

## Town of Windsor

### Memorandum

February 12, 2019

**TO:** The Honorable Mayor and Members of Town Council  
**FROM:** Michael Stallings, Town Manager *MS*  
**SUBJECT:** Drainage Study

As you may be aware, the Town contracted with Bowman Consulting to conduct a drainage assessment of the Town. They have completed their assessment and the report of their findings is attached.

Mr. Jonathan Jackson from Bowman will present his findings to Council at the February 12<sup>th</sup> meeting.

As you can see from the report, a large amount of the issues identified fall under the responsibility of VDOT. The items that are outside of VDOT's right of way fall under the responsibility of the landowner. It will be important for Town Council to review these issues to determine which, if any, privately owned drainage facilities the Town wishes to address.

We anticipate next steps to be meeting with VDOT to go over the recommended work identified in the report to see how much assistance we can get from them. We will then review the remainder of the issues to identify property ownership and how best to proceed.

This is for your information.

# Memorandum

**To:** Michael Stallings, Town of Windsor  
**From:** Jonathan H. Jackson, P.E.  
**Date:** 1/3/2019  
**Re:** Town of Windsor Drainage Assessment

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As requested, Bowman Consulting Group (BCG) has conducted a drainage assessment per the prioritized list of problem drainage areas in the Town of Windsor, Virginia as provided by town staff on June 11, 2018. This prioritized list includes six (6) priority problem drainage areas with specific areas within the six overall problem areas to be analyzed.

In order to perform a drainage assessment on these areas, BCG conducted desk top research with regards to existing topography and drainage divides throughout the Town of Windsor. BCG also performed field visits to inspect existing drainage infrastructure and problems as outlined in the prioritized list of problems as outlined by the town staff. Field visits were performed on September 17<sup>th</sup>, November 21<sup>st</sup> and December 31<sup>st</sup>, 2018.

Please find attached to this memo exhibits which summarize the research and field visits findings as completed by BCG. Note that on the field sketch exhibits, notes with a text box include items that BCG would recommend occur in order to relieve drainage issues. These recommendations have been summarized below, also note recommended priority assigned to each:

#### **Recommendations for Maintenance by VDOT:**

1. There is a low point along the southern side of 460 across from the Town's municipal offices. An inlet is needed here or possibly regrade the end of the gutter pan to allow for stormwater to outfall away from 460.
2. Storm inlets throughout the 6 corners intersection contain sediment and are in need of cleaning.
3. The roadside ditch North of Shiloh Drive (near Sarahnell Lane) needs to be cleaned to remove debris. It also needs to be evaluated to ensure it can sufficiently handle the large ditch coming from the north along the farm field. This ditch is collecting a large drainage area and was full of water when the field visit was conducted.
4. There is a DI-1 drop inlet in the roadside ditch along North Court Street North of the intersection with A Street. This DI-1 structure has a road sign placed over the inflow pipe. This road sign is keeping the inlet from operating as originally designed.

5. There appears to be a lack of drainage structures along North Court Street. There are only 2 drainage structures located on the eastern side (northbound) of North Court Street, this seems like an inadequate amount and additional structures would help eliminate standing water in this area. Also, there are very few drainage Structures on the western side (southbound) of North Court Street. Only 3 structures could be field located in North Court Street from the high point (near 26 North Court Street) and the creek outfall. Additionally, the closest storm structure that could be located from the creek outfall is approximately 850' from the outfall, this is an extremely long run of storm sewer without a drainage structure.
6. There are numerous sinkholes across the frontage of the business located on the Western side of North Court Street South of the stream crossing. These sinkholes appear to be the result of failing storm sewer.
7. Sinkholes were discovered along Duke Street near the intersection with A Street, it appears these sinkholes are a result of failing storm sewer.
8. We recommend removing the DI-1 structure near the corner of Sarahnell Lane and Shiloh Drive located near the roadside ditch. If this structure was removed the existing two 24" culverts can better work in tandem to handle water coming from Sarahnell Lane and the roadside ditch from the West which is serving the large ditch coming from the North which is located beside the farm field.
9. Ditch along the northern side of Bank Street appears to have no outfall as it approaches Walters Highway (Route 258).
10. No culvert/storm sewer is provided across Maple Lane at the intersection of Maple Lane and Bank Street, causing stagnant water in the ditches along Maple Street.
11. VDOT Standard DI-1 located at the sharp curve along Holland Drive appears clogged and includes large amount of sediment. This inlet needs to be flushed and further inspected.
12. Roadside ditches and storm sewer are in need of cleaning near along Holland Drive (near 28 Holland Drive) as this area is under water frequently.
13. Multiple inlets along north and south side of Church Street (Duke Street to Johnson Avenue) are in need of flushing and inspection. Note that a large number of these inlets were clogged with soil and other debris.
14. VDOT Standard DI-1 (multiple) at the curve of Roberts Avenue is full of sediment.
15. VDOT Standard DI-1 along Bank Street west of the Masonic Lodge is full of sediment.
16. HDPE stormwater pipe outfalls along the northern side of Bank Street (across from Maple Street) is buried in sediment.
17. Driveway culverts along Blackwater Road are clogged with grass, causing ditches upstream to be full of water.
18. Driveway culvert is clogged with sediment and debris along Bank Street near the intersection with Blackwater Road.
19. The HDPE culvert located at the end of Watson Street is full of water as the downstream ditch needs to be cleared as it contains tall grass and positive drainage does not existing for water leaving the culvert. This is causing the storm sewer system along Watson Street to hold water.
20. Several driveway culverts along the northern side of 460 between Watson Street and the electric co-op are clogged with sediment and are in need of cleaning out.
21. Tall grass in the roadside ditches along Walters highway and Blackwater Road is restricting the flow of water.
22. 18" CMP culvert under Route 258 (near co-op) is clogged on the upstream side with grass and debris, restricting the flow.

23. Roadside ditches along Randolph Drive are full of sediment and need to be cleaned out to help with the flow of stormwater.
24. Culvert under A Street is full of sediment and Debris and cannot function properly.
25. There is heavy sediment found in the gutter pans (indicating low points) along Bank Street and S Court Street as they approach the 6 points intersection (South of Route 460). Special attention needs to be made to these areas to reduce the ponding of water within the roadway.
26. 54" wide by 39" tall box culvert located under Church Street near school service entrance. BCG noticed that there was minimal water movement at upstream end while water was rapidly moving at downstream end.
27. Culverts within the western roadside ditch along North Court Street between the stream crossing and the middle school are in need of maintenance. Many culverts appear to have become disconnected and are not operating as originally designed.
28. VDOT recommended to analyze the adequacy of existing inlets and storm sewer along Route 460 (between Route 258 and Shirley Drive) as there doesn't appear to be an adequate number of inlets per VDOT's Drainage Manual.

#### **Recommendations for Maintenance by Town/Others:**

1. The natural channel located West of Court Street and East of Watson Street appears to outfall towards Court Street, however the outfall is clogged with debris and leaves. This natural channel appears to outfall to the storm sewer located within Court Street. However, the outfall pipe is unable to outfall as it is buried in the natural channel. This outfall pipe is located under private property, of which numerous sinkholes were observed. This pipe may be failing and needs to be inspected.
2. The natural channel located West of Court Street and East of Watson Street needs to be cleared of debris and leaves as it is restricting the flow of water. The clogging in this natural channel is causing the build up of stormwater in upstream inlets along Route 460 and within the adjacent church property.
3. Natural channel at the edge of the park between Shirley Drive and Roberts Avenue needs to be cleared of underbrush and debris as it is overgrown and is restricting the flow of water in upstream storm sewer. There is water standing in upstream storm structures from Holland Drive to Church Street. This is also causing water to pond in ditches along Holland Drive. The outfall pipe is also buried under sediment in this ditch is and not currently functional. This ditch needs to be cleared from the inflow through to the outfall. Note that we are not sure where this outfall is located although we assume that this ditch outfalls to the south.
4. Ditch near the end of Randolph Drive which flows South towards the High School and outfalls to storm sewer at the high school is full of sediment and debris and needs to be cleaned out. This ditch serves as the outfall for stormwater along Virginia Avenue and Randolph Drive.
5. Ditch near the end of Virginia Avenue flowing South towards Randolph Drive is full of sediment and debris and needs to be cleaned out. This ditch serves as the outfall for stormwater along Virginia Avenue.
6. 36" CMP storm sewer from school to natural channel which outfalls to Alphin Pond has numerous sinkholes in the vicinity. There was also a large velocity difference noticed from the upstream and downstream ends. Potential failing storm sewer in this area.
7. Storm sewer needs to be inspected that goes from the co-op to the railroad. We were unable to determine which way this storm sewer flows in the field. It appears that the storm sewer flows towards the co-op, but the co-op has water flowing into the storm sewer, not providing an

outfall. From viewing old photos, it appears that the co-op constructed a new storage yard between April 2007 and October 2008. It appears that during the construction of this new storage yard a ditch was removed which served as the outfall for this storm sewer.

8. Storm sewer running through Masonic Lodge property on Bank Street is full of water from the natural channel at the rear of the property. This natural channel needs to be cleared to allow water to flow out of the storm sewer.
9. Resident's property along Old Suffolk Road (next to cemetery) that drains to the railroad ditch is full of water in the back yard, it appears this storm sewer may be failing. This could be relieved by ditching stormwater from Old Suffolk Road to the railroad ditch and adding fill into the back yard. Also, the rail road ditch needs to be cleared of underbrush and debris and needs to be more defined.
10. Ditch from Holland Drive storm sewer to natural channel (west of Holland Drive) appears to not have an outfall pipe (could not be field located) and there is a large sump in this area prior to the VDOT standard DI-1 structure (behind the Farmer's Daughter Café). Consider redesigning this area of intersecting drainage ways.
11. The natural creek/ditch flowing south to the Alphin Pond needs to be cleared of underbrush as it is overgrown and is restricting flow (beside Farmer's Daughter Café).
12. Earthen ditch located coming from CVS to VDOT Std. DI-1 should be cleared of underbrush and debris (behind Hardy's Towing).
13. Ditch near the end of Virginia Avenue flowing North towards the farm field and then West towards the storm sewer system behind the residential lots is full of sediment and debris. The outfall for this ditch towards the storm sewer is full of sediment and debris and the ditch cannot function properly.
14. Upstream of VDOT Standard DI-1 located in CVS parking lot there are sinkholes and failing pipes behind the rescue squad (south of Route 460).
15. Vegetation is very tall in the Alphin Pond forebay where the two (2) – 24" RCP culverts outfall into the pond under Route 460. Vegetation in this area needs to be maintained so that the outfall of the two (2) – 24" culverts can be observed/cleaned as needed.
16. Debris is beginning to dam the stream which crosses North Court Street right before the road crossing. This debris should be removed to allow the stream to flow easily

**Possible Actions:**

- Town to consider taking over ownership and maintenance of "major" ditches and storm sewer, these include:
  - 460 Storm sewer near CVS to Holland Drive
  - Alphin Pond to North Court Street
  - Church Street storm sewer to Creek Outfall South of Route 460
  - South of Bank Street and South of E Griffin Street Ditch
  - Windsor Christian Church to North Court Street Storm Sewer
  - Windsor Baptist Church Storm Sewer
  - Route 460 storm sewer through electric co-op to N Prince Boulevard roadside ditch
  - Farm ditch to Shiloh Drive roadside ditch
- Sizing calculations for town storm sewer and ditches to ensure field conditions are adequate





