking from the Swamp River, the reservoir's water surface dropped, such that the banks eroded and raw water quality deteriorated creating operational issues within the filtration facility. The historical research also indicated that a drop in the reservoir elevation of 10 feet has been a concern.
- Depending on the initial water demand, the new water treatment facility would be designed to provide between 0.25 and 0.5 mgd of potable water. This is being proposed as a back-up water-supply source by the applicant. The applicant is proposing to meet the initial phase of development solely by the groundwater sources.

The DEIS/DE reports the safe yield of the reservoir to be about 0.93 mgd and uses an average annual rainfall of 50 inches. The Tenmile River watershed typically receives approximately 44 inches (Chazen 2006) of annual precipitation which would, according to their formula, indicate a safe yield of the reservoir to be about 0.82 mgd in an average yield. The average drought precipitation is approximately 69 percent of average annual precipitation which indicates a reduced safe yield of about 0.56 mgd, under drought events. Therefore, it appears that typical rainfall in the Tenmile River watershed will not support the safe yield calculations included in the DEIS.

The safe yield in the DEIS does not consider loss components which include evaporation from the lake surface and seepage out of the reservoir. Incorporation of these components in the safe yield evaluation would further reduce the safe yield estimate. The FEIS should include a more representative safe yield of the reservoir including the loss components as follows:

- *hydrographic survey of lake to verify existing storage capacity;*
- *precipitation on lake surface;*
- *evaporation from lake surface;*
- *net ground-water flux into lake;*
- *overland flow; and*
- *stream flow (in/out).*

As discussed above, previous taking from the reservoir to meet demands of about 0.6 mgd without taking from the Swamp River, the reservoir's water surface levels dropped, such that the banks eroded and raw water quality deteriorated creating operational issues within the filtration facility. The historical records also indicate that the drop in the reservoir elevation of 10 feet has also been a concern. This indicates the safe yield of the reservoir is less than 0.6 mgd and supports a further evaluation of the safe yield by the applicant as noted above.

The DEIS is not clear if taking from either the Swamp River or Tenmile River is proposed to augment the reservoir source. This must be clarified (FEIS) and the safe yield and potential impacts must be addressed. It is unlikely considering the Critical Environmental Area designation in the study watershed that taking from the Swamp River will be permitted by the regulatory agencies (NYSDEC).

Depending on the initial water demand, the new water treatment facility would be designed to provide between 0.25 to 0.5 mgd of potable water. This is being proposed as a

back-up supply source by the applicant, with the proposed well supply source being the lead supply. The applicant is thus proposing to meet the initial phases of development solely by the groundwater source. If this continues to be the plan as the applicant progresses, a much more detailed engineering, safe yield, cost feasibility and regulatory review should be conducted as a supplemental study is released for public review. Further, any final approvals of this project must be conditional that the applicant receive all regulatory permits (NYSDEC) and approvals (DCDOH/NYSDOH) for the development of the proposed surface-water supply.

The phased development of the overall project and water-supply plan to meet the water demands and regulatory requirements is not defined in the DEIS. Therefore, the adequacy of the available water-supply sources developed to date to meet the phase development cannot be determined.

Water Budget Analysis

A ground-water balance compares the available recharge to a property with the estimated water-supply demand of a proposed development. This comparison determines if the property is self-sufficient in providing the water that will be required by the proposed development, or whether the proposed water demand exceeds the available recharge. If the projected demand exceeds the estimated available recharge, periodically ground-water recharge would have to be drawn from beyond the property boundaries. For sites with planned new development, water availability within the watershed becomes important to determine if the proposed demand would oversubscribe the available resources. If onsite recharge meets or exceeds the proposed demand, the water supply should be reliable and not adversely affect the aquifer in offsite areas. Although water-budget analyses are useful in estimating available ground water resources, drilling and testing supply wells is the only definitive indicator and confirmation of ground water availability from the aquifer source and any potential impacts to neighboring water supplies.

The DEIS/SSEC report based on the Chazen Model (Chazen 2006) apply site-specific groundwater recharge rates to the bedrock aquifer and it is estimated to be about 0.81mgd or about 561 gpm. Under drought conditions (30% reduction) recharge would be about 0.56 mgd or about 392 gpm. Recharge estimates exceed the estimated water demand (357 gpm) under normal precipitation conditions and marginally meet the demands under drought conditions. *LBG concurs with the Chazen Model recharge estimates presented in the DEIS.*

However, the additional recharge estimate approach completed by SSEC is flawed for the following reasons.

1. The monthly recharge estimates provided by the applicant (table 3) are flawed because of the use of a constant arbitrary runoff rate for each month. Runoff also changes through the year. Therefore, the applicant should use a different runoff value for each month. Runoff can be estimated using data for USGS stream gauges and NOAA weather stations located near the study area.

2. To ensure that the proposed withdrawal will be sustainable during a prolonged dry period, recharge data from table 3 should also be corrected for drought conditions.

3. The applicant needs to correct several math errors observed on table 3.

Swamp River Base - Flow Analysis

Based on our review, the data presented in the DEIS for Swamp River Base – Flow Analysis is flawed for the following reasons:

1. The applicant needs to document the flow duration for the stream flow data used in the analysis. Especially considering only one measurement was documented at each of the gauging locations. This can be done by correlating the measure flow with data from continuous USGS gauges located near the study area. Once the relationship between the document monitoring locations and the USGS gauge(s) has been established the 90% flow duration should be utilized to assess the potential impact that the Knoll of Dover withdrawals may have on the flow of the river during drought conditions.

2. The applicant needs to correct the unit conversion problem documented in table 4.

3. The contribution of the Knolls of Dover property to Swamp River base flow should be calculated using the properties area percentage of the Swamp River drainage basin at the Chipewalla Road gauging location (approximately 17.28 square miles).

Onsite Environmental Concerns

One comment is provided at this time regarding the scoping document requirement to “include-monitoring wells between any site contamination areas and pumping wells” during onsite pumping test event. Onsite and offsite well monitoring was conducted during the test events however, the relationship of the monitoring well in regards to onsite contamination areas is not discussed in the DEIS. This should be addressed by the applicant in FEIS.

A review of the conclusions presented in the DEIS-Phase I Environmental Site Assessment (Freudenthal & Elkowitz Consulting Group, Inc., dated December 2008) indicated the following concerns related to onsite groundwater impacts from onsite sources.

- *“numerous” onsite dump sites, landfill sites including ash fill and spills are documented to have impacted onsite groundwater. Furthermore, a number of areas of concern have not been investigated to date. The DEIS does not address the potential impacts noted above to the onsite groundwater supply source, if any. In addition, no specific onsite monitoring is included in the DEIS related to the onsite contamination areas and test events. Well 18 appears to be completed in an area of ash fill.*

The applicant must address the potential of impacts from the onsite contamination sources to the proposed water-supply sources. All known contaminant sources should be clearly delineated on a map with the proposed ground-water sources and the reservoir site included. Failure to include this information in the DEIS as required by the Final Scope, precludes the public from reviewing the information. This information should be submitted in a supplemental form to permit public comment.

Water-Supply Source Adequacy

As proposed, if the graywater reuse is approved by the NYSDEC, the NYSDOH would require that the available water-supply source for the proposed development equal or exceed twice the average daily (peak) water demand estimate for the residential, commercial, community and clubhouse with the best well out of service. The applicant would be required to only meet the average water for the irrigation component (217,200 gpd). This would require the applicant to demonstrate 1,028,720 gpd or about 714 gpm with the best well excluded.

The combined yield of the six wells completed to date is about 630 gpm, excluding the best well (Well 18) the combined yield is reduced to 380 gpm. Considering the groundwater supply sources solely, the wells are deficient by about 334 gpm to meet the above noted regulatory guidelines. The applicant proposes to develop the onsite surface-water supply source as the back-up supply source. The DEIS/DE report depending on the water supply's deficiencies will require the new water treatment plant to be designed to provide between 0.25 to 0.5 mgd of potable water. The present water-supply deficiencies of the existing well supply source to meet regulatory guidelines would require the new treatment plant to produce a minimum of 0.48 mgd to meet the regulatory requirements. Such findings and support of adequacy/feasibility for developing of the surface-water supply source to meet such demands/regulatory requirements must be provided as supplemental study and released for public comments. Further, the DEIS/SSEC reports indicate the project goal is to meet the peak water demand of the project. The DEIS/SSEC report the peak water demand to be 1.7 times the average water demand of the project. The DE reports the peak demands at "twice the average water demand" of the project. Present regulatory guidelines indicate unless historical water demands are available, peak water demands are assumed to be twice the estimated water demand. This must be clarified and become consistent in future documents (FEIS). If the applicant is going to present the 1.7 times the average water demand as the peak water demand, a variance letter must be received from the NYSDOH/DCDOH. Finally, the DEIS does not discuss the requirement of exclusion of the "best well" to determine water-supply adequacy and the FEIS must incorporate such findings in future water supply adequacy evaluations for the proposed project.

LEGGETTE, BRASHEARS & GRAHAM, INC.



Thomas P. Cusack, CPG
Senior Vice President



TPC:cmm

June 26, 2009

H:\Dover Knolls\Hydro Water Supply rpt.doc