Water and Waste
Eaux et déchets

Environment and Climate Change
Environmental Stewardship Division
Environmental Approvals Branch
Box 36 14 Fultz Blvd
Winnipeg, MB R3Y 0L6

January 20, 2025
Client File No.: 1071.10
Our File No.: S-972, S-1146, EMS
020-17-08-11-00
020-17-08-11-0N

Dear Ms. Agnes Wittmann, Director,

RE: NOTICE OF ALTERATION – ENVIRONMENT ACT LICENCE NO. 2684 RRR: CITY OF WINNIPEG NORTH END SEWAGE TREATMENT PLANT (NEWPCC) ULTRAVIOLET LIGHT FACILITY AND HEADWORKS FACILITY UPGRADES

The City of Winnipeg (the City) is in the process of upgrading the North End Water Sewage Treatment Plant (NEWPCC). As part of the upgrades, several shutdowns and tie-ins are needed. The attached Notice of Alteration (NOA) to Environment Act License No. 2684 RRR describes the temporary bypass of the Ultraviolet Light (UV) Facility to allow the construction of the UV upgrades and testing and commissioning of the new Headworks Facility.

As described in the attached, multiple options were considered for the temporary bypass. The selected option minimizes the temporary shutdown window and reduces the risk to the environment. The methodology prescribed in the UV construction tender will be contingent upon approval of this NOA. Delay in awarding the UV construction tender has the potential to affect the overall commissioning schedule for the new Headworks Facility.

Please contact Linda McCusker at 204-330-1459 or lmccusker@winnipeg.ca if additional information is required or if you have any questions concerning this proposal. Please note, the City would like to pay the application fee via credit card. Please contact Jennilee Marcial at 204-390-1435 to coordinate payment.

Sincerely,

[redacted]

Chris Carroll, P.Eng.,
Manager of Wastewater Services

Attachment

c:

S. Burland Ross, MB Environment and Climate Change (email)
T. Shanks, Water and Waste Department (email)
C. Wiebe, Water and Waste Department (email)
T. Josephson, Water and Waste Department (email)
L. McCusker, Water and Waste Department (email)
K. Schimke, Water and Waste Department (email)
A. Weiss, Water and Waste Department (email)

WASTEWATER SERVICES DIVISION
110-1199 Pacific Avenue, Winnipeg, Manitoba R3E 3S8
DIVISION DES SERVICES D'INGÉNIERIE
1199, avenue Pacific, Porte 110, Winnipeg (Manitoba) R3E 3S8

Notice of Alteration Form

Manitoba

File No. : 1071.10	Environment Act Licence No. : 2684 RRR

Legal name of the Licensee: City of Winnipeg

Name of the development: North End Sewage Treatment Plant (NEWPCC)

Category and Type of development per Classes of Development Regulation:

Waste Treatment and Disposal <SELECT>

Licensee Contact Person: Chris Carroll

Mailing address of the Licensee: 110-1199 Pacific Avenue

City: Winnipeg Province: MB Postal Code: R3E 3S8

Phone Number: (204) 795-8530 Fax: (204) 224-0032 Email: ccarroll@winnipeg.ca

Name of proponent contact person for purposes of the environmental assessment (e.g. consultant):

Kristiina Cusitar, AECOM Canada ULC

Phone: (204) 477-5381 Fax: (431) 800-1210	Mailing address: 99 Commerce Drive Winnipeg MB R3P0Y7

Email address: Kristiina.Cusitar@aecom.com

Short Description of Alteration *(max 90 characters):*

This NOA requests the temporary bypass of the ultraviolet light disinfection system.

Alteration fee attached: Yes: ☐ No: ☑

If No, please explain:

Date: 2025-01-20

Signature: [redacted]

Printed name: Chris Carroll

A complete Notice of Alteration **(NoA)** consists of the following components:

- ☑ **Cover letter**
- ☑ **Notice of Alteration Form**
- ☑ **1 electronic copy of the NoA detailed report** (see "Information Bulletin - Alteration to Developments with Environment Act Licences")
- ☐ **$500 Application fee, if applicable** (Cheque, payable to the Minister of Finance)

Submit the complete NoA to:

Director, Environmental Approvals Branch
Environment and Climate Change
Box 35, 14 Fultz Blvd
Winnipeg MB R3Y 0L6
EABDirector@gov.mb.ca

For more information:

Toll-Free: 1-800-282-8069
Phone: 204-945-8321 Fax: 204-945-5229
https://www.gov.mb.ca/sd/permits_licenses_approvals/eal/ licence/index.html

Note: Per Section 14(3) of the Environment Act, Major Notices of Alteration must be filed through submission of an Environment Act Proposal Form (see "Information Bulletin – Environment Act Proposal Report Guidelines")

Reset Print

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Siobhan Burland Ross, M.Eng., P.Eng.
Engineering Manager
Environmental Approvals Branch
Environment and Climate Change
Box 35, 14 Fultz Boulevard
Winnipeg, MB R3Y 0L6

January 15, 2025

Project #
60711772

Subject: **Notice of Alteration - Environment Act License No. 2684 RRR: City of Winnipeg North End Water Pollution Control Center (NEWPCC) UV Facility and Headworks Facility Upgrades**

Dear Ms. Burland Ross:

1. Introduction

The City of Winnipeg (the City) is planning, or is in the process of constructing, all encompassing upgrades at the North End Water Pollution Control Center (NEWPCC) including Headworks, Ultraviolet (UV) Disinfection, Biosolids, and Nutrient Removal. Many of these processes are being, or will be, constructed offline to simplify construction and to minimize impacts on the existing treatment process.

This Notice of Alteration (NoA) to the NEWPCC Environment Act License No. 2684 RRR describes temporary bypassing of the UV Facility required to complete the UV Facility and Headworks Facility upgrades (i.e., the "Projects").

2. Description of the Projects

The Projects are necessary upgrades to the NEWPCC facility to ensure continued compliance with license requirements and increase capacity. Given that various components of the NEWPCC facility are currently being constructed or upgraded under separate projects, it is crucial to integrate these upgrades into a coordinated sequence to avoid or minimize disruptions.

As shown in **Figure 2-1**, the existing UV Facility and Headworks Facility, and the proposed short access road to the UV Facility, are located on previously disturbed 'brownfield' lands.

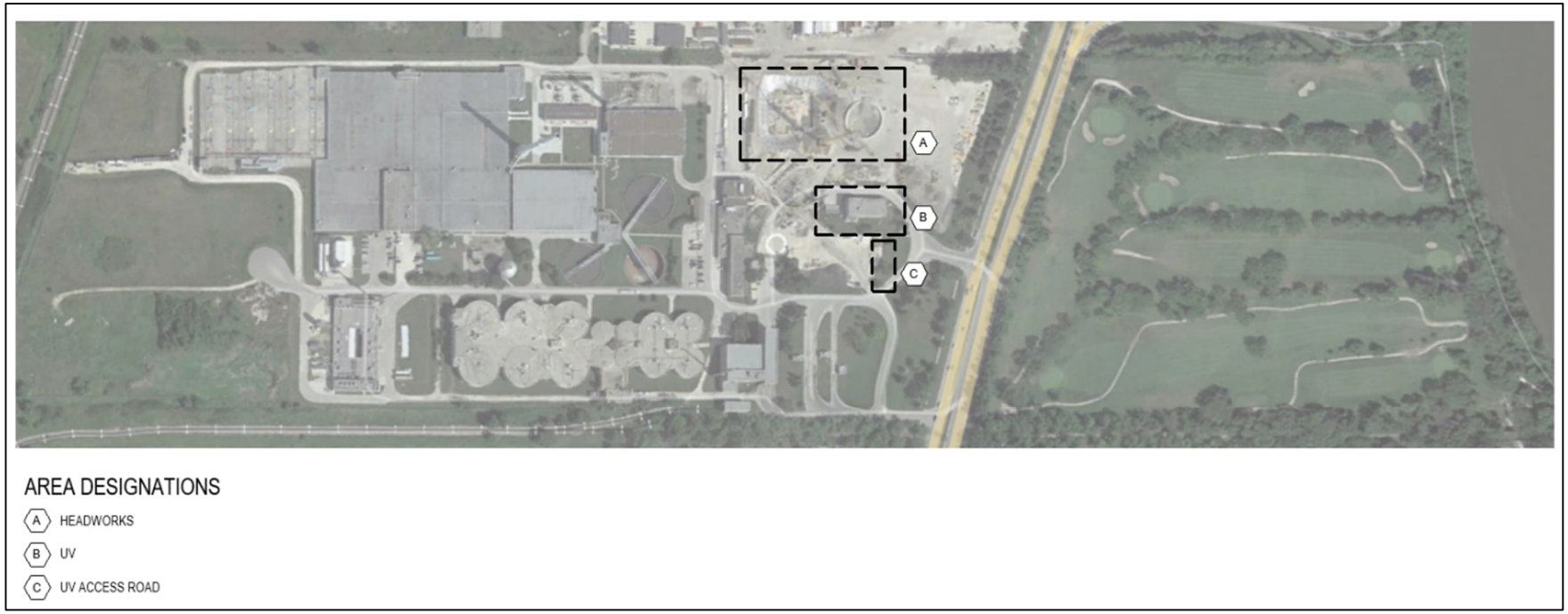

Figure 2-1: Location of Headworks and UV Projects

2.1 UV Facility Upgrade

The existing UV disinfection equipment no longer has manufacturer support and maintenance of the equipment has become increasingly difficult as some replacement parts cannot be readily ordered. Replacement of the existing UV disinfection equipment will result in significant energy savings and will increase treatment capacity. This will prepare the NEWPCC facility to meet 2050 flows.

In May 2024, the City entered into a pre-purchase agreement with Trojan Technologies for a new Trojan UV Signa 6-row system, which will be replacing the existing Trojan UV4000 Plus system. In addition to replacement of the UV system, the City will also:

- Replace the stop log slots on the upstream side of UV channels with automated motorized slide gates to improve the ability to isolate individual channels for future works;
- Replace the existing downstream motorized gates to regulate the channel level and accommodate channel changes;
- Raise the three (3) UV channels for improved system functionality and to improve safety and access by the operators;
- Modify the channels to match the shape and orientation of the new UV equipment;
- Install a pipe / conduit connection to the UV effluent channel to be used as a take-off point for the future Flushing Water Facility;
- Add a new storage room by adding a building with a pile foundation that is 6 m by 11 m onto the east side of the existing UV building;
- Add a new access road approximately 50 m in length to access the storage room;
- Install ventilation fans to improve air quality in the UV building;
- Install a construction access door on the north side of the UV building;
- Remove the existing 600 V and 480 V switchgear and replace them with 600 V and 480 V motor control centres (MCCs); and
- Replace the existing 4160 / 600 V and 4160 / 480 V transformers located on the southwest side of the UV Building.

The first five (5) bullets above are scopes of work that require a dry work area, which means the UV Facility needs to be temporarily bypassed while these works are ongoing.

2.2 Headworks Facility Upgrade

The Headworks Facility is where raw sewage first enters the wastewater treatment system. Its primary role is to prepare the incoming wastewater for subsequent treatment processes. This preparation involves several key functions:

1. **Pump Station:** Pumps the raw wastewater from the deep interceptor sewers and brings it to the surface for treatment. This also includes flow measurement and distribution to the downstream parts of the facility.
2. **Screening:** Large debris like sticks, leaves, and plastics are removed to prevent damage and blockages in downstream equipment.
3. **Grit Removal:** Finer materials such as sand and gravel are separated to reduce wear and tear on pipes and mechanical parts.

By performing these key functions, the Headworks Facility protects sensitive equipment, optimizes the treatment process, and helps maintain regulatory compliance. The existing Headworks Facility is decades old and has much lower removal efficiencies than is required for modern facilities. The existing Headworks Facility will be replaced by a new Headworks Facility equipped with new screens and new grit removal facilities.

The new Headworks Facility is anticipated to start commissioning and testing in late October 2025. To commission the new Headworks Facility, significant volumes of water will be required. The Design Builder is planning on using secondary effluent prior to the UV Facility for commissioning and testing as the water can be extracted by installing a bulkhead in the existing UV influent channel and redirecting flow to a nearby shaft. Effluent that has passed through the UV Facility cannot be used for commissioning and testing due to the effluent chamber location relative to the shaft and hydraulic design of the UV Facility. After commissioning and testing use in the new Headworks Facility, the secondary effluent will be directed to an overflow which is being constructed as part of the Headworks Facilities project. This overflow empties directly into the outfall downstream of the UV Facility. It is not possible to re-direct the secondary effluent used in the new Headworks Facility to the existing NEWPCC facility as it could hydraulically overload the facility which would result in discharging raw wastewater into the Red River.

Commissioning and testing of the new Headworks Facility is anticipated to begin in late October 2025 and be completed by late February 2026. Use of this secondary effluent for the new Headworks Facility would be intermittent for most of the commissioning period, with a short duration (approximately 1 week) of full use. Although the use of the secondary effluent is intermittent, the UV Facility will need to be by-passed for the entire duration of the commissioning and testing. It is not practical to intermittently use the UV Facility during this time as the mechanical setup for this scenario requires significant confined entry work and it is not feasible to rapidly remove and replace the bulkheads providing isolation because of the UV upgrades ongoing at the same time. Once the bulkheads are in place and the secondary effluent bypasses the UV Facility, they will need to stay in place until the new UV system is commissioned. It should be emphasized that this wastewater stream (the secondary effluent) will have gone through full treatment and will meet the Environment Act Licence requirements except for final disinfection.

2.3 UV Bypass Plan

The UV Facility and Headworks Facility upgrades both require a bypass of the UV Facility. In order to minimize the length of the UV Facility bypass, the UV Facility upgrades and testing of the new Headworks Facility will be undertaken concurrently. In this scenario, the Headworks Facility would periodically draw significant volumes of treated wastewater upstream of the UV Facility for its own startup and commissioning concurrent with UV Facility upgrade activities that require a bypass. Treated wastewater (without disinfection) would be diverted from the new Headworks Facility to a new overflow which would then discharge to the outfall downstream of the UV Facility.

A sketch of the proposed UV Facility bypass and facility upgrades is provided in **Figure 2-2**.

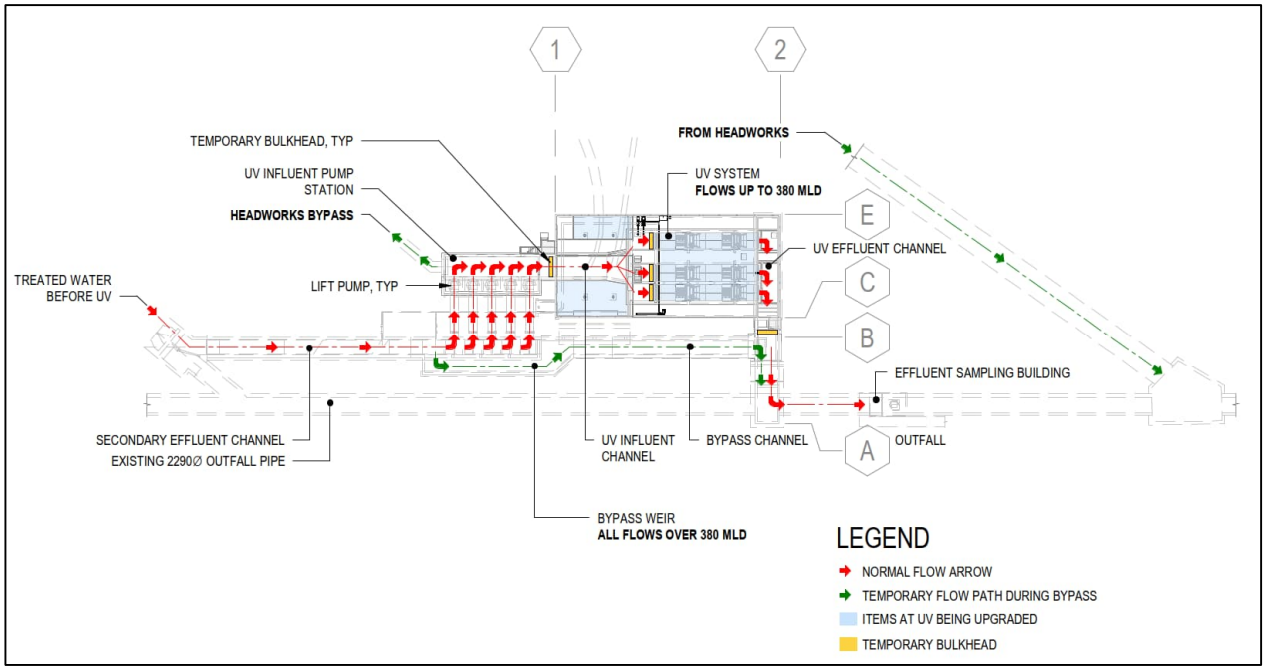

Figure 2-2: UV System with Flow Diversion

3. UV Facility Bypass Options

The following three alternative options were considered for the proposed Project:

- **Option #1**: 4 Month Shutdown
- **Option #2:** 2.5 Month Shutdowns in Two Sequential Years
- **Option #3:** Chlorine Disinfection During Low Flow Bypass

After assessing the three options for the UV Facility bypass, AECOM determined that the preferred option is Option #1. This option provides one month less bypass than Option #2 and avoids under-disinfection for the 2026 summer season. This option also services two projects at the same time and maximizes the amount of work that can be accomplished on the UV Facility upgrade while allowing the Headworks project to meet commissioning objectives. This option is less risky than Option #3, as Option #3 could potentially discharge chlorinated effluent to the river. Please see the following sections for further details on each option.

3.1 Option 1 – 4 Month Shutdown

Option #1 has a single four-month shutdown period of the UV Facility during the low flow period. The proposed UV Facility upgrades will be carried out in three stages as described below if Option #1 is selected.

Stage 1 – Prior to Bypass at the UV Facility (June 2025 – October 2025)

- Install doors on the north and east wall for new storage room access.
- Install pile foundation and 6 m by 11 m concrete floor for the new storage room to the east of the existing building.
- Receive pre-purchased gates, UV systems, transformers and Motor Control Centres (MCCs).
- Install temporary heat and electrical feed.

Stage 2 – Start of Bypass (Late October 2025 – Late February 2026)

- Turn off lift pumps and install bulkheads upstream and downstream of UV to prevent flow from entering the UV facility.
- Install bypass pipe and valve/gate to the Headworks Facility (by Headworks Design Builder).
- Remove upstream stop logs and install new slide gates.
- Remove existing UV equipment and modify all three channels.
- Remove and replace the three downstream gates.
- Install UV equipment in two of the three channels.
- Remove the 600 V and 480 V switchgear and replace with 600 V and 480 V MCCs.
- Install piping for future Flushing Water Facility for future usage.
- Remove and replace at least one of each transformer.
- As needed, turn the lift pumps on to supply secondary effluent to the Headworks Facility.

Stage 3 – Post Bypass (Late February 2026 – September 2026)

- Remove the bulkheads.
- Begin online commissioning.
- Begin operation in the two channels with the new UV equipment installed to meet disinfection requirements.
- Install new UV equipment in third channel as it has new isolation gates (if time allows this will be done during the bypass). Finish commissioning after the third channel is equipped.
- Install second of each transformer.
- Finish construction of the storage building east of the existing UV Facility.
- Install fencing around transformers.
- Construct roadway to new storage room.

With this option, the bypass would occur during low flow months (winter) which minimizes potential impacts to recreational users on the Red River.

3.2 Option 2 – 2.5 Month Shutdowns in Two Sequential Years

Option #2 divides the UV Facility upgrade into two shutdown periods of the UV Facility during the low flow period. The work would be undertaken in two sequential years. The proposed UV Facility upgrades will be carried out in three stages as described below if Option #2 is selected.

Stage 1 – Prior to Bypass at the UV Facility (June 2025 – October 2025)

- Same work undertaken as Option #1.

Stage 2 – First Year Bypass (Late October 2025 – January 2026)

- Turn off lift pumps and install bulkheads upstream and downstream of UV to prevent flow from entering the UV Facility.
- Install bypass pipe and valve/gate to the Headworks Facility (by Headworks Design Builder).
- Install UV inlet and outlet gates.
- Remove the bulkheads:
  - Operate the UV Facility using two channels; and
  - Isolate one channel and replace the UV equipment in that channel. Note, this channel would not be able to be operated until the following year as electrical upgrades are needed before it can be put

into use and the existing and new UV equipment cannot be operated concurrently because of differences in channel hydraulics.

It is anticipated that the Headworks commissioning activities will continue beyond the first-year bypass period, which means the bypass duration will likely extend beyond the 2.5 months (i.e. past January 2026).

Further, when the UV Facility is operated using two channels, the two channels do not have enough capacity to meet the 380 ML/d Environment Act Licence requirement meaning that full disinfection would not be achieved. Full disinfection would not be achieved until the upgrade is completed the following year. When the UV Facility is operated using two channels, the estimated capacity is 250 ML/d, which is often exceeded during peak daily flows and at times during mild precipitation. Flows in excess of the 250 ML/d would need to be bypassed, which could occur daily during the summer months.

Stage 3 – Second Year Bypass (November 2026 – January 2027)

- Shutdown the UV Facility to:
  - remove the 600 V and 480 V switchgear and replace with 600 V and 480 V MCCs;
  - remove and replace at least one of each transformer;
  - finalize the installation of the new UV equipment put in place the previous year.
- Operate the UV Facility using the one upgraded channel:
  - Upgrade the UV equipment in the remaining two channels:
    - Note, the two channels being upgraded would no longer be able to operate until the upgrades are complete because of the electrical equipment upgrades that have taken place (i.e. the existing and new UV equipment cannot be operated concurrently).

While the UV Facility is operated using one channel, it is unlikely to provide full disinfection capacity, even though this work is being performed during the low flow season. A single channel would provide approximately 235 ML/d capacity.

As soon as the second channel is completed, it would be commissioned while the third channel would be kept offline. Once the second channel is in operation, it is expected that operation of both channels would provide sufficient capacity to treat all flows through the UV Facility. The new UV equipment would then be installed in the third channel and the new system fully commissioned.

The disadvantages of Option #2 include:

- Shorter individual shutdowns compared to Option #1 (Section 3.1), but an extended total shutdown period over two years. There is also potential the first shutdown would need to be extended beyond the 2.5 months to accommodate commissioning and testing for the Headworks Facility.
- After the first shutdown, UV disinfection would be impaired for any flow over 250 ML/d due to the loss of a channel for approximately twelve months including the entirety of the summer of 2026. This increases the risk to the health of recreational users on the Red River.
- The intermittent nature of the work would be expected to increase costs by an additional $1 million for labor and temporary services.
- The extended operation period of the outdated UV system increases the risk of equipment failure or maintenance issues.

3.3 Option 3 – Chlorine Disinfection During Low Flow Bypass

Option #3, like Option #1, has a single four-month shutdown period of the UV Facility during the low flow period. However, an alternate disinfection is included prior to discharge to the Red River. The proposed UV Facility upgrades will be carried out in the same three stages as described in Option #1.

This option considers adding an alternate disinfectant technology, such as a sodium hypochlorite (chlorine), to the secondary effluent stream followed by the addition of a de-chlorination chemical such as sodium thiosulfate to quench the chlorine residual prior to discharge to the Red River. This option would eliminate undisinfected bypasses and would provide greater flexibility in terms of work scheduling.

The following factors were considered in the evaluation of the use of alternate disinfection:

- Available dosing locations and mixing capacity;
- Contact time based on sodium hypochlorite dosing location and sodium thiosulfate dosing location;
- Dose required to achieve a 2.5 log reduction in Fecal Coliforms and *E.Coli*;
- Dosing equipment required;
- Chemical storage infrastructure required; and
- Operational impacts to plant staff.

Based on the configuration of the NEWPCC facility, a temporary chlorine facility would need to be installed in the secondary clarifier area as shown in **Figure 3-1** (sodium hypochlorite feed location). This is the location where the effluent is collected from the secondary clarifiers. The chlorine facility would need to be heated and located outdoors, with chemical feed inside the NEWPCC facility.

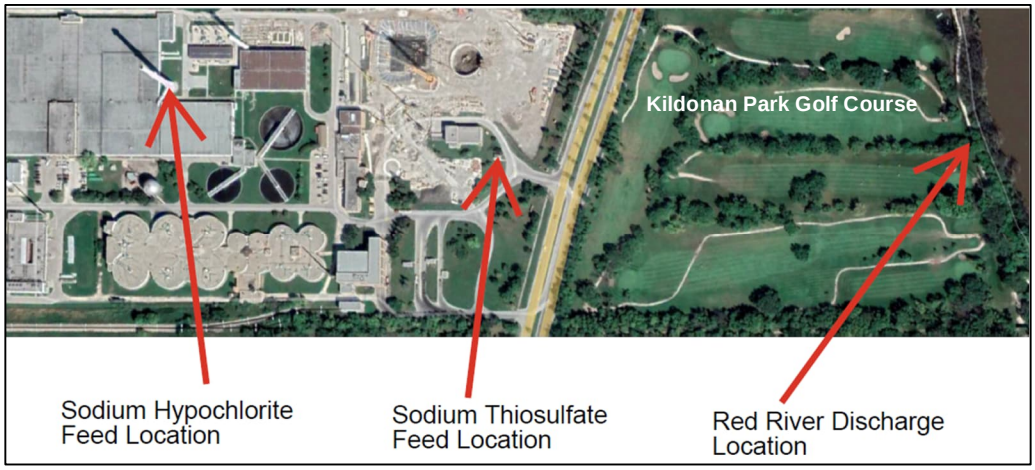

Figure 3-1: UV System with Flow Diversion

Residence time within conduits at the NEWPCC were calculated below for average dry weather flow:

- 11 minutes from secondaries to UV.
- 10 minutes from UV to Red River.
- 21 minutes total from secondaries to the Red River.

The preferred chlorination contact time for adequate disinfection is a minimum of 20 minutes. To achieve this, the sodium thiosulfate used for quenching the chlorine would need to be installed at the Kildonan Park Golf Course, immediately prior to discharge to the Red River. This is not feasible as access to the golf course is poor and

complete sodium thiosulfate consumption cannot be verified prior to discharge to the river. Discharging unconsumed chlorine or thiosulfate into the Red River needs to be avoided by monitoring and adjusting dosage rates. As such, the quenching dosing point would have to be moved back to the Effluent Sampling Building immediately downstream of the UV Facility, thus diminishing the contact time.

If chlorination was used, it would be added at the secondary clarifier effluent conduits and quenched 11 minutes later at the Effluent Sampling Building. Follow-up testing and monitoring would still need to be completed through a manhole on the golf course adjacent to the Red River on a daily basis. A temporary building, with access and snow clearing, would need to be maintained on the golf course while alternate disinfection occurred.

The alternate disinfection would require:

- Installation and operation of a sodium hypochlorite storage and feed facility;
- Installation and operation of a sodium thiosulfate storage and feed facility;
- Online temporary monitoring and controls;
- An Operator to check residual chlorine and thiosulfate concentrations at the golf course on a daily basis;
- Approximately 1 full truckload of 13% sodium hypochlorite used daily;
- Approximately 1.5 tonnes of sodium thiosulfate used daily;
- At least one additional operator to operate facilities.

The cost of such a system has been estimated below:

- Chlorine Feed Facility:
  - Structure - $1 Million
  - Chemical storage, containment and feed - $1 Million
- Daily Cost:
  - $20,000 -15% sodium hypochlorite - 15,000 litres
  - $15,000 - Granular sodium hypochlorite 1.5 tonnes
  - $1,000 - Daily temporary heating, water supply and ventilation
  - $36,000/day operating cost
- Sodium Thiosulfate Feed Facility:
  - Structure - $1 Million
  - Chemical dilution, mixing and controls - $1 Million
- Total Cost for 4 Months of Temporary Chemical Disinfection:
  - $4 Million Capital
  - $4.3 Million Operating Cost (120 days x $36,000)
  - $8.3 Million plus 1.5 full time operators

The disadvantages of Option #3 include:

- Ineffective disinfection over the period of use. This option would not meet disinfection requirements of the Environment Act Licence, aside from during some low flow periods at night, due to the short contact time.
- High likelihood of inadvertently discharging chlorinated water to the Red River. Manual samples would be collected to verify the absence of chlorine residuals; however, there is potential for several hours to pass between sampling intervals.
- High capital and operational costs for a solution that does not adequately meet disinfection requirements.
- Added operational risk in running a remote facility.

AECOM determined that the alternative disinfection option would likely not be effective for disinfection, has a higher risk to the environment, and is not recommended.

4. Contingency Works

In order to mitigate potential schedule risks that may extend the bypass timeline, a number of contingency measures are being undertaken including:

- Advance purchase of the UV equipment, MCCs, gates and transformers.
- Monitoring of the Headworks project and schedule to confirm schedule alignment with the UV Upgrade project.
- Inclusion of financial penalties (liquidated damages) in the UV Upgrade tender if the 4-month shutdown window is not met.
- Inclusion of clauses in the UV Upgrade tender indicating that double shift work may be required to meet deadlines.

The NEWPCC is capable of bypassing wet weather flows around UV should the bypass duration be extended; however, with the steps taken above, this outcome is not anticipated.

If the UV contractor is not meeting the construction schedule, modifications to the construction plan will be proposed such as focusing on completing a single channel and electrical upgrades to resume partial treatment.

5. Environmental Assessment

AECOM evaluated the potential environmental impacts to the surrounding environment that could potentially occur from the construction and operation of the Projects and the selected construction option. The selected option will limit the potential impacts to recreational users on the Red River during open water season and the environment by not discharging chlorinated effluent. In addition, any additional increase to the existing footprint of the UV Facility, will occur on previously disturbed and maintained (mowed) land on the NEWPCC property.

Mitigation measures for the selected option include:

- Minimizing the period of impact by selecting the shortest duration for bypass of the UV Facility.
- Conducting work during low flow periods when recreational use of the Red River is low.
- Continuing to adhere to the requirements of Environment Act License No.2684 RRR (aside from disinfection).

Monitoring and follow-up will include:

- All UV Facility upgrade works will have a 1-year warranty and will be monitored throughout to make sure there are no performance issues, leaks, mechanical failure, or other unknown issues.
- Ongoing wastewater monitoring (sampling and testing) for the effluent in the outfall at the Red River for the NEWPCC facility.
    - The existing effluent sampling building downstream of the UV Facility will remain in operation.
    - The City will continue to post monthly wastewater treatment compliance reports on their public website[1].

Option #1 will complete the bypass during low flow months, limit any potential impacts to the Red River and any recreational users. With the application of the above mitigation measures, monitoring, and follow-up, the work is not expected to result in significant adverse environmental impacts.

[1] *City of Winnipeg Wastewater Treatment Compliance Reports accessible at:* https://legacy.winnipeg.ca/waterandwaste/sewage/compliance.stm

6. Summary

With the substantial upgrades occurring at the NEWPCC facility, including the upgrades at the UV Facility and Headworks Facility, it is important to coordinate construction, commissioning, and shutdowns wherever possible. The preferred construction option is a single four-month shutdown (late October 2025 to late February 2026), which minimizes the duration of the bypass period and has the least risk to the environment. This proposed option also minimizes the risk of operating the existing UV system into the future, when replacement parts are difficult to obtain. Bypassing once during winter minimizes downstream impacts and eliminates the occurrence of reduced disinfection during the open water high flow period of Summer 2026. In addition, this would reduce the potential health risks to recreational users on the Red River.

Based on the selected construction alternative, and application of the mitigation measures, monitoring and follow-up described in Section 5, the Projects are not expected to result in significant adverse environmental impacts.

7. Closure

If you have any questions regarding this NoA, please contact the undersigned.

Sincerely,
AECOM Canada ULC

Prepared by:

[redacted]iina Cusitar, BA, CET, EP(SAR)
Environmental Planner
kristiina.cusitar@aecom.com

Reviewed By:

[redacted]
Paul Barsalou, P.Eng.
Project Manager
paul.barsalou@aecom.com

KC:PB:ag

Water and Waste
Eaux et déchets

Manitoba Environment and Climate
Environmental Stewardship Division
Environmental Approvals Branch
Box 35, 14 Fultz Boulevard
Winnipeg, MB R3Y 0L6

January 31, 2025

Dear Ms. Barsha Sagan,

RE: Notice of Alteration – Environment Act Licence No. 2684 RRR: City of Winnipeg North End Sewage Treatment Plant (NEWPCC) UV Facility and Headworks Facility Upgrades

Please see attached for responses to your January 23, 2025 information request regarding the Notice of Alteration application for the NEWPCC Environment Act licence No. 2684 RRR for the temporary bypass of the Ultraviolet Light (UV) Facility at the NEWPCC.

As described in the attached, the City is requesting the temporary suspension of licence clauses for fecal coliform and E.Coli content over a 17 week period (approximate) from late October 2025 to late February 2026 for the construction of the UV upgrades and testing and commissioning of the new Headworks facility. Potential environmental and human health impacts during this period are not anticipated due to the low potential for exposure, absence of surface water withdrawals for drinking water purposes, and low residual concentrations of fecal coliform and E.coli content after discharge to the environment.

If there are further information requests or if clarification is required, please feel free to contact me at lmccusker@winnipeg.ca or 204-330-1459.

Sincerely,

[redacted]

Linda McCusker, P.Eng.
Winnipeg Sewage Treatment Program Project Director

Attachment
c:
S. Burland Ross, MB Environment and Climate Change (email)
C. Carroll, P.Eng., Water and Waste Department (email)
T. Josephson, Water and Waste Department (email)
C. Wiebe, Water and Waste Department (email)
L. McCusker, Water and Waste Department (email)
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A. Weiss, Water and Waste Department (email)
I. Griffin, AECOM (email)
P. Barsalou, AECOM (email)
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Barsha Sagan, M.A.Sc., P.Eng.
A/Senior Engineer
Industrial & Wastewater Section
Environmental Approvals Branch
Manitoba Environment and Climate Change
14 Fultz Boulevard
Winnipeg, MB R3Y 0L6

January 31, 2025

Project #
60711772

Subject: City of Winnipeg North End Water Pollution Control Center (NEWPCC) UV Facility and Headworks Facility Upgrades - Additional Information Request Responses

Dear Ms. Sagan:

On behalf of the City of Winnipeg (the City), enclosed are responses to the additional information request received on January 23, 2025, regarding the Notice of Alteration (NoA) application for the North End Water Pollution Control Center (NEWPCC) Environment Act License No. 2684 RRR for the temporary bypass of the Ultraviolet Light (UV) Facility for the UV Facility and Headworks Facility upgrades (the “Project”).

If you have any questions regarding the proposed Project, please contact me at your earliest convenience.

Sincerely,
AECOM Canada ULC

[redacted]

Paul Barsalou, M.Sc., P.Eng.
Project Manager
Paul.Barsalou@aecom.com

PB:ag
Encl.

City of Winnipeg North End Water Pollution Control Center (NEWPCC)
Notice of Alteration to Environment Act License No. 2684 RRR
UV Facility and Headworks Facility Upgrades
Additional Information Request Responses

1. **Please clearly state the project duration when the North End Water Sewage Treatment Plant (NEWPCC) will not meet licence requirements for the fecal coliform and E.coli content for allowing the construction of the UV upgrades and testing and commissioning of the new Headworks Facility.**

   The proposed period where the NEWPCC is not anticipated to meet the Licence requirements for fecal coliform and E.coli content is from late October 2025 to late February 2026 (or approximately 17 weeks). During this period, construction of the UV upgrades and testing and commissioning of the new Headworks Facility will occur.

2. **Please specify your request to temporarily suspend clause 26 (c) (d) (i.e., the fecal coliform content and E.coli content) of the Licence to discharge partially treated effluent from the North End Water Sewage Treatment Plant (NEWPCC).**

   The City is requesting to temporarily suspend clause 26 (c) and (d) of Environment Act Licence No. 2684 RRR to allow the discharge of partially treated effluent from the NEWPCC.

3. **Please elaborate on the potential impacts of the partially treated effluent on the environment and human health, such as the potential risks during ice fishing.**

   The following potential effects on the environment and human health have been identified during the 17 week (approximate) required bypass:

   - Potential environmental effects on downstream recreational users of the Red River (i.e. fishing, ice fishing).
     - Potential exposure to harmful pathogens during recreational activities.
     - Potential waterborne illnesses / health issues if water is consumed.
   - Potential environmental effects on water quality.
     - Potential impacts on drinking water users. No surface water withdrawls from the Red River were identified downstream of the effluent discharge location. As such, this impact is not anticipated.

   Considering the response to Question 4, significant impacts on the environment and human health are not anticipated.

4. **Please identify any mitigation options for potential environmental and human health impacts.**

   The key mitigation measure to avoid or minimize effects on the environment and human health relates to the selected construction window (i.e., late October 2025 to late February 2026). During this period, recreational use on the Red River is low compared to summer months which limits public exposure to partly treated effluent in the Red River. Additionally, the effluent discharge area is not known to be a common ice fishing location on the Red River as compared to north of the Lockport Dam to Lake Winnipeg[1]. Additionally, the effluent discharge area on the Red River is not easily accessible for ice fishing (i.e.; cannot drive up to the river to offload ice fishing gear).

[1] *The Red River of the North: The Ice Fishing Guide. Accessed at: https://fishingprairieandshield.com/?p=2218*

Dilution of partly treated effluent in the Red River at the discharge location also minimizes the potential adverse effects on the environment and human health as detailed in the following paragraphs.

The approximate average flow of the Red River (134.5 m^3/s) is significantly higher than the flow from NEWPCC (1.55 m^3/s) which results in a dilution factor of approximately 87:1 (1.15% of the total flow). This dilution factor will significantly reduce the overall E.coli and fecal coliform concentrations as detailed in the notes below.

Notes*:*

When the UV treatment is not operational, E.coli and fecal coliforms regularly exceed the laboratory testing limits of 24,000/100 mL. As such, for calculation purposes, it was assumed that the E.coli and fecal coliforms concentration levels to be in the 50,000/100 mL range during the bypass. Considering a dilution factor of 87:1, the resultant E.coli and fecal coliforms concentrations during the temporary bypass of the UV facility are estimated to be 575 MPN/100 mL

Estimate Calculation: *50,000/100 mL x 1.15% = 575 MPN/100 mL*

The above calculations are conservative and based on flows near the NEWPCC outfall location. When UV disinfection is occurring, E.coli and fecal coliforms are typically less than 100 MPN/100 mL.

The gauge data that was used for the approximate flow rate is from the James Avenue Pumping Station location[2] and is approximately 9 km upstream of the discharge location.

[2] Government of Canda, Environment and Natural Resources. Accessed at: Daily Water Level Graph for RED RIVER AT JAMES AVENUE PUMPING STATION (05OJ015) [MB] - Water Level and Flow - Environment Canada

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March 6, 2025

Project #
60711772

Subject: City of Winnipeg North End Water Pollution Control Center (NEWPCC) UV Facility and Headworks Facility Upgrades - Additional Information Request Responses 2

Dear Ms. Sagan:

On behalf of the City of Winnipeg (the City), enclosed are responses to the additional information request received on February 20, 2025, regarding the Notice of Alteration (NoA) application for the North End Water Pollution Control Center (NEWPCC) Environment Act License No. 2684 RRR for the temporary bypass of the Ultraviolet Light (UV) Facility for the UV Facility and Headworks Facility upgrades (the “Project”).

If you have any questions regarding the proposed Project, please contact me at your earliest convenience.

Sincerely,
AECOM Canada ULC

[redacted]

Paul Barsalou, M.Sc., P.Eng.
Project Manager
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PB:ag
Encl.

City of Winnipeg North End Water Pollution Control Center (NEWPCC)
Notice of Alteration to Environment Act License No. 2684 RRR
UV Facility and Headworks Facility Upgrades
Additional Information Request Responses 2

1. **On pdf page 7 of the NOA, that Option #1 avoids under-disinfection for the 2026 summer season. Further, on pdf page 12 of the NOA, 'Option 1 will complete the bypass during low flow months, limit any potential impacts to the Red River and any recreational users.' Yet on page 7 and 8 of the NOA, describes Option #1 extending from June 2025 to September 2026 which does overlap with the summer season.**
   Stage 1 (June 2025 – October 2025),
   Stage 2 (late October 2025 – Late February 2026), and
   Stage 3 (Late February 2026 – September 2026).

   Please clarify Option #1 planned timing: at what stage(s) and in what months does the planned four (4) month window of non-UV disinfect window in Option #1 begin and end?

   The proposed upgrade for Option #1 will be carried out in three stages.

   - Stage 1 (June 2025 – October 2025) construction works will be completed **without** the requirement of a by-pass of the UV Facility.
   - Stage 2 (late October 2025 – Late February 2026) construction works will be completed with the requirement of a by-pass of the UV Facility.
   - Stage 3 (Late February 2026 – September 2026) construction works will be completed **without** the requirement of a by-pass of the UV Facility.

2. **As per your estimates, the <u>E.coli</u> concentration will be 575 MPN/100 mL downstream of the mixing zone during the four month UV shut down. Where the 575 MPN/100 mL estimate is based on <u>E.coli</u> results not analyzed to end point, the 575 MPN/100 mL estimate could be low. Prior to implementation the UV treatment at the North End Pollution Control Facility (~2005), you may have useful bacteria data for this estimate. Can you provide an estimate of the <u>E.coli</u> in the Red River based on treated effluent samples (n=40) collected upstream of UV treatment where the E.coli analysis is run to endpoint (contrast: upper limited to 24,000/100 mL)? And again, provide an anticipated concentration of <u>E.coli</u> at the North Perimeter Bridge during the UV shut down based on this data?**

   The following sections detail how the NEWPCC E.Coli Contributions were calculated. Please see below for formulas and details.

   NEWPCC E.Coli Contribution (MPN/100 mL) = NEWPCC Effluent E.Coli Concentration (MPN/100 mL) x Dilution Factor

   Where:

   Dilution Factor = NEWPCC Effluent Flow (m^3/s) ÷ Red River Flow at NEWPCC (m^3/s)

   In order to calculate the NEWPCC E.Coli Contribution, estimates for NEWPCC Effluent E.Coli Concentration, NEWPCC Effluent Flow, and Red River Flow was determined as described below.

NEWPCC Effluent E.Coli Concentration

The UV disinfection system at the NEWPCC came online in 2006 and began commissioning in August 2006. E.Coli data prior to the UV facility coming online was available between January 1, 2006 and July 31, 2006. The average E.Coli concentration in the final effluent during this period was calculated to be 71,400 MPN/100 mL. However, this is likely an over-estimate of the E.Coli concentration as levels are higher during warmer months.

In order to get a more accurate estimate, E.coli data from January 1, 2006 to February 28, 2006 was used to better match the planned shutdown period. The average E.coli concentration in the final effluent during this more representative period was calculated to be 46,500 MPN/100 mL.

NEWPCC Effluent Flow

Historical plant data from 2017 to 2023 was reviewed to calculate the estimated average effluent flow rate. Utilizing data during the same period as the proposed shutdown (late October to late February), the average NEWPCC effluent flow rate was found to be 133.8 ML/d or 1.55 m^3/s.

Red River Flow

The approximate flow rate for the Red River was calculated using gauge data from the James Avenue Pumping Station location[1] which is located approximately 9 km upstream of the NEWPCC discharge location. The average flows from 1971 to 2023 for the same period as the proposed shutdown (late October to late February) are shown below.

Table 1: Red River Flows at James Avenue Pumping Station from 1971 to 2023 (m^3/s)

	Jan	Feb	Oct	Nov	Dec
Average Flow (m^3/s)	142.49	138.76	369.34	164.73	148.63

Note that the October flows may be overestimated due to backwater from St. Andrews which affects the water level measurement. In order to not overestimate the dilution factor, flows from October were excluded from the calculation. The resultant average flow of the Red River was calculated to be 148.65 m^3/s. Please note, this is higher than the 134.5 m^3/s reported previously as there was a tabulation error.

Dilution Factor

The Dilution Factor is calculated below:

Dilution Factor = NEWPCC Effluent Flow (m^3/s) ÷ Red River Flow at NEWPCC (m^3/s)

= 1.55 m^3/s ÷ 148.65 m^3/s = 0.0104

[1] Government of Canda, Environment and Natural Resources. Accessed at: Daily Water Level Graph for RED RIVER AT JAMES AVENUE PUMPING STATION (05OJ015) [MB] - Water Level and Flow - Environment Canada

NEWPCC E.Coli Contribution

NEWPCC E.Coli Contribution (MPN/100 mL) = NEWPCC Effluent E.Coli Concentration (MPN/100 mL) x Dilution Factor

= 46,500 MPN/100 mL x 0.0104

= 483.6 MPN/100 mL

Estimated E.Coli Concentration at North Perimeter Bridge

Considering the bypass period from late October 2025 to late February 2026, the average flow of the Red River of approximately 148.65 m^3/s is anticipated to be similar at the North Perimeter Bridge approximately 1 km downstream of the NEWPCC outlet. Due to the short distance from the outlet to the bridge, it is anticipated that the E.coli concentration at the North Perimeter Bridge would be similar to the updated estimated concentration of 483.6 MPN/100 mL. This concentration represents additions from the NEWPCC discharge and does not take into account background counts in the Red River.

Historical E.Coli data was available from 2007 to 2024 at the North Perimeter Bridge. Data from October and November was examined to determine typical background concentrations of E.Coli in the Red River. Note that no data was available for December, January, or February as the data was only collected during open water conditions. Of the 55 data points, over 90% had E.Coli concentrations below 1000 MPN/100 mL, over 85% had E.Coli concentrations below 500 MPN/100 mL, and over 30% had E.Coli concentrations below 100 MPN/100 mL.

3. Can you add-in design features now, that mitigate and minimize the environmental impacts of future disinfection upgrades?

In order to minimize the environmental impacts of future disinfection upgrades, design features are being incorporated into this UV upgrade. The upgraded UV system will have the capacity to treat projected year 2050 average day flows with one of the three channels out of service. In addition, as part of the upgrade, isolation gates will be installed for each channel allowing a channel to be taken out of service for extended periods. Therefore, future upgrades can be undertaken in a phased approach by isolating a channel while keeping the other two channels in service. This should prevent the need to by-pass the UV facility in future UV upgrades.

In the current UV system, the channels can only be isolated using stop logs. This allows for some maintenance but does not allow for long term shutdowns or upgrades.