

# Memorandum



Date: May 9, 2014

To: Norm Baldwin, PE, City of Burlington  
Steve Roy, PE, City of Burlington

From: Joe Duncan, PE, A+E  
Rachel Marvin, PE, A+E

RE: City of Burlington Main Street Stormwater  
**Feasibility Analysis Summary**

## EXISTING CONDITIONS

The City of Burlington retained Aldrich + Elliott, PC (A+E) to conduct a feasibility analysis of stormwater improvements at the Main Street/South Winooski Avenue intersection. During significant stormwater events, such as the events which occurred on May 22<sup>nd</sup> and July 3<sup>rd</sup> of 2013, major flooding occurs in two locations, at the Main Street/South Winooski Avenue intersection (in front of Mr. Mike's) as well as in the bottom of the Courthouse parking lot on South Winooski Avenue that drains through the Burlington Community Justice Center and ultimately floods the low spot on King Street by the Hood Plant property.

The Main Street/South Winooski Avenue flooding is the result of drainage along the northern curb of Main Street from South Union Street, as well as some drainage from South Winooski Avenue from the College Street intersection. The flooding at the Courthouse parking lot and Burlington Community Justice Center is the result of drainage along the southern curb of Main Street where it jumps the Champlain Farms curb cut and flows down South Winooski Avenue to the Justice Center. The flooding at the low spot on King Street is a combination of drainage along King Street from South Union Street, as well as the flow along South Winooski Avenue.

Currently catch basins are located at the intersections of the study area but there are no catch basins along the stretches between those intersections. This results in the current collection system's inability to capture the surface runoff and convey it into the existing stormwater systems without flooding the intersections and low points during significant stormwater events.

The existing Ravine Sewer and Ravine Bypass Sewer convey stormwater from the study area through the combined sewer system to the Main Plant. The City is in the process of hiring a consultant to develop a hydrologic model of their overall collection system and it's anticipated that the model will be used in the future to further evaluate the existing conditions. For this study, the City conducted a basic hydraulic model of the Ravine Sewer and Ravine Bypass Sewer which indicates that there appears to be sufficient capacity for these lines to accept additional flow (refer to Appendix E).

## **RECOMMENDED IMPROVEMENTS**

Concepts for capturing the flow and discharging it directly into the Ravine Sewer and Ravine Bypass Sewer were evaluated. In addition, the possibility of providing detention was considered to minimize the potential of the additional flow in the Ravine Sewer and Ravine Bypass Sewer from impacting other locations downstream. Given that the hydrologic model is being developed, it was determined that providing detention at this time was not prudent as the model may give insight in the future as to the best long term approaches for detention on a system-wide basis.

Therefore, the recommended plan is to provide new collection systems that capture the flow and discharge it directly into the Ravine Sewer or Ravine Bypass Sewer upstream of the affected areas. Conceptual plans showing the proposed layouts for each area are attached.

### **Main Street**

- Install four catch basin structures, two on either side of the road. Install 18" diameter subsurface storm drain piping from the upper catch basins to the lower catch basins on the same side of the road.
- Connect the two lowest catch basins to existing manhole structures located near the entrance to the City parking lot and the entrance to Champlain Farms.
- Use vane grates and curb inlets to maximize capture to each catch basin.
- Construction cost is estimated at \$107,000.

### **South Winooski Avenue at Fire House**

- Install two catch basins in front of the Fire House and connect them to the existing Ravine Bypass Sewer drain manhole on South Winooski Avenue.
- Construction cost is estimated at \$32,000.

### **South Winooski Avenue at Courthouse**

- Install two catch basins, one of either side of the road, just up-gradient of the Courthouse parking garage entrance on South Winooski Avenue.
- Connect the two catch basins to the existing 54" diameter RCP Ravine Bypass Sewer via pipe core.
- Construction cost estimated at \$32,000.

### **King Street**

- Install two catch basins on King Street just uphill of the South Winooski Avenue intersection and connect it to the existing Ravine Bypass Sewer drain manhole.
- Construction cost estimated at \$39,000.

## **PRIORITIZATION AND IMPLEMENTATION**

The highest priority for the City is to address the Main Street/South Winooski Avenue intersection since that area has experienced the most significant flooding impacts. As a result, constructing the Main Street and South Winooski Avenue (at the Fire House) improvements are the highest priority. The next priority would be eliminating the flooding impacts to the Burlington Community Justice Center by

installing the South Winooski Avenue improvements near the Courthouse. The last priority is the King Street stormwater improvements.

Per discussions with the City, the recommended implementation is as follows:

#### **Main Street and South Winooski Avenue at Fire House**

It is recommended that the City construct the Main Street and South Winooski Avenue (at the Fire House) improvements this the spring of 2014. It is anticipated that City forces will also be available to construct these improvements. The final design for these improvements have been prepared by A+E and provided to the City.

#### **South Winooski Avenue at Courthouse**

The City has construction work planned in the spring of 2014 for sidewalk replacement along the west side of South Winooski Avenue near the Courthouse. The recommendation is to have the City forces also construct the stormwater improvements in this location at the same time. A+E has completed the final design of the stormwater improvements and will assist the City with final design of the sidewalk improvements in this area.

#### **King Street**

At this point, it is recommended that the Main Street and two South Winooski Avenue improvements be constructed first to evaluate their impact on the flooding that occurs at the low point on King Street. It is anticipated that these improvements will eliminate a majority of flow that would typically reach the King Street area such that the King Street improvements may not be needed. Therefore, construction of the King Street improvements is not recommended at this time.

#### **Hydrologic Model and Future Detention**

Detention of the flow from these improvements was evaluated but it was determined that a cost effective solution to detain the flows in the project area was not feasible given the limited available area and site constraints. As a result, the flow from these improvements will be discharged from the combined sewer to the City's Main Plant. It is possible that this additional flow may impact Main Plant's hydraulic capacity during significant storm events, which could result in bypass conditions at the plant. This was acknowledged during the study but it was determined that alleviating the flooding conditions in the Main Street/South Winooski area is a priority. It is recommended that, upon completion of the hydrologic model, a review of long term approaches for detention on a system-wide basis be conducted to offset the additional flow that will be discharged at Main Plant from these improvements.

Attached is more detailed information from our evaluation for your records. Upon your review, please don't hesitate to contact me with any questions.

*See Appendices for additional information.*

Appendix A – Figures

Appendix B – Cost Estimates

Appendix C – Hydrologic Analysis

Appendix D – Cuts Sheets for Catch Basin Grates and Curb Inlets

Appendix E – City of Burlington Memo Main Street Area Combined Sewer Model