Public Works Department
Wednesday, May 03, 2023

Subject: Farr Road and River Road Roadside Ditching and Culvert Drainage Improvements

Recommendation:

> **BE IT RESOLVED THAT Council receive Report #2023-0110 Farr Road and River Road Roadside Ditching and Culvert Drainage Improvements, for information;**
>
> **AND THAT Council Direct staff to complete a detailed inspection and survey of the roadside ditches along Farr Road and River Road including the culverts within the Town's road allowance and complete the required maintenance and repairs necessary to ensure that the town's infrastructure is performing as intended.**

Background:

At its regularly scheduled meeting of Council on April 19, 2023, staff presented report 2023-0097 Drainage Study Farr, River and Webber Road for Council's consideration. The report outlined the results of the drainage study completed by AHYDTECH Geomorphic Ltd. The staff report recommended the following resolution:

> **BE IT RESOLVED THAT Council receive Report #2023-0097 – Drainage Study for Farr, River, and Webber Road Area, for information;**
>
> **AND THAT Staff be directed to investigate the feasibility of dredging the roadside ditches and culverts along Farr and River Road within Public Works 2023 Operating Budget and/or the 2023 roadside ditching program;**
>
> **AND THAT Staff continues to participate in discussions with the developers on the east and west sides of River Road to identify potential long-term, comprehensive drainage and stormwater solutions.**

The following resolution was passed by Council based on the discussion regarding report 2023-0097:

BE IT RESOLVED THAT Council receive Report #2023-0097 – Drainage Study for Farr, River, and Webber Road Area, for information;

AND THAT Staff be directed to investigate the feasibility of dredging the roadside ditches and culverts along Farr and River Road within Public Works 2023 Operating Budget and/or the 2023 roadside ditching program;

AND THAT Staff continues to participate in discussions with the developers on the east and west sides of River Road to identify potential long-term, comprehensive drainage and stormwater solutions;

AND THAT staff be directed to produce a report with specific advice, recommendations and options on how we might proceed with a municipal drain to cover the study area.

This report aims to investigate the feasibility of dredging the roadside ditches and culverts along Farr and River Road and to provide a recommendation for completing maintenance work on the ditches and culverts within the Farr Road and River Road right-of-way.

Analysis:

Council approved an operating budget of $100,000 to complete roadside ditching for the municipality's entire geographic area. This work is generally contracted to a company that provides these services using specialized equipment. Based on an annual contract value of $100,000 the estimated quantity of ditching completed is approximately 10 km. In addition, an operating budget is set aside to complete ongoing maintenance and upkeep of various road culverts throughout the road network. The labour, equipment, and material cost to complete maintenance of culverts is embedded in the operating costs included in the annual Roads Operating budget and are not specifically designated for such.

In addition, Council approved a project RD 06-23 Culvert Replacement Program in the amount of $60,000. This project is an annual capital project that focuses on the repair and replacement of damaged culverts throughout the Town. As stated above the Public Works Department has the resources to complete repairs and replacement of smaller diameter culverts through the operating budget. This capital program is meant to repair and replace larger size culverts and is usually contracted out through the Town's procurement process.

The Engineering and Public Works Department has based a scope and estimate using GIS and previous contract pricing received for similar work in 2022. Farr Road from Webber Road to River Road is approximately 835 m and River Road from

RR 24 (Victoria Ave.) and Farr Road is approximately 575 m resulting in a total of 1,410 m. If both sides of the roadway were re-ditched the estimated total length of ditching is 2,820 m. In 2022, staff tendered a roadside ditching program and received a unit price of $9.22 per m (plus applicable taxes). Based on this rate the estimated cost to complete the re-ditching of the entire length of the roadside ditches on Farr and River Road is $26,000 (plus taxes). Adding a 5% inflation for 2023 costs the estimated total cost to re-ditch the entire length of roadside ditches as described above is $27,300 (plus applicable taxes).

There are 38 culverts located along and across Farr and River Road. At the time of writing this report, a thorough analysis of the condition and required maintenance was not completed. Most culverts will likely require a flush and clean while others may require replacement. Until a more detailed inspection by Engineering and Public Works, staff can be completed the scope of work is unknown. That being said if 6 culverts require replacement at a cost of $2,500 each and 32 culverts require minimum maintenance at a cost of $500 each the total cost related to culvert improvements can be estimated at $31,000 (plus applicable taxes). In addition, staff will require traffic control to complete the culvert maintenance which is estimated at $2,500. As a result, the total estimated cost to complete either maintenance or replacement to all of the culverts along Farr and River Road is $33,500 (plus applicable taxes). Note: this does not include work to any culverts on private property nor does it include any maintenance work or replacement of any Niagara Region-owned infrastructure.

Based on the above assumptions if Council directs staff to complete re-ditching on the entire length of roadside ditches on Farr and River Road in the area described above and staff performed maintenance on all 38 culverts along these road segments the total estimated cost is $60,800 (plus applicable taxes).

Roadside ditches are an item of Town infrastructure with the primary purpose to drain the roadbed and the water draining off the road surface. This is a common drainage technique that continues to be used in rural areas and some urban subdivisions. The obvious benefit of these systems is that they detain, filter and infiltrate runoff as it is conveyed along the grassed ditch, resulting in smaller volumes of runoff and associated pollutants from reaching the watercourse or stormwater management facility.

Material from roads, including sediment from winter sanding, moves from the roadbed to the ditches as a result of traffic, rainfall-runoff, snowmelt runoff, plowing, erosion, and potentially other activities. Over time roadside ditches and culverts fill in with gravel and sediment. The periodic removal of this material is required to maintain the hydraulic capacity of the ditches and protect the roadway and traveling public.

Ditches are typically vegetated to offer resistance to flow and erosion. Periodic mowing is often required to retain the hydraulic capacity of the ditches, hence why the Town has an Annual Roadside Mowing Program. When ditches are unstable, or when the vegetation is disturbed during ditch maintenance, erosion can significantly impact water quality and can cause increased volumes of water downstream as the time of concentration is reduced and the ability of the water to infiltrate into the ground is reduced.

In addition, ditch maintenance work is not allowed to impact private property unless proper easements are obtained. Water should not be diverted onto private property from either the road itself or the ditch. If conditions change in the watershed resulting in increased water volume, the ditch design may need to be evaluated. It is recommended that any major alterations of drainage elements be reviewed by a qualified engineer prior to carrying out any of the following:

- Create a new ditch
- Change the size of the culvert
- Change the size of the original ditch
- Change the shape of the original ditch
- Change the slope(s) for the culvert or the ditch
- Change culvert inverts
- Change the drainage pattern (lateral ditches, turn-outs)
- Work in ditches with perennial flow
- Find a long-term fit for a recurring problem
- Replace culverts for streams crossing under roads or ditches crossing under large roads

The Roads Department has identified approximately 8 km of roadside ditching locations throughout the Town, that currently require ditching in 2023. The intent is to complete this work as a contracted service as part of the 2023 operating budget. The anticipated costs for the ditching works, based on the previous year's costs indicated earlier in the report, would be approximately $77,448.00 plus applicable taxes. Some of these locations will need to be deferred to 2024 based on the scope of work to be completed on Farr Road and River Road.

Financial Considerations:

The estimated cost of re-ditching the entire length of roadside ditches (approximately 2,820 m) is $27,780 (including taxes).

The estimated cost to perform maintenance and/or replacement of the existing culverts within the road allowance of Farr and River Roads is $31,546 (including taxes).

The estimated cost to provide traffic control to complete the required work above is $2,544 (including taxes).

The total estimated cost to re-ditch the entire length of roadside ditches on Farr and River Roads is $61,870 (including taxes).

Council approved a project in the 2023 operating budget to complete roadside ditching in the amount of $100,000. The cost to complete the ditching work can be funded by this account in the amount of 27,780 which would defectively reduce the overall budget by 28 percent.

The culvert repairs and maintenance could be funded through the 2023 operating budget for the Roads Department. In addition, Council approved a capital project RD 06-23 Culvert Replacement Program in the amount of $60,000 which could be used to fund any replacements required.

Alternatives Reviewed:

Council may consider directing staff to complete a more detailed inspection and survey of the roadside ditches and culverts to determine a reduced scope of work that would be aimed at improving the performance of the roadside ditches and culverts along Farr Road and River Road. The cost to complete selective targeting of areas to receive re-ditching and culvert maintenance/replacement could be reduced following a more detailed review, lowering the overall cost. The ditching would still be funded through the annual ditching contract and the cost to perform any culvert maintenance would be absorbed by the 2023 operating budget. Major culvert repairs and replacements could be funded through capital account RD 06-23 Culvert Replacement Program.

Strategic Plan Relationship: Infrastructure Investment and Renewal

Maintaining the Town's Road infrastructure is critical to ensuring the safe movement of vehicular and pedestrian traffic. In addition, maintaining the drainage systems within the Town's Road allowance helps to mitigate against pre-mature failure of our road network and reduces the risk associated with flooding concerns caused by the Town's Road infrastructure.

Consultation:

A consultation was undertaken with the Manager of Engineering, Director of Community Planning & Development, and the Treasurer/Director of Corporate Services.

Other Pertinent Reports/Attachments:

2023-0097-Planning Drainage Study Farr, River and Webber Road, April 19, 2023.

Prepared and Recommended by:

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Prepared and Submitted by:

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