Questions and Comments on the
Safari Road Petition for Drainage Works and Appointment of a Drainage Engineer (PW22070) August 10, 2022
and
Preliminary Engineer's Report Safari Road Municipal Drain, Robinson Consultants Inc., June 2023
and
Safari Road Petition for Drainage Works Request for Full Engineer's Report (PW22070(a)), Nov 13 2023

Submitted by: Natalie Feisthauer and Gerald Tetreault, [redacted]

Comments on Safari Road Petition for Drainage Works and Appointment of a Drainage Engineer

1. In the Historical Background it is stated that there has been "historical flooding" of the low-lying segment of Safari Road between Valens Road and Kirkwall Road.
    - What records or evidence exist of historical flooding? What is the definition of "historical flooding" used in this Petition?
    - We have lived around the corner from the Safari and Kirkwall Road intersection since 2005 and have only witnessed flooding of Safari Road in the last three years (2021, 2022 and 2023).

2. TOM and HW identified that the primary means for drainage of Safari Road are the private culverts at 1759 and 1727 Safari Road and determined that the blockage of these two private culverts were contributing to the high water conditions.
    - What data were used by TOM and HW to determine the cause of flooding and to identify the means of mitigation?
    - Did TOM and HW also look at weather patterns (e.g., greater than usual rainfall amounts, or frequency or unusual timing over the last three years)?
    - Did TOM and HW look at the hydrology of the wetland to determine if anything has been altered that reduced flow from the wetland (other than the blocked culverts, beaver dams, etc.) in the last three years?

3. "TOM explored the option of repairing the culverts, however they are on private property…thereby restricting the City's ability to make the necessary repairs". Since the blockage of these private culverts appears to be a significant cause of flooding on Safari Road:
    - Has the City communicated with the landowners to inform them of their contribution to the flooding on Safari Road which has also caused flooding of their own driveways and their own access to Safari Road?
    - What measures has the City undertaken to consult with the landowners to fix their own property (culverts) before petitioning for a Municipal Drain in the Safari Road Wetland?
    - Is there resistance from the private landowners to fix their culverts? If yes, cannot any contentious issues be resolved by mediation between the landowners and the City?
    - Is there any City mechanism to incentivise landowners to maintain their own infrastructure?
    - If the landowners have been consulted, and refuse to upgrade their culverts, what liability do the landowners hold because of the contribution of their inadequately maintained culverts to the flooding on Safari Road?

4. "Since the culverts are privately owned, and there is no Municipal Drain, the City has limited ability to intervene to address the current flooding issue or resolve the historic flooding of Safari Road"
    - What is the difference between the current flooding issue and the historic flooding issue?

- Surely public consultation/engagement/mediation on this issue with the landowners (1759, 1727, 1665 Safari Road) can go a long way to resolve this issue before undertaking a costly and ecologically damaging short-term solution of installing a Municipal Drain in the Safari Road wetland.

5. "Petitioning for a Municipal Drain is one of the legal processes available to proponents like the City to establish a legal and adequate outlet for stormwater and/or subsurface drainage as per the Ontario Drainage Act."
    - What other legal processes are available to the City to resolve this issue?
    - The Drainage Act relates to stormwater and/or subsurface drainage, however;
        - The high water levels in Safari wetland are not stormwater; surface water is a natural hydrologic feature of a wetland and the elevated water levels are (presumably) a result of inadequate maintenance of private infrastructure
        - Installing a Municipal Drain to install or enhance subsurface drainage is to improve the arability of terrestrial agricultural systems such as providing for "improved management practices or a more profitable cropping system"[1], not to drain water from a wetland, especially a wetland of such local and regional significance as the Safari Road wetland.

6. Regarding the statements in the Analysis and Rationale for Recommendation section: "…TOM in consultation with HW has initiated the petition as a means to investigate options to mitigate the historical flooding of Safari Road in the area between Valens Road and Kirkwall Road" and "The recommendations in this report do not commit the City to anything other than completing the preliminary report", we appreciate that other options to resolve this issue will also be investigated, including but not limited to the raising of Safari Road.

7. An additional option we propose the City explore is the permanent closure of Safari Road between Kirkwall Road and Valens Road. Our rationale for this option is provided later in this document.

8. "ES is undertaking a Class Environmental Assessment (EA) associated with reconstructing Safari Road and the anticipated upgrade of road cross culverts"
    - Will there better public notice, engagement and consultation with this Class EA with local stakeholders than was conducted for the Drainage Petition? We were not aware of the Petition for Drainage or the May 9 2023 meeting to discuss the findings of the Engineer. We were only made aware of the Engineer's Preliminary Report through happenstance, not from any communication from the City.

9. What "traditional means" (mentioned in the Alternatives for Consideration section) were used to attempt to resolve the flooding to date?

10. Alignment to the 2016 – 2025 Strategic Plan
    - Installing a Municipal Drain in the Safari Road wetland is not aligned with the Priority of Clean & Green – Hamilton is environmentally sustainable with healthy balance of natural and urban spaces

[1] Drainage Act RSO, 1990 c.D.17

Comments on Preliminary Engineer's Report Safari Road Municipal Drain, Robinson Consultants Inc.

11. In the Introduction the report states: "The purpose of the proposed drain is to provide adequate drainage to the lands and roads within the drainage area"
    - The *lands* shouldn't be drained as the surrounding lands in the drainage area are wetlands. It is just road flooding that is at issue for the City.

12. Since we were not present (or aware of) the May 5 2023 meeting, can the City or Robinson Consultants provide the answers to the questions that were posed at the meeting (Section 1.2 of the Preliminary Report)?

With regard to the assumptions underlying the cause of flooding:

13. What and how were site-specific data, including geospatial data, collected during the site investigation and preliminary survey?
    - Were any empirical site-specific/ground-truth data collected?
    - Were historical data collected (e.g., natural baseline water flows from the wetland)?
    - Will this information be provided in the Full Engineer's Report?

14. If aerial photography was used as the primary (or only?) means to determine blockages, how was the nature and degree of channel restrictions and landform restrictions identified and measured?
    - What defines "channel restrictions" and "landform restrictions" and what is the different causes between the two types of restrictions?

15. "In general, the imagery confirmed findings that blockages…to be the primary issue of concern." The imagery only shows that there is flooding in the area, with a pattern and extent that has been observed consistently since 2021. Other than the driveways, it does not show specific blockages such as beaver dams, or other, unidentified land form restrictions.
    - There is no evidence presented in the Preliminary Report of specific vegetation, sedimentation or beaver dams obstructing the natural flow of water from the Safari Road wetland
        - Where specifically has Robinson Consultants identified that vegetation and sedimentation have cause blockages to the flow channel of the wetland?
        - Where specifically has the location of beaver dams and lodges been identified?

16. Was any consideration given to other possible causes of flooding? Safari Road has only been flooded like this in the last three years (2021, 2022, 2023) – what changed after 2020?
    - Changes in recent weather patterns? A similar increase in hydrology over the last three years has been observed in the watercourse draining the wetland after it crosses Kirkwall Road. This limestone bedrock stream was historically ephemeral, meaning that water flow was not continuous year-round (flow ceased during the dry months of the year). This stream is normally ephemeral throughout the length of the stream on the Kirkwall property over which it flows, even through different habitats (alvar, ash+maple swamp). However, over the last three years the duration of flow has been longer – the stream dried up later in the summer and flowed again earlier in the fall. In 2023 to date there has been continuous flow in the stream, consistent with this year's high rainfall levels.
        - This suggests that the surface hydrology, or even hydrogeology, of the system might be altering and the Safari Road flooding cannot not be explained by blockages alone.

- Are new blockages present in the natural flow path of the wetland that did not exist prior to 2021 such as beaver dams?

With regard to proposed drainage solutions:

17. We are relieved to note that full/direct drainage of the Safari Road wetland will not be considered. Constructing and maintaining such a drain, as well as draining the wetland, would cause significant and on-going damage to the ecological biodiversity and habitat quality of this valuable Core Area of a Provincially Significant Wetland, and would permanently impair its hydrological function of water storage and filtration, something that this green infrastructure provides free of charge to the City and its citizens.

18. We agree that Options 1 and 2 are clearly not viable options to reduce flooding on Safari Road and the driveways of the affected properties.

19. Option 3a proposes actions that will allow the "establishment of a natural channel".
    - Does this mean there is no existing naturally occurring flow path in the wetland such that one would need to be created? Is the wetland drained through sheet flow until it flows south through the culvert at Safari Road?
    - Or does Option 3a propose to increase (or re-establish higher) water flow rates in a naturally existing flow path strictly by only removing blockages?
    - Or will the "establishment of a natural channel" require sediment dredging, vegetation removal and bank creation to create what would be a "*naturalized* channel" through the wetland?

20. If Option 3a is not simply removing barriers but in fact proposes the creation of a naturalized channel would the channel design be such that the channel functions "like a stream in a natural state of stability such that it is able to transport water and sediment over time while maintaining channel form and ecological characteristics[2]" (i.e., Natural Channel Design[3])? If done well, a channel designed under site-specific Natural Channel Design will not require future maintenance. Does Option 3a propose to use Natural Channel Design?

21. However, establishing any engineered channel in the wetland, under Natural Channel Design or not, is still very problematic because by definition establishing anything that functions like a stream in the middle of a wetland changes the hydrology and habitat of that wetland. This is in addition to the disturbance and damage caused by channel construction and maintenance.

22. Option 3a includes "removal of any permanent blockages, including beaver dams".
    - Active beaver dams are not permanent blockages as beavers typically run out of available food sources within easy access within two to three years[4]
    - Until the food sources are exhausted however, beaver dam removal is usually an ineffective tool to clear water courses as beavers will rebuild their dams immediately, unless alternative solutions to dam management is implemented, such as pond levelers[5]. So on-going and frequent removal of

[2] https://www.twdb.texas.gov/publications/reports/contracted_reports/doc/1148321308_channeldesign.pdf
[3] https://www.collectionscanada.gc.ca/obj/s4/f2/dsk3/ftp04/MQ61935.pdf
[4] https://www2.gov.bc.ca/assets/gov/environment/natural-resource-stewardship/best-management-practices/beaver-guide.pdf
[5] https://www.beaverinstitute.org/

beaver dams would be required if it is a part of a flood abatement solution – with associated costs and ecological disturbances.

- Have beaver dams been identified in the Safari Road wetland? If yes, perhaps these new beaver dams have contributed to the recent flooding. An assessment would need to be made to determine if this is indeed the case, as per comment 16. If beaver dams are contributing to the problem, the situation could resolve itself without the need for human intervention as in time resident beavers will move on.
- Removal of beaver dams as part of the solution should only be considered after assessing if it will make a material difference in reducing flooding of Safari Road. Otherwise it will only add to the maintenance cost and disturbance frequency of the wetland.

23. What are the implications for the wetland if the channel is designated as a Municipal Drain? Does this mean that adjacent landowners will have a legal right to petition for dredging of the channel to further reduce water levels in the event of storms or high rainfall years?

24. How will the implementation of Option 3a affect downstream properties adjacent to the watercourse after it crosses Kirkwall Road?
    - Will it increase the risk of flooding?

25. How will the implementation of Option 3a affect downstream aquatic habitat after it crosses Kirkwall Road?
    - Will it change the stream habitat due to increased sediment transport from the naturalized channel?
    - Will it change the hydrology of the watercourse and downstream wetlands by increasing water flows?
    - As per the GRCA recommendations, hydrologic and hydraulic models need to be constructed to account for the loss of water storage in the wetland and the increased stream flows and potential for flooding downstream of the wetland

26. Weather patterns are changing due to climate change; it is entirely possible that we could experience significant periods of drought in the immediate and farther future.
    - It is during droughts that the water storage and filtration capacity of a large marsh like the one on Safari Road will become increasingly critical to support plant and wildlife survival and biodiversity, as well as maintain ground water levels for drinking water wells for private residents and rural businesses, including farms.
    - Installing any feature that increases the removal of water from a wetland runs the risk, in dry years, that water levels will drop to the point where the wetland can no longer function properly because of the loss of wetland-dependent plants and wildlife.
    - With the drawing down of water levels, the wetland will also be at increased risk of being overrun by invasive species, which will accelerate the decline in the ecological and hydrological functioning of the wetland.

With regard to the value of the Safari Road wetland:

27. The comments provided by the GRCA in Appendix B of the Preliminary Report provides an excellent summary of the critical ecological value of the Safari Road wetland and makes clear the emphatic need, and legal requirements, to protect the ecological and hydrological integrity of this ecological gem in Hamilton's natural heritage system.

28. The wetland is considered a Confirmed Significant Wildlife Habitat as well as a Core Area, Key Natural Heritage Feature and Key Hydrological Feature in Hamilton's Rural Official Plan

29. The Safari Road wetland is part of the Beverly Swamp Complex that is 2324 hectares and spans three watersheds (Fairchild, Spencer and Bronte Creeks) and is home to many locally and regionally rare species including both southern Carolinian species and northern Great Lakes-St. Lawrence/Boreal species, making it an ecologically unique area.

30. The GRCA has indicated, as strongly as it is now able to, that they *discourage any drainage works that would destroy or degrade wetlands*.

31. The Beverly Swamp is one of the largest remaining wetlands, and one of most pristine remaining wetlands (e.g., Class 1 wetlands), in southern Ontario. The natural heritage of Beverly Swamp habitats draws visitors from both within the City and without, to enjoy passive and active recreation.
    - Activities include, in the Safari Road wetland area alone, walking, running, hiking, biking, horseback riding, birdwatching, wildlife viewing, nature interpretation, hunting and simple relaxation.
    - The evidence is clear of the benefits to the physical, mental and emotional health of people being present in nature[6], such as walking in the forest in the adjacent Hyde Tract, listening to the sounds of the marsh from Safari Road (the spring chorus of frogs calling in the marsh is wonderfully tremendous and the gulping song of an American bittern is always a humourous surprise), and observing wildlife in the wetland – watching swallows winging over cattails chasing insects and great blue herons soaring overhead in the sun-setting sky.

32. As an addendum to the Sheffield-Rockton Wetland Data Record in Appendix 2, it should be noted that this particularly Provincially Significant Wetland and surrounding area is also frequented by members of the Hamilton Naturalist Club due to the many significant species here, including species at risk that include birds, herptiles, insects and plants.

33. This past summer (2023) while visiting the flooded Safari Road more than once we spoke with birders who had come from as far away as Toronto to visit the Safari Road wetland for chance sightings of marsh-breeding birds like the Virginia Rail and Common Gallinule (these two species were present while we were chatting).

34. This summer (July 2023) we have also observed spectacularly abundant populations (100s if not 1000s of individuals) of metamorphosing leopard frogs in the warm, shallow flooded ditch on the south east side of Safari Road east of the road barrier).

35. In addition to the ecological value of the wetland for marsh breeding birds, reptiles, amphibians and other wildlife as well as for plants and insects, as stated before the wetland also provides the following ecological goods and services (EG&S): water storage capacity on the landscape that reduces the risk of downstream flooding, filtering of sediment from the water, and recharge of bedrock aquifers in the region.

[6] Jimenez et al. 2021, Associations between nature exposure and health: A review of the evidence. Int J Environ Res Public Health doi:10.3390/ijerph18094790 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8125471/

36. The content of the Petition for Drainage Works Request for Full Engineer's Report is similar to the content of the Preliminary Report, however it is unclear based the wording if Option 3a is simply removing blockages or if it will entail any form of dredging or channel creation. This lack of clarity is discussed in detail in our earlier comments.
37. Does the Request for Full Engineer's Report commit the City under the Drainage Act to move ahead with Option 3a?
38. Alternatives for Consideration are provided below.

Alternative Solutions for Consideration:

39. Implement Option 3a in stages:
    - Stage 1: Add culverts to (presumably) 1811 Safari Road driveway, and replace/properly size/lower existing culverts at 1759 and 1727 Safari Road driveways to remove the most significant blockages to the natural flow path of the Safari Road wetland
    - Monitor water levels and flooding to Safari Road for one full water year (October to October), while also recording rainfall amounts, to determine if installing/replacing culverts on the three driveways is sufficient to resolve the flooding problem on Safari Road
    - Stage 2: If after one water year flooding is not reduced to acceptable levels, then consider options 40 and 41 below (or others) before considering the installation of a Municipal Drain in the wetland.

40. Raise Safari Road as suggested in the Safari Road Petition for Drainage Works and Appointment of a Drainage Engineer (PW22070) August 10, 2022 report.

However, "we cannot solve our problems with the same thinking we used when we created them[7]". Safari Road was built right through the middle of a large, ecologically sensitive wetland. This wetland is a natural system that will fluctuate with changes in local conditions, naturally induced or otherwise, causing constant challenges to maintain the road. Climate change will continue to introduce vagaries in our weather patterns that might increase flooding to the point where even a newly raised road is inundated on a regular basis, or conversely, drought years might render the raising of Safari Road unnecessary or even harmful as the raised road then becomes a safety hazard and a barrier to wildlife movement.

Perhaps instead of fighting nature by trying to out-engineer it, which is very expensive, requires constant maintenance and is ultimately ineffective, we suggest working with nature for a more permanent, cost-effective and sustainable solution.

41. Permanently close Safari Road between Kirkwall Road and Valens Road

- We acknowledge that Safari Road is normally an established transportation route through Flamborough for private and commercial traffic, not least of which is tourist traffic from Hwy 6 to the African Lion Safari.
- However, for the last three years traffic had been successfully re-routed via Regional Road 97, Concession 8, Concession 6, Kirkwall Road, and Safari Road west of Kirkwall Road.

[7] Albert Einstein

- There are many roads within Flamborough that are disconnected due to natural heritage features (e.g., Westover Road, Middleton Road, Concession 10). Traffic has successfully re-routed itself and the discontinuation of these roads provides protection to these natural areas.
- To our knowledge visitor traffic to the African Lion Safari has not been affected by the road closure as there are numerous access routes to the wildlife park other than Safari Road between Kirkwall and Valens Road.
- If the commercial rerouting is of economic concern to the City, an economic study should be conducted by TOM to determine the economic loss, if any, to the City or Flamborough businesses as a result of slightly longer commercial transit times through Flamborough.
- The benefits to the wetland of closing the road are clear:
    - reduced contamination of water from excess road salt, from oil, metal and tire micro-debris from cars, and from litter, including plastics, glass and cans, from vehicular traffic, all of which impact the health and reproduction of wildlife in the wetland
    - reduced risk of wildlife mortality from car collisions, especially for vulnerable wildlife like turtles and amphibians that do not display avoidance behaviour on roadways
    - reduced noise pollution from passing vehicles that interfere with mating and territorial call behaviour
    - reduced localized air pollution from vehicle emissions
- The benefits to human residents on Safari Road, and visitors to the Safari Road wetland and Hyde Tract are also clear:
    - reduced water, air and noise pollution, as well as litter, results in a healthier environment, especially for local residents
    - greatly reduced traffic, and the absence of high speed traffic, would make it much safer for Hamiltonians and visitors from outside the City to engage in walking, running, hiking, biking, horseback riding, birdwatching and wildlife viewing
    - a quiet, safe road would greatly enhance the recreational value of this part of rural Hamilton for Hamiltonians and visitors alike, both for the excellent wildlife observing opportunities and to engage in the other recreational activities described above
    - a quiet safe road for wildlife viewing would facilitate passive eco-tourism, which could be a economic benefit to the local community
    - Hamilton, by ensuring - in fact enhancing - the protection of this wetland, would be a leader in the sustainable integration of the natural environment with the human community, something that is more important than ever in this increasingly densely populated region of Ontario.
- The closure of Safari Road would not impact the reliability of emergency services, which originate from the Rockton Firehall, about 7 km to the south of the Safari Road wetland area. It is normal practice for emergency responders to route to a site using the nearest north-south axis road from Rockton and a closure of Safari Road between Kirkwall and Valens Road would not impact response times or access as they would access an emergency site from either Kirkwall or Valens Road, they would not traverse along Safari Road.
- Simple railings could be installed on the shoulders of Safari Road where water levels are deep next to the road for safety and liability reasons.

- The closure of Safari Road would not impact school buses except to modify routes; however rural school bus routes are continuously being modified as students are routinely added and removed from routes based on local demographics.
- Closure of Safari Road between Kirkwall and Valens Roads would reduce the cost of road maintenance and eliminate the need and cost of raising the road.

Thank you in advance for your time and careful consideration of our questions, comments, concerns and suggestions in our rather long submission to the November 13 2023 Hamilton Public Works Committee meeting.

We would be happy to discuss any aspect of our submission with members of the Public Works Committee as well as City Council in general.

Sincerely,
Natalie Feisthauer and Gerald Tetreault