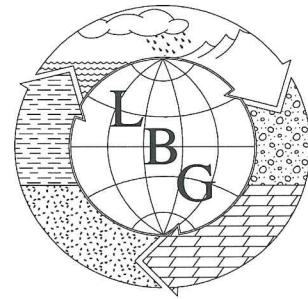
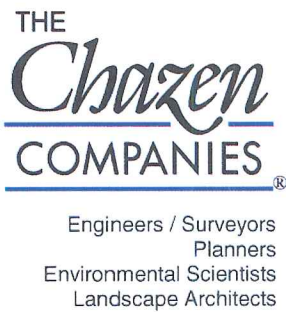


Water Budget Report for the Combined Irrigation Pond ~~and Island Green Pond~~

## SILO RIDGE RESORT COMMUNITY

Town of Amenia  
Dutchess County, New York

June 6, 2008  
August 21, 2014



Prepared for:

~~Millbrook Ventures~~ Silo Ridge Ventures, LLC  
5021 Route 44  
Amenia, NY 12501

Water Budget Report for the Combined Irrigation Pond ~~and Island Green Pond~~

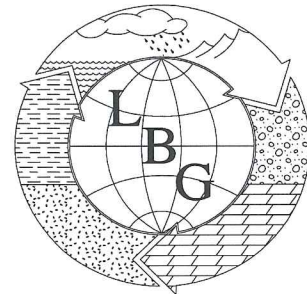
## SILO RIDGE RESORT COMMUNITY

Town of Amenia  
Dutchess County, New York

~~June 6, 2008~~  
August 21, 2014



Engineers / Surveyors  
Planners  
Environmental Scientists  
Landscape Architects



Prepared by:

Chazen Engineering, Land Surveying & Landscape Architecture Co., P.C.  
547 River Street  
Troy, NY 12180  
(518) 273-0055

&

LEGGETTE, BRASHEARS & GRAHAM, INC.  
Professional Groundwater and Environmental Engineering Services  
4 Research Drive, Suite 301  
Shelton, CT 06484

*Dutchess County*  
(845) 454-3980

*Orange County*  
(845) 567-1133

*Capital District*  
(518) 273-0055

*North Country*  
(518) 812-0513

*Connecticut*  
(860) 440-2690

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## 1.0 EXECUTIVE SUMMARY

### 1.1 Introduction

~~Higher Ground Country Club Management Co. L.L.C.~~ Silo Ridge Ventures, LLC is proposing the improvement of the existing Silo Ridge Country Club (hereinafter referred to as the “project site”) into a resort community which, will include clubhouse with 21 lodge units and restaurant and bar/lounge; Golf academy; Golf Maintenance Facility; 224 residences which included 52 condominium, 13 town home units and 159 single family homes; winery restaurant; Family Activity Barn; Sales Center with General Store; and a fitness spa, as well as an improved golf course. under the “Master Development Plan”, will include 278 town home units, 60 single family homes, a 300-unit hotel, a banquet space, two restaurants, a winery, a conference space, a spa and wellness center as well as an improved golf course. The purpose of this report is to present the methodologies and results of a water budget analysis performed for two ponds used for irrigation purposes and located in the central portion of the project site.

### 1.2 Methodology & Analysis

Monthly water budget calculations were performed for the proposed Combined irrigation ponds under three climate scenarios (dry year, normal year, and wet year) and two irrigation scenarios (golf course grow-in and established).

The inflows considered were direct precipitation, stormwater runoff, groundwater contributions, stream flows, ~~and treated wastewater~~ and well water supplements. The outflows considered were evapotranspiration, surface discharge, and irrigation usage.

### 1.3 Conclusions

During the golf course grow-in and established landscape periods, the capacity of the Combined irrigation ~~p~~Ponds should be adequate to meet the irrigation demands under the normal and wet year scenarios. During a dry year, the irrigation ponds may not be capable of supplying 100 percent of the grow-in and established landscape irrigation demands during the peak water usage months of July and August. Under the dry conditions Silo Ridge will implement water conservation measures to reduce irrigation water usage to maintain pond water-level elevations at acceptable levels. ~~Once the golf course and common landscaped areas are established, the irrigation ponds should have adequate capacity to supply 100 percent of the irrigation needs under any climate scenario.~~

~~The recycling of treated wastewater effluent from the proposed waste water treatment plant into the irrigation ponds is not expected to significantly increase the water surface elevation or flow rates within the NYSDEC wetland AM-15, located to the southeast of the irrigation pond.~~

## 2.0 WATER BUDGET METHODOLOGY

### 2.1 General Principles

A water budget can be described as an accounting of water gains (inflows) and water losses (outflows) from an open system over a fixed period of time. If the amount of water stored in the system at the start of the time period is known, then one can calculate the amount of water stored in the system at the end of the time period by adding the inflows to, and subtracting the outflows from, the amount of water stored at the start of the time period. Several time periods can then be analyzed in series, such that the water stored at the end of one time period becomes the water stored at the start of the next time period. In this water budget analysis, the basic time period is one month.

A water budget analysis was performed for several scenarios, as described in Sections 2.2 and 2.3 of this report. For each scenario, calculations were performed for a 12-month period, running from January through December.

### 2.2 Climate Scenarios

In order to gain an understanding of the functioning of the irrigation ponds under a wide range of climatic conditions, three climate scenarios were considered: dry year, normal year, and wet year.

In order to obtain precipitation data for the three scenarios, historical data was consulted. ~~The National Oceanic and Atmospheric Administration (NOAA) calculates climate normals based on a 30-year rolling historical data set. The current data set runs from 1971 through 2000 (once data for 2010 is available, the data set will be updated to run from 1981 through 2010).~~ Data from the Albany International Airport weather station from the years 1981 through 2012, which is available in publications from the NOAA web site, was chosen because it is the closest major weather station to the subject site.

Precipitation data for each year in the current data set was analyzed in order to select years that would be representative of the three desired climate scenarios. Representative years were selected based on their annual rainfall totals, and based on the distribution of rainfall throughout the year. Years with "abnormal" rainfall distributions, such as one or two very wet months in an otherwise dry year, were deliberately not selected. The following table presents the three years selected, as well as their respective annual precipitation totals.

**Table 1: Climate Scenario Year Selection**

| Climate Scenario | Year                        | Total Precipitation           |
|------------------|-----------------------------|-------------------------------|
| Dry Year         | <del>1985</del> <u>2001</u> | <del>29.95</del> <u>25.91</u> |
| Normal Year      | <del>1974</del> <u>2004</u> | <del>38.47</del> <u>37.31</u> |
| Wet Year         | 2000                        | <del>46.92</del> <u>42.60</u> |

## 2.3 Irrigation Scenarios

A golf course requires significantly more water during the “grow-in” phase than once the turf is established. For this reason, both grow-in and established scenarios were considered in this water budget analysis. When combined with the three climate scenarios described above, this brings the total number of scenarios considered to six.

## 2.4 Description and Modeling of Irrigation Ponds

The Silo Ridge Country Club ~~currently-previously withdrew~~ draws water from a system of two ponds to irrigate the existing golf course. These ponds, located in the central portion of the project site, are referred to in this report as the “Island Green Pond” and “Irrigation Pond”. Historically, these two ponds have been able to support the irrigation needs of the existing golf course, and no supplemental water has been required from any source, including existing on site wells. Under the proposed golf course redesign, the Island Green Pond and the Irrigation Pond will be joined to form one large, combined pond referred to in this report as the “Combined Irrigation Pond”.

The Island Green Pond is a NYSDEC Class C pond, NYSDEC #1122. It receives inflow from a single unnamed, unclassified small stream, which enters the pond through a submerged culvert. An 18-inch outflow culvert (invert 508.80) drains to the Irrigation Pond and controls the maximum water surface elevation (that is: the maximum water surface elevation outside of a significant storm event, which may temporarily raise the water surface elevation even further.) A secondary outlet pipe (invert 502.50) controls the minimum water surface elevation in the pond. This secondary outlet also drains to the Irrigation pond, and can be manually open or shut with a valve.

The Irrigation Pond is a NYSDEC Class C pond, NYSDEC #1121. It receives inflow directly from the Island Green Pond. An overflow weir (invert 506.00) controls the maximum water surface elevation. Irrigation water ~~is-was~~ drawn from a wet well hydraulically connected to this pond, with the wet well equalization pipe (reported invert 496.00) controlling the minimum water surface elevation in the pond.

The valve-controlled pipe between the two ponds ~~allows-allowed~~ the golf course operators to transfer water from the Island Green Pond to the Irrigation Pond as necessary to sustain irrigation operations. ~~As discussed above, for the purposes of this report, the minimum water surface elevations were taken as 502.50 and 496.00 for the Island Green Pond and Irrigation Pond respectively. It should be noted however that the bottom elevations of t~~The Island Green and Irrigation Ponds were determined to be approximately 500 feet and 458 feet respectively. These elevations were derived from a bathymetric survey conducted by The Chazen Companies in May 2008.

The proposed changes to the Combined Irrigation Pond under the proposed golf course renovation include the removal of the land bridge which separates the Island Green Pond from

the Irrigation Pond, creating one large irrigation pond on the golf course. Inflow to the pond will come from storm water runoff from the proposed resort community within the pond's watershed and from single unnamed, unclassified small stream, which will enter the pond through a submerged culvert. An overflow weir (invert 507.00) will control the maximum water surface elevation of the Combined Irrigation Pond. Irrigation water was drawn from two 24-inch pipes which will be installed approximately 10 feet below the top of the pond (invert 497.00). Because of the comparatively shallow depth of the former Island Green Pond section of the Combined Irrigation Pond, the minimum water surface elevation for this report was taken as 502.00 feet.

~~For water budget modeling purposes, the two ponds will be treated as a single entity, and will be generally referred to in this report as "the combined pond". This is made possible by the assumption that the golf course operators will consistently open the valve between the two ponds to ensure that golf course irrigation needs are met. Golf course personnel have indicated that this assumption is valid.~~

Please refer to Appendix A for detailed pond elevation and storage data.

## 3.0 DESCRIPTION OF INFLOWS

### 3.1 Direct Precipitation

A water body receives water via direct rainfall and snowfall. The volume of water received from direct precipitation is calculated by multiplying the water surface area by the depth of precipitation for a given month. For purposes of this water budget, the ~~combined~~ surface area of the ponds-Combined Irrigation Pond at their-its maximum elevation was used in calculations of the monthly volume of direct precipitation.

Please refer to Appendix A for the water surface area of the ponds, and to Appendix B for the dry year, normal year, and wet year monthly precipitation depths.

### 3.2 Stormwater Runoff

Precipitation that falls upon the land surrounding and draining to a water body does not necessarily reach that water body. A portion of that precipitation evaporates, is absorbed by vegetation, or infiltrates into the ground. However, during a large storm event, a fraction of the precipitation will become surface runoff and will in fact reach the water body.

The watershed draining to the subject ponds was analyzed using the Curve Number method, as described in "Technical Release 55 - Urban Hydrology for Small Watersheds" (TR-55), 1986, published by the Natural Resources Conservation Service by VHB Engineering, Surveying and Landscape Architecture P.C. in August 2014. Given a daily depth of precipitation, the Curve Number method can be used to calculate the daily depth of runoff. These calculations are dependent on the soils, ground covers, land uses, and slopes found within the watershed. It should be noted that not every storm event produces runoff. Specifically, for the watershed contributing to the subject ponds, the Curve Number method indicates that storm events smaller than approximately three-quarters of an inch will not produce surface runoff.

Daily rainfall data for the three years (dry, normal, and wet) described in Section 2.2 of this report was tabulated, and the corresponding daily runoff values were calculated using the Curve Number method. The appropriate daily runoff depths were summed to give monthly runoff depths. Finally, the volume of runoff reaching the irrigation ponds was calculated by multiplying the watershed surface area by the depth of runoff for a given month.

Please refer to Appendix A for the surface areas and curve numbers of the watersheds contributing to the irrigation ponds; and to Appendix B for the dry year, normal year, and wet year monthly runoff depths.

### 3.3 Groundwater Contribution

Groundwater contributions can be a significant factor in any water budget analysis. However, it is very difficult and impractical to directly measure groundwater flow rates. In some cases, it is possible to obtain an indirect measurement of groundwater flow into (or out of) a water body by calculating the difference between surface inflows and surface outflows. The subject ponds at

the project site have well defined inflow and outflow streams, making such a measurement possible.

Stream flow measurements were taken by TCC personnel on May 15, 2008. The golf course irrigation pumps were not in use at the time the measurements were taken, nor had they been used during the previous night (according to golf course personnel). This means that the irrigations ponds were likely in a “steady state” condition at the time of the flow measurements. The following measurements were made:

- The Island Green Pond was observed to have a surface inflow rate of 0.3 cubic feet per second (cfs), and a surface outflow rate of 0.2 cfs. Therefore, the Island Green Pond appears to “lose” water into the ground at a rate of 0.1 cfs.
- The Irrigation Pond was observed to have a surface inflow rate of 0.2 cfs, and a surface outflow rate of 0.5 cfs. Therefore, the Irrigation Pond appears to “gain” groundwater at a rate of 0.3 cfs.

Looking at both ponds together, there is a net groundwater contribution of 0.2 cfs. Because only one set of measurement was taken, reasonable assumptions were made for seasonal and climatic variations. The monthly volume of groundwater entering the subject ponds was calculated by converting cubic feet per second into gallons per month. The monthly groundwater contribution values, for a dry, normal, and wet year, are presented in Appendix C.

### 3.4 Stream Inflow

A single stream flows into the Island Green Pond. As described in the previous section, the flow rate for this stream was measured to be 0.3 cfs. Because only one measurement was taken, reasonable assumptions were made for seasonal and climatic variations. The monthly volume of stream inflow entering the irrigation ponds was calculated by converting cubic feet per second into gallons per month. The monthly stream inflow values, for a dry, normal, and wet year, are presented in Appendix C.

### 3.5 Treated Wastewater & Well Water Supplements

~~For aesthetic and water conservation reasons, it is proposed that treated wastewater effluent from the proposed 400,000 gallon per day (gpd) wastewater treatment plant to be built for the development be pumped directly into the Island Green Pond. The wastewater will be treated to intermittent stream and recreational contact standards. The reuse of treated wastewater effluent is a sustainable design feature of the project that will assist in the preservation of ground water resources.~~

~~Please note that it is assumed that the wastewater treatment plant will not yet be operational during the golf course grow in period, as such no treated wastewater contribution is included in the water budget models for those scenarios. Under the current design plan, treated wastewater effluent will not be discharged into the Combined Irrigation Pond because there are potable wells located within 200 feet of the pond. During this period, raw well water from the existing~~

irrigation water supply wells that were yield tested during a 72-hour hour pumping test event conducted in June 2014 will be diverted to the irrigation ponds to supplement the surface-water supplyif needed to ensure continued irrigation operations. The combined yield of the three proposed irrigation wells included in the 72-hour pumping test was 295,200 gallons per day. The maximum well water pumping rate has been modeled as 200,000250,000-gallons per day to be conservative and allow for periods of inactivity for the wells to recharge and recover.

For modeling purposes, it was assumed that these waters would be added at a constant daily rate. The quantity of ~~wastewater treatment effluent and~~ well water discharging into the ponds is presented in each one of the water budget calculation sheets found in Appendix F.

## 4.0 DESCRIPTION OF OUTFLOWS

### 4.1 Evapotranspiration

A water body loses water through evapotranspiration. The volume of water lost in this fashion is calculated by multiplying the water surface area by the depth of evapotranspiration for a given month. For purposes of this water budget, the combined surface area of the ponds at their maximum elevation was used in calculations of the monthly volume of evapotranspiration, thereby conservatively estimating the water lost during a given month.

Please refer to Appendix A for the water surface area of the ponds, and to Appendix D for the monthly evapotranspiration depths.

### 4.2 Surface Discharge

Under normal operating conditions, the only surface discharge from the subject ponds is an overflow weir located at the eastern end of the Combined Irrigation Pond. Discharge from this weir flows along a channel bed and into a NYSDEC Wetland designated "AM-15" which is located on site adjacent to NYS Route 22. Any excess water that enters the ponds after they are already full will be discharged in this fashion.

### 4.3 Irrigation Usage

Water will be pumped out of the subject ponds in order to irrigate the renovated golf course and other common landscaped areas of the proposed Master Development Plan for the site. Monthly irrigation demand figures for the established golf course in a normal year were provided by the irrigation system designer, Joseph Sarkisian & Associates, Inc. and confirmed by Aqua Agronomic Solutions, Inc. in August 2014. Reasonable assumptions were made for climatic and grow-in variations. It should be noted that the entire golf course and common landscaped areas will not be growing in simultaneously. Therefore the grow-in irrigation demands depicted in the appendices are conservatively overestimating the actual grow-in irrigation needs.

Please refer to Appendix E for irrigation demand data for all scenarios.

## 5.0 RESULTS AND ANALYSIS

### 5.1 Irrigation System Water Budget

Water budget calculations were performed to determine how the irrigation ponds would perform under the proposed Master Development Plan conditions for the site during six different scenarios (grow-in and established golf course conditions during dry, normal, and wet years). The detailed calculations are included in Appendix F.

This performance of the irrigation system can most easily be presented by the amount of estimated drawdown that ~~each the~~ pond should experience during the scenarios analyzed. The table below depicts the maximum drawdown in water surface elevation that each pond will experience, along with the percentage of desired irrigation volume that the golf course operators can expect to have available for use during those maximum drawdown months.

**Table 22: Maximum Drawdown and Fraction of Desired Irrigation Volume Available**

| Year Type   | Parameter   | Established Vegetation          |                          | Grow-In Vegetation              |                          |
|-------------|---|---------------------------------|--------------------------|---------------------------------|--------------------------|
|             |   | <u>Combined Irrigation Pond</u> | <u>Island Green Pond</u> | <u>Combined Irrigation Pond</u> | <u>Island Green Pond</u> |
| Dry Year    | Maximum Drawdown (feet)   | <u>6.365.00</u>                 | <u>3.58NA</u>            | <u>10.005.00</u>                | <u>6.30NA</u>            |
|             | Fraction of Desired Irrigation Volume Available During Maximum Drawdown | <u>100%72%</u>                  |                          | <u>68%77%</u>                   |                          |
| Normal Year | Maximum Drawdown (feet)   | 0.00                            | <u>0.00</u>              | 0.00                            | <u>0.00</u>              |
|             | Fraction of Desired Irrigation Volume Available During Maximum Drawdown | 100%                            |                          | 100%                            |                          |
| Wet Year    | Maximum Drawdown (feet)   | 0.00                            | <u>0.00</u>              | 0.00                            | <u>0.00</u>              |
|             | Fraction of Desired Irrigation Volume Available During Maximum Drawdown | 100%                            |                          | 100%                            |                          |

NA not applicable

As depicted in the table, the maximum drawdown occurs during the dry year, grow-in vegetation and established vegetation scenarios. During ~~that these~~ scenarios, ~~both the~~ ponds reaches ~~its~~their maximum drawdowns in July and August. However, even during the period of maximum drawdown, the water budget calculations indicate that 68-72 percent and 77 percent of the desired irrigation volume should still be available. ~~During the dry year, established vegetation scenario, both ponds experience significant drawdown, but 100 percent of the desired irrigation volume remains available.~~ Under all normal year and wet year scenarios, the ponds ~~do~~es not experience any significant drawdown, and 100 percent of desired irrigation volume is available at all times.

## 5.2 Wastewater Recycling & the NYSDEC Wetland

The discharge of treated wastewater effluent to the onsite irrigation pond and overflow into the NYSDEC regulated wetland AM-15 is no longer proposed. The onsite treated wastewater will likely be discharged to a tributary of the Ten Mile River which flows along Route 22 to the east of the project site.

~~Based on an April 22, 2008 meeting with NYSDEC, NYSDEC has expressed concern that the reuse of treated effluent will result in an increase in flow rate and water surface elevation in the DEC regulated wetland AM-15, located to the southeast of the irrigation pond.~~

~~Based on field observations described in Section 3.3 of this report, the existing base flow leaving the irrigation ponds is approximately 0.5 cubic feet per second. The maximum capacity of the proposed Waste Water Treatment Plant (WWTP) is 400,000 gallons per day, which corresponds to approximately 0.6 cubic feet per second. Therefore, assuming the WWTP is operating at full capacity, the base flow entering the wetland from the irrigation ponds should increase from 0.5 to 1.1 cubic feet per second.~~

~~This change is well within the expected natural seasonal and storm based fluctuations. For comparison purposes, based on hydrologic and hydraulic modeling performed in support of the Stormwater Pollution Prevention Plan for this project, the one year inflow and outflow from the DEC wetland are approximately 60 and 9 cfs, respectively. Based on the same modeling, the increase in base flow should result in an increase in the base water surface elevation within the wetland of approximately 0.2 feet. This figure is also well within the expected natural fluctuations. It is therefore clear that the wetland's natural characteristics have the capacity to absorb and pass much larger flow rates than those that will result from the reuse of treated effluent.~~

### ~~5.2.1 Discussion of the Overall Water Cycle~~

~~Since the inception of the existing golf course, water has been removed from Silo Ridge's deep irrigation pond for irrigation purposes, seasonally intercepting a share of site groundwater and surface water to support an existing 18-hole golf facility. In large measure, this irrigation water has been a net loss to local aquatic environments since irrigation water is normally transpired to the atmosphere by the watered vegetation. The current status of streams and wetlands down gradient of the site is already in equilibrium with the use of this water for irrigation. During seasons when no irrigation is occurring, site runoff and groundwater flow to streams and wetlands along Route 22, and then off-site.~~

~~The proposed Silo Ridge project has been designed to minimize disruption to the established water cycle described above by reusing water removed for potable uses as treated effluent for golf course irrigation. In its simplest portrayal, the site's potable water infrastructure simply adds a potable water pre-use cycle ahead of the summer irrigation withdrawal. More than 80 percent of the potable water withdrawal will be returned to the environment near the irrigation pond area. During the non-irrigation seasons, groundwater and runoff will continue to flow to receiving streams and wetlands along Route 22, with a share of the groundwater discharge shifted to a surface water flow with return water from the potable water use. This arrangement~~

~~will result in little net change to the site's wet season or dry season water budgets. Stated another way, the treated wastewater discharge to the island green pond will be almost fully offset by a reduction in groundwater discharge to surface waters, protecting local streams and wetlands from any flooding increases.~~

~~It has been an intentional component of site design to consider and design the potable water needs of the Silo Ridge project as a water pre-use component rather than as a compounding new water use. The reuse of treated effluent generated from the potable water supply use all on the same site significantly minimizes any change to the dry season or wet season water budgets on the site or the budgets of water flowing to offsite streams and wetlands via surface water or groundwater pathways.~~

## Appendix A

### Pond Data

The pond storage and surface elevation data presented below is based on bathymetric survey information collected by The Chazen Companies in May 2008 and proposed Combined Irrigation Pond contours provided by VHB Engineering, Surveying and Landscape Architecture, P.C. in August 2014.

|   | <b><u>Island Green Pond</u></b> | <b><u>Irrigation Pond</u></b> | <b><u>Combined Irrigation Pond</u></b> |
|---|---------------------------------|-------------------------------|--|
| Water Surface Area (SF)                 | <u>240,802</u>                  | <u>88,217</u>                 | <u>329,019</u> <u>358,934</u>          |
| Minimum Allowable WSE                   | <u>502.50</u>                   | <u>496.00</u>                 | <u>n/a</u> <u>502.00</u>               |
| Maximum Allowable WSE                   | <u>508.80</u>                   | <u>506.00</u>                 | <u>n/a</u> <u>507.00</u>               |
| Available Irrigation Storage (1000 Gal) | <u>8,303</u>                    | <u>5,261</u>                  | <u>13,564</u> <u>12,538</u>            |
| Watershed Area (Acres)                  | <u>199.66</u>                   | <u>22.12</u>                  | <u>221.78</u> <u>248</u>               |
| Watershed Composite Curve Number        | <u>69</u>                       | <u>75</u>                     | <u>70</u> <u>72</u>                    |

## Appendix B

### Precipitation and Runoff Data

Precipitation data presented below was gathered from official ~~monthly~~-hourly precipitation data published by the National Oceanic and Atmospheric Administration, as reported from the Albany International Airport, New York. Stormwater Runoff data was computed by VHB Engineering, Surveying and Landscape Architecture, P.C. in August 2014 using the official precipitation data through the Curve Number Method as described in "Technical Release 55 - Urban Hydrology for Small Watersheds" (TR-55), 1986, published by the Natural Resources Conservation Service.

|              | Precipitation (Inches)        |                               |                               | Stormwater Runoff (Inches)   |                              |                              |
|--------------|-------------------------------|-------------------------------|-------------------------------|------------------------------|------------------------------|------------------------------|
|              | Dry Year                      | Normal Year                   | Wet Year                      | Dry Year                     | Normal Year                  | Wet Year                     |
| January      | <del>0.81</del> <u>0.78</u>   | <del>2.04</del> <u>0.76</u>   | <del>3.43</del> <u>2.37</u>   | 0.00                         | 0.00                         | 0.00                         |
| February     | <del>3.67</del> <u>1.35</u>   | <del>2.12</del> <u>1.06</u>   | <del>2.83</del> <u>2.45</u>   | 0.06                         | 0.00                         | 0.00                         |
| March        | <del>1.18</del> <u>3.65</u>   | <del>3.10</del> <u>1.76</u>   | <del>3.80</del> <u>3.17</u>   | <del>0.00</del> <u>0.01</u>  | <del>0.01</del> <u>0.00</u>  | <del>0.00</del> <u>0.01</u>  |
| April        | <del>1.44</del> <u>1.33</u>   | <del>2.80</del> <u>3.04</u>   | <del>4.23</del> <u>3.04</u>   | 0.00                         | <del>0.00</del> <u>0.03</u>  | <del>0.10</del> <u>0.00</u>  |
| May          | <del>2.71</del> <u>3.21</u>   | <del>3.47</del> <u>3.54</u>   | <del>4.95</del> <u>4.90</u>   | 0.00                         | <del>0.08</del> <u>0.00</u>  | <del>0.02</del> <u>0.05</u>  |
| June         | <del>4.12</del> <u>3.78</u>   | <del>3.31</del> <u>2.08</u>   | <del>6.69</del> <u>6.68</u>   | <del>0.07</del> <u>0.02</u>  | <del>0.00</del> <u>0.00</u>  | <del>0.89</del> <u>0.99</u>  |
| July         | <del>1.86</del> <u>3.59</u>   | <del>4.84</del> <u>7.20</u>   | 4.48                          | <del>0.00</del> <u>0.04</u>  | <del>0.33</del> <u>0.41</u>  | <del>0.84</del> <u>0.95</u>  |
| August       | <del>2.23</del> <u>2.10</u>   | <del>3.53</del> <u>6.25</u>   | 4.69                          | 0.00                         | <del>0.00</del> <u>0.27</u>  | <del>0.01</del> <u>0.02</u>  |
| September    | <del>3.07</del> <u>1.70</u>   | <del>5.37</del> <u>4.67</u>   | <del>3.06</del> <u>3.02</u>   | <del>0.11</del> <u>0.00</u>  | <del>0.03</del> <u>0.07</u>  | 0.00                         |
| October      | <del>1.81</del> <u>1.25</u>   | <del>1.49</del> <u>1.23</u>   | <del>2.48</del> <u>2.39</u>   | 0.00                         | 0.00                         | <del>0.02</del> <u>0.04</u>  |
| November     | <del>5.00</del> <u>1.39</u>   | <del>3.83</del> <u>3.04</u>   | <del>1.90</del> <u>1.84</u>   | 0.00                         | <del>0.00</del> <u>0.01</u>  | 0.00                         |
| December     | <del>2.05</del> <u>1.78</u>   | <del>2.57</del> <u>2.68</u>   | <del>4.38</del> <u>3.57</u>   | 0.00                         | 0.00                         | <del>0.60</del> <u>0.69</u>  |
| <b>TOTAL</b> | <del>29.95</del> <u>25.91</u> | <del>38.47</del> <u>37.31</u> | <del>46.92</del> <u>42.60</u> | <del>0.24</del> <u>0.079</u> | <del>0.45</del> <u>0.802</u> | <del>2.48</del> <u>2.743</u> |

## Appendix C

### Groundwater and Stream Base Flow Data

The Groundwater Contribution and Stream Baseflow data presented below was derived from on-site field measurements conducted by TCC personnel on May 15, 2008 with reasonable monthly and climatic variation estimates made applied by using engineering judgment and past water budget report experience.

| Year Type | Multiplier |
|-----------|------------|
| Wet Year  | 1.1        |
| Dry Year  | 0.9        |

|              | Groundwater Inflow (1000 Gal) |               |               | Stream Baseflow (1000 Gal) |               |               |
|--------------|-------------------------------|---------------|---------------|----------------------------|---------------|---------------|
|              | Dry Year                      | Normal Year   | Wet Year      | Dry Year                   | Normal Year   | Wet Year      |
| January      | 3,839                         | 4,266         | 4,692         | 5,759                      | 6,399         | 7,039         |
| February     | 3,490                         | 3,878         | 4,266         | 5,235                      | 5,817         | 6,399         |
| March        | 3,490                         | 3,878         | 4,266         | 5,235                      | 5,817         | 6,399         |
| April        | 4,188                         | 4,654         | 5,119         | 6,282                      | 6,980         | 7,678         |
| May          | 3,490                         | 3,878         | 4,266         | 5,235                      | 5,817         | 6,399         |
| June         | 3,141                         | 3,490         | 3,839         | 4,712                      | 5,235         | 5,759         |
| July         | 2,792                         | 3,102         | 3,413         | 4,188                      | 4,654         | 5,119         |
| August       | 2,443                         | 2,715         | 2,986         | 3,665                      | 4,072         | 4,479         |
| September    | 2,094                         | 2,327         | 2,559         | 3,141                      | 3,490         | 3,839         |
| October      | 2,443                         | 2,715         | 2,986         | 3,665                      | 4,072         | 4,479         |
| November     | 2,792                         | 3,102         | 3,413         | 4,188                      | 4,654         | 5,119         |
| December     | 3,141                         | 3,490         | 3,839         | 4,712                      | 5,235         | 5,759         |
| <b>TOTAL</b> | <b>37,345</b>                 | <b>41,495</b> | <b>45,644</b> | <b>56,018</b>              | <b>62,242</b> | <b>68,466</b> |

## Appendix D

### Evapotranspiration Data

The potential evapotranspiration values presented in the following table are based on Technical Report NWS 33: Evaporation Atlas for the Contiguous 48 United States (published by the NOAA in June 1982) and Technical Report NWS 34: Mean Monthly, Seasonal, and Annual Pan Evaporation for the United States (published by the NOAA in December 1982).

The values presented are for Albany, NY.

|              | Potential<br>Evapotranspiration<br>(inches per day) | Total Evapotranspiration<br>(inches) |
|--------------|---|--------------------------------------|
| January      | 0.02  | 0.62                                 |
| February     | 0.03  | 0.84                                 |
| March        | 0.05  | 1.55                                 |
| April        | 0.10  | 3.00                                 |
| May          | 0.12  | 3.72                                 |
| June         | 0.15  | 4.50                                 |
| July         | 0.16  | 4.96                                 |
| August       | 0.13  | 4.03                                 |
| September    | 0.09  | 2.70                                 |
| October      | 0.06  | 1.86                                 |
| November     | 0.04  | 1.20                                 |
| December     | 0.02  | 0.62                                 |
| <b>Total</b> | <b>n/a</b>  | <b>29.60</b>                         |

## Appendix E

### Irrigation Demand (Page 1 of 2)

Monthly Monthly golf course irrigation demands were provided by irrigation system consultant Joseph Sarkisian & Associated, Inc. and confirmed by Aqua Agronomic Solutions, Inc. in August 2014. The data provided assumed normal climate conditions, and that the vegetation was established. The following multipliers were applied to obtain irrigation demand figures for the other scenarios being considered. For the golf course grow-in scenario, it was further assumed that landscape areas would not yet be online.

|                                |     |
|--------------------------------|-----|
| Dry year multiplier            | 1.7 |
| Wet year multiplier            | 0.8 |
| Golf course grow-in multiplier | 1.5 |

| Irrigation Demand (1000 Gal) - All Vegetation Established |               |               |               |                        |               |               |               |               |               |
|---|---------------|---------------|---------------|------------------------|---------------|---------------|---------------|---------------|---------------|
|   | Golf Course   |               |               | Landscape Common Areas |               |               | TOTAL         |               |               |
|   | Dry Year      | Normal Year   | Wet Year      | Dry Year               | Normal Year   | Wet Year      | Dry Year      | Normal Year   | Wet Year      |
| January   | 0             | 0             | 0             | 0                      | 0             | 0             | 0             | 0             | 0             |
| February  | 0             | 0             | 0             | 0                      | 0             | 0             | 0             | 0             | 0             |
| March   | 0             | 0             | 0             | 0                      | 0             | 0             | 0             | 0             | 0             |
| April   | 0             | 0             | 0             | 0                      | 0             | 0             | 0             | 0             | 0             |
| May   | 5,440         | 3,200         | 2,560         | 3,264                  | 1,920         | 1,536         | 8,704         | 5,120         | 4,096         |
| June  | 12,434        | 7,314         | 5,851         | 7,460                  | 4,388         | 3,511         | 19,894        | 11,702        | 9,362         |
| July  | 17,129        | 10,076        | 8,061         | 10,278                 | 6,046         | 4,836         | 27,407        | 16,122        | 12,897        |
| August  | 11,691        | 6,877         | 5,502         | 7,015                  | 4,126         | 3,301         | 18,705        | 11,003        | 8,803         |
| September   | 5,265         | 3,097         | 2,478         | 3,159                  | 1,858         | 1,487         | 8,424         | 4,955         | 3,964         |
| October   | 0             | 0             | 0             | 0                      | 0             | 0             | 0             | 0             | 0             |
| November  | 0             | 0             | 0             | 0                      | 0             | 0             | 0             | 0             | 0             |
| December  | 0             | 0             | 0             | 0                      | 0             | 0             | 0             | 0             | 0             |
| <b>TOTAL</b>  | <b>51,959</b> | <b>30,564</b> | <b>24,451</b> | <b>31,175</b>          | <b>18,338</b> | <b>14,671</b> | <b>83,134</b> | <b>48,902</b> | <b>39,122</b> |

## Appendix E Irrigation Demand (Page 2 of 2)

| Irrigation Demand (1000 Gal) - Golf Course Grow-in Period |               |               |               |                        |             |          |               |               |               |               |
|---|---------------|---------------|---------------|------------------------|-------------|----------|---------------|---------------|---------------|---------------|
|   | Golf Course   |               |               | Landscape Common Areas |             |          | TOTAL         |               |               |               |
|   | Dry Year      | Normal Year   | Wet Year      | Dry Year               | Normal Year | Wet Year | Dry Year      | Normal Year   | Wet Year      | Wet Year      |
| January   | 0             | 0             | 0             | 0                      | 0           | 0        | 0             | 0             | 0             | 0             |
| February  | 0             | 0             | 0             | 0                      | 0           | 0        | 0             | 0             | 0             | 0             |
| March   | 0             | 0             | 0             | 0                      | 0           | 0        | 0             | 0             | 0             | 0             |
| April   | 0             | 0             | 0             | 0                      | 0           | 0        | 0             | 0             | 0             | 0             |
| May   | 8,160         | 4,800         | 3,840         | 0                      | 0           | 0        | 8,160         | 4,800         | 3,840         | 3,840         |
| June  | 18,651        | 10,971        | 8,777         | 0                      | 0           | 0        | 18,651        | 10,971        | 8,777         | 8,777         |
| July  | 25,694        | 15,114        | 12,091        | 0                      | 0           | 0        | 25,694        | 15,114        | 12,091        | 12,091        |
| August  | 17,536        | 10,316        | 8,252         | 0                      | 0           | 0        | 17,536        | 10,316        | 8,252         | 8,252         |
| September   | 7,897         | 4,646         | 3,716         | 0                      | 0           | 0        | 7,897         | 4,646         | 3,716         | 3,716         |
| October   | 0             | 0             | 0             | 0                      | 0           | 0        | 0             | 0             | 0             | 0             |
| November  | 0             | 0             | 0             | 0                      | 0           | 0        | 0             | 0             | 0             | 0             |
| December  | 0             | 0             | 0             | 0                      | 0           | 0        | 0             | 0             | 0             | 0             |
| <b>TOTAL</b>  | <b>77,938</b> | <b>45,846</b> | <b>36,677</b> | <b>0</b>               | <b>0</b>    | <b>0</b> | <b>77,938</b> | <b>45,846</b> | <b>36,677</b> | <b>36,677</b> |

## Appendix F Water Budget Calculations (1 of 6)

Irrigation Scenario: **Established**  
Climate Scenario: **Dry Year**

| Combined<br>Irrigation<br>Pond<br>Drawdown | Island<br>Green Pond<br>Drawdown | Available<br>Pond<br>Volume | Desired<br>Irrigation<br>Usage | INFLOWS                 |                      |                             |                     |   |   | OUTFLOWS           |                |                      |                            |                             |                    |
|--|----------------------------------|-----------------------------|--------------------------------|-------------------------|----------------------|-----------------------------|---------------------|---|---|--------------------|----------------|----------------------|----------------------------|-----------------------------|--------------------|
|  |                                  |                             |                                | Direct<br>Precipitation | Stormwater<br>Runoff | Groundwater<br>Contribution | Stream Base<br>flow | Wastewater<br>Treatment<br>Plant Effluent<br>Contribution | Well Water<br>Supplement<br>( <i>Grow-in<br/>only</i> ) | Total<br>Inflows   | Evaporation    | Surface<br>Discharge | Actual Irrigation<br>Usage | Total<br>Outflows           |                    |
| (Feet)                                     | (Feet)                           | (1000 Gal)                  | (1000 Gal)                     | (1000 Gal)              | (1000 Gal)           | (1000 Gal)                  | (1000 Gal)          | (1000 Gal)  | (1000 Gal)  | (1000 Gal)         | (1000 Gal)     | (1000 Gal)           | (1000 Gal)                 | (Fraction<br>of<br>Desired) | 1000 Gal           |
| January                                    | 0.00                             | 13,564<br>12,538            | 0                              | 166<br>175              | 0                    | 3,839                       | 5,759               | 12,400<br>0   | 0<br>7,750  | 22,164<br>17,523   | 127<br>139     | 22,037<br>17,384     | 0                          | n/a                         | 22,164<br>17,523   |
| February                                   | 0.00                             | 13,564<br>12,538            | 0                              | 753<br>302              | 361<br>0             | 3,490                       | 5,235               | 11,200<br>0   | 0<br>7,000  | 21,040<br>16,028   | 172<br>188     | 20,867<br>15,840     | 0                          | n/a                         | 21,040<br>16,028   |
| March                                      | 0.00                             | 13,564<br>12,538            | 0                              | 242<br>817              | 0<br>67              | 3,490                       | 5,235               | 12,400<br>0   | 0<br>7,750  | 21,368<br>17,360   | 318<br>347     | 21,050<br>17,013     | 0                          | n/a                         | 21,368<br>17,360   |
| April                                      | 0.00                             | 13,564<br>12,537            | 0                              | 295<br>298              | 0                    | 4,188                       | 6,282               | 12,000<br>0   | 0<br>7,500  | 22,766<br>18,268   | 645<br>671     | 22,151<br>17,597     | 0                          | n/a                         | 22,766<br>18,268   |
| May  | 0.00                             | 13,564<br>12,538            | 8,704                          | 556<br>718              | 0                    | 3,490                       | 5,235               | 12,400<br>0   | 0<br>7,750  | 21,681<br>17,194   | 763<br>832     | 12,214<br>7,657      | 8,704                      | 100%                        | 21,681<br>17,194   |
| June                                       | 0.00                             | 13,564<br>12,538            | 19,894                         | 845<br>846              | 422<br>135           | 3,141                       | 4,712               | 12,000<br>0   | 0<br>7,500  | 21,120<br>16,333   | 923<br>1,007   | 302<br>0             | 19,894                     | 100%                        | 21,120<br>20,901   |
| July                                       | 0.00<br>1.88                     | 13,564<br>7,970             | 27,407                         | 381<br>803              | 0<br>269             | 2,792                       | 4,188               | 12,400<br>0   | 0<br>7,750  | 19,762<br>15,803   | 1,017<br>1,110 | 0                    | 37,407                     | 100%<br>83%                 | 28,424<br>23,773   |
| August                                     | 5.88<br>5.00                     | 4,902<br>0                  | 18,705                         | 457<br>470              | 0                    | 2,443                       | 3,665               | 12,400<br>0   | 0<br>7,750  | 18,965<br>14,328   | 827<br>902     | 0                    | 18,705                     | 100%<br>72%                 | 19,532<br>14,328   |
| September                                  | 6.36<br>5.00                     | 4,335<br>0                  | 8,424                          | 630<br>380              | 6620                 | 2,094                       | 3,141               | 12,000<br>0   | 0<br>7,500  | 18,527<br>13,116   | 554<br>604     | 321<br>0             | 8,424                      | 100%                        | 9,298<br>9,028     |
| October                                    | 0.00<br>3.44                     | 13,564<br>4,088             | 0                              | 371<br>280              | 0                    | 2,443                       | 3,665               | 12,400<br>0   | 0<br>7,750  | 18,879<br>14,138   | 381<br>416     | 18,498<br>5,271      | 0                          | n/a                         | 18,879<br>5,688    |
| November                                   | 0.00                             | 13,564<br>12,538            | 0                              | 1,026<br>311            | 0                    | 2,792                       | 4,188               | 12,000<br>0   | 0<br>7,500  | 20,006<br>14,791   | 246<br>269     | 19,760<br>14,523     | 0                          | n/a                         | 20,006<br>14,791   |
| December                                   | 0.00                             | 13,564<br>12,538            | 0                              | 420<br>398              | 0                    | 3,141                       | 4,712               | 12,400<br>0   | 0<br>7,750  | 20,673<br>16,001   | 127<br>139     | 20,546<br>15,863     | 0                          | n/a                         | 20,673<br>16,001   |
| TOTAL                                      | n/a                              | n/a                         | 83,134                         | 6,143<br>5,797          | 1,445<br>471         | 37,345                      | 56,018              | 146,000<br>0  | 0<br>91,250   | 246,951<br>190,882 | 6,071<br>6,623 | 157,746<br>111,147   | 83,134<br>73,111           | n/a                         | 246,951<br>190,881 |

Appendix F

Water Budget Calculations (2 of 6)

Irrigation Scenario: Established  
Climate Scenario: Normal Year

|  |                                  |                             |                                | INFLOWS                 |                      |                             |                     |   | OUTFLOWS  |                    |                |                      |                            |                    |
|--|----------------------------------|-----------------------------|--------------------------------|-------------------------|----------------------|-----------------------------|---------------------|---|---|--------------------|----------------|----------------------|----------------------------|--------------------|
| Combined<br>Irrigation<br>Pond<br>Drawdown | Island<br>Green-Pond<br>Drawdown | Available<br>Pond<br>Volume | Desired<br>Irrigation<br>Usage | Direct<br>Precipitation | Stormwater<br>Runoff | Groundwater<br>Contribution | Stream Base<br>flow | Wastewater<br>Treatment<br>Plant Effluent<br>Contribution | Well Water<br>Supplement<br>( <b>grow-in<br/>only</b> ) | Total<br>Inflows   | Evaporation    | Surface<br>Discharge | Actual Irrigation<br>Usage | Total<br>Outflows  |
| (Feet)                                     | (Feet)                           | (1000 Gal)                  | (1000 Gal)                     | (1000 Gal)              | (1000 Gal)           | (1000 Gal)                  | (1000 Gal)          | (1000 Gal)  | (1000 Gal)  | (1000 Gal)         | (1000 Gal)     | (1000 Gal)           | (1000 Gal)                 | (1000 Gal)         |
| January                                    | 0.00                             | 13,564<br>12,538            | 0                              | 418<br>170              | 0                    | 4,266                       | 6,399               | 12,400<br>0   | 0<br>7,750  | 23,483<br>18,585   | 427<br>139     | 23,356<br>18,446     | 0<br>n/a                   | 23,483<br>18,585   |
| February                                   | 0.00                             | 13,564<br>12,538            | 0                              | 435<br>237              | 0                    | 3,878                       | 5,817               | 11,200<br>0   | 0<br>7,000  | 21,339<br>16,932   | 472<br>188     | 21,158<br>16,744     | 0<br>n/a                   | 21,339<br>16,932   |
| March                                      | 0.00                             | 13,564<br>12,538            | 0                              | 636<br>394              | 60<br>0              | 3,878                       | 5,817               | 12,400<br>0   | 0<br>7,750  | 22,791<br>17,839   | 318<br>347     | 22,473<br>17,492     | 0<br>n/a                   | 22,791<br>17,839   |
| April                                      | 0.00                             | 13,564<br>12,538            | 0                              | 574<br>680              | 0<br>229             | 4,654                       | 6,980               | 12,400<br>0   | 0<br>7,500  | 24,208<br>20,043   | 645<br>671     | 23,593<br>19,372     | 0<br>n/a                   | 24,208<br>20,043   |
| May  | 0.00                             | 13,564<br>12,538            | 5,120                          | 712<br>792              | 482<br>27            | 3,878                       | 5,817               | 12,400<br>0   | 0<br>7,750  | 23,288<br>18,264   | 763<br>832     | 17,406<br>12,312     | 100%                       | 23,288<br>18,264   |
| June                                       | 0.00                             | 13,564<br>12,538            | 11,702                         | 679<br>465              | 0                    | 3,490                       | 5,235               | 12,400<br>0   | 0<br>7,500  | 21,404<br>16,691   | 923<br>1,007   | 8,779<br>3,982       | 100%                       | 21,404<br>16,691   |
| July                                       | 0.00                             | 13,564<br>12,538            | 16,122                         | 993<br>1,611            | 1,987<br>2,754       | 3,102                       | 4,654               | 12,400<br>0   | 0<br>7,750  | 23,136<br>19,871   | 1,017<br>1,110 | 5,997<br>2,640       | 100%                       | 23,136<br>19,871   |
| August                                     | 0.00                             | 13,564<br>12,538            | 11,003                         | 724<br>1,398            | 0<br>1,832           | 2,715                       | 4,072               | 12,400<br>0   | 0<br>7,750  | 19,911<br>17,767   | 827<br>902     | 8,081<br>5,862       | 100%                       | 19,911<br>17,767   |
| September                                  | 0.00                             | 13,564<br>12,538            | 4,955                          | 1,404<br>1,045          | 181<br>458           | 2,327                       | 3,490               | 12,400<br>0   | 0<br>7,500  | 19,099<br>14,820   | 554<br>604     | 13,590<br>9,261      | 100%                       | 19,099<br>14,820   |
| October                                    | 0.00                             | 13,564<br>12,538            | 0                              | 306<br>275              | 0                    | 2,715                       | 4,072               | 12,400<br>0   | 0<br>7,750  | 19,492<br>14,812   | 381<br>416     | 19,111<br>14,396     | n/a                        | 19,492<br>14,812   |
| November                                   | 0.00                             | 13,564<br>12,538            | 0                              | 786<br>680              | 0<br>81              | 3,102                       | 4,654               | 12,400<br>0   | 0<br>7,500  | 20,542<br>16,017   | 246<br>269     | 20,295<br>15,749     | n/a                        | 20,542<br>16,017   |
| December                                   | 0.00                             | 13,564<br>12,538            | 0                              | 527<br>600              | 0<br>7               | 3,490                       | 5,235               | 12,400<br>0   | 0<br>7,750  | 21,653<br>17,082   | 427<br>139     | 21,525<br>16,943     | n/a                        | 21,653<br>17,082   |
| TOTAL                                      | n/a                              | n/a                         | 48,902                         | 7,890<br>8,348          | 2,710<br>5,387       | 41,495                      | 62,242              | 146,000<br>0  | 0<br>91,250   | 260,337<br>208,722 | 6,071<br>6,623 | 205,363<br>153,197   | n/a                        | 260,337<br>208,722 |

## Appendix F Water Budget Calculations (3 of 6)

Irrigation Scenario: **Established**  
Climate Scenario: **Wet Year**

|           | Combined<br>Irrigation<br>Pond<br>Drawdown | Island<br>Green-Pond<br>Drawdown | Available<br>Pond<br>Volume | Desired<br>Irrigation<br>Usage | INFLOWS                 |                      |                             |                     |   | OUTFLOWS  |                    |                |                      |                             |                    |
|-----------|--|----------------------------------|-----------------------------|--------------------------------|-------------------------|----------------------|-----------------------------|---------------------|---|---|--------------------|----------------|----------------------|-----------------------------|--------------------|
|           |  |                                  |                             |                                | Direct<br>Precipitation | Stormwater<br>Runoff | Groundwater<br>Contribution | Stream Base<br>flow | Wastewater<br>Treatment<br>Plant Effluent<br>Contribution | Well Water<br>Supplement<br>( <i>Grow-in<br/>only</i> ) | Total<br>Inflows   | Evaporation    | Surface<br>Discharge | Actual Irrigation<br>Usage  | Total<br>Outflows  |
|           | (Feet)                                     | (Feet)                           | (1000 Gal)                  | (1000 Gal)                     | (1000 Gal)              | (1000 Gal)           | (1000 Gal)                  | (1000 Gal)          | (1000 Gal)  | (1000 Gal)  | (1000 Gal)         | (1000 Gal)     | (1000 Gal)           | (Fraction<br>of<br>Desired) | 1000 Gal           |
| January   | 0.00                                       | 0.00<br>n/a                      | 13,564<br>12,538            | 0                              | 704<br>530              | 0                    | 4,692                       | 7,039               | 12,400<br>0   | 0<br>7,750  | 24,834<br>20,011   | 127<br>139     | 24,707<br>19,873     | 0<br>n/a                    | 24,834<br>20,011   |
| February  | 0.00                                       | 0.00<br>n/a                      | 13,564<br>12,538            | 0                              | 580<br>548              | 0                    | 4,266                       | 6,399               | 11,200<br>0   | 7,000   | 22,445<br>18,213   | 172<br>188     | 22,273<br>18,025     | 0<br>n/a                    | 22,445<br>18,213   |
| March     | 0.00                                       | 0.00<br>n/a                      | 13,564<br>12,538            | 0                              | 779<br>709              | 0<br>81              | 4,266                       | 6,399               | 12,400<br>0   | 7,750   | 23,844<br>19,205   | 348<br>347     | 23,526<br>18,858     | 0<br>n/a                    | 23,844<br>19,205   |
| April     | 0.00                                       | 0.00<br>n/a                      | 13,564<br>12,538            | 0                              | 868<br>680              | 602<br>0             | 5,119                       | 7,678               | 12,400<br>0   | 7,500   | 26,267<br>20,978   | 645<br>671     | 25,652<br>20,306     | 0<br>n/a                    | 26,267<br>20,978   |
| May       | 0.00                                       | 0.00<br>n/a                      | 13,564<br>12,538            | 4,096                          | 1,015<br>1,096          | 120<br>357           | 4,266                       | 6,399               | 12,400<br>0   | 7,750   | 24,200<br>19,868   | 763<br>832     | 19,341<br>14,939     | 4,096<br>100%               | 24,200<br>19,868   |
| June      | 0.00                                       | 0.00<br>n/a                      | 13,564<br>12,538            | 9,362                          | 1,372<br>1,495          | 5,360<br>6,640       | 3,839                       | 5,759               | 12,400<br>0   | 7,500   | 28,330<br>25,233   | 923<br>1,007   | 18,045<br>14,864     | 9,362<br>100%               | 28,330<br>25,233   |
| July      | 0.00                                       | 0.00<br>n/a                      | 13,564<br>12,538            | 12,897                         | 949<br>1,002            | 5,059<br>6,384       | 3,413                       | 5,119               | 12,400<br>0   | 7,750   | 26,909<br>23,668   | 1,017<br>1,110 | 12,995<br>9,661      | 12,897<br>100%              | 26,909<br>23,668   |
| August    | 0.00                                       | 0.00<br>n/a                      | 13,564<br>12,538            | 8,803                          | 962<br>1,049            | 60<br>101            | 2,986                       | 4,479               | 12,400<br>0   | 7,750   | 20,887<br>16,366   | 827<br>902     | 11,258<br>6,661      | 8,803<br>100%               | 20,887<br>16,366   |
| September | 0.00                                       | 0.00<br>n/a                      | 13,564<br>12,538            | 3,964                          | 628<br>676              | 0<br>27              | 2,559                       | 3,839               | 12,400<br>0   | 7,500   | 19,026<br>14,601   | 554<br>604     | 14,508<br>10,033     | 3,964<br>100%               | 19,026<br>14,601   |
| October   | 0.00                                       | 0.00<br>n/a                      | 13,564<br>12,538            | 0                              | 509<br>535              | 120<br>256           | 2,986                       | 4,479               | 12,400<br>0   | 7,750   | 20,494<br>16,006   | 381<br>416     | 20,113<br>15,590     | 0<br>n/a                    | 20,494<br>16,006   |
| November  | 0.00                                       | 0.00<br>n/a                      | 13,564<br>12,538            | 0                              | 390<br>412              | 0                    | 3,413                       | 5,119               | 12,000<br>0   | 7,500   | 20,921<br>16,443   | 246<br>269     | 20,675<br>16,175     | 0<br>n/a                    | 20,921<br>16,443   |
| December  | 0.00                                       | 0.00<br>n/a                      | 13,564<br>12,538            | 0                              | 898<br>799              | 3,613<br>4,620       | 3,839                       | 5,759               | 12,400<br>0   | 7,750   | 26,510<br>22,767   | 127<br>139     | 26,383<br>22,628     | 0<br>n/a                    | 26,510<br>22,767   |
| TOTAL     | n/a  | n/a                              | n/a                         | 39,122                         | 9,623<br>9,532          | 14,935<br>18,465     | 45,644                      | 68,466              | 146,000<br>0  | 91,250  | 284,669<br>233,357 | 6,071<br>6,623 | 239,476<br>187,12    | n/a                         | 284,669<br>233,357 |

Appendix F  
Water Budget Calculations (4 of 6)

Irrigation Scenario: Grow-in  
Climate Scenario: Dry Year

|           | Combined<br>Irrigation<br>Pond<br>Drawdown | Island<br>Green Pond<br>Drawdown | Available<br>Pond<br>Volume | Desired<br>Irrigation<br>Usage | INFLOWS                 |                      |                             |                     |   | OUTFLOWS                                      |                  |             |                      |                            |                             |          |
|-----------|--|----------------------------------|-----------------------------|--------------------------------|-------------------------|----------------------|-----------------------------|---------------------|---|---|------------------|-------------|----------------------|----------------------------|-----------------------------|----------|
|           |  |                                  |                             |                                | Direct<br>Precipitation | Stormwater<br>Runoff | Groundwater<br>Contribution | Stream Base<br>flow | Wastewater<br>Treatment<br>Plant Effluent<br>Contribution | Well Water<br>Supplement<br>(Grow-in<br>only) | Total<br>Inflows | Evaporation | Surface<br>Discharge | Actual Irrigation<br>Usage | Total<br>Outflows           |          |
|           | (Feet)                                     | (Feet)                           | (1000 Gal)                  | (1000 Gal)                     | (1000 Gal)              | (1000 Gal)           | (1000 Gal)                  | (1000 Gal)          | (1000 Gal)  | (1000 Gal)                                    | (1000 Gal)       | (1000 Gal)  | (1000 Gal)           | (1000 Gal)                 | (Fraction<br>of<br>Desired) | 1000 Gal |
| January   | 0.00                                       | 0.00                             | 13,564                      | 0                              | 166                     | 0                    | 3,839                       | 5,759               | 0   | 6,200   | 15,964           | 127         | 15,837               | 0                          | n/a                         | 15,964   |
|           |  | n/a                              | 12,538                      |                                | 175                     |                      |                             |                     |   | 7,750   | 17,523           | 139         | 17,384               |                            |                             | 17,523   |
| February  | 0.00                                       | 0.00                             | 13,564                      | 0                              | 753                     | 361                  | 3,490                       | 5,235               | 0   | 5,600   | 15,440           | 172         | 15,267               | 0                          | n/a                         | 15,440   |
|           |  | n/a                              | 12,538                      |                                | 302                     | 0                    |                             |                     |   | 7,000   | 16,028           | 188         | 15,840               |                            |                             | 16,028   |
| March     | 0.00                                       | 0.00                             | 13,564                      | 0                              | 242                     | 0                    | 3,490                       | 5,235               | 0   | 6,200   | 15,168           | 318         | 14,850               | 0                          | n/a                         | 15,168   |
|           |  | n/a                              | 12,538                      |                                | 817                     | 67                   |                             |                     |   | 7,750   | 17,360           | 347         | 17,013               |                            |                             | 17,360   |
| April     | 0.00                                       | 0.00                             | 13,564                      | 0                              | 295                     | 0                    | 4,188                       | 6,282               | 0   | 6,000   | 16,766           | 615         | 16,151               | 0                          | n/a                         | 16,766   |
|           |  | n/a                              | 12,538                      |                                | 298                     |                      |                             |                     |   | 7,500   | 18,268           | 671         | 17,597               |                            |                             | 18,268   |
| May       | 0.00                                       | 0.00                             | 13,564                      | 8,160                          | 556                     | 0                    | 3,490                       | 5,235               | 0   | 6,200   | 15,481           | 763         | 15,358               |                            |                             | 15,481   |
|           |  | n/a                              | 12,538                      |                                | 718                     |                      |                             |                     |   | 7,750   | 17,194           | 832         | 16,361               | 8,160                      | 100%                        | 17,194   |
| June      | 0.00                                       | 0.00                             | 13,564                      | 18,651                         | 845                     | 422                  | 3,141                       | 4,712               | 0   | 6,000   | 15,120           | 923         | 14,207               | 0                          |                             | 19,574   |
|           |  | n/a                              | 12,538                      |                                | 846                     | 135                  |                             |                     |   | 7,500   | 16,333           | 1,007       | 15,326               | 18,651                     | 100%                        | 19,658   |
| July      | 2.84                                       | 1.60                             | 9,110                       | 25,694                         | 381                     | 0                    | 2,792                       | 4,188               | 0   | 6,200   | 13,562           | 1,017       | 12,545               | 21,655                     | 100%                        | 32,672   |
|           | 1.40                                       | n/a                              | 9,214                       |                                | 803                     | 269                  |                             |                     |   | 7,750   | 15,803           | 1,110       | 14,693               | 23,907                     | 93%                         | 25,017   |
| August    | 10.00                                      | 6.30                             | 0                           | 17,536                         | 457                     | 0                    | 2,443                       | 3,665               | 0   | 6,200   | 12,765           | 827         | 11,938               | 0                          |                             | 12,765   |
|           | 5.00                                       | n/a                              |                             |                                | 470                     |                      |                             |                     |   | 7,750   | 14,328           | 902         | 13,426               | 7,750                      | 77%                         | 14,328   |
| September | 10.00                                      | 6.30                             | 0                           | 7,897                          | 630                     | 662                  | 2,094                       | 3,141               | 0   | 6,000   | 12,527           | 554         | 11,973               | 0                          |                             | 8,451    |
|           | 5.00                                       | n/a                              |                             |                                | 380                     | 0                    |                             |                     |   | 7,500   | 13,116           | 604         | 12,512               | 7,897                      | 100%                        | 8,501    |
| October   | 6.60                                       | 3.70                             | 4,076                       | 0                              | 371                     | 0                    | 2,443                       | 3,665               | 0   | 6,200   | 12,679           | 381         | 12,298               | 0                          | n/a                         | 3,191    |
|           | 3.20                                       | n/a                              | 4,614                       |                                | 280                     |                      |                             |                     |   | 7,750   | 14,138           | 416         | 13,722               | 6,214                      |                             | 6,214    |
| November  | 0.00                                       | 0.00                             | 13,564                      | 0                              | 1,026                   | 0                    | 2,792                       | 4,188               | 0   | 6,000   | 14,006           | 246         | 13,760               | 0                          | n/a                         | 14,006   |
|           |  | n/a                              | 12,538                      |                                | 311                     |                      |                             |                     |   | 7,500   | 14,791           | 269         | 14,523               |                            |                             | 14,791   |
| December  | 0.00                                       | 0.00                             | 13,564                      | 0                              | 420                     | 0                    | 3,141                       | 4,712               | 0   | 6,200   | 14,473           | 127         | 14,346               | 0                          | n/a                         | 14,473   |
|           |  | n/a                              | 12,538                      |                                | 398                     |                      |                             |                     |   | 7,750   | 16,001           | 139         | 15,863               |                            |                             | 16,001   |
| TOTAL     | n/a  | n/a                              | n/a                         | 77,938                         | 6,143                   | 1,445                | 37,345                      | 56,018              | 0   | 73,000  | 173,951          | 6,071       | 167,880              | 68,301                     | n/a                         | 170,882  |

Appendix F  
Water Budget Calculations (5 of 6)

Irrigation Scenario: Grow-in  
Climate Scenario: Normal Year

|           | Combined<br>Irrigation<br>Pond<br>Drawdown | Island<br>Green-Pond<br>Drawdown | Available<br>Pond<br>Volume | Desired<br>Irrigation<br>Usage | INFLOWS                 |                      |                             |                     |   | OUTFLOWS                                       |                    |                |                      |                             |                   |
|-----------|--|----------------------------------|-----------------------------|--------------------------------|-------------------------|----------------------|-----------------------------|---------------------|---|--|--------------------|----------------|----------------------|-----------------------------|-------------------|
|           |  |                                  |                             |                                | Direct<br>Precipitation | Stormwater<br>Runoff | Groundwater<br>Contribution | Stream Base<br>flow | Wastewater<br>Treatment<br>Plant Effluent<br>Contribution | Well Water<br>Supplement<br>(Green-in<br>only) | Total<br>Inflows   | Evaporation    | Surface<br>Discharge | Actual Irrigation<br>Usage  | Total<br>Outflows |
|           | (Feet)                                     | (Feet)                           | (1000 Gal)                  | (1000 Gal)                     | (1000 Gal)              | (1000 Gal)           | (1000 Gal)                  | (1000 Gal)          | (1000 Gal)  | (1000 Gal)                                     | (1000 Gal)         | (1000 Gal)     | (1000 Gal)           | (Fraction<br>of<br>Desired) | 1000 Gal          |
| January   | 0.00                                       | 0.00<br>n/a                      | 13,564<br>12,538            | 0                              | 418<br>170              | 0                    | 4,266                       | 6,399               | 0   | 6,200<br>7,750                                 | 17,283<br>18,585   | 127<br>139     | 17,156<br>18,446     | 0                           | n/a<br>18,585     |
| February  | 0.00                                       | 0.00<br>n/a                      | 13,564<br>12,538            | 0                              | 435<br>237              | 0                    | 3,878                       | 5,817               | 0   | 5,600<br>7,000                                 | 15,730<br>16,932   | 172<br>188     | 15,558<br>16,744     | 0                           | n/a<br>16,932     |
| March     | 0.00                                       | 0.00<br>n/a                      | 13,564<br>12,538            | 0                              | 636<br>394              | 60<br>0              | 3,878                       | 5,817               | 0   | 6,200<br>7,750                                 | 16,594<br>17,839   | 318<br>347     | 16,273<br>17,492     | 0                           | n/a<br>17,839     |
| April     | 0.00                                       | 0.00<br>n/a                      | 13,564<br>12,538            | 0                              | 574<br>680              | 0<br>229             | 4,654                       | 6,980               | 0   | 6,400<br>7,500                                 | 18,208<br>20,043   | 615<br>671     | 17,593<br>19,372     | 0                           | n/a<br>20,043     |
| May       | 0.00                                       | 0.00<br>n/a                      | 13,564<br>12,538            | 4,800                          | 712<br>792              | 482<br>27            | 3,878                       | 5,817               | 0   | 6,200<br>7,750                                 | 17,088<br>18,264   | 763<br>832     | 14,526<br>12,632     | 4,800                       | 100%<br>18,264    |
| June      | 0.00                                       | 0.00<br>n/a                      | 13,564<br>12,538            | 10,971                         | 679<br>465              | 0                    | 3,490                       | 5,235               | 0   | 6,400<br>7,500                                 | 15,404<br>16,691   | 923<br>1,007   | 3,510<br>4,713       | 10,971                      | 100%<br>16,691    |
| July      | 0.00                                       | 0.00<br>n/a                      | 13,564<br>12,538            | 15,114                         | 993<br>1,611            | 1,987<br>2,754       | 3,102                       | 4,654               | 0   | 6,200<br>7,750                                 | 16,936<br>19,871   | 1,017<br>1,110 | 805<br>3,648         | 15,114                      | 100%<br>19,871    |
| August    | 0.00                                       | 0.00<br>n/a                      | 13,564<br>12,538            | 10,316                         | 724<br>1,398            | 0<br>1,832           | 2,715                       | 4,072               | 0   | 6,200<br>7,750                                 | 13,711<br>17,767   | 827<br>902     | 2,568<br>6,549       | 10,316                      | 100%<br>17,767    |
| September | 0.00                                       | 0.00<br>n/a                      | 13,564<br>12,538            | 4,646                          | 1,101<br>1,045          | 181<br>458           | 2,327                       | 3,490               | 0   | 6,400<br>7,500                                 | 13,099<br>14,820   | 554<br>604     | 7,900<br>9,570       | 4,646                       | 100%<br>14,820    |
| October   | 0.00                                       | 0.00<br>n/a                      | 13,564<br>12,538            | 0                              | 306<br>275              | 0                    | 2,715                       | 4,072               | 0   | 6,200<br>7,750                                 | 13,292<br>14,812   | 381<br>416     | 12,911<br>14,396     | 0                           | n/a<br>14,812     |
| November  | 0.00                                       | 0.00<br>n/a                      | 13,564<br>12,538            | 0                              | 786<br>680              | 0<br>81              | 3,102                       | 4,654               | 0   | 6,400<br>7,500                                 | 14,542<br>16,017   | 246<br>269     | 14,295<br>15,749     | 0                           | n/a<br>16,017     |
| December  | 0.00                                       | 0.00<br>n/a                      | 13,564<br>12,538            | 0                              | 527<br>600              | 0<br>7               | 3,490                       | 5,235               | 0   | 6,200<br>7,750                                 | 15,453<br>17,082   | 127<br>139     | 15,325<br>16,943     | 0                           | n/a<br>17,082     |
| TOTAL     | n/a  | n/a                              | n/a                         | 45,846                         | 7,890<br>8,348          | 2,710<br>5,387       | 41,495                      | 62,242              | 0   | 73,000<br>91,250                               | 187,337<br>208,722 | 6,071<br>6,623 | 135,420<br>156,253   | 45,846                      | n/a<br>208,722    |

Appendix F  
Water Budget Calculations (6 of 6)

Irrigation Scenario: Grow-in  
Climate Scenario: Wet Year

|           | Combined<br>Irrigation<br>Pond<br>Drawdown | Island<br>Green Pond<br>Drawdown | INFLOWS                     |                                |                         |                      |                             | OUTFLOWS            |   |   |                    |                |                      |                            |                   |                    |
|-----------|--|----------------------------------|-----------------------------|--------------------------------|-------------------------|----------------------|-----------------------------|---------------------|---|---|--------------------|----------------|----------------------|----------------------------|-------------------|--------------------|
|           |  |                                  | Available<br>Pond<br>Volume | Desired<br>Irrigation<br>Usage | Direct<br>Precipitation | Stormwater<br>Runoff | Groundwater<br>Contribution | Stream Base<br>flow | Wastewater<br>Treatment<br>Plant Effluent<br>Contribution | Well Water<br>Supplement<br>( <b>Grow-in<br/>only</b> ) | Total<br>Inflows   | Evaporation    | Surface<br>Discharge | Actual Irrigation<br>Usage | Total<br>Outflows |                    |
|           |  |                                  |                             |                                |                         |                      |                             |                     |   |   |                    |                |                      |                            |                   |                    |
| (Feet)    | (Feet)                                     | (Feet)                           | (1000 Gal)                  | (1000 Gal)                     | (1000 Gal)              | (1000 Gal)           | (1000 Gal)                  | (1000 Gal)          | (1000 Gal)  | (1000 Gal)  | (1000 Gal)         | (1000 Gal)     | (1000 Gal)           | (1000 Gal)                 | (1000 Gal)        | (1000 Gal)         |
| January   | 0.00                                       | 0.00                             | 13,564<br>12,538            | 0                              | 704<br>530              | 0                    | 4,692                       | 7,039               | 0   | 6,200<br>7,750  | 18,634<br>20,011   | 127<br>139     | 18,507<br>19,873     | 0                          | n/a               | 18,634<br>20,011   |
| February  | 0.00                                       | 0.00                             | 13,564<br>12,538            | 0                              | 580<br>548              | 0                    | 4,266                       | 6,399               | 0   | 5,600<br>7,000  | 16,845<br>18,213   | 172<br>188     | 16,673<br>18,025     | 0                          | n/a               | 16,845<br>18,213   |
| March     | 0.00                                       | 0.00                             | 13,564<br>12,538            | 0                              | 779<br>709              | 0<br>81              | 4,266                       | 6,399               | 0   | 6,200<br>7,750  | 17,644<br>19,205   | 318<br>347     | 17,326<br>18,858     | 0                          | n/a               | 17,644<br>19,205   |
| April     | 0.00                                       | 0.00                             | 13,564<br>12,538            | 0                              | 868<br>680              | 602<br>0             | 5,119                       | 7,678               | 0   | 6,400<br>7,500  | 20,267<br>20,978   | 615<br>671     | 19,652<br>20,306     | 0                          | n/a               | 20,267<br>20,978   |
| May       | 0.00                                       | 0.00                             | 13,564<br>12,538            | 3,840                          | 1,015<br>1,096          | 120<br>357           | 4,266                       | 6,399               | 0   | 6,200<br>7,750  | 18,000<br>19,868   | 763<br>832     | 13,397<br>15,195     | 3,840                      | 100%              | 18,000<br>19,868   |
| June      | 0.00                                       | 0.00                             | 13,564<br>12,538            | 8,777                          | 1,372<br>1,495          | 5,360<br>6,640       | 3,839                       | 5,759               | 0   | 6,000<br>7,500  | 22,330<br>25,233   | 923<br>1,007   | 12,630<br>15,449     | 8,777                      | 100%              | 22,330<br>25,233   |
| July      | 0.00                                       | 0.00                             | 13,564<br>12,538            | 12,091                         | 919<br>1,002            | 5,059<br>6,384       | 3,413                       | 5,119               | 0   | 6,200<br>7,750  | 20,709<br>23,688   | 1,017<br>1,110 | 7,601<br>10,467      | 12,091                     | 100%              | 20,709<br>23,688   |
| August    | 0.00                                       | 0.00                             | 13,564<br>12,538            | 8,252                          | 962<br>1,049            | 60<br>101            | 2,986                       | 4,479               | 0   | 6,200<br>7,750  | 14,687<br>16,366   | 827<br>902     | 5,608<br>7,211       | 8,252                      | 100%              | 14,687<br>16,366   |
| September | 0.00                                       | 0.00                             | 13,564<br>12,538            | 3,716                          | 628<br>676              | 0<br>27              | 2,559                       | 3,839               | 0   | 6,400<br>7,500  | 13,026<br>14,601   | 554<br>604     | 8,756<br>10,281      | 3,716                      | 100%              | 13,026<br>14,601   |
| October   | 0.00                                       | 0.00                             | 13,564<br>12,538            | 0                              | 509<br>535              | 120<br>256           | 2,986                       | 4,479               | 0   | 6,200<br>7,750  | 14,294<br>16,006   | 381<br>416     | 13,913<br>15,590     | 0                          | n/a               | 14,294<br>16,006   |
| November  | 0.00                                       | 0.00                             | 13,564<br>12,538            | 0                              | 390<br>412              | 0                    | 3,413                       | 5,119               | 0   | 6,400<br>7,500  | 14,921<br>16,443   | 246<br>269     | 14,675<br>16,175     | 0                          | n/a               | 14,921<br>16,443   |
| December  | 0.00                                       | 0.00                             | 13,564<br>12,538            | 0                              | 898<br>799              | 3,613<br>4,620       | 3,839                       | 5,759               | 0   | 6,200<br>7,750  | 20,310<br>22,767   | 127<br>139     | 20,183<br>22,628     | 0                          | n/a               | 20,310<br>22,767   |
| TOTAL     | n/a  | n/a                              | n/a                         | 36,677                         | 9,623<br>9,532          | 14,935<br>18,465     | 45,644                      | 68,466              | 0   | 73,000<br>91,250  | 211,669<br>233,357 | 6,071<br>6,623 | 168,921<br>190,057   | 36,677                     | n/a               | 211,669<br>233,357 |