RESPONSE TO STORMWATER MANAGEMENT COMPLAINT

Prepared for

Town of Whitestown
Holy Trinity Cemetery
Oneida County, New York

SCE No. 07008.06

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1.0 INTRODUCTION

Shumaker Consulting Engineering & Land Surveying, P.C. (SCE) has been provided a copy by Whitestown Town officials of a Stormwater Management Complaint (dated March 2008) filed by Robert W. Ross on behalf of his parents, Robert and Barbara Ross who reside at 77 Cross Street, Yorkville, New York. The complaint alleges that stormwater runoff as a result of improvements performed by the Diocese of Syracuse (Diocese) at the Holy Trinity Cemetery has negatively impacted their property. Refer to Figure 1.1 for the Site Location.

At the request of the Whitestown Town Board, SCE has reviewed the Ross complaint, reviewed documents within the Whitestown Planning Board files, met with the Village of Yorkville Engineer, met with the Whitestown and Yorkville Highway Superintendents at the cemetery site to review site conditions, and met with the New York State Department of Environmental Conservation (NYSDEC) at the site to review site conditions and at the SCE office to review the planning board files.

We also conducted an assessment of hydrologic and hydraulic conditions related to the Ross complaint.

By way of project background, the following is a brief history of events:

- The Diocese of Syracuse developed a long-range master plan for the expansion of Holy Trinity Cemetery. The development plan included the expansion of the mausoleum along with future burial plots. Full cemetery "build-out" per the master plan may be on the order of 100 years as indicated by Grever & Ward, Inc., planning consultant to the Diocese, in their letter to the Village of Yorkville dated January 10, 2001. Total acreage of the master plan area is approximately 26.5 acres.

- A Site Plan review application for this development plan was submitted by the Diocese to the Whitestown Planning Board in December 2000.

- The project design included a large stormwater management basin that bordered nearly the entire length of Douglas Avenue, westerly of Montrose Avenue. This configuration was specifically selected by the Diocese in order to remedy historical drainage problems that plagued village residents along Douglas Avenue whose homes abutted the cemetery.

- Site Plan review was conducted by the Planning Board and the Planning Board's consulting engineer during the period of December 2000 through April 2001.

- A public hearing was conducted on February 21, 2001. No public comments were received.

- Final Site Plan approval was granted on April 25, 2001.

- Construction commenced on or about May 2001.

- Construction was reportedly substantially complete on or about Fall 2001.

2.0 SUMMARY OF THE ROSS COMPLAINT

The complaint filed by Robert W. Ross dated March 2008 alleges that deficiencies exist within the stormwater management system designed by Grever & Ward, Inc. and constructed by J. K. Tobin Construction for the Diocese of Syracuse. It is further alleged that the deficiencies have seriously impacted the property and building foundation of the Ross property located at 77 Cross Street, Yorkville, New York. Specifically, the allegations in the complaint are summarized as follows:

- The project stormwater management plan prepared by the Diocese and approved by the Whitestown Planning Board is allegedly "fundamentally flawed".

- Discharge from the stormwater management basin exceeds village storm sewer capacity.

- Site grading at the cemetery site is not complete.

- Flood damage to the Ross property has occurred due to alleged deficiencies in the stormwater management design and construction.

3.0 EVALUATION OF THE ROSS COMPLAINT

3.1 STORMWATER MANAGEMENT PLAN

3.1.1 Assessment

SCE reviewed the previously prepared project stormwater management design report (dated December 12, 2000, and amended with revised calculations dated March 19, 2001) as prepared by Grever & Ward, Inc. on behalf of the Diocese of Syracuse. The plan was reviewed on behalf of the Whitestown Planning Board by Alan Swierczek, P.E., engineering consultant to the planning board. SCE also reviewed the comments submitted by Mr. Swierczek with respect to his review of the various Grever & Ward, Inc. submissions.

In addition, we have walked the project site on various occasions to observe the current conditions of site grading and functionality of the stormwater management basin. Our observations noted the following:

- Stormwater runoff which currently reaches the stormwater management basin is conveyed to the basin by overland sheet flow.

- The westerly portion of the property (approximately 3.3 acres) continues to drain toward Douglas Avenue, bypassing the stormwater management basin. A review of the topographic survey map prepared for this project by the Diocese indicates that this area drained in this direction prior to construction. Current grades retain this sheet runoff on cemetery property until it reaches Douglas Avenue. There is no visual evidence that this runoff is conveyed to Cross Street.

- The required 6-inch reducer is installed within the stormwater management basin control structure. Note that in a phone conversation on June 13, 2008, between SCE and Mr. Mark Lazaroski (Diocese of Syracuse Office of Catholic Cemeteries), Mr. Lazaroski re-affirmed his position that the reducer was installed on the outlet pipe inside the control structure prior to completion of the stormwater management basin in 2001. Mr. Lazaroski further stated that he believes this is an honest misunderstanding between the Village of Yorkville and the Diocese since the interior installation is concealed from public view and access for interior inspection is difficult due to fencing around the basin and height of the outlet structure.

- The site has not achieved full build-out. The work completed to date is generally limited to the construction of the stormwater management basin, limited site grading, and site improvements in the immediate area of the mausoleum. The ground cover (trees, brush, maintained grassed areas) generally remains in its pre-developed state, though a small area of ground cover toward the westerly end of the site has changed from brush/tall grass to a maintained lawn. Internal road and storm sewer construction to accommodate build-out along with the associated clearing and grading has not yet occurred.

Using the above information/observations, SCE performed a critique of the current stormwater management plan and its operation. Hydrologic conditions and pond routing were reviewed and data was input into HydroCAD stormwater modeling software. We specifically looked at two scenarios:

- Full Build-Out Scenario (see Appendix A).

- Current Condition Scenario (see Appendix B).

The following tables summarize our findings:

TABLE 1

FULL BUILD-OUT SCENARIO[1]
(ALL SITE RUN-OFF COLLECTED AND DETAINED)

Storm Frequency	Run-off Toward Douglas Avenue Prior to Project (cfs)	Stormwater Basin Outlet with Reducer (cfs)	Flow through Emergency Spillway (cfs)[2]	Peak Elevation in Basin (Ft.)
2	4.67	1.19	0.00	504.24
10	21.53	1.59	0.00	507.33
25	33.29	1.75	0.00	508.75
50	38.69	1.81	0.00	509.35
100	50.04	1.92	0.00	510.51
		Pipe Capacity at Douglas Avenue is 4.6 cfs		

Notes:
(1) Calculations based on site characteristic data as submitted by Grever & Ward, Inc.
(2) 0.00 cfs indicates that the emergency spillway is not receiving flow from the stormwater basin.

TABLE 2

CURRENT CONDITION SCENARIO (STORMWATER BASIN + BYPASS)[1]

Storm Frequency	Bypass Flow (cfs)	Outlet from Basin (cfs)	Total Outflow from Site (cfs)[2]	12-inch Village Pipe Capacity (cfs)
2	0.32	1.19	1.43	4.6
10	2.45	1.56	3.74	4.6
25	4.06	1.70	5.42	4.6
50	4.82	1.75	6.19	4.6
100	6.42	1.86	7.81	4.6

Notes:
(1) Current build-out based on existing site conditions based on SCE observations on June 11, 2008.
(2) Total outflow from site is bypass flow combined with outlet from basin routed through the grassed swale and measured at catch basin "C".

As noted in the tables above, both scenarios indicate that run-off from the modeled storm events that enters the stormwater management basin is contained within the stormwater management basin without over topping through the spillway. This condition was required by the Village of Yorkville in its letter from the Village Engineer dated January 11, 2001.

3.1.2 Findings

The stormwater management basin is appropriately sized to accommodate the planned full build-out of the cemetery.

3.2 STORMWATER MANAGEMENT BASIN DISCHARGE RATE

3.2.1 Assessment

In conjunction with our review, SCE discussed the discharge rate from the stormwater management basin on June 12, 2008 with Albert Zangrilli, P.E., engineering consultant to the Village of Yorkville. Douglas Avenue is located within the Village of Yorkville. The storm sewer that the stormwater management basin discharges to is owned by the Village.

As noted by Mr. Zangrilli, the Village's sole concern regarding the connection of the stormwater management basin discharge pipe to the Village storm sewer has been to ensure that the discharge rate did not exceed the available capacity of the Village storm sewer system. In particular, the Village identified the 12-inch diameter storm sewer at the westerly end of Douglas Avenue as a potential hydraulic bottleneck in their system with respect to pipe capacity. Mr. Zangrilli previously estimated this segment of pipe to have an available capacity of 0.5 cfs, with the remaining capacity being utilized by the watershed consisting of the Douglas Avenue residential properties plus water conveyed along the existing common ditch line between the cemetery and Cross Street properties.

SCE identified the Douglas Avenue storm sewer to have a capacity of 4.6 cfs based on 12-inch RCP drainage pipe, 269-feet in length, at 1.22 percent slope with 2.02 feet of head, which is the depth from the rim to the pipe invert. We also observed in the field that run-off generated from the homes and properties along Douglas Avenue bypass the 12-inch storm sewer. Rather, flow is

conveyed toward the street and then easterly along the road toward the connecting 24-inch diameter storm sewer in front of 2351 Douglas Avenue. Based on site observations and review of the survey prepared in conjunction with the 2001 cemetery project, flow reaching the 12-inch Douglas Avenue storm sewer is limited to run-off from the westerly portion of the cemetery site plus a small portion of upgradient properties on Cross Street.

In order to assess the potential for exceeding pipe capacity, we obtained on-line rainfall/precipitation data maintained by the meteorologists at WKTV, Utica, New York. We specifically searched the raw data between May 2001 to May 2008 for those days on which rainfall exceeded 3.8 inches over a 24-hour period, which is generally equivalent to a 10-year, 24-hour rainfall event in Oneida County.

The 10-year design storm, which is 3.8 inches of rainfall over a 24-hour period, is based on the statistical fact that a storm of this intensity occurs once every 10 years. Our findings show that the existing stormwater management system, with the bypass, will deliver stormwater to the Douglas Avenue storm sewer well within its capacity during the 10-year design storm. Statistically, this may have occurred one time during the period between May 2001 and May 2008.

Based on local weather data, rainfall accumulation of 3.8 inches was not observed on any day during the period of May 2001 to May 2008.

3.2.2 Findings

Based on the assessment of the local weather data obtained, it appears that the capacity of the 12-inch diameter Douglas Avenue storm sewer has not been reached or exceeded from the time in which construction at the cemetery began (May 2001) through the present (May 2008). In those cases where obstructions in the storm sewer caused reduced capacity, run-off would flow overland to a point downgradient from the catch basin. For this particular case, the

downgradient direction is easterly along Douglas Avenue toward the catch basins on the 24-inch diameter culvert in front of 2351 Douglas Avenue.

3.3 CEMETERY SITE GRADING

3.3.1 Assessment

Full build-out of the cemetery expansion is expected to take nearly 100 years to realize per correspondence from Grever & Ward, Inc. to the Village of Yorkville dated January 10, 2001. As a result, run-off that will eventually be collected by on-site storm sewers as shown on the approved plans which will most likely be phased in over time. Until that work occurs, run-off will continue to be conveyed by overland sheet flow and shallow, concentrated flow.

As noted in Section 3.1.1 of this report, we did observe that run-off from approximately 3.3 acres of the cemetery property bypasses the stormwater management basin and sheet flows toward the northwesterly corner of the property and through the grassed swale constructed to convey spillway flow toward Douglas Avenue. It was also observed that this acreage has not been developed yet by the cemetery for use as burial sites and that it consists of wooded areas and grass. While no negative downstream impacts of this bypass have been identified by our assessment of the project nor documented with photographs by others, it may be appropriate for the cemetery to construct a shallow swale to temporarily intercept this run-off and convey that flow to the stormwater management basin until such time as the cemetery constructs its road and storm sewer network in this westerly portion of the site. Performing this minor modification to the site will essentially be a housekeeping measure which will further increase available capacity of the 12-inch diameter storm sewer on Douglas Avenue.

The approved plans also show a proposed ditch being constructed along the westerly property line. The apparent intent of the proposed ditch is to intercept flow from the cemetery property before it leaves the site. Observations during our various site visits indicate that existing grades

at the westerly property line are such that run-off from cemetery property will be contained on the cemetery property with run-off being conveyed toward Douglas Avenue by sheet flow. Hydraulically, this is a much better scenario than the proposed concentrated ditch flow. Shallow concentrated and sheet flow yields a higher time of concentration resulting in a lower rate of run-off when compared to ditch, or channelized, flow which in turn benefits the Douglas Avenue storm sewer.

Observations during our various site visits noted the appearance of a historical ditch line along the westerly property line. Some of the upgradient ditch has been maintained, presumably by some of the Cross Street property owners, while other portions of the ditch closer to Douglas Avenue have not been maintained. The cemetery reportedly cleaned out the lower portions of the ditch, removing leaves, branches, brick, and other deposited debris.

3.3.2 Findings

Our assessment of the current site grading did identify variances from the designs shown on the approved plans. With respect to the proposed ditch not being constructed along the westerly property line, current conditions suggest that the current grading provides better hydraulic conditions that appear to benefit the Douglas Avenue storm sewer. Construction of a narrow ditch will result in concentrated flow reaching Douglas Avenue at a rate higher than existing conditions.

The bypass of overland flow from the referenced 3.3 acres of vegetated land, though not proving to be a negative impact at Douglas Avenue, should be intercepted and conveyed to the stormwater management basin in order to take full opportunity of the basin's capacity while further increasing the available capacity at the Douglas Avenue 12-inch diameter storm sewer.

3.4 FLOOD DAMAGE TO THE ROSS PROPERTY HAS OCCURRED DUE TO ALLEGED DEFICIENCIES IN THE STORMWATER MANAGEMENT DESIGN AND CONSTRUCTION

3.4.1 Assessment

The Ross complaint specifically alleges that incomplete construction at the Holy Trinity Cemetery combined with the Town of Whitestown's failure to require the Diocese to comply with Village of Yorkville requirements with respect to the stormwater management basin discharge rate is the cause of continuous flooding of their project which in turn has caused serious foundation damage to their residence.

Observations of the surrounding area from the cemetery property and public rights-of-way note the following:

- Grading, berms, and ditches separate the cemetery property from Cross Street properties.

- Natural topography along Cross Street causes run-off from upgradient parcels to sheet flow in a northerly direction toward the Ross property.

- The cedar hedge boarding the easterly and northerly boundary of the Ross property creates a small berm (3 – 4 inches in height) which may be sufficient enough to trap run-off and snow melt that otherwise would be able to flow off the property.

- The estimated grade at the northeasterly corner of the Ross property appears to be approximately 12-inches lower than the finish grade at the easterly foundation wall of the home.

- The Ross home lacks gutters and down spouts, allowing roof water to fall directly on the ground adjacent to the foundation walls.

3.4.2 Findings

Based on SCE's review of this project, including our critique and cursory modeling of the cemetery's stormwater system, we do not find the approved stormwater management plan to be "fundamentally flawed" as alleged in the Ross complaint. We interpret "fundamentally flawed" as meaning that the design by Grever & Ward, Inc. is grossly in error with serious inaccuracies. This plan has now been reviewed independently on the Town's behalf by different professional engineers using differing methodologies, both of which have concluded in similar findings that (1) The stormwater management basin as designed by Grever & Ward, Inc. has the capability to retain the 100-year storm event without activating the spillway per the requirement of the Village of Yorkville; and (2) Discharges from the stormwater management basin under full build-out will be nearly 90 percent less than the pre-developed run-off conditions. This is a substantial betterment for the Village of Yorkville and greatly exceeds New York State stormwater requirements.

With respect to the discharge rate from the stormwater management basin, that rate does exceed the 0.5 cfs rate as originally stipulated by the Village Engineer in his February 12, 2001 letter to the Whitestown Planning Board. As noted in Section 3.2 of this report, this restriction was imposed by the Village on the premise that available capacity within the Douglas Avenue 12-inch storm sewer is 0.5 cfs based on assumed flow contribution from properties along Douglas Avenue. However, we also have assessed the capacity of the 12-inch Douglas Avenue storm sewer and found that under current conditions, Douglas Avenue properties are not contributing flow to this section of storm sewer. We further noted in Section 3.2 of this report that under current conditions, the Douglas Avenue storm sewer is capable of conveying flow from the tributary water shed under the 10-year, 24-hour storm event. Based on our assessment, the 10-year, 24-hour storm event does not appear to have occurred since 2001. Therefore, we have not

been able to substantiate the claim that continuous flooding of the Ross property has or continues to occur as a result of surcharging of the Douglas Avenue 12-inch storm sewer. We do recommend that the Diocese consider the construction of a temporary interceptor swale that will convey flow to the stormwater management basin that otherwise is being bypassed.

4.0 SUMMARY AND CONCLUSIONS

The purpose of this report is to assess the condition of the Holy Trinity Cemetery property with respect to conformance of the construction of stormwater management facilities and site grading with the approved plans as well as to assess the potential for serious and destructive off-site flooding caused by the construction of the work.

Based on our assessment, we are not able to replicate the alleged continuous flooding conditions as stated in the Ross complaint. While there is no reason to dispute the claim that the Ross home may be exhibiting foundation wall damage, it has not been documented by the claimant, nor shown by our assessment, that the cause is directly and/or solely the result of the construction of drainage improvements at the Holy Trinity Cemetery site.