# OXFORD ROAD/KELLOGG ROAD
# REGIONAL STORM DRAINAGE ASSESSMENT

Prepared for

Town of New Hartford
111 New Hartford Street
New Hartford, NY 13413

SCE Project No. 00549.00

By

SHUMAKER
Consulting Engineering & Land Surveying, P.C.
181 Genesee Street
Utica, NY 13501
Telephone No.: (315) 724-0100 Fax No.: (315) 724-3715

November 11, 2005

## EXECUTIVE SUMMARY

This report presents the findings of a detailed assessment of the watershed in the vicinity of Snowden Hill Road, Oxford Road, and Kellogg Road in the Town of New Hartford. As the result of a comprehensive hydraulic model for the study area, several problem areas were identified which could result in periodic flooding and/or possible property damage in the event of large storm events. With knowledge of these problem areas, the Town may focus its maintenance budget on designing and implementing corrective actions to minimize potential property damage caused by localized flooding conditions during storm events. In addition, this report may be utilized as a planning tool to establish baseline conditions for new development that may impact the study area, or downstream areas that may impact the ability to remove stormwater from the study area.

The following sections present a summary of the critical areas identified within the watershed area that are prone to localized flooding and where corrective measures may be recommended.

### INTERSECTION OF OXFORD ROAD/KELLOGG ROAD

Periodic flooding has been reported near the intersection of Oxford Road and Kellogg Road in the vicinity of the outfall of the new Jubilee Estates residential subdivision. These observations were confirmed mathematically by this watershed analysis. Although partially mitigated with the addition of an upstream detention facility at Longworth Acres, the flow of stormwater in this area has been shown to be largely dominated by the runoff from the Jubilee Estates stormwater system coupled with the inability to convey the stormwater within the existing Oxford Road storm drainage system.

It is recommended that the Town of New Hartford implement a combination of stormwater detention on the Jubilee Estates site, in conjunction with a project to increase the size/slope of driveway culverts along the Oxford Road. Since Oxford Road is an Oneida County road, construction must be coordinated with the Oneida County Department of Public Works. The estimated cost to modify existing driveway culverts is approximately $12,000 each, and the

capital cost for constructing stormwater detention in the Jubilee Estates subdivision is estimated at $25,000 not including land acquisition costs.

## CULVERT AND STORMWATER SWALE NEAR TOPS PLAZA AND REACH 1

The stormwater runoff model indicates that the capacity of the 42-inch stormwater culvert and swale that separate the Tops Plaza and the Town of New Hartford Offices may be of insufficient capacity for storms of magnitude greater than the 25-year storm. Should the capacity of the culvert and swale be increased, it is also suggested that the capacity of Reach 1 be increased to accommodate the increased flow without creating substantial downstream flooding conditions. The capital costs for improving an existing detention pond, increasing the culvert capacity, increasing the swale capacity, and increasing the capacity of Reach 1 has been estimated to be approximately $170,000. Since none of the structures within the Kellogg Road corridor will be impacted, it is not expected that coordination with Oneida County will be required for this project.

## OXFORDTOWN AREA

The Oxfordtown subarea receives stormwater flow from three upstream subareas via Reach C and discharges to Reach D through a 48-inch culvert pipe that passes under Harrogate Road. Flooding in the vicinity of the outfall of Reach C has been historically observed and supported by this hydraulic model; however, it appears that the flooding is contained to a low-lying lawn area near the site outfall point. It is recommended that a detailed topographic survey and engineering study within the lawn area be conducted to evaluate the existing detention capacity of the lawn. Subsequent to the detention study, a construction project that integrates the known detention characteristics with capacity improvements to the culvert under Harrogate Road is recommended. The estimated cost to implement corrective actions in this area is $68,000.

## CULVERT AT COMMERCIAL PLAZA ON TIBBITTS ROAD

An entrance drive to a small commercial plaza near the outlet of the Tibbitts subarea has a culvert that has a calculated nominal capacity that is less than the calculated peak runoff for the 10-year storm event in the Tibbitts subarea. It may be expected that this culvert may become surcharged, resulting in stormwater runoff entering Tibbitts Road and/or the Town of New Hartford property situated immediately downgradient from this location. Replacing this driveway culvert with a new culvert of greater capacity has been estimated to cost approximately $17,000.

## TABLE OF CONTENTS

## FIGURES

**Figure No.**



## APPENDICES

# 1.0 INTRODUCTION

Shumaker Consulting Engineering & Land Surveying, P.C. (SCE) was retained by the Town of New Hartford to conduct a detailed evaluation and assessment of the stormwater management issues associated with a large drainage area in the Town of New Hartford. The study area is comprised of one watershed of over 411 acres of land consisting of developed residential, commercial, and agricultural land along the primary roadways consisting of Tibbitts Road, Oxford Road, Snowden Hill Road, and Kellogg Road in the Town of New Hartford. The watershed ultimately discharges surface water runoff (stormwater) into a low point of land, to the east of the New Hartford Public Library and immediately to the west of a rail line reportedly owned by New York, Susquehanna, and Western Railroad, which passes in a north/south direction immediately to the west of NYS Route 8 near Washington Mills. The limits of the study area are depicted on **Figure 1.**

One additional area that was assessed as part of this report consists of 205.2 acres of predominantly agricultural land to the south of Tibbitts Road and west of the Longworth Acres Subdivision. Although runoff from this area is ultimately directed out of the study area, the potential for localized flooding may impact residences along Tibbitts Road and poses a potential to impact the study area. Hence, this additional area was also evaluated as part of this report, which brings to land area studied under this assessment to a total of 616.2 acres.

The sections that follow will describe the methodology utilized to conduct this evaluation, a detailed assessment of the drainage characteristics of each watershed area, estimated costs for improvements, and a summary of the project findings.

## 2.0 METHODOLOGY

The first step of this evaluation involved conducting a detailed physical evaluation of the subject watershed. Consisting of an abbreviated survey of the existing storm sewer systems, drainageways, outfalls, numerous site walkover inspections, and a detailed review of aerial photographs, the watershed evaluation was useful in determining general land use and ground cover, drainage pathways, and sizing and mapping of stormwater system components.

As a result of the on-site inspections and site survey, watershed boundaries were adjusted to reflect recent residential and commercial development that diverts water either toward or away from the study area discharge points. Watershed boundaries were adjusted to account for man-made drainage boundaries within the Janet Terrace housing area and in residential areas to the northeast of Snowden Hill Road and Oxford Road.

The second step in the watershed evaluation consisted of collecting readily available information for the project area. SCE utilized published soils mapping from Cornell University, topographic maps from the United States Geologic Survey (USGS); rainfall statistical data from the Natural Resources Conservation Services (NRCS); and 2003 aerial photography from the New York State Geographic Information System (NYSGIS).

Physical and digital data was integrated and used in the USDA/NRCS WinTR-55 Computer Model. The WinTR-55 model was selected based in its ease of use, regulatory acceptability, and ability to provide rapid and useful output for stormwater runoff modeling. Capacity calculations for open channels and other drainage courses were made by utilizing the Federal Highway Administration's Urban Drainage Design Model (HY-22) and Mannings formula for full pipe flow conditions. It should be noted that full pipe conditions were utilized in this assessment to indicate nominal maximum capacity. Inlet or outlet hydraulic control at culverts may actually result in a lower pipe capacity; however, that scenario must be evaluated on a pipe-by-pipe basis during future design development.

## 2.1 SOILS AND TOPOGRAPHY

The study area is situated on the northeast side of a large hill in the general vicinity of Tibbitts Road and Snowden Hill Road in the Town of New Hartford. In general, the slope of the land is northeasterly, with an approximate average slope of 0.08 feet per foot. Most of the watershed is open agricultural land; however, significant parcels of woods and residential areas are also located within the study area. Currently, at least one new residential subdivision, comprised of over 52 acres of land, is planned within one of the agricultural zones within the study area. The new subdivision is referred to herein as Longworth Acres (Longworth).

Soils mapping for the watershed indicates that most of the watershed soils are hydrologic soil group "B" and "C" soils. Class B soils are typically described as silt loam, or loam with moderate infiltration rates. Class C soils are sandy clay loam, which typically have low infiltration that impedes downward movement of water into the soil matrix. Since the predominant percentage of land area within the study area is comprised of Class B soils, this evaluation utilized Class B soils as the primary soil type for all watershed modeling computations.

**Figure 2** provides an aerial photograph depicting the soils types and USGS topography of the study area.

## 2.2 RAINFALL CHARACTERISTICS

Rainfall data for the watershed area was derived from the synthetic rainfall distribution model as defined by the NRCS. The Type II rainfall distribution typical for Oneida County, New York, was utilized to support the runoff model. Type II storms are representative for a major portion of the United States and are utilized to model rainfall at inland areas that are not typically impacted by maritime storms.

# 3.0 WATERSHED MODEL

The following sections present specific information pertinent to the overall watershed and each identified drainage subarea and its associated reach. One overall drainage model was developed in support of this project and an assessment of total flow at any given point within the watershed may be made by evaluating the associated reach or drainage structure that conveys stormwater runoff.

## 3.1 WATERSHED DESCRIPTION

The subject watershed is comprised of approximately 411.7 acres of land consisting of agricultural, wooded, commercial, and residential areas. The watershed originates in the higher land elevations just south of Tibbitts Road, then extends northeasterly and ultimately discharges into a low-lying parcel to east of the New Hartford Public Library. Based on observed stormwater outlets from the watershed, a total of nine primary subareas were modeled in order to ease understanding of the complex hydraulic system.

An additional area that was assessed as part of this study consists of 205.2 acres of predominantly agricultural land to the south of Tibbitts Road and west of the Longworth Acres Subdivision. Although runoff from this area is ultimately directed out of the study area, this area was retained as part of the evaluation due to its potential to impact the study area should localized flooding occur. This area is identified as the "Additional Subarea" within the context of this report.

## 3.2 WATERSHED SUBAREAS

To facilitate the computations to support this study, the watershed was divided into subareas, each with separate reaches or drainage channels, leading to unique discharge points. A total of

nine subareas were identified for the watershed. Each subarea has been selected based on its topographic characteristics, runoff channels, and ultimate point of discharge into the next downstream subarea or reach.

The subareas defined in this watershed are depicted on **Figure 3** and are identified as follows:

- Longworth – A 34.5-acre drainage area that is currently planned for residential development as part of Longworth Acres.
- Jubilee – A 59-acre drainage area consisting primarily of a new residential development known as Jubilee Estates.
- Janet Terrace – A 21.2-acre residential subdivision comprised primarily of 1/4-acre parcels.
- Oxfordtown – a residential/apartment complex comprised of approximately 49 acres of land.
- Snowden Hill – An area with steep topography in the vicinity of Snowden Hill Road. Snowden Hill subarea is comprised of approximately 143 acres of land that is characterized as 1/4-acre residential, wooded, and agricultural.
- Tibbitts – The southeastern portion of the Longworth Acres development and land abutting the south side of Tibbitts Road from Kellogg Road to Oxford Road. This area is comprised of nearly 52 acres of land with undeveloped, residential and commercial uses.
- Tops – A commercial development area adjacent to Kellogg Road comprised of approximately 11 acres of land area. The Tops portion of the subarea is comprised of a large parking lot. The other portion of this subarea is situated on the north side of Kellogg Road where a Walgreens pharmacy is currently under construction.
- Radio – A 21.2-acre drainage subarea comprised of land immediately north of Tibbitts Road extending westerly under Kellogg Road to a large grassy parcel occupied by a radio station and four antennae.

- Flatlands – A parcel comprised of 20.8 acres of land with two residential parcels, the New Hartford Public Library, and a large, flat grassland. All stormwater from the various subarea reaches passes through the flatlands in a series of meandering, manmade swales, and ultimately discharges at the watershed outlet at the northeast corner of this parcel. The watershed outlet discharges to a swale to the west of the railroad line that bounds the eastern side of the Flatlands Subarea.

The outlet from the watershed discharges into a swale adjacent to the rail line, thence flows northerly along the rail embankment to a trestle. At the trestle, water passes under the rail embankment to a large grassland between NYS Route 8 and the rail line. A detailed evaluation of this regional detention area was not conducted as part of this study, and no representations can be made if the size and discharge characteristics are adequate to prevent excessive runoff into the Sauquoit Creek.

It is noteworthy that residential development from Oxford Road toward the rail line appears to be encroaching on the regional stormwater discharge swale. In one location, the historic high volume of stormwater flow within the swale appears to have caused noticeable erosion of the rail embankment. The area of apparent damage to the rail embankment is north of the watershed outlet identified herein.

## 4.0 WATERSHED STORMWATER RUNOFF MODEL

A TR-55 model of the watershed was prepared as part of this assessment and the results are summarized in **Table 1**. Full reports from the TR-55 model, as well as, relevant hydrographs are included as Appendix A. For this model, the built-out (e.g., fully developed) conditions for both the proposed Longworth Acres residential subdivision and the Jubilee Estates subdivision were input as existing conditions. In addition, the observed watershed boundaries created by residential development within the Janet Terrace and Oxfordtown areas were also utilized to derive the entire land area of Watershed. The "outlet" identified for the watershed subarea is a point in swale adjacent to the rail spur and east of the New Hartford Public Library.

The stormwater generated by each subarea within the watershed model is conveyed toward the outlet by a reach which is typically a roadside ditch, swale, creek, or other water course. The TR-55 model for this watershed identified a total of 6 reaches within the watershed. The reaches identified in this study are depicted on **Figure 4 and Figure 5**, and the reach flow path is presented graphically on **Figure 6**. An overview of the entire study area, with all reaches and subareas in included as **Plate 1** at the rear of this document. As expected with any drainage system, a given reach discharges into a larger reach in a cumulative manner until all reaches ultimately converge at the watershed outlet. The watershed outlet represents the cumulative flow of all reaches and their subareas within the entire watershed.

Capacities of storm sewers, ditches, and swales were calculated for several locations within the watershed. **Table 2** presents a summary of the primary stormwater conveyance systems that serve this study area. All calculations herein have been made utilizing the HY-22 open channel flow model and Manning's full-pipe calculations. Pipe size and slope input was based on surveyed inverts and elevations of identified storm system components. Calculation summaries are included as part of Appendix C.

The calculated peak flow within each identified reach was calculated as part of this assessment, and is presented on **Table 3**.

## 4.1 STORMWATER MODEL IMPLICATIONS

Based on historic observations of localized flooding and modeling conducted as part of this study, several critical areas within the watershed area have been identified. Critical areas are defined as those areas where the calculated stormwater flow exceeds the capacity of the stormwater conveyance system which may result in surcharged drainage structures, localized flooding, or property damage. The following sections identify and discuss each critical area identified in this study.

### 4.1.1 Outfall at Jubilee Subarea

The calculated peak stormwater runoff for Reach B (shown on Table 3) is primarily derived from stormwater runoff from the Longworth and Jubilee subareas. The calculated peak runoff within this reach exceeds the capacity of the downstream driveway culvert for all storms in excess of the 2-year storm. This data suggests that the swale associated with Reach B becomes surcharged during storms with intensity greater than the 2-year storm, and may result in localized flooding near the intersection of Kellogg Road and Oxford Road.

**Figure 7** presents a representative hydrograph for the 10-year storm event within Reach A and Reach B. This hydrograph exhibits an excellent demonstration of the effectiveness of stormwater detention on downstream areas. From the hydrograph, it is indicated that the peak stormwater flow at this suspect area is largely driven by the quantity of stormwater runoff from the Jubilee drainage subarea. The likely reason for this condition is the designed detention planned for the Longworth drainage subarea, which effectively delays the peak runoff from the Longworth subarea until after the peak discharge from the Jubilee subarea has passed. The planned detention within the Longworth subarea effectively reduces the overall peak discharge observed within Reach B; however, the reach overflow conditions remain and localized flooding should still be expected.

The calculated peak runoff from these subareas in Reach B can be used to evaluate the reported localized flooding at Oxford Road, near the intersection with Kellogg Road. Upon entering the roadside ditch along Oxford Road, the combined runoff from these areas is immediately restricted by inefficient hydraulic sections and undersized driveway culverts. These conditions result in stormwater becoming surcharged out of the drainage ditches to surrounding roads, yards, low points, and buildings along Oxford Road and/or Kellogg Road corridor.

### 4.1.2 Culvert and Stormwater Swale near Tops Plaza

The stormwater conveyance system, associated with the Snowden subarea, is a complex system of open swales, cross culverts, and subsurface piping systems. Based on an analysis of the stormwater conveyance systems from this subarea, it appears the stormwater management infrastructure capacity *decreases* from the upper portions of the subarea to the lower subarea.

Based on the capacity of the Snowden subarea storm conveyance system relative to the calculated subarea peak stormwater discharges, it appears that the largest single hydraulic restriction exists in a 42-inch storm sewer culvert to the west of Tops Plaza. A detention pond exists at the mouth of the subject 42-inch storm sewer culvert; however, the basin is small, and the design detention and capacity of the pond is unknown. With a calculated capacity of approximately 51 CFS at the outlet of the small detention pond, it appears that this system likely overflows during heavy rainfall events, and stormwater flow continues downstream to a swale abutting the Tops Plaza parking lot (immediately adjacent to the New Hartford Municipal buildings). The swale has a calculated full flow capacity of approximately 102 CFS, which suggests that periodic localized flooding may be expected during storms greater than the 25-year storm.

The 72-inch x 48-inch corrugated metal pipe arch under Kellogg Road at the outlet of this swale has a calculated nominal capacity of approximately 296 CFS, which is adequate to accommodate the cumulative peak stormwater runoff flow from both the Tibbitts and Snowden subareas for all storms evaluated as part of this study.

### 4.1.3 Reach 1

Reach 1 is a large drainage swale that receives stormwater from the Snowden and Tibbitts subareas. The capacity of Reach 1 has been calculated to be approximately 72.9 CFS which is substantially lower than the predicted stormwater flow from storms greater than the 10-year storm. Reach 1 is situated in an area to the northeast of Kellogg Road and passes to the rear (northwest) of the commercial lots in that area.

Due to the flat topography of the area, property damage in the vicinity of Reach 1 may be expected to be minimal; however, some minor flooding may be observed in the vicinity of the radio station that is situated on this low-lying parcel. In general, most flooding experienced in this area may be expected to resemble sheet flow across the existing roadways and into the grassy field occupied by the four radio antennae. Ultimately, the peak flow from Reach 1 through the radio subarea is accommodated by the adequate capacity of Reach 2.

### 4.1.4 Oxfordtown Apartment Complex

Calculations and observations made during storm events indicates that localized flooding near the terminus of Reach C is likely in a low-lying lawn area within the Oxfordtown Apartment Complex. The downstream culvert under Harrogate Road has a large (48-inch) diameter; however, the slope of this culvert results in a low discharge capacity. The discharge from Oxfordtown in this location is limited to approximately 71 CFS, which is substantially lower than the peak discharges from all modeled storms greater than the 5-year event. The inability to

adequately convey the inflow of water to Reach D results in ponded water at the outlet structure within Oxfordtown during many rainfall events.

The lawn area in the vicinity of the Oxfordtown outlet has been observed to serve as an impoundment or detention basin during heavy rainfall events. It is unknown if historic damage to apartments or residences has occurred in this area. A detailed topographic survey of this area would enable the quantification of the storage volume provided by this lawn. Once the storage volume of the area is known, it can be easily determined if the 10, 50, and 100-year design storms have the potential to cause property damage in this area due to flooding conditions.

### 4.1.5 Culvert at Commercial Plaza on Tibbitts Road

The Tibbitts subarea discharges stormwater at a point where Tibbitts Road intersects Kellogg Road, just west of two Town of New Hartford Municipal buildings. A stormwater culvert under the driveway entrance to a business plaza just upstream from the subarea outlet swale has an entrance diameter of 24 inches and an outlet diameter of 30 inches. Based on the most limiting diameter, the calculated nominal capacity of this culvert is calculated at 21.55 CFS, which is not sufficient to pass runoff from storms over the calculated 10-year storm in the Tibbitts subarea. This data suggests that localized flooding within Tibbitts Road and/or in the vicinity of the downgradient municipal buildings is likely for many storm events in excess of the 10-year storm event.

# 5.0 ADDITIONAL STUDY AREA ON TIBBITTS ROAD

Predominately agricultural areas situated on the south side of Tibbitts Road comprise approximately 205.2 acres of land that discharges to a ditch and culvert system that is part of the Tibbitts Road construction. In this location, stormwater runoff is intercepted by the built-up section of Tibbitts Road, where it enters one of three cross-culverts to be directed to the north and east, out of the study area. This additional area has been included as part of this report because of its proximity to the study area, and potential impacts on personal property and downstream areas should a large storm event occur.

## 5.1 ADDITIONAL STUDY AREA RUNOFF MODEL

Stormwater runoff from this primarily agricultural subarea was modeled utilizing TR-55 and the runoff results are summarized on Table 4. A full printout of the TR-55 model is included as Appendix B. For this model, SCE made the conservative assumption that 50% of the agricultural usage was for row crops (e.g., high Runoff Curve Number (RCN)), and 50% of the agricultural usage was for meadow (e.g., low RCN).

A total of three reinforced concrete pipe (RCP) cross culverts pass stormwater under Tibbitts Road in this area of the watershed. The RCP cross-culverts are comprised of one 15-inch and two 18-inch pipes. The combined maximum capacity of these cross culverts was calculated to be 36.9 CFS.

**TABLE 4**
ADDITIONAL STUDY AREA
STORMWATER RUNOFF SUMMARY

| Storm Periodicity | 24-Hour Design Storm (in.) | Peak Stormwater Runoff (CFS) | Maximum Culvert Capacity (CFS)* | Overflow to On-Site Detention, or Downslope (CFS) |
|---|---|---|---|---|
| 1-Yr | 2.3 | 11.10 | 36.9 | 0 |
| 2-Yr | 2.5 | 17.02 | 36.9 | 0 |
| 5-Yr | 3.2 | 46.36 | 36.9 | 9.46 |
| 10-Yr | 3.8 | 80.32 | 36.9 | 43.35 |
| 25-Yr | 4.5 | 127.42 | 36.9 | 90.52 |
| 50-Yr | 4.8 | 149.18 | 36.9 | 112.28 |
| 100-Yr | 5.4 | 196.10 | 36.9 | 159.2 |

*** Calculated culvert capacity is the nominal capacity. Hydraulic control at the culvert inlet and/or outlet may lower the maximum capacity.**

## 5.2 ADDITIONAL AREA STORMWATER RUNOFF IMPLICATIONS

The nature and magnitude of stormwater runoff generated by the additional subarea is largely dictated by the upgradient land use. Specifically, the types of crops and method of planting could result in a wide range of runoff characteristics, ranging from a non-grazed meadow (with a RCN of 58) to row crops (with a RCN of 72). Based on the computer model for this subarea, it is apparent that insufficient capacity exists to pass all of the generated stormwater from the 5, 10, 50, and 100-year storms under Tibbitts Road and out of the study area.

The lawns of homes situated on the south side of Tibbitts Road in this area are graded to various low points and typically include over-sized roadside ditches. The configuration of the lawns appears to provide detention storage for storms that may exceed the capacity of the cross culvert system. Without a detailed survey of the stormwater storage capacity of the lawn areas, the exact amount of water that overtops Tibbitts Road, or is passed easterly toward the downgradient areas, is largely unknown.

Visual observations suggest that the lawn areas offer detention for most storms, and driveway configurations indicate that stormwater likely overtops Tibbitts Road and is passed northerly and out of the study area.

Therefore, it may be concluded that for larger storm events (5-year, 10-year, 50-year, and 100-year storms) minor flooding in the residential yards and minor overtopping of Tibbitts Road may be observed in this area; however, severe property damage due to flood conditions is not likely. To assist in mitigating these situations, farmers within the region can also be encouraged to practice contour (terraced) planting, and creating erosion control buffer zones to minimize runoff and subsequent soil loss from the upland areas.

# 6.0 PROJECTED COSTS OF CORRECTIVE ACTIONS

The following sections present construction estimates to address the critical areas identified in this report.

## 6.1 CORRECTIVE MEASURES FOR FLOODING IN OXFORD ROAD

The calculated existing stormwater flow in the Oxford Road storm drainage system exceeds the capacity of at least one driveway culvert along this reach (Reach B). Driveway culverts may be replaced along Oxford Road in order to increase the capacity of the roadside stormwater conveyance system; however, careful engineering and planning must be implemented in order to prevent downstream flooding in the Oxfordtown Area caused by flow restrictions in that area. It should be noted that increasing the size and/or slope of existing driveway culverts by itself may reduce the frequency of flooding but is not likely to eliminate it altogether without consideration of upstream detention within the Jubilee Estates site.

When increasing the size of culverts, the capacity should be limited by the most limiting downstream structure, specifically the 48-inch culvert in Oxfordtown that discharges to Reach D at 71.2 CFS.

The typical cost for a culvert replacement on Oxford Road may be expected as shown on Table 5. Oxford Road is maintained by Oneida County. Therefore, coordination of any construction along this road must be coordinated with the Oneida County Department of Public Works.

**TABLE 5**
ESTIMATED COST, TYPICAL CULVERT REPLACEMENT ON OXFORD ROAD

| Element | Estimated Cost |
|---|---|
| Maintenance and Protection of Traffic | $1,500 |
| Two 48-Inch Metal End Sections | $1,600 |
| 24-Feet, 48-Inch CMP Culvert Pipe, Installed | $3,000 |
| Restoration, Asphalt Paving | $2,100 |
| **Subtotal** | **$8,200** |
| 15% Engineering/Surveying | $1,230 |
| 30% Contingency | $2,460 |
| **Total** | **$11,890** |
| | say |
| | **$12,000** |

In addition to culvert replacements, control of stormwater flow departing the Jubilee Estates development may be achieved by making modifications to that site stormwater management system to include detention and controlled release of stormwater. Based on SCE's report entitled "Feasibility Assessment, Stormwater Management Practices, Jubilee Estates" dated January 7, 2005, the most feasible solution to stormwater detention on the Jubilee Estates site is a single stormwater detention pond and discharge structure. The cost for the proposed detention facility on the Jubilee Estates subdivision was estimated to be approximately $25,000 which does not include the cost for yearly operations and maintenance, or the purchase price for up to three vacant lots on the northeast corner of the development.

## 6.2 CORRECTIVE MEASURES, CULVERT AND SWALE AT TOPS PLAZA AND REACH 1

The correction of the potential flooding in the vicinity of Tops Plaza and the Town of New Hartford offices may require a combination of engineering measures to detain stormwater and increase the capacity of downstream conveyance systems. The project will likely include studying and increasing the size of the existing detention pond, designing a staged discharge structure within the pond, possibly increasing the size of the 42-inch storm sewer pipe, and

increasing the capacity of the swale that passes between the Tops Plaza parking lot and the town buildings. Increasing the flow capacity upstream will also require that the capacity of Reach 1 be increased to accommodate the increased flow to accommodate a larger storm event. Increasing the capacity of Reach 1 will involve excavation of a wider and deeper swale and potentially implementing some form of stream bank erosion practices to prevent damage during large storm events. The corrugated pipe arch culvert across Kellogg Road in this area has a calculated nominal capacity that is sufficient to handle the peak flows from both upstream drainage subareas.

A breakdown of the potential costs for this effort is shown on Table 6.

**TABLE 6**
ESTIMATED COST
MODIFICATIONS TO CULVERT AND SWALE AT TOPS PLAZA AND REACH 1

| Element | Estimated Cost |
|---|---|
| Detention Pond Outlet Structure | $ 8,000 |
| Detention Pond Earthwork | $ 4,000 |
| 150-Foot New Storm Sewer/Culvert | $ 12,000 |
| 1,000-Foot Swale Improvements (includes Reach 1) | $ 60,000 |
| Stream Bank Protection | $ 30,000 |
| Restoration and Seeding | $ 3,500 |
| **Subtotal** | **$117,500** |
| 15% Engineering/Surveying | $ 17,625 |
| 30% Contingency | $ 35,250 |
| **Total** | **$170,375** |
| | say |
| | **$170,000** |

## 6.3 CORRECTIVE MEASURES, OXFORDTOWN AREA

The existing lawn area within the low elevations in the Oxfordtown Area appears to be acting as a stormwater detention pond; however, its detention capacity is unknown. Observed flooding in this area appears to be the result of a relatively restrictive discharge through a 48-inch culvert in Reach C that passes under Harrogate Road and leads to Reach D.

Similar to previous options, the corrective measures implemented at this site may consist of a combination of stormwater detention within the lawn area in conjunction with increasing the capacity of the 48-inch culvert under Harrogate Road. Conceptual project costs are presented on Table 7.

**TABLE 7**
ESTIMATED COST
MODIFICATIONS TO REACH C, OXFORDTOWN COMPLEX

| Element | Estimated Cost |
|---|---|
| Detention Pond Outlet Structure | $ 8,000 |
| Earthwork | $10,000 |
| 140-Foot New Culvert Pipe (Estimate 54-inches) | $15,400 |
| Asphalt Repair | $10,000 |
| Restoration and Seeding | $ 3,500 |
| **Subtotal** | **$46,900** |
| 15% Engineering/Surveying | $ 7,035 |
| 30% Contingency | $14,070 |
| **Total** | **$68,005** |
| | say |
| | **$68,000** |

## 6.4 CORRECTIVE MEASURES, COMMERCIAL PLAZA DRIVEWAY CULVERT ON TIBBITTS ROAD

A 24-inch diameter driveway culvert at a commercial plaza on Tibbitts Road, near the outlet of the Tibbitts subarea, has a calculated nominal capacity that may result in localized flooding within Tibbitts Road and/or the downgradient New Hartford Municipal building parking lot

during storms in excess of the 10-year storm event. The corrective measure identified for the localized flooding is to increase the capacity of this culvert to convey the desired design storm. For the purposes of this assessment, it has been assumed that the entire length of the subject culvert must be replaced in order to increase the capacity of the system.

No modifications to the downstream swale or 72-inch x 48-inch corrugated pipe arch under Kellogg Road are called for as part of this improvement; however, the identified corrective measures within Reach 1 would be required to adequately convey the increased stormwater flow out of the area.

Table 8 identifies the projected costs for replacing the existing culvert with a newly designed installation with a greater capacity:

**TABLE 8**
ESTIMATED COST, CULVERT REPLACEMENT
AT COMMERCIAL PLAZA ENTRANCE ON TIBBITTS ROAD

| Element | Estimated Cost |
|---|---|
| Maintenance and Protection of Traffic | $1,500 |
| Two 30-Inch Metal End Sections | $1,000 |
| 110-Feet, 30-Inch CMP Culvert Pipe, Installed | $5,500 |
| Restoration, Asphalt Paving | $3,500 |
| **Subtotal** | **$11,500** |
| 15% Engineering/Surveying | $1,725 |
| 30% Contingency | $3,450 |
| **Total** | **$16,675** |
| | say |
| | **$17,000** |

# 7.0 SUMMARY AND CONCLUSIONS

The report presents the findings of a detailed assessment of the watershed in the vicinity of Snowden Hill Road, Oxford Road, and Kellogg Road in the Town of New Hartford. As the result of a comprehensive hydraulic model for the study area, several problem areas were identified which could result in periodic flooding and/or possible property damage in the event of large storm events.

## 7.1 INTERSECTION OF OXFORD ROAD AND KELLOGG ROAD

Periodic flooding has been reported near the intersection of Oxford Road and Kellogg Road in the vicinity of the outfall of the new Jubilee Estates residential subdivision. These observations were confirmed mathematically by this watershed analysis. Although partially mitigated with the addition of an upstream detention facility at Longworth Acres, the flow of stormwater in this area has been shown to be largely dominated by the runoff from the Jubilee Estates stormwater system coupled with the inability to convey the stormwater within the existing Oxford Road storm drainage system.

It is recommended that the Town of New Hartford implement a combination of stormwater detention on the Jubilee Estates site, in conjunction with a project to increase the size/slope of driveway culverts along the Oxford Road. Since Oxford Road is an Oneida County road, construction must be coordinated with the Oneida County Department of Public Works. The estimated cost to modify existing driveway culverts is approximately $12,000 each, and the capital cost for constructing stormwater detention in the Jubilee Estates subdivision is estimated at $25,000 not including land acquisition costs.

## 7.2 CULVERT AND STORMWATER SWALE NEAR TOPS PLAZA AND REACH 1

The stormwater runoff model indicates that the capacity of the 42-inch stormwater culvert and swale that separate the Tops Plaza and the Town of New Hartford Offices may be of insufficient capacity for storms of magnitude greater than the 25-year storm. Should the capacity of the culvert and swale be increased, it is also suggested that the capacity of Reach 1 be increased to accommodate the increased flow without creating substantial downstream flooding conditions. The capital costs for improving an existing detention pond, increasing the culvert capacity, increasing the swale capacity, and increasing the capacity of Reach 1 has been estimated to be approximately $170,000. Since none of the structures within the Kellogg Road corridor will be impacted, it is not expected that coordination with Oneida County will be required for this project.

## 7.3 OXFORDTOWN AREA

The Oxfordtown subarea receives stormwater flow from three upstream subareas via Reach C and discharges to Reach D through a 48-inch culvert pipe that passes under Harrogate Road. Flooding in the vicinity of the outfall of Reach C has been historically observed and supported by this hydraulic model; however, it appears that the flooding is contained to a low-lying lawn area near the site outfall point. It is recommended that a detailed topographic survey and engineering study within the lawn area be conducted to evaluate the existing detention capacity of the lawn. Subsequent to the detention study, a construction project that integrates the known detention characteristics with capacity improvements to the culvert under Harrogate Road is recommended. The estimated cost to implement corrective actions in this area is $68,000.

## 7.4 CULVERT AT COMMERCIAL PLAZA ON TIBBITTS ROAD

An entrance drive to a small commercial plaza near the outlet of the Tibbitts subarea has a culvert that has a calculated nominal capacity that is less than the calculated peak runoff for the

10-year storm event in the Tibbitts subarea. It may be expected that this culvert may become surcharged, resulting in stormwater runoff entering Tibbitts Road and/or the Town of New Hartford property situated immediately downgradient from this location. Replacing this driveway culvert with a new culvert of greater capacity has been estimated to cost approximately $17,000.