WATCHTOWER EDUCATIONAL CENTER AMENDED SITE PLAN

FINAL ENVIRONMENTAL IMPACT STATEMENT

2011

Lead Agency: Town of Patterson Planning Board

Applicant: Watchtower Bible and Tract Society of New York, Inc.

Prepared by: Watchtower Bible and Tract Society of New York, Inc., in consultation with AKRF Engineering, P.C.

Watchtower Educational Center
Amended Site Plan

Final Environmental Impact Statement (FEIS)

Project Name: Watchtower Educational Center Amended Site Plan

Project Location: NYS Route 22, Town of Patterson, Putnam County, New York

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DEIS Acceptance Date: July 29, 2010

FEIS Acceptance Date: December 1, 2011

This document is the Final Environmental Impact Statement for the above-referenced project. Copies are available for review at the office of the Lead Agency. A copy of this document has also been made available on the Internet at the following address: www.pattersonny.org.

This document, by reference, incorporates the Watchtower Bible and Tract Society – Amended Site Plan Draft Environmental Impact Statement (DEIS), accepted as complete on July 29, 2010, and published on August 6, 2010.

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Table of Contents

LIST OF APPENDICES

*Appendix F to be provided separately in Volume 2.

List of Tables

List of Figures

Figure No.

Drawing Set

*To be provided separately in Volume 2

✷

Chapter 1: Project Description

A. INTRODUCTION

The Watchtower Bible and Tract Society of New York, Inc., (the "Applicant") proposes to expand the Watchtower Educational Center (WEC) in the Town of Patterson, located on New York State (NYS) Route 22 approximately one mile south of Route 311. This action requires an amendment to the WEC's existing site plan.

In compliance with the State Environmental Quality Review Act (SEQRA), the Applicant prepared a Draft Environmental Impact Statement (DEIS), which was submitted to the Town of Patterson Planning Board on June 1, 2010. The DEIS was accepted for circulation on July 29, 2010, and a public hearing was held on September 2, 2010, to review the content of the DEIS and solicit comments (see Appendix I.1). The deadline for receipt of comments was October 7, 2010.

This Final Environmental Impact Statement (FEIS) provides an update to the information supplied in the DEIS and is organized as follows:

- Chapter 1 provides an updated description of the proposed action, including modifications to the proposed project in response to DEIS comments and design development that was necessary to fully address the DEIS comments received;
- Chapter 2 summarizes the potential environmental impacts and proposed mitigation measures of the proposed action; and,
- Chapter 3 includes responses to the comments received during the public review process.
- Appendices include correspondence since the DEIS was issued, revised portions of the DEIS, and additional supporting documentation.

The DEIS is hereby incorporated by reference as part of this document.

B. UPDATED DESCRIPTION OF THE PROPOSED PROJECT

The proposed project has been further developed to address the public comments received on the DEIS and to conform to new stormwater regulations promulgated since the issuance of the DEIS. Additionally, some clarification to the information provided in the DEIS was requested. These changes and clarifications are outlined below. Changes in environmental impacts are discussed in Chapter 2 of this FEIS.

1. **Project Description.**

    a. **Residents**. The proposed project will accommodate a maximum of 2,275 residents (2,200 on-site residents plus 75 commuters who live off-site), an increase of 661 from existing conditions. The DEIS previously documented impacts based on 500

additional residents. It should be noted that this increase in residents is not due to an increase in the proposed building area. Rather, the increase is a result of how the site population was reported in the DEIS. Environmental impacts were previously assessed based on the 15-year historical average number of residents on site and the applicant's previous and future operational strategy of maintaining a buffer of vacant rooms. However, based on review comments from the Town of Patterson Planning Board, the environmental impacts are now evaluated based on the maximum potential number of residents that can be accommodated on site as determined by the number of dwelling units on site. It should be noted that it is highly unlikely that the number of residents would reach this maximum value given that the applicant will still need to maintain a buffer of vacant rooms to accommodate residents who are displaced as a result of maintenance or other reasons.

b. **Dwelling Units**. One residence building (G Residence) will be constructed with a maximum of 289 dwelling units (studio and one-bedroom units). An existing residential building (A Residence), will be renovated to accommodate up to 28 additional dwelling units, for an increase of 317 dwelling units in both the A and G Residence Buildings. The DEIS previously documented impacts based on the construction of two new residential buildings with an increase of between 250 and 280 dwelling units.

c. **Buildings**. The previously proposed H Residence, Recycling Building, Visitor Services Center, South Services Building expansion, and diesel fuel tank near the Warehouse have been removed from the proposed project. Additionally, the Maintenance, Office and G Residence Buildings have been reconfigured, while a Visitor's Comfort Station and three Picnic Pavilions have been added. The total new gross floor area proposed is 903,400 square feet as compared to 904,000 square feet in the DEIS.

d. **Recreational Facilities**. The previously proposed steam room in the Maintenance Building has been removed from the project. Instead, two new basketball courts (one full court and one half court) and two racquetball courts will be constructed in the proposed Maintenance Building.

e. **Parking**. The visitor parking lot layout has been modified since the DEIS was issued to eliminate the encroachment in the watercourse setback. The overall site will include 1,937 total parking spaces, an increase of 571 (398 garaged spaces, 173 surface spaces) from existing conditions. The DEIS previously documented impacts based on 434 (351 garaged spaces, 83 surface spaces) additional parking spaces. This increase accounts for the maximum site population, as explained above in paragraph "a".

f. **Impervious Cover**. The revised building layout has resulted in a reduction of proposed impervious cover on site. The proposed project will include 407,794 square feet of additional impervious cover. The DEIS previously documented impacts based on 444,478 square feet of additional impervious cover.

g. **Miscellaneous.** The maintenance work on the existing mobile concrete batch plant includes needed modifications to the aggregate bins and temporary boiler replacement using natural gas. The proposed project includes eventual dismantling and removal of the plant.

h. **Site Plan**. Figure 2-1 shows the layout of the proposed site plan, which has been modified from the one shown in the DEIS in response to comments received and further design development.

2. **Land Use, Zoning, and Public Policy.** The heights of four of the proposed buildings have been modified as shown in Table 1-1.

Table 1-1

Revised Buildings Requiring Variance for Height

New Building	DEIS Height (ft)	FEIS Height (ft)
Maintenance Building	67	76
G Residence	64	76
North Addition to Audio Visual Building	31	47
West Addition to Audio Visual Building	45	39

3. **Geology, Soils, and Topography**. The site disturbance has reduced as a result of the updated site plan. Table 1-2 outlines the significant reductions to limits of disturbance, excess fill and excavated material, and bedrock and steep slope disturbances.

Table 1-2

Changes in Geology, Soils and Topography

Parameter	DEIS Value	FEIS Value
Limits of Disturbance	2,138,529 ft^2 (49.1 acres)	2,108,300 ft2 (48.4 acres)
Excess Fill	85,524 yd^3	37,142 yd^3
Bedrock Disturbance	42,910 yd^3	13,587 yd^3
Steep Slopes Disturbance (25% or greater)	5.6 acres	3.49 acres
Excavated Material	196,088 yd^3	133,067 yd^3

4. **Water Supply and Utilities**. The amount of water demand and wastewater generation have been modified from the values presented in the DEIS based on the maximum potential dwelling unit population as described above. Since commuters do not spend the night on the site, their impact to water demand and wastewater generation was assumed to be 60 percent of an on-site resident. Thus, after additional water conservation features are implemented in the proposed project, the average daily water demand is projected to be approximately 134,000 gpd, while peak daily demand is projected to be 233,000 gpd. The DEIS previously documented impacts based on an estimated average daily demand of 142,980 gpd and a peak daily demand of 218,600 gpd. The highest monthly average wastewater demand is projected to be 124,000 gpd. The DEIS previously documented impacts based on an average monthly demand of 154,400 gpd.

The total maximum monthly solid waste generation for the proposed 2,200 residents plus 75 commuters will be 115.7 tons per month. The DEIS previously documented impacts based on 91.7 tons per month.

The new diesel fuel tank that had been proposed near the stream setback adjacent to the existing Warehouse has been removed from the scope of work.

5. **Stormwater Management**. The Stormwater Pollution Prevention Plan (SPPP) (see Appendix F) has been designed around the August 2010 *New York State Stormwater Management Design Manual (NYSSMDM)*. The previously submitted SPPP was designed based on the 2008 regulations. Although the DEIS was submitted prior to promulgation of the 2010 regulations, the applicant is voluntarily making an effort to implement green practices on-site, which is one of the significant design changes that was included in the 2010 update of the *NYSSMDM*. This voluntary compliance with the 2010 *NYSSMDM* was one of the design changes requested during the public review process. As a result of this change, stormwater treatment practices will include vegetated green roofs, bioretention ponds, and pervious pavers.

6. **Surface Water and Wetlands**. In the DEIS, permanent buffer disturbance included areas within the 100-foot stream or wetland buffer that were disturbed by regrading. These areas will be revegetated. However, they will not include impervious surfaces; thus, they are classified as temporary rather than permanent disturbances in the FEIS. The revised site plan results in 43,951 square feet of encroachment in the 100-foot wetland buffers as regulated by the Town of Patterson; 33,348 square feet of this area will be temporarily disturbed and returned to its preexisting condition after construction for a net total encroachment of 10,603 square feet. The DEIS previously documented impacts based on 48,994 square feet of buffer encroachment. Of this total, 15,627 square feet would have been temporary encroachment resulting in a net total of 33,367 square feet of buffer encroachment. Revised Figure 8-4 shows the new areas of buffer encroachment.

7. **Traffic**. Site generated traffic volumes were recalculated based on the maximum potential population of 2,275. This value includes both the maximum number of residents based on the number of dwelling units and commuters. The DEIS previously documented impacts based on a population of 2,050, which only included residents. As a result, Chapter 10, "Traffic, Parking, and Public Transportation," has been revised and is included in Appendix H.10.

8. **Construction**. Construction phasing for the proposed project has been revised since the DEIS was submitted (see revised Figures 14-1A and 14-1B). The proposed project is expected to be constructed in 11 phases, with between approximately 3 and 10 acres of disturbed area in each phase. The duration of site disturbance is projected to last 945 days. The DEIS previously documented impacts based on 10 construction phases with a maximum site disturbance of 9.3 acres per phase and a duration of 815 days.

   Additionally, the "north pasture" area has been selected for the disposal of excess spoil material. The DEIS documented impacts based on both this area and the area previously preferred, the "excess soil deposition area."

Chapter 2 discusses the environmental impacts of the foregoing changes.

Chapter 2: Discussion of Potential Environmental Impacts for the Updates to the Proposed Project

Chapter 2: Discussion of Potential Environmental Impacts for the Updates to the Proposed Project

A. INTRODUCTION

The following sections describe adjustments and changes to environmental impacts that are a result of the project updates discussed in Chapter 1.

B. LAND USE, ZONING, AND PUBLIC POLICY

Based on information provided in the 2007 Putnam County GIS database, the Town includes 4,654 parcels. There are nine major parcel classification categories: 1) agricultural, 2) residential, 3) vacant, 4) commercial, 5) recreational, 6) community service, 7) industrial, 8) public service, and 9) public parks, wild, forested and conservation. Table 2-1 provides a summary of the nine major land use categories, while revised Figure 3-1, "Existing Land Use," depicts parcels using these major classification codes. The database also includes 110 parcels which were not assigned a use category. These parcels are shown as "unclassified" in Table 2-1.

Table 2-1

Town of Patterson Summary of Land Use

Category	Description	Parcel Count	Percent of Total Parcels	Acres	Percent of Total Acres
100	Agricultural	13	0.3%	642.12	3.2%
200	Residential	3,153	67.7%	6,665.76	33.3%
300	Vacant Land	1,139	24.5%	7,220.83	36.1%
400	Commercial	122	2.6%	590.48	2.9%
500	Recreational	8	0.2%	455.67	2.3%
600	Community Service	68	1.5%	1,907.16	9.5%
700	Industrial	9	0.2%	157.06	0.8%
800	Public Service	11	0.2%	135.82	0.7%
900	Public Parks, Wild, Forested and Conservation	21	0.5%	1,492.81	7.5%
Unclassified	Unclassified	110	2.4%	738.46	3.7%
Totals		**4,654**	**100.0%**	**20,006.17**	**100.0%**
Source: New York State Office of Real Property Services, Putnam County GIS 2007					

DEIS comments requested clarification on the classification of vacant land. The 2007 Putnam County GIS Database assigns a use category to vacant land; thus, vacant land has been depicted on revised Figure 3-1 by its classification category. Table 2-2 provides a summary of vacant land uses.

Table 2-2

Town of Patterson Summary of Vacant Land Uses

Property Classification Code	Description	Parcel Count	Percent of Total Parcels	Acres	Percent of Total Acres
311	Residential Vacant Land	904	79.4%	1,474.90	20.4%
312	Residential Land Including a Small Improvement (not used for living accommodations)	47	4.1%	755.92	10.5%
313	Unclassified	1	0.1%	83.58	1.2%
314	Rural Vacant Lots of 10 Acres or Less	10	0.9%	66.63	0.9%
321	Abandoned Agricultural Land	1	0.1%	32.09	0.4%
322	Residential Vacant Land Over 10 Acres	91	8.0%	4,069.64	56.3%
330	Vacant Land Located in Commercial Areas	57	5.0%	607.32	8.4%
331	Commercial Vacant Land with Minor Improvements	1	0.1%	0.17	0.0%
340	Vacant Land Located in Industrial Areas	2	0.2%	25.72	0.4%
380	Public Utility Vacant Land	25	2.2%	104.86	1.5%
Totals		**1,139**	**100.0%**	**7,220.83**	**100.0%**
Source: New York State Office of Real Property Services, Putnam County GIS 2007					

As stated in the DEIS, the Patterson Town Zoning Code limits the height of structures in the R-4 zoning district to 38 feet. Since the buildings exceed this height limit, a variance will be required from the Patterson Zoning Board of Appeals (ZBA), which was also the case in the DEIS. (Refer to Chapter 1, Table 1-1, *Buildings Requiring Variance for Height*.) Although the building heights have been revised from what was documented in the DEIS, the proposed project will remain in context with existing structures. A portion of the increase in building height is a result of raising the buildings to minimize bedrock excavation. Furthermore, a mechanical equipment room was added to the roof of the North Addition of the Audio/Video Building, while one floor was also added to the G Residence and Maintenance Buildings. None of the proposed structures will be taller than 76 feet, which was approved in the February 11, 1988, ZBA resolution granting previous height variance for the buildings on site. The proposed building coverage will remain at 186,000 square feet as presented in the DEIS. The revised building layout has resulted in a reduction of proposed impervious cover on site. The proposed project will include

407,794 square feet of additional impervious cover. The DEIS previously documented impacts based on 444,478 square feet of additional impervious cover.

C. COMMUNITY SERVICES AND FACILITIES

A further reduction in the potential impacts to community services and facilities is expected since additional recreational facilities will be provided on-site. These additional facilities will include two new basketball courts (one full court and one half court) and two racquetball courts. No other potential impacts to community services and facilities as documented in the DEIS, are being proposed.

D. GEOLOGY, SOILS, AND TOPOGRAPHY

Revisions to the site plan resulted in adjustments to the cut and fill plan, area of slope disturbance, and area of expected bedrock removal. Updated Figures 5-2, 5-4, 5-5, and 5-6 are provided in this FEIS.

The proposed area of disturbance will be approximately 48.4 acres, which is slightly less than the area of disturbance reported in the DEIS. Excavation volume has been reduced by 63,000 cubic yards and excess spoil volume has been reduced by 48,383 cubic yards from values reported in the DEIS.

E. WATER SUPPLY AND UTILITIES

The previous water and wastewater engineering reports included in the DEIS used average population counts per New York State reporting standards. These average values were less than the maximum site population based on the number of dwelling units proposed. The more than 15-year operational history at the existing facility supports the reduction in average population count from maximum permitted due to ongoing facility operation and maintenance needs. While the applicant recognizes that the proposed facility will never function at the maximum potential population, the analysis has been revised to use the maximum site population counts as requested in the review of the DEIS instead of the average values.

The average daily water demand is projected to be approximately 134,000 gpd, while peak daily demand is projected to be 233,000 gpd. The water treatment facility is permitted for an average flow rate of 165,000 gpd, which is sufficient to treat the water supply required for the maximum potential site population based on the number of dwelling units proposed. Additionally, the water treatment facility has a permitted peak daily capacity of 330,000 gpd, which also is sufficient to treat peak daily water demand. Furthermore, the applicant proposes to implement water conservation measures, as outlined in the DEIS, that would further reduce potable water demand by approximately 20,000 gpd. Thus, average and peak daily demands will be 114,000 gpd and 213,000 gpd, respectively. Refer to Appendix D.1 for the revised Water System Engineering Report. Figures 6-2 and 6-3 have also been revised to show the elimination of the Recycling Building and the change in the wastewater treatment plant flow meter location.

The highest monthly average wastewater flow is projected to be approximately 124,000 gpd. The wastewater treatment plant is permitted for a monthly average flow of 165,000 gpd, which is sufficient to treat the wastewater generated by the maximum potential site population. The projected wastewater flow is typically less than the potable water flow since a portion of the

water used does not reach the wastewater treatment plant. An example of this diverted flow is at the cooling towers where the water is evaporated.

New buildings will include separate risers for toilet flushing which will allow for the possibility of additional water conserving features such as a future non-potable water system should that prove to be economically feasible in the future.

The average amount of municipal solid waste generated is 3.39 pounds per capita per day. This is below the national average published by EPA (for 2007) of 4.60 pounds per day. The total maximum monthly solid waste generation for the proposed 2,200 residents plus 75 commuters will be 115.7 tons per month, an increase of 33.8 tons per month from existing conditions. The applicant will continue to use private vendors to care for its solid waste removal.

Also, the new diesel fuel tank that had been proposed near the stream setback adjacent to the existing Warehouse has been removed from the scope of work.

F. STORMWATER MANAGEMENT

Although the NYSDEC is not requiring compliance with the regulations outlined in the *2010 New York State Stormwater Management Design Manual* (*NYSSMDM*), the applicant will voluntarily implement green infrastructure practices, which are now considered as the primary means of stormwater treatment in the 2010 regulations. (See Appendix F.4—DOW—1.2.5: *New York State Stormwater Management Design Manual* 2010 Update Transition Policy). The Stormwater Pollution Prevention Plan (SPPP) has been revised to account for changes in the site plan and the implementation of green infrastructure practices. A summary is included below with a complete SPPP report in Appendix F.1. DEIS Chapter 7 has also been revised and is included in Appendix F.2.

Water Quality Analysis

Due to the project being located in a phosphorus-restricted watershed, the required water quality volume (WQv) for the drainage areas was computed using the SCS Method discussed in Chapter 10 of *NYSSMDM*. For the Project Site, the 1-year, 24-hour rainfall event generates 3.1 inches of rainfall. A summary of WQv is provided in Table 2-3 Summary of Water Quality Volume.

Table 2-3 Summary of Water Quality Volume

Design Point	Drainage Area	Total Area (ft^2)	Required WQv (ft3)	WQv Green Practices (ft3)	WQv Standard Practices (ft3)	Total Provided WQv (ft3)
1	5B	160,069	0	0	0	0
2	2	9,470	0	0	0	0
3	3	64,709	0	0	0	0
4	4	53,831	0	0	0	0
5	5A	99,419	0	0	0	0

Design Point	Drainage Area	Total Area (ft^2)	Required WQv (ft3)	WQv Green Practices (ft3)	WQv Standard Practices (ft3)	Total Provided WQv (ft3)
6	6A	448,448	1,114	1,114	1,114	2,228
6	6B[1]	313,226	0	0	0	0
7	7	70,915	0	0	0	0
8	8A	305,343	0	0	0	0
8	8B_1	59,869	10,724	7,683	13,765	21,448
8	8B_2	99,854	20,894	20,820	20,894	41,714
8	8B_3	187,200	16,668	16,668	16,668	33,336
8	8B_4	84,340	12,487	12,487	12,487	24,974
8	8B_5	56,887	3,685	3,685	3,685	7,370
8	8B_6	15,924	2,982	2,982	2,982	5,964
8	8B_7	21,302	2,408	2,408	2,408	4,816
8	8B_8	25,906	4,021	4,021	4,021	8,042
8	8B_9	67,701	13,315	4,694	21,936	26,630
8	8B_10	21,222	3,667	3,667	3,667	7,334
8	8B_11	38,389	6,713	6,713	6,713	13,426
8	8B_12	43,274	6,127	6,127	6,127	12,254
8	8B_13	28,114	0	0	0	0
8	8C	75,280	15,013	15,013	15,013	30,026
9	9	508,290	11,259	0	11,259	11,259
10	10	64,816	5,626	0	5,626	5,626
12	12	24,403	746	746	0	746
13	13	11,691	907	907	0	907
14	14A	2,870	686	686	0	686
14	14B	5,683	271	271	271	542
15	15A	36,566	0	0	0	0
15	15B	2,642	668	668	0	668
16	16[2]	221,955	0	0	0	0
17	17	295,163	0	0	0	0
18	18	393,128	0	0	0	0
19	19	507,219	0	0	0	0

Design Point	Drainage Area	Total Area (ft^2)	Required WQv (ft3)	WQv Green Practices (ft3)	WQv Standard Practices (ft3)	Total Provided WQv (ft3)
Grand Total		**4,425,118**	**139,981**	**111,360**	**148,636**	**259,996**

Notes:

1. DA -6B, Sub-basin 1 comprises an area of approximately 442,000 square feet and will include approximately 925 square feet (0.2 %) of proposed pavement area that results from increasing the turning radius of the existing road. Since the quantity of additional impervious area is so small compared to the total drainage basin area and location of improvement precludes a practice, no treatment of the water quality volume was provided.

2. DA-16 will include approximately 426 square feet of proposed sidewalk, or 0.2% of additional impervious area. Because the proposed impervious area is so small in comparison to the total drainage basin area, no treatment of the water quality volume was provided.

Phosphorus Loading Analysis

Excess amounts of phosphorus can lead to contamination and degradation of a water supply. Consequently, the State of New York has been actively engaged in minimizing the quantity of phosphorus that enters the East of Hudson watershed, which includes reservoirs used as a drinking water supply for New York City and surrounding areas.

In January 2009, the NYSDEC prepared a report entitled "Croton Watershed Phase II Phosphorus TMDL Implementation Plan" (see Appendix F.5). The purpose of this report was to identify a plan to reduce phosphorus pollution in the Croton watershed. According to the report, typical sources of phosphorus include: "stormwater runoff from impervious surfaces, agricultural land and construction sites, excessive fertilizer use, leachate from septic systems and effluent from wastewater treatment plants." This report also quantified the phosphorus reduction that should be achieved by each Town in the Croton watershed. For the Town of Patterson, the goal is to reduce phosphorus loading by 17.2 kg over a period of five years.

The Town of Patterson has taken positive steps to meet this goal. In December 2009, the firm of Malcolm-Pirnie prepared a report for the Putnam County MS4 Coordinating Committee in which ten stormwater retrofit projects were identified in the Town of Patterson (see Appendix F.6). Once implemented, these retrofits are projected to reduce the phosphorus loading in the watershed by 26.9 lbs (12.2 kg), which is 71 percent of the Town's five-year goal.

Additionally, the Owner of this proposed action has also taken an active role in reducing their "phosphorus footprint." For example, the phosphorus concentration of the existing orchard area is assumed to be similar to lawn areas, or 2.1 mg/L. (See Table A.2 in "The Simple Method to Calculate Urban Stormwater Loads," at http://www.dec.ny.gov/docs/water_pdf/simple.pdf). The orchard is being replaced by areas with lower phosphorus concentrations (roofs and driveways range between 0.11 mg/L to 0.56 mg/L). Furthermore, this SPPP has been developed based on criteria outlined in Chapter 10 of *2010 NYSSWDM*, which provides direction for the selection and sizing of stormwater practices that specifically reduce phosphorus in stormwater runoff. Thus, the proposed action results in a decrease of phosphorus loading when compared to existing conditions. As an additional demonstration of the Owner's commitment to reducing phosphorus

pollution, historical data has been included in Appendix F.7 of this SPPP quantifying the amount of phosphorus found in the effluent stream of the Owner's wastewater treatment plant.

Based on the existing land use and runoff from the 1-year, 24-hour storm event, the amount of phosphorus calculated to be present in stormwater runoff from the existing facility is 208.7 pounds (94.7 kg). Under proposed mitigated conditions, the phosphorus amount is expected to decrease to 196.3 pounds (89.0 kg), a reduction of 5.9 percent or 12.4 pounds (5.6 kg) from present conditions. Thus, this reduction contributes to the Town's overall goal of decreasing phosphorus pollution in the watershed as shown in Table 2-4 Pollutant Loading Pre- vs. Post-Development Values. Moreover, the combination of proposed project and the Town's ten stormwater retrofit projects should allow the Town to meet or exceed its 5-year phosphorus reduction goal. For detailed phosphorus calculations see SPPP Appendix F.1.F.

Table 2-4 Pollutant Loading Pre- vs. Post-Development Values

Design Point	Pre-Development Conditions (lbs)				Post-Development Conditions (lbs)			
	TSS	TP	TN	BOD	TSS	TP	TN	BOD
1	425.2	1.4	6.0	4.9	638.5	1.5	6.0	14.7
2	568.8	2.0	8.5	4.7	67.8	0.2	1.0	0.1
3	962.4	3.4	14.5	7.5	463.1	1.6	7.0	1.0
4	491.6	1.7	7.4	2.8	376.5	1.3	5.7	0.9
5	5,499.8	18.6	81.3	47.9	711.5	2.5	10.8	1.5
6	19,603.5	68.3	317.8	373.8	17,749.9	62.0	291.8	364.0
7	1,224.6	4.2	18.3	12.5	1,607.9	5.6	24.1	5.9
8	4,103.0	14.3	61.6	13.4	4,340.8	28.8	128.6	55.7
9	5,537.4	19.3	83.6	13.1	5,451.2	21.8	93.8	22.5
10	379.6	1.3	5.7	1.2	74.8	0.7	3.0	0.6
12	15.7	0.1	0.5	0.1	14.8	0.2	0.8	0.4
13	57.7	0.5	1.8	3.5	60.4	0.5	2.2	3.8
14	78.2	0.7	3.1	1.7	55.2	0.5	2.6	1.5
15	1,608.8	5.5	23.7	33.8	1,619.7	5.6	24.4	34.6
16	7,753.5	26.9	115.7	35.0	7,174.4	24.9	106.8	37.9
17	2,667.7	23.1	104.1	82.2	2,436.1	21.2	95.9	77.7
18	2,347.8	8.1	35.0	6.5	2,347.8	8.1	35.0	6.5
19	2,784.8	9.3	40.1	9.9	2,784.8	9.3	40.1	9.9
Totals:	***56,110.1***	***208.7***	***928.7***	***654.5***	***47,975.2***	***196.3***	***879.6***	***639.2***

Notes:

Design Point 11 is not used.

Phosphorus loading calculations were calculated using HydroCAD, which bases the stormwater concentration loads on subwatershed drainage area, impervious cover, stormwater runoff pollutant concentrations, and annual precipitation. The Simple Method estimates the pollutant loads based on the following equation from "The Simple Method to Calculate Urban Stormwater Loads" by NYSDEC:

$$L = 0.226 * R * C * A$$

Where:

L = Annual Load (pounds)

R = Annual Runoff (inches)

C = Pollutant Concentration (mg/l)

A = Area (acres)

0.226 = Unit Conversion Factor

Stormwater Management Practices have been included for both existing and proposed conditions to determine what the final annual pollutant load leaving the site will be. Suggested Removal rates have been referenced from Appendix A. Due to the project being located in a phosphorus restricted basin, at times two treatment practices will be required. In the event that some practices are located in series the following equation was used:

$$R = L\ [(E_1) + (1-E_1)\ E2 + (1-((E_1) + (1-E_1)\ E2)\ E3+\ldots]$$

Where:

R = Pollutant Removal (pounds)

L = Annual Loads from Simple Method (pounds)

E_i = Efficiency of the *ith* practice in a series

For detailed phosphorus removal calculations, see SPPP Appendix F.1.F.

Water Quantity Analysis

In order to determine the potential impacts associated with the project, existing and proposed condition hydrographs were generated using a Type III rainfall distribution based on Appendix B of the *Technical Release 55 Manual (TR-55)*. Rainfall depths for the design storm events were referenced from Chapter 4 of the *2010 NYSSMDM*. Data for the 1-year storm is more recent in the *2010 NYSSMDM*, while rainfall depths for the 10-year and 100-year storms are identical in both the *2008* and *2010 NYSSMDM*. The 24-hour rainfall depths for the 1-, 2-10-, 25-, and 100-year design storm events for the Project Site are listed in Table 2-5 Rainfall Depths, 24-Hour Storm Duration.

Table 2-5 Rainfall Depths, 24-Hour Storm Duration

Storm Event	Rainfall Depth (inches)
1-year	3.1
2-year	3.5
10-year	5.5
25-year	6.0
100-year	9.5

Runoff curve numbers (CN) and times of concentration (Tc) were computed using the NRCS TR-55 methodology. Additionally, peak stormwater flows for the existing and proposed conditions were computed using *HydroCAD's Stormwater Modeling Systems,* Version 9.1 (which is based on NRCS TR-20 methodology).

Table 2-6 Pre- and Post-Developed Peak Flow Comparison, provides a summary of the peak flows by design point for each storm event. Post-developed peak flow at all the design points has been maintained at or below the existing peak flow rates.

Table 2-6 Pre- and Post-Developed Peak Flow Comparison

Design Point	Pre-Development Conditions			Post-Development Conditions		
	1-yr	10-yr	100-yr	1-yr	10-yr	100-yr
1	1.0	2.9	6.4	0.7	2.2	5.6
2	0.7	3.3	8.8	0.5	2.4	7.0
3	1.2	5.4	14.6	0.9	3.7	9.4
4	1.5	4.4	10.0	1.3	3.9	8.7
5	8.6	29.3	70.4	2.5	16.9	16.9
6	24.0	50.2	98.6	22.5	46.6	91.8
7	3.0	6.8	13.3	2.1	5.6	12.1
8	7.5	21.0	45.7	5.4	14.7	42.3
9	10.8	31.7	70.8	8.2	28.2	70.5
10	1.3	3.9	8.6	1.2	3.8	8.6
12	0.4	1.4	3.2	0.3	1.1	3.2
13	0.5	0.9	1.6	0.5	0.9	1.6
14	0.4	0.9	1.8	0.3	0.8	1.6
15	2.2	4.2	7.7	2.2	4.2	7.7
16	6.6	16.8	35.4	6.5	16.1	34.1
17	14.1	27.7	51.0	13.9	27.2	50.2
18	7.8	23.6	53.4	7.8	23.6	53.4
19	11.7	38.1	89.0	11.7	38.1	89.0

Notes:

DP-11 is not used.

G. SURFACE WATER AND WETLANDS

The site plan has been designed to avoid direct impacts to wetlands and watercourses and to minimize disturbance within the 100-foot buffer area (adjacent area) of on-site streams and wetlands. In the FEIS, buffer disturbances resulting in new impervious areas are considered permanent disturbances, while regraded and revegetated areas are considered temporary

disturbances. The proposed project results in 43,951 square feet of encroachment in wetland buffers. Of this area, 33,348 square feet will be temporarily disturbed and returned to its preexisting condition after construction, leaving 10,603 square feet of permanently disturbed area inside the buffer. In contrast, the permanent buffer disturbance reported in the DEIS was 33,367 square feet because regraded (but pervious) areas were included in the calculation of permanent buffer disturbance. The total buffer disturbance reported in the DEIS was 48,994 square feet; thus, the revised site plan results in a decrease of approximately 5,000 square feet of total buffer disturbance and includes a reclassification of regraded areas from permanent to temporary buffer disturbance. Revised Figure 8-4 shows the areas of buffer encroachment.

In the limited areas of permanent stream buffer disturbance, new surfaces will be fitted with pervious pavers to allow infiltration of rainwater. A stormwater management plan will be implemented to avoid any impacts to streams/wetlands associated with increases in stormwater runoff. During the construction period, this will be achieved via erosion and sediment control practices. Over the long term, new stormwater management facilities will be installed to detain runoff and avoid water quality and flooding impacts for the life of the project. In sum, these project components would avoid any significant adverse impacts to on-site or off-site surface waters and wetlands.

H. NATURAL RESOURCES

As discussed in the DEIS, cut/fill calculations have determined that excess earth material to be excavated from the construction site cannot be fully accommodated as part of regrading within the primary area of construction and would require deposition elsewhere on the project site parcel (Lot #53 - 362.50-acre lot). The two soil deposition sites identified in the DEIS as the "excess soil deposition area" and the "north pasture area" were evaluated. The DEIS assessed impacts based on the "excess soil deposition area." In response to the public DEIS comments received, both of these areas were further evaluated and the advantages and disadvantages weighed. Although the DEIS, pages 8-8, 9, reported that the preferred deposition area is the "existing excess soil deposition area," the applicant has revised the proposed project design to use the "north pasture" as the soil deposition area. While it is true that a section of new road and a stream crossing will be required, the applicant proposes to use the north pasture area because it has the least environmental impact and allows for methodical restoration, as noted by the following points:

- The DEIS cited "excess soil deposition area" has the challenges of wetlands, rock outcrops, steep slopes, and extensive forest clear-cutting if used as the soil deposition area. These challenges do not exist for the north pasture area.
- Natural habitat will not be disturbed in the north pasture area as it is currently used for cow grazing. The north pasture can be returned to its present use for grazing cows once phased soil deposition is complete.
- The additional environmental impacts related with the DEIS proposed excess soil deposition area include: the clear-cutting required for the area, the limited usable land area in this location, and the quantity of excess soil to be deposited, which may impact the view shed. These challenges do not exist in the north pasture area.

- The Mountain Brook stream crossing is proposed to be a single-span bridge, thereby limiting construction activity to the \ area adjacent to the stream. There will be no disturbance to the stream itself. The area proposed to make this stream crossing was inspected by a wetland ecologist retained by the applicant and no wetland soils or vegetation were found.—See report in Appendix A.6.
- As noted by the Town ECI (letter dated December 8, 2009, in Appendix A.1), the pasture can be opened up in limited areas to provide a soil deposition area commensurate with the proposed phased site removal quantities. This will reduce visual impacts and allow for stabilization with pasture seed mix before filling a new section.
- The existing slopes in the north pasture area allow for more moderate erosion controls.
- The existing top soil can be temporarily stockpiled downslope in the pasture site and reused on the site once the limited phase area deposition is completed.

I. TRAFFIC, PARKING, AND PUBLIC TRANSPORTATION

The traffic study and associated DEIS chapter (Chapter 10, "Traffic, Parking, and Public Transportation") have been updated based on the maximum potential occupancy and maximum potential commuters (See Appendices H.9 and H.10). Additionally, future traffic volumes for signalized intersections were reassessed based on the Percentile Delay Methodology included in the Synchro traffic signal analysis software as currently required by NYSDOT. Unsignalized intersections were assessed based on the HCM methodology employed in the DEIS. The Percentile Delay methodology builds on the methodologies presented in the 2000 Highway Capacity Manual (HCM) for signalized intersections and differs from the 2000 HCM methodology by accounting for variations in traffic flow which often occur with the presence of actuated signals. Unsignalized intersections were assessed based on the HCM methodology included in the Synchro traffic analysis software (Synchro does not employ the Percentile Delay Methodology for unsignalized intersections) as currently required by NYSDOT. The DEIS previously assessed traffic volumes based on utilizing the Highway Capacity Software (HCS, based on the 2000 HCM methodology) for both signalized and unsignalized intersections as HCS was the traffic analysis software required at the time by NYSDOT.

As described in revised Chapter 10, "Traffic, Parking, and Public Transportation" (Appendix H.10), these adjustments do not significantly change the impacts to the roadway network. Therefore, the proposed amended site plan would have only a minimal effect on traffic on the surrounding roadway network and would not cause any significant impacts requiring mitigation.

J. AIR QUALITY

No changes to the potential impacts to air quality, as documented in the DEIS, are being proposed.

K. HISTORIC AND VISUAL RESOURCES

Although the proposed building heights noted in the FEIS are somewhat taller than in the DEIS, they are in harmony with the heights of the existing buildings. A visual comparison of the new and existing building elevations is included in Drawing A-201. The proposed project will not

result in a substantial change in the existing overall visual character of the area. Figures 12-18, 12-19, and 12-20 have been updated.

It should be noted that subsequent to circulation of the DEIS, the Phase IA Archaeological Documentary Study (included as Appendix G in the DEIS), which includes a protocol for future Phase IB field testing, was updated to incorporate public comments and was submitted to and accepted by the New York State Office of Parks, Recreation, and Historic Preservation (OPRHP). Additional correspondence with the New York State Office of Parks, Recreation and Historic Preservation OPRHP is included in Appendices A.4 and A.5.

L. ECONOMIC ANALYSIS

Based on comments received on the DEIS, more information would be required to conclusively quantify the project's economic benefits. However, data regarding the applicant's use of local and regional products and services is not available. Instead of performing exhaustive additional study to further support the applicant's comments in the DEIS, the applicant agrees to the Planning Board's position that the economic benefit has not been conclusively quantified. No changes to the potential impacts to the local and regional economy, as documented in the DEIS, are being proposed.

M. CONSTRUCTION

As described in FEIS Chapter 1, "Project Description," the previously proposed H Residence, Recycling Building, Visitor Services Center, South Services Building expansion, and diesel fuel tank near the Warehouse have been removed from the proposed project. Additionally, the Maintenance, Office and G Residence Buildings have been reconfigured, while a Visitor's Comfort Station and three picnic pavilions have been added. These adjustments resulted in changes to the limits of disturbance, cut and fill volumes and construction phasing plan. Furthermore, the excess spoils location has been changed to the "north pasture" as described above in Section H, "Natural Resources."

The limit of disturbance for the proposed project will encompass approximately 48.4 acres. This is 0.7 acres (or 1.4 percent) fewer than the limit of disturbance reported in the DEIS. Cut and fill volumes have been reduced based on the reconfiguration of the buildings and the elimination of others. Approximately 133,000 cubic yards of material are projected to be excavated during construction. Of this volume, approximately 96,000 cubic yards can be reused on different areas of the site for regrading and fill. The remaining 37,000 cubic yards will be deposited within the "north pasture" area.

Construction would occur over a period of approximately five years and will commence in September 2012. The construction of new buildings will be started in the following order:

- North Audio/Video Building
- G Residence
- Maintenance and North Office Buildings
- West Audio/Video Building
- Main Lobby Addition

Site work will be divided into 11 phases, lasting approximately 945 days as outlined in Table 2-7 below and shown in Figures 14-1A and 14-1B, "Construction Phases." This is an increase of 130 days from what was documented in the DEIS.

Table 2-7

Proposed Phasing for Areas of Soil Disturbance

Phase and Duration	Area of Disturbance Cut/Fill Net	Construction Activity
Preconstruction (10 Days)		Tree protection, perimeter erosion control, stabilized construction entrance (SCE) off of Route 22 Before any grading begins, complete the following: 1. Install tree protection at trees to be preserved. 2. Install perimeter dikes/swales and sediment fences at project limits. 3. Install storm drain inlet protection at existing inlets. 4. Install orange construction fencing.
Phase 1 (45 Days)	7.7 Acres 4048 cu yd / 4048cu yd 0 cu yd	Temporary construction sheds, rock crushing facility, construction trailers, staging & storage, haul roads 1. Install silt fences, dikes, & inlet protection for existing inlets. 2. Construct road to connect to existing road near existing concrete batch plant. 3. Excavate and install construction sheds at concrete batch plant. 4. Install construction shed and rock crushing facility at existing recreation area. 5. Install construction office trailer near existing concrete batch plant. 6. Excavate and blast loop road station 16+00 to 22+00. 7. Install underground utilities at loop road station 16+00 to 22+00 and at haul road. 8. Construct loop road station 16+00 to 22+00 and haul roads connecting new loop road to pond and batch plant. 9. Install construction office trailers and staging areas north of loop road & temporary utilities. 10. Begin clearing of access road off of Route 22. 11. Stabilize all areas with exception of access road off of Route 22.
Phase 2 (40 Days)	9.4 Acres 12,687 cu yd / 8685 cu yd 4002 cu yd	North Audio/Video Building, access and haul roads, staging/storage areas, pond embankment 1. Install silt fences, dikes, & inlet protection for existing inlets. 2. Blast and excavate at audio/video building. 3. Install temporary concrete surface for construction trailers and materials staging. Install retaining wall behind building. 4. Construct overflow/event parking area and retaining wall. 5. Construct staging/storage area and haul road to spoil area in north pasture. 6. Construct swales, dikes, and sediment trap at spoils area. Deposit excess soils at spoils area. 7. Construct permanent pond outlet and outfall. 8. Begin construction of pond embankment and outfall (temporary pond to be converted to permanent pond). 9. Stabilize all areas.
Phase 3 (120 Days)	8.3 Acres 53,262 cu yd / 53,262 cu yd 0 cu yd	Office Building, tunnel to powerhouse 1. Install silt fences, dikes, and inlet protection for existing inlets. 2. Excavate for foundation of Office and tunnel to bedrock. 3. Install underground utilities. 4. Construct loop road from station 0+00 to 16+00 and construct retaining walls. 5. Finalize sediment pond construction. 6. Stabilize all areas with exception of building excavation.

Phase and Duration	Area of Disturbance Cut/Fill Net	Construction Activity
Phase 4 (140 Days)	9.9 Acres 37,500 cu yd / 11,291 cu yd 26,209 cu yd	Maintenance and Office Buildings 1. Install silt fences, dikes, and inlet protection for existing inlets. 2. Excavate for foundation of Office and Maintenance Buildings to bedrock. 3. Blast bedrock at Office and Maintenance Buildings' foundations. 4. Place concrete slab on prepared subgrade. 5. Excavate and install sediment trap at Maintenance Building. 6. Install underground utilities. 7. Haul excess soils to spoils area. 8. Stabilize all areas.
Phase 5 (120 Days)	7.1 Acres 25,064 cu yd / 25,064 cu yd 0 cu yd	G Residence (south) and tunnel, sediment traps, Maintenance and Office Buildings and tunnel to Powerhouse 1. Excavate and install foundation of G Residence (south) and backfill. 2. Install underground utilities and storm inlets. 3. Install sediment trap at G Residence. 4. Excavate and install sediment trap at Maintenance Building. 5. Backfill at foundation walls of Maintenance and Office buildings and tunnel to Powerhouse. 6. Install inlet protection. 7. Stabilize all areas.
Phase 6 (210 Days)	4.5 Acres 17,956 cu yd / 21,800 cu yd 3,844 cu yd	G Residence (north), west Audio/Video Building, area around residence 1. Excavate and install foundation of G Residence (north) and backfill. 2. Grade area around G Residence. 3. Backfill at G Residence foundation walls. 4. Blast and excavate for west Audio/Video Building and tunnel foundation. 5. Haul backfill from spoils area and construct loop station 22+00 to end and construct adjacent parking areas. 6. Stabilize all areas.
Phase 7 (30 Days)	10.0 Acres	Final grading and soil restoration 1. Final grade area around buildings, staging area, and trailers. 2. Pave walkways, driveways, and parking areas. 3. Excavate and construct bioretention areas. 4. Perform soil restoration as described in New York State DEC "Deep-Ripping and Decompaction", April 2008. 5. Stabilize all areas with permanent landscaping.
Phase 8 (30 Days)	2.8 Acres	Final grading and soil restoration 1. Demolish existing gravel road. 2. Perform final grading. 3. Pave walkways, driveways, and parking areas. 4. Excavate and construct bioretention areas. 5. Perform soil restoration as described in New York State DEC "Deep-Ripping and Decompaction", April 2008. Stabilize area with permanent landscaping. 6. Permanently stabilize all areas with permanent landscaping.

Phase and Duration	Area of Disturbance Cut/Fill Net	Construction Activity
Phase 9 (120 Days)	6.6 Acres 998 cu yd / 5022 cu yd 998 cu yd	Bus and Visitor Parking Lot, Main Lobby Addition, dining room expansion, Visitor Comfort Station and picnic areas, parking at E Residence and F Residence and Patterson Inn, pedestrian bridge, walkways, security gate, soil restoration 1. Excavate and construct building foundation at lobby. 2. Excavate and construct building foundation at dining room expansion. 3. Haul excess soils to spoils area. 4. Construct bus and visitor parking lots. 5. Construct Visitor Comfort Station and picnic areas. 6. Construct parking at E and F Residences and at Inn. 7. Construct walkways and pedestrian bridge. 8. Reconstruct gate house and Install security gate. 9. Install underground utilities. 10. Pave parking lots, drives, and walkways. 11. Construct bioretention areas. 12. Remove sheds, rock crusher, trailers and repair recreation areas as needed. 13. Perform soil restoration as described in New York State DEC "Deep-Ripping and Decompaction", April 2008. Stabilize area with permanent landscaping. 14. Permanently stabilize all areas with permanent landscaping.
Phase 10 (40 days)	9.7 Acres	Stormwater pond, landscaping storage bins, batch plant, haul roads, trailers, sheds 1. Demolish batch plant, construction trailers, and sheds. 2. Remove haul roads from new loop road to pond. 3. Install permanent landscaping storage area. 4. Perform soil restoration as described in New York State DEC "Deep-Ripping and Decompaction", April 2008. Stabilize area with permanent landscaping. 5. Permanently stabilize all areas with permanent landscaping.
Phase 11 (40 days)	9.0 Acres	Spoils area, haul road, and staging area 9. Demolish haul road and staging area. 10. Perform final grading of spoils area. 11. Perform soil restoration as described in New York State DEC "Deep-Ripping and Decompaction", April 2008. Stabilize area with permanent landscaping. 12. Permanently stabilize all areas with permanent landscaping.
Total Duration: 945 Days		
Notes: Total duration of 945 days is for site disturbance only. Total construction duration will be approximately 5 years.		

In accordance with Part II.C.3 of SPDES General Permit for Stormwater Discharges (GP-0-10-001), a waiver will be sought from the Town of Patterson, as a regulated traditional land use control MS4, for disturbances greater then five (5) acres. In addition, the applicant will comply with the following requirements of the permit:

a. The owner or operator shall have a qualified inspector conduct at least two (2) site inspections in accordance with Part IV.C. every seven (7) calendar days, for as long as greater than five (5) acres of soil remain disturbed. The two (2) inspections shall be separated by a minimum of two (2) full calendar days.

b. In areas where soil disturbance activity has been temporarily or permanently ceased, temporary and/or permanent soil stabilization measures shall be installed and/or implemented within seven (7) days from the date the soil disturbance activity

ceased. The soil stabilization measures selected shall be in conformance with the most current version of the technical standard, New York State Standards and Specifications for Erosion and Sediment Control.

c. The owner or operator shall prepare a phasing plan that defines maximum disturbed area per phase and shows required cuts and fills.

d. The owner or operator shall install any additional site specific practices needed to protect water quality.

e. The owner or operator shall include the requirements above in their SPPP.

N. UNAVOIDABLE ADVERSE IMPACTS

No changes to the unavoidable adverse impacts documented in the DEIS are being proposed, except that the area of disturbance will decrease from 49.1 acres to 48.4 acres and new impervious surfaces will make up 9.4 acres. The DEIS previously reported that 10.2 acres of new impervious area would be added.

O. ALTERNATIVES

No changes to the scope of the alternatives documented in the DEIS are being proposed. In some cases changes to the proposed project also affected one or more of the alternatives. A summary table is provided in Table 2-8 with these changes shown in bold text. None of these alternatives would adequately meet the needs of the applicant while effectively conserving the greatest number of environmental resources.

Table 2-8
Summary Comparison of Alternatives

Potential Impacts	Proposed Project (as Presented in DEIS)	Revised Proposed Project	No Action Alternative	As-of-Right Alternative[1]	Reduced Project Size Alternative	Alternative Use
Project Description						
New Building Coverage	186,000 sf	186,000 sf	0 sf	307,000 sf	152,000 sf	91,250 sf
Total Building Coverage	715,542 sf	715,542 sf	529,711 sf	836,711 sf	681,711 sf	620,961 sf
Additional Impervious Surface Coverage	444,478 sf	407,794 sf	0 sf	579,706 sf	402,998 sf	1,850,000 sf
New Gross Floor Area	904,000 sf	903,400 sf	0 sf	902,000 sf	904,000 sf	182,500 sf - 219,000 sf[2]
Total Gross Floor Area	2,845,256 sf	2,845,256 sf	1,941,256 sf	2,843,256 sf	2,845,256 sf	2,123,756 sf - 2,160,256 sf
Maximum Building Height	76 ft	76 ft	75 ft	38 ft	111 ft	2 ½ stories
Number of New Parking Spaces	434 spaces	571 spaces	0 spaces	571 spaces	571 spaces	146 spaces[3]
Land Use, Zoning, and Public Policy						
Variances	Building Height; Fence Height	Building Height; Fence Height	None	Fence Height	Building Height; Fence Height	None
Waiver	Parking Dimensions	Parking Dimensions	None	Parking Dimensions	Parking Dimensions	None
Zoning Use	Permitted Use w/Special Permit	Permitted Use w/Special Permit	Permitted Use w/Special Permit	Permitted Use w/Special Permit	Permitted Use w/Special Permit	Permitted Use
Comprehensive Plan	Complies	Complies	Complies	Contradicts	Complies	Contradicts
Community Services and Facilities						
Police, Fire and EMS	Onsite security and routine and emergency medical services; Fire-resistant construction	Onsite security and routine and emergency medical services; Fire-resistant construction	No Impact	Onsite services; Lower buildings	Onsite services; Taller buildings	Relies on Town services; Single-family housing typically greater tax burden than benefit
Schools	No School-Age Children	No School-Age Children	No School-Age Children	No School-Age Children	No School-Age Children	Generates school-age children
Parks and Recreation	Onsite recreation	Onsite recreation	Onsite recreation	Onsite recreation	Onsite recreation	Municipal recreation
Geology, Soils, and Topography						
Limit of Disturbance Area	2,138,529 sf (49.1 acres)	2,108,300 sf (48.4 acres)	0 sf (0 acres)	2,361,646 sf (54.2 acres)	1,970,844 sf (45.2 acres)	7,400,000 sf (169.9 acres)
Excess Fill	85,524 cu yd	37,142 cu yd	0 cu yd	211,434 cu yd	0 cu yd	100,000 cu yd
Bedrock Disturbance	42,9210 cu yd	13,587 cu yd	0 cu yd	40,226 cu yd	24,194 cu yd	Unknown
Steep Slopes Disturbance (greater than or equal to 25%)	5.6 acres	3.49 acres	0 acres	5.8 acres	4.8 acres	62.8 acres
Excavated Material	196,088 cu yd	133,067 cu yd	0 cu yd	285,270 cu yd	98,343 cu yd	320,000 cu yd

Table 2-8
Summary Comparison of Alternatives

Potential Impacts	Proposed Project (as Presented in DEIS)	Revised Proposed Project	No Action Alternative	As-of-Right Alternative[1]	Reduced Project Size Alternative	Alternative Use
Water Supply and Utilities						
Water Demand[4]	50,548 gpd (29,048 gpd)	41,570 gpd (21,570 gpd)	0 gpd	41,570 gpd (21,570 gpd)	41,570 gpd (21,570 gpd)	58,400 gpd
Wastewater Generation[4]	50,548 gpd (29,048 gpd)	31,570 gpd	0 gpd	31,570 gpd	31,570 gpd	58,400 gpd
Electricity / Gas	0.9 MW / 200 Dth	0.9 MW / 200 Dth	0 MW / 0 Dth	0.9 MW / 200 Dth	0.9 MW / 200 Dth	Unknown
Solid Waste		46.46 tons/ month	0 tons/month	46.46 tons/ month	46.46 tons/ month	Unknown
Stormwater						
Runoff (2-year event)[5]	3.66 acre-feet	4.25 acre feet	0 acre-feet	4.23 acre-feet	3.45 acre-feet	Greater Impact Replacement of wooded areas with lawns
Surface Water and Wetlands						
Buffer Disturbance	33,367 sf (permanent) 15,627 sf (temporary)	10,603 sf (permanent) 33,348 sf (temporary)	0 sf	61,881 sf	33,853 sf (permanent) 14,785 sf (temporary)	125,000 sf
Natural Resources						
Limit of Disturbance Area	2,138,529 sf	2,108,300 sf	0 sf	2,361,646 sf	1,970,844 sf	7,400,000 sf
T/E Species	No Adverse Impact	No Adverse Impact	No Impact	Greater habitat area disturbed	No Adverse Impact	Habitat Fragmentation
Traffic						
Weekday AM Peak	16 trips	21 trips	0 trips	21 trips	21 trips	56 trips
Weekday PM Peak	47 trips	82 trips	0 trips	82 trips	82 trips	75 trips
Weekday late evening peak	63 trips	82 trips	0 trips	82 trips	82 trips	Less
Saturday midday peak	64 trips	83 trips	0 trips	83 trips	83 trips	66 trips
Air Quality						
	No Adverse Impacts	No Adverse Impacts	No Impact	No Adverse Impacts	No Adverse Impacts	No Adverse Impacts
Historic and Visual Resources						
Historic and Architectural Resources	No Adverse Impacts	No Adverse Impacts	No Impact	No Adverse Impacts	No Adverse Impact	Potential Impact to Rocco's Diner
Archaeological Resources	3 potentially sensitive areas	2 potentially sensitive areas	No Impact	Requires APE Expansion	1 potentially sensitive area	Requires APE Expansion
Visual Resources	Consolidated Construction	Consolidated Construction	No Impact	Greater Sprawl	Consolidated Construction; Taller buildings	Greater Sprawl; Inconsistent with existing Rt 22 character

Table 2-8
Summary Comparison of Alternatives

Potential Impacts	Proposed Project (as Presented in DEIS)	Revised Proposed Project	No Action Alternative	As-of-Right Alternative[1]	Reduced Project Size Alternative	Alternative Use
Socioeconomics						
Construction Employment	1,173 person years	1,173 person years	0 person years	1,173 person years	1,173 person years	Unknown
Economic Activity from Construction[6]	$229.32 million[6]	$229.32 million[6]	$0.00	$229.32 million[6]	$229.32 million[7]	Single-family residential development is typically a greater tax burden than benefit
Construction						
	No Adverse Impacts	No Adverse Impacts	No Impact	No Adverse Impacts	No Adverse Impacts	Greater limit-of-disturbance area and greater environmental impacts

Notes: Figures shown are *changes* from existing. For example, the numbers shown for water demand indicate the *increase* from existing demand.
Terms herein such as "greater" or "less" refer to comparisons with the Proposed Project.
[1] The "As-of-Right Alternative" refers to the building coverage allowed without a variance in 1988 compared to the current zoning code building coverage allowed without the granting of a variance.
[2] Assumes 2,500 - 3,000 sf per residence.
[3] Assumes two parking spaces per residence.
[4] These figures indicate *increases* in demand from existing conditions. Numbers in parentheses indicate increases in demand with implementation of proposed water conservation measures.
[5] The 2-year storm event is presented in the FEIS for consistency with values presented in the DEIS. However, updated regulations no longer require treatment of the 2-year storm; instead the SPPP has been prepared to treat the Water Quality Volume from the 1-year storm. See Appendix F.
[6] The extent to which volunteers can be used for construction depends on future market conditions. To the extent volunteers are used, the paid direct employment and direct wages and salaries would be reduced.
[7] Because new floor space would be similar under the proposed project, the As-of-Right alternative, and the Reduced Project Size alternative, construction costs are assumed to be similar. However, slight variations may occur due to the varying site layouts and building heights.

P. GROWTH-INDUCING ASPECTS

No changes to growth-inducing aspects, as documented in the DEIS, are being proposed.

Q. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

No changes to irreversible and irretrievable commitment of resources, as documented in the DEIS, are being proposed. Construction of the project will commit a total of approximately 407,794 square feet of the site to development of impervious surfaces and approximately 1.1 acre of pervious pavers.

R. EFFECTS ON THE USE AND CONSERVATION OF ENERGY RESOURCES

No changes to the effects on the use and conservation of energy resources, as documented in the DEIS, is being proposed.

Chapter 3: Comments and Responses

A. INTRODUCTION

This Final Environmental Impact Statement (FEIS) addresses comments that were made on the Draft EIS (DEIS) that were presented verbally at a Public Hearing held on September 2, 2010, as well as the comments made in writing by public officials, area residents and their representatives, and interested and involved agencies.

The DEIS, prepared on behalf of the Watchtower Bible and Tract Society of New York, Inc. (the "Applicant"), analyzed the potential environmental impacts of the proposed amended site plan for the Watchtower Education Center ("WEC" or "Proposed Project").

This chapter of the FEIS summarizes the substantive verbal and written comments submitted on the DEIS. Although most comments were submitted during the comment period, comments have been included that were submitted outside the comment period in deference to the commenters and to be as inclusive as possible. Comments that are similar in terms of subject or technical points are grouped together, and the commenter(s) noted in bold font text. Full transcripts of public testimony and complete correspondence from which these summaries are drawn can be found in Appendices I.1 and I.2. Cross-references have been added to the comments in these appendices in order to aid the reviewer in locating the corresponding response here in Chapter 3.

B. COMMENTERS ON THE DEIS

The following list summarizes the DEIS reviewers and the date their comments were made. For ease of reference a table is also provided, which lists each reviewer and their corresponding comment/response number.

1. Terence J. Donoghue, NYSDOT, letter dated August 23, 2010
2. James J. Troetti, 22 North Realty Corporation, letter dated August 24, 2010
3. Edie Keasbey, verbal at hearing on September 2, 2010
4. Deidre Blohm, verbal at hearing on September 2, 2010
5. Robert Lehmert, verbal at hearing on September 2, 2010
6. Thomas McNulty, Planning Board Member, verbal at hearing on September 2, 2010
7. Shawn Rogan, Planning Board Chairman, verbal at hearing on September 2, 2010
8. Richard Williams, Sr., Town Planner, verbal at hearing on September 2, 2010
9. Cynthia Garcia, NYCDEP, letter dated October 4, 2010
10. Richard Williams, Sr., Town Planner, letter dated October 7, 2010
11. Shawn Rogan, Planning Board Chair, on behalf of the Town of Patterson Planning Board, letter dated October 11, 2010. Planning Board Members include:
    a. Shawn Rogan, Chairman
    b. Charles Cook, Vice Chairman
    c. Michael Montesano
    d. Thomas McNulty

e. Ron Taylor

12. Rebecca Crist, NYSDEC, letter dated October 19, 2010

Table 3-1
DEIS Review Comments Cross-Reference

Commenter	Agency	Comment and Response Nos.
Blohm	Public	94
Crist	NYSDEC	39, 48-50, 58, 76
Donoghue	NYSDOT	62-66
Garcia	NYSDEP	4, 20-25, 28, 41-46, 51-55, 59-61, 95-98, 101-103
Keasbey	Public	40
Lehmert	Public	27
McNulty	Town of Patterson Planning Board	6, 28, 68, 77
Planning Board Members	Town of Patterson Planning Board	3, 5, 6, 8-19, 30-38, 56, 57, 71-75, 78, 79, 81-93
Rogan	Town of Patterson Planning Board	6
Troetti	Public	67
Williams	Town Planner	1, 2, 6, 7, 26, 29, 47, 69, 70, 80, 99, 100, 104, 105

C. COMMENTS AND RESPONSES

CHAPTER 1: EXECUTIVE SUMMARY

1. **Town Planner, 1:** Chapter 1, page 1-2, paragraph 2, indicates that G Residence and H Residence will provide between 250-280 residential units. The sum of the residential units proposed for [these] two buildings, as shown in this section is 287 residential units.

Response Town Planner, 1: *The two new residence buildings proposed in the DEIS have been consolidated into one new building to be called the G Residence. This building will have 289 dwelling units. An additional 28 dwelling units will be added within the existing A Residence as part of a renovation.*

2. **Town Planner, 2:** Chapter 1, page 1-2 the DEIS identifies that there is currently available housing for 1,500 persons, and WEC intends to expand available housing to accommodate an additional 500 persons on-site. In addition, the DEIS identifies a substantial increase in office space, audio video space and maintenance space. The DEIS does not include a discussion of the number of persons that presently or in the future will work on site, but live off-site. As these numbers could potentially affect water usage, wastewater usage or traffic patterns, these numbers should be provided.

Response Town Planner, 2: *The existing maximum site population that can be accommodated on-site is 1,566 in 783 dwelling units, with a maximum of 48 individuals living off-site and commuting to the WEC for work each day for a total potential working population of 1,614 volunteers. The proposed maximum site population as a*

result of the amended site plan that could be accommodated on-site will be 2,200, in 1,100 dwelling units. In addition, up to 75 volunteers could be living off-site and commuting to the WEC for work during the day for a total potential working population of 2,275 volunteers. While the actual maximum additional population that will live on-site will be 500 persons since a portion of the rooms will need to be reserved for maintenance and other support functions, the maximum potential population increase based on the number of dwelling units added is 634. The total potential increase in workers on-site as a result of the proposed action will be 661. The existing commuter contributions to existing water and wastewater use, parking, and traffic patterns have already been accounted for in the water, wastewater, and traffic studies provided in the DEIS. The future commuter impacts at full potential occupancy are included in revised studies or conclusions for water, wastewater, and traffic, which are included within the FEIS in Appendices D, E, and H.

3. **Planning Board, A.1:** In general, the environmental impact statement needs to focus on the maximum potential impact, and not the average or typical impact that may occur.

Response Planning Board, A.1: *The applicant agrees and has provided additional supporting data and figures to better explain the maximum potential impacts. The maximum site population is projected to be 2,200 people within 1,100 dwelling units plus up to 75 commuters. The revised engineering water and wastewater and traffic studies document how this maximum potential population would be supported (see Appendices D, E, and H).*

4. **NYCDEP, 1:** There are a several references to site visits and work to be done in the future, as of now the past. The DEIS should be updated to reflect the results of this work, namely:

- Pg. 1-8: The proposed construction schedule showing the work beginning in February 2010 should be updated to reflect new timetables;

Response NYCDEP, 1: *The proposed construction schedule has been updated for the FEIS to reflect a September 2012 construction start date.*

CHAPTER 2: PROJECT DESCRIPTION

5. **Planning Board, A.2:** There are inconsistencies throughout the DEIS on the existing and future number of residents at the WEC. [Ch.1, pg. 1.1¶5; Ch.2,pg.2.1 ¶3 and pg.2.3 ¶1; Ch. 4,pg. 4.1¶'2 and pg. 4.8¶2, Ch. 6, pg. 6.1 ¶2, pg. 6.2 ¶4, pg. 6.8 ¶6,.et.al.]

A serious design-evaluation problem extends across much of the [D]EIS, namely that the proposed upgrade of the facilities will result in a capacity for 2050 residents, but because of a (what might be called) 'standard vacancy rate' only 1803 residents will be onsite utilizing services at any time. Demands on WEC systems and facilities is then justified and impacts are analyzed for the 1803 probable residents. Reviewing authorities cannot reasonably be expected to base their evaluation on any other figure than the maximum capacity and the service demands and impacts there from, any lesser figure would be an unenforceable limitation. Whether either immediately after the

completion of the new construction or into the future, there would not be any way to prevent occupancy to the maximum capacity should the WEC requirements or standards change, or should the property change ownership. **All data and arguments about impacts should be focused on the maximum possible occupancy.** For example, in Appendix D.l, p.7, Table 1 shows that at a maximum occupancy of 2050, water usage, even with the new conservation measures being proposed, would be very close (98.65%) to the allowed maximum. As another example, the entire analysis of traffic impacts in Chapter 10 appears to be based on a population increase of 500 residents (10-1¶2) (at a total of 1803 residents), not the possible increase of 747 residents (at the maximum capacity of 2050 residents). In all applicable areas the [D]EIS should be amended to **clearly** address the possible maximum residency of 2050, that is 747 additional individuals. Calculations should be shown, and the confusion in much of the discussion of numbers should be replaced by following a mathematically logical progression in the reasoning and presentation.

The proposed amended site plan would accommodate approximately 500 new residents in 250-280 residential units (most double-occupancy, but some single-occupancy), which would increase the site's maximum population to about 2,050. Average residential population at the WEC is expected to be approximately 1,800. The extra space is needed to house residents that are displaced from their regular accommodations for a variety of reasons including ongoing maintenance projects' (2-3¶1).

Clarification of these numbers is required. Are the 500 new residents all part of the 1800 (or 1803 figured used elsewhere)? If so then the maximum population would include a possible 2050 - 1803 = 747 new residents (an additional 747 - 500 = 247 new residents)? Are the 250-280 residential units all new units in the proposed construction? If so, then even if all new units were double-occupancy, the total new residents could only be a maximum of 280 x2 = 560. Where do the other 747 -560 = 187 of the maximum new residents reside? The 250-280 new residential units would seem to be for the 500 new residents, which would mathematically follow as 250 units at double occupancy would be 250 X 2 = 500 new residents, or 220 units at double occupancy plus 60 units at single occupancy would be (220 X2) + (60 Xl) = 500 new residents, in 220 + 60 = 280 new units. So then all the 250-280 new units would seem to be occupied. –Where then are the units needed to accommodate the vacancy rate? At a possible maximum of 750 (let's round off the number for a moment) new residents, 750/2 = 375 minimum new units at double occupancy would be required, or keeping the same ratio of double- to single-occupancy units as above, 250:375::280: = 420 maximum new units. We haven't been shown any draft floor plans, but do they include a maximum of 420 residential units? Or only 280? **To reiterate, the confusion in the numbers needs to be clarified and all calculations clearly shown.**

The maximum capacity could be reduced; increasing maintenance efficiency so there is a faster turnaround in rehabilitating units could reduce the vacancy rate so that the target of 1803 residents could still be achieved while reducing the total number of built units; the floor space could then be rearranged so that more or wider parking spaces

become available, or a smaller volume of built space could be achieved. **Or the impacts of each resident could be reduced;** increased water-conservation could be undertaken; or for parking, the number of residents' cars could be reduced through some creative approach such as providing a fleet of quick, curb-side, short-term rentals (like some municipalities are testing) or a jitney service. **In any case, discussion should focus on and applications be designed to address the actual potential maximum usage--the peaks and the extremes, not the averages.** Gallons of water or cars are not abstracts that can be averaged away, they are real volumes that must be accounted for or stored or accommodated within regulatory tolerances. Peak volumes need to be addressed: Why do they occur? How long are they sustained? Is there adequate storage capacity for these maximums and durations? How can the peaks be flattened, or volumes reduced?

Response Planning Board, A.2: *The data in the FEIS has been clarified to consistently indicate a maximum potential capacity of 1,100 dwelling units, resulting in a maximum potential population of 2,200 residents housed on-site. In addition, up to 75 volunteers would be living off-site and commuting to the WEC for work during the day. The revised engineering water, wastewater, and traffic studies document how this maximum on-site and working population would be supported—see Appendices D, E, and H.*

While the FEIS focuses on maximum site population as requested, the applicant now has over 15 years of operational experience of the facility, and is constantly seeking opportunities to improve efficiencies. This experience has shown that the facility needs a buffer of rooms to deal with logistics. The impacts of each resident are already reduced significantly by means of central laundry facilities, multiple water conservation and reuse measures and shuttle services. As noted in the DEIS, these measures will continue and be expanded to reduce the potential impact of the residents.

6. **Planning Board Meetings:** The 500 new residents and 250-280 new residential units must be clarified and justified and made consistent throughout the document. (Planning Board, 10/11/10; T. McNulty, 09/02/10; S. Rogan, 09/02/10, and R. Williams, 09/02/10).

Response Planning Board Meetings: *The maximum potential number of residents and dwelling units has been clarified. Please see responses to Comments #2 and #5. The attached engineering studies have been revised to be consistent and to provide evidence that the revised projection of maximum potential impacts can be supported by the existing and proposed infrastructure amendments—see Appendices D, E, and H.*

CHAPTER 3: LAND USE, ZONING, AND PUBLIC POLICY

7. **Town Planner, 6:** Chapter 1, page 1-4 "Public Policy" The Town of Patterson Comprehensive Plan outlines the goals and strategies of balancing environmental protection, providing for residential growth, encouraging commercial growth in appropriate areas and maintaining a rural character for the Town of Patterson. None of these goals appear to apply to the expansion of the Watchtower Education Center

(WEC) and therefore it should not be suggested that the expansion of the WEC is supported in the Comprehensive Plan or by public policy.

Response Town Planner, 6: *The applicant acknowledges that neither the Comprehensive Plan nor public policy supports expansion of a particular property such as the WEC. In the amended site plan, the applicant is proposing to work in harmony with the concepts fostered within the Comprehensive Plan. For example, the proposed population growth is contained within the general area of the existing facilities, and no additional property is being acquired. The project, not commercial in nature, is located within the R4 District and thus does not affect the potential commercial location or growth within the Town. The proposal continues to follow the clustered concept of development thereby striving to maintain the rural character of the majority of the property.*

The current and proposed development on the site of the educational center incorporate design features that are consistent with an educational use as outlined in The Patterson Town Code, Chapter 154, Section 154-99, Schools and colleges: 1) the lot is 362.5 acres; 2) application has been made to amend the special use permit to incorporate the proposal contained herein; 3) the location is in a residential district; 4) the facility is operated by a nonprofit organization with service, administrative buildings, residential facilities, recreational facilities and parking areas; 5) the facility has setbacks in excess of those required by code; 6) frontage and access to the lot is on State Highway Route 22; 7) maximum building coverage following the proposed improvements is less than 15 percent; and 8) the parking is cared for on-site.

8. **Planning Board B:** Some introductory comments are in order: The purpose of the EIS is to provide information that reviewing authorities can use to evaluate the project's impacts. For the Planning Board whose task is to analyze the proposed project from the standpoint of the Town Plan and other regulations and concerns of the Town Board, the information most useful is current and probable future use as it is reflected in the property-tax base, maintenance of the watershed and quality of the reservoir (Croton River) waters, and the balance, quality, and use of the built and unbuilt environments. Chapter 3 should provide that information, however, the discussion therein is not particularly useful in that regard.

Response Planning Board B: *The applicant agrees that the overall purpose of the EIS is to provide information that reviewing authorities can use to evaluate the proposed project impacts. Chapter 3 is intended to evaluate the proposed project's compatibility with existing and/or future land uses, and its compliance with applicable zoning and policy documents that regulate or guide development. The information in regards to property-tax base, stormwater impact, and environments are presented in the respective chapters within the overall draft EIS (DEIS) as follows:*

Chapter 5—Geology, Soils and Topography

Chapter 7—Stormwater Management

Chapter 8—Surface Water and Wetlands

Chapter 9—Natural Resources

Chapter 13—Economic Analysis

The DEIS structure and information presented therein are based upon the Scoping Document as approved by the Town Planning Board.

9. **Planning Board B.3.a:** The overall situation as visually presented in Figure 3-1 and as discussed is rather incomplete. First of all, at the minimum all of Patterson (not just the northeast comer) should be considered as it is the primary authority and area of land-use impact, in other considerations, the watershed or the aquifer should be the areas evaluated.

Response Planning Board B.3.a: *Chapter 3 is intended to evaluate the proposed project's compatibility with existing and/or future land uses, and its compliance with applicable zoning and policy documents that regulate or guide development. While environmental impacts in the watershed and aquifer areas should be evaluated (as it was in the DEIS), this is not relevant to the Land Use discussion, which focuses on compatibility of the proposed project within the context of the surrounding area. For discussion on water and aquifer, please see DEIS Chapter 6, "Water Supply and Utilities," and DEIS Chapter 8, "Surface Water and Wetlands."*

A larger map showing parcels in the entire Town of Patterson is provided in Figure 3-1 of this FEIS. A summary of parcel information is also presented in Chapter 2. By way of reference, the area of influence for the original WEC site plan approval was established by the Town in the 1987 Watchtower EIS as being within the immediate area of the Watchtower property, the surrounding properties and the State Highway Route 22. This continues to be the case in 2011.

10. **Planning Board B.3.b:** The overall situation as visually presented in Figure 3-1 and as discussed is rather incomplete. Second, the "vacant/unclassified" lands are all, at the minimum, zoned and could thus be classified with "agricultural, residential, commercial, or institutional" land uses.

Response Planning Board B.3.b: *A larger map showing parcels in the Town of Patterson is provided in Figure 3-1 of this FEIS. Data used to create this map was obtained from the 2007 land parcel database provided by Putnam County. This map includes vacant parcels that are classified as "residential," "rural," "commercial," "industrial," or "public utility." Approximately 2.4 percent or 110 parcels in the database are missing a classification and are thus shown as "unclassified." A breakdown of the vacant parcels is shown in the Table 2-2 of this FEIS.*

11. **Planning Board B.3.c:** The overall situation as visually presented in Figure 3-1 and as discussed is rather incomplete. Third, distinguishing property that is tax exempt would be more useful for evaluation of impacts. The map lists some as "institutional" but others such as Guiding Eyes are otherwise classified.

Response Planning Board B.3.c: *There are 167 properties in the Town of Patterson that are shown as tax exempt in the Putnam County 2007 land parcel database. Four of*

the six properties owned by the applicant are tax exempt. The applicant voluntarily pays taxes on two of the six properties it owns. Please see Tables 13-2 and 13-3 in the DEIS for a breakdown of taxes paid by the applicant. No adjustment is proposed or being made to the applicant's tax exempt status nor is more property being taken off of the tax rolls; therefore, the tax exempt status of other properties would not be a differentiating factor in the evaluation of impacts for this proposal.

A more detailed description of the applicant's land parcel classification is provided below. These classifications were obtained from the 2007 land parcel database provided by Putnam County.

Tax ID # 14.-1-15	620—Community, Religious
Tax ID # 14.-1-37	321—Vacant Land, Rural, Abandoned Agricultural Land
Tax ID # 14.-1-53	620—Community, Religious
Tax ID # 14.-1-54	415—Commercial, Motel
Tax ID # 14.-1-61	322—Vacant Land, Rural, Residential Vacant Land Over 10 Acres
Tax ID # 14.-19-1-14	210—Residential, One Family Year-Round Residence

The figure has been revised to reflect the nine major property classification codes included in the Putnam County 2007 land parcel database. Please refer to revised Figure 3-1 in this FEIS.

12. **Planning Board B.3.d:** The overall situation as visually presented in Figure 3-1 and as discussed is rather incomplete. Fourth, areas that are regulated wetlands or buffers or dedicated to remain undeveloped, be they whole parcels or parts of parcels (whatever the zoning or use of the rest of the parcel), parks, preserves, or other conservation lands, should be distinguished as such. Agricultural land should be continue to be distinguished separately.

Response Planning Board B.3.d: *Surface water and wetlands are shown on Figures 8-1 through 8-3 of the DEIS. Agricultural land is depicted on revised Figure 3-1 included with this FEIS.*

13. **Planning Board B.3.e:** The overall situation as visually presented in Figure 3-1 and as discussed is rather incomplete. Fifth, residential land should be distinguished in two ways: a) present use or preexisting approvals for intensive development and b) present use or R4 zoned lower-density housing. .

Response Planning Board B.3.e: *The Zoning within the Town of Patterson is approved by the Town Board by resolution and local law. The zoning of the applicant's property is shown on DEIS Figure 3-5, "Existing Zoning," as R-4 and C-1. No commercial*

development is proposed by the applicant within the C-1 district. The use of the R-4 Zone on-site by special permit as an educational center is a pre-existing use approved by the Zoning Board of Appeals. No other zones are contained on the applicant's property. Furthermore, the size of residential parcels usually indicates the density of housing areas, so further distinguishing the density on the figure seems unnecessary. Also, the DEIS described future known housing development proposals, with no intense housing developments being proposed.

14. **Planning Board B.3.f:** The overall situation as visually presented in Figure 3-1 and as discussed is rather incomplete. Sixth, 'present' and 'possible' maps would be useful in evaluating future impacts, especially, as regards the two types of residential development and the potential for commercial development as would be allowed by the present zoning map. (Such potential commercial development includes a considerable strip of the WEC property along Rt. 22.)

Response Planning Board B.3.f: *As noted above, no commercial development is proposed by the applicant within the C-1 district. The use of the R-4 Zone on-site by special permit as an educational center is a pre-existing use approved by the Zoning Board of Appeals. The proposal contained within the EIS relates to an amended site plan for this use. However, the applicant is not in a position to foresee the future development on other properties. The applicant can only follow the directions contained within the Town Zoning ordinance in regard to its own property.*

15. **Planning Board B.4:** The remark "Patterson is largely undeveloped" is not qualified in regards to what criteria—Yonkers? North Salem? It also leaves out of consideration those lands already approved for small-lot residential development and those protected by DEC as part of the watershed. As part of a 'development strategy' land can be dedicated to other uses than being heavily built upon, which does not mean then the land is 'undeveloped.' It also disregards the Comprehensive Plan, part of whose intent is to maintain a rural character for the Town. The WEC recognizes these considerations in attempting to maintain a small building footprint on their property and in trying to maintain a high percentage of the land as environmentally-beneficial open space.

Response Planning Board B.4: *Please see Table 2-1 in this FEIS for a summary of parcel classifications.*

Based on the New York Office of Real Property Tax Service, vacant land is defined as "Property that is not in use, is in temporary use, or lacks permanent improvement." The 2007 Putnam County land parcel database includes 1,139 parcels classified as Category 300—Vacant Land, which comprise 7,220.83 acres, or 36.1 percent of the total land area in the Town of Patterson.

The applicant agrees that as part of the Town of Patterson's "development strategy," land can be dedicated to other uses, rather than being developed. As an example, please note that Category 900—Public Parks, Wild, Forested and Conservation properties amount to 1,492.81 acres, or 7.5 percent of the total land area in the Town of Patterson.

The applicant further agrees that the intent of the Comprehensive Plan is to maintain the rural character of the Town; thus, in keeping with this objective, the applicant is attempting to maintain a small building footprint on its property, as acknowledged by the Planning Board. Properties classified as "rural" in the 2007 Putnam County land parcel database (which are not already included in Category 300—Vacant Land) amount to 2,073.28 acres, or 10.4 percent of the total land area in the Town of Patterson.

Furthermore, properties used for agricultural purposes also contribute to the "rural" setting of the Town. Properties classified as Category 100—Agricultural amount to 642.12 acres, or 3.2 percent of the total land area in the Town of Patterson.

When the statement that the Town of Patterson is "largely undeveloped" was made, it was in reference to all these properties combined, which amount to 11,429.04 acres, or 57.1 percent of the total land area in the Town of Patterson.

16. **Planning Board B.5:** To evaluate the impact of the proposed building heights, an architectural rendering of the existing and proposed elevations would be helpful.

Response Planning Board B.5: *An architectural drawing, A-201, depicting the wall elevations with building heights of the respective proposed buildings was included in the DEIS. The drawing has been revised and included in the FEIS. It includes existing building elevations for a comparative impact evaluation. Updated photosimulations which show the proposed and existing buildings have also been included in the FEIS as Figures 12-19 and 12-20.*

17. **Planning Board B.6:** How is there an "as-of-right building coverage" if a zoning waiver is needed? Explain the statement and reasoning.

Response Planning Board B.6: *The "as-of-right" is in reference to the building coverage allowed without a variance in 1988 compared to the current zoning code building coverage allowed without the granting of a variance.*

18. **Planning Board B.7: Perhaps WEC does not need to answer this point, but it should be evaluated by the Planning Board:** The existing zoning which was changed after the WEC properties were built-up makes the Patterson Inn a pre-existing, non-conforming use, and has an R-4 zone over buildings whose density far exceed the limits of that zone. What were the considerations at the time of the zoning changes that applied these zones to those uses? Are there factors in the record from that time that the Planning Board should be weighing in this review of the FEIS?

Response Planning Board B.7: *The original zoning of the applicant's Patterson Inn property was Industrial [I]. It should be noted that the current zoning is C -1. It should also be noted that although the WEC is in an R-4 zone, it operates with a special use permit and complies with all applicable regulations thereto.*

19. **Planning Board B.8:** The tallest proposed structure is 76' and three additional structures over 60'. The location of these structures and the elevation they are being built from

should be looked at closely to determine the impact on the view shed. Reference Table 3-3.

Response Planning Board B.8: *The applicant agrees that the height is an important factor when considering the potential visual impact. The potential impact in the viewshed is addressed in DEIS chapter 12, pages 12 and 13, and the updated Figures 12-19 and 12-20. The photosimulations demonstrate that the visual impact would be minimal and in context with the existing structures. Visual screening using additional trees will help mitigate the remaining impact. The proposed plantings are shown on the landscaping drawings LD101 through LD106. The proposed project would not result in a substantial change in the existing overall visual character of the area or the visual resources identified in the study area and would not block or meaningfully alter views to and from these visual resources. Thus, the project would not result in an adverse impact on visual resources.*

CHAPTER 4: COMMUNITY SERVICES AND FACILITIES

No comments.

CHAPTER 5: GEOLOGY, SOILS, AND TOPOGRAPHY

20. **NYCDEP 3:** The applicant should include a description of how proposed grading and blasting will impact overall drainage patterns, and what environmental impacts during and post construction are likely to result as a consequence of those changes. The DEIS should indicate where blasting is anticipated relative to existing building, infrastructure, erosive soils, watercourses etc. so that the impacts to these features can be evaluated. It is recommended that the document includes an extensive pre-blast baseline survey of all infrastructures. Moreover, the potential water quality impacts associated with blasting, rock hammering, excavation and stockpiling should be analyzed during the SEQRA process.

Response NYCDEP 3: *Post-development drainage patterns will be altered from existing drainage patterns due to site grading, blasting, and the addition of several buildings. Although the site's topography will be modified, a stormwater pond will be constructed to attenuate flow and maintain the post-development peak stormwater discharge rates at or below existing rates. Doing so prevents adverse environmental impacts due to increased stormwater runoff.*

Water quality controls as well as erosion and sediment control measures will also be implemented as part of the proposed project. Water quality controls include several green practices such as green roofs, pervious pavers, vegetated swales and bioretention ponds that will treat stormwater runoff after construction. During construction, the applicant will implement several erosion and sediment control measures to prevent the pollution of waterways that could result from grading, blasting, and erosive soils. Erosion and sediment-control measures include the use of silt fence, application of hydromulch, and seeding for soil stabilization, storm drain inlet protection and sediment

traps. The pre- and post-drainage patterns, erosion and sediment control measures, and water quantity and quality controls are further discussed in the updated Stormwater Pollution Prevention Plan (SPPP) included with this FEIS contained in Appendix F.

DEIS Figure 5-6 has been updated to show the locations of bedrock removal on the site with the revised site plan. Page 5-12 in the DEIS states the following: "Various methods of rock excavation would be used during site construction depending on the type and condition of the bedrock at a particular area. In soft weathered rock, standard construction equipment is typically sufficient to excavate or "rip" the bedrock. If the rock is less weathered and stronger, additional mechanical devices, such as a hydraulic hammer mounted on an excavator, may be required to break the rock down into removable size pieces for excavation. As a last resort, to break apart massive, strong, and fresh (non-weathered) bedrock, drill and blast operations would be used if required to fragment the rock so that it can be excavated." Therefore, the areas of bedrock disturbance shown on DEIS Figure 5-6 represent the upper limits of where blasting may take place.

Additionally, measures to avoid blasting impacts that may occur are discussed in DEIS Chapter 5, pages 5-12, 13. As noted therein, the proposed project site is located 2,200 feet to the south and 1,500 feet to the north of the nearest off-site residence, as such the applicant believes that a pre-blast baseline survey is unwarranted. Additionally, since vibrations associated with blasting are diminished with distance, no significant vibration impacts are expected.

21. **NYCDEP 4:** It should be noted that the NYSDEC general permit covers discharges that are associated with construction activities with disturbance equal to or greater than 5000 sq. ft. of land. The statement in page 5-14 should be corrected.

Response NYCDEP 4: *The applicant agrees. Please note that Chapter 7, Stormwater Management, page 7-1 contains the correct statement, as noted by the reviewer. The correct information is also contained in the revised SPPP, which has been updated based on 2010 requirements.*

22. **NYCDEP 5:** The topographical map provided indicates that existing slopes in the proposed work area vary up to >25%. Such areas are generally considered to be very steep for use as loop roads and stormwater practices unless regraded. It would be appropriate to include the slope stability analysis discussed on pg 5-12 in the DEIS as impacts associated with these slopes can be identified. More detail should be provided as to how these areas will be regarded and stabilized without significant impacts.

Response NYCDEP 5: *Page 5-12 refers to the Town of Patterson requirement for a slope stability analysis for slopes greater than 3H:1V (horizontal: vertical) which is a 33-percent slope. On Figure 5-5 the majority of the proposed loop road is placed on a sloped area of 15 to 25 percent. The section that is proposed in the Office Building area where the slope may approach 33 percent will have the final graded slope stabilized using such standards as the "reinforced earth" method with geogrid in layers as the fill*

is brought up to grade. This is normally included as a routine construction detail during the site work.

23. **NYCDEP 6:** The DEIS should evaluate the project's impact on the Town's ability to achieve its TMDL under the NYSDEC MS4 general permit.

Response NYCDEP 6: *The revised SPPP (see Appendix F) contains the following information on page 3:*

"Excess amounts of phosphorus can lead to contamination and degradation of a water supply. Consequently, the State of New York has been actively engaged in minimizing the quantity of phosphorus that enters the East of Hudson watershed, which includes reservoirs used as a drinking water supply for New York City and surrounding areas.

In January 2009, the NYSDEC prepared a report entitled 'Croton Watershed Phase II Phosphorus TMDL Implementation Plan' (see Appendix F.5). The purpose of this report was to identify a plan to reduce phosphorus pollution in the Croton watershed. According to the report, typical sources of phosphorus include: 'stormwater runoff from impervious surfaces, agricultural land and construction sites, excessive fertilizer use, leachate from septic systems and effluent from wastewater treatment plants.' This report also quantified the phosphorus reduction that should be achieved by each Town in the Croton watershed. For the Town of Patterson, the goal is to reduce phosphorus loading by 17.2 kg over a period of five years.

The Town of Patterson has taken positive steps to meet this goal. In December 2009, the firm of Malcolm-Pirnie prepared a report for the Putnam County MS4 Coordinating Committee in which 10 stormwater retrofit projects were identified in the Town of Patterson (see Appendix F.6). Once implemented, these retrofits are projected to reduce the phosphorus loading in the watershed by 26.9 lbs (12.2 kg), which is 71 percent of the Town's five-year goal.

Additionally, the Owner of this proposed action has also taken an active role in reducing their 'phosphorus footprint.' For example, the phosphorus concentration of the existing orchard area is assumed to be similar to lawn areas, or 2.1 mg/L (See Table A.2 in 'The Simple Method to Calculate Urban Stormwater Loads' at http://www.dec.ny.gov/docs/water_pdf/simple.pdf). The orchard is being replaced by areas with lower phosphorus concentrations (roofs and driveways range between 0.11 mg/L to 0.56 mg/L). Furthermore, this SPPP has been developed based on criteria outlined in Chapter 10 of 2010 NYSSWDM, which provides direction for the selection and sizing of stormwater practices that specifically reduce phosphorus in stormwater runoff. Thus, the proposed action results in a decrease of phosphorus loading when compared to existing conditions. As an additional demonstration of the Owner's commitment to reducing phosphorus pollution, historical data has been included in Appendix F.7 of this SPPP quantifying the amount of phosphorus found in the effluent stream of the Owner's wastewater treatment plant.

Based on the existing land use and runoff from the 1-year, 24-hour storm event, the amount of phosphorus calculated to be present in stormwater runoff from the existing

facility is 208.7 lbs (94.7 kg). Under proposed mitigated conditions, the phosphorus amount is expected to decrease to 196.3 lbs (89.0 kg), a reduction of 5.9 percent or 12.4 lbs (5.6 kg) from present conditions. Thus, this reduction contributes to the Town's overall goal of decreasing phosphorus pollution in the watershed as shown in Table 2-4, "Pollutant Loading Pre- vs. Post-Development Values." Moreover, the combination of proposed project and the Town's ten stormwater retrofit projects should allow the Town to meet or exceed its five-year phosphorus reduction goal. For detailed phosphorus calculations see SPPP Appendix F.1.F."

24. **NYCDEP 7:** An actual rock crushing plan has not been provided; therefore it is unclear how much disturbance will be required for this operation and the duration for this activity. The DEIS should discuss whether the rock crushing facility will require relocation of recreational facilities and whether the haul road for the rock crushing operation require improvements such as widening, paving, upgraded stream crossings, etc.

Response NYCDEP 7: *The applicant intends on using the entire existing recreation footprint for construction staging, rock crushing, and temporary storage of excavated spoil and crushed material. This area is shown on sheets CD101 and CE108. The existing recreational facilities will be restored to their current condition after the construction activities cease. The existing access to this area is adequate and will not need to be improved.*

25. **NYCDEP 8:** Hay bales are not to be used as a filtering device for inlet protection, as discussed on page 5-14 in the DEIS, because experience shows that hay bales do not filter but rather block the inlet causing the stormwater to flow around the straw bales leading to higher water velocities. This practice will not reduce the potential adverse impact to water quality and may cause an additional impact should it be implemented as proposed.

Response NYCDEP 8: *Applicant agrees with this comment. Hay bales will not be used as a filtering device for inlet protection and have been deleted from the drawing details.*

26. **Town Planner 11:** Chapter 5, page 5-8, ¶6 provides an estimate of 196,000 cubic yards of excavation that will occur to develop the site as proposed. Given that the Maintenance and North Office Building has an estimated footprint of 65,000 s.f. and will have one basement and two cellar levels the estimate of 196,000 cubic yards appears to be low.

Response Town Planner 11: *The footprint of the proposed buildings has been reevaluated with the result of less proposed cut. Chapter 2, "Project Description," page 2-1, par. 3 proposes approximately 186,000 square feet of added building coverage. The revised estimate of approximately 133,000 cubic yards of excavation, if confined to this building coverage, would result in a depth of 19.3 feet. However, due to the terrain, some cuts will be less, some more. Plus there will be some cuts/fills adjacent to the proposed buildings. A review of the excavation estimate indicates that it is adequate to accommodate the basement and cellar levels for the Maintenance and North Office Buildings.*

CHAPTER 6: WATER SUPPLY AND UTILITIES

27. **Lehmert:** Who supplies the electrical power to the WEC?

Response Lehmert: *Chapter 6, page 6-6 of the DEIS states: "Electric and gas services are provided to the WEC by NYSEG (New York State Electric and Gas). The WEC also has the capability to provide power to critical onsite facilities by means of emergency generators during an emergency."*

28. **NYCDEP 1:** There are a several references to site visits and work to be done in the future, as of now the past. The DEIS should be updated to reflect the results of this work, namely:

- Pg. 8-9: states that pump testing of backup groundwater wells would occur in the summer of 2009;

McNulty: The materials on groundwater testing appear dated to 1988. More up-to-date tests/reports should be submitted.

Response NYCDEP 1 and McNulty: *Copies of the original testing dated to 1988 were included for reference in DEIS Appendix C.1. Also, within DEIS Appendices C.3 through C.7 were included in the following more recent groundwater references:*

- *Appendix C.3—Groundwater Supply Analysis (Excerpts) by Stanley M. Remington, August 12, 1996*
- *Appendix C.4—Hydrogeologic Analysis by C.A. Rich Consultants, January 2010*
- *Appendix C.5—Aquifer Mapping and Test Borings by C.A. Rich Consultants, May 2008*
- *Appendix C.6—Letter from C.A. Rich to Town of Patterson Planning Board, July 2, 2008*
- *Appendix C.7—Pumping Test Report by C.A. Rich Consultants, January 2010*

29. **Town Planner 12:** Chapter 6, page 6-4, ¶1 states that the mean annual precipitation rate used for calculating recharge is 51 inches, obtain over a 30 year period for the NOAA station in Yorktown Heights. Typical sources of annual rainfall such as Soil Survey of Putnam and Westchester Counties, New York provide a much lower estimate of the average annual rainfall. If data from an independent NOAA station is to be used to provide more site specific data for the average annual rainfall of the site under consideration than the identification number of the station and the raw data should be included in the appendix. Further, data should be used from a weather station located closer to the subject site, and certainly a weather station located in Putnam County.

Response Town Planner 12: *The NOAA Station utilized for the average precipitation data is identified as NOAA Station No. 227 (Yorktown Heights 1W). The NOAA publication from which the data were taken was referenced in DEIS Appendix C4, C.A. Rich "Hydrogeologic Analysis" of January 2010, page 11. However, for convenience, a copy of the data for this Station is included with this FEIS in*

Appendix C.8. Although this station may be a bit further away than others in Putnam County, C.A. Rich has relied upon climatological data from NOAA during their more than 25 years of performing successful water resource evaluations. The reason NOAA data is relied upon as opposed to other "typical" sources is the accuracy of the data, and the extent of the database. NOAA calculates the average monthly rainfall over a period of 30 years. This takes into consideration periods of below-average rainfall as well as above-average rainfall and, as such, is a more accurate representation for long-term water resource planning. Also, the difference between the Yorktown Heights station data and the local Putnam County station data is only a few inches per year. This difference in precipitation rates will not significantly alter the conclusions of the water budget analysis.

For comparison purposes, C.A. Rich has obtained local precipitation data from two additional sources including the National Climatic Data Center (NCDC) and the Northeast Regional Climate Center (NRCC). Both agency weather stations are located in Carmel, NY. The NCDC station reports mean annual precipitation in Carmel at 45.7 inches between the period of 1931 and 1995. The NRCC database (while more recent) is smaller, encompassing only the period from August 2002 to April 2011. This database reports a mean annual precipitation for Carmel of 52.9 inches. These values (along with the original figure of 51 inches included in the C.A. Rich report) have been analyzed with respect to the resulting variation in associated runoff and recharge, and are illustrated on Table 1 (attached in Appendix C.8.b). The data sources are also attached. In addition to the three data sets, C.A. Rich included a fourth value of 35.7 inches for comparison purposes. This figure is approximately 70 percent of our estimated mean annual precipitation of 51 inches and has been included to represent drought conditions.

As illustrated on Table 1, the variation in precipitation would result in estimated average daily groundwater recharge ranging from approximately 1.8 million gallons per day (mgd) assuming 52.9 inches of precipitation annually, down to around 1.2 mgd, utilizing the estimated annual drought precipitation value of 35.7 inches. Assuming no change in groundwater consumption within the mapped subwatershed, the resulting associated percentage of available groundwater recharge consumed would range from 10 percent (with 52.9 inches of precipitation) up to 15 percent (with 35.7 inches of precipitation). Based upon the above analysis, it appears that even under drought conditions, as much as 85 percent of the estimated groundwater recharge within the Watchtower Subwatershed Area would remain unutilized.

30. **Planning Board C.1:** As the various reports move forward in time, the explanations are derived more from local data and become more complex. The model created for the Hydrologic Budget and aquifer recharge (Appendix C.4), however, is overly generalized and abstract, and should be evaluated. The model subwatershed (C.4 Fig. 1) from which the aquifer is recharged, based on the discussion and calculations of recharge, must postulate a relatively porous basin, collecting water from an extensive area, in which water withdrawn from a well in one comer would be recharged by rainfall, including

that from a distant comer of the area. The boundaries of this subwatershed are derived from the surface topography—the western slopes of Cranberry Mtn., from just above Haviland Hollow in the south to just past Stevens Brook in the north, from the ridgeline downward to the river's edge in the Great Swamp. The reality, however, is that the eastern and western portions of the Property are very different geomorphologically (C.7, Fig. 2). So different (C.3, p.2¶7) that they are referred to as two different aquifers (C.4 p.15¶1, C.7, p.4¶2). On the eastern portion, wells are deep in the Manhattan Formation bedrock, while on the western portion the wells are shallow for "overlying the [Stockbridge Marble] bedrock in this area are unconsolidated glacial deposits comprised of stratified drift" (C.1, p.2¶3), which "represents the most productive source of groundwater on the Site. Wells drilled in this location provide significant yields of water with a minimal drawdown of the water table" (C.2, p.3¶2).

In contrast, the bedrock wells east of Rt. 22 are recharged through rainfall on exposed rock and groundwater seeping into and through fissures and fractures in the rock (C.2, p.6¶2; C.4, p.¶3). "Primary porosity and permeability of the bedrock is negligible. Consequently, the quantity of groundwater available to the on-site wells is controlled by the geometry and density of intercepted, water-bearing joints and fractures within the bedrock aquifer" (C.l, p.2¶5). Depending on the degree of folding, the inclinations of the folds, and where glaciation and weathering have exposed the bedrock layers, water recharge could occur as far away as the other side of the mountain. (Supporting evidence for this statement might be the report of a resident of the Old Stagecoach Road, that a well on her property that used to flow before WEC occupation of their site, ceased to flow afterwards.) Such recharge, however, would not be through a widely-spaced continuous area such as the recharge model postulates because of the impervious nature of the bedrock. "Typical low yielding wells are the only type one can expect in this aquifer type. Bedrock, composed of these types of metamorphic rocks, can produce only from secondary fracturing. Normally, the fractures are few and far between. Fracturing becomes less and less at depth" (C.3, p.4¶4). Consequently, recharge through fissures and fractures would be highly localized, especially in the northern area of the site. "Some smaller bedrock fracture systems are often highly localized. These *may occasionally* be reflected on the natural land surface by pronounced topographic features. Larger groups of fractures or potential faults or fault zones *may be* interconnected and indicative of regional structural bedrock lineaments that *tend to* traverse a much larger regional area (as much as several thousands of feet in length). Lineaments, *when known, usually* characterize areas of a series of mappable faults trending in a preferred compass orientation that correlate with each other" (C.4, p.5¶3; emphasis this commentators to highlight how tenuous the models constructs are). The bedrock in the southern portion apparently is more fractured and interconnected (C.2, p.5¶5), and so could be recharged from a wider area. Nevertheless, a better understanding of the morphology of the bedrock layers is necessary before equating their recharge area with the surface topography.

One could almost speak of the bedrock wells as drawing from *two* aquifers, because of their distinctively different drawdown and recovery rates and measured effects on

neighboring wells. What the corresponding two recharge areas *might be,* would be difficult to determine, but some of it could be from surface waters.

The extent of base flow from surface water if known could then be assigned to a portion of recharge and attributed to the watershed specific to that flow. (In such a case, the reintroduction of treated water to Mountain Brook would add to the possible well recharge.) And direct recharge by rainfall, as recorded during some of the well tests, could be assigned another portion; however, in both instances the recharge would be limited by the very specific (and more or less, limited) networks of fissures and fractures into which a particular well is drilled. One of the bedrock wells did not show rainfall recharge during the pumping test, such as did the other two (C.7, p.9, W-2).

Response Planning Board C.1: *The format of the hydrologic budget is the industry standard derived from proven principles of hydrogeology and widely utilized regionally for similar DEIS submittals. C.A. Rich has successfully used this approach in similar applications for over 25 years during dozens of similar groundwater resource investigations within the northeast United States. It is general in that it encompasses a relatively large area and, as such, the application of analytical tools to heterogeneous environments (e.g., the amount of recharge into different materials with different surface relief, etc.) may not be as inherently precise as if a much smaller homogeneous area were being studied. However, to adjust for these differences, the methodology utilizes a conservative approach in assigning recharge values for the different aquifers. The methodology is not abstract, but rather relies upon proven scientific principles and utilizes concrete site-specific and regional data from reliable sources in its analysis.*

The utilization of a surface water drainage basin or subwatershed as the area of study for a hydrologic budget is the industry standard for this type of study, the model for which can be found in numerous textbooks on the subject (e.g., Fetter 1980, Dunne, et. al. 1978). Again, there are inherent imperfections in doing this, but a drainage basin is the most logical area to study given the interrelationship between surface water and groundwater. It is not possible to accurately assign multiple recharge areas within a subwatershed without extensive field studies and data analysis which are beyond the scope of this submittal. Nevertheless, the subwatershed approach is the most representative model to consider in a hydrologic budget as it is a defined system in nature used to evaluate the interrelationship between precipitation and groundwater recharge. The disparity in recharge of the fractured bedrock aquifer versus that of the sand and gravel aquifer is accounted for in the hydrologic budget through assigning a conservatively low recharge percentage throughout the entire drainage basin.

The premise that surface water recharges the groundwater aquifer in the form of baseflow is not representative of conditions at the site. In the northeastern United States, baseflow is comprised of groundwater discharge from the aquifer to surface water, not the other way around. This is demonstrated by the fact that the streams on the WEC property flow year long even after long periods of no precipitation. As such, no portion of surface water flow can be assigned to groundwater recharge. Surface water flow is runoff and is assigned proportionally and appropriately in the hydrologic budget.

31. **Planning Board C.2:** The subwatershed model and accompanying calculations of recharge, assume a closed-bottom basin in which water is stored. Without knowing the positional relationship between the Manhattan formation bedrock and the marble bedrock, a determination is not possible as to whether waters accessible to the bedrock wells are backing up and being stored or are slowly percolating through the bedrock to somewhere else. If the latter is the case the recharge calculations should include a percentage loss from percolation.

Response Planning Board C.2: *Although a percentage of recharge is stored within the sand and gravel aquifer as well as the bedrock fractures, much of the recharge flows through the watershed and is discharged to streams as baseflow or flows out of the watershed as groundwater flow. It is not known what percentage is stored and what percentage is discharged as either surface water runoff or groundwater flow. However, the water budget does not need to take this into account and does not discuss groundwater flow out of the drainage basin. The water budget estimates how much water enters the aquifer as recharge versus how much groundwater is being utilized through pumping within the specific subwatershed. The volume of water that is left over as storage within the aquifer versus the volume that leaves the system as outflow is not critical for this analysis since this process continually occurs as part of the natural processes of the water cycle. More importantly, the critical factors are the portion of precipitation that enters this system as recharge and the amount of that water which will be used through pumping. Both these factors have been incorporated into the model.*

32. **Planning Board C.3:** The aquifer from which the sand wells are drawing water, more closely fits the subwatershed model—for it seems to be a basin carved in the marble bedrock, filled with relatively porous materials, capped by a layer of river and swamp deposits (C.3, p.6¶2). "The sand wells have a significantly larger recharge area than do the bedrock wells and the storage of groundwater within the aquifers are much greater than those of the bedrock" (C.3, p.8¶6). Well drill logs indicate the water-logged, porous fill shelves to the east (C.5, p.2¶2 and included Fig. 2 and 3), and one could reasonably expect it to do the same to the west as it approaches the lower slopes of Cornwall Hill. Undetermined is whether it similarly shelves to the north approaching Pine Island, or whether the aquifer is connected through channels in the bedrock to beneath the open flat lands around Patterson village, and to the south farther down the valley of the East Branch of the Croton. If the aquifer is connected it would be of considerable extent, and determination of drawdown effects would have to include wells from a much large area than included in the later WEC report. Similarly, recharge would have to be calculated from a much larger area, but would be complicated by many of the unknowns posed for the bedrock wells, as well as additional unknowns: What, if any, of the water in the Manhattan-formation bedrock enters the aquifer beneath the Great Swamp—either at the margins where the Manhattan formation meets the marble or otherwise? How much recharge is there from the marble bedrock underlying the aquifer—springs or fissures flowing from beneath into the aquifer? (If the water pumped daily out of the quarry is from the marble bedrock instead of the unconsolidated layer, that would be evidence of there being considerable water in the marble formation.) How much recharge is there

through the 'leaky' layer of sediments on top of the aquifer? Interestingly the records for the well-pumping tests show varied influence by rainfall on the sand wells in this aquifer (C.7, pp.9-1 0 SG-1 through SG-4); and, there was drawdown of the surface waters in Stevens Brook (C.7, p.l4 S-l). How much baseflow from tributaries or the Croton River is there into the aquifer?

Response Planning Board C.3: *While these questions are interesting from the standpoint of completely understanding the interrelationship between different water-bearing units within the fractured bedrock and sand and gravel aquifers, it is impossible to answer them given available information and the site-specific testing performed. However, the answers to these questions would not affect the findings of our studies relative to the water budget, which concerns itself with recharge to the aquifers versus what is being withdrawn, or the results of the site-specific pumping test which measures the effect of pumping stress on the aquifers. In addition, the concept that baseflow recharges the sand and gravel aquifer is not representative of this site. As previously stated, baseflow is groundwater that is discharged to surface water bodies, not the other way around. While the results of our pumping test indicate that heavy pumping stress on the sand and gravel aquifer (far beyond that which will ever occur during normal system operation at WEC) may potentially result in a reduction in groundwater discharge to Stephens Brook (i.e., baseflow), there is no baseflow infiltrating into the aquifer from tributaries or the Croton River. In addition, specific chemical analyses were performed on the groundwater from the sand and gravel wells during the 72-hour pumping test to determine if the pumping stress imposed by the test was causing the wells to be in direct influence of surface water. The results of the testing indicated no direct surface water influence on any of the wells—see DEIS Appendix C.7.*

33. **Planning Board C.4:** There is not enough known to make a calculation of the effects of WEC drawdown upon water underlying the property. (Remington suggested-C.3, pp.8-9 #2-6, 10--that well data be recorded quarterly which would then help with analysis of the water system. Has that data been collected and analyzed?) Until more is known, assessments must be based upon the effects on neighboring wells and long-term drawdown in the WEC wells. Periodic monitoring is necessary.

Response Planning Board C.4: *The water supply network at WEC has been in operation for more than 20 years. As such, a reliable long-term record of the wells' impact to the underlying aquifer is available. However, the applicant agrees that additional long-term monitoring of both the pumping rates of the wells and the drawdown experienced in the pumping wells and in on-site monitoring wells should be performed. This will ensure the long-term sustainability of the aquifer.*

34. **Planning Board C.5:** There are problems with the bedrock wells, especially on the northern portion of the property. "It appears that some areas of the bedrock aquifer are in a state of overdraft; that is, more groundwater is being taken from the aquifer than is being recharged from rainfall" (C.3, p.7¶3). "Well #1 in the bedrock has only been used as a source of water for construction. A large decline in the static level has occurred" (¶7). Well #6 has an iron problem" (¶8). "Well #4 has a corrosion problem" (p.8¶1).

"During the Spring of 2007, WEC reported an increase in the pumping depth to water in bedrock well W-4.... [A] rehabilitation effort resulted in only minor improvements to the well's production capacity" (C.6, p.2¶4). "Well W-2 should only be used for pumping intervals of up to eight hours and then allowed to recover" (C.7, p.l9¶3). "The bedrock wells are not a long-term reliable source of water. This is because of the nature of the Manhattan metamorphic rocks with their poor transmissivity and low storativity factors together with their small recharge areas. Wells drilled into this formation will produce low yields and most likely dry up during severe drought conditions (C.3, p. 8¶2)."

Response Planning Board C.5: *The bedrock wells are not pumped for long durations of time and are used to supplement the more productive sand and gravel wells. Wells W-2, W-4, and W-6 are typically pumped for eight hours or less at a time. WEC's experience over the past 20 years has shown that these wells are reliable when the amount and rate of water pumped from them is properly managed. The intermittent use of the bedrock wells allows WEC to rotate the operation of the wells in the supply network.*

WEC relies on the sand and gravel wells for pumping over longer durations. That is why two new sand and gravel wells were added to the well network. The operation of the bedrock wells provides a source of supply while maintenance is performed on the more productive sand and gravel wells.

35. **Planning Board C.6:** The conclusion could be made that the bedrock wells should be phased out from large-volume use; "the drawdown of wells in the bedrock aquifer stabilized towards the end of the test. Therefore, these wells are better suited for short term pumping needs" (C.7, p.18¶6). The WEC should be permitted to drill one or more additional sand-and-gravel wells to replace them.

Response Planning Board C.6: *WEC has added two new sand and gravel wells to their well network. Once these are placed online, the sand and gravel wells will be relied upon for the bulk of the water supply. The bedrock wells will be used more as a supplement to the sand and gravel wells when they need maintenance or are at rest between pumping periods.*

36. **Planning Board C.7:** In one final area of comment, pump-testing data was used to calculate "an estimated radius of influence of approximately 1,000 feet" (C.7, p.15¶5), that is, the distance from a well at which drawdown is zero, or, to put it another way, the radius of the volume of aquifer required to recharge or equal the amount of water being pumped. The recommendation based on this calculation is "a wellhead projection [sic, 'protection' was intended] area of 1,000 feet from the center of the sand and gravel well field should be created. This should include a prohibition of the storage of any materials that might impact the water quality of the aquifer" (C.7, p.19¶4). This figure is considerably greater than that recommended in an earlier report, that "each well incorporated in the final system have a dedicated well head protection zone (sanitary easement) of no less than 100 feet and preferably 200 feet in radius" (C.2, p.9¶4). In either case, the reasoning that protecting a surface area with a radius equal to the distance drawdown of the well, will protect the quality of the well water, is not valid.

Firstly, rainfall, even on a surface area with a 1,000 foot radius, would not be sufficient to recharge a well. The reason being the water being pumped is from a volume, not an area, of aquifer. Secondly, there is an intervening only semi-leaky (it is referred to after all as an *'aqui*tard')* layer of sediments between the surface and the aquifer, so not all rainfall directly above will reach the aquifer directly beneath. The proposed structure of the aquifer above the Stockbridge Marble bedrock suggests, rather, the importance of maintaining water quality in a number of possible contributing (not exclusive) sources of water recharge—the marble bedrock, the extensive sand and gravel deposits above it, the Croton River and tributaries to it such as Stevens Brook, and the watershed as a whole. Maintaining the quality of the main and most reliable source of water for the WEC Property, is then part of a regional, community responsibility.

Response Planning Board C.7: *The applicant agrees completely with the statement "Maintaining the quality of the main and most reliable source of water for the WEC Property, is then part of a regional community responsibility." The staff at WEC is very conscious of the need to protect water quality and have incorporated the following measures to do so into the operations at this facility:*

- *The sand and gravel well field is located in a fence enclosed area.*
- *No pesticides or fertilizers are used on the fields surrounding the wells.*
- *There is no bulk storage of chemicals that would impact water quality in the land surrounding the sand and gravel well field.*
- *Most of the buildings at WEC are heated with natural gas which does not pose a threat to water quality.*
- *There are no underground petroleum storage tanks at the WEC facility that could leak and impact water quality. Any bulk petroleum that is stored for use as heating or motor fuel is placed in aboveground tanks which have spill containment and are inspected monthly.*
- *WEC maintains a limited number of livestock at the facility. The barnyards and pens for these animals are more than 2,000 feet southeast of the sand and gravel wells.*
- *WEC owns and operates a wastewater treatment plant on the premises. The operation of this facility is closely monitored to ensure the plant's effluent is within State standards.*

The pump test that was performed in October 2009 and described in our January 2010 Pump Test Report was conducted in accordance with the NYSDEC's August 31, 2005, Recommended Pump Test Procedures For Water Supply Applications (Appendix 10, TOGS 3.2.1). Section 13 (c) of that document explains the procedures to be followed to delineate the wellhead protection area of a supply well. The 1,000-foot radius presented in C.A. Rich report was calculated using the procedures outlined in that document. However, the comments of the reviewers are quite valid. Measures to protect water quality should be employed throughout the watershed. The delineated wellhead protection area is deemed to be somewhat more sensitive as calculations suggest that

precipitation falling upon this area may take a more direct path to the well than other portions of the watershed.

37. **Planning Board C.8:** Electric & gas reference ch. 6-12. What firm assurances has NYSEG given to WEC for increased capacity and what risk is there to the community if capacity is not increased. Also do the transmission lines from the Haviland Hollow sub-station have to be upgraded and how will they be upgraded (overhead or sub surface).

Response Planning Board C.8: *Based on a previous meeting with NYSEG's Substation/ Engineering departments, the applicant was informed by NYSEG that there would be "no change to the substation footprint." A verbal conversation with NYSEG on October 26, 2010, confirmed that the existing transmission lines would be adequate for the project's proposed additional load. The substation adjustments will primarily involve increasing the size of the transformer located within the substation.*

The capacity of the existing substation transformer is 10 MVA and NYSEG plans to increase its capacity to 12 MVA in the near future. By comparison, the applicant's proposed expansion will be less than 1 MVA. There will be minimal risk to the community as NYSEG has the transmission capacity and will have the substation capacity to support the applicant's expansion. Nevertheless, if NYSEG has substation capacity issues resulting from equipment failure, the applicant is agreeable to using on-site generation to reduce the facility's load until the problem is corrected, thus providing benefits to the community.

38. **Planning Board C.9:** Solid waste reference ch 6-13. The proposed recycling facility appears to be a sizable operation. Is the state, county or town responsible to monitor the facility? If they are do these agencies get compensated? Referring to previous comments about maximum occupancy [Comments A.2] should the solid waste numbers be based on a total population of 2,050?

Response Planning Board C.9: *The proposed recycling building has been removed from the project. DEIS Chapter 6, page 6-6, 7, 13, Solid Waste, discusses the applicant's current and proposed future use of private vendors to care for its solid waste removal. The average amount of municipal solid waste generated is 3.39 pounds per capita per day. This is below the national average published by EPA (for 2007) of 4.60 pounds per day. The total maximum monthly solid waste generation for the proposed 2,200 residents plus 75 commuters will be 114.2 tons per month, an increase of 32.3 tons per month from existing conditions. The applicant will continue to use private vendors to care for its solid waste removal.*

39. **NYCDEC 4:** Staff from the DEC Division of Water inspected the existing sanitary treatment plant on August 30, 2010 and determined that the plant is operating in a satisfactory manner and that the projected daily average flows after expansion would remain below the current permit limits. The new effluent flow meter discussed in the Plan is in-place and is reflected in the current permit effective July 1, 2009. Therefore no permit modification is required at this time.

Response NYCDEC 4: *Comment is noted.*

CHAPTER 7: STORMWATER MANAGEMENT

40. **Keasbey:** Oh thank you, I miss seeing you. Hi, I'm Edie Keasbey, Couch Road in Patterson, most times when I get up here it's usually to complain about something is too big or it's in the wetlands or something but having worked with Watchtower, all during the dump fight, I have come to realize that when they say they are going to do something and do it well, they do it well and I have no comments to what you are proposing. I did check with my pal Ted Kozlowski, and he said he has no problem with any of this and feels the same way, basically when you say you're going to do it well, you do, do it well but I'm asking you a favor, you are obviously conforming and this new construction to the enhanced MS4 requirements. The original project was built in the '90's, does not have that same protection and in the capture and treatment of stormwater and what I would like to propose to you, knowing your good hearts is and you can't do it all at once, it would be much too expensive, to little by little with the original campus, if you can bring it up to the new enhanced MS4 stormwater regs. I think it would be a great treat for all of us because you look right over on the beautiful Great Swamp, your stream flows directly into it, your drinking water, as well as most of ours who live in this valley comes from under the great swamp and you will be making more of an effort than most to protect that drinking water and I just would like to see you make some efforts in that way, out of the goodness of your heart, no one can make you bring the original campus up to the enhanced regulations but I think you might think about it and if you can. I didn't know you were doing so much green building in this new one, can you put green roofs on any of your old buildings or any other things you could do to the old buildings to make them more sustainable, that would be wonderful, just because you sit in such a valuable spot, I'm not talking money wise, I'm talking environment wise of the Great Swamp and I would and I am speaking for myself, I am not representing FrOGS in anyway tonight, this is strictly my thoughts and I would just like to propose it, and that's all, thank you.

Response Keasbey: *Comment noted. Although the NYSDEC is not requiring compliance with the new stormwater regulations, the applicant will voluntarily implement green practices as part of the proposed project (see Figure 7-3). The applicant will continue to follow the direction of the Town of Patterson as a regulated land use MS4. Additionally, the applicant will continue to investigate the feasibility of converting existing roofs to green roofs, rainwater harvesting, and other accepted green methods in an effort to reduce any stormwater impact from our existing complex as a follow-up project after the construction of the proposed new structures.*

41. **NYCDEP 2:** The entire DEIS should be proofread to comply with the updated DEP and New York State Department of Environmental Conservation (NYSDEC) regulations requirements. For example, page 7-2 should be changed to reflect the DEP section 18-39(c)(2) which states that the stormwater practices would be capable of capturing and treating the stormwater runoff generated from the 1 yr, 24 hour storm event.

Response NYCDEP 2: *Comment noted and adjustment is incorporated in the updated SPPP included in the FEIS.*

42. **NYCDEP 9:** Based on the review of the existing and proposed drainage areas tributary to a practice, it is evident that some of the existing drainage areas are highly impervious. As such, it is recommended that the applicant must consider implementing redevelopment stormwater management practices in these areas to improve water quality. These areas should be considered as part of the redevelopment project. For example, the stormwater runoff is shown to be released without any treatment directly to the nearest watercourse/water body or the drainage area 4A at design point 4. The redevelopment of previously developed sites is encouraged from a watershed protection standpoint because it provides an opportunity to correct existing problems and reduce pollutant discharges from older developed areas that were constructed without effective stormwater pollution controls.

Response NYCDEP 9: *A revised SPPP is submitted with this FEIS. Redevelopment criteria are not proposed for any of the basins as sufficient green and standard practices will be implemented to treat the required water quality volume.*

43. **NYCDEP 10:** Although the pavers, which may be pervious, are shown in the proposed drainage areas 1F, 1J, 5A etc. some new impervious additions are also proposed in these areas. Please consider including stormwater treatment methods in those areas since the pavers are considered a runoff reduction method as per the NYS Stormwater Design Manual.

Response NYCDEP 10: *The drainage basins have been redrawn and renamed. The basins formerly designated as 1F, 1J, and 5A are now part of DA-8, 9 and 15 respectively. Refinements in the design show that all new impervious areas within these drainage basins will be treated prior to discharging into a watercourse. Please see Jamaica Bay Watershed Protection Plan, Volume II, page 177 (link provided below) where porous pavement is shown to provide treatment by NYCDEC.*

http://www.esf.edu/glrc/EBM%20publications/Jamaica%20Bay%20Watershed%20Protection%20Plan%20volume%202.pdf)

44. **NYCDEP 11:** As per the amended DEP regulations of April 2010, section 18-39 (c) (6), if a stormwater management practice is designed for a drainage area with 20% or more of the impervious area tributary to that area, then the Stormwater Pollution Prevention Plan (SPPP) shall provide for the stormwater runoff from that drainage area to be treated by two different types of stormwater management practice in series. The DEIS and its associated drawings must incorporate this design in order to reflect these changes in the regulations. For instance, considering the space limitations for the proposed drainage area B, it is suggested to evaluate the feasibility of proposing other types of filter practices which will require comparatively lesser space. Consequently, the stormwater management section in the DEIS is expected to change significantly during the regulatory review phase. It may be beneficial to consider the associated impacts in the DEIS.

Response NYCDEP 11: *The revised Stormwater Pollution Prevention Plan (SPPP) provides two practices in series for drainage areas with more than 20 percent*

imperviousness, except where the provided practice is an infiltration practice in which case two practices in series are not required per WRR §18-39(c)(6)(i). *The affected basins and the two practices are summarized below:*

Drainage Area	First Practice	Second Practice
DA-6a	Bioretention	Existing North SWP
DA-8B-1a	Bioretention	New Stormwater Pond
DA-8B-1b	Green Roofs	New Stormwater Pond
DA-8B-1c	Pervious Pavers	New Stormwater Pond
DA-8B-2a	Bioretention	New Stormwater Pond
DA-8B-2b	Green Roofs	New Stormwater Pond
DA-8B-3	Bioretention	New Stormwater Pond
DA-8B-4	Bioretention	New Stormwater Pond
DA-8B-5	Vegetated Swale	New Stormwater Pond
DA-8B-5a	Bioretention	New Stormwater Pond
DA-8B-5b	Pervious Pavers	New Stormwater Pond
DA-8B-5c	Pervious Pavers	New Stormwater Pond
DA-8B-5d	Pervious Pavers	New Stormwater Pond
DA-8B-6a	Bioretention	New Stormwater Pond
DA-8B-6b	Pervious Pavers	New Stormwater Pond
DA-8B-7	Bioretention	New Stormwater Pond
DA-8B-8	Bioretention	New Stormwater Pond
DA-8B-9a	Underground Sand Filter	New Stormwater Pond
DA-8B-9b	Pervious Pavers	New Stormwater Pond
DA-8B-9c	Pervious Pavers	New Stormwater Pond
DA-8B-10	Bioretention	New Stormwater Pond
DA-8B-11a	Bioretention	New Stormwater Pond
DA-8B-11b	Pervious Pavers	New Stormwater Pond
DA-8B-12	Bioretention	New Stormwater Pond
DA-8B-13	None	New Stormwater Pond
DA-8C-1a	Bioretention	New Stormwater Pond
DA-8C-1b	Bioretention	New Stormwater Pond
DA-8C-1c	Pervious Pavers	New Stormwater Pond
DA-12a	None	Existing North Stormwater Pond
DA-14b	Bioretention	Existing North Stormwater Pond
DA-16	None	New Stormwater Pond

45. **NYCDEP 12:** It is noted that the pre and post development drainage maps do not take into account the two excess soil deposition areas or the rock crushing facility proposed for the pollutant loading calculations and hydrologic calculations. Due to the fact that a significant soil disturbance activity will occur in those areas, the impacts to the water

quality from those areas and the access paths must be evaluated to the fullest extent possible.

Response NYCDEP 12: *The upland wooded excess soil deposition area has been removed from the project. The "north pasture" will be used for spoil deposition and has been included in the drainage area (see Appendix F.1, Figure 3-3. The spoil deposition area is part of Drainage Area DA-19. This basin has been evaluated and the calculations demonstrate that no increase in runoff rates occur with the addition of the spoils deposition area—see Appendix F.1, Table 3-6.*

The temporary rock crushing facility will be constructed within the footprint of the existing recreation area and will incorporate several erosion and sediment control measures. These include placing the majority of the facilities within the existing impervious areas, inlet protection for all catch basins, perimeter silt fence and use of NYSDOT sub-base material on pervious areas. After the rock crushing facility is dismantled, the recreation area will be reconstructed to pre-development conditions ensuring that the hydrology pattern will remain.

46. **NYCDEP 13:** Although the DEIS indicates that site practices will be employed to avoid discharging turbid water resulting from the excavation of the building foundations, the drawings must identify the space allocated for those practices if required, and a detailed dewatering methods and a plan must be included. Appropriate dewatering measures must be detailed in the DEIS in order to evaluate its adequacy.

Response NYCDEP 13: *A foundation dewatering plan has been prepared and is included as Appendix F.3. Dewatering details are also included in the Erosion and Sediment Control plans.*

47. **Town Planner 13:** Chapter 7, Page 7·2 "C. Methodology" should address the 2010 amendments to the NYCDEP WRR.

Response Town Planner 13: *The updated SPPP is based on the 2010 amendments to the NYCDEP WRR.*

48. **NYSDEC 2:** As described in the DEIS Chapter 7, it appears that the proposed stormwater basins are of sufficient size to require a dam safety permit pursuant to Article 15 of the Environmental Conservation Law, Use & Protection of Waters. This chapter makes reference to "proposed rule changes" regarding the regulations, 6 NYCRR Part 608. These changes were adopted August 19, 2009 and will apply to this proposal. Under this regulation, a permit is required for a dam with:

• a height of more than fifteen feet and a maximum impoundment capacity equal to or more than one million gallons;

• a height of more than six feet and a maximum impoundment capacity equal to or more than three million gallons.

Response NYSDEC 2: *The proposed stormwater pond in the revised SPPP will have a capacity of approximately 3,000,000 gallons and embankment of 35 ft. The pond will*

require a dam safety permit pursuant to Article 15 of the Environmental Conservation Law, Use & Protection of Waters.

49. **NYSDEC 5:** For proposed disturbance of more than 5000 square feet within the NYC DEP Watershed, coverage is required under the SPDES General Permit for Construction Activity (GP-0-10-001). This site is within a town having a regulated MS-4 (Municipal Separate Storm Sewer System), so the SWPPP must be reviewed and accepted by the municipality and the MS-4 Acceptance Form must be submitted to the Department. Authorization for coverage under the SPDES General Permit is not granted until the Department issues any other necessary DEC permits. Receipt of the signed MS-4 Acceptance Form is a requirement of issuance of any dam safety and/or air permits.

Response NYSDEC 5: *Comment noted. The MS-4 Acceptance Form will be submitted for approval.*

50. **NYSDEC 6:** Please note that stormwater discharges associated with the concrete plant may require coverage under the SPDES Multi-Sector General Permit (MSGP) for Stormwater Discharges Associated with Industrial Activity GP-0-06-002. According to the "Pre-Development Drainage Map", it appears that this area currently discharges to Mountain Brook. The applicant must either obtain coverage or submit proof to the Department that industrial stormwater is not discharged. Questions regarding this issue can be directed to Natalie Browne, DEC Division of Water, at (914) 428-2505, ext.

Response NYSDEC 6: *Industrial stormwater is not discharged from the concrete batch plant or anywhere else on the applicant's site. The GP-O-06-002 does not apply to the applicant's concrete plant since it will not be retained permanently, is a mobile plant with wheels, and does not discharge to Mountain Brook.*

CHAPTER 8: SURFACE WATER AND WETLANDS

51. **NYCDEP 14:** The 1936 fisheries survey by NYSDEC concluded that there was poor habitat for trout and therefore no stocking was done at that time. The DEIS mentions that the WEC has stocked the Reservoir with a mix of warm water and cold water fish (Brook Trout). An updated fisheries survey of Mountain Brook should be done to assess whether stream habitat conditions have changed since 1936 that it may support trout and whether trout have established from the stocked trout. If so, the stream's classification may have changed to a 'Protected Stream.'

Response NYCDEP 14: *Comment noted. Mountain Brook continues to be designated as a Class C stream by the NYSDEC with the Water Reference Number H-31-P-44-24-23 and Trib. 23-2. The stream classification is not that of a "protected stream."*

52. **NYCDEP 15:** The DEIS states that the footprint of the proposed project area was examined by a wetland ecologist retained by the applicant and no other wetlands were found. The wetland ecologist's report should be attached to the DEIS.

Response NYCDEP 15: *The wetland ecologist's report is included in Appendix A.6.*

53. **NYCDEP 16:** The DEIS states that most of the areas of proposed buffer encroachment would involve streams or detention ponds within the existing WEC campus in areas that have been previously disturbed. It then goes on to say that 48,994 square feet (1.12 acres) of land within the on-site stream buffer would be disturbed, of which 15,627 square feet would be temporary disturbance during construction and re-vegetated upon project completion. The DEIS should discuss the other areas of proposed buffer encroachment and quantify each buffer disturbance separately.

Response NYCDEP 16: *Figure 8-4 has been revised to quantify the specific areas of buffer disturbance. New impervious areas are considered permanent disturbances, while re-graded and re-vegetated areas are considered temporary disturbances. The largest permanent buffer disturbance is associated with the proposed vehicle bridge across Mountain Brook. Runoff from the impervious area at the crossing is being treated in an underground sand filter and pervious areas will be re-vegetated after completion. The permanent buffer disturbance associated with additional pull-off and drop-off parking spaces will incorporate permeable pavers to provide filtration of stormwater runoff. A retaining wall will also be constructed to minimized disturbance in the buffer.*

54. **NYCDEP 17:** Given that both the potential excess soil deposition areas (up to 85,500 cubic yards) have potential impacts, the applicant should consider off-site disposal.

Response NYCDEP 17: *The applicant has considered off-site disposal, but found that it could introduce other problems, for example additional heavy truck traffic on Route 22. Sitework redesign has resulted in reducing the excess soil to 49,703 cubic yards, a reduction of 42 percent from the DEIS estimate. As noted in the response to Comment NYCDEP 24, the deposition of the excess soil is proposed in the north pasture site. The method of placement and returning of the area to a pasture is discussed on page 5-9 of the DEIS.*

55. **NYCDEP 1:** There are a several references to site visits and work to be done in the future, as of now the past. The DEIS should be updated to reflect the results of this work, namely:

- Pg. 8-9: states that the wetland adjacent to the excess soil deposition is to be delineated in Spring 2010;

- Pg. 8-6, Third Paragraph under Wetland Delineation: The DEIS states that following the review of the DEIS by the Lead Agency, one of two excess soil deposition areas would be chosen and then examined by a wetland ecologist. The determination should be made before the release of the DEIS and the impacts of the chosen site assessed in the DEIS.

NYCDEP 18: The results of the Spring 2010 delineation of the forested wetland next to the soil deposition area identified during the Dec 8, 2009 site visit should be discussed and the delineation methods and report attached to the DEIS.

Response NYCDEP 1 and 18: *Additional wetlands delineation was performed in the wooded location that had been considered and is included in Appendix A.6. Based on*

this further study and comments from the Town Environmental Conservation Inspector (see Appendix A.2), the excess soil deposition area is now proposed to be in the north pasture area instead of in the wooded area.

56. **Planning Board D.1:** While no water quality testing results are available for the Unnamed Stream, it is presumed that as Class "C" streams, both Mountain Brook and the Unnamed Stream currently conform to the surface water quality standards' (8-5¶5). The quality of the water should not be presumed, the water in the unnamed stream (note if capitalized, the stream is no longer 'unnamed' but has been named the 'Unnamed Stream'), should be tested as it is the stream with the substantial intrusion of buildings and driveways into its buffer, it is the one with the minimum of natural vegetation along its banks, it is the one that will have even more of its buffer permanently disturbed under the proposed construction plan. Testing should be conducted at various times of the year to check for effects of runoff from snow removal operations, for low-water seepages, for effects of grounds maintenance, for effects of heavy rain runoff from nearby constructed, impervious surfaces.

Response Planning Board D.1: *Water quality testing of Mountain Brook included in the DEIS on page 8-4 has shown no impact on water quality from any of the factors mentioned. In addition, the EIS analyzes the impact of the pre- and post-construction stormwater pollutant loading in Table 7-6 by design point. Design Points 13 and 14 direct water to the unnamed stream. The four pollutants analyzed are total suspended solids (TSS), biochemical oxygen demand (BOD), total phosphorus (TP) and total nitrogen (TN). The post-development pollutant loading analysis indicates a decrease to less than pre-development conditions. The proposed pick-up and drop off parking area also incorporates permeable pavers which provide filtration to runoff prior to discharging to unnamed stream.*

57. **Planning Board D.2:** There are several references to the Vehicle Maintenance Building and the upgrading of a diesel fueling station adjacent to it. Since much of this building sits in the wetland buffer and the new fueling station is very close to the buffer, a little more discussion of the building is in order. What vehicles are repaired or maintained in this building and would be refueled there? Are residents' vehicles serviced there? Is it a NYC certified vehicle repair shop? Are the vehicle-maintenance personnel certified by any nationally-recognized agency? Are the personnel especially trained in avoiding, containing, and cleaning up hazardous spills?

Response Planning Board D.2: *The pre-existing vehicle maintenance building is not part of this action. It is a New York State certified vehicle repair shop with qualified personnel who receive ongoing training in avoiding, containing, and cleaning up spills. The addition of a diesel fueling station between the warehouse and vehicle maintenance building is no longer being proposed as part of this action.*

58. **NYSDEC 1:** No work is proposed on the west side of NYS Route 22 in the vicinity of state-regulated wetland DP-22, therefore no permit is needed pursuant to Article 24 of the Environmental Conservation Law, Freshwater Wetlands. The stream on the eastern

parcel is NYS Waters Index # H-31-P 44-24-23, Mountain Brook, is Class C and not protected.

Response NYSDEC 1: *Comment noted.*

CHAPTER 9: NATURAL RESOURCES

59. **NYCDEP 19:** The applicant should request an updated letter from the New York Natural Heritage (NH) Program. The current letter is two years old and out of date. The NH response letter should be included with the DEIS.

Response NYCDEP 19: *An updated letter, dated April 5, 2011, is included in the FEIS Appendix A.3. The letter indicates no change in animals, plants, natural communities or habitats.*

60. **NYCDEP 20:** The habitat of the New England Cottontail and the Eastern Cottontail overlap enough that a survey for the New England Cottontail should be conducted on site.

Response NYCDEP 20: *The last sentence on page 9-14 of the DEIS states that the mapped location of the designated NHP habitat for the New England cottontail is not located on the project site. Additionally, page 4 of the publication "A Landowner's Guide to New England Cottontail Habitat Management"*[1] *states the following: "In particular, New England cottontails require the dense, woody understory cover that occurs in shrub thickets and young regenerating forests. Unlike eastern cottontails, they are not likely to be found on golf courses, lawns, or active agricultural lands with insufficient hedge cover." It should be noted that the normal way to survey/identify the New England cottontail is by post-mortem analysis or DNA testing of rabbit pellets. Although the New England cottontail habitat is not located on the project site, the applicant proposes to install a silt fence, embedded at least 6 inches in the ground, around the perimeter of the construction area to prevent rabbits from entering.*

61. **NYCDEP 21:** It is unclear if the applicant plans to replace the existing orchard and, if so, whether pesticides and herbicides will be used in close proximity to surface water. This should be clarified in the DEIS.

Response NYCDEP 21: *The applicant has no plan to replace the existing orchard. The orchard will be removed for placement and construction of the proposed action and would not be re-established.*

CHAPTER 10: TRAFFIC, PARKING, AND PUBLIC TRANSPORTATION

62. **NYSDOT 1:** The applicant shall submit a HIGHWAY WORK PERMIT APPLICATION FOR NON-UTILITY WORK (PERM 33). It must be signed by the applicant and

[1] Prepared by Environmental Defense Fund, U.S. Fish & Wildlife Service, Main Department of Inland Fisheries & Wildlife, and USDA Natural Resource Conservation Service.

the name/address provided in the upper left hand corner. The remaining information will be completed at a later date.

Response NYSDOT 1: *Comment noted. The applicant will submit the application after a revised site plan is finalized and approved.*

63. **NYSDOT 2:** The applicant shall submit a PERMIT AGREEMENT FOR HIGHWAY WORK PERMITS DESIGN REVIEW (PERM 51) must be completed by the applicant. The Application No. and PIN will be filled in by the Regional Traffic Engineering & Safety Group. The applicant should be aware that the $2,000 fee referenced thereon shall be the minimum cost for the Department's review time and is non-refundable. Hereafter, all Department employees assigned the responsibility of reviewing any documents, plans, maps, etc., which are directly related to the subject proposal, shall charge their review time to this project. The applicant will then be billed periodically by the Department for the actual cost of our review and processing of the respective project. Such billings which exceed the minimum $2,000 initial fee must be paid immediately upon receipt or the Highway Work Permit shall not be issued, or shall be revoked.

Response NYSDOT 2: *Comment noted.*

64. **NYSDOT 3:** A check for $2,000 made out to the New York State Department of Transportation.

Response NYSDOT 3: *Comment noted.*

65. **NYSDOT 4:** 7 sets of plans, 1 copy of drainage study/SWPPP on disc, 1 copy of Synchro analysis of affected intersections on disc, 1 copy of the Traffic Impact Study (TIS) on disc.

Response NYSDOT 4: *Copies will be provided as requested.*

66. **NYSDOT 5:** A Priority Investigation Location (PIL) has been identified near this development. It is on Rt. 22 between reference marker 22 8403 1118 and 22 8403 1120. A Highway Safety Investigation (HSI) study and proposed mitigation is required for this PIL segment. Please contact Region 8 Safety Program for guidance.

Response NYSDOT 5: *A Highway Safety Investigation (HSI) was completed in June 2011 and is included in Appendix H.11. The investigation recommends additional signage, flashing beacons for the signs and pavement striping. None of the proposed solutions or mitigations directly relate to the proposed project.*

67. **North Realty 1:** I have had a concern, for the past ten (4) years regarding the traffic, Especially the speed, on Route 22. The record will show I started contacting both Watchtower and our Town Supervisor; Michal Griffin regarding this problem. A Town of Patterson Resolution #R-0906-08 was submitted to the D.O.T. on September 27, 2006 requesting a speed reduction. To my knowledge nothing further has been done to correct this dangerous problem. I again wrote to Supervisor Griffin on April 22, 2008 requesting a follow-up on this problem with no response. I feel now may be the time to suggest to the D.O.T. the installation of a traffic signal at the Watchtower entrance. With the

increase of population, as a result of expansion to the complex, access from Route 22 will become even more dangerous. The signal will surely help the problem of speeders for part of the time. Thank you for your cooperation in this matter.

Response North Realty 1: *A Signal Warrant Analysis has been conducted at the expense of the applicant and is included in Appendix H.9. If NYSDOT decides that a signal is necessary, the applicant would support that decision and is willing to pay their fair share of the installation expense.*

68. **McNulty:** The number of proposed parking spaces should be justified and the calculations should be clarified.

Response McNulty: *Please see response to Comment #75.*

69. **Town Planner 3:** Chapter 1, page 1.2, ¶9 notes that approximately 300 parking spaces will be constructed to serve the 287 new residential units (1.05 spaces per unit). The DEIS indicates that historically 1.13 parking spaces per residential unit is adequate. This would require 325 parking spaces to be provided for the residential units.

Response Town Planner 3: *Please see response to Comment #75.*

70. **Town Planner 4:** Chapter 1, page 1.2, ¶9 Allocating 300 spaces to the residential units leaves 134 parking spaces allocated to the 46,000 s.f. audio visual building and the 524,000 s.f. maintenance and office building. The DEIS provides a basis for the number of spaces allocated to the residential units, however does not provide a basis for the low number of parking spaces that will be available for office and maintenance workers. There are 351 parking spaces provide in an underground parking garage under the maintenance and office building. Deducting the 300 parking stalls allocated to the residential units leaves 51 parking spaces available to the office and maintenance building.

Response Town Planner 4: *Please see response to Comment #75.*

71. **Planning Board E.1:** As stated above [Comment A.2], the entire analysis of traffic impacts in Chapter 10 appears to be based on a population increase of 500 residents (10-1¶2) (at a total of 1803 residents), not the possible increase of 747 residents (at the maximum capacity of 2050 residents). An analysis should be conducted on the possible impacts from 747 new residents, as well.

Response Planning Board E.1: *Please see response to Comment #5. The revised traffic study and supporting documentation is included with this FEIS in Appendix H.10.*

72. **Planning Board E.2:** It is recommended that the New York State (NYS) Route 22/WEC Main and South Driveways be monitored shortly after completion of the project to determine if signalization of the intersection is required' (10-1¶3). Who is going to pay for this study and the signal if it is required, the State or WEC? The cost should be entered into the WEC economic balance sheet either as a doubled negative, if the former, or a zero balancing out an adverse impact, if the latter.

Response Planning Board E.2: *The applicant noted that James J. Troetti, 22 North Realty Corporation (i.e., restaurant that abuts to the south) in his submission of August 24, 2010, also suggests the installation of a traffic signal at the Watchtower entrance as a means of controlling the traffic speed on Route 22. A Signal Warrant Analysis has been conducted at the expense of the applicant and is included in Appendix H.9. If NYSDOT decides that a signal is necessary, the applicant would support that decision and is willing to pay their fair share of the installation expense.*

73. **Planning Board E.3:** 'The proposed amended site plan would include an additiona1 434 parking spaces on-site, of which 351 would be located in garages. The existing site currently provides approximately 1,317 parking spaces, which are located in parking garages and lots throughout the site. Thus, the future parking supply would be approximately 1,751 parking spaces and all parking would be accommodated on-site' (l0-17¶5). [It would be really helpful to reviewers if all relevant information was put together in one section instead of scattered over the whole report.] 'The applicant projects the expansion to accommodate 500 additional residents onsite' (2-1¶3). '**Additional Parking**. A total of 434 new parking spaces would be added to the WEC site, of which 83 new spaces would be surface parking. Most of these new surface parking spaces would be constructed near the main facility entrance (as shown on Figure 2-1), with other spaces being constructed throughout the site to satisfy local temporary parking needs as well as passenger pick-up and drop-off. The modification of the visitor parking lot and the passenger pick-up and drop-off spaces would improve pedestrian safety. Of the 434 new parking spaces, approximately 300 would be used for new resident parking. This provides for 1.13 spaces per new residential unit, which is based on the applicant's knowledge of the number of cars per resident currently on-site. (This ratio allows for the variation between residential units occupied by a married couple, those occupied by two single individuals, and single-occupant units.) The remaining new parking spaces, including the 13 new spaces for the Patterson Inn, would be used for necessary on-site maintenance and operations vehicle parking, required disabled-persons parking, convenient visitor parking, and short-term temporary parking as vehicles are used to circulate between areas within the site' (2-4¶2). Clarify all this data in a table: A) Parking distribution—1) residences, la) garages and 1b) above ground; 2) office building parking; 3) Patterson Inn; 4) short-term and maintenance; 5) overflow. B) 1) Number of residents or 2) Inn visitors. C) 1) Existing and 2) proposed (at a) 1803 and b) 2050).

Response Planning Board E.3: *Please see response to Comment #75.*

74. **Planning Board E-2 (E.4):** What are requirements from relevant codes as to the number of parking spaces per dwelling unit or bedrooms in apartments?

Response Planning Board E-2 (E.4): *Please see response to Comment #75.*

75. **Planning Board E-3 (E.5):** The FEIS discusses adding 300 new residents' parking spaces but does not adequately discuss adding 500-750 new residents. A ratio of 1.13 spaces per new residential unit is cited which if applied to the total 250-280 units (is that range the 1803-2050 range or different for some other reason?): 300/250=1.20;

300/280=1.07; 1.20+1.07=1.135. So it would appear that the 300 new spaces for new residents is an average of the 1.13 spaces per residential unit. Again, **averages are not valid in these projections, actual cars can not be averaged not of existence.** So 280 new units at 1.13 spaces per unit = 316.4 [since 4 tenths of a car is not a possibility] = 317 spaces maximum required. Where are the extra 317 - 300 = 17 cars going to park? And as suggested above, since the range of new units cited apparently apply to 500 new residents, not the maximum possible of 750, if we calculate for the maximums we get 420 maximum possible new units X 1.13 spaces per unit = 474.6 = 475 new parking spaces required for the new residents. So where are the 475 - 300 = 175 additional cars to be parked? **These are very serious inconsistencies in the numbers that need to be addressed.** And the figures used in the calculations should include code requirements, not just averages for the WEC residents—adjustments to any differences resulting from calculations with these two numbers should be discussed.

Response Planning Board E-3 (E.5): *Existing and proposed parking for the complex has been compiled into Table 3-2 below. On-site parking will be designed in conformance with the following code requirements.*

1. *Town of Patterson Zoning Code §154-73.A. applies to sites with multiple uses and states: "Where multiple uses are located on one site the total number of parking spaces that must be provided shall be determined by establishing the parking requirements for each use and adding them together, unless it can be demonstrated, to the satisfaction of the Planning Board that one or more uses may share parking." Since the majority of the people housed on- site are the same people working in the Office buildings, parking spaces are shared between the residential and office uses. Therefore, an additional multiplier for the office staff is not applied. An on-site shuttle service is provided for those residents needing assistance traveling between their home and office.*
2. *Town of Patterson Zoning Code §154-73.A.(25) applies to residences and multifamily dwellings and requires 1.5 parking spaces per one-bedroom dwelling unit.*
3. *Town of Patterson Zoning Code §154-73.A. (15) applies to motels, hotels, tourist cabins, rooming or boarding houses and requires 1 parking space for each room.*

Table 3-2

Parking Summary

Parameter	Existing Conditions	Increase or Decrease for Proposed Conditions	Total
REQUIRED PARKING			
Residences			
No. of Dwelling Units (Studio and 1-Bedroom)	633	317	950
Required Parking per Dwelling Unit(1)	1.5	1.5	
Subtotal Required Parking for Residences	950	476	1,426
Patterson Inn			
No. of Dwelling Units	150	0	150
Required Parking per Dwelling Unit(2)	1	1	
Subtotal Required Parking for Patterson Inn	150	0	150
Total Required Parking	***1,100***	***476***	***1,576***
PROVIDED PARKING			
Residences			
Residences—North & South Garages	867	0	867
Office Garage	57	0	57
Proposed Office & Maintenance Bldgs—Garages	0	398	398
Proposed Office & Maintenance Bldgs—Surface	0	20	20
Department—Surface	103	-10	93
Subtotal Residences	1,027	408	1,435
Patterson Inn			
Patterson Inn—Surface	172	13	185
Subtotal Patterson Inn	172	13	185
Other Parking			
Visitor & Commuter Parking—Surface	112	25	137
Overflow Parking	0	70	70
15-min Parking	35	46	81
Bicycle and Utility Cart Parking (10’ x 20’ spaces)	4	7	11
Bus Parking	16	2	18
Subtotal Other Parking	167	150	317
Total Provided Parking	***1,366***	***571***	***1,937***

Notes:
(1) Source: *Town of Patterson Zoning Code* §154-73.A.(25)
(2) Source: *Town of Patterson Zoning Code* §154-73.A. (15)

CHAPTER 11: AIR QUALITY

76. **NYSDEC 3:** This facility is currently covered by a NYS Air Facility registration. Additional information is needed to determine if this registration must be upgraded to a State Facility permit:

- The size of the boilers to be installed in the various buildings if not connected to the existing plant
- The nature of the "upgrades" to the concrete batch plant
- The duration of the rock crushing and capacity of the machinery used

If an Air permit is required, the application must be submitted and reviewed in conjunction with the dam safety permit.

Response NYSDEC 3: *DEIS 11-8 states that the existing fossil fuel-fired heating and hot water systems in the central plant will serve the existing and proposed new buildings. As noted, the proposed project would not result in significant adverse air quality impacts. It is not anticipated that the current NYS Air Facility registration will require an upgrade. The two new steam boilers for the powerhouse would be 11,720,000 Btu/hr each, using either natural gas or fuel oil. These are the only proposed boilers that would exceed the 10,000,000 Btu/hr threshold requiring either an air permit or a facility registration. Since actual emissions from the proposed project are expected to be less than half the major source thresholds, the existing facility registration would still be applicable and an upgrade to a state facility permit is not warranted..*

The "upgrade" of the mobile batch plant includes needed maintenance work to the aggregate bins and temporary boiler replacement using natural gas which would not exceed the 10,000,000 Btu/hr threshold requiring an air permit. The mobile batch plant is exempt per 6NYCRR 201-3.2(c)(37).

In regard to the rock crushing, the equipment is expected to be rented periodically as needed over a two-year period. The size unit would be less than 150 tons per hour and is therefore exempt from air permitting per 6NYCRR 201-3.2(30).

CHAPTER 12: HISTORIC AND VISUAL RESOURCES

77. **McNulty:** How does the height of the proposed 76-foot structure compare to the height of existing buildings at the WEC?

Response McNulty: *The height is measured from the average grade plan per the Town Zoning Code. As noted in DEIS chapter 3, "These proposed new buildings would remain in context with existing conditions, as several existing buildings (including the South Services Building, South Office Building, North Services Building, Auditorium, and F Residence) have comparable heights ranging from approximately 54 feet to 75 feet above average grade. These exceptions were allowed under a previous height variance from the Patterson ZBA." An architectural drawing, A-201, depicting the wall elevations with building heights of the respective proposed buildings was included in the*

DEIS. The drawing has been revised and included in the FEIS. It includes existing building elevations for a comparative impact evaluation. Figures 12-19 and 12-20 have been revised to include updated photosimulations of the proposed and existing buildings.

78. **Planning Board F.1:** The Archeological examination of historical documents and site structures, including the effort to contact local sources of information, concluded 'there are no known or potential architectural resources on the project site' (12-1¶5). Their three-page summary (Appendix G, Chap.3-1-4) of the history of the area contains at least 16 errors and 22 misleading or questionable statements; this observation is not intended as further criticism, but to illustrate the problem faced by generalist archaeologists when attempting to appraise the local history of an area, especially one as little studied and documented (in readily-available editions) as Patterson. In such an area, the investigators should take more responsibility to (metaphorically) dig deeper into sources.

The present historic structures on the property will not be affected by the proposed construction, but they should not be written off in the report (since future reports will be based upon its conclusions) with the summary statements 'there are no known or potential architectural resources on the project site' (12-1¶5 and 12-16¶1). Rather, a qualified statement buried further in the report should represent the summary view: 'It is recognized that some of these buildings, in particular the former Judge Stone House and the former Mabie House, while lacking in historic integrity, do possess historic interest and value, and a more detailed investigation of the physical fabric of these structures could yield further insight into the history of the structures' (l2-9¶3). So the summary could be 'there are presently no known architectural resources on the project site, *but* some of the historic buildings *may potentially be*, and more detailed investigations of these structures should be undertaken if a future construction project might impact them.' A more thorough investigation of documentary resources with information about the buildings should also be called for. For example, it has recently been discovered that Sybil Ludington, shortly after her marriage, owned property and may have lived somewhere in the immediate WEC area. Establishing a documented connection between any of the WEC buildings and her would give such a building some national historically-recognized significance.

Response Planning Board F.1: *The project site presented within the DEIS does not include historic residences. There are older residences located on the WEC properties in the vicinity of Route 22 identified in the DEIS on page 12-9. All are far removed from the archaeological APE and none would be directly impacted as part of this project. If substantial future work is contemplated on the residences that are located outside of the project site that possess historic interest and value, the statement that is noted above from page 12-9, par. 3 will govern.*

79. **Planning Board F.2:** Since the initial DEIS, the WEC archaeological firm has been supplied with information about the property's history at the time of the Revolutionary War and about Continental Army encampments which were on the property during that

time. This information was included in a revision of the text of Chapter 12 and especially of parts of the Appendix. Modifications in study procedures were proposed to include for Segment 2, the North Pasture: 'A metal detector survey would be conducted to assist in locating deposits that may relate to the Revolutionary War period sensitivity of the area' (Appendix G, Chap.5-3¶3). Similar metal detector surveys should be included in the investigations of the other areas with potential 'Revolutionary War period activities' which are Segment 3, the Recreation Area, and Segment 4, the Existing Excess Soil Deposition Area. Another modification 'Due to the possibility that Revolutionary War period burials associated with a Continental army encampment could be located in the vicinity' (12-11¶6) is that 'in addition to the archaeological field testing . . .an Unanticipated Discoveries Plan for Archaeological Resources will be prepared and implemented in consultation with NYSOPRHP prior to the commencement of project-related construction. This Unanticipated Discoveries Plan will present a protocol for the proper treatment of any archaeological resources or human remains that may be encountered during construction' (12-16¶5). Such sensitivity and care is appropriate as these are graves of unknown soldiers whose efforts and sacrifices made possible the very existence of our nation.

Response Planning Board F.2: *A metal detector survey will be conducted to assist in locating deposits that may relate to the Revolutionary War period sensitivity of the area in both APE Segment 2 and 3. Segment 4 will not be disturbed under the proposed project, since Segment 2 will be used instead for the soil deposition.*

CHAPTER 13: ECONOMIC ANALYSIS

80. **Town Planner 7:** Chapter 1.B "Economic Analysis" (page 1.7) The DEIS provides an estimate for the employment and annual jobs that would result from the proposed action. As noted, the majority of work on construction projects has completed by volunteers, and as such the number of person-years of employment, and annual jobs is overestimated.

Response Town Planner 7: *The RIMS II analysis accurately predicts the amount of person-years of labor that would be required to construct the proposed project. The fact that many of these workers are volunteers who would not be paid does not compromise the accuracy of the estimate. However, the applicant agrees that it is difficult to accurately estimate the amount of employment and jobs that will be generated by the project considering the voluntary nature of the applicant. The applicant attempted to account for this reduction by noting that the majority of the work would be accomplished by volunteers.*

81. **Planning Board G.1:** **"PRINCIPAL CONCLUSIONS--**... no significant adverse fiscal impacts are anticipated" and "the overall socioeconomic impacts of the proposed project to the Town of Patterson and Putnam County are expected to be positive."

Review of this section shows that insufficient data is provided to analyze the impacts and, consequently, the conclusions drawn are questionable. The overall economic

arguments would be clearer, if presented in a cost-benefit format, or a balance-sheet format, in which negative impacts, zero impacts, and positive impacts are quantified monetarily so they could be summed to assess total impact of the WEC properties and proposed project. Refer to comments given below.

Response Planning Board G.1: *The fiscal benefit of the project has not been fully quantified in the balance-sheet format suggested by the comment, but the applicant suggests that a full quantified fiscal impact assessment is not necessary to determine that the proposed project would not have adverse fiscal impacts. The DEIS analysis provides a service-by-service assessment of potential impacts. While some of these assessments are not quantified, they provide strong arguments for why there would not be an adverse impact. In order to provide a quantified balance-sheet analysis, simplifying assumptions would be required. These assumptions then would be open to further question. Instead of performing significant additional study to further support the applicant's comments in the DEIS, the applicant agrees to the Planning Board's position that the economic benefit has not been conclusively quantified, while holding to the conclusion that there is no adverse impact.*

82. **Planning Board G.2:** **"B. EXISTING CONDITIONS--**This section establishes an existing baseline from which impacts of the proposed project can be assessed....This section also discusses the Town of Patterson budget and the existing demand placed by the WEC site on the Town of Patterson services."

What the baseline fails to take into account is the inherent negative tax effects that tax exempt properties have on local authorities that are compelled to rely preponderantly upon property taxes as a revenue source. The analysis also does not provide sufficient data about WEC use of or impact (whether positive or negative) on services or businesses in Town. See the comments at 13-3¶4—property taxes, and 13-5—demand on services, below for data required to correct the baseline.

Response Planning Board G.2: *As described in Response #81 above, instead of performing significant additional study to further support the applicant's comments in the DEIS, the applicant agrees to the Planning Board's position that the economic benefit has not been conclusively quantified, while holding to the conclusion that there is no adverse impact.*

83. **Planning Board G.3:** "The WEC is exempt from federal, state, and local taxes due to the applicant's status as a tax exempt organization. The combined assessed value for all six Watchtower parcels was $177,181,900 in 2008."

"Despite the tax exempt status, for the Patterson Inn...the applicant continues to voluntarily pay taxes to the various taxing jurisdictions in the Town of Patterson. The 2008 assessed value of Patterson Inn located in Section 14, Block 1, Lot 54 is $14,850,300...." [Adding in Valley Farms Corporation, the WEC, then, pays in-lieu-of taxes on 8.6% of the total assessed value of WEC properties.]

[Combined] **Tables 13-2 & 13-3 2008 Tax Payments**

Patterson Inn	**Valley Farms Corporation**

Taxing Jurisdiction	**Taxes paid**	**Taxes paid**
Putnam County	$30,413	$6.95
Town of Patterson	$46,429\	$10.61\
Patterson Library	$4,180 \ [$62852]	$0.95 \[$295.08 = $63147.08]
Pat. Fire District No. 1	$10,942 / [(18.2% of T)]	$253.40/ [(71.1% of T)]
Park District	$1,301 /	$30.12 /
Carmel CS District	$251,298	$112.93
Total	$344,563 [(2.32% of AV:)]	$414.93 [(.12%ofAV:) = $344,977.93]
[Assessed Value from text	$14,850,300	$354,200]

TOWN OF PATTERSON BUDGET

"The total adopted budget for the Town of Patterson in 2008 was $10,377,533. Of this total, approximately 81 percent ($8,401,783) was raised by property tax revenues. The remaining 19 percent of the budget was funded with state aid and general fund revenues." *Some comparisons can be made by tabulating the WEC data thusly:*

Footnote 1: "The individual assessed value of the Watchtower parcels is as follows:

		[Taxes @ 2.32%	@ 12%]
Parcel 14.[19]-1-14	AV $271,900		[$32.63]
Parcel 14.-1-15	AV $5,027,100	[$116,628.72]	
Parcel 14.-1-37	AV $ 7,100		[$8.52][34 acres by Environmental Park]
Parcel 14.-1-53	AV $ 156,225,100	[$3,624,422.32]	
Parcel 14.-1-54	AV $15,295,800[*?]	[$35,486.25]	
Parcel 14.-1-61	AV $ 354,200."		[$414.93]
[Total	**$3,776,537.29**	**$456.08** =	$3,776,993.37
Patterson's share (@18.2%)		**$687,412.79**	(8.2% of T Town prop taxes collected)
	(@71.1%)	$2,685,442.29	(32% of T Town prop taxes collected)]

* The assessed value give in footnote 1 is different from that given in Table 13-2, without explanation, if from a different year one or the other should be corrected; data should be consistent in coming from the same year, otherwise comparisons become even more difficult.

Response Planning Board G.3: *Response to the comment on footnote 1: The assessed value for the Patterson Inn property (14.-1-54) given in paragraph 2 is $14,850,350, the value given in footnote 1 is $15,295,800. A review of the 2008 County and Town Tax invoice indicated that the assessed value was $14,850,300 based upon the Town Assessor estimate of full market value as of July 1, 2006. This value was used to calculate the County and Town property taxes collected for the fiscal year 01/01/08–12/31/08. The 2008/2009 Carmel Central School Tax invoice indicated that the assessed value was $15,295,800 based upon the Town Assessor estimate of full market value as of*

July 1, 2007. This value was used to calculate the Carmel Central School Taxes for the year 07/01/08-06/30/09. The values given in footnote 1 of the six tax parcels including that for Patterson Inn of $15,295,800 is the estimated full market values for 2008 set as of July 1, 2007. It should be noted that the assessed value changes each year based upon the estimated market value.

84. **Planning Board G.4:** No history of in-lieu-of-tax payments is given. Have they been comparable on a year-to-year basis with the single example year cited?

Response Planning Board G.4: *The applicant does not make "payments in lieu of tax" for the Patterson Inn parcel or any other parcels. Payments made by the applicant have been based upon tax statements presented by the Town of Patterson and the Carmel Central School District. The tax assessment and rate is set annually by the Town.*

85. **Planning Board G.5:** A look at Tables 13-2 and 13-3 shows that Patterson's share of the in-lieu-of-tax payments differs between the Patterson Inn's portion and the Valley Farms' portion. No explanation for this difference is given in the [D]EIS. Using each figure, applied with the assessed values given in footnote 1, to calculate what Patterson's potential tax revenue from the WEC properties could be if they were not exempt, shows that the result would be substantial—WEC payments would be 8% or 32% of the total revenue collected from property taxes in the entire Town. (Let us be clear, we are not challenging the applicant's tax-exempt status; rather we are analyzing and clarifying their claim as to economic benefits to the Town.) A deeper look at the tax figures given by the applicant shows their in-lieu-of-tax payments are considerably less than they first seem when the assessed value of *all* properties owned is taken into consideration. To support their claim that WEC has a positive economic impact on the Town, a different set of data would need to be presented: A table listing each parcel owned which compares what the assessed value and corresponding property tax for each would be if 1) it still was being used as it had been prior to acquisition by WEC, for example, agricultural land with a few single-family residences; or 2) it was being used at its maximum permitted existing zoning allowance, for example, maximum number of single-family homes at average new-home value in other R-4 zones in Town; or 3) it was taxed at the accessed value as if the existing use was not tax-exempt, for example, the taxes that would be generated by apartments or office space equal to that now constructed on some of the WEC parcels. With such information one would be able to weigh the effect of having the tax exempt WEC on the properties, and able to assess whether their presence has a negative or positive economic impact on the Town's tax base.

Response Planning Board G.5: *Tax Parcel 14.-1-54 is taxed based upon full 100 percent assessed valuation. The Valley Farms parcel [14.-1-61] is taxed based upon an agricultural exemption; hence, the difference in the two tax bills. In regards to the concept of economic benefit, please see the response to Comment #88.*

86. **Planning Board G.6:** Note: one observation that emerges from the data that is presented is that **the WEC could have a very positive benefit to the Town under their present practices if they would make the following change:** Since the WEC

does not have any negative impact on the Carmel Central School District (beyond their property being excluded from the property-tax base which negative impact is spread across a number of towns and larger population then just that of Patterson alone), they need not make in-lieu-of-tax payments to the Carmel CSD. Instead if the WEC were to alter those in-lieu-of-tax payments so they go to the Town of Patterson, which proportionately bears much more of the impacts of the WEC properties, the payments would have a significant positive impact on the Town. As example, the Table 13-2 payment to the Carmel CSD is $251,298 which if it had been paid to the Town instead would have been almost 3% of the property taxes collected by the Town, or looked at in another way, 32% of the Fire Department budget, or 60% of the Library budget, or 98% of the public safety budget.

Response Planning Board G.6: *The applicant does not make "payments in lieu of tax" to the Carmel Central School District for the Patterson Inn parcel or any other parcels. The Patterson Inn parcel has been maintained on the tax roll, as a result of which the applicant has paid taxes, since its inception at the beginning of the early 1990s. The Town's position was that the Patterson Inn parcel should remain taxable, as the Town desired that a portion of the applicant's property be taxable. As a result, the applicant pays taxes based on standard tax bills; one bill includes taxes levied by various taxing authorities in Putnam County while another bill contains taxes levied by the Carmel Central School District. The applicant cannot legally shift the amount that it pays in taxes from one taxing authority to another.*

87. **Planning Board G.7:** *PATTERSON PARK DISTRICT* "The Town of Patterson owns and operates its own recreational lands and programs, including: ... the Michael Ciaiola Conservation Area ...." *Is not that Conservation Area operated by Putnam County?*

Response Planning Board G.7: *Based upon the Putnam County website, the Michael Ciaiola Conservation Area is owned and operated by Putnam County.*

88. **Planning Board G.8:** Before proceeding further some corrective remarks are in order. To start with, let us be clear about the definition of the word "benefit." A "benefit" is not the lack of impact or a reduced amount of negative impact. A "benefit" is a positive impact. The FEIS repeatedly uses "benefit" incorrectly, when it should instead be using "lack of impact"—items –or "reduced negative impact"—items. Not impacting public services is not a '+' on the balance sheet, it is a '0.' Furthermore the FEIS claims water-treatment and wastewater treatment and stormwater management as positive benefits. Many large subdivisions in Town have their own water- and wastewater treatment facilities (paid for out of special assessments on those subdivisions), even more properties have stormwater management. WEC is not special in this regard. Meeting regulatory requirements is not a positive impact **that can be assigned to the WEC balance sheet,** rather its impact should be assigned to the regulations and the regulatory authorities. In fact in the case of the water-treatment upgrade required and paid for by the DEC (the greater community's tax dollars), WEC density and quantity of wastewater discharge made it necessary for public funds to be used at the WEC facility, so if anything, meeting this regulatory requirement was a negative on the WEC economic

benefit balance sheet. Only if the WEC is going **above and beyond** regulatory requirements, as they propose to do by qualifying for Green Globes or as they are considering with some water-saving measures, would the outcome be a positive benefit on their balance sheet.

Collecting and summarizing the DEIS argument about economic benefits yields [from Page 13-5]:

Service	Use	budget; tax	$/use	WEC use	WEC $ impact
Patterson Library	60,000 visitors	$434,000	$.72	? some residents use	
Refuse District No.2		$1,003,320		0	
Carmel CS District	4,900 students	$74,212,786		0	
Security Priv./PC Sheriff	25,407/yr	?		2	
Fire Protection	870 calls/yr	$781,481	$898.25	3	$2694.75
Medical Service	?	?		37	
Recreational Fac.	?	?		"Occasional use of nature parks and outdoor trails"	

Data is missing with which economic impacts could be quantified; a survey of WEC residents could supply some of the missing data as well help quantify use of local businesses. (Planning Board, 10/11/10).

Response Planning Board G.8: *Chapter 13, "Economic Analysis" uses the term "benefit" or "benefits" approximately ten times in a variety of contexts. It is common in an economic analysis to use the term "economic benefit" when a positive economic impact is presented. However, as noted above, instead of performing exhaustive additional study to further support the applicant's comments in the DEIS, the applicant agrees to the Planning Board's position that the economic benefit has not been conclusively quantified , while holding to the conclusion that there is no adverse impact.*

89. **Planning Board G.9:** The FEIS repeatedly states how the WEC is "self-sustaining" and therefore has little impact on public services. For example, 1-1¶3 and 2-2¶1: "...The WEC is a largely self-sustaining community that is operated by on-site residents and supports itself with many of its own resources, including its own water and wastewater treatment plants on-site" and 1-11¶3: "and provides a basic level of emergency response services, thereby minimizing any impacts to local municipal services." Although small, Table 13-4 for example, the impact on services should be quantified so it can be entered into the balance sheet and its contribution be included in the calculation of net positive or negative impact. The data used to derive Table 13-4 could provide a dollar value of some impacts, total cost of service divided by total community demand would yield a

per-response cost which multiplied by the WEC facility use would give an annual demand cost for the WEC on these services (see rough tabulation above).

Response Planning Board G.9: *To our knowledge, such economic information is not available. The information that was publicly available showed that the fire/emergency impact responding to the applicant's property was 2 calls out of a total of 870 calls elsewhere. Police response to the applicant's property was 3 calls out of a total of 25,407 elsewhere based upon publicly available data.*

90. **Planning Board G.10:** "PROJECTED IMPACTS ON THE REGIONAL ECONOMY--The proposed project would contribute to the regional economy in two primary ways: I) direct expenditures for goods and services and 2) tourism expenditures by visitors." The argument of self-sustenance has another consequence, without data to the contrary, it seems to contradict the argument that the presence of the WEC has a positive commercial impact on the surrounding community. For example the FEIS maintains, 2-5¶4: "The addition of new residents, as well as temporary construction activities, would contribute positively to the local economy." But, the WEC residents eat in their own dining hall, use their own recreational facilities and library, have their own medical treatment facilities and laundry; *so what do they buy in the surrounding community?* Furthermore, 2-6¶6: "The WEC is staffed by Jehovah's Witnesses who are members of the Worldwide Order and reside on-site....Members of the Worldwide Order perform their duties "full-time without compensation", have chosen to live either unmarried or married without children, and have taken a *simple vow of obedience and poverty."* [Emphasis this reviewers.] So, if the WEC residents are unpaid volunteers, where do yet get money to spend on services in the outside community? Because of the self-reliant nature of the WEC residents and, possibly as well, the visitors and the unpaid status of the former, the abstract economic argument that their presence in the area has a positive financial impact needs to be supplemented with data. A survey could be conducted of the residents to substantiate the claim of their benefit to businesses in the area, (and to help quantify their impact on local services like the library or recreation facilities in Town.) Economic impacts should be analyzed by locality—Patterson, Putnam County, the greater NY and CT area. For example, if an examination of the reality of local economics, rather than an abstract model, is made, some of the following questions need to be asked, to which the existing FEIS does not provide concrete or data-derived answers:

a. Do visitors to the Patterson Inn have dining privileges?

b. Are there cooking facilities at the Inn or in its rooms?

c. If they must, to what extent and where exactly (Patterson, Putnam, etc.) do these visitors eat out?

d. How often and where exactly do residents eat out?

e. Do residents, and how often, shop at the local A&P?

f. Eat at local restaurants, or get take out or hire catering services?

g. Where do residents go for clothes shopping? Unless they like the styles at the Duffle Bag or Tractor Supply, there are not any clothing stores in Patterson.

h. Where do they buy hardware items, books, or go for entertainment? --Again, little if any sources in Patterson.

i. Do they use the services of AVP or Olsens, or of local plumbers or electricians, or painters, or handymen, or lawn-care professionals, or beauticians or barbers?

j. Where are their doctors or dentists or veterinarians outside of the WEC facility?

k. Where do they go to have their cars repaired or to buy gas?

Without such additional data, because of the self-reliant position and volunteer status of the WEC residents, as well as because of the limited shopping opportunities available in Patterson (which is acknowledged in the FEIS at 13-14¶5), the most reasonable conclusion (despite the abstract assertions in the FEIS to the contrary) is that the WEC has little economic impact, at least on Patterson's businesses, and more than likely on Putnam County's as well.

(If the WEC desired to have a positive economic impact locally, they certainly have the buying power to do so, but they could not rely on abstract economics, instead the WEC would have to make targeted purchasing decisions. For example, the WEC could support local agriculture by contracting to purchase a portion of their food supplies from local producers such as Kessman Farms or Cascade Farms and thereby stimulate the use of more agricultural land in Patterson. Or the WEC could seek out local contractors to use during their short-term construction.).

An additional problem with the assertion of contribution to the regional economy is that a standard economic model seems to underlay the argument, but such models are based on assumptions of certain norms of economic behavior of consumers. The residents who have taken a vow of poverty and live in a self-sustaining community are not normal consumers (are the visitors to the WEC similarly not normal consumers?) and therefore the very economic model may not be applicable to them. This consideration is important not only as regards the economic effects of the residents and visitors but in the short-term economic effects of the proposed construction. 13-9¶6: "The principal model used to estimate the effect of constructing the proposed project on the regional economy is the Regional Input-Output Modeling System (RIMS II)." The FEIS bases impacts on this model but adds, 13-11¶1: "It is currently anticipated that 75 percent of the construction labor demand would be met through volunteers, with the remaining 25 percent through contracted personnel."

a. Can net effects be arrived at by multiplying those predicted by the model by 25% (the non-volunteer workforce)?

b. Will such a modification to the model give valid results?

c. Will the model design allow a 75% alteration in labor costs without there being any effect on the multiplier benefits?

Response Planning Board G.10: *The DEIS, pg. 13-14, "Projected Impacts on the Regional Economy, Goods and Services," states, "The extent of regional economic benefit to a community cannot be specifically quantified. The overall economic contributions to a local community or a region would depend upon the size of the region and the portion of economic activity which is captured within the region, as well as the availability of goods and services in that community." The level of detail requested by the comment goes beyond the scope of work, and is not necessary in order to determine whether the proposed project would have significant adverse socioeconomic impacts. As noted further in Comment #92 below, the applicant has purchased a significant amount of materials and equipment from local businesses. Over the years that the WEC has been in operation, residents have traveled off-site for a variety of local goods and services, including restaurants, electronics, major automotive needs, personal household goods, clothing, and major medical services. The volume of these purchases will likely increase with the proposed increase in resident count associated with the proposed project.*

91. **Planning Board G.11:** **POSITIVE CONSTRUCTION IMPACTS. 13-11¶5:** "Construction impacts are expected to be comparable to that of any other similarly sized construction project, although **the amount of directly generated construction wages and salaries will be less to the extent that volunteer workers are used for construction.** Local expenditures are expected for goods and services, such as meals, fuel and vehicle maintenance, and other miscellaneous expenditures." [Emphasis this reviewers.]

The discussion of positive construction impacts throughout the [D]EIS does not provide adjusted figures for the effects of volunteer workers. Even setting aside the possible problems of using outputs from an economic model without adjusting the model first for the use of volunteer labor as discussed above, all the figures presented should be adjusted (that is, **reduced**) by the amount of volunteer labor anticipated. Table 13-6 for example should have a fourth column that reflects the effects of projected volunteer labor: so the average direct employment per year would be 42 not 166 (and at 13-11¶2, the yearly "increase . . .in the construction industry in Putnam County" *would be* 1.5% *not 6%).*

Response Planning Board G.11: *The amount of labor that will be performed by volunteer labor will not be known until later in the construction planning process. Instead of performing significant additional study to further support the applicant's comments in the DEIS, the applicant agrees to the Planning Board's position that the economic benefit has not been conclusively quantified , while holding to the conclusion that there is no adverse impact.*

92. **Planning Board G.12:** "It is expected that secondary employees would be generated by the construction project throughout the region of influence. The induced economic growth in this region would create the demand for local labor in businesses providing services noted above or other support services. This local economic growth would

continue for an estimated 4 years and benefit local restaurants, food suppliers, lodging, automobile services, building supply stores, and other services."

In this argument are encountered the same two problems of determining economic impacts that existed for residents and visitors to the WEC: I) the use of an abstract economic model without reference to the realities of the local situation; 2) the probably different consumption and spending patterns of the WEC residents and visitors or in this case temporary volunteer workers, or even the contractual workers.

To address 1) the potential for real (rather than the projected abstract) local economic impacts need to be taken into account. For example:

a. Where will building supplies be purchased?

b. Where were they purchased during the previous constructions at the site?

c. Do records support the projections of positive local benefits?

d. There are not any lumberyards in Patterson, and if Paige or Interstate, then one is in Dutchess and the other Westchester, so these impacts would not even be in Putnam. Since WEC has their own concrete plant and will be crushing their own rock, these materials will not be purchased locally. Similar problems exist for plumbing, electrical, and other building materials' suppliers, lodging, food suppliers, or most large-scale wholesale suppliers. Unless purchasing is targeted to local or county businesses, which the FEIS does not mention as a strategy to benefit the local economy, most likely construction purchases will not have local effects.

e. Will the contractors needed to supplement the volunteer workers be hired locally, or bid out to large regional firms?

f. Again what do the records say from past construction?

Response Planning Board G.12: *For building supplies that are available from local companies, the applicant would likely work with the ones with whom it already has a business relationship. Over the years, the applicant has established solid relationships with local businesses and purchases materials and equipment from them when the need arises. Just in the past three years, these have included: Brewster Honda; Empire Power Tools (Patterson); Carmel Winwater Works Co.; Patterson Nursery; Peterson's Patterson Greenhouses; Westchester Tractor, Inc. (Brewster); Eugene J. Boesch (Mahopac); Boyd Artesian Well Co., Inc. (Carmel); Putnam Steel, Inc. (Brewster); Hipotronics, Inc. (Brewster); Skyline Crane Services LLC (Brewster); and Shaw Welding Supply (Carmel), among others. Records indicate that in the last three years, the applicant has spent over $385,000 on maintenance- and construction-related materials and equipment in Putnam County. These local purchases can be considered a positive local benefit. However, the applicant is planning on minimal use of contractors and subcontractors, so the economic benefit that contractors working on this project will have on the local area will also be minimal.*

93. **Planning Board G.13:** "Volunteer construction workers are expected to be housed on-site at the WEC, at the Patterson Inn, or off-site. Contract workers would be expected to commute from Putnam and surrounding counties depending on the type of contracts and needed skill levels." To address 2) whether there exists a consumption pattern presumed in the economic models:

a. Will the contractors be from the general labor pool (as the argument about positive effects on the construction labor pool in Putnam would suggest), or will they be affiliated with the Watchtower and hence possibly not have the same multiplier effect?

b. How in particular will the volunteer construction workers contribute to the local economy?

Response Planning Board G.13: *The type of labor that will be performed by volunteer versus contracted labor will not be known until later in the construction planning process. Volunteers and visitors to the WEC have patronized local hotels and restaurants over the last 20 years. However, instead of performing significant additional study or surveys to further support the applicant's comments in the DEIS, the applicant agrees to the Planning Board's position that the economic benefit has not been conclusively quantified , while holding to the conclusion that there is no adverse impact.*

CHAPTER 14: CONSTRUCTION

94. **Blohm:** What is the expected timing and duration of construction?

Response Blohm: *Some aspects of the project are proposed to start in 2012 with a potential five-year duration.*

95. **NYCDEP 22:** The DEIS indicates that the construction schedule for the proposed project has been prepared in accordance with the NYSDEC guidelines that limit the land disturbance to less than 5 acres at anyone time. It also implies in Chapter 1 that up to 10 acres may be disturbed at one time that the applicant will seek a waiver to be able to disturb more than 5 acres at any one time. Based on the severely erosive soils existing on-site, the 5 acre limitation may already be too large to ensure that erosion and sedimentation will be successfully controlled. In fact, it would be more appropriate to severely decrease the maximum disturbance at any given time, based on the site conditions. The limit of disturbance should not just be based on strict regulatory limits rather it should be based on how well the erosion and control standards can be maintained at a particular phasing time. Moreover, the applicant must demonstrate on the plan that an adequate stockpiling area exists on-site for each of the phase on-site within the limits of disturbance. It is also recommended to provide an individual phasing plan for the different phase proposed.

Response NYCDEP 22: *Due to the nature of the construction, the size of the buildings and the need to stockpile excess soil on site, the applicant proposes to disturb up to ten acres during any given phase of construction (please see drawings CD101 and CD102). The necessary area for stockpiling is shown for each phase on these drawings, including the main area for excess soil deposition in the north pasture area. Prior to disturbing*

more than five acres, Part II.C.3 of GP-0-10-001 requires that written authorization be obtained "from the Department or, in areas under the jurisdiction of a regulated, traditional land use control MS4, the MS4 (provided the MS4 is not the owner or operator of the construction activity)." In addition, the applicant will comply with the following requirements per Part II.C.3 of GP-0-10-001:

a. The owner or operator shall have a qualified inspector conduct ***at least*** *two (2) site inspections in accordance with Part IV.C. every seven (7) calendar days, for as long as greater than five (5) acres of soil remain disturbed. The two (2) inspections shall be separated by a minimum of two (2) full calendar days.*

b. In areas where soil disturbance activity has been temporarily or permanently ceased, temporary and/or permanent soil stabilization measures shall be installed and/or implemented within seven (7) days from the date the soil disturbance activity ceased. The soil stabilization measures selected shall be in conformance with the most current version of the technical standard, New York State Standards and Specifications for Erosion and Sediment Control.

c. The owner or operator shall prepare a phasing plan that defines maximum disturbed area per phase and shows required cuts and fills.

d. The owner or operator shall install any additional site specific practices needed to protect water quality.

e. *The owner or operator shall include the requirements above in their SWPPP.*

96. **NYCDEP 23:** It is important to include a reference in the construction section of volume 1 that there is phasing details provided in the stormwater management section of volume 2. A more detailed phasing and sequencing plan is critical to effective mitigation of potential water quality impacts resulting from the proposed construction. Given the importance of construction phasing and sequencing to the effectiveness of the erosion and sediment control plan, additional details should be provided within the context of SEQRA in order to evaluate if potential water quality impacts will be adequately mitigated.

Response NYCDEP 23: *A revised Stormwater Pollution Prevention Plan (SPPP) has been included with this FEIS and contains a detailed phasing and construction sequencing plan as well as an erosion and sediment control plan.*

97. **NYCDEP 24:** Alternate soil deposition area discussed in section #8 for surface water and wetlands is not recommended because of the new gravel road being proposed, stream crossing required for Mountain Brook etc.

Response NYCDEP 24: *Two soil deposition areas were evaluated by the applicant and the advantages and disadvantages of each site were weighed. Additionally, the findings of the Town of Patterson Environmental Conservation Inspector were considered (see letters dated December 8, 2009 and December 10, 2010 in Appendices A.1 and A.2). Although the DEIS pages 8-8, 9 reported that the preferred deposition area is the "existing excess soil deposition area," further design development warrants the use of*

the "north pasture" as the soil deposition area. While it is true that a section of new road and a stream crossing will be required, the applicant proposes to use the north pasture area because it has the least environmental impact and allows for methodical restoration, as noted by the following points:

- *The DEIS cited excess soil deposition area has the challenges of wetlands, rock outcrops, steep slopes, and extensive forest clear-cutting if used as the soil deposition area. These challenges do not exist for the north pasture area.*
- *Natural habitat will not be disturbed in the north pasture area as it is currently used for cow grazing. The north pasture can be returned to its present use for grazing cows once phased soil deposition is complete.*
- *The additional environmental impacts related with the DEIS proposed excess soil deposition area include: clear-cutting required for the area, the limited usable land area in this location, and the quantity of excess soil to be deposited, which may impact the view shed. These challenges do not exist in the north pasture area.*
- *The Mountain Brook stream crossing is proposed to be a single-span bridge, thereby limiting construction activity to the buffer area adjacent to the stream. There will be no disturbance to the stream itself. The area proposed to make this stream crossing was inspected by a wetland ecologist retained by the applicant and no wetland soils or vegetation were found—see report in Appendix A.6.*
- *As noted by the Town ECI (letter dated December 8, 2009 in Appendix A.1), the pasture can be opened up in limited areas to provide a soil deposition area commensurate with the proposed phased site removal quantities. This will reduce visual impacts and allow for stabilization with pasture seed mix before filling a new section.*
- *The existing slopes in the north pasture area allow for more moderate erosion controls.*
- *The existing topsoil can be temporarily stockpiled downslope in the pasture site and reused on the site once the limited phase area deposition is completed.*

98. **NYCDEP 25:** The overall cut and fill volumes for the project is provided in the DEIS. No incremental analysis or interim balancing of cut and fill materials is provided. It is evident that there will be substantial cuts throughout the construction there is a possibility to encounter rock and/or groundwater based on the geologic conditions. Discussion of the locations where cut materials can be stockpiled, where rock crushing facilities can be set up, where dewatering operations can function, etc. must be included in the discussions so that the mitigation of the impacts generated by these activities can be provided.

Response NYCDEP 25: *Table 2-4 of the construction phasing plan included in Section 2 of the SPPP has been amended to reflect a "per-phase" cut and fill analysis. Each construction phase is either balanced or excess spoil is deposited at the north pasture location.*

The only areas where groundwater is likely to be encountered is during the construction of the footing for the Office and Maintenance buildings. A dewatering plan has been included as Appendix F.3 that includes the use of sediment tanks and bags for storage of the groundwater.

As part of the redesign of the Office and Maintenance buildings, the amount of estimated bedrock removal has been reduced by 68 percent. Any bedrock that is encountered will be hauled to the temporary rock crushing facility described in Response #45 and used as fill on-site.

99. **Town Planner 5:** Chapter 1, page 1.3 notes that the existing concrete batch plant will eventually be dismantled and removed. The DEIS should identify specifically when the plant will be removed and how the area will be restored.

Response Town Planner 5: *The concrete batch plant will be removed in the final phase of the construction sequence, which is projected to be four to five years after construction starts. The area will be re-vegetated as shown in LD104 drawing.*

100. **Town Planner 8:** Chapter 1.B "Construction" (page 1-8) notes that a temporary construction entrance is being proposed. A sight distance analysis should be completed for this temporary entrance.

Response Town Planner 8: *As discussed in Chapter 17, "Construction," of the DEIS, sight distance observations and measurements at the temporary construction entrance indicated that sight distance would be approximately 1,000 feet in both directions, which would be sufficient to allow for safe ingress and egress.*

CHAPTER 15: UNAVOIDABLE ADVERSE IMPACTS

No comments.

CHAPTER 16: ALTERNATIVES

101. **NYCDEP 26:** The DEIS does not include the comparison of the pre and post development pollutant loading rates from the different alternatives suggested. The peak discharge rates for the various design storms and its significance at the various discharge points for each of the alternatives must be included. The DEIS also does not include how those higher frequency storms are attenuated for the different alternatives. This must be evaluated in sufficient detail for the various alternatives in order to make a reasonable judgment. The pollutant loading analyses should be provided for each of the alternatives in order to make an educated review; therefore, it is difficult to recommend either of the alternatives provided in the DEIS from a water quality point of view.

Response NYCDEP 26: *It is not typical to perform the requested level of analysis (including calculations of pollutant loading and flow rates) for the alternatives as part of the DEIS. The revised comparison table (Table 2-3) presented in Chapter 2 of the FEIS is sufficient to draw conclusions on the potential impacts to stormwater runoff due to the limit of disturbance and amount of impervious surfaces. Total phosphorous was*

identified by both NYSDEC and NYCDEP as the pollutant of concern in the East of Hudson watershed for the proposed project during the scoping of the environmental impact statement; therefore, it was evaluated in the DEIS. In comparison to the other pollutants, total phosphorous is generally more difficult to demonstrate that the loading rate in the proposed condition can be reduced to pre-development level. Therefore, it is a conservative estimate that the other pollutants, TN, TSS, and BOD, have been reduced to the pre-development level if the phosphorous loading has been reduced to pre-development levels.

Each of the alternatives are presented conceptually in the DEIS. Similar to the proposed project, the stormwater management system for each alternative would be designed in accordance with applicable local and state standards. As discussed in the DEIS, the As-of-Right Alternative and the Alternative Use would result in increased impervious surface coverage, which would lead to an increase in phosphorous loading as compared to the proposed project. While it would be assumed that stormwater impacts relative to the increased grading and impervious surfaces would be increased for each of these alternatives, each would have a stormwater management system designed in accordance with all applicable local and state regulations, thereby ensuring post-development pollutant loading rates would be in compliance with accepted standards.

The As-of-Right Alternative and Alternative Use were included in the DEIS to provide a conceptual analysis of environmental impacts (including those related to stormwater) for alternative development options. The increased impervious coverage from these alternatives would inherently lead to significantly higher pollutant loading levels and stormwater flows than in the proposed design. This would lead to a stormwater management system which would need to convey and treat larger stormwater flows. In order to do so, larger pond sizes may be necessary and the stormwater design practices would involve more disturbed land area.

In addition to the above-mentioned alternatives, a Reduced Size Alternative was evaluated per the adopted scope in order to reduce building and impervious surface coverage. It should be noted that in response to comments and upon further refinement of the proposed project calculations, the revised proposed site plan has resulted in a significant reduction of impervious surface coverage from 444,478 square feet (as presented in the DEIS) to 407,794 square feet, in line with the Reduced Size Alternative. As such, pollutant loading rates would be reduced from pre-development levels. The proposed stormwater management system for the revised proposed project is detailed in the Stormwater Pollution Prevention Plan (SPPP) included in Appendix F.

102. **NYCDEP 27:** Changes in volume of stormwater runoff for each of the alternatives and its impacts to the downstream hydrology must be fully addressed in the DEIS and avoided or mitigated to the maximum extent practicable. Erosion control plans and phasing plans for the proposed alternatives have not been included with the DEIS. The plans are necessary to demonstrate that impacts due to erosion during construction can be avoided or adequately mitigated. It would be helpful to include this along with the DEIS.

Response NYCDEP 27: *It is not typical to perform the requested level of analysis (including calculations of pollutant loading, flow rates, and erosion control and phasing plans) for the alternatives as part of the DEIS. The DEIS evaluated each project alternative to a level of adequate detail for reasonable comparison with the proposed project. Where practical, impacts were assessed quantitatively, whereas other impact areas were evaluated conceptually. Full design, grading, hydrologic modeling, pollutant loading, erosion, and sediment control plans are not typically provided in the evaluation of the project alternatives. However, reasonable comparison of stormwater-related impacts can be determined based on analysis of impervious surface coverage and conceptual site plan layouts for each alternative. Sufficient data and qualitative discussion have been provided within the DEIS to provide reasonable comparison of each alternative with the proposed project. However, it should be noted that in response to comments and further refinement of the proposed project calculations, the revised site plan has resulted in a reduction of 36,684 square feet of impervious surface coverage as compared to the proposed project presented in the DEIS. As such, stormwater volume and pollutant loading rates would be reduced from pre-development levels, as described further in the revised SPPP (see Appendix F).*

103. **NYCDEP 28:** Without the information discussed in the preceding comments, a comparison of alternatives was conducted based on the information provided in the Table 16-1. It appears that the proposed action would disturb more area and the amount of fill required will be increased significantly, similar to the disturbance of slopes >25%. Based on the potential water quality impacts the action could have, the reduced foot print alternative appears to be a reasonable and preferred alternative. The DEIS must be supplemented with such an alternative to satisfy SEQRA.

Response NYCDEP 28: *Please see responses to Comments #101 and #102. As discussed above, the revised proposed project calculations have resulted in a significant decrease in impervious surface coverage, in line with the Reduced Size Alternative that was presented in the DEIS. As such, stormwater volume and pollutant loading rates would be reduced from pre-development levels, as described further in the revised SPPP—see Appendix F.*

104. **Town Planner, 9:** Chapter 1.B "Unavoidable Impacts, No action alternative" (page 1-9) indicates that the No Action Alternative if implemented would "forego the economic benefits to the Town". I question whether there are economic benefits. In addition, the No Action Alternative would impede the applicant's ability to "meet the increasing demand for religious materials, and support existing religious and organizational education programs" Couldn't these issues be addressed at a different location.

Response Town Planner, 9: *As noted above in Comment #92, the applicant has purchased a significant amount of materials and equipment from local businesses. Over the years that the WEC has been in operation, residents have traveled off-site for a variety of local goods and services, including restaurants, electronics, major automotive needs, personal household goods, clothing, and major medical services. The volume of these purchases will likely increase with the proposed increase in resident count*

associated with the proposed project. The fiscal benefit of the project has not been fully quantified in a balance-sheet format, but the applicant suggests that a full quantified fiscal impact assessment is not necessary to determine that the proposed project would not have adverse fiscal impacts. Instead of performing significant additional study to further support the applicant's comments in the DEIS, the applicant agrees to the Planning Board's position that the economic benefit has not been conclusively quantified, while holding to the conclusion that there is no adverse impact. A more detailed comparison of the alternatives was included in DEIS Chapter 16, "Alternatives."

In regard to the location for the project, it is important to note that the project is primarily in response to growth in the departments already located in the WEC, like the Audio/Video Services Department. Relocating these departments would be disruptive.

105. **Town Planner, 10:** Chapter 1.B "Unavoidable Impacts, Reduced Project Size Alternative" (page 1-10) suggests that the proposed project" has been carefully designed to meet the applicant's needs while disturbing the least amount of land possible and providing the greatest benefit to the surrounding community." The "benefit to the surrounding community" should be expanded upon.

Response Town Planner, 10: *One of the principal benefits to the community is the enhanced and more efficient production of religious materials which the WEC directly supports. In order to respond to increasing demand and better serve those who rely on its services, the applicant needs to expand its production capabilities. The proposed project would allow people to continue to benefit from the teachings and educational materials which are supported by the WEC facilities. A more detailed comparison of the alternatives was included in DEIS Chapter 16, "Alternatives."*

The benefit of the proposed project as compared to the Reduced Project Size Alternative in the context of the surrounding community includes the lower heights of the proposed project with less visual impact. The taller buildings that would result from the alternative would be visible from a greater distance and have a greater visual impact than the proposed project. The lower height of the proposed project is also easier for emergency equipment, particularly fire protection services, to access. An additional benefit of the proposed project is that it would not require the construction traffic carrying fill material since the proposed project results in a surplus not a deficit of fill material.

CHAPTER 17: GROWTH-INDUCING ASPECTS

No comments.

CHAPTER 18: IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

No comments.

CHAPTER 19: EFFECTS ON THE USE AND CONSERVATION OF ENERGY RESOURCES

No comments.

Appendix A: Correspondence

Appendix A: Correspondence

A.1 Letter from Ted Kozlowski, ECI, to Town Planning Board, Waste Soil Deposition Site Assessments, December 8, 2009

PLANNING DEPARTMENT
P.O. Box 470
1142 Route 311
Patterson, NY 12563

Michelle Russo
Sarah Wagar
Secretary

Richard Williams
Town Planner

Telephone (845) 878-6500
FAX (845) 878-2019

TOWN OF PATTERSON
PLANNING & ZONING OFFICE

MEMO

TO: Planning Board

FROM: Ted Kozlowski, ECI

RE: Watchtower Educational Center Waste Soil Deposition Site Assessments

DATE: December 8, 2009

On December 4, 2009 I met with representatives of Watchtower and Jim Nash of AKRF to review and discuss the two potential soil deposition sites on the Watchtower property as it relates to their Educational Center DEIS. I wish to recap and advise the Board on our site evaluation for your consideration of this project:

Site I – Existing Soil Deposition Area - This is a forested hill with many rocky outcroppings on the eastern side of the property, above the campus. Part of this site is an existing soil and debris deposition area and is surrounded by upland central hardwoods, dominated by mixed oaks with beech and maple associates. In order to use this site for the project a substantial portion of forest will need to be clearcut and the fill will be within 100 feet of a Town regulated wetland, which serves as the headwaters of an un-named class "C" stream that flows west through the campus and eventually into the Great Swamp. At certain points the fill will pile upwards to 30 feet in elevation that may have impacts on the view shed, especially during the dormant season.
If this site is selected, I recommend that the applicant preserve as many trees within the fill zone as possible, especially at the extreme south limits of disturbance, to maintain a visual buffer and to protect slopes that drain into the stream. Additionally, the hundreds of trees that are to be removed will present a disposal challenge. Many of these trees are of sawtimber quality and should be utilized as such. Logging them prior to work will help clear the site, use the wood as a resource and possibly generate income to the applicant. The fill will need to have erosion controls and be stabilized with either meadow seed mix or planted up with tree seedlings to restore it to forest. A restoration plan for the clearcut and soil deposition should be incorporated within the final EIS. Finally, the applicant will need to protect the depressional area between the top of slope where the fill ends on the west side and the toe of slope of the eastern steep hillside that

defines the headwaters of the stream. Additionally, the southern end of the fill side will need to be engineered to protect the stream from runoff. While the fill will be within 100 feet of the regulated wetland and stream, the site can be protected with properly engineered erosion controls. I also agreed that the applicant can (and should) delineate this wetland in the Spring of 2010.

Site II – Alternate Excess Soil Deposition Area – This is an open pasture located within the northern section of the property. Currently it is used as pasture by the farm animals and is an aesthetic resource. This site does not have the challenges of wetlands, rock outcrop, steep slopes and forest clearcutting. However, the applicant will either need to use a portion of State Rout 22 to access the site with their heavy equipment and fill trucks, presenting a traffic challenge, or construct a bridge and roadway that will impact Mt. Brook, a class "C" stream.
If this site is selected I recommend that the fill be distributed in sections that can be managed in such a way as to reduce visual impacts by filling limited areas at a time and quickly stabilizing with pasture seed mix before filling in a new section. The fill will not be piled as high as proposed on Site I as it can be spread out further without any clearcutting. In addition, I feel the erosion controls and engineering costs will likely be less for this site than for Site I. Visual impacts will be temporary and the site will be quickly restored to pasture. As with Site I, a restoration plan for the pasture area (if selected) should be included within the final EIS.
While the applicant wishes to avoid the time consuming permit process to construct a bridge, it may benefit Watchtower in the long run as they will have a permanent access point to their property north of Mt. Brook without impacting Route 22. This has future planning possibilities that can be free of stream crossing impacts. Of the two sites I feel this site has the least environmental impacts and will be restored much quicker.

I am confident Watchtower will properly control erosion and restore whichever site is selected.

CC:
Town Planner
Maser Consulting
Jim Nash, AKRF
Mark Coles, Watchtower
Richard Eldred, PE, Watchtower

Appendix A: Correspondence

A.2 Letter from Ted Kozlowski, ECI, to Watchtower, Wetland Delineation, December 10, 2010

PLANNING DEPARTMENT
P.O. Box 470
1142 Route 311
Patterson, NY 12563

Michelle Russo
Sarah Wagar
Secretary

Richard Williams
Town Planner

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TOWN OF PATTERSON
PLANNING & ZONING OFFICE

December 10, 2010

Mr. Mark Coles
Watchtower Bible and Tract Society of NY, Inc.
25 Columbia Heights
Brooklyn, NY

RE: Wetland Delineation within Excess Soil Deposition Zone
Watchtower Education Center, Patterson, NY

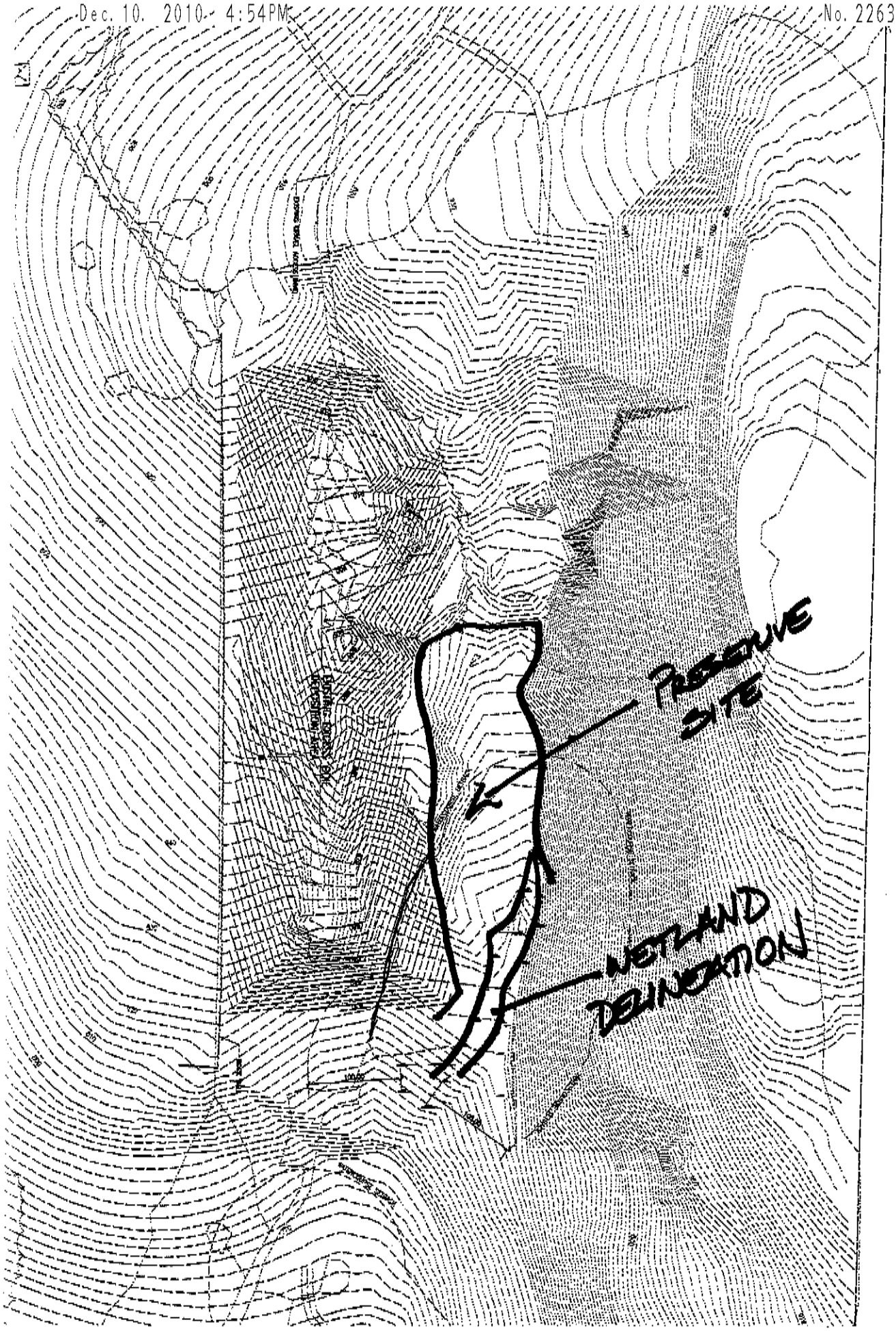
Dear Mr. Coles:

As per our site review on December 3, 2010 with James Nash of AKRF and Richard Eldred, I wish to make the following comments with regard to the wetland delineation and general concept of the project:

1. In general, I agree with the wetland delineation. However, the seeps and seasonal drainage areas to the north of the delineation are part of the headwaters of the stream. Presently the plan is to not enter into this area and it should be maintained as is without any disturbances to preserve it. I have enclosed a map identifying this area of concern. If this area is preserved, I would not oppose the identified disturbance within the wetland buffer as proposed.
2. My concerns about tree removals, view vistas, and site disturbances still remain regarding this location for the excess soil deposition area. The alternate area in the animal pastures in the northwestern section of the tract is in my estimation, far less impacting and more practical. Although a bridge is needed to cross the stream, I feel that you will eventually need improved access to this area in the not too distant future. Why not do it now?

Sincerely,

Ted Kozlowski, Environmental Conservation Inspector
cc:
Planning Board
Town Planner
J. Nash, AKRF


PRESERVE SITE
WETLAND DELINEATION

Appendix A: Correspondence

A.3 Letter from NHP to AKRF, Response, Second without Maps, April 5, 2011

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
Division of Fish, Wildlife & Marine Resources
625 Broadway, 5th Floor, Albany, New York 12233-4757
Phone: (518) 402-8935 • **Fax:** (518) 402-8925
Website: www.dec.ny.gov

Joe Martens
Commissioner

April 5, 2011

James Nash
AKRF Environmntl and Planning Consultnts
34 South Broadway, Suite 401
White Plains, NY 10601

Dear Mr. Nash:

In response to your recent request, we have reviewed the New York Natural Heritage Program database with respect to an Environmental Assessment for the proposed Watchtower Education Center Expansion - site as indicated on the map you provided, located on Route 22, Town of Patterson, Putnam County.

Enclosed is a report of rare or state-listed animals and plants, significant natural communities, and other significant habitats, which our databases indicate occur, or may occur, on your site or in the immediate vicinity of your site. For most sites, comprehensive field surveys have not been conducted; the enclosed report only includes records from our databases. We cannot provide a definitive statement as to the presence or absence of all rare or state-listed species or significant natural communities. This information should not be substituted for on-site surveys that may be required for environmental impact assessment.
PLEASE NOTE: This Project is NEAR the Cranberry Mountain Wildlife Management Area.

The enclosed report may be included in documents that will be available to the public. However, any enclosed maps displaying locations of rare species are considered sensitive information, and are intended only for the internal use of the recipient; they should not be included in any document that will be made available to the public, without permission from the New York Natural Heritage Program.

The presence of the plants and animals identified in the enclosed report may result in this project requiring additional review or permit conditions. For further guidance, and for information regarding other permits that may be required under state law for regulated areas or activities (e.g., regulated wetlands), please contact the appropriate NYS DEC Regional Office, Division of Environmental Permits, as listed at www.dec.ny.gov/about/39381.html.

Our databases are continually growing as records are added and updated. If this proposed project is still under development one year from now, we recommend that you contact us again so that we may update this response with the most current information.

Sincerely,
Jean Pietrusiak
Jean Pietrusiak
Information Services

Enc.
cc: Region 3

316

Natural Heritage Report on Rare Species

NY Natural Heritage Program, NYS DEC, 625 Broadway, 5th Floor,
Albany, NY 12233-4757
(518) 402-8935

~The information in this report includes only records entered into the NY Natural Heritage databases as of the date of the report. This report is not a definitive statement on the presence or absence of all rare species or significant natural communities at or in the vicinity of this site.
~Refer to the User's Guide for explanations of codes, ranks and fields.
~We do not provide maps for species most vulnerable to disturbance.

Natural Heritage Report on Rare Species and Ecological Communities

REPTILES

Glyptemys muhlenbergii ***(formerly Clemmys muhlenbergii)***

Bog Turtle

				Office Use
NY Legal Status:	Endangered	**NYS Rank:**	S2 - Imperiled	10977
Federal Listing:	Threatened	**Global Rank:**	G3 - Vulnerable	ESU
County:	Putnam			USFWS
Town:	Patterson			
Location:	Documented within 1 mile of project site. Animals can move 1 mile or more from documented locations. For information on the population at this location and management considerations, please contact the NYS DEC Regional Wildlife Manager for the Region where the project is located.			

1 Records Processed

More detailed information about many of the rare and listed animals in New York, including biology, identification, habitat, conservation, and management, are available online in Natural Heritage's Conservation Guides at www.acris.nynhp.org, from NatureServe Explorer at http://www.natureserve.org/explorer, and from NYSDEC at http://www.dec.ny.gov/animals/7494.html.

Natural Heritage Report on Rare Species and Ecological Communities

NY Natural Heritage Program, NYS DEC, 625 Broadway, 5th Floor, Albany, NY
12233-4757
(518) 402-8935

~The information in this report includes only records entered into the NY Natural Heritage databases as of the date of the report. This report is not a definitive statement on the presence or absence of all rare species or significant natural communities at or in the vicinity of this site.
~Refer to the User's Guide for explanations of codes, ranks and fields.
~Location maps for certain species and communities may not be provided 1) if the species is vulnerable to disturbance, 2) if the location and/or extent is not precisely known, 3) if the location and/or extent is too large to display, and/or 4) if the animal is listed as Endangered or Threatened by New York State.

Natural Heritage Report on Rare Species and Ecological Communities

COMMUNITIES

Pitch pine-oak-heath rocky summit

This occurrence of Pitch Pine-Oak-Heath Rocky Summit is considered significant from a statewide perspective by the NY Natural Heritage Program. It is either an occurrence of a community type that is rare in the state or a high quality example of a more common community type. By meeting specific, documented significance criteria, the NY Natural Heritage Program considers this occurrence to have high ecological and conservation value.

Office Use

NY Legal Status:	Unlisted	**NYS Rank:**	S3S4	4578
Federal Listing:		**Global Rank:**	G4	
Last Report:	1995-08-01	**EO Rank:**		
County:	Putnam			S
Town:	Patterson			
Location:	Cranberry Mountain			

General Quality and Habitat: Small community in a remote, undisturbed landscape. A savanna to woodland oak-heath with blueberry shrubland and seasonally wet Nyssa woodland inclusions surrounded by oak-hickory and chestnut oak forest. The woodland consists mostly of scrub oak thicket with overstory (10-50%) of red maple, white oak, chestnut oak, scarlet oak, shadbush and understory of low heaths. Mountain laurel is scattered or locally dense. The community is on a north to south running ridge between two stream valleys near the south end of the upland north of the streams confluence. The East Branch Croton River is to the west and Quaker Brook to the east.

Red maple-hardwood swamp

This occurrence of Red Maple-Hardwood Swamp is considered significant from a statewide perspective by the NY Natural Heritage Program. It is either an occurrence of a community type that is rare in the state or a high quality example of a more common community type. By meeting specific, documented significance criteria, the NY Natural Heritage Program considers this occurrence to have high ecological and conservation value.

Office Use

NY Legal Status:	Unlisted	**NYS Rank:**	S4S5	874
Federal Listing:		**Global Rank:**	G5	
Last Report:	1997-09-25	**EO Rank:**		
County:	Dutchess, Putnam			S
Town:	Patterson, Pawling, Southeast			
Location:	Great Swamp South Flow			

General Quality and Habitat: A very large swamp with good diversity. Not old growth, but the central portion is mature. Invasive exotics at edges. 10% somewhat invasive exotics within. Immediate landscape is somewhat fragmented by a major road and cultural development. A large patch of red maple-hardwood swamp which occurs in a valley and follows the East Branch Croton River which flows south into the East Branch Reservoir. The red maple-hardwood swamp grades into floodplain forest which occurs adjacent to the East Branch Croton River. Small scattered patches of shallow/deep emergent marsh and purple loosestrife marsh occur at the edge of the in the river. The red maple-hardwood swamp is less frequently flooded than the floodplain forest. A railroad runs north to south through and at the west edge of the swamp. The hills on either side of the swamp are predominantly forested with recovering hardwood forest. The swamp is located in a somewhat fragmented landscape.

Floodplain forest

This occurrence of Floodplain Forest is considered significant from a statewide perspective by the NY Natural Heritage Program. It is either an occurrence of a community type that is rare in the state or a high quality example of a more common community type. By meeting specific, documented significance criteria, the NY Natural Heritage Program considers this occurrence to have high ecological and conservation value.

Office Use

NY Legal Status: Unlisted
NYS Rank: S2S3
9479
Federal Listing:
Global Rank: G3G4
Last Report: 1997-09-25
EO Rank:
County: Putnam
S
Town: Patterson, Southeast
Location: Great Swamp South Flow
General Quality and Habitat: This is a large floodplain forest with good diversity. Not old growth, but the central portion is mature. Invasive exotics at edges. 20% somewhat invasive exotics within. Immediate landscape is somewhat fragmented by a major road and cultural development. The community is a large patch of floodplain forest which follows the East Branch Croton River which flows south into the East Branch Reservoir. Small scattered patches of shallow/deep emergent marsh and purple loosestrife marsh occur at the edge of, and in the river. The floodplain forest grades into red maple-hardwood swamp moving away from the river. The surrounding red maple hardwood swamp in the valley is 1858 acres. The hills on either side of the swamp are predominantly forested with recovering hardwood forest. The swamp is located in a somewhat fragmented landscape that includes forest, successional communities, agricultural land, residential and commercial development centered on Route 22.

MAMMALS

Sylvilagus transitionalis

Office Use

New England Cottontail

NY Legal Status: Special Concern
NYS Rank: S1S2 - Critically imperiled
12104
Federal Listing: Candidate
Global Rank: G3 - Vulnerable
Last Report: 2009-03-26
EO Rank: Fair
USFWS
County: Dutchess, Putnam
Town: Dover, Patterson, Pawling
Location: Southern Dutchess County and Northern Putnam County
General Quality and Habitat: The rank is based on the Generic Element Occurrence Rank Specifications of 2008. Evidence of New England cottontails was found at four locations near roads and one location in the edge of a parking area with multiflora rose and an oak/cherry overstory.

---

4 Records Processed

More detailed information about many of the rare and listed animals and plants in New York, including biology, identification, habitat, conservation, and management, are available online in Natural Heritage's Conservation Guides at www.acris.nynhp.org, from NatureServe Explorer at http://www.natureserve.org/explorer, from NYSDEC at http://www.dec.ny.gov/animals/7494.html (for animals), and from USDA's Plants Database at http://plants.usda.gov/index.html (for plants).

More detailed information about many of the natural community types in New York, including identification, dominant and characteristic vegetation, distribution, conservation, and management, is available online in Natural Heritage's Conservation Guides at www.acris.nynhp.org. For descriptions of all community types, go to http://www.dec.ny.gov/animals/29384.html and click on Draft Ecological Communities of New York State.

Appendix A: Correspondence

A.4 Letter from AKRF to OPRHP, Phase 1A Archaeological Study, April 18, 2011

AKRF
Environmental and Planning Consultants

440 Park Avenue South
New York, NY 10016
tel: 212 696-0670
fax: 212 213-3191
www.akrf.com

April 18, 2011

Mr. Doug Mackey
New York State Office of Parks, Recreation and Historic Preservation
Delaware Avenue
Cohoes, NY 12047

Re:	**Phase IA Archaeological Study** **Watchtower Educational Center Amended Site Plan** **Route 22, Town of Patterson, Putnam County, New York**

Dear Mr. Mackey:

AKRF, Inc. has been retained by the Watchtower Bible and Tract Society of New York, Inc., (the applicant) to perform environmental services in connection with their proposed site plan amendment to the applicant's Watchtower Educational Center (WEC) in the Town of Patterson (Putnam County). The total area of the parcel on which development is proposed is approximately 374.5 acres. It is located on the east side of NYS Route 22 at Watchtower Drive, located approximately one-half mile north of Haviland Hollow Road (CR #68) and approximately 1.5 miles south of Route 311. The WEC also includes parcels on the west side of Route 22; however, no project-related construction would occur on the west side of Route 22.

The applicant proposes to construct two new residence buildings, a maintenance/office building, an addition to the Audio/Video Building, and a loop road that would connect the proposed structures. The existing Main Lobby would be expanded to allow for a larger gathering area. The existing visitor and bus parking area would be expanded to allow for additional parking and address pedestrian safety. The existing concrete Batch Plant would be demolished, and a single-story structure that would serve as a recycling facility would be constructed in its place. Other site improvements include new sidewalks, temporary parking, and passenger pick up/drop off areas. A stormwater management system would also be constructed to address Town, NYCDEP, and NYSDEC regulations regarding stormwater runoff. This system would include a conveyance system to collect the stormwater runoff throughout the new development areas as well as two stormwater treatment basins that are proposed on-site.

The enclosed Phase IA archaeological documentary study was conducted to evaluate the potential for archaeological resources to be impacted by proposed construction. The study synthesizes and updates information presented in previous archaeological studies conducted on the WEC properties in 1988-9 by Historical Perspectives, Inc. (HPI). Because much documentation and analysis were previously completed as part of the HPI studies, the present report adheres to a Condensed Report Format, as set forth in ORPHP guidelines (OPRHP 2005: 23), and as

requested by Cynthia Blakemore of OPRHP in a telephone conversation regarding this project (Cynthia Blakemore, pers. comm. 2008). The enclosed report identifies areas of archaeological sensitivity in the APE and recommends strategies for field testing and monitoring in these areas.

We would like to request your review and comments on the Phase IA archaeological study enclosed. Thank you for your assistance in this matter. Please let me know if you have any further questions. I can be reached at (646) 388-9810.

Sincerely,

AKRF, INC.

Molly R McDonald

Molly McDonald, RPA
Technical Director/ Archaeologist & Architectural Historian

cc. Mark Coles, Watchtower Bible and Tract Society of New York, Inc.
Richard Williams, Town Planner, Town of Patterson

Appendix A: Correspondence

A.5 Letter from SHPO to AKRF, Response to Phase 1A, May 18, 2011

Andrew M. Cuomo
Governor

Rose Harvey
Commissioner

New York State Office of Parks, Recreation and Historic Preservation

Historic Preservation Field Services Bureau • Peebles Island, PO Box 189, Waterford, New York 12188-0189
518-237-8643
www.nysparks.com

May 18, 2011

Molly McDonald, RPA
AKRF
440 Park Avenue South
New York, New York 10016

Re: DEC
Watchtower Educational Center
Amended Site Plan
Route 22/PATTERSON, Putnam County
11PR03423

Dear Ms. McDonald, RPA:

Thank you for requesting the comments of the Field Services Bureau of the Office of Parks, Recreation and Historic Preservation (OPRHP). We have reviewed the project in accordance with the New York State Historic Preservation Act of 1980 (Section 14.09 of the New York Parks, Recreation and Historic Preservation Law). These comments are those of the Field Services Bureau and relate only to Historic/Cultural resources. They do not include potential environmental impacts to New York State Parkland that may be involved in or near your project. Such impacts must be considered as part of the environmental review of the project pursuant to the State Environmental Quality Review Act (New York Environmental Conservation Law Article 8) and its implementing regulations (6 NYCRR Part 617).

Based upon this review OPRHP offers the following comments: With regard to concerns for standing historic structures, There is insufficient information to make an eligibility determination regarding the house on the west side of Rte 22 at the north end of the APE (depicted in photo 13). However, based on the scope of the project, this house will not be impacted due to screening provided by the densely wooded area on the east side of Rte 22. Thus, if you intend to leave the wooded area intact, SHPO has no concerns with any buildings/structures near the proposed expansions to the complex.

With regard to archaeological issues: OPRHP concurs with the report's find regarding recommendations for archaeological Phase 1B testing locations and with the proposed methodologies in most places. However for APE segment 2: North Pasture we would like to clarify a few points regarding the recommended plowing and surface inspection. First, it should be noted that plowed transects are to be no wider than 50 feet from center point to center point of the transects, not from edge to edge as could be construed from the report text.

Second, the recommendation indicates that "freshly plowed" transects will be examined. While this is important, it should be noted that the transects need to be "freshly plowed and washed". washing of the sediments is the primary way in which exposed artifacts are cleaned and made visible. .

Finally, the text indicates that the work should be undertaken under supervision of an Registered Professional Archaeologist (RPA) in accordance with NYAC and OPRHP standards. As far as I know, RPA is not required by the NYAC and I am certain it is not required by OPRHP.

If further correspondence is required regarding this project, please be sure to refer to the OPRHP Project Review (PR) number noted above.Please contact me at extension 3291, or by e-mail at douglas.mackey@oprhp.state.ny.us, if you have any questions regarding these comments.

Sincerely

Douglas P. Mackey

Douglas P. Mackey
Historic Preservation Program Analyst
Archaeology

Appendix A: Correspondence

A.6 Letter from AKRF to Watchtower, Wetland Delineation, November 15, 2010

Environmental and Planning Consultants

34 South Broadway
Suite 314
White Plains, NY 10601
tel: 914 949-7336
fax: 914 949-7559
www.akrf.com

November 15, 2010

Mr. Mark Coles
Watchtower Bible and Tract Society of New York, Inc.
Design/Build Dept.
25 Columbia Heights
Brooklyn, N.Y 11201- 2483

Re: Wetland Delineation of excess soil deposition area

Dear Mr. Coles:

The following letter report describes the results of a wetland delineation conducted on November 12th, 2010 at a site proposed for the deposition of excess soil to be excavated for construction of the Watchtower Education Center (WEC) project. During earlier site investigations, an area of potential wetland was identified in the wooded ravine east of the proposed "excess soil deposition area". This site was subsequently inspected by the Town's wetland consultant Ted Kozlowski who confirmed the presence of wetland within the ravine and requested that the area be delineated. On November 12th, 2010 AKRF also conducted a wetland inspection of the lower reach of Mountain Brook (Class C stream) where a stream crossing is proposed to access the alternative soil deposition location, referred to as the "north pasture soil deposition area".

Wetland Delineation of Excess Soil Deposition Area:

To summarize, a federally-regulated and town-regulated wetland area was identified and delineated in the ravine east of the proposed excess soil deposition area on the WEC campus. This wetland area was delineated in accordance with the Corps of Engineers Wetlands Delineation Manual (TR Y-87-1)[1] and §158-18 Wetlands and Watercourses, Town of Patterson Code. No additional wetland areas were identified in the vicinity of the proposed excess soil deposition area.

[1] As amended by: U.S. Army Corps of Engineers. 2009. *Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region*, ed. J.S. Wakeley, R.W. Lichvar, and C.V. Noble. ERDC/EL TR-09-19. Vicksburg, MS: U.S. Army Engineer Research and Development Center.

The majority of the site consists of upland habitat. The ravine east of the proposed excess soil deposition area is occupied by an early mature forest dominated by red oak (*Quercus rubra*), tulip tree (*Liriodendron tulipifera*), black birch (*Betula nigra*), and sugar maple (*Acer saccharum*) with Christmas fern (*Polystichum acrostichoides*), blackberry (*Rubus allegheniensis*), and Japanese barberry (*Berberis thunbergii)* common in the understory. Due to the season, no dominant herbaceous vegetation was present aside from the more persistent fern species. The habitat is bedrock controlled, with a thin mantle of soil throughout (<12" typically) and a talus slope/rock outcrop forming a dominant topographic feature to the east. Although dominated by upland plants, this ravine forms the headwaters for the "Unnamed Stream" (see Watchtower Education Center Amended Site Plan DEIS). Ephemeral drainage ways receive surface runoff and percolating groundwater from the adjacent talus slope forming narrow channels. Approximately ½ way downslope within this ravine, these channels coalesce and begin to show signs of dominant wetland indicators (vegetation, soils, hydrology) sufficient to meet the Federal wetland definition. This wetland was flagged A1-A19 (See attached sketch plan). It contains such species as witch hazel (*Hamamelis virginiana*), spicebush (*Lindera benzoin*), yellow birch (*Betula alleghaniensis*), American beech (*Fagus grandifolia*), and northern maidenhair fern (*Adiantum pedatum*). Please note, the wetland continues downslope beyond the inspection area – at wetland flags A-11 and A-12 a note should be added to the survey indicating that the wetland continues to the south.

The ephemeral drainage ways upstream of the delineated wetland do not exhibit wetland soils or vegetation. Nor do they clearly meet Town or Federal definitions of a "watercourse" (Town) or "waters of the U.S." (U.S. Army Corps of Engineers - USACE). Therefore they were not flagged as wetland/watercourse during AKRF's site investigation. The lack of a permanent bank or high water mark and the accumulation of leaves/debris within the ephemeral drainage ways indicates that they do not contain running water for three (3) months of the year (required by the Town). Nor are these drainage features "relatively permanent waters" because they do not exhibit continuous flow at least seasonally (required by USACE). Nevertheless, these drainage features within the upland habitat of the ravine serve to convey surface and groundwater during and immediately after storm events which modify and enhance wetland and watercourse functions downstream.

The NRCS has mapped "CuD – Chatfield-Hollis-Rock outcrop complex, hilly" soils within the wetland investigation area. This is a non-hydric soil mapping unit which can contain hydric (wetland) soil inclusions.

Mountain Brook Wetland Inspection:

AKRF examined Mountain Brook from the culvert at Route 22 upstream a distance of approximately 200 feet. Within this study area, the stream is a narrow channel 3-5' in width with steep embankments. The stream bank is composed variously of bedrock and upland soil. Vegetation bordering the stream bank up to the water's edge was dominated by upland plants, including multiflora rose (*Rosa multiflora*), Oriental bittersweet (*Celastrus orbiculatus*), horse nettle (*Solanum carolinense*), wrinkeleaf goldenrod (*Solidago rugosa*), orchard grass (*Dactylis glomerata*), catalpa (*Catalpa bignonioides*), and common cinquefoil (*Potentilla simplex).* Soil in the embankments adjacent to the stream was uniformly non-hydric.

The stream itself is regulated by the Town as a "watercourse" and by the U.S. Army Corps of Engineers as "waters of the U.S.". The stream's boundary is the well-defined embankments visible on site-specific topographic survey. Because no adjacent vegetated wetlands were observed along the stream's banks, no wetland flags were placed in the field.

The NRCS has mapped "SgC – Stockbridge-Rock outcrop complex, rolling" soils adjacent to the lower reaches of Mountain Brook near Route 22. This is a non-hydric soil mapping unit.

Conclusion:

Once the wetland flags have been survey-located, AKRF is available to inspect the delineation drawing. We are also available to meet with Town or Federal wetland regulators to inspect the wetland boundary in the field as part of the regulatory review process.

Sincerely,

James Nash

Wetland Ecologist*

cc: Nanette Bourne (AKRF)

enc: site photos; wetland flag location sketch plan; USACE Data Sheets

* Mr. Nash has performed wetland delineations and functional assessments for residential and non-residential projects in the private and public sector throughout the New York City Metropolitan Region since 1998. As part of AKRF's municipal planning contracts, Mr. Nash has provided wetland inspection services to a number of municipalities in Westchester, Putnam and Dutchess Counties. In addition to delineation of wetland boundaries, this wetland related work has involved assessing alterations in ecological functions and values provided by wetlands and the design of wetland mitigation plans. Coordination with federal, state and local officials for the multi-jurisdictional permitting of wetland impacts has been an important component of this work. Mr. Nash holds a Masters in Environmental Science (MES) degree from Yale University School of Forestry and completed the USACE required wetland training certification coursework in 1996.

Photograph 1: Onsite wetland below hiking trail, in vicinity of flag A-10.

Photograph 2: Lower reach of wetland where narrow/channelized in vicinity of flag A-8.

Photograph 3: Upper reaches of flagged wetland, in vicinity of headwater perc by talus slope.

Photograph 4: Ephemeral drainage features, just up-gradient of flagged wetland. Vegetation predominantly non-hydric. Area not flagged.

Onsite wetland – Wooded Excess Soil Deposition Area

Approximate Flag Locations: Flagged A-1 to A-19 on November 12th, 2010 by AKRF, Inc. Wetland continues to south from flags A11-A12 as “Unnamed Stream”.

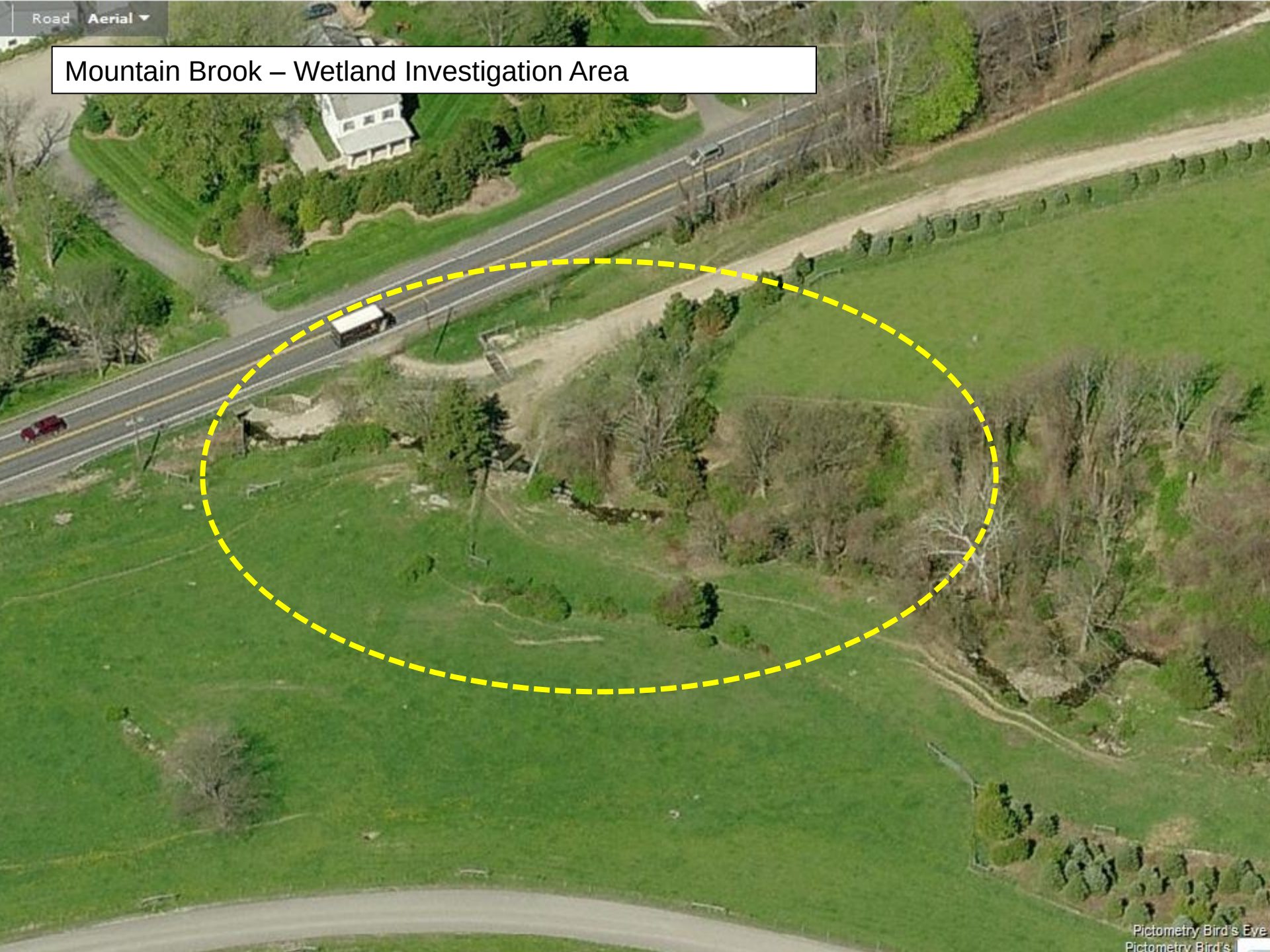
Photograph 5: Mountain Brook at location of proposed stream crossing.

Photograph 6: Mountain Brook culvert under Route 22.

Photograph 7: Mountain Brook, confined stream course segment just prior to Route 22.

Photograph 8: Mountain Brook, existing cattle crossing.

Mountain Brook – Wetland Investigation Area



WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Watchtower - Excess Soil Deposition Area City/County: Patterson NY, Putum County Sampling Date: 11/12/10

Applicant/Owner: Watchtower Bible and Tract Society State: NY Sampling Point: Point #1

Investigator(s): J. Nash (AKRF Inc.) Section, Township, Range: _____

Landform (hillslope, terrace, etc.): forested slope/hillside Local relief (concave, convex, none): concave

Slope (%): 10-15% Lat: 41.50 Long: -73.56 Datum: _____

Soil Map Unit Name: CuD - Chatfield Hollis Rock outcrop complex, hilly NWI classification: Not mapped by NWI

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No X (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No X	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** X
Hydric Soil Present?	Yes _____	No X	If yes, optional Wetland Site ID: _____
Wetland Hydrology Present?	Yes _____	No X	

Remarks: (Explain alternative procedures here or in a separate report.)

Sampling point is the northern portion of ravine, upgradient of flagged wetland.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- X Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No X	Depth (inches): 6-12 inches - variable
Water Table Present?	Yes _____	No X	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes _____	No X	Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

- Positive hydrology indicators limited to narrow ephemeral drainage ways only, majority of upland habitat exhibits no wetland hydrology. At ephemeral drainage ways, drainage patterns (B3), saturation (A3) and high groundwater table (A2) are present.
- No redox features
- Soil overlying ephemeral drainage features (only) encounters rock as shallow as 6" and fails to meet primary hydric soil indicators. Hydrophytic vegetation indicator not met. Therefore, drainage features not regulated as USACE wetland.

VEGETATION – Use scientific names of plants.

Sampling Point: Point #1

Tree Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. red oak (Quercus rubra)	40	yes	FACU-
2. tulip tree (Liriodendron tulipifera)	40	yes	FACU
3. black birch (Betula nigra)	30	yes	FACU
4. sugar maple (Acer saccharum)	40	yes	FACU-
5.			
6.			
7.			
	150 = Total Cover		

Sapling/Shrub Stratum (Plot size: 15' radius)			
1. blackberry (Rubus allegheniensis)	20	yes	FACU-
2. Japanese barberry (Berberis thunbergii)	30	yes	FACU
3.			
4.			
5.			
6.			
7.			
	50 = Total Cover		

Herb Stratum (Plot size: 5' radius)			
1. Christmas fern (Polystichum acrostichoides)	20	yes	FACU-
2. intermediate woodfern (Drypteris intermedia)	20	yes	FACU
3. marginal woodfern (Drypoteris marginalis)	20	yes	FACU-
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	60 = Total Cover		

Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 9 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

___ Rapid Test for Hydrophytic Vegetation

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: Point #1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-6	10 YR 3/3	XXXX		20 XX			loam	
5-10	10 YR 4/6	XXXX		XXXX			loam	4/6 and 3/3 both 50% of matrix
10+	rock	XXXX						
		XXXX						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: Rock

Depth (inches): 6-12 inches - variable

Hydric Soil Present? **Yes** _____ **No** X

Remarks:

- Positive hydrology indicators limited to narrow ephemeral drainage ways only, majority of upland habitat exhibits no wetland hydrology. At ephemeral drainage ways, drainage patterns (B3), saturation (A3) and high groundwater table (A2) are present.
- No redox features
- Soil overlying ephemeral drainage features (only) encounters rock as shallow as 6" and fails to meet primary hydric soil indicators. Hydrophytic vegetation indicator not met. Therefore, drainage features not regulated as USACE wetland.

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Watchtower - Excess Soil Deposition Area City/County: Patterson NY, Putum County Sampling Date: 11/12/10

Applicant/Owner: Watchtower Bible and Tract Society State: NY Sampling Point: Point #2

Investigator(s): J. Nash (AKRF Inc.) Section, Township, Range: _____

Landform (hillslope, terrace, etc.): forested slope/hillside Local relief (concave, convex, none): concave

Slope (%): 10-15% Lat: 41.50 Long: -73.56 Datum: _____

Soil Map Unit Name: CuD - Chatfield Hollis Rock outcrop complex, hilly NWI classification: Not mapped by NWI

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No _____	**Is the Sampled Area within a Wetland?** **Yes** X **No** _____
Hydric Soil Present?	Yes X	No _____	
Wetland Hydrology Present?	Yes X	No _____	If yes, optional Wetland Site ID: _____

Remarks: (Explain alternative procedures here or in a separate report.)

Sampling point is lower reaches of ravine where headwaters of "Unnamed Stream" begin. Wetland flagged A1-A19. Wetland a meandering stream/groundwater perc surrounded by upland habitat.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- X Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- X Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes X	No _____	Depth (inches): 1-2"
Water Table Present?	Yes X	No _____	Depth (inches): at 5"
Saturation Present? (includes capillary fringe)	Yes X	No _____	Depth (inches): to surface

Wetland Hydrology Present? **Yes** X **No** _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Water table frequently encountered at 5-6" below grade. Groundwater percolation evident at toe-of-slope of talus bedrock area east side of ravine, in vicinity of flag A1.

VEGETATION – Use scientific names of plants.

Sampling Point: Point #2

Tree Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. sugar maple (Acer saccharum)	40	yes	FACU-
2. yellow birch (Betula alleghaniensis) FAC	40	yes	FAC
3. American beech (Fagus grandifolia)	10	no	FAC+
4.			
5.			
6.			
7.			
	90 = Total Cover		

Sapling/Shrub Stratum (Plot size: 15' radius)			
1. witch hazel (Hamamelis virginiana)	50	yes	FAC-
2. spicebush (Lindera benzoin)	40	yes	FACW-
3.			
4.			
5.			
6.			
7.			
	90 = Total Cover		

Herb Stratum (Plot size: 5' radius)			
1. northern maidenhair fern (Adiantum pedatum)	10	yes	FAC-
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	10 = Total Cover		

Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 80% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ Rapid Test for Hydrophytic Vegetation
- X Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

Note - pussy willow (Salix discolor) FACW and slender goldentop (Euthamia galetorum) FAC become dominant at lower reaches of the wetland beyond the study area (south of the hiking trail) where the Unnamed stream flows to the southeast and becomes perennial.

SOIL

Sampling Point: Point #2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-4	10 YR 3/2	XXX		50			silty loam	mucky mineral
5-10	10 YR 3/2	XXX	10YR 4/6	XXX	C		silty loam	mucky mineral
10+	10YR 3/1	XXX	10YR 3/6		C		silty loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (TF2)
- X Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: Rock

Depth (inches): 1-2"

Hydric Soil Present? **Yes** X **No** ___

Remarks:

Water table frequently encountered at 5-6" below grade. Groundwater percolation evident at toe-of-slope of talus bedrock area east side of ravine, in vicinity of flag A1.

Appendix C: Groundwater Analysis

Appendix C: Groundwater Analysis

C.8.a Letter from C.A. Rich Consultants to Watchtower, Response to Comments, April 27, 2011

e-mail: eweinstock@carichinc.com

April 27, 2011

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Mark Coles
Watchtower Bible and Tract Society of New York, Inc.
Design/Build Department
25 Columbia Hts.
Brooklyn, NY 11201-2483

Re: **Responses to Town of Patterson Planning & Zoning Office Comments Watchtower Educational Center Patterson, NY**

Dear Mr. Coles:

CA RICH Consultants, Inc. (CA RICH) is pleased to provide you with the following responses to comments issued by the Town of Patterson, Planning & Zoning Office regarding water supply issues at the Watchtower Educational Center (WEC) located in Patterson, NY.

October 7, 2010 letter

Comment 12. Chapter 6, page 6-4, ¶ 1 states that the mean annual precipitation rate used for calculating recharge is 51 inches, obtain over a 30 year period for the NOAA station in Yorktown Heights. Typical sources of annual rainfall such as Soil Survey of Putnam and Westchester Counties, New York provide a much lower estimate of the average annual rainfall. If data from an independent NOAA station is to be used to provide more site specific data for the average annual rainfall of the site under consideration than the identification number of the station and the raw data should be included in the appendix. Further, data should be used from a weather station located closer to the subject site, and certainly a weather station located in Putnam County.

Response: The NOAA Station utilized for the average precipitation data is identified as NOAA Station No. 227 (Yorktown Heights 1W). The NOAA publication from which the data were taken was properly referenced in our report, however, for everyone's convenience we include a copy of the data set for this Station. Although this station may be a bit further away than others in Putnam County, CA RICH has relied upon climatological data from NOAA during our 28 years of performing successful water resource evaluations. The reason we rely upon the NOAA data as opposed to other "typical" sources is not only our confidence in the accuracy of the data, but also the extent of the database. NOAA calculates the average monthly rainfall over a period of 30 years. This takes into consideration periods of below average rainfall as well as above-average rainfall and, as such, is a more accurate representation for long-term water resource planning.

Comment 12 response (contd.)

For comparison purposes, CA RICH has obtained local precipitation data from two additional sources including the National Climatic Data Center (NCDC) and the Northeast Regional Climate Center (NRCC). Both agency weather stations are located in Carmel, NY. The NCDC station reports mean annual precipitation in Carmel at 45.7 inches between the period of 1931 and 1995. The NRCC database (while more recent) is smaller, encompassing only the period from August 2002 to April 2011. This database reports a mean annual precipitation for Carmel of 52.9 inches. These values (along with the original figure of 51 inches included in our report) have been analyzed with respect to the resulting variation in associated runoff and recharge, and are illustrated on Table 1 (attached). The data sources are also attached. In addition to the three data sets, CA RICH included a fourth value of 35.7 inches for comparison purposes. This figure is approximately 70% of our estimated mean annual precipitation of 51 inches and has been included to represent drought conditions.

As illustrated on Table 1, the variation in precipitation would result in estimated average daily groundwater recharge ranging from approximately 1.8 million gallons per day (mgd) assuming 52.9 inches of precipitation annually, down to around 1.2 mgd, utilizing the estimated annual drought precipitation value of 35.7 inches. Assuming no change in groundwater consumption within the mapped subwatershed, the resulting associated percentage of available groundwater recharge consumed would range from 10% (with 52.9 inches of precipitation) up to 15% (with 35.7 inches of precipitation). Based upon the above analysis, it appears that even under drought conditions, as much as 85% of the estimated groundwater recharge within the WSA would remain unutilized.

October 11, 2010 letter

C. <u>CHAPER 6 WATER SUPPLY AND UTILITIES; APPENDIX C, GROUNDWATER ANALYSIS</u>

Comment 1. As the various reports move forward in time, the explanations are derived more from local data and become more complex. The model created for the Hydrologic Budget and aquifer recharge (Appendix C. 4), however, is overly generalized and abstract, and should be evaluated. The model subwatershed (C. 4 Fig. 1) from which the aquifer is recharged, based on the discussion and calculations of recharge, must postulate a relatively porous basin, collecting water from an extensive area, in which water withdrawn from a well in one corner would be recharged by rainfall, including that from a distant corner of the area. The boundaries of this subwatershed are derived from the surface topography – the western slopes of Cranberry Mtn., from just above Haviland Hollow in the south to just past Stevens Brook in the north, from the ridgeline downward to the river's edge in the Great Swamp.

The reality, however, is that the eastern and western portions of the Property are very different geomorphologically (C. 7, fig. 2). So different (C. 3, p.2 ¶7) that they are referred to as two different aquifers (C. 4 p.15 ¶1, C. 7, p.4). On the eastern portion, wells are deep in the Manhattan Formation bedrock, while on the western portion the wells are shallow for "overlying the [Stockbridge Marble] bedrock in this area are unconsolidated glacial deposits comprised of stratified drift" (C. 1, p.2 ¶3), which 'represents the most productive source of groundwater on the Site. Wells drilled in this location provide significant yields of water with a minimal drawdown of the water table (C. 2, p.3 ¶2).

In contrast, the bedrock wells east of Rt. 22 are recharged through rainfall on exposed rock and groundwater seeping into the through fissures and fractures in the rock (C. 1, p.6 ¶2; C. 4, p.9 ¶3). "Primary porosity and permeability of the bedrock is negligible. Consequently, the quantity of groundwater available to the on-site wells is controlled by the geometry and density of intercepted, water-bearing joints and fractures within the bedrock aquifer" (C. 1, p.2 ¶5). Depending on the degree of folding, the inclinations of the folds, and where glaciation and weathering have exposed the bedrock layers, water recharge could occur as far away as the other side of the mountain. (Supporting evidence of this statement might be the report of a resident of the Old Stagecoach Road, that a well on her property that used to flow before WEC occupation of their site, ceased to flow afterwards.) Such recharge, however, would not be through a widely-spaced continuous area such as the recharge model postulates because of the impervious nature of the bedrock. "Typical low yielding wells are the only type one can expect in this aquifer type. Bedrock, composed of these types of metamorphic rocks can produce only from secondary fracturing. Normally, the fractures are few and far between. Fracturing becomes less and less at depth" (C. 3, p.4 ¶4). Consequently, recharge through fissures and fractures would be highly localized, especially in the northern area of the site. "Some smaller bedrock fracture systems are often highly localized. These *may occasionally* be reflected on the natural land surface by pronounced topographic features. Larger groups of fractures or potential faults or fault zones *may be* interconnected and indicative of regional structural bedrock lineaments that *tend to* traverse a much larger regional area (as much as several thousands of feet in length). Lineaments, *when known, usually* characterize areas of a series of mappable faults trending in a preferred compass orientation that correlate with each other" (C. 4, p.5 ¶3; emphasis this commentators to highlight how tenuous the models constructs are). The bedrock in the southern portion apparently is more fractured and interconnected (C. 2, p.5 ¶5), and so could be recharged from a wider area. Nevertheless, a better understanding of the morphology of the bedrock layers is necessary before equating their recharge area with the surface topography.

One could almost speak of the bedrock wells as drawing from *two* aquifers, because of their distinctively different drawdown and recovery rates and measured effects on neighboring wells. What the corresponding two recharge area *might be*, would be difficult to determine, but some of it could be from surface waters.

The extent of baseflow from surface water if known could then be assigned to a portion of the recharge and attributed to the watershed specific to that flow. (In such a case, the reintroduction of treated water to Mountain Brook would add to the possible well recharge.) And direct recharge by rainfall, as recorded during some of the well tests, could be assigned another portion; however, in both instances the recharge would be limited by the very specific (and more or less, limited) networks of fissures and fractures into which a particular well is drilled. One of the bedrock wells did not show rainfall recharge during the pumping test, such as did the other two (C. 7, p.9, W-2).

Response: The format of the hydrologic budget is the industry standard derived from proven principles of hydrogeology and widely utilized regionally for similar DEIS submittals. CA RICH has successfully used this approach in similar applications for over 25 years during dozens of similar groundwater resource investigations within the northeast United States. It is general in that it encompasses a relatively large area and, as such, the application of analytical tools to heterogeneous environments (e.g. the amount of recharge into different materials with different surface relief, etc.) may not be as inherently precise as if a much

smaller homogeneous area were being studied. However, to adjust for these differences, the methodology utilizes a conservative approach in assigning recharge values for the different aquifers. The methodology is not abstract, but rather relies upon proven scientific principles and utilizes concrete site-specific and regional data from reliable sources in its analysis.

The utilization of a surface water drainage basin or subwatershed as the area of study for a hydrologic budget is the industry standard for this type of study, the model for which can be found in numerous textbooks on the subject (e.g. Fetter 1980, Dunne, et. al. 1978). Again, there are inherent imperfections in doing this, but a drainage basin is the most logical area to study given the interrelationship between surface water and groundwater. It is not possible to accurately assign multiple recharge areas within a subwatershed without extensive field studies and data analysis which are beyond the scope of this submittal. Nevertheless, the subwatershed approach is the most representative model to consider in a hydrologic budget as it is a defined system in nature used to evaluate the interrelationship between precipitation and groundwater recharge. The disparity in recharge of the fractured bedrock aquifer versus that of the sand and gravel aquifer is accounted for in our hydrologic budget through assigning a conservatively low recharge percentage throughout the entire drainage basin.

The premise that surface water recharges the groundwater aquifer in the form of baseflow is not representative of conditions at the site. In the northeastern United States, baseflow is comprised of groundwater discharge from the aquifer to surface water, not the other way around. This is demonstrated by the fact that the streams on the WEC property flow year long even after long periods of no precipitation. As such, no portion of surface water flow can be assigned to groundwater recharge. Surface water flow is runoff and is assigned proportionally and appropriately in the hydrologic budget.

Comment 2: The subwatershed model and accompanying calculations of recharge, assume a closed-bottom basin in which water is stored. Without knowing the positional relationship between the Manhattan formation bedrock and the marble bedrock, a determination is not possible as to whether waters accessible to the bedrock wells are backing up and being stored or are slowly percolating through the bedrock to somewhere else. If the latter is the case the recharge calculations should include a percentage loss from percolation.

Response: Although a percentage of recharge is stored within the sand and gravel aquifer as well as the bedrock fractures, much of the recharge flows through the watershed and is discharged to streams as baseflow or flows out of the watershed as groundwater flow. It is not known what the percentage is that is stored and what the percentage is that is discharged as either surface water runoff or groundwater flow. However, the water budget does not need to take this into account and does not discuss groundwater flow out of the drainage basin. The water budget estimates how much water enters the aquifer as recharge versus how much groundwater is being utilized through pumping within the specific subwatershed. The volume of water that is left over as storage within the aquifer versus the volume that leaves the system as outflow is not critical for this analysis as this process continually occurs as part of the natural processes of the water cycle. More importantly, the critical factors are the portion of precipitation that enters this system as recharge and the amount of that water which will be used through pumpage. These factors have both been incorporated into our model.

Comment 3: The aquifer from which the sand wells are drawing water, more closely fits the subwatershed model – for it seems to be a basin carved in the marble bedrock, filled with relatively porous materials, capped by a layer of river and swamp deposits (C. 3, p.6 ¶2). "The sand wells have a significantly larger recharge area than do the bedrock wells and the storage of groundwater within the aquifers are much greater than those of the bedrock" (C. 3, p.8 ¶6). Well drill logs indicate the water–logged, porous fill shelves to the east (C. 5, p.2 ¶2 and Fig.2 and 3), and one could reasonable expect it to do the same to the west as it approaches the lower slopes of Cornwall Hill. Undetermined is whether it similarly shelves to the north approaching Pine Island, or whether the aquifer is connected through channels in the bedrock to beneath the open flat lands around Patterson Village, and to the south farther down the valley of the East Branch of the Croton. If the aquifer is connected it would be of considerable extent, and determination of drawdown effects would have to include wells from a much larger area than included in the later WEC report. Similarly, recharge would have to be calculated from a much larger area, but would be complicated by many of the unknowns posed from the bedrock wells, as well as additional unknowns: What, if any, of the water in the Manhattan formation bedrock enters the aquifer beneath the Great Swamp – either at the margins where the Manhattan formation meets the marble or otherwise? How much recharge is there from the marble bedrock underlying the aquifer – springs or fissures flowing from beneath into the aquifer? (If the water pumped daily out of the quarry is from the marble bedrock instead of the unconsolidated layer, what would be evidence of there being considerable water in the marble formation.) How much recharge is there through the 'leaky' layer of sediments on top of the aquifer? Interestingly the records fro the well-pumping tests show varied influence by rainfall on the sand wells in this aquifer (C. 7, pp.9-20 SG-1 through SG-4); and, there was drawdown of the surface waters in Stevens Brook (C. 7, p.14 S-1). How much baseflow from tributaries or the Croton River is there into the aquifer?

Response: While these questions are interesting from the standpoint of completely understanding the interrelationship between different water-bearing units within the fractured bedrock and sand and gravel aquifers, it is impossible to answer them given available information and the site-specific testing performed. However, the answers to these questions would not affect the findings of our studies relative to the water budget which concerns itself with recharge to the aquifers versus what is being withdrawn, or the results of the site-specific pumping test which measures the effect of pumping stress on the aquifers. In addition, the concept that baseflow recharges the sand and gravel aquifer is not representative of this site. As previously stated, baseflow is groundwater that is discharged to surface water bodies, not the other way around. While the results of our pumping test indicate that heavy pumping stress on the sand and gravel aquifer (far beyond that which will ever occur during normal system operation at WEC) may potentially result in a reduction in groundwater discharge to Stephens Brook (i.e. baseflow), there is no baseflow infiltrating into the aquifer from tributaries or the Croton River. In addition, specific chemical analyses were performed on the groundwater from the sand and gravel wells during the 72-hour pumping test to determine if the pumping stress imposed by the test was causing the wells to be in direct influence of surface water. The results of the testing indicated no direct surface water influence on any of the wells.

Comment 4: There is not enough known to make a calculation of the effects of WEC drawdown upon water underlying the property. (Remington suggested-C.3, pp8-9 #2-6, 10--that well data be recorded quarterly which would then help with analysis of the water system. Has that data been collected and analyzed?) Until

more is known, assessments must be based upon the effects on neighboring wells and long-term drawdown in the WEC wells. Periodic monitoring is necessary.

Response: The water supply network at WEC has been in operation for more than 20 years. As such, a reliable long-term record of the wells' impact to the underlying aquifer is available. However, we agree that additional long-term monitoring of both the pumping rates of the wells and the drawdown experienced in the pumping wells and in on-site monitoring wells should be performed. This will ensure the long-term sustainability of the aquifer.

Comment 5: There are problems with the bedrock wells, especially on the northern portion of the property. "It appears that some areas of the bedrock aquifer are in a state of overdraft; that is, more groundwater is being taken from the aquifer than is being recharged from rainfall" (C. 3, p.7 ¶3). "Well #1 in the bedrock has only been used as a source of water for construction. A large decline in the static level has occurred" (¶7). Well #6 has an iron problem" (¶8). "Well #4 has a corrosion problem" (p.8 ¶1). "During the Spring of 2007, WEC reported an increase in the pumping depth to water in bedrock well W-4…[A} rehabilitation effort resulted in only minor improvements to the well's production capacity" (C. 6, p.2 ¶4). "Well W-2 should only be used for pumping intervals of up to eight hours and then allowed to recover" (C.7,p.19¶3).

The bedrock wells are not a long-term reliable source of water. This is because of the nature of the Manhattan metamorphic rocks with their poor transmissivity and low storativity factors together with their small recharge areas. Wells drilled into this formation will produce low yields and most likely dry up during severe drought conditions (C. 3, p.8 ¶2)."

Response: The bedrock wells are not pumped for long durations of time and are used to supplement the more productive sand and gravel wells. Wells W-2, W-4 and W-6 are typically pumped for 8 hours or less at a time. WEC's experience over the past 20 years has shown that these wells are reliable when the amount and rate of water pumped from them is properly managed. The intermittent use of the bedrock wells allows WEC to rotate the operation of the wells in the supply network.

WEC relies on the sand and gravel wells for pumping over longer durations. That is why two new sand and gravel wells were added to the well network. The operation of the bedrock wells provides a source of supply while maintenance is performed on the more productive sand and gravel wells.

Comment 6: The conclusion could be made that the bedrock wells should be phased out from large-volume use; "the drawdown of wells in the bedrock aquifer stabilized towards the end of the test. Therefore, these wells are better suited for short term pumping needs" (C. 7, p.18 ¶6). The WEC should be permitted to drill one or more additional sand-and-gravel wells to replace them.

Response: WEC has added two new sand and gravel wells to their well network. Once these are place online, the sand and gravel wells will be relied upon for the bulk of the water supply. The bedrock wells will be used more as a supplement to the sand and gravel wells when they need maintenance or are at rest between pumping periods.

Comment 7: In one final area of comment, pump-testing data was used to calculate "an estimated radius of influence of approximately 1,000 feet" (C. 7, p.15 ¶5), that is, the distance from a well at which drawdown is zero, or, to put it another way, the radius of the volume of aquifer required to recharge or equal the amount of water being pumped. The recommendation based on this calculation is "a wellhead projection [sic, 'protection' was intended] area of 1,000 feet from the center of the sand and gravel well field should be created. This should include a prohibition of the storage of any materials that might impact the waster quality of the aquifer" (C. 7, p.19 ¶4). This figure is considerably greater than that recommended in an earlier report, that "each well incorporated in the final system have a dedicated well head protection zone (sanitary easement)of no less than 100 feet and preferably 200 feet in radius" (C. 2, p.9 ¶4). In either case, the reasoning that protecting a surface area with a radius equal to the distance drawdown of the well, will protect the quality of the well water, is not valid. Firstly, rainfall, even on a surface area with a 1,000 foot radius, would not be sufficient to recharge a well. The reason being the water being pumped is from a volume, not an area, of aquifer. Secondly, there is an intervening only semi-leaky (it is referred to after all as an 'aqui*tart'*) layer of sediments between the surface and the aquifer, so not all rainfall directly above will reach the aquifer directly beneath. The proposed structure of the aquifer above the Stockbridge Marble bedrock suggests, rather, the importance of maintaining water quality in a number of possible contributing (not exclusive) sources of water recharge – the marble bedrock, the extensive sand and gravel deposits above it, the Croton River and tributaries to it such as Stevens Brook, and the watershed as a whole. Maintaining the quality of the main and most reliable source of water for the WEC Property, is then part of a regional community responsibility.

Response: We agree completely with the statement "Maintaining the quality of the main and most reliable source of water for the WEC Property, is then part of a regional community responsibility." The staff at WEC are very conscious of the need to protect water quality and have incorporated the following measures into the operations at this facility:

- The sand and gravel well field is located in a fence enclosed area.
- No pesticides or fertilizers are used on the fields surrounding the wells.
- There is no bulk storage of chemicals that would impact water quality in the land surrounding the sand and gravel well field.
- Most of the buildings at WEC are heated with natural gas which does not pose a threat to water quality.
- There are no underground petroleum storage tanks at the WEC facility that could leak and impact water quality. Any bulk petroleum that is stored for use as heating or motor fuel is placed in above ground tanks which have spill containment and are inspected monthly.
- WEC maintains a limited number of livestock at the facility. The barnyards and pens for these animals are more than 2,000 feet southeast of the sand and gravel wells.

- WEC owns and operates a wastewater treatment plant on the premises. The operation of this facility is closely monitored to ensure the plant's effluent is within State standards.

The pump test that was performed in October 2009 and described in our January 2010 Pump Test Report was conducted in accordance with the NYSDEC's August 31, 2005 *Recommended Pump Test Procedures For Water Supply Applications* (Appendix 10, TOGS 3.2.1). Section 13 (c) of that document explains the procedures to be followed to delineate the wellhead protection area of a supply well. The 1,000 foot radius presented in our report was calculated using the procedures outlined in that document. However, the comments of the reviewers are quite valid. Measures to protect water quality should be employed throughout the watershed. The delineated wellhead protection area is deemed to be somewhat more sensitive as calculations suggest that precipitation falling upon this area may take a more direct path to the well than other portions of the watershed.

If you have any questions regarding these responses, please do not hesitate to call our office.

Respectfully,

CA RICH CONSULTANTS, INC.

Richard J. Izzo, CPG
Associate

Eric A. Weinstock, CPG, CGWP
Vice President

cc:
Robert May
Rich Eldred
Joel Heier

Appendix C: Groundwater Analysis

C.8.b Table 1 and Recharge Estimates

Table 1

Hydrologic Budget Analysis Using Varied Average Annual Precipitation Values
Watchtower Educational Center
Patterson, NY
April 2011

Average Annual Precipitation (in.)	Data Source	Average Annual Evapotranspiration (in.)[1]	Average Annual Surface Water Runoff (in.)[2]	Average Annual Groundwater Recharge (in.)[3]	Average Daily Groundwater Recharge (gal.)[4]	Percent of Recharge Used Within the WSA[6]
51	NOAA (Yorktown)	25.5	17.5	8.0	1,732,993	11%
52.9	NRCC (Carmel)	26.45	18.1	8.3	1,799,128	10%
45.7	NCDC (Carmel)	22.85	15.7	7.2	1,554,256	12%
35.7	Drought Conditions[5]	17.85	12.2	5.6	1,214,156	15%

Notes:

1. Evapotranspiration is estimated at approximately 50% of precipitation
2. Surface water runoff is estimated at approximately 34% of precipitation
3. Groundwater recharge is estimated at approximately 16% of precipitation
4. The volume of groundwater recharge is based upon an approximately 4.55 square mile drainage basin
5. Drought conditions represent approximately 70% of the estimated average precipitation of 51 inches/year
6. Percent of recharge used is based upon a combined consumptive loss within the WSA of approximately 185,000 gal./day

NOAA = National Oceanic and Atmospheric Administration "Monthly Station Normals of Temperature Precipitation, and Heating and Cooling Degree Days 1971-1990" (Revised 2/ 2002)Station 227, Yorktown Heights, NY

NCDC = National Climatic Data Center Carmel, NY Putnam County Averages 1931-1995

NRCC = Northeast Regional Climate Center Carmel, NY Station Average Annual Precipitation (August 2002 - April 2011)

RICH ENVIRONMENTAL SPECIALISTS

No.	Station Name	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
		PRECIPITATION NORMALS (Total in Inches)												
208	WARSAW 6 SW	3.00	2.31	3.12	3.34	3.67	4.48	4.23	3.82	4.59	3.63	3.82	3.43	43.44
209	WATERLOO	1.81	1.51	2.12	2.79	3.03	3.76	3.35	3.31	3.73	2.93	2.98	2.30	33.62
210	WATERTOWN	3.54	2.48	2.86	3.06	3.33	3.40	3.32	3.95	4.59	3.77	4.51	3.76	42.57
211	WATERTOWN AP	2.77	2.22	2.41	2.77	2.86	2.84	2.48	3.11	3.91	3.10	3.45	2.83	34.75
212	WAVERLY	1.82	1.69	2.43	3.13	3.12	4.80	2.78	3.26	3.71	3.19	2.80	2.43	35.16
213	WELLESLEY ISLAND	2.92	2.28	2.64	3.21	2.92	3.27	2.11	3.27	3.89	3.19	3.87	3.19	36.76
214	WELLSVILLE	2.10	1.76	2.46	2.86	3.28	4.59	3.62	3.13	3.60	2.97	2.73	2.31	35.41
215	WELLSVILLE 4 NNW	1.92	1.60	2.29	2.83	3.18	4.40	3.44	3.09	3.77	3.04	2.84	2.31	34.71
216	WESTCHESTER CO AP	4.32	3.24	4.73	4.44	4.58	3.77	3.72	4.00	4.70	4.17	4.47	4.31	50.45
217	WESTFIELD 2 SSE	2.46	2.20	2.98	3.39	3.65	4.37	4.15	4.45	5.30	4.75	4.42	3.51	45.63
218	WEST MILTON	3.35	2.57	3.72	3.82	4.37	4.09	3.51	3.66	3.94	3.79	3.78	3.42	44.02
219	WEST POINT	4.14	3.10	4.06	4.32	4.86	4.24	4.39	4.39	4.51	4.14	4.47	3.96	50.58
220	WEST SAND LAKE 2 S	2.88	2.29	3.16	3.63	4.13	4.08	3.97	4.07	3.69	3.47	3.70	2.99	42.06
221	WHITEHALL	3.31	2.33	2.97	3.03	3.76	3.29	4.09	4.28	3.77	3.53	3.52	2.85	40.73
222	WHITESVILLE	2.31	2.11	2.66	3.01	3.60	4.74	3.80	3.49	3.65	3.02	3.11	2.65	38.15
223	WHITNEY POINT LAKE	2.17	2.03	2.64	3.31	3.35	3.58	3.09	3.28	3.43	2.82	3.03	2.71	35.44
224	WILSON 4 S	1.80	1.35	2.08	2.77	2.88	3.18	2.78	3.37	3.59	2.74	3.15	2.61	32.30
225	WINDHAM 3 E	3.34	2.65	3.54	3.92	4.09	4.22	3.64	3.78	4.00	3.80	3.68	3.24	43.90
226	WISCOY 1 E	1.71	1.50	2.17	2.53	3.13	3.95	3.35	3.22	3.77	2.95	2.77	2.30	33.35
227	YORKTOWN HEIGHTS 1 W	4.06	3.09	4.20	4.39	4.84	4.21	4.63	4.55	4.75	4.09	4.51	3.81	51.13

CARMEL, PUTNAM COUNTY, NEW YORK USA

WorldClimate

Weather station **CARMEL, PUTNAM COUNTY** is at about 41.43°N 73.68°W. Height about 161m / 528 feet above sea level.

Average Rainfall

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
mm	83.3	73.1	93.3	92.0	106.2	97.9	112.7	111.0	105.3	86.0	101.4	98.6	1161.9
inches	3.3	2.9	3.7	3.6	4.2	3.9	4.4	4.4	4.1	3.4	4.0	3.9	45.7

Source: CARMEL, PUTNAM COUNTY data derived from NCDC Cooperative Stations. 46 complete years between 1931 and 1995

Map of the area around CARMEL, PUTNAM COUNTY from tiger.census.gov.
Locations outside the continental US are not mapped.

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Monthly Time Series

Department of Earth and Atmospheric Science (EAS)
Northeast Regional Climate Center (NRCC)
1107 Bradfield Hall, Cornell University
Ithaca, NY 14853

Station: CARMEL 4 N

State: NY

ID: 301211
Latitude: 41.47 degrees
Longitude: -73.66 degrees
Elevation: 680 feet
Station period of record: 08/02/2002-04/25/2011

CLIMOD product: Monthly Time Series
Creation time: 04/26/2011 08:19 EDT
Element: Precipitation
Units: inch

Analysis: Sum
Max allowable missing days: 20
Lowest acceptable quality of data: Raw data
Column delimiter: tab

YEAR(S)	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
2002	-z	-z	-z	-z	-z	-z	-z	6.66g	4.33g	6.01	5.30a	2.42b	24.72g
2003	2.17e	2.24b	3.97a	1.64c	3.31	6.92b	4.46b	3.04c	9.87h	5.08a	4.48a	6.16	53.34
2004	2.98a	1.62	2.05a	4.6	2.11a	2.37	6.57	7.36	10.41	2.11	3.16	5.36	50.7
2005	4.65	2.85	5	3.32	2.96	4.46	5.92	1.63	3.55	16.92a	5.5	3.37b	60.13
2006	6.91	2.76a	0.84	4.44	3.77	7.65	2.29	7.95	2.66	5.91	6.21	2.09	53.48
2007	2.97a	1.41a	5.73	8.31a	1.22	3.47	7.29	3.36	0.87	4.73	3.51	4.41	47.28
2008	2.22	8.09	5.91	3.66	2.33	4.68	5.27	3.8	7.88	3.33	3.06	7.33a	57.56
2009	2.54	1.19	4.22	3.32	4.31	9.41	6.63	9.42	1.52	5.37	1.8	6.06	55.79
2010	3.63	5.21	8.05	2.14	2.17	2.47	2.33	0.42c	2.85	7.41	3	5.21	44.89
2011	1.93b	1.87d	1.60c	4.67h	-z	-z	-z	-z	-z	-z	-z	-z	10.07h
Normals	-	-	-	-	-	-	-	-	-	-	-	-	-
Mean	3.33	3.03	4.15	4.01	2.77	5.18	5.1	4.85	4.88	6.32	4	4.71	52.9

FLAGS:
a = 1, b = 2, c = 3, ..., or z = 26 or more missing days in a month or missing months in a year.
A = Accumulation over more than one day, S = Subsequent

NOTES:
- Long-term means based on columns. Thus, the sum (or average) of the monthly values may not equal the annual value.

Appendix D: Water Supply System

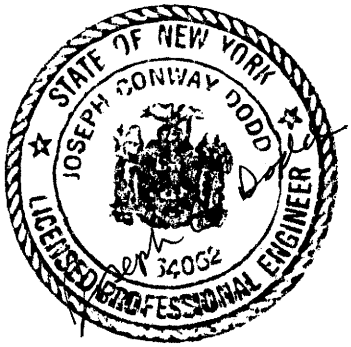
Appendix D: Water Supply System

D.1 Revised Water System Engineering Report, Watchtower Bible and Tract Society of New York, Inc., June 17, 2011

WATER SYSTEM ENGINEERING REPORT
WATCHTOWER EDUCATIONAL CENTER
AMENDED SITE PLAN

July 8, 2009
(Revised June 17, 2011)

Prepared by Joseph Dodd, P.E.



This report gives a brief description of the existing approved potable water system for the Watchtower Educational Center (WEC) at Patterson, New York. It also describes the proposed work required to support the Watchtower Educational Center Amended Site Plan.

Existing Potable Water System

The existing potable water system is divided into two components, the water supply component and the water distribution component. The NYSDEC water supply permit number 3-3724-0045/1-0 was issued on August 11, 1989, to the Watchtower Bible and Tract Society of New York, Inc. (The Applicant). The facility number is WSA 8240. This water supply permit indicated an anticipated average of 165,000 gallons per day would be pumped from the wells. On August 12, 2010, NYSDEC made a "determination of no jurisdiction" indicating that no permit was needed for the addition of two new sand wells to the water supply. The Applicant owns and operates the potable water system. The water supply component includes the original five (5) wells, the two new wells, and the supply piping (force mains) and appurtenances, including well houses and a surge tank, between the wells and the Water Softening Facility (WSF). The distribution component includes the WSF, high level storage tank, and the distribution piping to the WEC buildings and the 152-room hotel (Inn). The NYSDOH approved the plans and specifications for the original project, including installation of the new water system and appurtenances (clearwells for chlorination only) on December 20, 1989, to supply the WEC and 152-room hotel. The approval specified ~~serving a population of 1,500 with a distribution system average daily demand of 165,000 gpd and a~~ an anticipated average daily demand of 165,000 gpd and an anticipated maximum daily demand of 330,000 gpd. In addition the NYSDOH approved on July 31, 1996, the plans and specifications for the installation of the WSF to treat the water hardness. The WSF is approved for a maximum treatment capacity of 331,200 gallons per day.

The general layout of the existing potable water system is shown on Figure 1 and a profile of the water system is shown on Figure 2. The raw water supply includes the three rock wells (W-2, W-4, and W-6) on the east side of Route 22, along with two sand wells (SW-1 and SW-2) on the west side of Route 22. These wells deliver water through 3-inch and 4-inch force mains to the surge tank, except for Rock Well W-2, which delivers directly to the WSF. The sand wells deliver initially through individual 3-inch pipes to the adjacent well house, which was designed to allow the addition of two more sand wells, SW-3 and SW-4, which are to be installed this year. A 200-foot well head protection area is currently maintained around the sand wells.

Water from the sand wells continues on from the well house in two 4-inch force mains to a well control house located adjacent to Well W-6 east of Route 22. Flow metering and well pump control for the sand wells and Rock Well W-6 is done in the well control house. From there the three force mains, including the 3-inch force main from Rock Well W-6, continue crossing beneath Mountain Brook to the surge tank located upslope from Rock Well W-4. Rock Well W-4 also discharges into the surge tank. From the surge tank, well water is pumped through a 4-inch force main to the WSF. Once treated, the water is pumped through a 6-inch force main from the WSF to the 405,000-gallon high-level storage tank. This tank is sized to contain one-day's volume of potable water, 165,000 gallons, plus 240,000 gallons reserved for fire water storage.

The fire water storage is based upon ISO design standards and exceeds the volume required by NFPA for the largest building in the WEC, the Office Building. Thus, 165,000 gallons are reserved for distribution to the various other uses on the site. Fire flows are supplied from the

potable water distribution system, with hydrants located throughout the existing project site. Sprinklers are provided in residential hallways and the below grade floors of the parking garages. Standpipes are provided in all exit stairways. A fire water demand of 2,000 gpm for a period of two hours was used for design of the main complex, as reviewed by the Patterson Fire Department. Quoting from page 4 of the September 4, 1989, Engineering Report, "Water Supply/Treatment/Distribution," Exhibit "F," it states: "As discussed with the Patterson Fire Department on March 24, 1988, a fire water demand of 2,000 gpm for a period of at least two hours will be provided, based on the size and nature of the proposed facility. The NFPA Code No. 1231, Table 5-5.1 (C), fire flow requirement for this facility is not less than 1,000 gpm." The Patterson Inn was designed for a fire flow of 1,000 gpm. A network analysis was included in that report, demonstrating that the above requirements were met.

The existing surge tank provides approximately one hour of storage at maximum combined flow from the tributary wells. Two pumps are provided, each capable of lifting the combined flow to the WSF. The surge tank pumps are controlled by level sensors at the surge tank.

The WSF is described in the FEIS, Chapter 6, "Water Supply and Utilities." The water distribution system is supplied by gravity through a 12-inch main from the high level storage tank to the compound fire flow meter near the WSF, and then into the distribution network. This network consists of one main loop generally along the circular loop road with four sub-loops. Branches from the main loop serve the Patterson Inn and other buildings outside the main loop. One of these is a 10-inch pipeline serving the Audio/Video Building, which is controlled by fire protection needs.

Proposed Adjustments to the Water System

The proposed adjustments to the water system will require approval of plans and specifications by the NYSDOH and review of the plans by the PCDOH. A summary of the proposed additions to the existing potable water system to meet the needs of the WEC Amended Site Plan are as follows:

1. A larger two-compartment surge tank, pumps, and force mains east of ~~adjacent to~~ the existing surge tank and force main will replace existing surge tank to provide greater flexibility in operation and redundancy in the event of mechanical failure or maintenance needs.

2. Increased capacity supernatant pumps and a provision of another lime feeder at the WSF to facilitate operation.

3. Addition of distribution mains and fire hydrants in the area of the proposed buildings to extend the potable water service to these buildings and meet fire protection needs. Modifications to the existing water mains are proposed where necessary to avoid conflict with new construction.

4. Cooling water for the cooling towers at the powerhouse to be supplied from a new treated effluent pump at the Wastewater Treatment Facility (WWTF), using a new dedicated 3-inch force main from the WWTF to the cooling towers. Regulatory approval by the NYSDEC and NYSDOH will be required for this adjustment

prior to construction. If Regulatory approval is not granted, then potable water use will be continued. If approval is granted, potable water would no longer be used for this purpose except when the WWTF treated effluent is not available at the cooling towers.

Details of the above additions are described further for each category:

1. New Surge Tank, Pumps, and Force Main:

   The new surge tank will be similar to the existing surge tank, but will have two compartments and be larger to give one hour detention for the new combined well flows as shown on Figure 3. The force mains from the connected wells will be valved to allow discharge to either compartment. A single larger pump capable of handling the combined flow will be provided in each compartment. The new pumps will discharge into the two new 6-inch force mains, but piping and valves will be provided to allow either surge tank compartment to operate with either force main to allow cleaning or other maintenance to be carried out on either compartment. The 6-inch force mains will connect to the existing 6-inch line stubbed out from the WSF for this purpose.

2. Increased Capacity of Supernatant Pumps at Water Softening Facility:

   This proposed change in the supernatant pump capacity from 25 gpm to 50 gpm will allow the WSF to meet its 10 percent supernatant allowance. A new lime feeder will also be installed in the space provided in the WSF to facilitate operation.

3. Addition of Distribution Mains and Fire Hydrants for New Buildings:

   The proposed new water mains and fire hydrants needed to serve the new buildings are shown on the utility Drawings CU-101 and CU-102. The line sizes and fire hydrant locations shown are preliminary, and may change as detailed design progresses.

4. Cooling Water for Cooling Towers at Powerhouse:

   The proposed powerhouse cooling tower demands are anticipated to require over 18,000 gpd during July and August. This represents a significant demand on the potable water system in this period and to a lesser extent during the remainder of the year. This demand can be avoided by the proposed use of WWTF effluent treated with hypochlorite to reduce biological fouling. Piping is proposed to allow use of potable water when effluent is not available. An air gap will be included for cross connection control. Level controls in the towers are proposed to control the WWTF pump and potable water makeup when needed.

Fire Protection

Fire protection requirements are discussed in the FEIS, Chapter 4, "Community Services and Facilities." The proposed potable water system would be designed to conform to these requirements, including those for flow and pressure. Since the plumbing design is still at schematic stage, the pressure requirements for sprinklers and hose racks in the topmost floors of

the proposed residence buildings may require the addition of booster pumps. This is a typical design solution to elevate the pressure and flow appropriately.

Site-Wide Potable Water Usage

~~Table 1 presents the potable water usage figures from the monthly reports submitted to the Putnam County Department of Health for the 31-month period from June 2006 through December 2008. It also presents the population and per capita water usage figures based on the population reported on the water supply report for that month. Table 1 has been corrected for a population figure error from 1,017 to 1,133, for February 2007 that was discovered after the report was submitted.~~

~~The average per capita potable water usage shown in Table 1 for the 31-month period is 79.30 gallons-per-capita-per-day (gpcd). The highest per capita daily water usage was 97.94 gpcd for July 2008. The typical powerhouse cooling tower potable water usage of about 18,000 gpd is one factor in this high usage. Another factor in the July 2008 water usage in particular appears to be the amount of water used for flushing the potable water mains during the month, estimated to have consumed a total of about 136,000 gallons. When this amount of flushing water is deducted, the average daily water usage in July drops from 110,476 gpd to 106,089 gpd. This is a more normal value for this time of year. Since the flushing water was discharged into the stormwater drains, this did not affect the wastewater flow to the WWTF. Also, since water main flushing could be deferred to less demanding months in the event of a water supply shortfall, it is conservative to include this high monthly value in the usage calculations. It should be noted that the NYSDOH approval is for an average daily demand of 165,000 gpd with a maximum day demand of 330,000 gpd. The amount of wastewater processed during the same month of July 2008 averaged 90,000 gpd with a population of 1,128 or 79.79 gpd.~~

~~The potable water usage figures are based on turbine water meter readings. In June 2006, a number of adjustments were made to the steam system; including steam trap repairs, blow-down reductions, and conversion of laundry dryers from steam to gas. It is estimated that these adjustments reduced water usage by about 10,000 gpd. Comparing the records for a two-year period from before and after these adjustments seems to show a 10 gpcd drop in per capita water usage from 87 gpcd to 77 gpcd.~~

The original NYSDEC water supply permit allows pumping "a supply of water in amounts estimated to average 165,000 gallons per day" from the original 5 wells. The August 12, 2010 letter from NYSDEC indicates that no permit is needed to pump water from the two new water supply wells. The original NYSDOH approval of the distribution system was for an "anticipated distribution system demand" with an average of 165,000 gallons per day and a maximum of 330,000 gallons per day. Both the original NYSDOH approval and the 1996 NYSDOH approval of the WSF limit the maximum treatment capacity to 331,200 gallons per day.

The WEC amended site plan maximum population is set at 2,200 (based on future dwelling unit count) plus a maximum of 75 day workers (living off-site), at an estimated equivalent flow for day workers equal to 60 percent of that for residents, the total equivalent population would be 2,245. The potable water usages for this population will remain comfortably below the average of 165,000 gallons per day and a maximum of 330,000 gallons per day estimates that were

originally approved. Table 1 presents the potable water usage figures for the 57-month period from June 2006 through February 2011. For this entire period, the maximum site population was 1,595 (based on the existing dwelling unit count of 1,566 plus 60 percent of day workers count of 48).

The data analysis has been revised in response to the Town's request that the Environmental Impact Statement focus on the maximum potential impact and not the typical impact. The results are presented using standard statistical bell-curve charts to illustrate projected usage in comparison to the regulatory limits.

Figure 4 graphically presents the potable water usage data on the basis of gallons/maximum population/day. The average potable water usage for the 57-month period is 95,285 gallons per day which corresponds to 59.74 gallons/maximum population/day. The highest potable water usage occurred on June 17, 2010. On that day 168,840 gallons were treated which corresponds to 105.9 gallons/maximum population/day. Peak water usage days typically occur in the summer. One factor is the 18,000 gallons per day used in the powerhouse cooling towers during the summer. Another factor is the water used for flushing potable water mains which is typically also done in summer. On the weekends, water usage is significantly lower than on weekdays.

Figure 5 graphically presents the flow data scaled up to the proposed maximum site population of 2,245. This chart shows an expected average water usage of 134,000 gallons per day and a peak day of more than 233,000 gallons per day can be expected to occur about once every 5 years. (Based on a normal bell curve, this data can be extrapolated to predict that once every 100 years, a peak day with about 257,000 gallons per day will occur.)

In addition, ~~A "Water Conservation/Reuse/Recycling Options Feasibility Study"~~ a water conservation/reuse/recycling study was done with the goal of identifying options that had the potential for reducing potable water demands and ~~in most cases~~ reducing the amount of wastewater to be discharged to Mountain Brook. Options A through F listed in Table 2 were selected for implementation. ~~with Option G (irrigation reuse) to be pursued if SPDES credit is given and some of the restrictions on reuse are removed. Options A through F are assumed to apply for this evaluation. These options are described in Table 2, along with the estimated water and wastewater use reductions for a population of 1,803.~~ These options are expected to result in an average potable water usage reduction of at least 20,000 gallons/day. This further reduces the likelihood of ever exceeding the 331,200 gallon/day maximum treatment limit or the 165,000 gallon per day average water usage that was expected when the facility was originally approved.

~~Conclusion~~

~~With the water reduction Options A through F implemented as indicated, the 31-month analysis results in projected water usages as shown in Table 3, both for a population of 1,803 (DEIS) and a population of 2,050 (bed count). Note that actual maximum population will be 1,803 due to facility operational requirements as explained in the DEIS. Table 3 shows that under the least favorable assumptions and with a maximum population of 2,050, the maximum projected potable water demand should not exceed the 165,000 gpd limit set by the NYSDEC water taking and SPDES permits.~~

TABLE 1: PATTERSON POTABLE WATER USAGE - 57 MONTHS

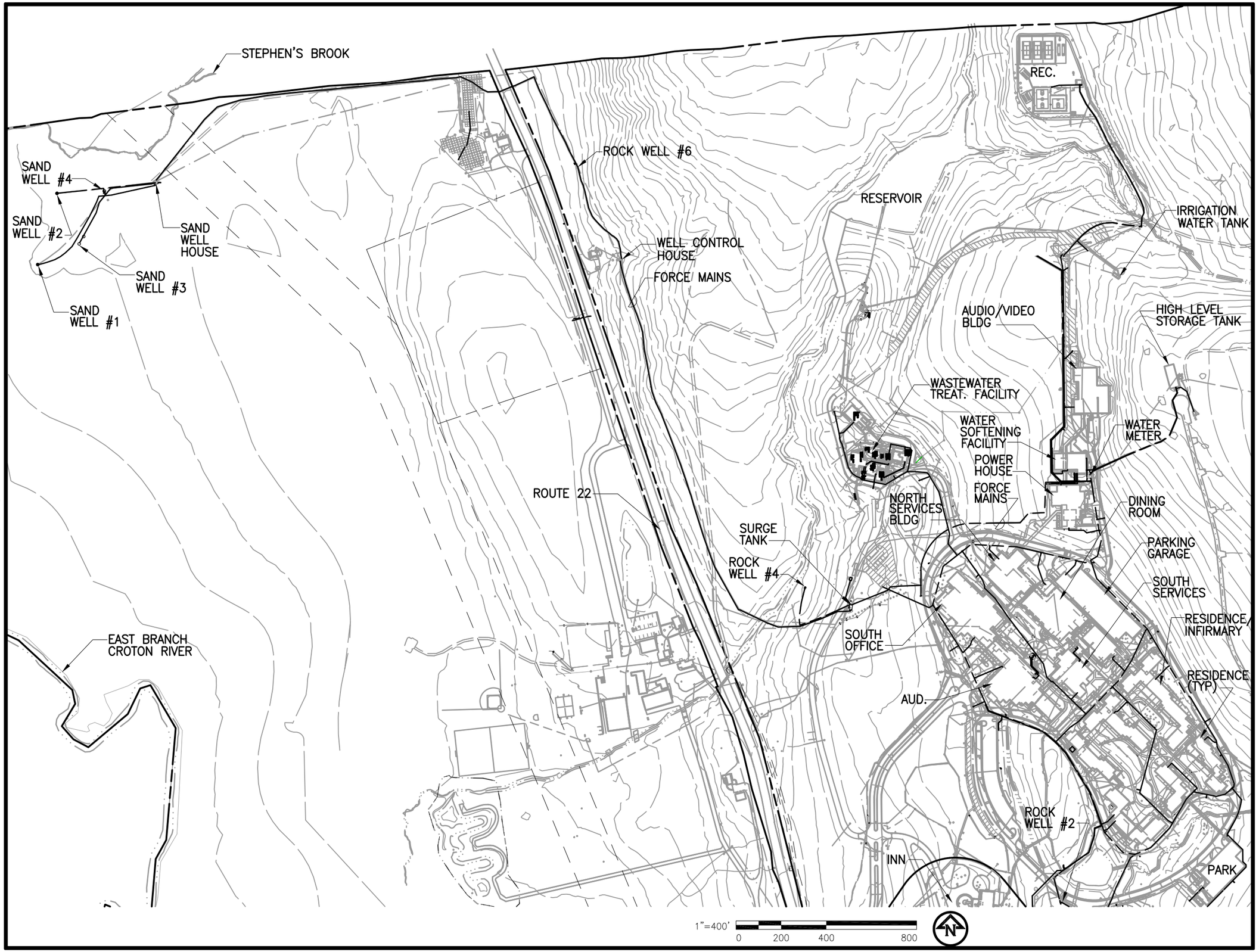
			Avg	95,245	Avg	124,945	Avg	59.7
			Std Dev	8,412	Std Dev	15,365	Std Dev	5.3
			Max	114,808	Max	168,840	Max	72.0
Date	Maximum Site Population		Monthly Average Potable Water Usage (gal/day)		Peak Potable Water Usage during Month (gal/day)		Monthly Average Potable Water Usage (gal/max pop/day)	
Jun-06	1595		92,880		144,710		58.23	
Jul-06	1595		92,301		118,830		57.87	
Aug-06	1595		95,593		148,740		59.93	
Sep-06	1595		95,896		136,730		60.12	
Oct-06	1595		93,075		117,110		58.35	
Nov-06	1595		87,497		110,670		54.86	
Dec-06	1595		80,538		109,430		50.49	
Jan-07	1595		84,361		114,930		52.89	
Feb-07	1595		85,359		131,250		53.52	
Mar-07	1595		84,396		112,830		52.91	
Apr-07	1595		80,150		108,540		50.25	
May-07	1595		88,280		111,720		55.35	
Jun-07	1595		87,454		126,490		54.83	
Jul-07	1595		89,719		115,440		56.25	
Aug-07	1595		103,443		165,530		64.85	
Sep-07	1595		93,700		124,480		58.75	
Oct-07	1595		102,468		135,230		64.24	
Nov-07	1595		90,829		110,710		56.95	
Dec-07	1595		86,633		107,170		54.32	
Jan-08	1595		82,790		105,890		51.91	
Feb-08	1595		85,580		110,070		53.66	
Mar-08	1595		85,463		120,810		53.58	
Apr-08	1595		92,797		122,780		58.18	
May-08	1595		94,414		115,510		59.19	
Jun-08	1595		98,068		136,600		61.48	
Jul-08	1595		110,476		149,640		69.26	
Aug-08	1595		104,269		128,190		65.37	
Sep-08	1595		107,798		130,170		67.58	
Oct-08	1595		105,431		132,250		66.10	
Nov-08	1595		90,880		114,510		56.98	
Dec-08	1595		92,854		114,980		58.22	
Jan-09	1595		91,902		106,980		57.62	
Feb-09	1595		91,105		106,990		57.12	

TABLE 1 (continued)

Mar-09	1595	98,761	129,376	61.92
Apr-09	1595	92,298	140,020	57.87
May-09	1595	98,878	131,010	61.99
Jun-09	1595	93,897	121,510	58.87
Jul-09	1595	96,096	117,000	60.25
Aug-09	1595	95,787	121,530	60.05
Sep-09	1595	99,698	141,340	62.51
Oct-09	1595	95,856	129,700	60.10
Nov-09	1595	100,438	120,130	62.97
Dec-09	1595	99,086	119,960	62.12
Jan-10	1595	99,086	123,270	62.12
Feb-10	1595	97,601	112,560	61.19
Mar-10	1595	97,933	118,030	61.40
Apr-10	1595	112,889	147,240	70.78
May-10	1595	114,808	152,480	71.98
Jun-10	1595	114,145	168,840	71.56
Jul-10	1595	110,689	145,050	69.40
Aug-10	1595	102,303	131,130	64.14
Sep-10	1595	107,883	149,120	67.64
Oct-10	1595	94,450	114,610	59.22
Nov-10	1595	90,813	115,040	56.94
Dec-10	1595	89,335	109,480	56.01
Jan-11	1595	89,962	110,970	56.40
Feb-11	1595	87,899	106,540	55.11

TABLE 2: WATER CONSERVATION/REUSE/RECYCLING OPTIONS

Options	Potable Water Use Reduction (gpd)
A: Premium Quality Reduced Flow Showerheads	13,300
B: Dual-Flush Flushometers In Women's Rooms	1,200
C: Water Conserving Washing Machines (Personal Laundry)	3,200
D: High-Efficiency Urinals in High-Use Areas	1,100
E: Dual-Flush Tank Toilets in New Residences	1,200
Subtotal:	**20,000**
F: Reuse WWTF Effluent in Cooling Towers	1,500 (Jan) 6,000 (Apr) 18,000 (Aug)



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WATCHTOWER

BIBLE AND TRACT SOCIETY
OF NEW YORK, INC

25 COLUMBIA HEIGHTS
BROOKLYN, NY 11201 USA
PH: (718) 560-5000
FAX: (718) 560-8831

MARK:	DATE:	DESCRIPTION:

OWNER:

WATCHTOWER BIBLE & TRACT SOCIETY
25 COLUMBIA HEIGHTS
BROOKLYN, NY 11201

ACCOUNT No.

PROJECT TITLE:

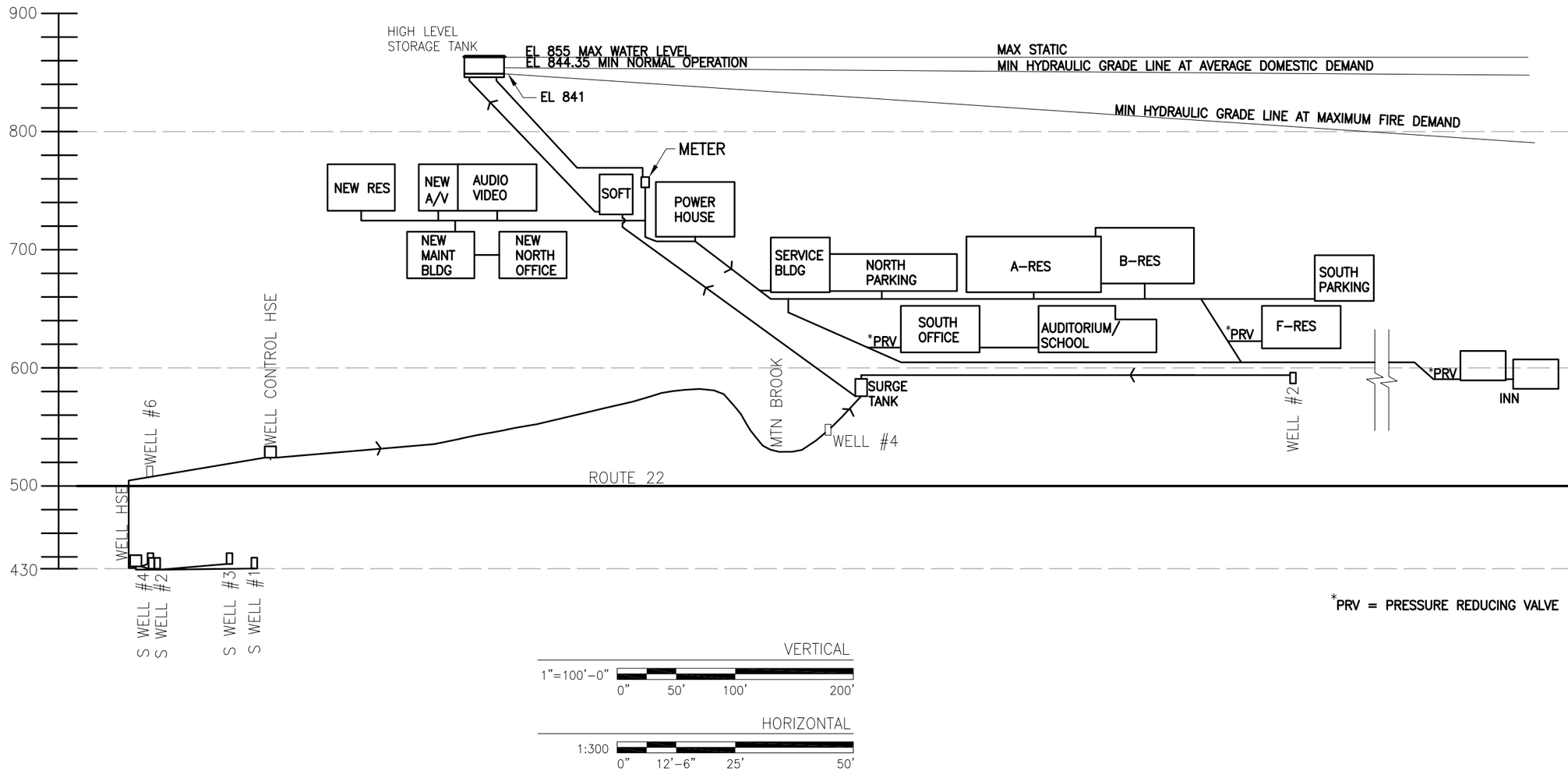
WATCHTOWER EDUCATIONAL CENTER AMENDED SITE PLAN
100 WATCHTOWER DRIVE
PATTERSON, NY 12563

SHEET TITLE:

WATER SYSTEM SITE PLAN

PROJECT No.
PPAT0104

SHEET No.
FIG 1



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WATCHTOWER

BIBLE AND TRACT SOCIETY
OF NEW YORK, INC

25 COLUMBIA HEIGHTS
BROOKLYN, NY 11201 USA
PH: (718) 560-5000
FAX: (718) 560-8831

MARK:	DATE:	DESCRIPTION:

OWNER:

WATCHTOWER BIBLE & TRACT SOCIETY
25 COLUMBIA HEIGHTS
BROOKLYN, NY 11201

ACCOUNT No.

PROJECT TITLE:

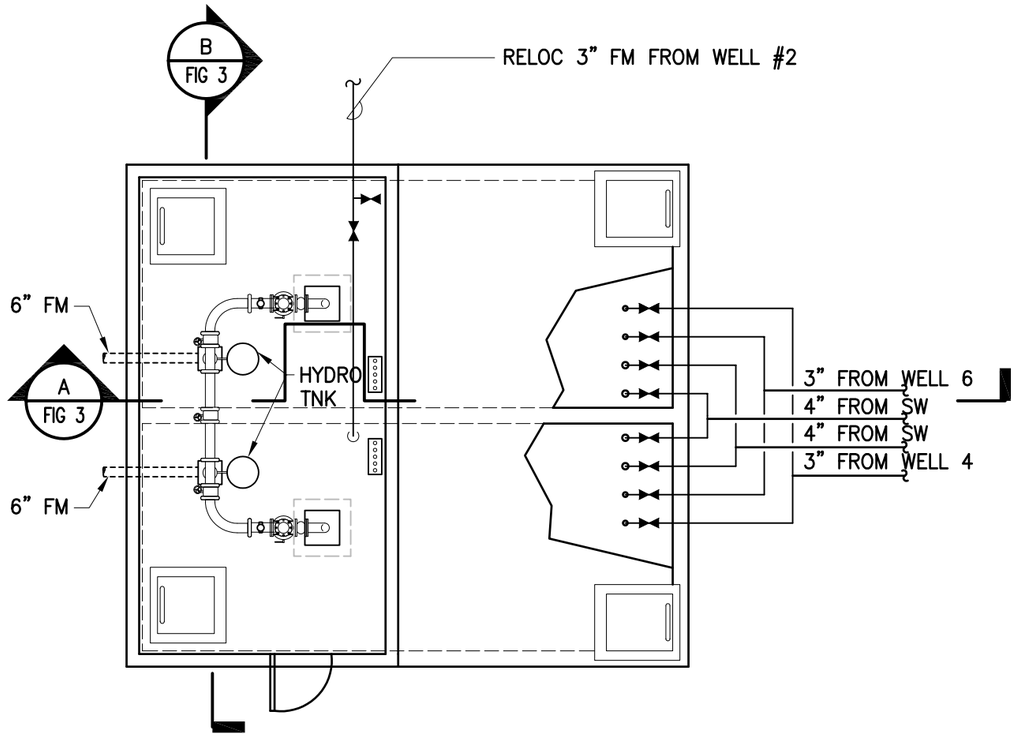
WATCHTOWER EDUCATIONAL CENTER AMENDED SITE PLAN
100 WATCHTOWER DRIVE
PATTERSON, NY 12563

SHEET TITLE:

WATER SYSTEM PROFILE

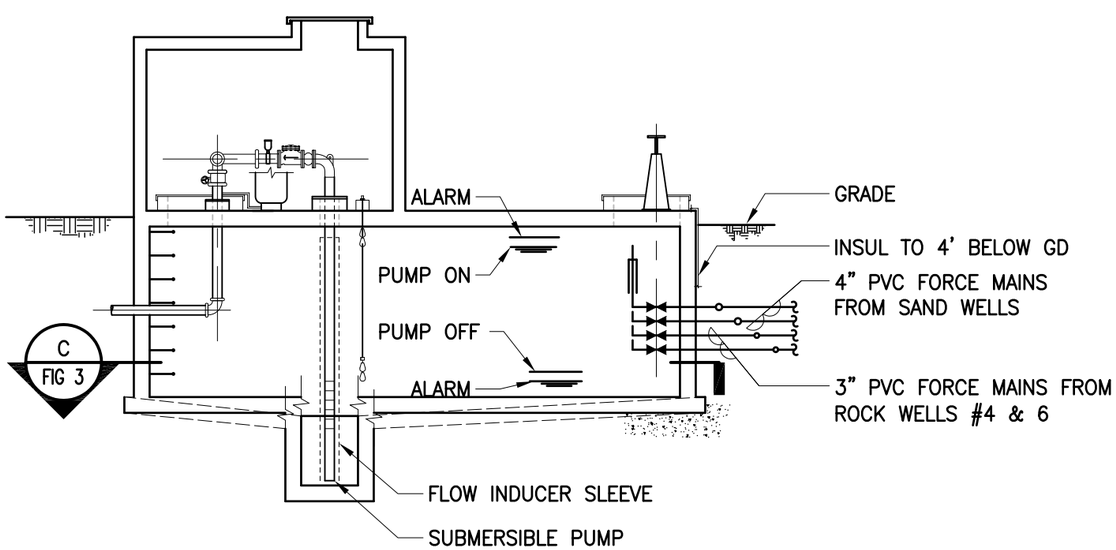
PROJECT No.
PPAT0104

SHEET No.
FIG 2



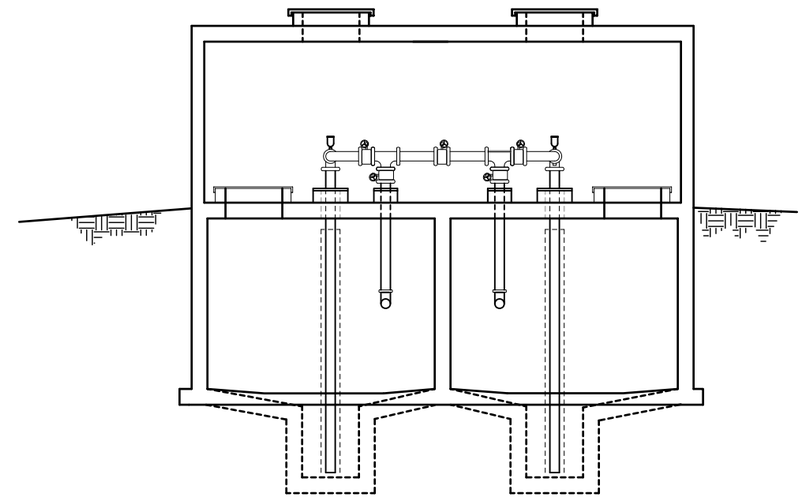
1 PLAN – SURGE TANK

1/8"=1'-0" 0" 4' 8' 16'



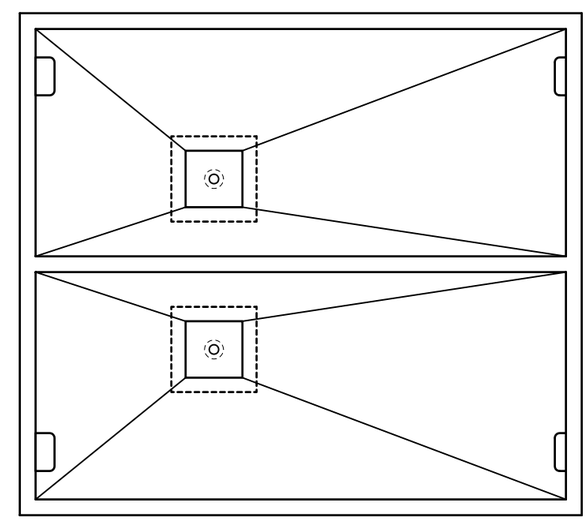
A SECTION – SURGE TANK

1/8"=1'-0" 0" 4' 8' 16'



B SECTION – SURGE TANK

1/8"=1'-0" 0" 4' 8' 16'



C SECTION – SURGE TANK

1/8"=1'-0" 0" 4' 8' 16'

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DIMSCALE: 1.0000
PLOT DATE: 29 Jun 11

WATCHTOWER

BIBLE AND TRACT SOCIETY
OF NEW YORK, INC

25 COLUMBIA HEIGHTS
BROOKLYN, NY 11201 USA
PH: (718) 560-5000
FAX: (718) 560-8831

MARK:	DATE:	DESCRIPTION:

OWNER:

WATCHTOWER BIBLE & TRACT SOCIETY
25 COLUMBIA HEIGHTS
BROOKLYN, NY 11201

ACCOUNT No.

PROJECT TITLE:

WATCHTOWER EDUCATIONAL CENTER AMENDED SITE PLAN
100 WATCHTOWER DRIVE
PATTERSON, NY 12563

SHEET TITLE:

WATER SYSTEM
SURGE TANK

PROJECT No.
PPAT0104

SHEET No.
FIG 3

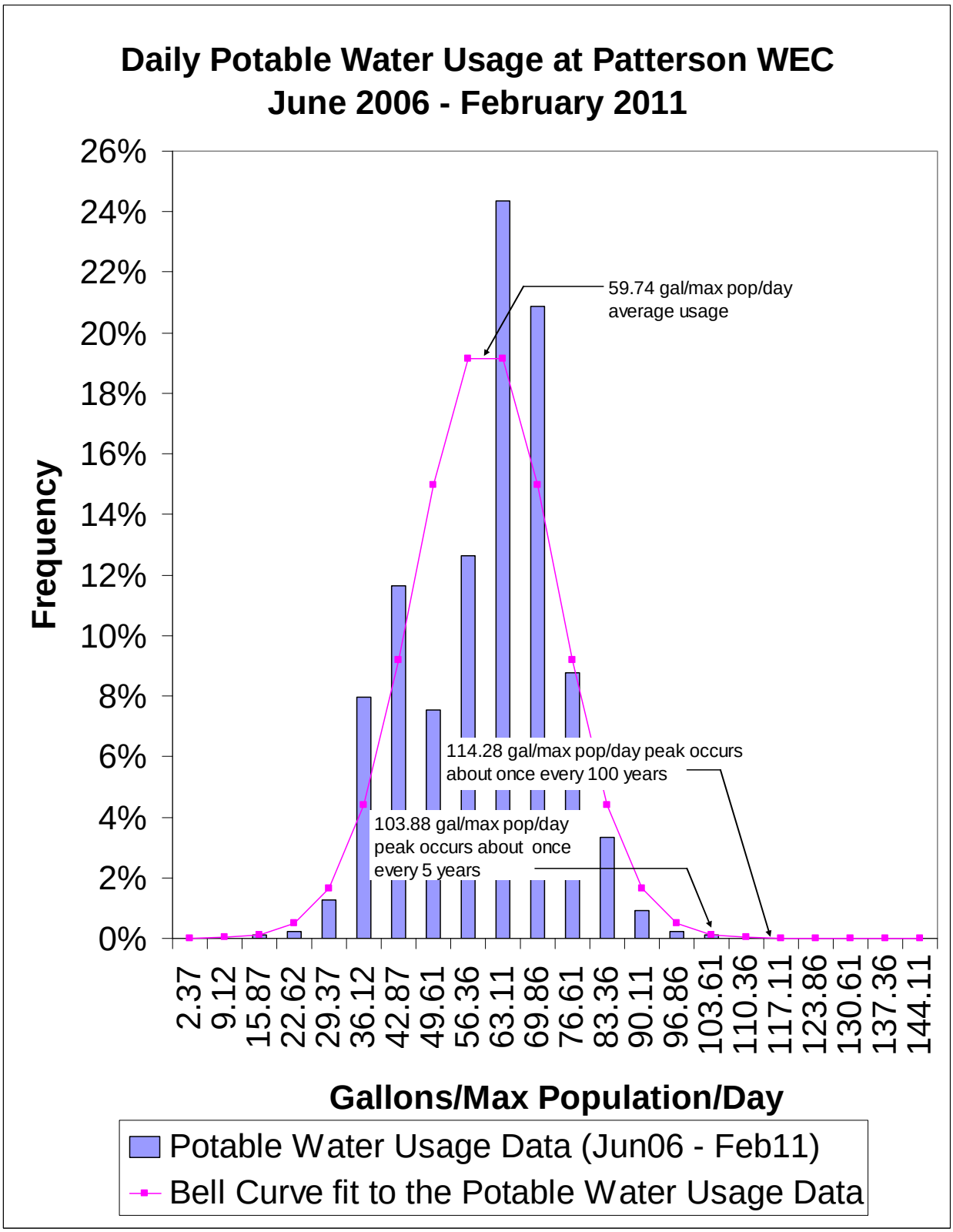


FIGURE 4: DAILY POTABLE WATER USAGE DATA

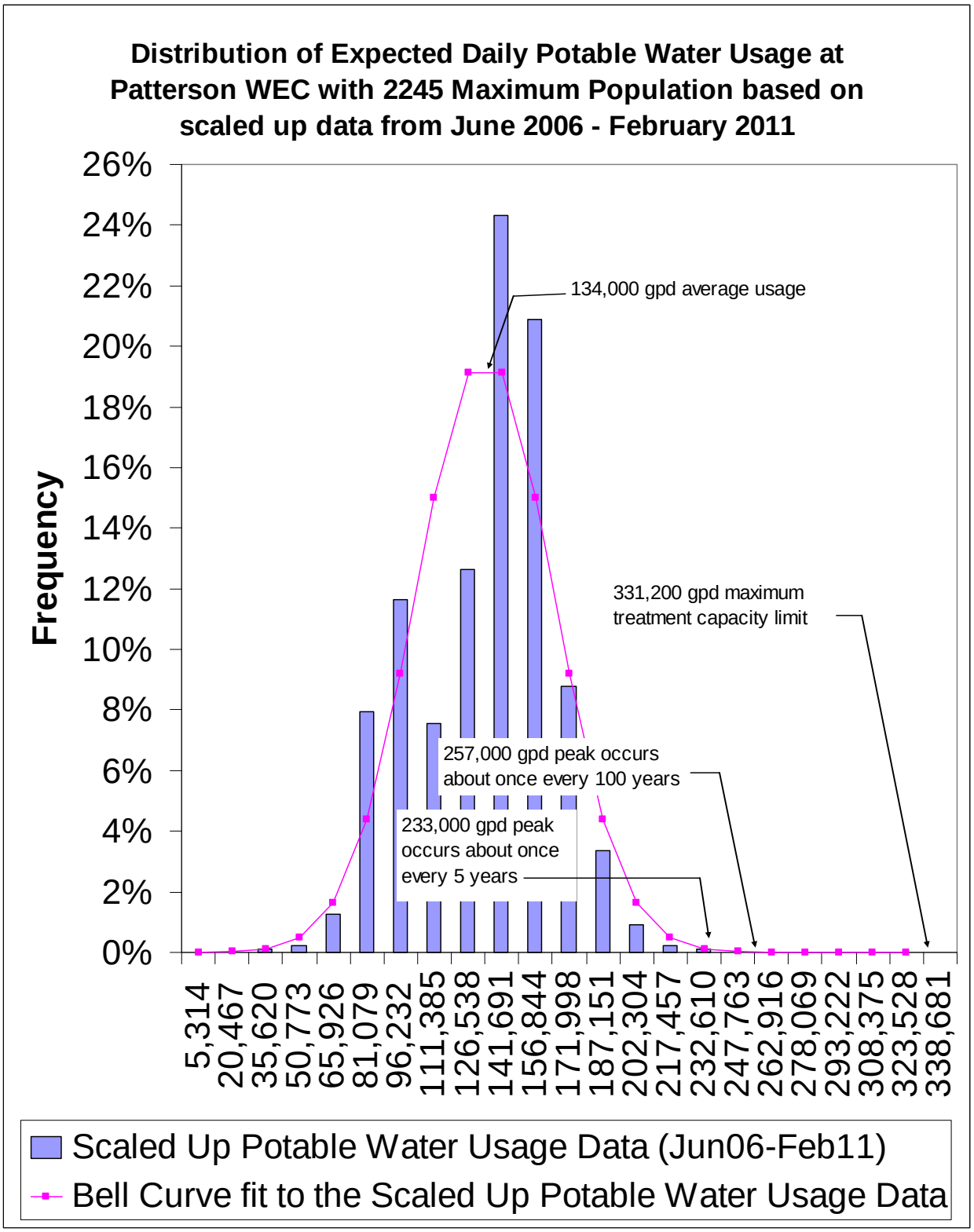


FIGURE 5: EXPECTED POTABLE WATER USAGE AT 2245 POPULATION

Appendix E: Wastewater System

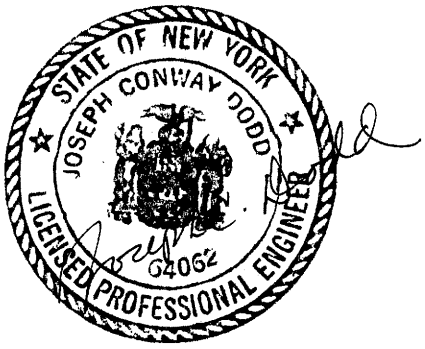
Appendix E: Wastewater System

E.1 Revised Wastewater System Engineering Report, Watchtower Bible and Tract Society of New York, Inc., June 17, 2011

WASTEWATER SYSTEM ENGINEERING REPORT
WATCHTOWER EDUCATIONAL CENTER
AMENDED SITE PLAN

July 8, 2009
(Revised June 17, 2011)

Prepared by Joseph Dodd, P.E.



WASTEWATER SYSTEM ENGINEERING REPORT
WATCHTOWER EDUCATIONAL CENTER
AMENDED SITE PLAN June 17, 2011

This report gives a brief description of the existing wastewater system for the Watchtower Educational Center (WEC) to provide background material to the Final Environmental Impact Statement. It focuses on the changes in flows and loads resulting from the Watchtower Bible and Tract Society Amended Site Plan and the ability of the present Wastewater Treatment Facility (WWTF) to meet these changes without the need for an upgrade of the WWTF itself.

Existing Wastewater System

The Applicant's WWTF treats domestic sewage emanating from an educational center, which includes classrooms, dormitories, dining rooms, offices, and support operations. The present average daily flow is about 88,000 gpd, while the permitted flow is 165,000 gpd (30-day arithmetic mean). A plan and schematic flow diagram of the WWTF are shown on Figures 1 and 2, respectively.

The WWTF uses the single-stage nitrification mode of the activated sludge process, as described in the DEIS, Chapter 6, "Water Supply and Utilities." The WWTF was initially constructed in 1989 to 1991, and has undergone an upgrade from 1994 to 1995 to add primary clarification and more flow equalization, and again from 2001 to 2003 to meet the NYCDEP's Regulatory Upgrade Program. Aerobic sludge digestion and dewatering are carried out in the Mechanical Dewatering Facility constructed from 1997 to 2000. The plant discharges to Mountain Brook, a Class C intermittent stream, at a location within the Watchtower Educational Center (WEC) property. In over 18 years of operation, the plant has experienced only a few exceedances of the SPDES permit. ~~, and none within the past year.~~

The WWTF is regulated under SPDES Permit No. NY-0165778. Specific effluent criteria are as follows:

1. Flow = 0.165 MGD 30-day arithmetic mean.
2. CBOD = 5.0 mg/L maximum.
3. TSS = 10.0 mg/L maximum.
4. Fecal coliform = 30-day geometric mean not-to-exceed 200/100 ml.
5. pH = 6.5 to 8.5 su.
6. Settleable solids = 0.1 ml/L maximum.
7. Ammonia = 2 mg/L maximum (1.5 mg/L maximum; June 1 to October 31).
8. Dissolved oxygen = 7.0 mg/L minimum.
9. Phosphorus = 0.5 mg/L 30 day average.
10. Chlorine residual: 0.2 mg/L min. in contact tank; 0.1 mg/L max. in effluent.
11. Turbidity: 0.5 NTU 95% of monthly readings; 5.0 NTU maximum.
12. Giardia lamblia cysts: 99.9% removal; Enteric viruses 99.99% removal.

Projected Flows and Biochemical Oxygen Demand (BOD) Loadings for the WEC WWTF, Amended Site Plan

The WEC amended site plan maximum population is set at 2,200 (based on future dwelling unit count) plus a maximum of 75 day workers (living off-site). At an estimated equivalent flow and load contribution for day workers equal to 60 percent of that for residents, the total equivalent population would be 2,245.

The BOD loading on the aeration tanks of the WWTF secondary treatment system is an important design parameter in sizing these tanks, as called for in paragraph 92.31 of *10 States Standards*. This loading is influenced not only by the influent BOD loading on the WWTF, but also by the BOD removal efficiency of the primary sedimentation tanks (clarifiers), and the flows and loads contributed by the sidestreams from other process areas, which are returned to the flow equalization tanks ahead of the primary clarifiers. Sidestreams include solids processing return flows from digester decanting, sludge thickening, sludge pressing, tank wash down, and the dual sand filter backwash flow. The latter amounts to about 30,000 gpd, and is required to maintain filter performance. The best way to evaluate the above factors is by full scale testing based on flow measurements and sampling to provide BOD concentrations and loads for quantitative analyses.

In the past, only monthly Carbonaceous BOD (CBOD) samples of the WWTF influent and final effluent were taken, as required by the SPDES permit. (CBOD is called for in the SPDES permit in lieu of BOD to remove ammonia interference in determining organic load, but is equivalent to BOD in this usage except when considering nitrification as discussed later.) Therefore, there was no way to establish primary clarifier performance or the effect of sidestreams based on previously available data. To provide the needed information, a program of testing was carried out to measure weekly flow and CBOD values for the WWTF influent and primary effluent for the 20-week period from January 23 to June 11, 2008. This took advantage of the recent installation and calibration of the new ultrasonic level sensors with improved accuracy for the Parshall flume flow meters, for both the WWTF influent and primary effluent. A single primary clarifier was in operation during this period (without chemical enhancement), as has typically been the case since primary clarifier startup.

CBOD values were analyzed both in the Orange County Lab (OCL) (State certified) and the Applicant's lab, with the OCL results being used to determine loads except in one case where the OCL sample was lost. The measurements were taken at mid-week in each case, so the averages for flows and loads are somewhat higher than the monthly averages would have been, considering the lower weekend values. The SPDES limit on flow of 165,000 gpd is based on the 30-day arithmetic mean of WWTF daily influent flows. The design average BOD5 loading given in paragraph 92.31 of *10 States Standards* is the average organic load entering the aeration tank over a continuous 12-month period.

The results of the 20-week BOD testing period are given in Table 1. Of particular note is the average primary treatment BOD removal percentage of 43.7 percent, which includes the effects of sidestream flows and loads. Of further interest is the tendency toward increasing primary removal efficiency with increasing WWTF influent loads, as shown in the plot in Figure 3. Therefore, the average percent removal value should be conservative if applied to higher than average loadings.

For present purposes, and neglecting flow and load reductions based on possible conservation and recycling measures, an estimate of future BOD loadings may be made. For the equivalent population of 2,245 stated above, ~~1,803 used in the DEIS,~~ and taking the average population during the 20-week study as ~~1,147 (from Water Systems Operation Reports sent to PCDOH),~~ 1,595 based on existing dwelling unit count of 1,566 plus 60 percent of day worker count of 48,

the projected BOD load would be: 182.8 x 2,245 ~~1,803~~ ÷ 1,595 ~~1,147~~ = 257.3 ~~287.3~~ lb/day. With the full aeration ring of both activated sludge units in operation (23,400 cf total), the BOD loading would be 11.0 ~~12.3~~ lb BOD/1,000 cf. This compares with the allowable *10 States Standards* loading for single-stage nitrification plants of 15 lb/1,000 cf. ~~If the bed count of 2,050 is used instead of the population of 1,803 (as PCDOH has used in the past), the loading would increase to 14.0 lb/1,000 cf, still within the allowable value.~~ The above midweek BOD loadings overstate the average monthly or yearly values called for in the permit. ~~, as discussed below for flows.~~ The results of the 20-week BOD study indicate that the WWTF will be adequate to handle the projected BOD loads after the amended site plan is implemented.

~~Also, using the average daily influent flow of 96,000 gpd from the 20-week BOD study, the projected flow for a population of 1,803 would be 150,900 gpd, without correction for lower weekend flows. For a population of 2,050, this would be 171,600 gpd. The monthly average flow for the period of test was close to 90 percent of the average midweek flow on the sampling days. Thus, the corrected monthly average flow would be about 135,800 gpd and 154,400 gpd for populations of 1,803 and 2,050, respectively. Planned water conservation and other measures discussed in the "Water Conservation/Reuse/Recycling Options Feasibility Study," particularly the premium quality reduced flow showerheads option, will further reduce the projected flows and in some options, the loads. The total flow reductions for the options selected for implementation, Options A through E, amount to 20,000 gpd for a population of 1,803.~~

Site-Wide Monthly Average Wastewater Flows

The SPDES Permit for the Wastewater Treatment Facility limits the monthly average wastewater flow to a maximum of 165,000 gallons/day. Table 2 presents the monthly average wastewater flow figures for the 57-month period from June 2006 through February 2011. For this entire period, the maximum site population was 1,595 (based on existing dwelling unit count plus 60 percent of day worker count).

Figure 4 graphically presents this flow data. As this chart shows, the historical data for the existing facility indicate that the highest monthly average wastewater flow is expected to be about 55.2 gallons/maximum site population/day.

Figure 5 graphically presents the flow data scaled up to the proposed maximum site population of 2,245 (based on future dwelling unit count plus 60 percent of day worker count). This chart indicates that the monthly average wastewater flow is expected to be about 124,000 gallons/day. Figure 5 also indicates that a peak monthly average wastewater flow of 153,000 gallons/day can be expected about once every 100 years. This peak is within the 165,000 gallons/day permit limit.

See Water System Engineering Report for methodology used to develop the information in Figures 4 and 5.

In addition, a water conservation/reuse/recycling study was done with the goal of identifying options that had the potential for reducing potable water demands and reducing the amount of wastewater to be discharged to Mountain Brook. Options A through F listed in Table 3 were

selected for implementation. Options A through E are expected to result in an average potable water usage reduction of about 20,000 gallons/day. Option F, "Reuse of WWTF Effluent in Cooling Towers," produces a variable reduction depending on time of year, ranging from 1,500 gpd in January to 18,000 gpd in August ~~(1,803 population)~~. Effluent reuse options such as Option F would not reduce flow through the WWTF, but would reduce the flow discharged under the SPDES permit. ~~Flow projections will be discussed further in connection with the potable water system portion of the DEIS, based on the 31-month study period from June 2006 through December 2008.~~

The case of single unit activated sludge operation deserves consideration. This occurs when one unit is out of service as necessitated by mechanical problems (short-term) at any time, or during scheduled down time such as for painting submerged equipment (longer term and which is typically scheduled during the warm part of the year). For this it may be advisable to improve primary removal by using both primary clarifiers. Chemically enhanced primary treatment is another possibility and was allowed for in the design, but this is probably not warranted except in extreme cases. With these considerations, it is expected that the WWTF can operate and meet all requirements using only one treatment ring when necessary, or before full buildup of population or loads.

The only changes required to the WWTF under the amended site plan are a result of possible recycling/reuse options, ~~that may require relocating the final effluent meter downstream of the chlorine contact tank (including a new meter pit),~~ covering the chlorine contact tank for algae control, and related minor changes such as controls. ~~The present SPDES permit uses the influent meter to record flow, but this would need to be changed to the new downstream meter location to remove recycled flows from the amount discharged to Mountain Brook.~~

Regarding the ability of the WWTF to safely sustain peak flows and loads in addition to the average values cited above (such as 15 lb BOD/d/1000 cf). Paragraph 92.31 of *10 States Standards* states: "These values apply to plants receiving diurnal load ratios of design peak hourly BOD to design average BOD ranging from about 2:1 to 4:1. Thus, a utilization of flow equalization facilities to reduce the diurnal peak hourly BOD organic load may be considered by the appropriate reviewing authority as justification to approve organic loading rates that exceed those specified in the table." The actual peak hourly to average daily ratios for flows and loads at the WWTF are typically less than the 2:1 to 4:1 range given above. The two flow equalization tanks at the WWTF having a working volume of about 23,000 gallons each provide an additional factor of safety to reduce peak flows and loads. Therefore, the WWTF will be able to handle the peak flows and loads with the 2,245 population.

NITRIFICATION

The following demonstrates ability to nitrify during winter conditions:

Temperature for nitrification = 10° C (water in aeration tank)

Specific nitrifier growth rate $u_{N(10^o)} = 0.180\ day^{-1}$
Soap and Detergent Assn., *Phosphorous and Nitrogen Removal from Municipal Wastewater*, 2nd ed., p. 13)

$kNd = 0.05\ day^{-1}$

Heterotrophic yield coefficient, a = 0.60
(estimate based on results from field observations)

$$SRT = \frac{1}{u_N - k_{Nd}} = \frac{1}{0.180 - 0.05} = 7.7 \text{ days}$$

Safety factor = 2.5

SRT design = 2.5 x 7.7 = 19.2 days

$$\text{Organic removal rate, } q_b = \frac{\left(\frac{1}{(SRT\_design)}\right) + 0.05}{0.6} = 0.170 \frac{lb\ BOD\ removed}{lb\ MLVSS - day}$$

(EPA Design Manual for Nitrogen Control, 1975, p. 4-10)

$$\text{Hydraulic detention time (HDT) required} = \frac{S_0 - S_1}{X_1 q_b}$$

TBOD to aeration = CBOD + NOD
NOD (nitrogenous oxygen demand) = 4.5 (NH_3 mg/l)
Average NH_3 from monthly reports to PCDOH = 24 mg/l

NOD = 4.5x24 = 108 mg/l

$$CBOD = \frac{182.8}{8.34 x 0.147} = 149.1 \text{ mg/l (ave. for 20-wk. test)}$$

TBOD to aeration = 257.1 mg/lS_0 = TBOD to Aeration tank = 257.1 mg/l

S_1 = Effluent TBOD= 2 mg/l
X_1 = MLVSS = 3000 mg/l

$$\text{HDT required} = \frac{So - S_1}{MLVSS \times q_b} = \frac{257.1 - 2}{3000 \times 0.170} = 0.500 \text{ days} = \underline{12.0 \text{ hrs}}$$

$$\text{Available detention time (full aeration rings)} = \frac{23{,}400 \times 7.48 \times 24}{165{,}000} = 25.5 \text{ hrs.} > 12.0 \text{ hrs. OK}$$

		WWTF Influent				Primary Effluent					WWTF Effluent (Final)
Data Points	Date	Avg Daily WW Flow mil gal/day	OCL CBOD mg/l	WTL CBOD mg/l	CBOD* load lb/d	Avg Daily WW Flow mil. gal/d	OCL CBOD mg/l	WTL CBOD mg/l	CBOD* load lb/d	% Rem (Primary)	Avg Daily WW Flow mil gal/day
1	23-Jan	0.083	588	473	407.0	0.138	135	100	155.4	61.8	0.104
2	30-Jan	0.103	294		252.6	0.148	114		140.7	44.3	0.099
3	6-Feb	0.099	765	686	631.6	0.145	213	179	257.6	59.2	0.094
4	14-Feb	0.094	270	302	211.7	0.157	131	151	171.5	19.0	0.104
5	20-Feb	0.089	294	280	218.2	0.150	129	124	161.4	26.0	0.095
6	27-Feb	0.097	246	349	199.0	0.141	87	115	102.3	48.6	0.095
7	6-Mar	0.094	388	354	304.2	0.147	131	116	160.6	47.2	0.105
8	12-Mar	0.095	630	579	499.1	0.134	160	166	178.8	64.2	0.087
9	19-Mar	0.101	395	367	332.7	0.139	210	122	243.4	26.8	0.114
10	26-Mar	0.096	735	539	588.5	0.139	211	178	244.6	58.4	0.096
11	2-Apr	0.095	485	465	384.3	0.167	144	151	200.6	47.8	0.118
12	9-Apr	0.096	348	316	278.6	0.151	174	133	219.1	21.4	0.097
13	16-Apr	0.094	329	372	257.9	0.147	168	145	206.0	20.1	0.097
14	23-Apr	0.098	426	405	348.2	0.152	159	147	201.6	42.1	0.100
15	24-Apr	0.109	341	358	310.0	0.150	119	128	148.9	52.0	0.113
16	30-Apr	0.094	432	425	338.7	0.154	176	155	226.0	33.3	0.100
17	7-May	0.097	392	407	317.1	0.147	137	120	168.0	47.0	no data
18	14-May	0.097	414	357	334.9	0.150	181	106	226.4	32.4	0.100
19	21-May	0.091	318	362	241.3	0.147	119	128	145.9	39.6	0.094
20	28-May	0.101	a	411	346.2	0.134	130	122	145.3	58.0	0.099
21	5-Jun	0.100	381	358	317.8	0.137	146	104	118.8	62.6	0.099
22	11-Jun	0.096	495	439	396.3	0.153	155	157	197.8	50.1	0.100
	Average	0.096	426		341.6	0.147			182.8	43.7	0.100

* Load = 8.34 (WW flow) (OCL CBOD) - see note a

OCL = Orange County Lab

WTL = Watchtower Lab

% removal (primary) = 100[(WWTF CBOD influent load) - (primary effluent CBOD load)] / (WWTF CBOD influent load)

Note:

a - lost sample, use WTL value for influent CBOD

Month (2008)	Avg Monthly WW Flow mil gal/day	Population*	WW Flow gal/ person /day
Jun	0.085	1595	53.3
Jul	0.090	1595	56.4
Aug	0.085	1595	53.3
Sept	0.091	1595	57.1
Oct	0.089	1595	55.8
Nov	0.089	1595	55.8
Dec	0.086	1595	53.9

*Population based on existing dwelling unit count plus day worker count x 0.60

Table 1

TABLE 2: PATTERSON MONTHLY AVG WASTEWATER FLOW - 57 MONTHS

			Avg	88,065	Avg	3.15
			Std Dev	5,024	Std Dev	55.21
			Max	100,980	Max	63.31
Date	Maximum Site Population		Monthly Avg Wastewater Flow (gal/day)		Wastewater Flow (gal/max pop/day)	
Jun-06	1595		81,000		50.78	
Jul-06	1595		80,000		50.16	
Aug-06	1595		88,000		55.17	
Sep-06	1595		85,000		53.29	
Oct-06	1595		86,000		53.92	
Nov-06	1595		83,000		52.04	
Dec-06	1595		74,000		46.39	
Jan-07	1595		84,000		52.66	
Feb-07	1595		85,260		53.45	
Mar-07	1595		82,667		51.83	
Apr-07	1595		81,778		51.27	
May-07	1595		87,037		54.57	
Jun-07	1595		86,111		53.99	
Jul-07	1595		90,741		56.89	
Aug-07	1595		100,980		63.31	
Sep-07	1595		92,157		57.78	
Oct-07	1595		98,000		61.44	
Nov-07	1595		89,000		55.80	
Dec-07	1595		86,000		53.92	
Jan-08	1595		81,000		50.78	
Feb-08	1595		86,000		53.92	
Mar-08	1595		84,000		52.66	
Apr-08	1595		87,000		54.55	
May-08	1595		87,000		54.55	
Jun-08	1595		85,000		53.29	
Jul-08	1595		90,000		56.43	
Aug-08	1595		85,000		53.29	
Sep-08	1595		91,000		57.05	
Oct-08	1595		89,000		55.80	
Nov-08	1595		89,000		55.80	
Dec-08	1595		86,000		53.92	
Jan-09	1595		85,000		53.29	
Feb-09	1595		80,000		50.16	
Mar-09	1595		91,000		57.05	
Apr-09	1595		84,000		52.66	
May-09	1595		89,000		55.80	
Jun-09	1595		92,000		57.68	
Jul-09	1595		92,000		57.68	

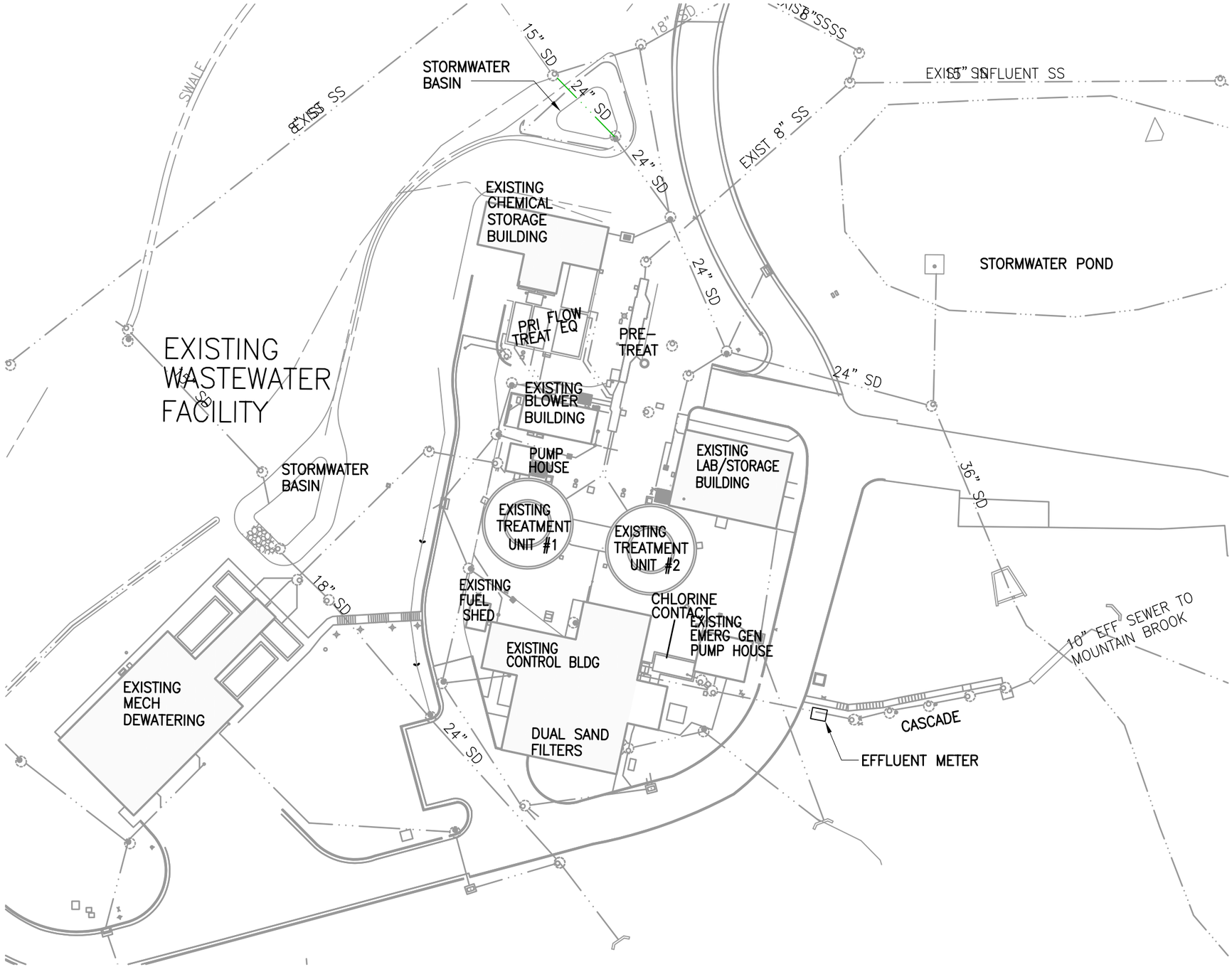
TABLE 2 (continued)

Aug-09	1595	94,000	58.93
Sep-09	1595	91,000	57.05
Oct-09	1595	92,000	57.68
Nov-09	1595	90,000	56.43
Dec-09	1595	92,000	57.68
Jan-10	1595	89,000	55.80
Feb-10	1595	89,000	55.80
Mar-10	1595	93,000	58.31
Apr-10	1595	92,000	57.68
May-10	1595	91,000	57.05
Jun-10	1595	92,000	57.68
Jul-10	1595	97,000	60.82
Aug-10	1595	95,000	59.56
Sep-10	1595	99,000	62.07
Oct-10	1595	89,000	55.80
Nov-10	1595	86,000	53.92
Dec-10	1595	86,000	53.92
Jan-11*	1595	84,000	52.66
Feb-11*	1595	85,000	53.29

*Based on flow measured at new effluent flow meter.

TABLE 3: WATER CONSERVATION/REUSE/RECYCLING OPTIONS

Options	Expected Wastewater Flow Reduction (gpd)
A: Premium Quality Reduced Flow Showerheads	13,300
B: Dual-Flush Flushometers In Women's Rooms	1,200
C: Water Conserving Washing Machines (Personal Laundry)	3,200
D: High-Efficiency Urinals in High-Use Areas	1,100
E: Dual-Flush Tank Toilets in New Residences	1,200
Subtotal:	**20,000**
F: Reuse WWTF Effluent in Cooling Towers	1,500 (Jan) 6,000 (Apr) 18,000 (Aug)



1 PLAN – WASTEWATER TREATMENT FACILITY

1"=50'
0 25 50 100

DSGN\DRFT: JD
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DIMSCALE: 600.00
PLOT DATE: 28 Jun 11

WATCHTOWER
BIBLE AND TRACT SOCIETY OF NEW YORK, INC
25 COLUMBIA HEIGHTS
BROOKLYN, NY 11201 USA
PH: (718) 560-5000
FAX: (718) 560-8831

MARK:	DATE:	DESCRIPTION:

OWNER:
WATCHTOWER BIBLE & TRACT SOCIETY
25 COLUMBIA HEIGHTS
BROOKLYN, NY 11201

ACCOUNT No.

PROJECT TITLE:
WATCHTOWER EDUCATIONAL CENTER AMENDED SITE PLAN
100 WATCHTOWER DRIVE
PATTERSON, NY 12563

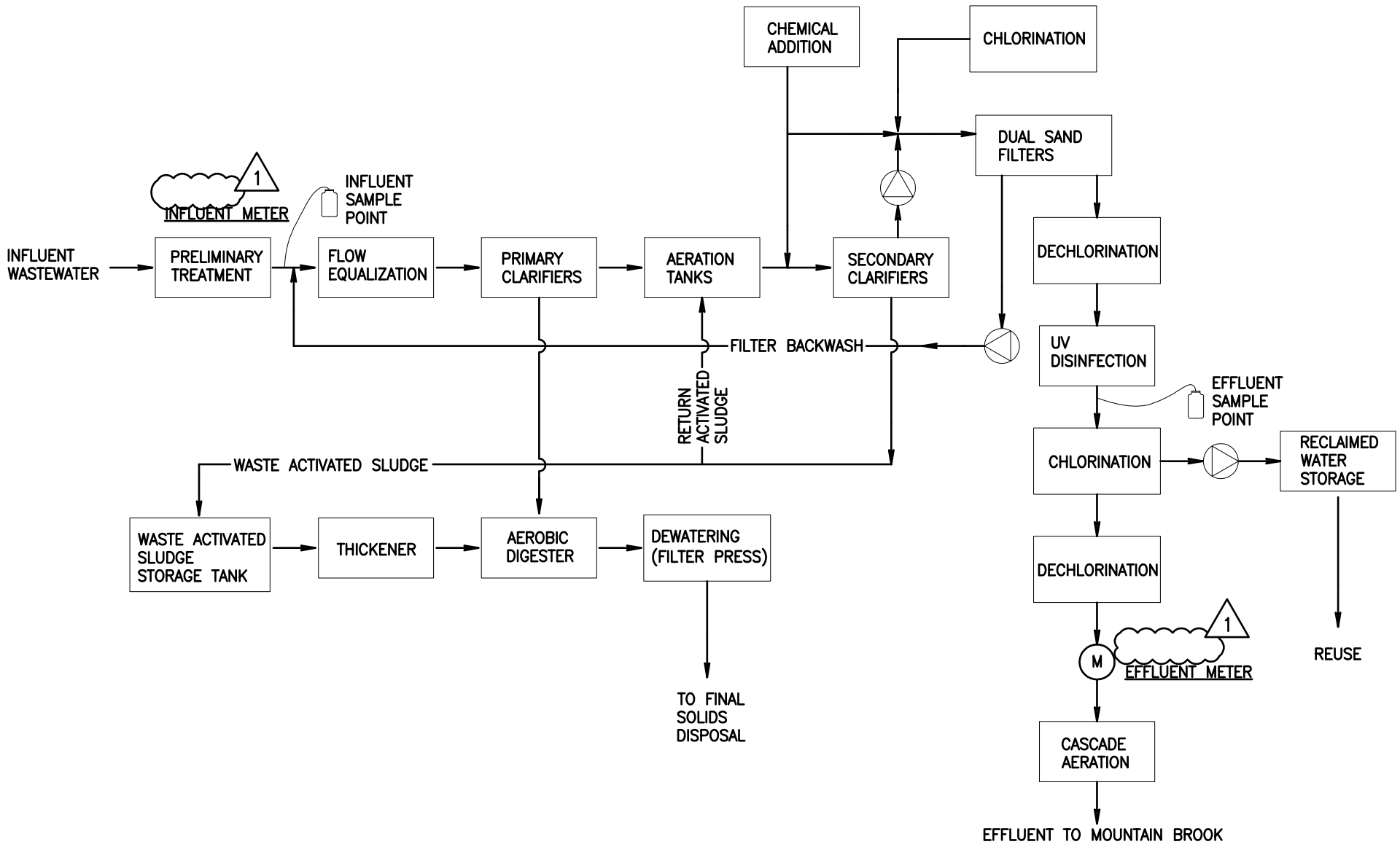
SHEET TITLE:
WASTEWATER TREATMENT FACILITY SITE PLAN

PROJECT No.
PPAT0104

SHEET No.
FIG 1

DIMSCALE: 1.0000
PLOT DATE: 10 Mar 11

DSGN\DRFT: JD
FILE PATH: P:\USA\PPAT0104\3_CONSTRUCTION DOCUMENTS\3.10 Drawings\Filing\WWTF Schematic_2.dwg



WATCHTOWER
BIBLE AND TRACT SOCIETY OF NEW YORK, INC

MARK:	DATE:	DESCRIPTION:
1	10 MAR 11	FEIS REVISION

OWNER: WATCHTOWER BIBLE & TRACT SOCIETY OF NY, INC.
ACCOUNT No.

PROJECT TITLE: WEC AMENDED SITE PLAN

SHEET TITLE: WASTEWATER TREATMENT FACILITY SCHEMATIC

PROJECT No. PPAT0104

SHEET No. FIG 2

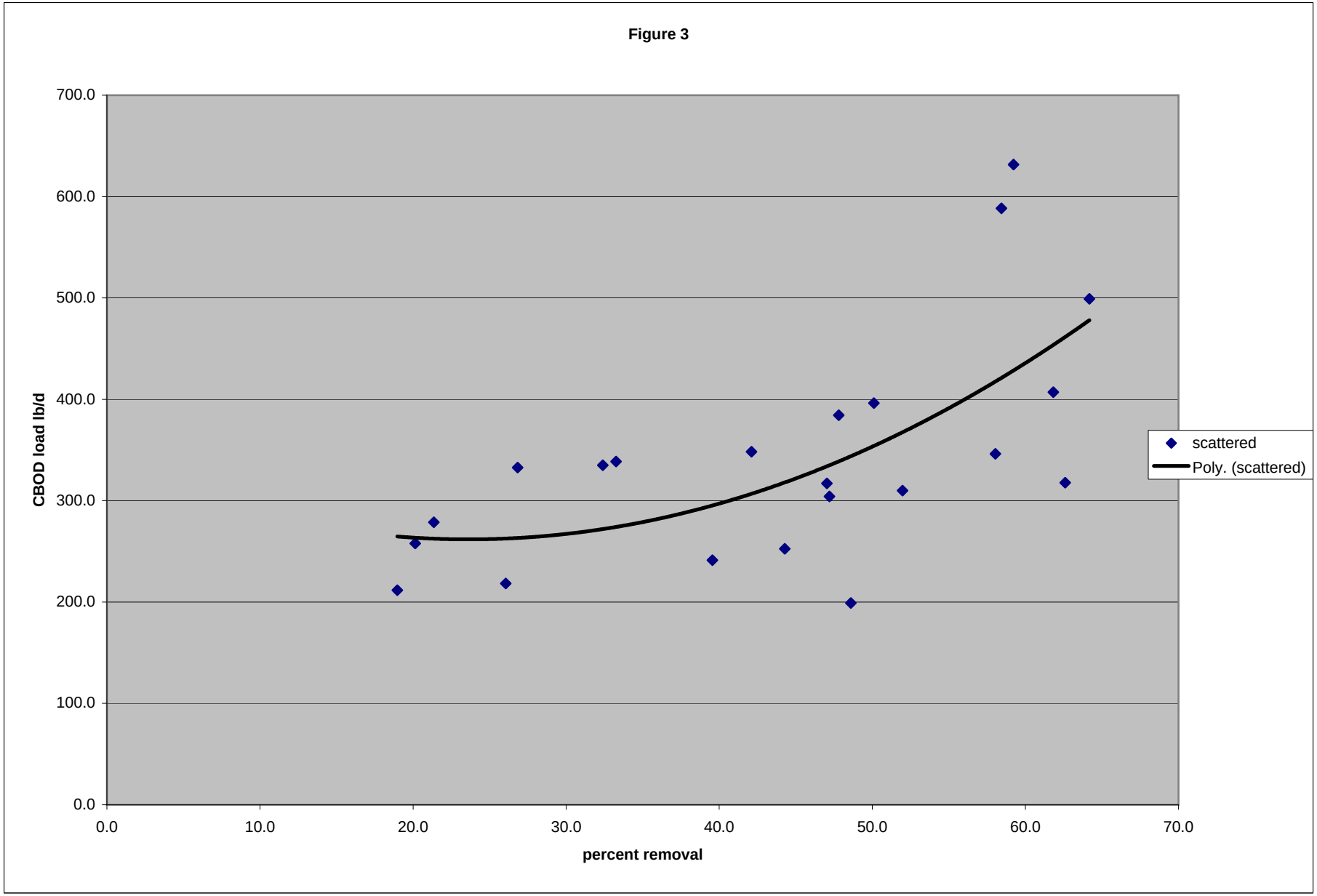


Figure 3
700.0
600.0
500.0
400.0
300.0
200.0
100.0
0.0
CBOD load lb/d
0.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
percent removal
scattered
Poly. (scattered)

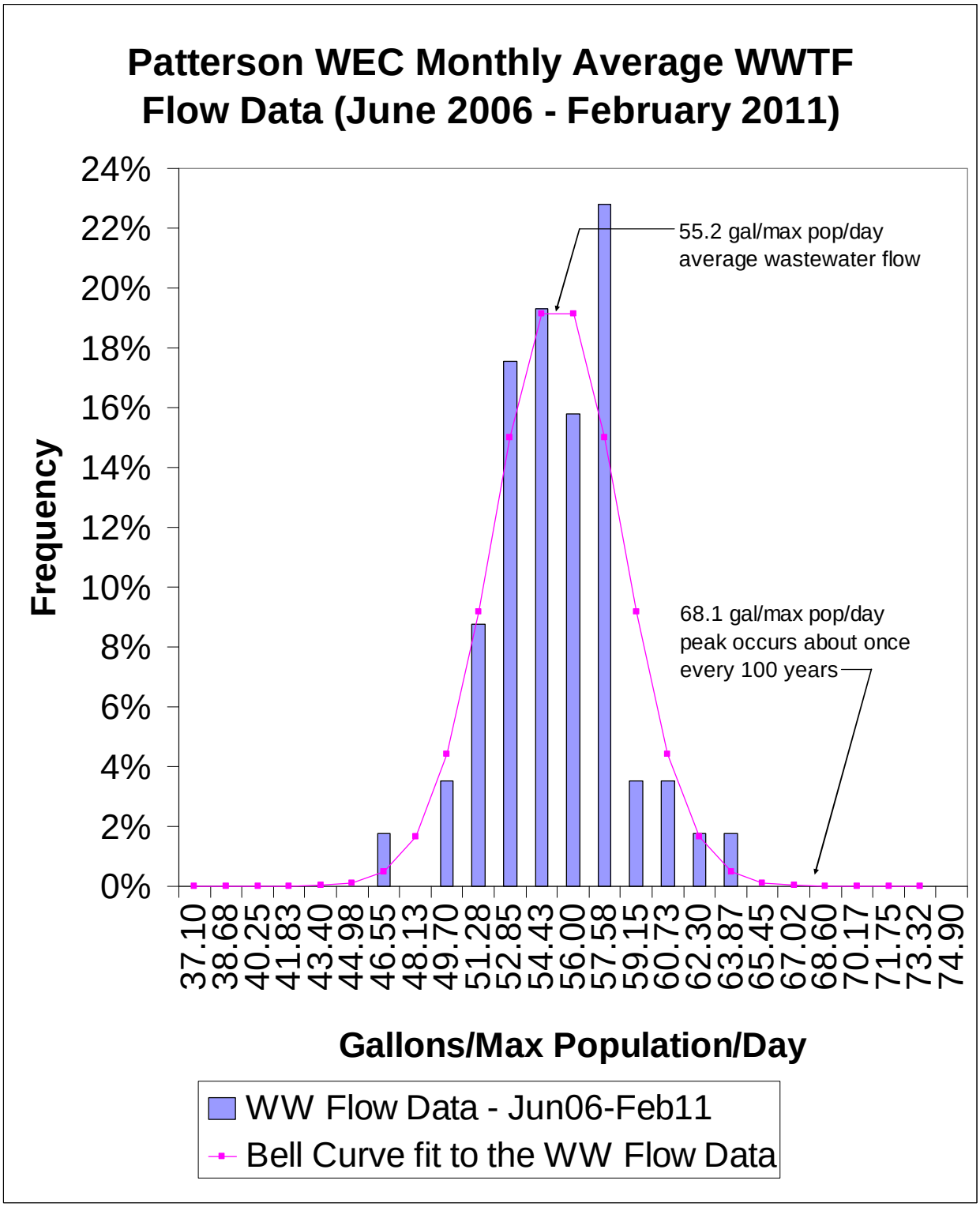


FIGURE 4: AVERAGE MONTHLY WASTEWATER FLOW DATA

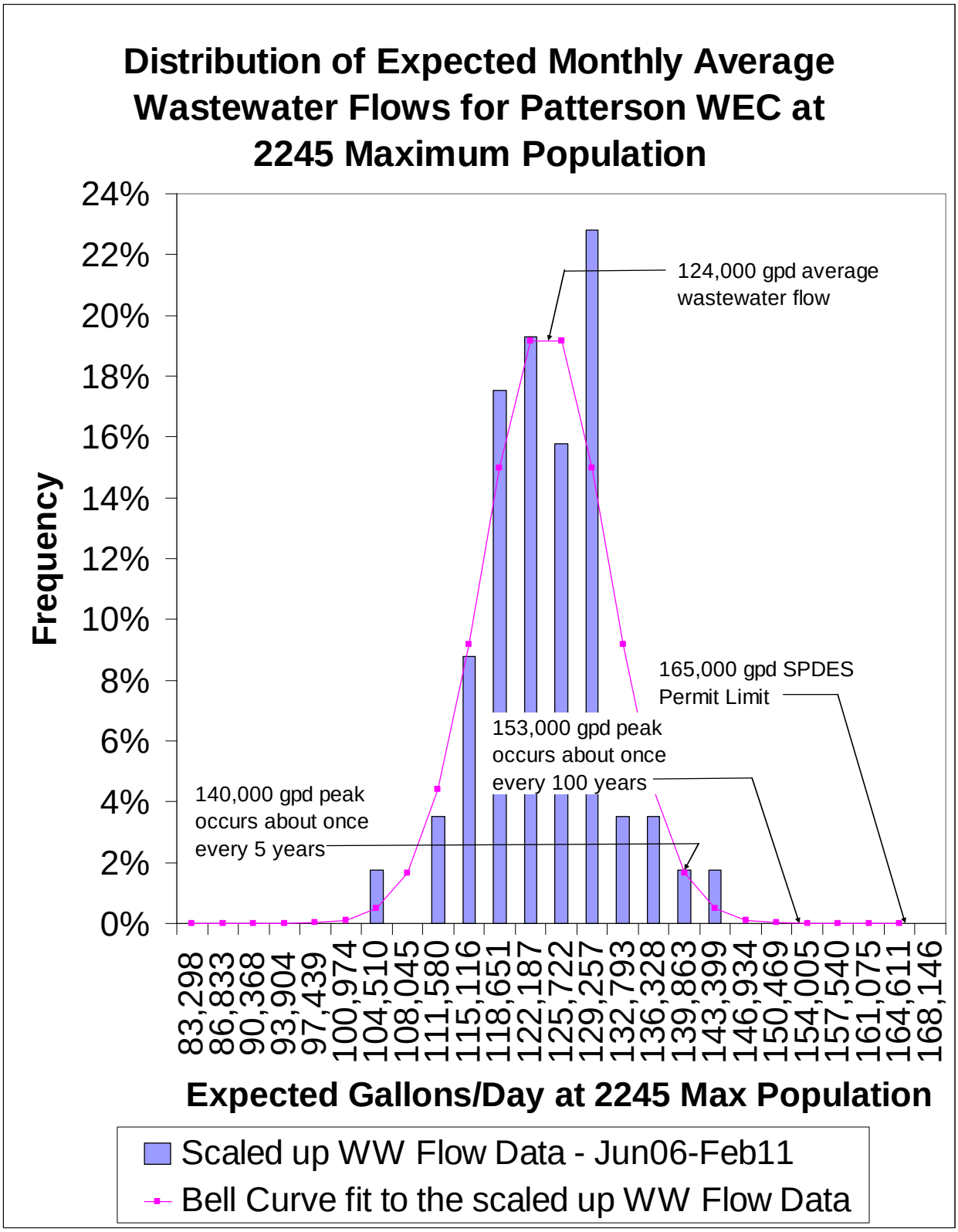


FIGURE 5: EXPECTED WASTEWATER FLOWS AT 2245 POPULATION