Manitoba Hydro

2019 05 15

Director
Environmental Approvals Branch
Manitoba Sustainable Development
1007 Century Street
Winnipeg Manitoba R3H 0W4

Dear Director, Environment Approvals Branch:

ATTN: Bruce Webb, Water Development and Control Assessment Officer

RE: ENVIRONMENT ACT PROPOSAL SUBMISSION TO OBTAIN A MANITOBA ENVIRONMENT ACT LICENSE FOR THE GRAND RAPIDS FISH HATCHERY UPGRADE AND EXPANSION PROJECT

Enclosed are 2 hard copies and one electronic copy of the Environment Act Proposal Application, report and form related to the construction and operation of the Grand Rapids Fish Hatchery Upgrade and Expansion Project. The $1,000 application fee has also been enclosed, as per the Environment Act Fees Regulation for a Class 1 Development.

We appreciate your review of the enclosed information and look forward to obtaining a Manitoba Environment Act License for the Grand Rapids Fish Hatchery in the near future.

Yours truly,

Stephanie Backhouse
Environmental Licensing and Protection
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Winnipeg, Manitoba R3C 0G8

ENVIRONMENT ACT PROPOSAL APPLICATION for the GRAND RAPIDS HATCHERY UPGRADE AND EXPANSION

Prepared by Manitoba Hydro

Environmental Licensing and Protection Department

Power Planning Division

14 May 2019

Manitoba Hydro

EXECUTIVE SUMMARY

This Environment Act Proposal and report has been prepared pursuant to *The Environment Act* to obtain a Class 1 Environment Act Licence for the upgrade and expansion, and subsequent operation, of the Grand Rapids Fish Hatchery (GRFH) located in Grand Rapids, Manitoba. A complete, signed copy of the Manitoba *Environment Act* Proposal Form is included in Appendix 1 of this report. This document was prepared following the provincial *Environment Act* Proposal report Guidelines, and includes a description of the proposed construction, predicted environmental effects, mitigation techniques and any monitoring and follow-up required.

Manitoba Hydro is revising the current operations of the GRFH, with the goal of upgrading infrastructure and improving biosecurity protocols. This is necessary to meet increased production needs required to support conservation stocking programs in Northern Manitoba, as well as achieve a standard of fish production that meets national and provincial regulations. The project includes the design, procurement, construction and commissioning of upgrades and expansion items, as well as the long-term operation of the GRFH. The work will be sequenced such that modified hatchery operation can continue throughout the project.

An assessment of the potential environmental effects of the project during construction and operation was carried out. Potential environmental effects were identified by superimposing project elements onto existing conditions and applying standard mitigation measures. With the proposed mitigation implemented, it is predicted that residual environmental effects occurring as a result of this project will not be measurable. Monitoring and follow up will be used to verify these predictions.

A draft Environmental Protection Plan for this project is included as an appendix.

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1.0 INTRODUCTION

Manitoba Hydro prepared this *Environment Act* Proposal (EAP) report to obtain a Class 1 Development Licence under *The Environment Act* (Manitoba), for an upgrade and expansion to the Grand Rapids Fish Hatchery (GRFH), located in Grand Rapids, MB. This document was prepared following the provincial *Environment Act* Proposal Report Guidelines, and includes a description of the proposed construction, predicted environmental effects, mitigation techniques and any monitoring and follow-up required.

1.1 BACKGROUND INFORMATION

Manitoba Hydro is revising the current operations of the GRFH, with the goal of upgrading infrastructure and improving biosecurity protocols. This is necessary to meet increased production requirements and achieve a standard of fish production required to meet national and provincial regulations (section 1.1.2.3).

The GRFH is located in Grand Rapids, Manitoba (Figures 1 and 2). Constructed in 1973 by the Province of Manitoba to support their fish stocking efforts (e.g., sport fishery, conservation, etc.), the building was originally configured for production of Walleye, Lake Whitefish and a variety of trout species. From 1989 – 2007, Manitoba Hydro entered into a series of funding agreements (1 to 3 year terms) with what is now Manitoba Sustainable Development (Fisheries Branch) to produce fish at the hatchery for Manitoba Hydro's mitigation and community relations program. For over 20 years, the GRFH produced trout fingerlings/yearlings and Walleye fry for the province of Manitoba, as well as Lake Sturgeon fingerlings and yearlings, Walleye fry, and Lake Whitefish fry for Manitoba Hydro. In 1994, the GRFH began producing Lake Sturgeon for the Nelson River Sturgeon Board (NRSB) to support efforts to conserve upper Nelson River populations. Manitoba Hydro purchased the GRFH (including the lands, buildings, and related equipment) from the Province of Manitoba in 2007, and operated the facility in partnership with Manitoba Sustainable Development (Fisheries Branch) through a Joint Management Committee. At the end of 2012, Manitoba Hydro assumed full operation of the hatchery, employing seven permanent and two seasonal staff.

Since 2012, the GRFH has focused its production efforts exclusively on Lake Sturgeon and Walleye. In addition to producing Lake Sturgeon for the NRSB, the GRFH began producing Lake Sturgeon for the Keeyask Project in 2013. Currently the hatchery produces/holds Lake Sturgeon fingerlings and yearlings annually, small numbers of older sturgeon for research and education purposes, and Walleye fry each spring. There are no broodstock held at the hatchery long-term. All production and stocking activities are conducted under the terms of Live Fish Handling Permits issued to Manitoba Hydro annually by Manitoba Sustainable Development.

The first phase of the GRFH upgrades (capital investment of $2.9M to repair building infrastructure and extend the useful life of the facility) was completed in late 2015. In March 2014, a facility assessment was completed through a contract with HDR Inc. (an environmental engineering firm with expertise in hatchery design) which concluded the existing infrastructure could not meet projected Lake Sturgeon production commitments. Upgrades are also necessary to reach national and provincial biosecurity standards (see section 1.1.2.3). Planning for infrastructure upgrades and expansion of the GRFH began at the end of 2014.

The shift in target species at the GRFH, from supporting sport fisheries across the province to supporting conservation stocking programs in northern Manitoba, necessitates a functional upgrade of the facility to better maximize its potential for Lake Sturgeon production. Manitoba Hydro currently produces Lake Sturgeon fingerlings and yearlings for the NRSB and as mitigation for the Keeyask Project (a minimum 25 year commitment). With the current infrastructure, the GRFH is unable to meet required Keeyask production targets, or support the NRSB stocking program on the upper Nelson River. Since the hatchery's construction in 1973, water and aquaculture effluent treatment technology has improved and the associated regulations with each have become more stringent. Biosecurity best practices and regulations have also become stricter. Upgrades to most of the infrastructure and treatment processes currently used at the GRFH are necessary in order to meet regulatory requirements, facilitate best management practices for conservation stocking programs and maximize efficiency in the hatchery.

1.1.1 EXISTING SYSTEM

The existing infrastructure at the GRFH includes three 140-jar hatching batteries for egg incubation and 18 grey fiberglass-rearing troughs (4.6 m x 0.55 m x 0.25 m) (Figure 3). Total usable rearing area is approximately 50 m^2. The grey troughs were originally configured to permit the use of both well water and surface water (Saskatchewan River). However, current operations are restricted to well water use only, due to the potential threat of pathogens within the surface water. Large concrete floor tanks, originally used for fish production, now serve as water reservoirs in a simple sump pump operated water re-circulation system. Water temperature is managed using ambient room temperature and submersible water heaters. Outdoor tanks (six raceways and 10 circular tanks) serviced by well and surface water are used to temporarily hold Walleye brood stock (Saskatchewan River origin) and older Lake Sturgeon (long-term residents), as well as for interim holding of Lake Sturgeon yearlings (well water) prior to being stocked out in the spring.

1.1.2 REGULATORY PROCESS

1.1.2.1 *THE ENVIRONMENT ACT*

The Environmental Assessment and licensing of projects in Manitoba is legislated under *The Environment Act* (the Act) and its subsequent regulations and guidelines. *The Act* is administered by Manitoba Sustainable Development. Under the Act *Classes of Development Regulation* (Regulation 164/88), there are three Classes of Developments; Class I, Class II, and, Class III. These classes range from least disruptive (Class I; primarily the discharge of pollutants) to most disruptive (Class III, effects of which are of such a magnitude or which generate such a number of environmental issues that it is as an exceptional project). Based on the nature of the Hatchery upgrades and expansion required, the water use scheme proposed (re-circulating), the water treatment methodologies employed, and discussion with Manitoba Sustainable Development, the proposed development is classified as a Class 1 development (Government of Manitoba 1988).

1.1.2.1.1 Manitoba Conservation System Operator Regulations

Manitoba Sustainable Development, under the *Water and Wastewater Facility Operators Regulation* (WWFOR), distinguishes between water distribution facilities, water treatment facilities, wastewater collection facilities and the wastewater treatment facilities, and classifies each independently. The aquaculture process water and effluent treatment methodologies proposed for the hatchery was described to the Environmental Approvals Branch of Manitoba Sustainable Development, which confirmed there is no requirement for the aquaculture effluent system to be classified or for Manitoba Hydro to retain an operator under this regulation.

1.1.2.2 *DRINKING WATER SAFETY* ACT

Manitoba Sustainable Development, under The *Drinking Water Safety Act* (2002), oversees that drinking water supplied to the public is safe. The scope of this project pertaining to this *Act* includes new water service line extensions off a pre-existing municipal potable water line that serves a fire hydrant on the hatchery property. Upon review of the proposed changes to the potable water distribution lines, and learning the potable water is supplied by the Town of Grand Rapids with no requirement for a new service connection to the Town's watermain, the Office of Drinking Water confirmed that no additional permits under the *Drinking Water Safety Act* are required.

1.1.2.3 OPERATIONS AND BIOSECURITY

Ongoing operations and Biosecurity requirements at the hatchery are governed by provincial and federal permits and regulations. Manitoba Sustainable Development issues Live Fish Handling Permits to Manitoba Hydro on an annual basis that are guided by National Standards outlined within the Canadian Food and Inspection Agency's Program for Compartment Recognition. GRFH also reports on chemical use to the federal Department of Fisheries and Oceans under the *Aquaculture Activities Regulations* (section 16) of the federal *Fisheries Act* on an annual basis.

2.0 DESCRIPTION OF PROPOSED DEVELOPMENT

2.1 CERTIFICATE OF TITLE/PROJECT LOCATION

The GRFH is located at 3 McKay Avenue, Grand Rapids (Figure 2). The legal land description is Northwest ¼ Section 22, Township 48 in Range 13 West of the Principle Meridian in Manitoba. All work associated with the project will be done within the current footprint of the hatchery grounds (Figure 4).

Detailed Land Description is:

- Lot I Plan 883 PLTO (NDiv) excluding area taken for Parcel A Plan 7185, more particularly described on Certificate of Title #2274569;
- Parcels 4 & 5 Plan 5442 PLTO (N Div), more particularly described on Certificate of Titles 2274567 and 22734568, and;
- Parcels B and C Plan 46509 PLTO more particularly described on Certificate of Title 2274564.

2.2 CERTIFICATES, PERMITS AND LEASES

The GRFH currently holds water use permits for both surface water (WRA Licence #2013-175) and ground water (WRA Licence #2012-139). A Provincial Live Fish Handling Permit is obtained annually from Manitoba Sustainable Development for collection of Lake Sturgeon eggs and milt and Walleye broodstock, and stocking of both species. There are no other known certificates, permits and leases associated with the GRFH property. The GRFH will be upgraded, operated and maintained according to a Manitoba *Environment Act* Licence.

2.3 OWNER OF MINERAL RIGHTS

The land in the area of the proposed development is owned by Manitoba Hydro. Manitoba Hydro owns the mine and mineral rights for Titles 2274569 and 2274567. Titles 22734568 and 2274564 exclude all mines, minerals, gypsum, valuable stone and gravel. There are currently no known mineral titles or mines that exist in the area.

2.4 DESCRIPTION OF EXISTING LAND USE

The majority of work associated with the project will be done within the current footprint of the hatchery grounds (the exception being replacement of a buried well water distribution line that crosses the existing conservation bunkhouse driveway (owned by MSD), located adjacent to the hatchery grounds). All upgrades to the GRFH will take place within existing buildings or previously disturbed land.

The GRFH is located approximately 500 m east of the Grand Rapids Generating Station, 500 m west of Grand Rapids Drive (within the town of Grand Rapids), and 40 meters (from the southernmost edge of the property) south of the Saskatchewan River.

2.5 LAND USE DESIGNATION

The GRFH upgrade project is located in an area with a land use designation of Residential/Other.

2.6 PUBLIC ENGAGEMENT

In order to inform the public, and provide those who are potentially affected by (or interested in) the Project, with meaningful opportunities to obtain and/or provide information or their views about the Project, Manitoba Hydro developed and implemented a public engagement plan. The plan uses a variety of communication mechanisms, and was guided by the following principles: process accessibility; opportunities for engagement; a transparent and open process; and, a responsive and adaptive approach. The target audience for the plan are groups potentially affected by the project (including Misipawistik Cree Nation and the Town of Grand Rapids) and other potentially interested groups (including the Grand Rapids Fisherman's Association, Keeyask Hydropower Limited Partnership partners, Manitoba Metis Federation, NRSB, Grand Rapids Generating Station staff, other Manitoba Hydro staff, and the general public). The engagement plan includes opportunities for face-to-face meetings with community leadership, as well as electronic and paper communication (including presentations, a project webpage (during construction) and project factsheet and summary engagement reports).

A principle of the engagement plan is to provide opportunities to share and obtain information at stages throughout the Project. Engagement will take place during the project-planning phase, project construction, and at project completion. To ensure integrity and transparency of the engagement process, engagement activities will be documented, with meeting notes shared with meeting participants.

In summary, Manitoba Hydro will engage with the public regarding the project, including keeping members of the public informed, listening to the public's concerns and communicating how their input influenced decisions.

Phase One engagement activities were completed from February through April 2019, focusing on potentially affected and interested Indigenous in close proximity to the Project location. To date, engagement activities were undertaken with the Town of Grand Rapids leadership. Discussions to determine if Misipawistik Cree Nation leadership is interested in meeting to discuss the Project are ongoing. Project factsheets were shared in advance of potential meetings with Misipawistik Cree Nation leadership and the Town of Grand Rapids leadership.

The methods utilized in Phase One include a Project Factsheet and face-to-face meetings. Meetings with community leadership have and will provide an opportunity to introduce the Project and the environmental assessment (EA) process and initiate dialogue about potential Project issues and perspectives. A brief presentation about the Project was/will be provided by the EA Study Team to the leadership in each community. Throughout, and following the discussion, meeting participants were encouraged to ask questions, offer perspectives, and to identify any issues or concerns they might have about the proposed project, the EA and engagement plan. The discussion was recorded by a member of the EA Study Team and these draft notes were later reviewed by meeting participants for accuracy.

A Project Factsheet (Appendix 2) was provided to all attendees at the meetings undertaken and will be made available on the Project website and to any interested party. The Project Factsheet summarized the Project, its rationale, Project schedule, potential local effects and EA activities. The Factsheet also provided information on how to make contact with any questions, concerns or issues about the Project.

The Engagement activities with MCN and the Town of Grand Rapids leadership are ongoing and therefore the following key issues and perspectives include information from completed engagement meetings (Table A2-1). The comments below are not verbatim, but reflect the issues and perspectives identified at engagement meetings completed to date:

- Some expressed a desire to have access to fish waste, planned for disposal at a landfill, to use for their own needs;
- Concern with Project traffic using local road through Town of Grand Rapids;
- Expressed interest in the local water operator supervisor to be informed of and be able to view the potable water hook-up Project work;
- Leadership appreciated the opportunity to learn about the Project and to provide their perspectives.

2.7 DESCRIPTION OF THE PROPOSED DEVELOPMENT

2.7.1 LOCATION

The GRFH is located in central Manitoba approximately 450 kilometers north of Winnipeg (on Provincial Trunk Highway 6) (Figure 1). It is situated adjacent to the Grand Rapids Generating Station and in the town of Grand Rapids (more than 500 meters from the nearest business or residential building). The GRFH site is on the shores of the Saskatchewan River, immediately prior to it entering Lake Winnipeg. The address of the hatchery is 3 McKay Avenue in Grand Rapids, MB (Figure 2). This can also be described as Northwest ¼ Section 22, Township 48 in Range 13 West of the Principle Meridian in Manitoba. The majority of work associated with the project will be done within the current footprint of the hatchery grounds (the exception being replacement of a buried well water distribution line that crosses the existing conservation bunkhouse driveway (owned by MSD), located adjacent to the hatchery grounds). Manitoba Hydro holds the title to the current hatchery grounds.

2.7.2 DESCRIPTION OF PROPOSED PROJECT

The hatchery upgrade/expansion will *upgrade* the hatchery through the inclusion of process water and aquaculture effluent treatment and temperature control, and *expand* the hatchery capacity through design of rearing systems designed to accommodate a greater number of Lake Sturgeon than at present.

Existing well water piping on the hatchery grounds will be replaced to supply the newly installed hatchery water-treatment system (Figure 4). The new piping will be connected to three existing wells on the property (figures 2 and 4), which will continue to provide water for all hatchery processes.

Surface water piping that supplies the existing outdoor tanks will remain in place; however, they will also be connected to a new line that will provide well water, once it passes through a degasser in the aeration building (Figure 4).

New aquaculture piping will be installed to connect treated aquaculture effluent to an existing wastewater outfall that discharges directly to the Saskatchewan River (Figures 4, 11 and 12). Additional piping will be installed to convey domestic wastewater and hatchery process backwash water during selected cleaning operations (if necessary) into an existing septic tank that acts as a lift station to pump wastewater through an existing sewer line that connects to the Town of Grand Rapids' wastewater collection system.

New potable water piping will be installed to connect the hatchery and service garage buildings to the existing Town of Grand Rapids potable water distribution piping. This will provide potable water required for safety showers and eyewash stations, as well as for hatchery staff and visitors to the hatchery.

The majority of the work will take place within the hatchery grounds, on Manitoba Hydro property. Replacement of the buried well water distribution line running from the East Pumphouse to the Aeration Building will cross the existing driveway to the conservation bunkhouse (owned by Manitoba Sustainable Development), located adjacent to the hatchery grounds (Figure 2 and 4). Existing public roads and highways will be used to access the site for construction activities, with traffic associated with the project routed down Government Road (same access as the Grand Rapids Generating Station uses), which is maintained by Manitoba Hydro. McKay Road will also be used by construction vehicles for access.

2.7.3 OVERVIEW OF SCOPE

The GRFH Upgrade and Expansion Project (the Project) is required in order to meet Keeyask fish stocking requirements, national and provincial bio-security standards and strategic commitments to stock fish. The Project includes the design, procurement, construction and commissioning of upgrades and expansion items, as summarized below. The work will be sequenced such that modified hatchery operation can continue throughout the Project. An overview of project components can be found on Figure 4.

2.7.3.1 GENERAL SITE

- Install buried piping and cable (well water for hatchery operations, potable water, sanitary sewer and utilities) as shown on Figure 4
- All buried piping that will no longer be in use will be abandoned in place. Pipe will be drained, capped or plugged, and abandoned in place
- Remove and replace electrical service to the aeration building, service garage, east and west pump houses, including placement of a service padmount oil filled transformer and diesel generator
- Tap into the existing potable water line, which serves a fire hydrant on the hatchery grounds, from the town of Grand Rapids water distribution system, and expand the distribution piping on the property to supply the hatchery building and service garage with potable water (currently potable water only serves the fire hydrant at the site).

- General site rehabilitation and revegetation post-construction

2.7.3.2 WEST PUMP HOUSE (EXISTING)

- General structural, electrical and instrumentation upgrades within the existing building
    - Remediate existing pump pedestal and concrete slab
- Connection to new buried well water piping
- Connection to new electrical service

2.7.3.3 EAST PUMP HOUSE (EXISTING)

- General structural, electrical, mechanical and instrumentation upgrades within the existing building
    - Remediate existing pump pedestal and concrete slab
- Connection to new buried well water piping
- Connection to new electrical service

2.7.3.4 AERATION BUILDING (EXISTING)

- General structural upgrades within and on exterior of existing building
- Remove existing degassing tower and install new degassing towers
- Connection to new buried well water piping
- Connection to new electrical service

2.7.3.5 SERVICE GARAGE (EXISTING)

- Connection to new buried well and potable water piping (Figure 4)
- General structural upgrades within existing building (including replacement of doors and windows)
- General electrical upgrades including replacement of existing electrical service and distribution panel.
- Replace and enlarge existing sidewalk to hatchery building (Figure 7)
- Construction of gravel pad adjacent to service garage (Figure 5)
- Install modular hatchery process water treatment facility (modified shipping container) on gravel pad adjacent to the service garage
- Installation of piping from service garage process water treatment equipment to existing river outfall piping
- Install a sewage line to connect the service garage to the hatchery building's existing sanitary sewer system (domestic wastewater, and hatchery process backwash water during cleaning operations (if needed)).

  - From the hatchery building, sanitary wastewater passes into an existing septic tank that acts as a lift station to pump wastewater through an existing sewer line that connects to the town of Grand Rapids' wastewater collection system.

- Installation of HVAC equipment in the service garage
- Replacement of electrical fixtures inside building

2.7.3.6 NORTH PARKING LOT (NEW)

- Construct new gravel parking lot adjacent to service garage (Figure 6)
- Install electrical service, lighting and block heater outlets

2.7.3.7 HATCHERY BUILDING (EXISTING)

- Repair/replace existing chain-link fence around perimeter of hatchery grounds (including outdoor circular tanks and raceways)
- Construction of exterior concrete equipment pad for HVAC equipment
- General structural renovation and upgrades within existing building (Figure 8)
  - Replace exterior and overhead doors on south side of hatchery building
  - Hazardous material remediation (including materials containing lead and asbestos)
  - Installation of HVAC equipment
  - Installation of aquaculture equipment:
    - Water and aquaculture effluent treatment
    - Tanks, etc.
- General electrical upgrades including replacement of existing electrical service and distribution panel.
- Connection to new buried well and potable water piping
- Installation of piping from aquaculture effluent treatment equipment to existing river outfall piping
- Install wastewater piping to hatchery sanitary sewer system

2.7.3.8 ELECTRICAL YARD (NEW)

- Construct (excavate and placement of granular material) electrical yard, including chain-link fencing, pre-cast barrier curbs and paver sidewalk. Install reinforced concrete pads and equipment support (Figure 5)
- Establish new electrical service

2.7.3.9 DIESEL GENERATOR (NEW)

- Install in electrical yard complete with sub base-mounted fuel oil tank (capacity 1,330 L) to serve the generator with fuel capacity for 24-hour continuous operation.

- Fuel and oil storage will comply with the National Fire Protection Association Flammable and Combustible Liquids Code (NFPA 30)
- Sub base-mounted fuel oil tank will be double wall secondary containment type, constructed of corrosion resistant steel, and be CSA listed and labeled.

2.7.3.10 OUTDOOR TANKS (CIRCULAR TANKS AND RACEWAYS; EXISTING))

- Replace existing pole top lighting adjacent to outdoor tanks

2.7.4 GENERAL SYSTEM ARRANGEMENT

2.7.4.1 LAKE STURGEON REARING SYSTEM

The Lake Sturgeon hatching/rearing system will operate in the main hatchery building using four identical, independent systems with no cross connections (Figure 8). Each system contains twelve 5 foot diameter circular (with a maximum rearing volume of 2,194 L/tank) fiberglass tanks (60 tanks total), a mixing sump, and a water treatment skid, which receives fresh and recirculation water. Each system is capable of producing 1000 yearlings and 2500 fall fingerlings.

2.7.4.2 WALLEYE HATCHING SYSTEM

The Walleye hatching system will operate in the service garage, and will have the capacity to hatch up to 20 million walleye eggs in two isolated hatching systems (Figure 9). Each system contains two troughs (26'-10 ¼" L x 3'-4 ¼" W x 1'-8 ½" H), a mixing sump and water treatment skid which receives fresh and recirculation water.

2.7.4.3 WASTEWATER TREATMENT

Aquaculture effluent will be treated as represented on Figures 10 – 12, and described below.

Aquaculture effluent will consist of backwash water from the drum filter (which collects uneaten fish food and fish waste). The drum filter will be backwashed using filtered well water from the Filox filter. The backwash will be collected in a sump, which will be pumped into the backwash treatment system. The backwash treatment system consists of four bag filters containing a series of polypropylene felt bags of decreasing pore size, which will filter out all particles larger than 40 µm. As each of the bag filters become full, the bag filter will be taken offline (to ensure filtration continues during servicing), and the filter bag will be replaced. The frequency of maintenance (filter bag replacement and disposal) will depend on the amount of feed provided to the fish. Excess feeding will result in higher waste volumes and more frequent filter bag changes. Bi-weekly filter bag replacements are expected, increasing to weekly filter bag replacements during peak feeding periods. Each bag is expected to contain between 10 -15 kg of retained solids. Used filter bags will be disposed of at a licensed landfill facility (estimated to be approximately 1500 kg annually), unless an interested individual or business requests it for use as domestic fertilizer.

After filtration, the water will be disinfected using UV disinfection to provide a validated germicidal dose of 80 mJ/cm^2 prior to being discharged into the river via the existing river outfall. This dosage was determined based on conversations with Manitoba Sustainable Development (pers. comm., L. Janusz, September 11, 2018). During

normal hatchery operations, there will be a total discharge of approximately 130 LPM of treated aquaculture effluent to the Saskatchewan River; however, the discharge can range between 0 – 850 LPM during abnormal operating conditions (draining of tanks, etc.).

A sampling port will be located downstream of the UV system to allow treated water to be sampled (Total Suspended Solids (TSS), Biological Oxygen Demand (BOD), Total Nitrogen (TN), Total Phosphorus (TP), temperature and pH) on a monthly basis for one year to ensure it meets the Tier 1 Manitoba Water Quality Standards, Objectives and Guidelines (MWQSOG's) for the protection of aquatic life at the point of discharge. Ongoing monitoring will be determined based on the results of the initial year of monitoring. Effluent from the outdoor tanks and raceways is discharged downstream of the sampling point, however the usage (temporary holding of Lake Sturgeon and unfed Walleye Brood Stock), low fish density and high flow rate of water (flow-through water use) in these tanks is expected to result in water that meets Tier 1 MWQSOG's at the discharge point.

All domestic wastewater from the Hatchery property will continue to be directed to the Town of Grand Rapids wastewater collection system for treatment in the Grand Rapids Lagoon (owned and operated under a separate licence by Manitoba Hydro).

2.7.4.4 CHEMICAL USE DURING OPERATION

Specific types of chemical cleaning agents and products required for fish health and production are used in low concentrations at the hatchery (Table 1). Chemicals are also used to disinfect equipment and rearing systems, to maintain a biosecure facility and prevent transfer of disease or pathogens. The following sections describe normal operating procedures that require chemicals, with details on how the chemicals are used and disposed of.

2.7.4.4.1 Disinfection

Indoor Rearing Systems

Hypochlorite (200 ppm) will be used to disinfect hatchery tanks (six systems total, 1 to 2 times annually). During this cleaning operation, the volume of water used (approximately 8,000 L per system in the hatchery and 13,000 L per system in the service garage) and configuration of piping within the hatchery precludes sending the chlorinated water to the sanitary sewer. After disinfection is complete, the chlorinated water will be held (and aerated) for two days or longer, until a dipstick test shows the majority of the total residual chlorine (TRC) has been removed. After this, the TRC will be completely neutralized using an agent that is safe for the aquatic environment (e.g. sodium thiosulfate or sodium ascorbate), before the effluent is discharged through the existing river outfall

Outdoor Tanks

Outdoor tanks (20' dia. x 4' deep) will be disinfected on an annual basis. Tank disinfection takes place through isolating, draining and drying the tanks before spraying the tank walls, bottom and standpipe with a 1% Virkon solution (14 L per tank). The Virkon solution will be rinsed from surfaces with fresh well water before restoring

flow. Once the tank is filled to capacity (approximately 24,000 L with standpipe in), the standpipe will be removed, allowing the water to flush out directly to the existing river outfall. In situations where higher volumes of Virkon solution are required (e.g. larger tank surface area), adjacent tanks will be filled with fresh water and drained simultaneously. This will ensure the concentration of Virkon in the discharge to the river is below 6.5 mg/L (the 48 hour exposure acute LC50 for Daphnia as indicated in the Safety Data Sheet for Virkon Aquatic; http://www.dynamicaqua.com/msds/virkon_aquatic_sds.pdf).

Hatchery Equipment

Hatchery equipment used on the production floor will be sprayed with Virkon solution at a concentration of 1-2%. Following the recommended contact time (10-30 min), equipment will be rinsed with water. Solution will be discharged to the sanitary sewer.

Footbaths will be filled with Virkon on a daily basis at a concentration of 1-2%. Following a 24-hour period, remaining disinfectant in footbaths will be disposed of in the sanitary sewer and replaced.

Stocking Equipment

Stocking equipment (e.g., transport trailer, tanks, buckets, dip nets, etc.) will be sprayed with Virkon solution at a concentration of 1-2% at a location offsite (greater than 30 m away from a water body). Surfaces will be rinsed with clean water and solution discharged to land.

If the stocking equipment comes into contact with river water, additional disinfection will be undertaken to remove potential Aquatic Invasive Species (AIS). Approved decontamination methods will be followed, as outlined in the AIS Regulation (*The Water Protection Act*). For example, equipment will be disinfected with hot water (>60°C) or exposed to temperatures below -10°C for 3 days.

Egg Disinfection

Prior to entering the production area, eggs will be submersed in 100-ppm Ovadine solution. A minimum of twice the volume of Ovadine solution to eggs is required. Eggs will then be rinsed with clean water and the Ovadine solution discharged to the sanitary sewer.

2.7.4.4.2 Walleye Marking

Walleye fry will be marked with oxytetracyline (OTC) at a concentration of 700 mg/L. An equal amount of sodium dibasic will be added to buffer the solution. De-foam (roughly 350 µl/L) will also be added, if needed. Fry will be marked in bags that can hold 14 L of OTC solution. Following the marking process, fry will be removed from the solution and either stocked out immediately (if at the stocking site) or transferred to new shipping bags with fresh water (if at the hatchery). The OTC solution will be disposed of on land (at least 30 m from a water body) or sent to the sanitary sewer.

2.7.4.4.3 Therapeutics

On occasion, it may be necessary to treat fish with a salt bath (1-3%). When possible, sick fish will be removed from a rearing tank and treated in a smaller dedicated treatment tank. Solution will be discharged to the

sanitary sewer or on land. However, if it is necessary to treat an entire group of fish in an outdoor tank, the salt solution will be discharged directly to the river.

Tricaine Methanesulfonate (TMS) will be used to euthanize fish, as needed (e.g., fish health concerns, lethal sampling, etc.). A concentration of 200 to 250 ppm is usually sufficient. Solution will be discharged to the sanitary sewer.

2.7.4.5 HATCHERY PROCESS WATER TREATMENT

Post upgrade, the hatchery will operate on a 95% Recirculation Aquaculture System (RAS), which will:

- Remove suspended particles (food, fish waste, detritus) larger than 40 µm
- Provide UV disinfection of 80 mJ/cm^2
- Maintain un-ionized ammonia levels below 0.017 mg NH_3/L.
- Maintain water quality within specific design parameters to optimize fish rearing conditions
    - pH range between 6.5 to 8.5
    - Maintain a minimum dissolved oxygen concentration of 5 mg DO/L throughout the system
    - Maintain temperature between 6 and 20°C

The water treatment process is represented on Figures 10 – 12, and described below.

The hatchery will continue to operate using well water from three existing wells on the property. The east and west pump houses and the aeration building pump the water from each well (within the amount specified in the existing water use permits). Water pumped from the three wells will converge in the aeration building, where it will either be pumped to the main hatchery and service garage or be pumped through two new degassing towers to increase oxygen and remove carbon dioxide before being pumped to the outdoor tanks. The water flowing to the outdoor tanks will not receive any additional treatment.

Well water going to the main hatchery and/or service garage flows into the treatment skids (Figure 13), where it will receive additional treatment. The water will first pass through a Filox filter (within the main hatchery and service garage) to remove mineral and particulates including iron, manganese and trace amounts of sulphide. The Filox filters will backwash as necessary (based on a pressure set point), with backwashed water being discharged to the existing river outfall. A sampling port will be located downstream of the backwash water discharge line to allow backwashed water to be sampled on a monthly basis for the first three months of operation to ensure it meets the Tier 1 Manitoba Water Quality Standards, Objectives and Guidelines (MWQSOG's) for the protection of aquatic life (Iron and Manganese) at the point of discharge. Additional monitoring will be determined based on the results of the initial three months.

Water that passes through the Filox filter will flow to a mixing sump, which will also receive filtered, recycled water from the RAS's drum filter. The mixing sump contains instrumentation to monitor pH, dissolved oxygen and temperature to confirm that water quality is maintained within design parameters, and is equipped with alarms that will trigger if one or more parameters exceed the specified range. Water is drawn from the mixing sump and pumped through a biofilter to remove ammonia (through nitrification) and a degasser to replenish oxygen and remove carbon dioxide. After this, it will be pumped through a system level UV disinfection unit that

provides an adequate germicidal dose to kill off any anticipated pathogens, and into the aquaculture tank distribution piping. From the tank, water will be pumped back to the drum filter within the RAS, where it will be treated by filtration for reuse. At the end of the aquaculture tank distribution piping, a water discharge line will allow a controlled discharge between 0 and 100 LPM per system of treated (filtered and UV disinfected) water to the existing river outfall. The same amount of fresh makeup water will be introduced into the mixing sump to keep the system's water volume constant. During normal hatchery operations, there will be a total discharge of approximately 130 LPM of treated aquaculture effluent to the Saskatchewan River.

The recirculation system will maintain a treated water recirculation rate of 350 LPM per sturgeon rearing system and will provide filtered well water (degassed and UV disinfected) as makeup water on an as needed basis. The total residence time of the water in the Lake Sturgeon systems will be 23 minutes (2.6 water changes/hour), and 38 minutes for the Walleye systems. Temperature can be adjusted between approximately 6^{o}C (the ambient temperature of the well water) up to 20^{o}C, and can be varied between each system.

2.7.4.6 INTERIM PRODUCTION

During construction, the work will be sequenced such that modified production of Lake Sturgeon can continue. Upgrades to the water supply and service garage will be completed first while Lake Sturgeon production continues in the main hatchery building. Lake Sturgeon production will be relocated to the service garage upon completion of that work, allowing construction access to the main hatchery. Walleye production will not take place in the main hatchery or service garage during the construction period.

2.7.5 CONSTRUCTION

Construction associated with the GRFH Upgrade and Expansion will take place between Fall 2019 and Fall 2021, with an estimated peak workforce of 25 people and average workforce of 10-12 people. Work hours on site will be determined by the contractor, but are anticipated to be 10-12 hour days between the hours of 7 am and 9 pm, up to 7 days/week. No night shift is anticipated as part of this project.

Construction will require the use of heavy machinery. Intermittent presence/use of small numbers of each of the following types of machinery is expected: flatbed delivery trucks, bulldozers, backhoes, forklifts and dump trucks. During construction, traffic in the project area will increase due to heavy equipment and employee arrival at the project site, construction material deliveries and waste removal. Existing roads and highways will be used, with no new access points from the road to the property. Traffic associated with the project will be routed down Government Road, which provides access to the Grand Rapids Generating Station and is maintained by Manitoba Hydro. The GRFH is a private facility and will be closed to the public during the construction period, with the exception of the Visitor Centre, which will remain open when possible (and accessed through a separate entrance, outside the construction area). Construction fencing and other isolation measures will be implemented to ensure there is no public access to active construction areas.

Work associated with the project will include the following: mobilization, site drainage, clearing, grubbing/stripping, grading, ditching, excavation and/or directional drilling, gravelling, construction-related

water/wastewater and sewage, facility upgrades, fish rearing system upgrades, electrical upgrades, decommissioning/demobilization, rehabilitation, etc.

All work included in the project will be required to adhere to an Environmental Protection Plan (appendix 5) that will specify specific practices and mitigation measures designed to minimize or mitigate any potential environmental impacts of the Project. Ongoing operational activities will be done in accordance with the commissioning and operational maintenance plan developed by Integrated Designs Inc., the commissioning agent involved in the project.

Additional information on each of the components, as it pertains to an Environmental Assessment of the project, can be found below.

2.7.5.1 MOBILIZATION

A peak workforce of 25 people is anticipated for this project, with average workforce estimates being closer to 10 people. There will not be a camp provided – the contractor will be expected to arrange for their own accommodations. Contractors will be required to arrange their own transportation to site (likely using personal vehicles), and will park along the side of McKay Avenue, or in an alternate laydown area identified by the contractor, on the hatchery property.

2.7.5.2 GENERAL CONSTRUCTION

Material stockpiles (sand, gravel, etc.) and laydown areas will be established on existing cleared areas within the hatchery grounds or at the location of the future north parking lot. A construction site office will also be established within the project area.

Refueling of vehicles and machinery will take place in accordance with the project Environmental Protection Plan.

Aside from installation of sewer and water lines, installation of electrical equipment in the new electrical yard, gravel placement and building upgrades, minimal work will be required outside of the existing buildings.

2.7.5.3 CLEARING AND GRUBBING

Clearing and grubbing will be required in the vicinity of the east and west pumphouses, the aeration building and the service garage for replacement of buried well water distribution piping (Figure 4) – final areas will be determined once the contractor has determined the construction methodology to be used. Trees/shrubs removed during clearing will be available for local use, chipped, or disposed of at a licensed landfill, as determined by the contractor.

2.7.5.4 STRIPPING

Topsoil will be stripped during excavation for new buried piping. Excavated topsoil will be stockpiled and used for remediation of excavated areas.

2.7.5.5 GRADING

Grading of the parking lot and electrical pad will be done to ensure positive drainage of water from rain and snowmelt.

2.7.5.6 EXCAVATION AND/OR, DIRECTIONAL DRILLING

Replacement of existing well water piping, and provision of new potable water piping, sewage lines and electrical conduit, will be done either through excavation or directional drilling (as determined by the contractor).

Should it be required, trenching at the locations on the map (Figure 4) will occur at a maximum depth of 8'6" (depending on site conditions). Piping will be laid and connected and the trench will be backfilled using excavated material, in a sequential order, to limit the amount of excavated area left open at the end of each day. This area will be secured at the end of each workday. No storm water settling ponds are anticipated to be required during the project. The contractor will be responsible for dewatering any small open excavations that collect storm water, by pumping the water to a vegetated area away from the river, as specified in the Environmental Protection Plan.

2.7.5.7 QUARRIES AND BLASTING

No new quarries or borrow pits are required for this project. The small amounts of material required will be sourced from existing suppliers by the contractor.

Blasting is not required as part of this project.

2.7.5.8 GRAVELLING

Gravelling of the new north parking lot and new electrical yard will occur.

2.7.5.9 CONSTRUCTION-RELATED WATER/WASTEWATER AND SEWAGE

Small amounts of water may be required for construction related activities (e.g., washing machinery). This will be sourced from existing GRFH water sources.

The contractor will be responsible for supplying washroom facilities for contractor staff. These will be emptied by a certified sewage hauler, and disposed of at the Grand Rapids Sewage Lagoon (owned and operated by Manitoba Hydro). Provision of potable water for the construction workforce will also be the responsibility of the contractor.

2.7.5.10 SOLID WASTE DISPOSAL

Solid waste generated throughout the duration of this project will include worker-generated waste and construction generated waste. The Contractor will be required to develop a Waste Management Plan as per the Environmental Protection Plan.

Construction generated waste will include that resulting from demolition (concrete, piping, windows, etc.) and packaging waste from new equipment. Worker generated waste will include general waste generation resulting

from additional people being on site. The contractor will be responsible for disposal of waste generated by workers and construction activities at a licensed waste disposal facility as determined by the contractor. Temporary onsite storage of food waste will be contained in animal proof storage areas/receptacles.

Recycling receptacles will be provided on site to process worker-generated waste, in line with local recycling programs.

Hazardous materials such as asbestos, lead and chromium have been identified within the existing facilities. The contractor will be responsible for the management, transport and disposal of hazardous waste materials in compliance with applicable regulations.

2.7.5.11 DECOMMISSIONING/DEMOBILIZATION

Buried water/wastewater piping that will no longer be required will be abandoned in place. As per previous direction by Manitoba Sustainable Development, abandoned piping will be: pumped out by a licensed sewage hauler to be disposed of at a licensed wastewater treatment lagoon (wastewater piping); cut off at or below the surface; filled with clean sand or gravel (where practical); capped with concrete fill; backfilled with excavated material, graded; and revegetated.

2.7.5.12 REHABILITATION AND REVEGETATION

All excavated and disturbed areas will be backfilled with existing soil/organic material and prepared for revegetation prior to project completion. Re-seeding of disturbed areas will occur using MH approved seed mixes in accordance with the Environmental Protection Plan. Once 50% vegetative coverage is achieved, seeding will be considered complete.

3.0 DESCRIPTION OF EXISTING ENVIRONMENT

3.1 STUDY AREA

The Saskatchewan River system drains a large area of western Canada from the Rocky Mountains in Alberta eastward to Lake Winnipeg in Manitoba. The Saskatchewan River system drains a total area of approximately 416,000 km^2, with the river basin covering much of the Boreal Plains Ecozone and the western portion of the Prairies Ecozone of western Canada (Smith *et al*. 1998 In Jones and Armstrong 2001). Soils are generally rich and natural vegetation communities are diverse and include marsh/wetland, grassland, aspen parkland and boreal forest (Jones and Armstrong 2001). The Saskatchewan River travels about 1,940 km before draining into Lake Winnipeg.

Land use in the drainage basin is largely agricultural, although forestry is common in the boreal forest portion of the drainage basin (Jones and Armstrong 2001). Point and non-point source agriculture related nutrient loading occurs in the basin. In Manitoba, the Saskatchewan River basin encompasses land held by the Opaskwayak Cree Nation, Mosahiken Cree Nation, Chemawawin Cree Nation and the Misipawistik Cree Nation.

The Saskatchewan River is a multi-use waterway, being used extensively for agricultural irrigation and livestock watering, recreational purposes, fishing (domestic and commercial), hunting (domestic and licensed), domestic and industrial water consumption, tourism, and hydroelectric power generation (Jones and Armstrong 2001). Regulation of the Saskatchewan River basin began in the 1890s with the construction of irrigation projects and works to divert and deliver water to land in southern Alberta (Rosenberg *et al.* 2005). Diversion of water for irrigation projects was followed by regulation for hydroelectric power generation, first in the upper reaches of the Bow River (1911 to 1955) and then in the upper North Saskatchewan River (1965 to 1972) and Saskatchewan River (1963 to 1985) (Rosenberg *et al.* 2005). The Grand Rapids Generating Station is the only station on the Saskatchewan River in Manitoba, however there are eleven hydroelectric generating stations, six storage reservoirs (one on the mainstem and five on tributaries), and one regulating reservoir along its length (Rosenberg *et al.* 2005).

The GRFH, situated beside the Grand Rapids Generating Station and in proximity to the town of Grand Rapids, is located in central Manitoba approximately 450 kilometers north of Winnipeg (on Provincial Trunk Highway 6). The GRFH site is on the shores of the Saskatchewan River, immediately prior to it entering Lake Winnipeg (Figures 1 and 2).

3.2 PHYSIOGRAPHIC SETTING AND CLIMATE

The topography of the town of Grand Rapids decreases sharply from an elevation of 267 meters at Cedar Lake to 229 meters at the town. The study area has a continental climate, characterized by short, cool summers, and long, cold winters. The area experiences a large range in annual temperature and has a mean annual temperature of less than 0.8°C (based on Environment Canada climatic data), with below zero average daily temperatures from November through March. Mean annual precipitation is 437.7 mm.

3.3 HYDROLOGY

The GRFH is located on the tailrace channel of the Grand Rapids Generating Station (completed in 1968), approximately 500 meters downstream of the Grand Rapids Generating Station (Figures 1 and 2). The Saskatchewan River is approximately 100 m wide at the tailrace channel, and quickly widens to over 400 m. Cedar Lake (which forms part of the forebay for the Grand Rapids Generating Station) is located approximately 4 km upstream of the GRFH.

Manitoba Hydro currently holds *Water Rights Act* Licences 2013-180 and 2013-175, which specify that water diverted from Cedar Lake adjacent to the Grand Rapids Generating Station shall not exceed 1820 cubic decameters annually. Manitoba Hydro also holds *Water Rights Act* Licence 2012-139, which specifies that water diverted from a fractured limestone aquifer by three wells located on the GRFH grounds shall not exceed 3384 cubic decameters annually or a maximum rate of 0.107 m^3/s. Based on water meter records from the hatchery, both the surface and well water supplies are being operated within the respective Licence limits.

3.4 FISH AND FISH HABITAT

Year round, the Saskatchewan River provides habitat for a number of resident large and small-bodied fish species. These species include Lake Sturgeon, White Sucker, Longnose Sucker, Walleye, Burbot, Goldeye, Cisco, Lake Whitefish, Northern Pike, Sauger, Shorthead Redhorse, Yellow Perch, Longnose Dace, Spottail Shiner, Emerald Shiner, Ninespine Stickleback, Pearl Dace, Lake Chub, Trout Perch, Brook Stickleback, Common Carp, Central Mudminnow, Johnny Darter, Logperch, Spoonhead Sculpin, Blacknose Dace and Mottled Sculpin (Stewart and Watkinson, 2004). Each spring, Walleye congregate downstream of the Grand Rapids Generating Station to spawn. Lake Winnipeg supports a commercial fishery, with Walleye and Lake Whitefish being the target species, and a fish packing shed in Grand Rapids.

3.5 TERRESTRIAL VEGETATION AND WILDLIFE

The project area is located within the Mid-Boreal Lowland ecoregion of the Boreal Plains ecozone (Agriculture and Agri-Food Canada 2019). The ecoregion is classified as having a subhumid mid-boreal ecoclimate. Permafrost occurs in isolated patches in peatlands and is more prevalent in the region's northeastern section. Pulpwood and local forestry, some commercial fishing, water-oriented recreation and wildlife trapping and hunting are the dominant uses of land in this region although seed grains, oilseeds and forage crops are produced where soils and drainage are suitable (www.ecozones.ca).

3.5.1 VEGETATION

The mid-boreal lowland ecoregion is fairly flat, low-lying with approximately half the area covered by wetlands with sedges, willows, some black spruce and tamarack. Dry sandy sites are vegetated with open stands of tall jack pines. The rest of the region has a mixed coniferous and deciduous forest with a ground cover of mixed herbs, an understory of tall shrubs, and medium to tall, trembling aspen and balsam poplar. As the forests

mature, climax species such as white spruce and balsam fir become dominant. The project area is located within this latter type of mixed forest vegetation.

A vegetation survey of all potentially disturbed areas was completed by a qualified botanist on August 2/3 2018. A total of 110 taxa were identified, including one cultivated species (*Prunus virginiana* 'Schubert'), 16 non-native species and 6 invasive species (Appendix 3, Table A2-1).

According to the Manitoba Conservation Data Centre (2019), there are 41 species of conservation concern that occur in the mid boreal lowland ecoregion none of these were identified in the potentially disturbed project areas (Appendix 3, Table A2-2). Manitoba Conservation Data Centre (2019) provided the occurrences of seven S1 to S3S4 species found within 2 km buffer of the fish hatchery (Appendix 3, Table A2-3). None of these were found in the project area. Gastony's cliffbrake (*Pellaea gastonyi*) listed as endangered by the *Manitoba Endangered Species and Ecosystems Act* occurs in the mid boreal lowland ecoregion but was not found in the project area.

No species recommended for listing under COSEWIC or listed under the federal *Species at Risk Act* were identified in the project area (Appendix 3, Table A2-4).

3.5.2 REPTILES AND AMPHIBIANS

The range of red-sided garter snakes, painted turtle, northern leopard frogs (listed as special concern under the *Species at Risk Act*), wood frog, Canadian toad and boreal chorus frogs all overlap with the GRFH (www.naturenorth.com). Garter snakes have been observed on the hatchery grounds, primarily on the concrete pad by the main hatchery door (northeast side of the building, Figure 2).

3.5.3 BIRDS

Approximately 160 different species of birds have the potential to nest in the area of the GRFH. See Appendix 4 for a list of breeding birds near the GRFH. The general breeding period for breeding birds in the area of the GRFH is April 19-August 29.

The range of nine bird species listed under the federal *Species at Risk Act* (SARA) and/or the *Manitoba Endangered Species and Ecosystems Act* (MESEA) overlap with the GRFH. These nine species are bank swallow (SARA Threatened), barn swallow (SARA Threatened), Canada warbler (SARA and MESEA Threatened), common nighthawk (SARA and MESEA Threatened), eastern whip-poor-will (SARA and MESEA Threatened), olive-sided flycatcher (SARA and MESEA Threatened), rusty blackbird (SARA Special Concern), short-eared owl (SARA Special Concern MESEA Threatened), and yellow rail (SARA Special Concern). Although the ranges of all these species overlap with the GRFH, required habitat is not available for most of these species within the project area.

3.5.4 MAMMALS

The range of numerous mammals including moose, boreal woodland caribou, black bear, wolf, fox, lynx, beaver, muskrat, snowshoe hare and a variety of small mammals (www.ecozones.ca) have the potential to occur in the area of the GRFH.

The range of three mammal species listed under the federal *Species at Risk Act* (SARA) and/or the *Manitoba Endangered Species and Ecosystems Act* (MESEA) overlap with the GRFH. These species are little brown bat (SARA and MESEA Endangered), northern long-eared bat (SARA and MESEA Endangered) and boreal woodland caribou (SARA and MESEA Threatened). Bats (species unknown) have been observed at the GRFH.

3.6 SOCIO-ECONOMIC

The GRFH is located downstream of the Grand Rapids Generating Station, completed in 1968. Manitoba Hydro owns and maintains staffing quarters for the Generating Station, which can accommodate 200 people. The Town of Grand Rapids is located north of the generating station, covering an area of 85.95 km^2. The town has a population of 268 people with 135 private dwellings (Statistics Canada, 2016). Businesses in the Town of Grand Rapids include lodging (hotels and recreational lodges), gas stations and restaurants, as well as a school, churches, arena, community recreational grounds and recreational activities such as camping and fishing.

3.7 FIRST NATIONS

The Misipawistik Cree Nation (MCN) is located on the Grand Rapids 33 reserve, at the mouth of the Saskatchewan River as it runs into Lake Winnipeg. It has an area of 16.97 km^2 and a population of 865 with 225 private dwellings (Statistics Canada, 2016). It is governed by an elected Chief and three elected Councillors. On-reserve community facilities include a Band Office, health authority, grocery store, credit union, service station, convenience store and restaurant.

3.7.1 HERITAGE RESOURCES

The Provincial Historic Resources Branch has advised there are heritage resources identified within the Grand Rapids Area.

After initial consultation with the Provincial Historic Resources Branch regarding heritage resource concerns, Manitoba Hydro has been advised that there are no immediate concerns with the proposed upgrade/expansion project within the identified project footprint. The work associated with the proposed upgrade/expansion project is within the previously disturbed hatchery grounds, and has low potential to impact heritage resources identified within the area.

4.0 DISCUSSION OF ENVIRONMENTAL EFFECTS, SIGNIFICANCE AND MITIGATION

4.1 SCOPE OF THE ASSESSMENT

The temporal boundaries of the assessment were divided into the following phases:

- Construction Phase; and
- Operation Phase.

There are no immediate plans to decommission the GRFH. Lake Sturgeon raised at the hatchery will be stocked for a minimum of 25 years as mitigation for the Keeyask project, and the operation of the GRFH is required to fulfill this commitment. When decommissioning becomes necessary, it will be undertaken according to the legislative requirements, existing agreements and industry standards prevalent at that time. Decommissioning will not be discussed further in this report.

4.2 EFFECTS ASSESSMENT METHODOLOGY

The purpose of this *Environmental Act* Proposal is to identify and describe potential environmental effects that may occur as a result of the construction of the GRFH upgrade, and any subsequent renovation and operation of the GRFH. Potential environmental effects were identified by superimposing project elements onto existing natural conditions and applying standard mitigation measures. An underlying assumption of this method is that the project will be constructed with due care for safety and environmental matters, using current and reasonable engineering practices. Various terms have been used to identify and describe the potential effects. Specifically, in terms of the magnitude of effect, the term not measureable was used to describe an immeasurable change compared to the existing background conditions, minor was used to describe a change that would be a 1% change compared to the existing background conditions, major was used to describe a change that would be more than a 10% change compared to the existing background conditions, and moderate was used to describe anything between minor and major.

The following sections address the various components of the environment and social environment, which are anticipated to potentially be affected by the proposed construction and operating activities.

4.2.1 AIR QUALITY

4.2.1.1 CONSTRUCTION

4.2.1.1.1 Emissions

The potential for air quality to be affected as a result of vehicle and construction equipment/exhaust emissions exists during construction/transportation activities associated with the Project. As the transportation of

components will take place gradually and over an extended duration, the effects are not expected to be measurable. To reduce the effects of unwanted exhaust emissions, vehicles and equipment will be properly maintained and vehicle idling will be kept to a minimum.

4.2.1.1.2 Dust and Odours

Potential effects to air quality may result from dust and odour generation during construction activities, including transport of facility components to the site, and hauling, dumping and compacting gravel for the new north parking lot and electrical yard. By requiring the contractor to access the site using Government Road, take care to minimize dust production during construction and transportation, and monitor road conditions to minimize transport during dry conditions, the effect of dust and odours as a result of upgrading the GRFH is not expected to be measurable, considering existing traffic on the road. Should dust suppression be required, only water and dust suppression products approved by EL&P will be used, where required. Oil, petroleum products and wastewater will not be used to control dust.

4.2.1.1.3 Noise

Increased noise associated with construction of the GRFH upgrade will result from construction activities. The remoteness of the hatchery (more than 500 meters from the nearest business or residential building) will reduce the disturbance possible increases in noise may cause. The majority of the construction activities will take place within a building (either the hatchery or service garage) and no night shift is anticipated; therefore, the impact of additional noise is not expected to be measurable beyond the project area.

4.2.1.1.4 Indoor Air Quality

Hazardous materials such as asbestos, lead and chromium have been identified within the existing facilities. Removal of these materials has the potential to impact indoor air quality. The contractor will be responsible for the management, transport and disposal of hazardous waste materials (as identified by Manitoba Hydro) by qualified professionals in compliance with regulations and the Environmental Protection Plan for the project. By complying with regulations and the Environmental Protection Plan, a measurable impact on indoor air quality is not expected.

4.2.1.2 OPERATION

4.2.1.2.1 Emissions, Dust and Noise

During operation, minimal activities are expected to result in the generation of dust, noise or emissions. Due to the mode of effluent treatment implemented, minimal additional transportation of waste resulting from the aquaculture effluent treatment process to the landfill is expected. As a result of the equipment design, no increased dust, noise or emissions (compared to current conditions) is expected. The residual effects of dust, noise and emissions on air quality are not expected to be measureable.

4.2.2 CLIMATE

4.2.2.1 CONSTRUCTION

Given the size of this project, construction activities are not anticipated to have a measurable effect on climate.

4.2.2.2 OPERATION

The project is not anticipated to have a measurable effect on climate during operation. Additionally, the operation of the GRFH will not likely be affected by changes in climate.

4.2.3 SOIL

4.2.3.1 CONSTRUCTION

As construction and operating activities will be limited to movement on existing roadways and inside the existing GRFH grounds, the project is not anticipated to have a measureable effect on soils. Trenching required for new piping will be done in a sequential fashion, such that piping will be laid and connected, and the excavated area will be backfilled, to limit the amount of excavated area left open at the end of each day. This area will be secured at the end of each workday. All excavated material will be used to backfill the excavated areas.

No storm water settling ponds are anticipated to be required – the contractor will be responsible for dewatering any small open excavations that collect storm water, by pumping the water to a vegetated area away from the river.

For these reasons, no measurable impact on soils is expected as a result of the project.

4.2.3.2 OPERATION

The project is not anticipated to have a measurable effect on soils during operation.

4.2.4 GROUNDWATER

4.2.4.1 CONSTRUCTION

Construction related spills will be cleaned up as they occur, in accordance with the Contractor's spill response plan, which will be approved prior to construction by Manitoba Hydro and included as an appendix of the Environmental Protection Plan. Therefore, construction activities are not anticipated to have a measurable effect on ground water.

4.2.4.2 OPERATION

Well water use will continue under the existing water use licence 2012-139, valid until 2032. By adding re-use capabilities to the GRFH, water use will not increase, despite added production volume. As water withdrawal volumes from the hatchery wells will not change from those occurring currently, and there will be no connection between process water and the well, there is no potential for either over-withdrawal or contamination of the

aquifer with aquaculture process water. No additional impacts to groundwater are expected as a result of operating the project.

4.2.5 SURFACE WATER

4.2.5.1 CONSTRUCTION

Excavation to lay new water and sewer pipe will take place sequentially, where a section of the trench will be excavated, a section of pipe will be laid and then the pipe will be backfilled before moving onto the next section. Should heavy rains occur while the excavation is open, water that accumulates in the trench will be pumped into dense vegetation, where it will percolate into the ground and/or the sediment in it will be filtered out before entering the receiving stream. Minimal areas on the project site will have exposed soils, so erosion from the site will be limited, and the distance and vegetation between the site and the river will be sufficient to trap any soil that erodes.

Disturbed soils will be graded and revegetated as soon as practical after the work is complete.

Due to the sequential method of excavation and pipe laying distance from construction activities to the Saskatchewan River (200+ meters) and planned site re-vegetation activities, the GRFH upgrade will have no measurable impact on surface water during construction.

4.2.5.2 OPERATION

Treated (filtered and UV disinfected) hatchery process water will be discharged directly into the Saskatchewan River (approximately 68.3 megalitres annually). During standard operation of the GRFH, all aquaculture effluent being discharged will be within the water quality standards as indicated in Section 2.7.4.4. Discharged water will meet *Manitoba Water Quality Standards, Objectives and Guidelines Draft: Tier I Water Quality Standards*.

Specific types of chemical cleaning agents and products used for fish health and production are used in low concentrations at the hatchery (Table 1).

Hypochlorite (200 ppm) will be used to disinfect hatchery tanks (six systems total, 1 to 2 times annually). During this cleaning operation, the volume of water used (approximately 8,000 L per system in hatchery and 13,000 L per system in Service Garage) and configuration of piping within the hatchery precludes sending the chlorinated water to the sanitary sewer. After disinfection is complete, the chlorinated water will be held (and aerated) for two days or longer, until a dipstick test shows the majority of the total residual chlorine (TRC) has been removed. After this, the TRC will be completely neutralized using an agent that is safe for the aquatic environment (e.g. sodium thiosulfate or sodium ascorbate), before the effluent is discharged through the existing river outfall

Outdoor tanks (20’ dia. x 4’ deep) will be disinfected on an annual basis. Tank disinfection takes place through isolating, draining and drying the tanks before spraying the tank walls, bottom and standpipe with a 1% Virkon solution (14 L per tank). The Virkon solution will be rinsed from surfaces with fresh well water before restoring flow. Once the tank is filled to capacity (approximately 24,000 L with standpipe in), the standpipe will be removed allowing the water to flush out directly to the existing river outfall. In situations where higher volumes

of Virkon solution are required (e.g. larger surface area), adjacent tanks will be filled with fresh water and drained simultaneously. This will ensure the concentration of Virkon in the discharge to the river is below 6.5 mg/L (the 48 hour exposure acute LC50 for Daphnia as indicated in the Safety Data Sheet for Virkon Aquatic; http://www.dynamicaqua.com/msds/virkon_aquatic_sds.pdf).

On occasion, it may be necessary to treat fish with a salt bath (1-3%). When possible, sick fish will be removed from a rearing tank and treated in a smaller dedicated treatment tank. Solution will be discharged to the sanitary sewer or on land. However, if it is necessary to treat an entire group of fish in an outdoor tank, the salt solution will be discharged directly to the river.

Hatchery water will range in temperature from 6 – 20 ^{0}C. Treated process water is conveyed along an uninsulated buried river outfall pipe (200+ meters), before being discharged into the Saskatchewan River downstream of the Grand Rapids Generating Station. The relatively low volume of treated process water, combined with the large size and high velocity of the receiving water body, will result in rapid mixing and no detectable temperature difference at the river outfall.

Discharged treated process water will be monitored (for TSS, BOD, TN, TP, temperature and pH) monthly, or as stipulated in the *Environment Act* Licence, to ensure the MWQSOG's for the protection of aquatic life are met. Due to the relatively small volume of water compared to the receiving body, the low nutrient levels, and the use of filtration and disinfection prior to discharge, no measureable impacts to the water quality of the Saskatchewan River are anticipated as a result of this project.

4.2.6 FLORA AND FAUNA

4.2.6.1 CONSTRUCTION

4.2.6.1.1 Fish Habitat

Construction activities are not located in or near waterways, so will not destroy or alter fish or fish habitat.

4.2.6.1.2 Terrestrial Flora and Fauna

4.2.6.1.2.1 Vegetation

Due to the location of the project on the existing (previously disturbed) hatchery grounds, and inclusion of revegetation in the project scope, the residual effects on vegetation habitat loss associated with the GRFH upgrade are not expected to be measureable.

4.2.6.1.2.2 Amphibians and Reptiles

Potential construction disturbances to amphibians and reptiles could include disruption and loss of habitat, and vehicle collisions. As the construction footprint is primarily contained within the existing hatchery footprint, the GRFH construction project impacts to amphibians and reptiles are not expected to be measureable.

Disruption and Loss of Habitat

Although the ranges of multiple species of reptiles and amphibians (Section 3.5.2) overlap with the GRFH construction site, required habitat types are not present for all species. This section will focus on garter snakes as construction activities have the potential to impact garter snake habitat.

Garter snakes (*Thamnophis sirtalis*) have been observed on the hatchery grounds, primarily on the concrete pad by the main hatchery door (northeast corner of the building, Figure 2). The numbers of garter snakes vary, and they are typically observed on warm sunny days during spring and summer.

Work to replace doors and seal around the floor in the main hatchery building, as well as work to replace buried piping elsewhere on site (refer to Figure 4), has the potential to disturb garter snakes and their hibernacula if present. A garter snake survey was conducted in September 2018, to record any garter snakes observed in the construction area. No snakes were observed during the survey. This could be in part due to the unseasonably cold and wet weather conditions at Grand Rapids in September 2018. Additional surveys will be conducted in spring 2019, to search for garter snake activity and evidence of garter snake hibernacula on the Project site. If evidence of a hibernaculum is found, efforts will be made to schedule work that may damage the hibernaculum (i.e., excavation) when it is not occupied (June-September) or to exclude snakes from the hibernaculum, prior to their return for the winter. If a hibernaculum is damaged as a result of the GRFH upgrade, Manitoba Hydro will design and construct replacement hibernacula habitat, as required.

As a result of the proposed surveys and mitigation (if required), the residual effects on garter snakes associated with the GRFH upgrade are not expected to be measureable.

Vehicle Collisions

Mitigation measures applied for vehicle collisions with mammals will also benefit all amphibians and reptiles, therefore construction impacts are not expected to be measureable.

4.2.6.1.2.3 Birds

Potential construction disturbances to birds could include: disruption and loss of habitat; vehicle collisions; and noise. As the construction footprint is primarily contained within the existing hatchery footprint, construction impacts to birds are not expected to be measureable.

Disruption and Loss of Habitat

Although the ranges of multiple bird species (section 3.5.3) overlap with the Project site, required habitat types are not present for all species within the Project footprint. This section will focus on nesting birds, raptors and barn swallows as construction activities have the potential to impact the habitat of these birds.

A small amount of vegetation clearing is required for this project. Depending on the timing of the clearing, there is the potential to destroy breeding bird nests, or disrupt breeding bird nesting behavior. To minimize this risk, all clearing will be completed outside of the general nesting period for migratory birds for this region (April 19-August 28). If small amounts (less than 1 ha) of unplanned clearing is required within the general nesting period,

a survey for active nests will be completed prior to the start of any clearing and species specific buffers will be applied as appropriate.

Although clearing is planned to occur outside April 19-August 28, there is still the potential to disturb or destroy established raptor nests if any are present in the area to be cleared. To minimize this risk, a survey for raptor nests in the planned area to be cleared was completed in October 2018. No raptor nests were observed. If clearing does not occur prior to the next general nesting period, the raptor nest survey will be repeated. If any raptor nests are discovered, the tree containing the nest will be retained if possible.

Barn swallows (*Hirundo rustica*) are listed as Threatened by Canada's *Species at Risk Act* (SARA). They are also protected under the *Migratory Birds Convention Act* (MBCA). Required work on the exterior of the Main Hatchery Building, the Aeration Building, the service garage and the Pump houses (East and West) all have the potential to disrupt barn swallow nests (if present).

A survey will take place in spring/summer 2019, prior to construction commencing, to determine if there are any active barn swallow nests in the planned construction area.

If nests are found, efforts will be made to schedule all work on buildings where barn swallow nests are present outside of the general nesting period for migratory birds (April 19-August 28). If any work with the potential to impact barn swallows and their nests is required within the general nesting period, mitigation measures such as exclusion buffers from active nests or installation of physical exclusion devices (netting, plywood, etc.) prior to barn swallows returning to nest for the season will be implemented. Buildings and materials arriving on site will also be inspected for potential nesting sites for barn swallows and exclusion will be applied if necessary.

As a result of the planned timing of clearing, the raptor and barn swallow nest surveys, and the other mitigation measures, the residual effect on bird associated disruption and loss of habitat during the construction phase of the Project are not expected to be measureable.

Vehicle Collisions

Mitigation measures applied for vehicle collisions with mammals will also benefit all birds. Any construction traffic collisions with listed bird species at risk that occur on site or within the town of Grand Rapids will be reported to the appropriate Regulator(s). Construction impacts on birds related to vehicle collisions are not expected to be measureable.

Noise

Increased noise associated with construction of the GRFH upgrade will result from construction activities. Noise will be short term and mitigated, as the majority of the construction activities will take place within a building (either the hatchery or service garage). Construction impacts on birds related to noise is short term and not expected to be measureable.

4.2.6.1.2.4 Mammals

Potential construction disturbances to mammals could include: disruption and loss of habitat; vehicle collisions; human/wildlife interactions; and noise. As the construction footprint is primarily contained within the existing hatchery footprint, construction impacts to mammals are not expected to be measurable.

Disruption and Loss of Habitat

Although the ranges of multiple mammal species (Section 3.5.4) overlap with the Project site, required habitat types are not present for all species. This section will focus on bats as construction activities have the potential to impact the habitat of these mammals.

Little brown bats (*Myotis lucifugus)* and northern long-eared bats (*Myotis septentrionalis*) are listed as endangered by both Canada's *Species at Risk Act* (SARA) and Manitoba's *Manitoba Endangered Species and Ecosystems Act* (MESEA). Little brown bats and/or northern bats may be roosting and/or have maternity sites in the service garage and aeration building (bats have been observed in both these areas in the spring and summer). There is also a potential for bats to be found in the main hatchery building.

Required work on the service garage and aeration building, and (to a lesser extent) the main hatchery building (Section 2.7.2 and Figure 4), has the potential to eliminate access for bats to roosting/maternal habitats inside these buildings, or disrupt roosting/maternal behaviours. To mitigate this risk, infrastructure affected by the project and identified as having the potential to be used by bats, will be surveyed in summer 2019. If bats are determined to be present, measures will be taken in winter 2019/20 to exclude bats from re-entering the infrastructure in spring 2020. In addition, bat boxes (two Canadian Bat Houses 'Bat Motel', capacity 600 bats each, http://canadianbathouses.com/) will be installed in suitable locations on site prior to bats arriving in the spring. Buildings and materials arriving on site will also be inspected for potential roosting sites for bats and exclusion will be applied if necessary. If, despite these mitigation measures, bats are still found in/on infrastructure where work is required, alternate mitigation measures will be considered such as scheduling potentially disruptive work at these particular areas to occur when no bats are present (generally the November 1 to March 31).

As a result of the planned timing of work, bat surveys and the other mitigation measures, the residual effect on bats associated with disruption and loss of habitat during the construction phase of the GRFH upgrade are not expected to be measureable.

Vehicle Collisions

Construction and worker vehicles will cause a slight increase in traffic during the construction phase of the project, which may result in an increase in collisions with local wildlife. To mitigate potential collisions, workers will be reminded to follow posted speed limits and wildlife crossing signs while driving to and from the construction site and to be more cautious at dusk/dawn when wildlife are likely to be more prevalent in the area. If a collision with a large mammal occurs on site or within the town of Grand Rapids, the local Manitoba Sustainable Development office will be contacted. The resulting residual effect of collisions with wildlife is considered to not be measureable.

Noise

Increased noise associated with construction of the GRFH upgrade will result from construction activities. Noise will be short term and mitigated as the majority of the construction activities will take place within a building (either the main hatchery building or service garage). Construction impacts on mammals related to noise is not expected to be measureable.

Human/Wildlife Interactions

Although there is no camp planned for the GRFH upgrade construction work, the presence of a construction workforce has the potential to affect wildlife through human/wildlife interactions such as feeding wildlife, and increased access to food waste by wildlife. Mitigation measures including the use of animal proof storage areas/receptacles to contain food waste, regular removal of food waste from the site and not feeding wildlife will be implemented. The resulting residual effect of human/wildlife interactions is considered to not be measureable.

4.2.6.1.3 Invasive Species

To avoid the transfer of invasive species to and from site, the equipment used during construction will arrive at and leave the hatchery grounds in clean condition.

4.2.6.2 OPERATION

As the GRFH upgrade will take place within the existing hatchery grounds, no changes to effects to vegetation or wildlife in the area are anticipated as a result of operation. Provided the GRFH effluent meets the design water quality objectives (as determined from water quality monitoring results), there will be no impact to aquatic life within the receiving water body (Saskatchewan River).

4.2.6.2.1 Fish Habitat

Operation activities are not located in or near waterways, and are not anticipated to destroy or harmfully alter fish or fish habitat. Aquaculture effluent discharged to the Saskatchewan River during operation periods will be tested monthly for the first year of operation to ensure it meets MWQSOG's for the protection of Aquatic Life (TSS, BOD, TN, TP, temperature and pH), and not have a measurable impact on fish or fish habitat in the Saskatchewan River.

4.2.6.2.2 Terrestrial Flora and Fauna

During operations of the GRFH, traffic and noise will return to pre-construction levels, the construction workforce will vacate the GRFH site and no further modifications to terrestrial habitat are anticipated. Therefore, there are no anticipated changes to effects on terrestrial flora or fauna at the GRFH as a result of operations.

4.2.6.2.3 Invasive Species

To avoid the transfer of invasive species to and from site, the Grand Rapids Fish Hatchery uses well water to transport fish not locally sourced or stocked. Equipment used during egg/milt collection and stocking activities is decontaminated using methods outlined in the *Aquatic Invasive Species Regulation* (The *Water Protection Act*). Following construction, potable water will replace surface water for all domestic use. Surface water pipes that continue to feed the outdoor tanks will be drained for a period of one month during fall to effectively kill any zebra mussels that may be present.

4.2.7 VEHICLE CONGESTION

4.2.7.1 CONSTRUCTION

During construction, traffic in the project area will increase due to heavy equipment and employee arrival at the project site, construction material deliveries and increased traffic associated with waste removal. Lighter traffic could also include contractor and sub-contractor vehicles. Existing roads and highways will be used during construction activities, with traffic associated with the project routed down Government Road (same access as the Grand Rapids Generating Station uses), which is maintained by Manitoba Hydro. The GRFH is a private facility and will be closed to the public during the construction period. Workforce numbers are estimated to be moderate, with a peak workforce of less than 25 people on site at a time. Heavy equipment required for the project includes intermittent use of small numbers of each of the following types: flatbed delivery trucks, bulldozers, backhoes, forklift and dump truck. Construction traffic associated with the GRFH upgrade will result in a small increase in congestion during peak construction periods. Therefore, residual effects due to vehicle congestion are not considered measurable.

4.2.7.2 OPERATION

During operation, traffic at the project site will remain the same as that under existing operations, with the addition of a regular transport of used filter bags (containing fish waste and uneaten fish food) to a licensed landfill facility or provided to interested businesses or individuals for use as domestic fertilizer. Maintenance vehicles may be required if additional maintenance is required. This traffic is anticipated to occur rarely and only as required. As a result, residual effects due to traffic during facility operation are not anticipated to be measurable.

4.2.8 WASTE MANAGEMENT

4.2.8.1 CONSTRUCTION

4.2.8.1.1 Hazardous Waste

Hazardous materials such as asbestos, lead and chromium have been identified within the existing facilities. The contractor will be responsible for the management, transport and disposal of hazardous waste materials in compliance with regulations and the Environmental Protection Plan for the project. Following these practices,

the effect of hazardous waste generated during the construction phase of the project is not anticipated to be measureable.

4.2.8.1.2 Non-hazardous waste

During construction of the GRFH upgrade, some construction related solid waste will be generated. All solid waste generated will be stored appropriately, and disposed of at a licensed waste disposal ground, with the site left clean at project completion. Recycling receptacles will be provided for collection of appropriate worker generated waste, in line with local recycling programs. Following these practices, the effect of waste generated during the construction phase of the project is not anticipated to be measureable.

4.2.8.2 OPERATION

4.2.8.2.1 Hazardous Waste

Some of the chemicals used in hatchery operations (Table 1) have the potential to be hazardous if not handled properly. Chemicals are currently transported, stored, used, handled and disposed of in accordance with the manufacturers Safety Data Sheets. By continuing to follow these practices during operation, no hazardous waste is anticipated to be generated during hatchery operations.

4.2.8.2.2 Non-hazardous waste

Waste generated during the GRFH operation will consist primarily of used filter bags containing treated and dewatered effluent (fish waste) sludge. It is estimated that the hatchery will use approximately 100 filter bags a year, for a total of approximately 1500 kg of disposed waste. If not properly disposed, this waste material could affect the land and water, with subsequent affects to flora, fauna and human health. In order to protect against this, used filter bags will be hauled to a licensed landfill for disposal. The preferred disposal site is the Grand Rapids Landfill. Alternatively, Manitoba Hydro will make the fish waste material available to groups or individuals interested in using it as domestic fertilizer.

Specific types of chemical cleaning agents and products used for fish health and production are currently used in low concentrations at the hatchery, and will continue to be used post-upgrade (Table 1). During specific cleaning processes post-upgrade (e.g. when using Virkon or Ovadine), backwash going to the effluent UV unit will be bypassed directly to the sanitary sewer. Hypochlorite (200 ppm) will be used to disinfect hatchery tanks (six systems total, 1 to 2 times annually). During this cleaning operation, the volume of water used (approximately 8,000 L per system in the hatchery and 13,000 L per system in the service garage) and configuration of piping within the hatchery precludes sending the chlorinated water to the sanitary sewer. After disinfection is complete, the chlorinated water will be held (and aerated) for two days or longer, until a dipstick test shows the majority of the total residual chlorine (TRC) has been removed. After this, the TRC will be completely neutralized using an agent that is safe for the aquatic environment (e.g. sodium thiosulfate or sodium ascorbate), before the effluent is discharged through the existing river outfall.

With the disposal procedures in place, the effects of non-hazardous waste generated during hatchery operation are not anticipated to be measurable.

4.2.9 AESTHETICS

4.2.9.1 CONSTRUCTION

The GRFH will be constructed within the already disturbed hatchery grounds. Construction traffic will access the site using the Government Road, thereby limiting the risk of increased noise or tracked mud on shared roadways (e.g., Highway 6 or municipal roadways). The remoteness of the hatchery (more than 500 meters from the nearest business or residential building) and lack of public access to hatchery grounds (with the exception of the Visitors Centre, accessed from a separate entrance outside the construction footprint) also limits the potential for construction activities to impact the aesthetics of the area. At the conclusion of construction activities, disturbed areas will be revegetated with Manitoba Hydro approved seed mixes. As a result, the construction phase of the project is expected to have minor, short-term impacts on the aesthetics of the area, which will be mitigated by activities prescribed in the Environmental Protection Plan.

4.2.9.2 OPERATION

No additional aesthetic impacts are anticipated to occur during operation. Storage of the used effluent filter bags in a sealed disposal bin, and prompt removal to the landfill, will ensure there will be no operational odours.

4.2.10 LAND USE

The construction and operation of the GRFH will not change the site's current land use. As a result, the residual effects are not anticipated to be measurable.

4.2.11 HERITAGE RESOURCES

Manitoba Hydro engaged in discussions with the Provincial Historic Resources Branch (HRB) regarding potential heritage resource concerns. HRB advised there are no immediate heritage concerns with the proposed upgrade/expansion project within the identified project footprint. The work associated with the proposed upgrade/expansion project is within the previously disturbed hatchery grounds, and has low potential to adversely affect heritage resources identified within the area.

If construction activities associated with the project (such as trenching) unearth heritage artifacts, work will stop immediately and the clauses pertaining to heritage resources identified in the Environmental Protection Plan will be followed. An archaeologist will be consulted and will identify any suspected heritage resources that are encountered before work at that location resumes. With the mitigation proposed, there is no effect on Heritage Resources anticipated during the construction phase of the project.

4.2.12 SOCIOECONOMIC

There will be limited employment opportunities for local labour associated with the construction phase of the project. The contractor will be encouraged to engage the local labour force where appropriate.

There will be economic opportunities associated with the construction phase of the project. The contractor will be encouraged to utilize local accommodations, fuel services and other local suppliers as appropriate.

There will be a small workforce located locally during the construction phase of the project, with the potential to interact with local residents of Grand Rapids and Misipawistik Cree Nation. Manitoba Hydro requires all employees and contractors to abide by a respectful workplace policy, and has a zero tolerance policy for discrimination and harassment.

As a result of the potential economic and employment opportunities associated with the construction phase of the project, and the zero-tolerance policy for all Manitoba Hydro employees and contractors, it is anticipated that there will be some small, local, short-term positive benefits of the construction aspect of the project.

4.2.13 HUMAN HEALTH AND WELL BEING

The Saskatchewan River is used recreationally by residents of Grand Rapids, and supports local commercial fishers. As there are no anticipated impacts in ground or surface water as a result of this project, there are no anticipated impacts to human health and well-being.

4.2.14 ACCIDENTS AND MALFUNCTIONS

4.2.14.1 CONSTRUCTION

Potential accidents or malfunctions that may occur during construction and result in environmental concern include:

- Spills of deleterious substances (fuel, oil, etc.);
- Fires; and
- Vehicle accidents.

There is potential for spills of deleterious substances to occur, including fuel and oil. The risk of spills is reduced through compliance with relevant regulatory restrictions and the Environmental Protection Plan for the project. If a spill does occur, the Spill Contingency and Emergency Response Plan (as provided by the contractor and reviewed by Manitoba Hydro) documents required clean-up procedures for the various substances anticipated to be onsite during the construction period. Fuel will be stored in a double-walled tank located within the construction area; the greatest spill risk is associated with the improper transfer and handling.

Fires, including forest fires and structure fires, present another risk to the Project, staff and environment. The probability of a building fire is low and the consequence to the environment is also deemed to be low. The lack of vegetation currently present on the site minimizes the risk of fire spreading between buildings or to surrounding areas, should a fire occur. Smoking is not permitted in buildings, and appropriate cigarette butt disposal receptacles are provided on site. Appropriate firefighting equipment is installed in all buildings.

There is also potential for project-related vehicular accidents to occur, resulting in harm, injury or death of workers or wildlife. To mitigate potential collisions, traffic regulations, posted speed limits and wildlife crossing

signs will be followed while driving to and from the construction site. Workers will be reminded to abide by the *Highway Traffic Act*, and be alert and cautious at all times (particularly at dusk/dawn when wildlife are likely to be more prevalent in the area). If a collision with a large mammal occurs on site or within the town of Grand Rapids, the local Manitoba Sustainable Development office will be contacted.

4.2.14.2 Operation

Potential accidents or malfunctions that may occur during operation and result in environmental concern include:

- Power Failure, resulting in equipment failure or system overload;
- Equipment failure (drum or bag filters) which may cause partially treated aquaculture effluent to be released;
- Failure of the UV disinfection system which may not deactivate fish pathogens in the aquaculture effluent prior to discharge into the Saskatchewan River;
- Potential overload of aquaculture effluent from the hatchery, resulting in system failure and the release of partially treated aquaculture effluent into the Saskatchewan River; and
- Operational errors resulting in diversion of untreated aquaculture process water to the river outfall.

The potential for accidents and malfunctions is reduced by proper maintenance, inspection and operational directives for the GRFH. The GRFH water and aquaculture effluent treatment systems will be new, and will consist of modern, proven and reliable technology. Ongoing and timely preventative maintenance (in line with equipment manufacturer recommendations and as prescribed by the commissioning agent) will reduce the risk of malfunctions as a result of equipment failure (e.g., regular cleaning of UV sleeves will prevent failure resulting from biofilm growth). Furthermore, overloading the system is not expected to occur, as the GRFH will be operated within its designed capacity. If any of these potential accidents or malfunctions were to occur, potential outcomes could include:

- Contamination of surface water and shoreline soils from elevated levels of TSS and nutrients;
- Contamination of surface water from release of untreated or partially treated aquaculture effluent containing fish pathogens;
- Loss and disturbance of fish from increased TSS concentrations and low amounts of dissolved oxygen due to an increased BOD in the Saskatchewan River (unlikely due to a high dilution factor).

The severity of the impact on the environment would be determined by four (4) factors:

- The amount of untreated aquaculture effluent discharged into the Saskatchewan River;
- The degree to which the discharge was treated (if at all);
- The composition of the effluent; and
- The size of the received water body.

The GRFH will process aquaculture effluent produced by Walleye and Lake Sturgeon. The hatchery will only raise numbers and age classes within its designed capacity; therefore, the potential quantity of aquaculture effluent released to the Saskatchewan River would be limited. Additionally, as the effluent is discharged into a large body of water that is fast-flowing, any untreated aquaculture effluent entering into the Saskatchewan River would be substantially diluted. Ongoing Biosecurity measures (including egg and facility disinfection, population isolation with dedicated equipment, controlled facility access, virus testing and ongoing health checks, and use of a pathogen free water source) within the hatchery will reduce the probability that fish pathogens are present within the hatchery systems. System failure resulting from a power outage will be mitigated through the use of a back-up power source (on site diesel generator), required to maintain hatchery functions critical to the health of the fish being raised. In a power failure situation, operation of the hatchery will occur under a 100% reuse water scheme, resulting in no discharge of aquaculture effluent.

Any adverse effects on the environment associated with the release of untreated water into the Saskatchewan River as a result of an accident or malfunction are not expected to be measurable.

5.0 MONITORING AND FOLLOW UP

5.1 CONSTRUCTION

Manitoba Hydro will conduct compliance monitoring of Environmental Protection Plan items during construction.

Monitoring for revegetation success will occur in revegetated Project areas. The specific monitoring locations and schedule will depend on the location of the areas that are revegetated.

Additional monitoring and follow-up programs were considered; however, the residual environmental effects are anticipated to be not measureable with the implementation of the mitigation measures stated.

5.2 OPERATION

In accordance with an Environment Act Licence, on-site personnel will complete water quality monitoring of aquaculture effluent and Filox filter backwash water from designated sampling ports on a monthly basis. Aquaculture effluent will be sampled for the first year of operations (to cover an entire year of fish production), and the Filox filter backwash line will be sampled for the first three months of operation (as well water quality is expected to have minimal variation). This will ensure that the GRFH water treatment systems are operating properly, and allow any issues to be addressed in a timely manner in order to minimize environmental effects to surface water, shoreline soils and aquatic species and habitat. Additional monitoring will be determined based on these results.

Any constructed habitat installed for terrestrial mitigation (i.e. bat houses, barn swallow nesting structures and artificial snake dens), will be monitored for use by the target species. The specific monitoring schedule will be developed once the constructed habitat is installed.

Additional monitoring and follow-up programs were considered; however, the residual environmental effects are anticipated to be not measureable with the implementation of the mitigation measures stated.

5.3 REPORTING

A report summarizing all construction and operation monitoring will be submitted one-year post project completion. This report will also indicate if additional monitoring was determined to be necessary.

The Hatchery also reports annually as a requirement of their provincial Live Fish Handling Permit, and under the federal *Aquaculture Activities Regulations for Land-Based Operations (including Hatcheries) Discharging to Fish-Bearing Waters*.

6.0 ENVIRONMENTAL MANAGEMENT MEASURES

A comprehensive Environmental Protection Plan prescribing specific measure to be employed during the construction of the GRFH Upgrade and Expansion and ongoing operation of the facility has been developed (appendix 5). This plan includes environmental management and risk mitigation practices to be employed to prevent or mitigate adverse implications from the impacts identified above. As a result of the project design and application of the proposed measures, the residual environmental impacts resulting from construction and operation of the project are not anticipated to be measurable.

7.0 CONCLUSIONS

This *Environment Act* Proposal and accompanying report was prepared to support an application for an *Environment Act* licence for the construction and operation of an upgrade and expansion to the existing GRFH, located in Grand Rapids, Manitoba. The hatchery upgrade/expansion will *upgrade* the hatchery through the inclusion of process water and aquaculture effluent treatment and temperature control, and *expand* the hatchery capacity through design of rearing systems designed to accommodate a greater number of Lake Sturgeon than at present.

The proposed aquaculture effluent treatment system will incorporate a recirculation water use system, and filtration (bag filters) and UV disinfection of aquaculture effluent to meet or exceed Tier 1 MWQSOG's (TSS, BOD, TN, TP, temperature and pH). Used filter bags containing dewatered fish waste and uneaten fish food will be disposed of at an approved landfill facility.

As part of this study, an assessment of the potential environmental effects of the project during construction and operation was carried out. For potential environmental effects that were considered to be not measureable, no additional mitigation measures were proposed. Based on the assessment of available information and documented assumptions, potential residual environmental effects were all expected to be not measureable. Proposed monitoring will be used to confirm predictions. If additional public concerns about the project are raised, Manitoba Hydro will work with local area residents and businesses towards an acceptable solution.

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9.0 TABLES

Table 1: Chemicals used for fish rearing at Grand Rapids Fish Hatchery

Product Name	Composition	Manufacturer* (or equivalent)	Purpose	Point of Use	Concentration at point of use	Frequency and Volume (undiluted) of Use	Point(s) of Disposal
Hypochlorite	12% sodium hypochlorite	Brenntag	General Disinfection	Soak hatchery systems (4 @ 8,000 L)	200 ppm	1 - 2 times annually per system (14 L per system)	aquaculture effluent (after neutralization)
				Soak Service Garage systems (2 @ 13,000 L)	200 ppm	1 - 2 times annually per system (23 L per system)	aquaculture effluent (after neutralization)
Chlorine Neutralizing Agent (e.g. sodium thiosulfate or sodium ascorbate)	To be determined	To be determined	Chlorine neutralization	hatchery and garage systems	To be determined	1-2 times annually per system	aquaculture effluent
Virkon Aquatic	Potassium peroxymonosulfate sulfamic acid	Dupont	Hatchery Equipment Disinfection	sprayed on outdoor circular tanks (10 @ 565 ft^2 surface area)	1 - 2% (10,000 - 20,000 ppm)	1 - 2 times annually (13 L per tank)	aquaculture effluent (after dilution)
				sprayed on outdoor raceways (6 @ 1,322 ft^2 surface area)		sporadic (31 L per tank)	aquaculture effluent (after dilution)
				sprayed on stocking equipment (8 - 16 trips annually @ 10 L per trip)		200 g per treatment	disposed of on land (sprayed overtop of gravel or concrete pad)
				footbaths; sprayed on hatchery equipment @ 20 L per week		400 g weekly	evaporation (footbaths); sanitary sewer
Sodium phosphate dibasic	Sodium phosphate dibasic	VWR International Inc.	Walleye Marking	Walleye Hatchery (in bags with larvae to be stocked @ 14 L per bag)	700 ppm	9.8 g per bag (up to 3920 g annually)	sanitary sewer or drained onto land during stocking
Onycin 1000	Proprietary	Vetoquinol	Walleye Marking	Walleye Hatchery (in bags with larvae to be stocked @ 14 L per bag)	700 ppm	9.8 g per bag (up to 3920 g annually)	sanitary sewer or drained onto land during stocking
De-Foam FG 10	Proprietary	Syndel Labs	Walleye Marking	Walleye Hatchery (in bags with larvae to be stocked @ 14 L per bag)	357 ppm	5 ml per bag (up to 2 L annually)	sanitary sewer or drained onto land during stocking
Ovadine	Povidone iodine solution	Syndel Labs	Egg Disinfection	Treat (soak) eggs when they arrive in the hatchery @ 20 L per treatment	100 ppm	200 ml per treatment (up to 8 L annually)	sanitary sewer
Salt	Sodium Chloride	Sifto	Therapeutics	added to indoor tanks (@ 348 L maximum)	1% (10,000 ppm)	sporadic (up to 3.5 kg per treatment)	sanitary sewer
				added to outdoor tanks (@ 6,000 L maximum)	1% (10,000 ppm)	sporadic (up to 60 kg per treatment)	aquaculture effluent
TMS	Tricaine Methanesulfonate	Aqua Life	Therapeutics	added to bucket @ 10 L	250 ppm	sporadic (2.5 g per treatment)	sanitary sewer

Note: * Indicates Manufacturer of product currently used by the hatchery. Equivalent products from different manufacturers may be used on a go-forward basis, as required.

10.0 FIGURES

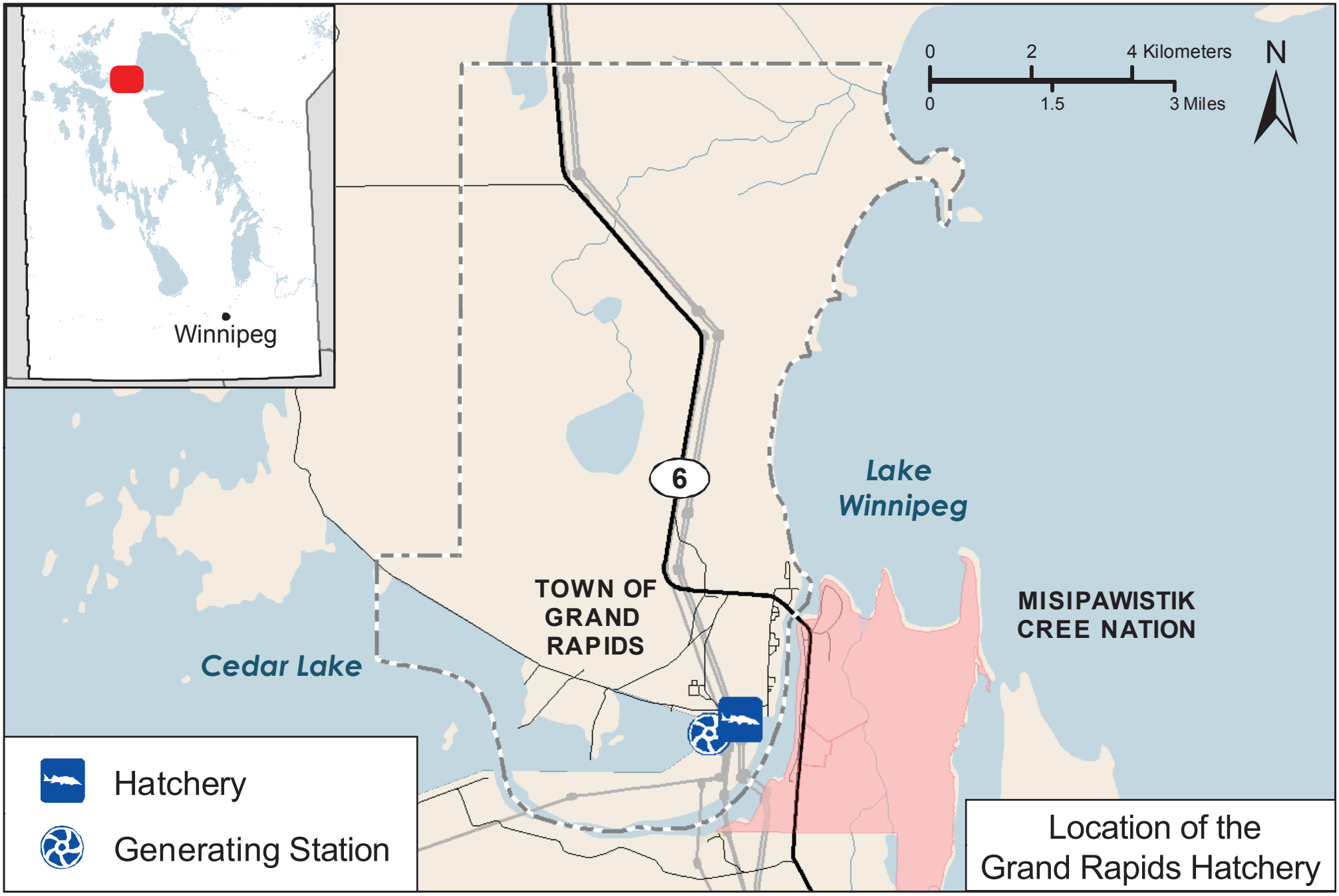

Winnipeg
0 2 4 Kilometers
0 1.5 3 Miles
N
6
Lake Winnipeg
TOWN OF GRAND RAPIDS
MISIPAWISTIK CREE NATION
Cedar Lake
Hatchery
Generating Station
Location of the Grand Rapids Hatchery

Figure 1

Figure 2: Aerial view of the Grand Rapids Fish Hatchery

Figure 3: Grand Rapids Fish Hatchery

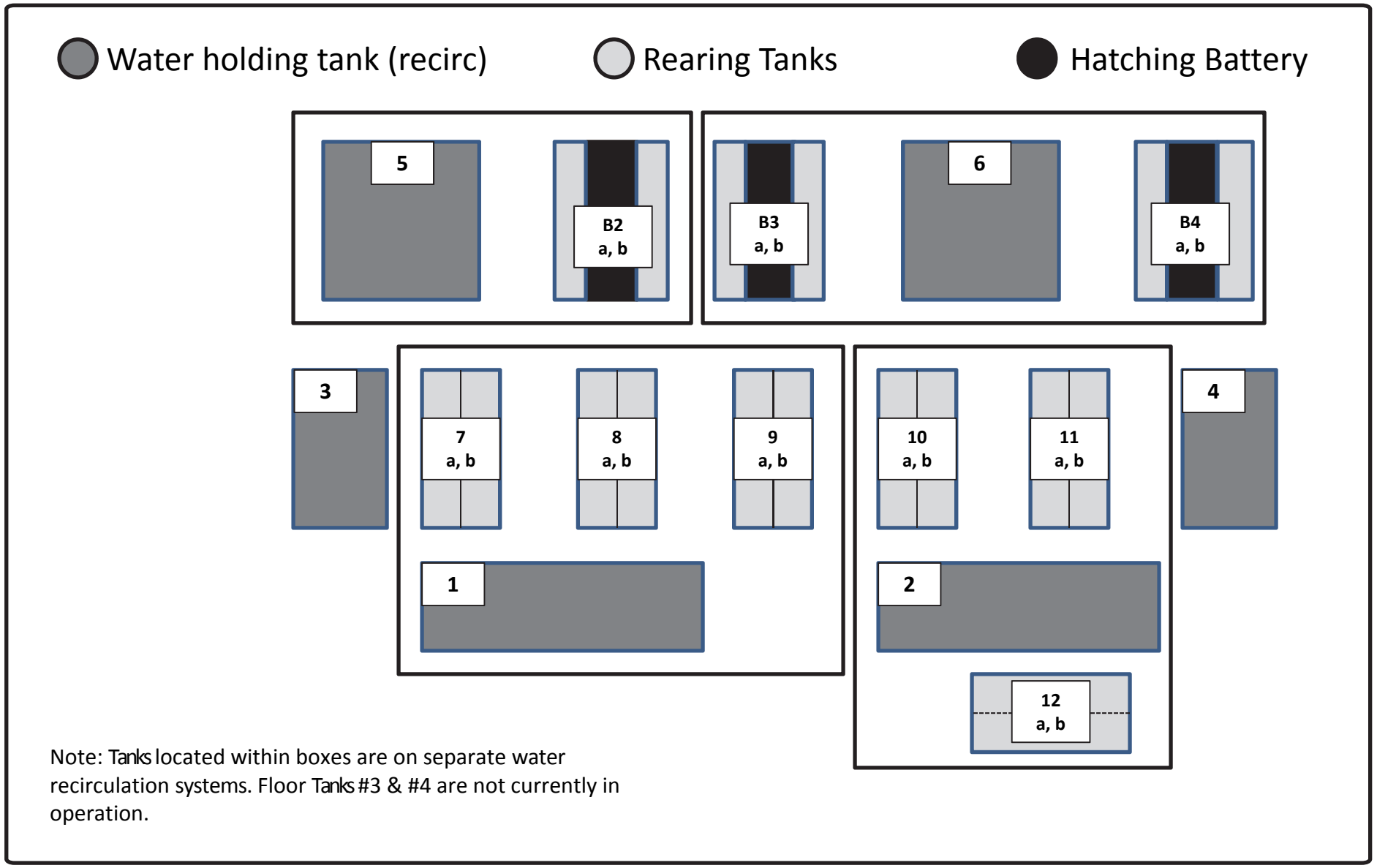
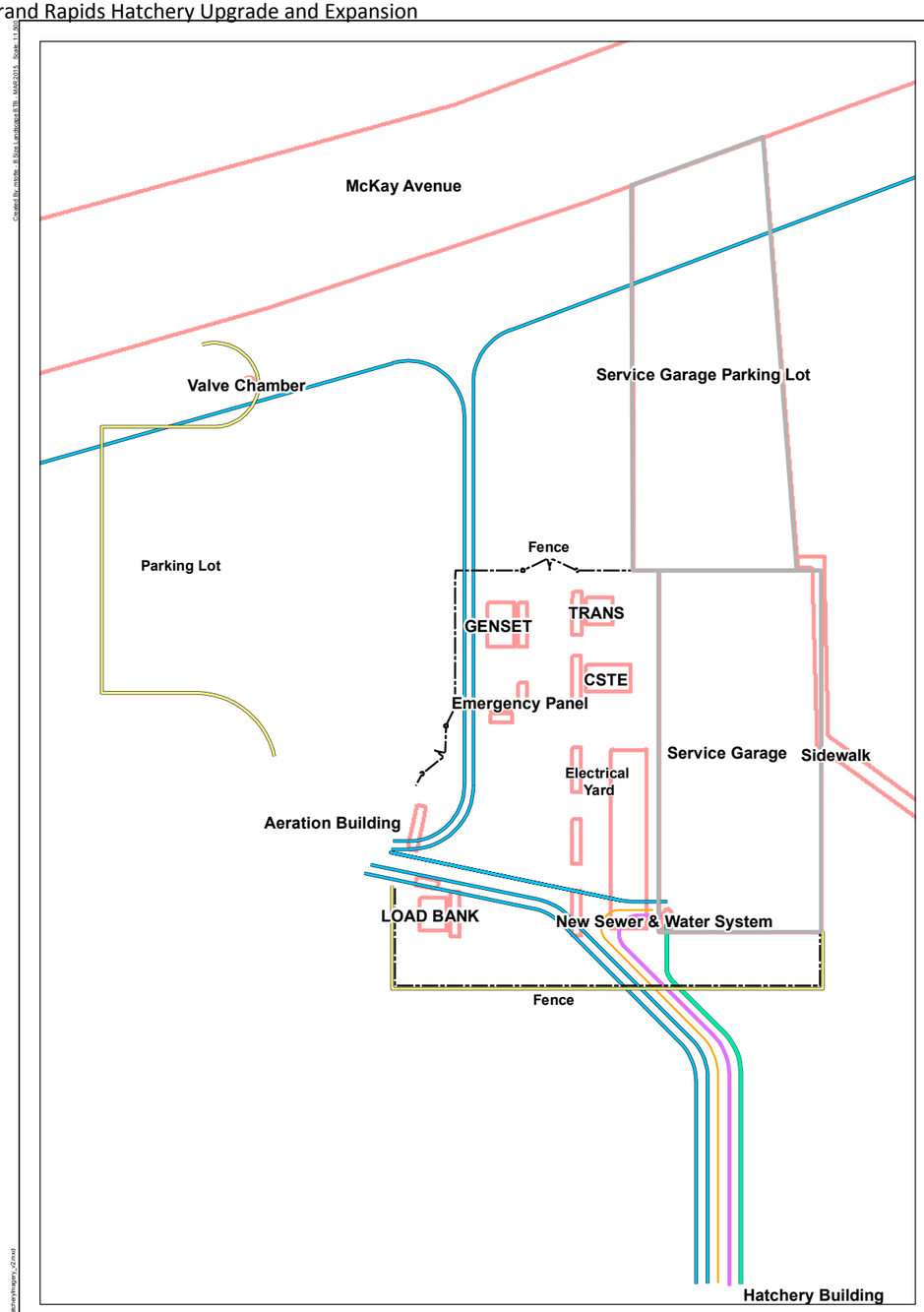


Figure 4: Schematic of existing fish production infrastructure layout at the Grand Rapids Fish Hatchery



Manitoba Hydro

DATA SOURCE:
Manitoba Hydro; Government of Manitoba; Government of Canada

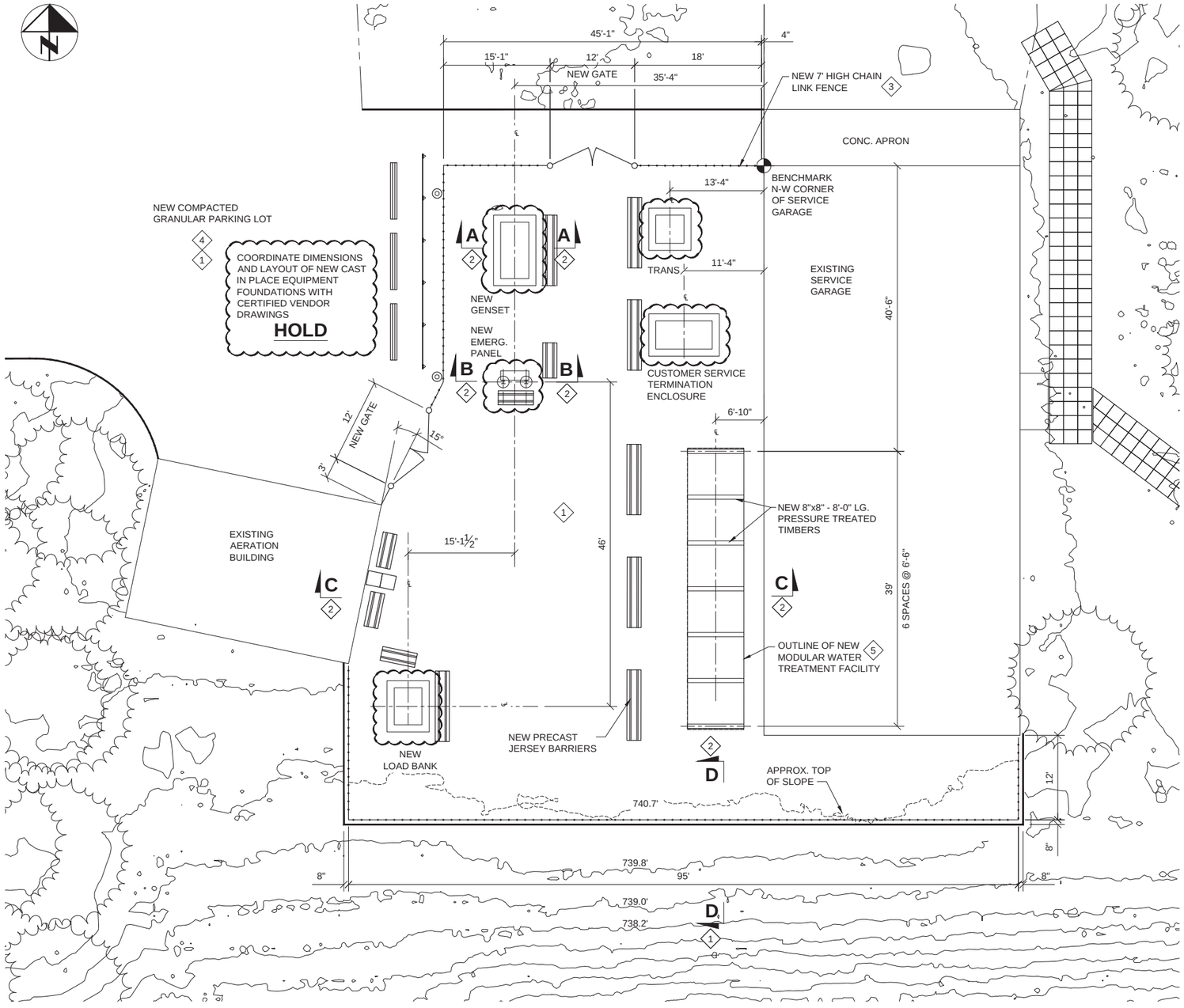
CREATED BY:
Manitoba Hydro - GIS Studies

COORDINATE SYSTEM:	DATE CREATED:	REVISION DATE:
NAD 1983 UTM Zone 14N	01-MAR-19	
0 0.015 0.03 Kilometres 0 0.01 0.02 Miles	VERSION NO: 1.0	QA/QC:

Legend

- Fence
- Parking Lot
- Aquaculture Filter Backwash
- Potable Water
- Well Water Piping
- New Sewer

Grand Rapids Hatchery
Site Overview



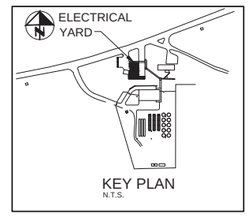
ELECTRICAL YARD PLAN

SCALE: 1/8" = 1'-0"

REFERENCE DRAWINGS		
CODE	DRAWING NUMBER	DRAWING TITLE
1	1-09063-DD-10100-0000 0002	SITE GENERAL - CIVIL - LIDAR SURVEY - SITE PLAN
2	1-09063-DD-27000-0000 0001	SITE GENERAL - CIVIL - ELECTRICAL EQUIPMENT PAD DETAILS
3	1-01000-DE-15100-0001 0001	MANITOBA HYDRO STANDARD - SEVEN FOOT HIGH CHAIN LINK FENCE - MATERIAL, ASSEMBLY & INSTALLATION SPECIFICATIONS & DETAILS
4	1-09063-DD-16500-5000 0001	NORTH PARKING LOT - CIVIL - PLAN
5	1-09063-DD-22003-4001 0001	SERVICE GARAGE - STRUCTURAL - MODULAR WATER TREATMENT FACILITY - PLANS AND SECTION

GENERAL NOTES

1. COORDINATE LOCATIONS AND INSTALLATION OF LIGHT POST FOUNDATIONS, CHAIN LINK FENCE POSTS AND PARKING FENCE POSTS SO AS TO AVOID DETRIMENTAL INTERFERENCES.
2. LOCATE ALL UNDERGROUND SERVICES PRIOR TO INSTALLATION OF LIGHT POST FOUNDATIONS, CHAIN LINK FENCE POSTS AND PARKING FENCE POSTS.
3. EXCAVATE TO 12" MIN. BELOW FINISHED GRADE. AREAS THAT HAVE BEEN EXCAVATED FOR MECHANICAL AND/OR ELECTRICAL SERVICES TO BE BACKFILLED TO 12" BELOW ELEVATIONS SHOWN.
4. CONTRACTOR TO TAKE PRECAUTIONS TO NOT DAMAGE EXISTING BUILDINGS OR FOUNDATIONS DURING EXCAVATION, BACKFILL OR COMPACTION.
5. JERSEY BARRIERS: BARKMAN CONCRETE LTD. PN.106484 - 120" x 30" PRECAST BARRIER CURB AND #106488 - 60" x 30" PRECAST BARRIER CURB.
6. COORDINATE LOCATIONS OF JERSEY BARRIERS WITH ELECTRICAL EQUIPMENT ACCESS REQUIREMENTS TO THE APPROVAL OF THE ENGINEER.



SNC·LAVALIN

APEGM Certificate of Authorization
SNC-Lavalin Inc.
No. 4489

4' 0 4' 12' 20'
1/8" = 1'-0"

REV.	DATE	DESCRIPTION	BY	CKD.	APP.
E	2019-03-06	RELEASED FOR TENDER	KDM	RCB	TD
D	2019-01-21	RELEASED FOR 95% SUBMISSION	KDM		TD
C	2018-11-16	RELEASED FOR 95% SUBMISSION	KDM		TD
B	2018-08-13	RELEASED FOR 60% SUBMISSION	KDM		TD
A	2018-05-11	RELEASED FOR 30% SUBMISSION	KDM		TD

Manitoba Hydro

DRAWN:	CHECKED:	SCALE:
K. McINTOSH	R. BEAN	N.T.S.
DESIGNED:	DATE:	SNC-LAVALIN
T. DEGER	2018-03-23	635455-0001-42DD

GRAND RAPIDS FISH HATCHERY

AUTHENTICATION FOR CURRENT REVISION

NOT FOR CONSTRUCTION

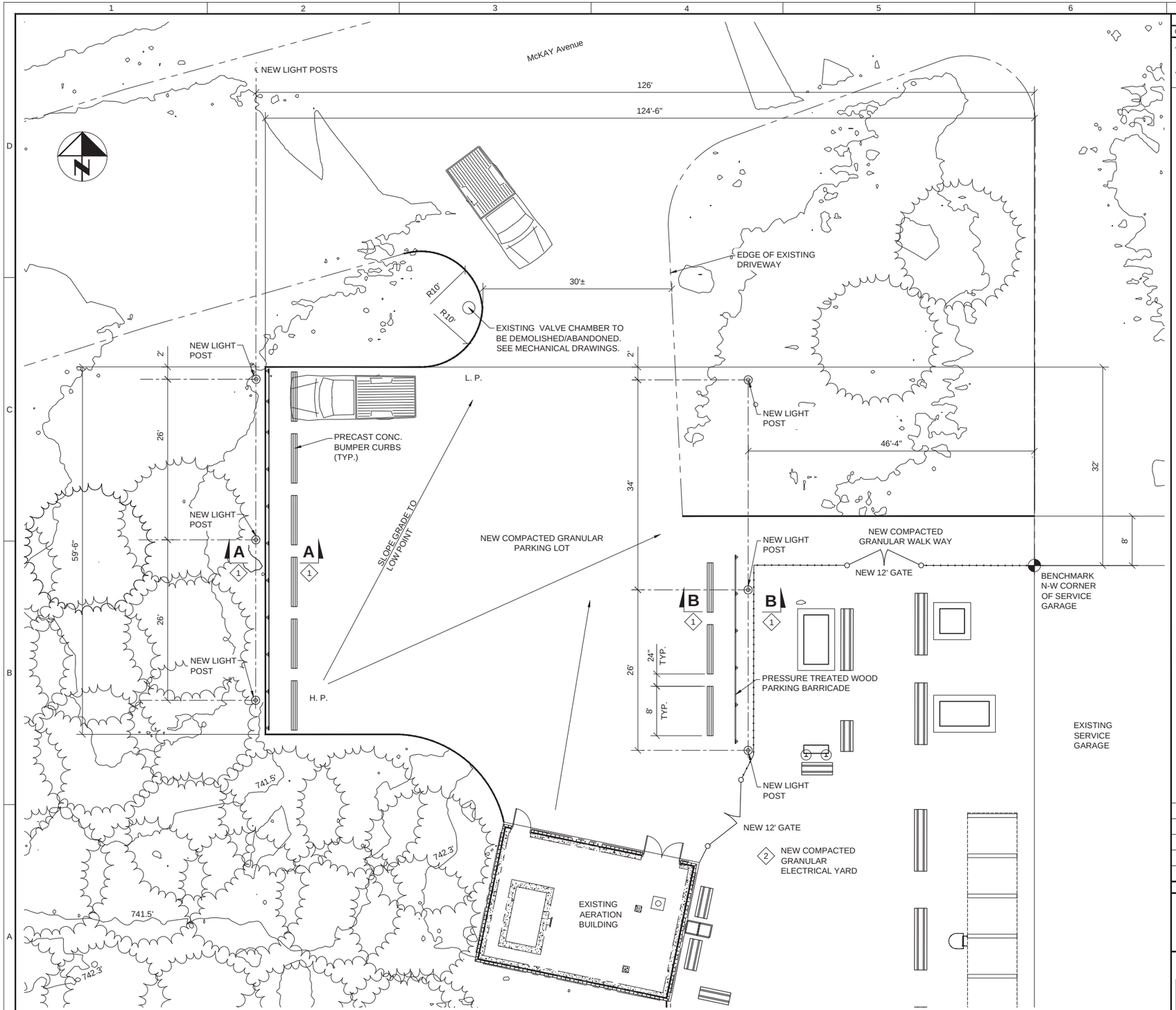
SITE GENERAL CIVIL ELECTRICAL YARD PLAN

DRAWING NUMBER	SHEET	REVISION
1-09063-DD-10100-0001	0001	E

ISO A1 (33.1 x 23.4)

M:\635455\0001\4ENG\41CIV\DD - General DWG\0000-Site General\1-09063-DD-10100-0001 0001.dwg 3/5/2019 11:22 AM

Figure 6



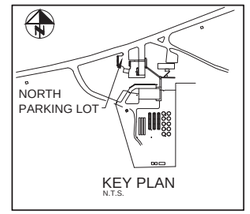
NORTH PARKING LOT PLAN

SCALE: 1/8" = 1'-0"

REFERENCE DRAWINGS		
CODE	DRAWING NUMBER	DRAWING TITLE
1	1-09063-DD-16500-5000 0002	NORTH PARKING LOT - CIVIL - DETAILS
2	1-09063-DD-10100-0001 0001	SITE GENERAL - CIVIL - ELECTRICAL YARD - PLAN

GENERAL NOTES

1. CONTRACTOR SHALL PROVIDE DRAINAGE PLAN FOR THE PARKING LOT AND ELECTRICAL YARD FOR THE ENGINEER'S APPROVAL.
2. PARKING LOT TO BE CONSTRUCTED AFTER DECOMMISSIONING OF THE 25kV LINE & REMOVAL OF THE EXISTING HYDRO POLES. REFER TO ELECTRICAL DRAWINGS.
3. EXCAVATE TO 12" MIN. BELOW FINISHED GRADE. AREAS THAT HAVE BEEN EXCAVATED FOR MECHANICAL AND/OR ELECTRICAL SERVICES TO BE BACKFILLED TO 12" BELOW ELEVATIONS SHOWN.
4. CONTRACTOR TO TAKE PRECAUTIONS TO PREVENT DAMAGE TO EXISTING BUILDINGS OR FOUNDATIONS DURING CONSTRUCTION.



KEY PLAN
N.T.S.

SNC·LAVALIN

APEGM Certificate of Authorization
SNC-Lavalin Inc.
No. 4489

4' 0 4' 12' 20'
1/8" = 1'-0"

REV.	DATE	DESCRIPTION	BY	CKD.	APP.
E	2019-03-06	RELEASED FOR TENDER	KDM	RCB	TD
D	2019-01-21	RELEASED FOR 95% SUBMISSION	KDM		TD
C	2018-11-16	RELEASED FOR 95% SUBMISSION	KDM		TD
B	2018-08-13	RELEASED FOR 60% SUBMISSION	KDM		TD
A	2018-05-11	RELEASED FOR 30% SUBMISSION	KDM		TD

Manitoba Hydro

DRAWN:	CHECKED:	SCALE:
K. McINTOSH	R. BEAN	N.T.S.
DESIGNED:	DATE:	SNC-LAVALIN
T. DEGER	2018-03-18	635455-0001-41DD

GRAND RAPIDS FISH HATCHERY

AUTHENTICATION FOR CURRENT REVISION

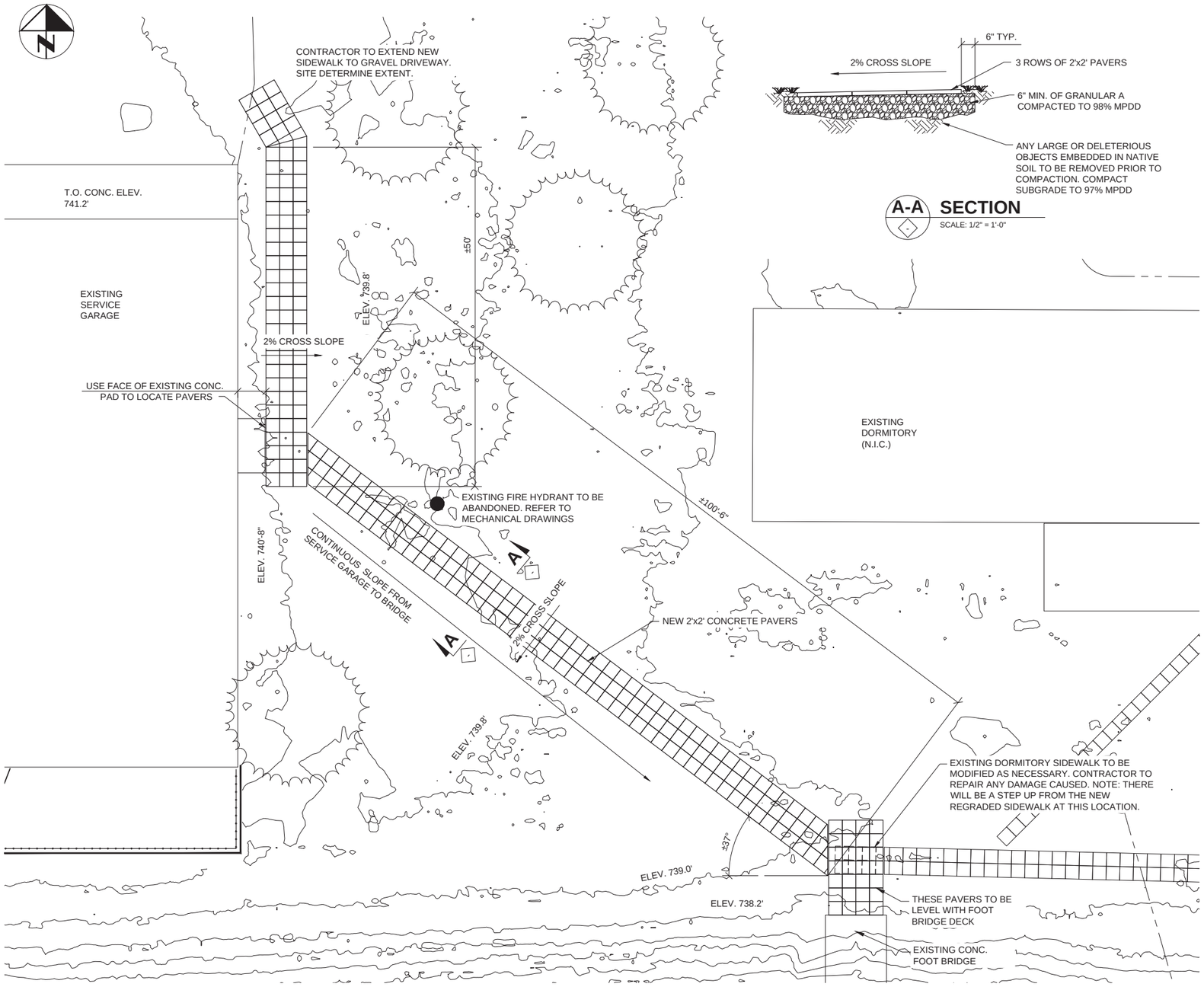
NOT FOR CONSTRUCTION

NORTH PARKING LOT CIVIL PLAN

DRAWING NUMBER	SHEET	REVISION
1-09063-DD-16500-5000	0001	E

ISO A1 (33.1 x 23.4)

M:\635455\0001\4ENG\41CIV\DD - General DWG\5000-North Parking Lot\1-09063-DD-16500-5000 0001.dwg 3/4/2019 1:07 PM



NEW SIDEWALK PLAN

SCALE: 1/8" = 1'-0"

A-A SECTION

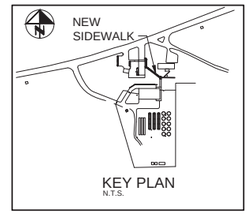
SCALE: 1/2" = 1'-0"

REFERENCE DRAWINGS

CODE	DRAWING NUMBER	DRAWING TITLE

GENERAL NOTES

1. DECOR PRECAST NATURAL DIAMOND PATIO PAVER - 2'x2'x1.63" (ESTIMATED 1050 SQ. FT. FINISHED AREA)



KEY PLAN
N.T.S.

1' 0 1' 3' 5'
1/2" = 1'-0"

4' 0 4' 12' 20'
1/8" = 1'-0"

SNC·LAVALIN

APEGM Certificate of Authorization
SNC-Lavalin Inc.
No. 4489

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C	2018-11-16	RELEASED FOR 95% SUBMISSION	KDM		TD
B	2018-08-13	RELEASED FOR 60% SUBMISSION	KDM		TD
A	2018-05-11	RELEASED FOR 30% SUBMISSION	KDM		TD

Manitoba Hydro

DRAWN:	CHECKED:	SCALE:
K. McINTOSH	R. BEAN	N.T.S.
DESIGNED:	DATE:	SNC-LAVALIN
T. DEGER	2018-03-19	635455-0001-42DD

GRAND RAPIDS FISH HATCHERY

AUTHENTICATION FOR CURRENT REVISION

NOT FOR CONSTRUCTION

SITE GENERAL CIVIL LANDSCAPING NEW SIDEWALK PLAN

DRAWING NUMBER	SHEET	REVISION
1-09063-DD-12600-0000	0001	E

ISO A1 (33.1 x 23.4)

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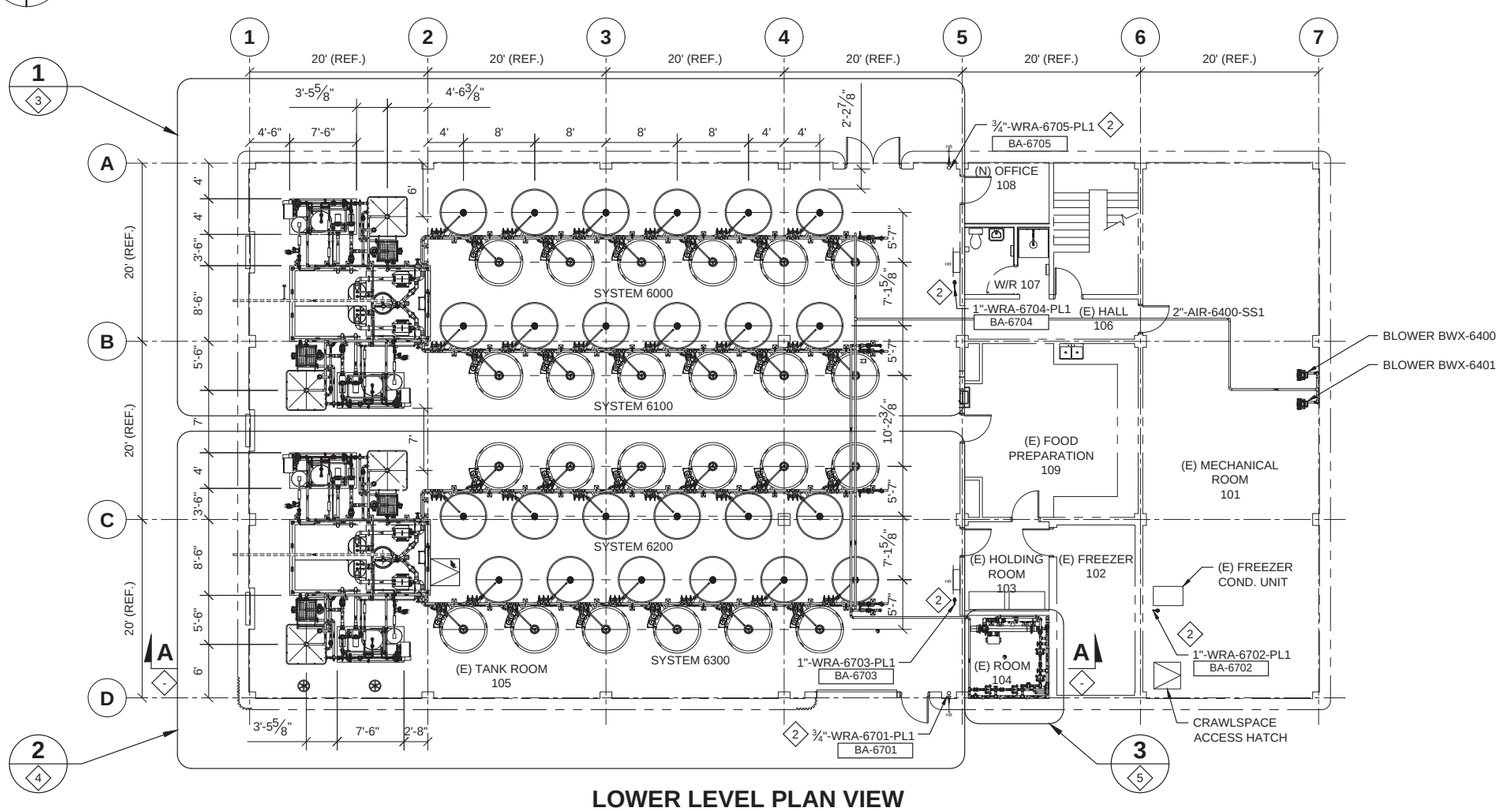
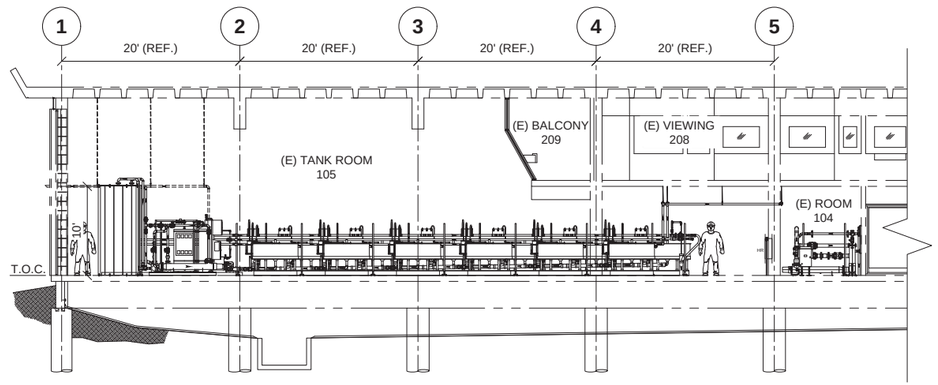


LOWER LEVEL PLAN VIEW

SCALE: 1/8" = 1'-0"



A-A SECTION

SCALE: 1/8" = 1'-0"

REFERENCE DRAWINGS		
CODE	DRAWING NUMBER	DRAWING TITLE
1	1-09063-DD-67278-0000 0001	PROCESS - LEGEND
2	1-09063-DD-72700-6000 0001	HATCHERY BUILDING - MECHANICAL - AQUACULTURE WATER SYSTEM - CRAWLSPACE - PLAN
3	1-09063-DD-72700-6002 0001	HATCHERY BUILDING - MECHANICAL - AQUACULTURE WATER SYSTEM - 6000 & 6100 PLAN & SECTIONS
4	1-09063-DD-72700-6003 0001	HATCHERY BUILDING - MECHANICAL - AQUACULTURE WATER SYSTEM - 6200 & 6300 PLAN & SECTIONS
5	1-09063-DD-72700-6005 0001	HATCHERY BUILDING - MECHANICAL - AQUACULTURE WATER SYSTEM - BAG FILTERS - RM 104 PLAN VIEW

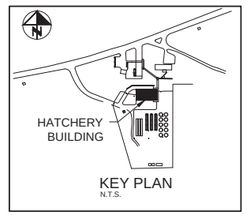
LEGEND

HB — NEW HOSE BIB

HR — NEW HOSE REEL

GENERAL NOTES

1. SEE DRAWING 1-09063-DD-67278-0000-0001 FOR LINE AND VALVE NUMBER IDENTIFICATION. 1
2. ALL WRA PIPING SHALL BE INSULATED ACCORDING TO PROJECT SPECIFICATIONS. REFER TO PROCESS AND INSTRUMENTATION DRAWINGS FOR INSULATION THICKNESS.



KEY PLAN
N.T.S.

SNC·LAVALIN

APEGM
Certificate of Authorization
SNC-Lavalin Inc.
No. 4489

4' 0 4' 12' 20'
1/8" = 1'-0"

REV.	DATE	DESCRIPTION	BY	CKD.	APP.
E	2019-03-06	RELEASED FOR TENDER	CAF	DAC	JA
D	2019-01-21	RELEASED FOR 95% SUBMISSION	CAF		JA
C	2018-11-16	RELEASED FOR 95% SUBMISSION	CAF		JA
B	2018-08-13	RELEASED FOR 60% SUBMISSION	CAF		JA
A	2018-05-11	RELEASED FOR 30% SUBMISSION	CAF		JA

Manitoba Hydro

DRAWN:	CHECKED:	SCALE:
C. FETTERLY	D. CROCKER	N.T.S.
DESIGNED:	DATE:	SNC-LAVALIN
F. ZURZOLO	2018-03-22	635455-0001-45DD

GRAND RAPIDS FISH HATCHERY

AUTHENTICATION FOR CURRENT REVISION

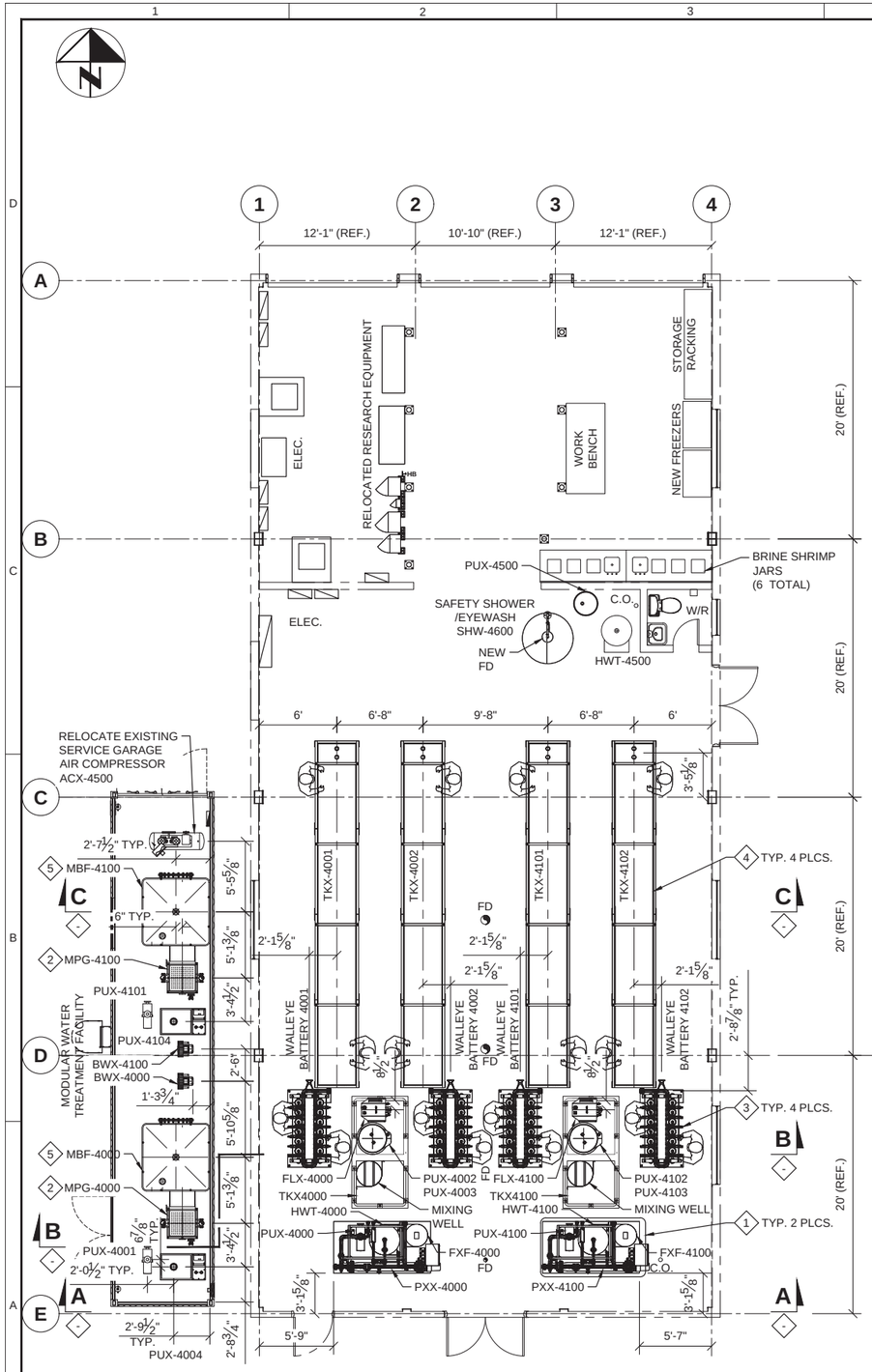
NOT FOR CONSTRUCTION

HATCHERY BUILDING MECHANICAL AQUACULTURE WATER SYSTEM LOWER LEVEL PLAN & SECTION

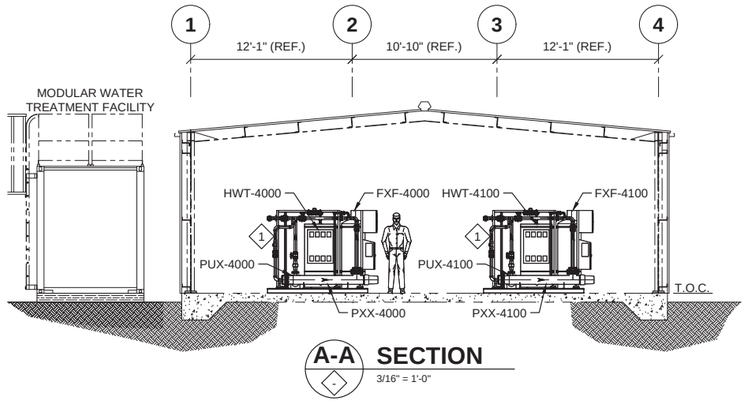
DRAWING NUMBER	SHEET	REVISION
1-09063-DD-72700-6001	0001	E

ISO A1 (33.1 x 23.4)

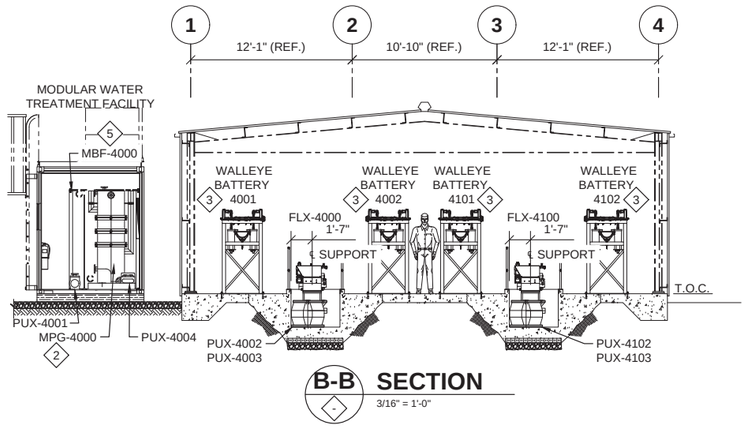
M:\635455\0001\4ENG\45MEC\DD - General DWG\6000-Hatchery\72700 - Aquaculture\1-09063-DD-72700-6001 0001.dwg 3/19/2019 9:06 AM



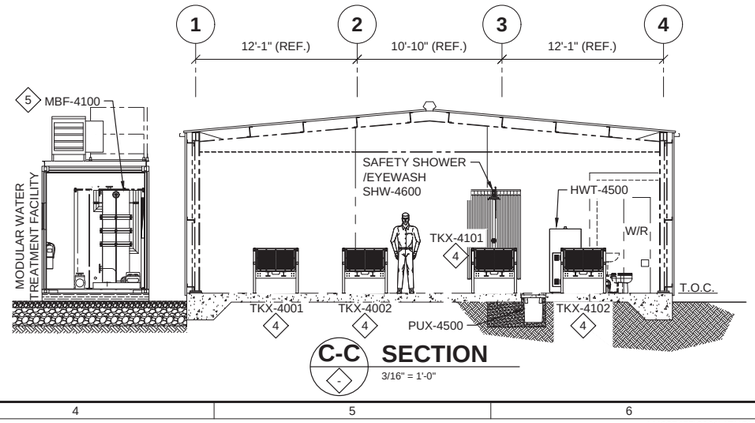
SERVICE GARAGE PLAN VIEW
3/16" = 1'-0"



A-A SECTION
3/16" = 1'-0"



B-B SECTION
3/16" = 1'-0"

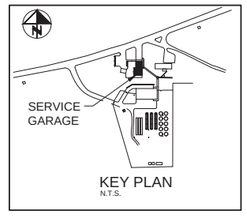


C-C SECTION
3/16" = 1'-0"

REFERENCE DRAWINGS		
CODE	DRAWING NUMBER	DRAWING TITLE
1	1-09063-DD-72700-0001 0001	SITE GENERAL - MECHANICAL - AQUACULTURE WATER SYSTEM - EQUIP. SKID GEN. ARRANGEMENT
2	1-09063-DD-72700-0003 0001	SITE GENERAL - MECHANICAL - AQUACULTURE WATER SYSTEM - 93 GPM DEGASSER DETAILS
3	1-09063-DD-72700-4001 0001	SERVICE GARAGE - MECHANICAL - AQUACULTURE WATER SYSTEM - FISH BATTERY ARRANGEMENT
4	1-09063-DD-72700-4002 0001	SERVICE GARAGE - MECHANICAL - AQUACULTURE WATER SYSTEM - RECT. TANK ARRANGEMENT
5	1-09063-DD-72700-4003 0001	SERVICE GARAGE - MECHANICAL - AQUACULTURE WATER SYSTEM - 1,085 GAL. BIOFILTER DETAILS

GENERAL NOTES

1. ALL EQUIPMENT SHALL BE INSTALLED AS PER MANUFACTURE'S SPECIFICATIONS.



KEY PLAN
N.T.S.

SNC·LAVALIN

APEGM
Certificate of Authorization
SNC-Lavalin Inc.
No. 4489

4' 0 4' 8' 12'
3/16" = 1'-0"

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C	2018-11-16	RELEASED FOR 95% SUBMISSION	CAF		JA
B	2018-08-13	RELEASED FOR 60% SUBMISSION	CAF		JA
A	2018-05-11	RELEASED FOR 30% SUBMISSION	CAF		JA

Manitoba Hydro

DRAWN:	CHECKED:	SCALE:
C. FETTERLY	D. CROCKER	N.T.S.
DESIGNED:	DATE:	SNC-LAVALIN
F. ZURZOLO	2018-03-22	635455-0001-45DD

GRAND RAPIDS FISH HATCHERY

AUTHENTICATION FOR CURRENT REVISION

NOT FOR CONSTRUCTION

SERVICE GARAGE MECHANICAL AQUACULTURE WATER SYSTEM PLAN AND SECTIONS

DRAWING NUMBER	SHEET	REVISION
1-09063-DD-72700-4000	0001	E

ISO A1 (33.1 x 23.4)

M:\635455\0001\4ENG\45MEC\DD - General DWG\4000-Service Garage\72700 - Aquaculture\1-09063-DD-72700-4000 0001.dwg 3/18/2019 1:57 PM

VALVE & PIPING SYMBOLS

- GLOBE VALVE (N.C.)
- GATE VALVE (N.O.)
- GATE VALVE (N.C.)
- BALL VALVE (N.O.)
- BALL VALVE (N.C.)
- BUTTERFLY VALVE (N.O.)
- BUTTERFLY VALVE (N.C.)
- STRAINER
- CAP
- PRESSURE RELIEF
- O/F — OVERFLOW TO FLOOR
- FLEX JOINT
- FLOOR DRAIN
- TRAP
- VENT
- ORIFICE
- AR — REGULATED-EXHAUST DEVICE
- C.O. — CLEAN OUT
- M — MOTORIZED LINEAR GLOBE VALVE
- S — SOLENOID VALVE
- M — MOTORIZED BALL VALVE
- M — MOTORIZED GATE VALVE
- M — MOTORIZED THREE WAY VALVE
- T — THERMOSTATIC MIXING VALVE
- THREE WAY VALVE
- AR — AIR RELEASE
- ROTAMETER
- REDUCER
- PRESSURE REGULATING VALVE
- CHECK VALVE
- S — SAMPLE PORT
- CAMLOCK
- M — POTABLE WATER METER
- M — FLOW METER
- HOSE
- EXPANSION JOIN
- BACKFLOW PREVENTER

MISCELLANEOUS SYMBOLS

- PI — PRESSURE INDICATOR
- PIT — PRESSURE INDICATING TRANSMITTER
- FS — FLOW SWITCH
- PS — PRESSURE SWITCH
- DPT — DIFFERENTIAL PRESSURE TRANSMITTER
- LSL — LEVEL SWITCH LOW
- LSH — LEVEL SWITCH HIGH
- M — MOTOR
- VFD — VARIABLE FREQUENCY DRIVE
- FI — FLOW INDICATOR
- TIT — TEMPERATURE INDICATING TRANSMITTER
- AE — ANALYZER ELEMENT
- AIT — ANALYZER INDICATING TRANSMITTER
- FIT — FLOW INDICATING TRANSMITTER
- LIT — LEVEL INDICATING TRANSMITTER
- FCV — FLOW CONTROL VALVE
- LCV — LEVEL CONTROL VALVE
- TCV — TEMPERATURE CONTROL VALVE
- PUMP
- HEAT RECOVERY VENTILATOR
- EXHAUST FAN
- ULTRAVIOLET UNIT
- HB — HOSE BIB
- HR — HOSE RACK
- 1" H — PIPING INSULATION
- FIRE HYDRANT
- MACDONALD JAR
- BLOWER/FAN

P&ID STANDARDS

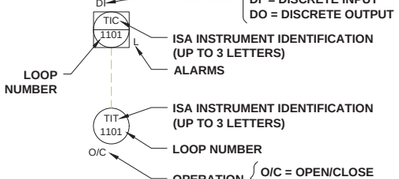
1. ALL UNITS IN IMPERIAL, EXCEPT AS OTHERWISE NOTED.
2. DRAWING CONTENT GENERALLY CONFORMS TO ANSI/ISA STANDARDS S5.1 AND S5.3.
3. PID'S INDICATE MAJOR PROCESS PIPING AND EQUIPMENT, ASSOCIATED LOCAL INSTRUMENTATION AND UCMS I/O.
4. EQUIPMENT IS ARRANGED IN SEQUENCE WITH PRINCIPLE FUNCTIONS AND FLOWS.
5. ALL PROCESS LINES ARE LABELED ACCORDING TO FUNCTION AND SIZE UTILIZING SYSTEM CODES DEFINED HEREIN.
6. EACH SYSTEM INTERCONNECTION POINT BETWEEN DRAWINGS IS LABELED WITH A SOURCE DRAWING NUMBER AND A DESTINATION DRAWING NUMBER. ARROWS ON PROCESS PIPING INDICATE THE DIRECTION OF FLOW BETWEEN THE DRAWINGS.

LINETYPE LEGEND

- BUILDING/EQUIPMENT REFERENCE
- WELL WATER
- F — FILTERED WATER
- FB — FOREBAY WATER
- HIGH SOLIDS WATER
- TREATED EFFLUENT
- AIR
- TREATED WATER
- TREATED WARM WATER
- BACKWASH
- WDC — POTABLE COLD WATER SUPPLY
- WDH — POTABLE HOT WATER SUPPLY
- SEWER
- V — VENT

INSTRUMENT DESIGNATION

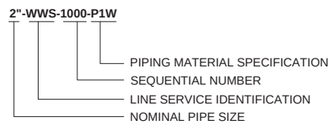
LINE SERVICE IDENTIFICATION



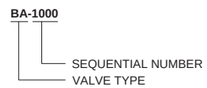
INSTRUMENT SYMBOLS

- PLC FUNCTION FIELD MOUNTED
- PLC FUNCTION PRIMARY LOCATION (CONTROL ROOM) FIELD MOUNTED
- PLC FUNCTION PRIMARY LOCATION (CONTROL ROOM) REAR PANEL MOUNTED
- INSTRUMENTS FIELD MOUNTED
- INSTRUMENTS PRIMARY LOCATION FIELD MOUNTED
- INSTRUMENTS PRIMARY LOCATION FIELD MOUNTED REAR PANEL MOUNTED
- I — INTERLOCK

LINE NUMBER



VALVE NUMBER



INSTRUMENT LINE SYMBOLS

- INSTRUMENT SUPPLY OR CONNECTION TO PROCESS DESIGNATED AS FOLLOWS:
- CONTROL SIGNAL
- ELECTRIC SIGNAL (3-WIRE)
- PNEUMATIC SIGNAL
- CAPILLARY TUBE
- ELECTROMAGNETIC OR SONIC SIGNAL GUIDED
- DATA / SERIAL LINK (OPTIONAL)

LINE SERVICE IDENTIFICATION

WRA - WELL WATER
WPR - FILTERED WATER
WFR - FOREBAY WATER
WWS - HIGH SOLIDS WATER
WRE - TREATED EFFLUENT
AIR - AIR
WTS - TREATED WATER
WRS - TREATED WARM WATER
WBK - BACKWASH
WDC - POTABLE COLD WATER SUPPLY
WDH - POTABLE HOT WATER SUPPLY
SEW - SEWER
VNT - VENT

VALVE TYPE

GA - GATE
BA - BALL
BF - BUTTERFLY
GL - GLOBE
CH - CHECK
RV - PRESSURE RELIEF

AREA IDENTIFICATION

0000 - SITE GENERAL
1000 - WEST PUMP HOUSE
2000 - EAST PUMP HOUSE
3000 - AERATION BUILDING
4000 - SERVICE GARAGE
5000 - NORTH PARKING LOT
6000 - HATCHERY BUILDING
7000 - GENSET
8000 - OUTDOOR TANKS

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No. 4489

REV.	DATE	DESCRIPTION	BY	CKD.	APP.
F	2019-03-06	RELEASED FOR TENDER	CAF	FZ	JA
E	2019-01-21	RELEASED FOR 95% SUBMISSION	CAF		JA
D	2018-11-16	RELEASED FOR 95% SUBMISSION	CAF		JA
C	2018-08-24	RELEASED FOR 60% SUBMISSION (ELECTRICAL)	YK		JA
B	2018-08-13	RELEASED FOR 60% SUBMISSION	CAF		JA
A	2018-05-11	RELEASED FOR 30% SUBMISSION	CAF		JA

Manitoba Hydro

DRAWN: C. FETTERLY	CHECKED: F. ZURZOLO	SCALE: N.T.S.
DESIGNED: F. ZURZOLO	DATE: 2018-03-19	SNC-LAVALIN 635455-0001-49DD

GRAND RAPIDS FISH HATCHERY

AUTHENTICATION FOR CURRENT REVISION

NOT FOR CONSTRUCTION

PROCESS LEGEND

DRAWING NUMBER	SHEET	REVISION
1-09063-DD-67278-0000	0001	F

ISO A1 (33.1 x 23.4)

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3000 - AERATION BUILDING

6000 - HATCHERY BUILDING

ATMOSPHERE 900 CFM FAN FNX-3000 ATMOS.

ATMOS. ATMOSPHERE 900 CFM FAN FNX-3001

DEGASSER MPG-3001

1000 - WEST PUMPHOUSE

0 TO 1,900 LPM @ 52 PSIG WELL PUMP PUX-1000

DEGASSER MPG-3000

TANK TKX-3000

2000 - EAST PUMPHOUSE

0 TO 1,750 LPM @ 57 PSIG WELL PUMP PUX-2000

0 TO 2,280 LPM @ 50 PSIG WELL PUMP PUX-3000

1 0 - 200 LPM TO SERVICE GARAGE

0 TO 100 LPM

0 TO 100 LPM

OPERATING BLOWER BWX-6000

ATMOSPHERE

STANDBY BLOWER BWX-6001

ATMOSPHERE

80 CFM

0 - 230 LPM TO EXIST. BUILDING UTILITIES

1 0 TO 350 LPM FROM SERVICE GARAGE

BAG FILTER FXF-6402

BAG FILTER FXF-6403

BAG FILTER FXF-6400

BAG FILTER FXF-6401

UV UNIT PXX-6400

0 - 350 LPM TREATED WATER TO EXIST. RIVER DISCHARGE

0 TO 5,000 LPM TO OUTDOOR CIRCULAR TANKS & RACEWAYS

SYSTEM 6000

HOT WATER HEATER HWT-6000

MEDIA BIO FILTER MBF-6000 20 CFM

0 TO 92 LPM FILOX FILTER FXF-6000

0 TO 8 LPM DRUMFILTER FLX-6000

TANK TKX-6000

0 TO 350 LPM PUMP PUX-6000

ATMOSPHERE 150 CFM FAN FNX-6000

DEGASSER MPG-6000

ATMOS.

PUMP PUX-6001

UV UNIT PXX-6000

0 TO 350 LPM

0 - 100 LPM WATER TO EXIST. RIVER DISCHARGE

0 - 17.5 LPM TREATED WATER TO EXIST. RIVER DISCHARGE

0 TO 8 LPM TYP.

0 - 50 LPM CAMLOCK CONNECTION FOR FISH TRANSPORT TANK OR SYSTEM DRAIN

0 TO 29 LPM

TANK TKX-6001

TYP. 10 TANKS TKX-6002 TO 6011

TANK TKX-6012

SYSTEM 6100

HOT WATER HEATER HWT-6100

MEDIA BIO FILTER MBF-6100 20 CFM

0 TO 92 LPM FILOX FILTER FXF-6100

0 TO 8 LPM DRUMFILTER FLX-6100

TANK TKX-6100

0 TO 350 LPM PUMP PUX-6100

PUMP PUX-6400 PUX-6401

ATMOSPHERE 150 CFM FAN FNX-6100

DEGASSER MPG-6100

ATMOS.

PUMP PUX-6101

UV UNIT PXX-6100

0 TO 350 LPM

0 - 100 LPM WATER TO EXIST. RIVER DISCHARGE

0 - 17.5 LPM TREATED WATER TO EXIST. RIVER DISCHARGE

0 TO 8 LPM TYP.

0 - 50 LPM CAMLOCK CONNECTION FOR FISH TRANSPORT TANK OR SYSTEM DRAIN

0 TO 29 LPM

TANK TKX-6101

TYP. 10 TANKS TKX-6102 TO 6111

TANK TKX-6112

SYSTEM 6200

HOT WATER HEATER HWT-6200

MEDIA BIO FILTER MBF-6200 20 CFM

0 TO 92 LPM FILOX FILTER FXF-6200

0 TO 8 LPM DRUMFILTER FLX-6200

TANK TKX-6200

0 TO 350 LPM PUMP PUX-6200

ATMOSPHERE 150 CFM FAN FNX-6200

DEGASSER MPG-6200

ATMOS.

PUMP PUX-6201

UV UNIT PXX-6200

0 TO 350 LPM

0 - 100 LPM WATER TO EXIST. RIVER DISCHARGE

0 - 17.5 LPM TREATED WATER TO EXIST. RIVER DISCHARGE

0 TO 8 LPM TYP.

0 - 50 LPM CAMLOCK CONNECTION FOR FISH TRANSPORT TANK OR SYSTEM DRAIN

0 TO 29 LPM

TANK TKX-6201

TYP. 10 TANKS TKX-6202 TO 6211

TANK TKX-6212

SYSTEM 6300

HOT WATER HEATER HWT-6300

MEDIA BIO FILTER MBF-6300 20 CFM

0 TO 92 LPM FILOX FILTER FXF-6300

0 TO 8 LPM DRUMFILTER FLX-6300

TANK TKX-6300

0 TO 350 LPM PUMP PUX-6300

PUMP PUX-6402 PUX-6403

ATMOSPHERE 150 CFM FAN FNX-6300

DEGASSER MPG-6300

ATMOS.

PUMP PUX-6301

UV UNIT PXX-6300

0 TO 350 LPM

0 - 100 LPM WATER TO EXIST. RIVER DISCHARGE

0 - 17.5 LPM TREATED WATER TO EXIST. RIVER DISCHARGE

0 TO 8 LPM TYP.

0 - 50 LPM CAMLOCK CONNECTION FOR FISH TRANSPORT TANK OR SYSTEM DRAIN

0 TO 29 LPM

TANK TKX-6301

TYP. 10 TANKS TKX-6302 TO 6311

TANK TKX-6312

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REFERENCE DRAWINGS

CODE	DRAWING NUMBER	DRAWING TITLE
1	1-09063-DD-67278-0000 0003	PROCESS FLOW DIAGRAM SERVICE GARAGE

GENERAL NOTES

1. REFER TO DWG 1-09063-DD-67278-0000-0001 FOR LEGEND.
2. REFER TO DESIGN REPORT FOR OPERATING SCENARIOS.

REV.	DATE	DESCRIPTION	BY	CKD.	APP.
E	2019-03-06	RELEASED FOR TENDER	CAF	FZ	JA
D	2019-01-21	RELEASED FOR 95% SUBMISSION	CAF		JA
C	2018-11-16	RELEASED FOR 95% SUBMISSION	CAF		JA
B	2018-08-13	RELEASED FOR 60% SUBMISSION	CAF		JA
A	2018-05-11	RELEASED FOR 30% SUBMISSION	CAF		JA

Manitoba Hydro

DRAWN:	CHECKED:	SCALE:
C. FETTERLY	F. ZURZOLO	N.T.S.
DESIGNED: F. ZURZOLO	DATE: 2018-03-19	SNC-LAVALIN 635455-0001-49DD

GRAND RAPIDS FISH HATCHERY

AUTHENTICATION FOR CURRENT REVISION

NOT FOR CONSTRUCTION

PROCESS FLOW DIAGRAM PUMPHOUSE, AERATION & HATCHERY BUILDINGS

DRAWING NUMBER	SHEET	REVISION
1-09063-DD-67278-0000	0002	E

ISO A1 (33.1 x 23.4)

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Figure 12

4000 - SERVICE GARAGE

SYSTEM 4000

MEDIA BIO FILTER MBF-4000 40 CFM

ATMOSPHERE 150 CFM FAN FNX-4000

DEGASSER MPG-4000

ATMOS.

PUMP PUX-4001

UV UNIT PXX-4000

0 TO 8 LPM TYP.

0 TO 96 LPM

0 - 50 LPM CAMLOCK CONNECTION FOR FISH TRANSPORT TANK OR SYSTEM DRAIN

0 TO 17.5 LPM TYP.

TANK TKX-4001

WALLEYE BATTERY 4001

0 - 9 LPM TREATED WATER TO EXIST. RIVER DISCHARGE

0 TO 8 LPM TYP.

0 TO 96 LPM

0 - 50 LPM CAMLOCK CONNECTION FOR FISH TRANSPORT TANK OR SYSTEM DRAIN

0 TO 17.5 LPM TYP.

TANK TKX-4002

WALLEYE BATTERY 4002

0 - 9 LPM TREATED WATER TO EXIST. RIVER DISCHARGE

0 TO 100 LPM FILOX FILTER FXF-4000

F

HOT WATER HEATER HWT-4000

0 TO 8 LPM DRUMFILTER FLX-4000

0 TO 350 LPM

0 TO 350 LPM PUMP PUX-4000

TANK TKX-4000

PUMP PUX-4002 PUX-4003

0 - 100 LPM WATER TO EXIST. RIVER DISCHARGE

80 CFM

OPERATING BLOWER BWX-4000

ATMOSPHERE

STANDBY BLOWER BWX-4001

ATMOSPHERE

1

0 TO 200 LPM FROM AERATION BUILDING

SYSTEM 4100

MEDIA BIO FILTER MBF-4100 40 CFM

ATMOSPHERE 150 CFM FAN FNX-4100

DEGASSER MPG-4100

ATMOS.

PUMP PUX-4101

UV UNIT PXX-4100

0 TO 8 LPM TYP.

0 TO 96 LPM

0 - 50 LPM CAMLOCK CONNECTION FOR FISH TRANSPORT TANK OR SYSTEM DRAIN

0 TO 17.5 LPM TYP.

TANK TKX-4101

WALLEYE BATTERY 4101

0 - 9 LPM TREATED WATER TO EXIST. RIVER DISCHARGE

0 TO 8 LPM TYP.

0 TO 96 LPM

0 - 50 LPM CAMLOCK CONNECTION FOR FISH TRANSPORT TANK OR SYSTEM DRAIN

0 TO 17.5 LPM TYP.

TANK TKX-4102

WALLEYE BATTERY 4102

0 - 9 LPM TREATED WATER TO EXIST. RIVER DISCHARGE

0 TO 100 LPM FILOX FILTER FXF-4100

F

HOT WATER HEATER HWT-4100

0 TO 8 LPM DRUMFILTER FLX-4100

0 TO 350 LPM

0 TO 350 LPM PUMP PUX-4100

TANK TKX-4100

PUMP PUX-4102 PUX-4103

0 - 100 LPM WATER TO EXIST. RIVER DISCHARGE

0 - 350 LPM BACKWASH WATER TO HATCHERY BAG FILTERS

1

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REFERENCE DRAWINGS

CODE	DRAWING NUMBER	DRAWING TITLE
1	1-09063-DD-67278-0000 0002	PROCESS FLOW DIAGRAM PUMPHOUSE, AERATION & HATCHERY BUILDINGS

GENERAL NOTES

1. REFER TO DWG 1-09063-DD-67278-0000-0001 FOR LEGEND.
2. REFER TO DESIGN REPORT FOR OPERATING SCENARIOS.

REV.	DATE	DESCRIPTION	BY	CKD.	APP.
E	2019-03-06	RELEASED FOR TENDER	CAF	FZ	JA
D	2019-01-21	RELEASED FOR 95% SUBMISSION	CAF		JA
C	2018-11-16	RELEASED FOR 95% SUBMISSION	CAF		JA
B	2018-08-13	RELEASED FOR 60% SUBMISSION	CAF		JA
A	2018-05-11	RELEASED FOR 30% SUBMISSION	CAF		JA

Manitoba Hydro

DRAWN:	CHECKED:	SCALE:
C. FETTERLY	F. ZURZOLO	N.T.S.
DESIGNED:	DATE:	SNC-LAVALIN
F. ZURZOLO	2018-03-19	635455-0001-49DD

GRAND RAPIDS FISH HATCHERY

AUTHENTICATION FOR CURRENT REVISION

NOT FOR CONSTRUCTION

PROCESS FLOW DIAGRAM SERVICE GARAGE

DRAWING NUMBER	SHEET	REVISION
1-09063-DD-67278-0000	0003	E

ISO A1 (33.1 x 23.4)

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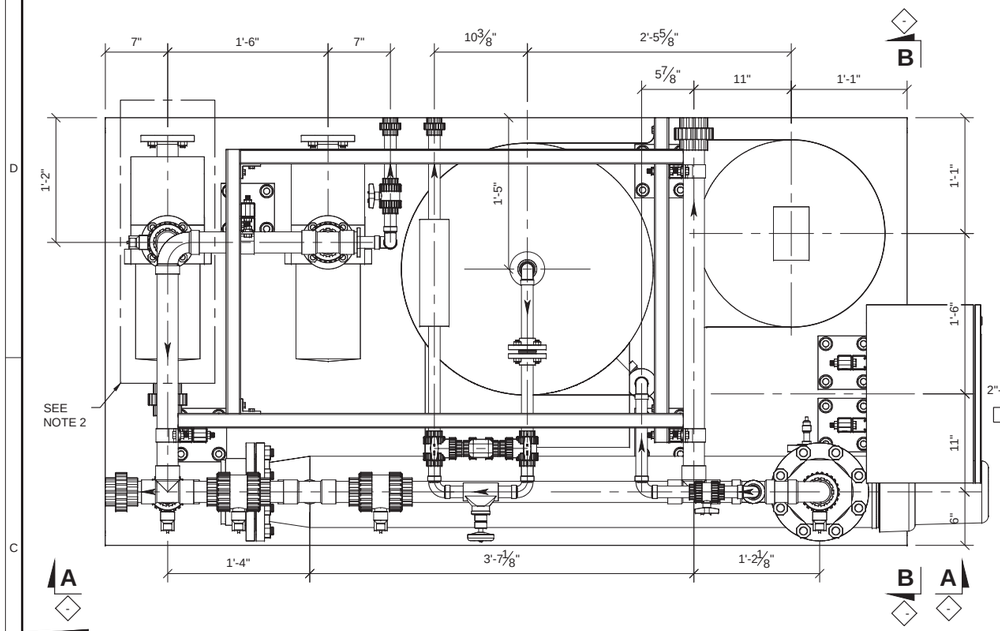
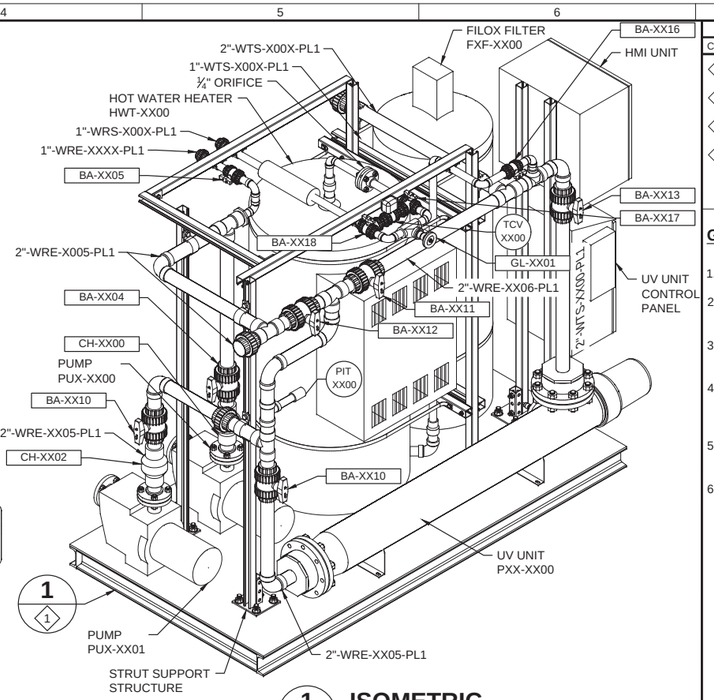


PLAN VIEW 2 3 4

SCALE: 1 1/2" = 1'-0"



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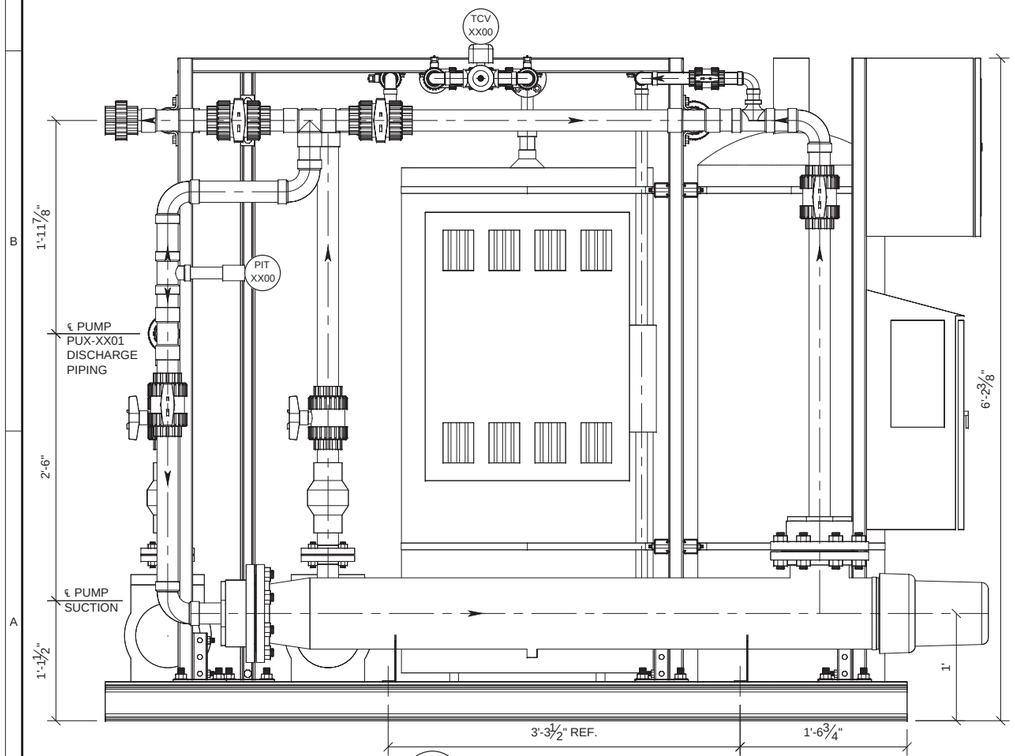
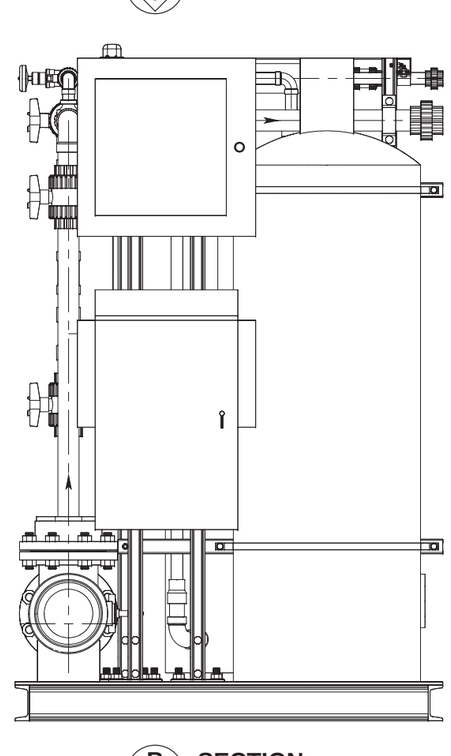


A SECTION

SCALE: 1 1/2" = 1'-0"



B SECTION

SCALE: 1 1/2" = 1'-0"

REFERENCE DRAWINGS		
CODE	DRAWING NUMBER	DRAWING TITLE
1	1-09063-DD-72700-0001 0002	SITE GENERAL - MECHANICAL - AQUACULTURE WATER SYSTEM - EQUIP. SKID FRAME DETAILS
2	1-09063-DD-72700-4000 0001	SERVICE GARAGE - MECHANICAL - AQUACULTURE WATER SYSTEM - PLAN & SECTIONS
3	1-09063-DD-72700-6002 0001	HATCHERY BUILDING - MECHANICAL - AQUACULTURE WATER SYSTEM - 6000 & 6100 PLAN & SECTION
4	1-09063-DD-72700-6003 0001	HATCHERY BUILDING - MECHANICAL - AQUACULTURE WATER SYSTEM - 6200 & 6300 PLAN & SECTION

GENERAL NOTES

1. ALL VALVES, FITTINGS AND PIPING ARE PER SPEC. PL1.
2. EQUIPMENT SKIDS FOR SERVICE GARAGE **DO NOT** REQUIRE PUMP PUX-XX01, VALVES BA-XX10 CH-XX02, FITTINGS & PIPE UP TO FIRST UNION.
3. ALL MECHANICAL EQUIPMENT AND STRUT SUPPORTS SHALL BE SECURELY FASTENED TO EQUIP. SKID FRAME 1 AS REQUIRED.
4. ALL WRS PIPING SHALL BE INSULATED ACCORDING TO PROJECT SPECIFICATION. REFER TO PROCESS AND INSTRUMENTATION DRAWINGS FOR INSULATION THICKNESS.
5. DETAIL DESIGN FABRICATION AND TESTING SHALL BE IN ACCORDANCE WITH THE CONTRACT SPECIFICATIONS.
6. DIMENSIONS ARE FOR REFERENCE ONLY.

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No. 4489

6" 0 6" 12" 18"
1 1/2" = 1'-0"

REV.	DATE	DESCRIPTION	BY	CKD.	APP.
E	2019-03-06	RELEASED FOR TENDER	CAF	DAC	JA
D	2019-01-21	RELEASED FOR 95% SUBMISSION	CAF		JA
C	2018-11-16	RELEASED FOR 95% SUBMISSION	CAF		JA
B	2018-08-13	RELEASED FOR 60% SUBMISSION	CAF		JA
A	2018-05-11	RELEASED FOR 30% SUBMISSION	CAF		JA

Manitoba Hydro

DRAWN:	CHECKED:	SCALE:
C. FETTERLY	D. CROCKER	N.T.S.
DESIGNED:	DATE:	SNC-LAVALIN
F. ZURZOLO	2018-03-29	635455-0001-45DD

GRAND RAPIDS FISH HATCHERY

AUTHENTICATION FOR CURRENT REVISION

NOT FOR CONSTRUCTION

SITE GENERAL MECHANICAL AQUACULTURE WATER SYSTEM EQUIP. SKID GEN. ARRANGEMENT

DRAWING NUMBER	SHEET	REVISION
1-09063-DD-72700-0001	0001	E

ISO A1 (33.1 x 23.4)

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APPENDIX 1:
ENVIRONMENT ACT PROPOSAL FORM

Environment Act Proposal Form

Manitoba
Sustainable Development

Name of the development:
Grand Rapids Fish Hatchery Upgrade and Expansion

Type of development per Classes of Development Regulation (Manitoba Regulation 164/88):
Class 1

Legal name of the applicant:
Manitoba Hydro

Mailing address of the applicant: 360 Portage Avenue (16) Winnipeg, MB R3C 0G8

Contact Person: Stephanie Backhouse

City: Winnipeg Province: Manitoba Postal Code: R3C 0G8

Phone Number: (204) 360-3476 Fax: (204) 360-3298 email: sbackhouse@hydro.mb.ca

Location of the development: Grand Rapids, Manitoba

Contact Person: Stephanie Backhouse

Street Address: 3 McKay Avenue

Legal Description: Northwest ¼ Section 22, Township 48 in Range 13 West

City/Town: Grand Rapids Province: Manitoba Postal Code: R3C 0G8

Phone Number: (204) 639-2644 Fax: email:

Name of proponent contact person for purposes of the environmental assessment:
Stephanie Backhouse

Phone: (204) 360-3476
Fax: (204) 360-6135

Mailing address: 360 Portage Avenue (16)
Winnipeg, MB
R3C 0G8

Email address: sbackhouse@hydro.mb.ca

Webpage address:

Date: 2019-05-17

Signature of proponent, or corporate principal of corporate proponent:

Printed name: Stephanie Backhouse

PRINT RESET

A complete **Environment Act Proposal (EAP)** consists of the following components:

- ☑ **Cover letter**
- ☑ **Environment Act Proposal Form**
- ☑ **Reports/plans supporting the EAP** (see "Information Bulletin - Environment Act Proposal Report Guidelines" for required information and number of copies)
- ☑ **Application fee** (Cheque, payable to Minister of Finance, for the appropriate fee)

Per Environment Act Fees Regulation (Manitoba Regulation 168/96):

Class 1 Developments	$1,000
Class 2 Developments	$7,500
Class 3 Developments:	
Transportation and Transmission Lines	$10,000
Water Developments	$60,000
Energy and Mining	$120,000

Submit the complete EAP to:

Director
Environmental Approvals Branch
Manitoba Conservation and Water Stewardship
Suite 160, 123 Main Street
Winnipeg, Manitoba R3C 1A5

For more information:
Phone: (204) 945-8321
Fax: (204) 945-5229
http://www.gov.mb.ca/sd/eal

APPENDIX 2: PUBLIC ENGAGEMENT MATERIALS AND DOCUMENTATION

Public Engagement Materials A2-1: Project Fact Sheet

Grand Rapids Fish Hatchery Upgrade

What is it?

Beginning in fall 2019, Manitoba Hydro's Grand Rapids Fish Hatchery will undergo extensive upgrades, mainly to its fish rearing equipment and water treatment processes. There will be no physical expansion of the hatchery grounds or facilities.

The hatchery rears lake sturgeon for stocking in the Nelson River and Burntwood River and hatches walleye eggs for stocking in the local Saskatchewan River and Sandhill Bay in Southern Indian Lake.

Why do we need it?

Manitoba Hydro needs to increase the number of lake sturgeon reared at the hatchery to meet stocking commitments made under the Keeyask Environment Act Licence and to the Nelson River Sturgeon Board. The upgrades will also replace aging infrastructure and ensure continued compliance with water quality and biosecurity requirements. An improved rearing environment will result in better fish hatch, survival, and growth.

The Grand Rapids Fish Hatchery borders the Misipawistik Cree Nation and Town of Grand Rapids, about 450 kilometres north of Winnipeg. It supports fish conservation, research and public education.

Manitoba Hydro

When will it start?

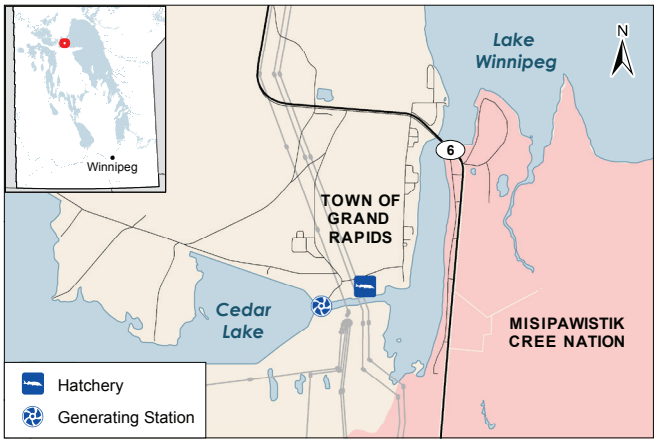
The upgrade will take approximately two years, with the following tentative schedule:

- winter 2019 - engagement of interested parties
- fall 2019 - project start
- fall 2021 - project completion

What local impacts will it have?

Following the upgrade, the hatchery will discharge less aquaculture waste water into the Saskatchewan River and treatment filters will be installed to ensure continued compliance with nutrient and pollutant removal requirements. All solid waste (uneaten fish food and fish excrement) will be treated and disposed of in a licenced landfill.

As part of the upgrade, the hatchery plans to disconnect from the surface water supply line (from the forebay) and connect to the local municipal water supply for its potable water needs, like washroom facilities. The local municipality will be consulted on this change. On-site groundwater wells will continue to supply water for the hatchery's fish rearing processes.



During construction, work crews will access the facility using Government Road to limit disruption in the Town of Grand Rapids. Little noise disturbance to the public is expected because most of the work will be taking place indoors.

A licenced disposal area will be used for any solid waste produced by the upgrade work.

Are work permits, licences, or regulatory approvals required?

Manitoba Hydro is currently preparing an Environment Act Proposal (EAP) report to obtain a Class 1 Development Licence, which is classified as the least environmentally disruptive type of work. A plan to prevent or lessen the potential impacts identified in the EAP report will also be submitted.

All production and stocking activities are conducted under the terms of a Live Fish Handling Permit issued by Manitoba Sustainable Development. Another permit may be required due to the presence of endangered little brown bats on the premises.

Manitoba Hydro will continue to monitor the quality of waste water generated by its fish rearing processes, in accordance with its Environment Act Licence and to ensure continued compliance with nutrient and pollutant removal requirements imposed by the Water Protection Act.

Will there be local employment or business opportunities?

Due to the specialized nature of the upgrade work, local employment and business opportunities will be limited. Manitoba Hydro will encourage the contractor to use local services, like accommodations for work crews.

For more information:

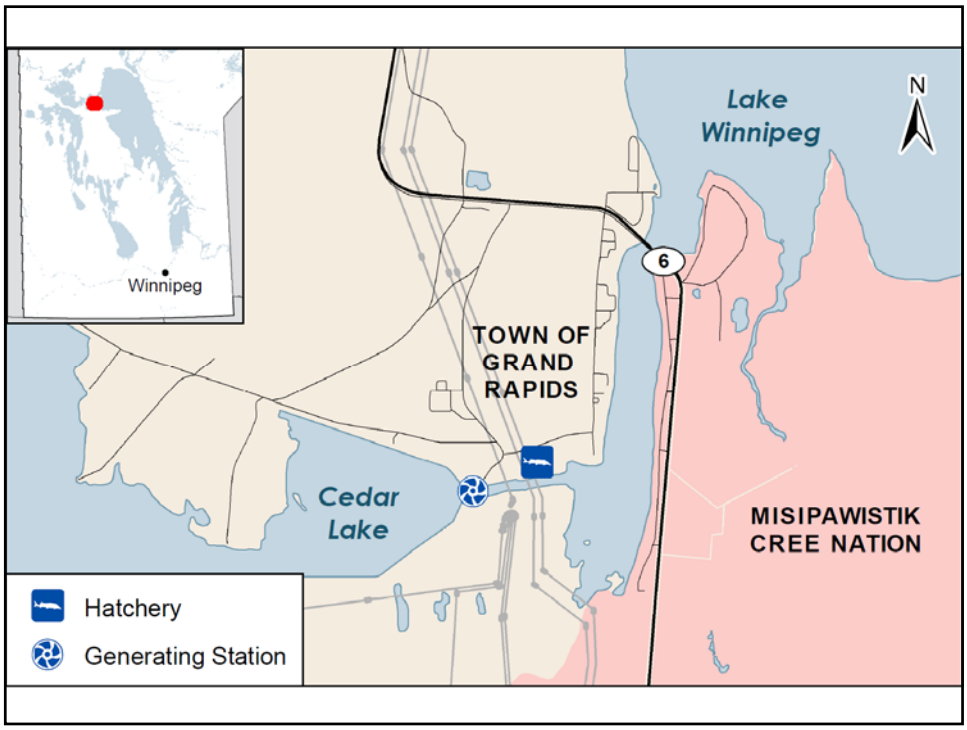
Questions related to the Grand Rapids Fish Hatchery Upgrade can be directed to:

Mark Manzer
Manitoba Hydro
Community Engagement
T: 204-360-3258
C: 204-391-1726
E: mmanzer@hydro.mb.ca

Public Engagement Materials A2-2: Presentation to Grand Rapids Town Council (March 22. 2019)

Grand Rapids Fish Hatchery Upgrade and Expansion Project

Presentation to
Town of Grand Rapids Mayor & Council
March 22, 2019
Presented by Manitoba Hydro



History

- 1973: Built by Province to stock fish for commercial & recreational fisheries
  - Lake Whitefish, Walleye, Trout
- 1994: Began producing Lake Sturgeon for Nelson River Sturgeon Board's conservation efforts

History

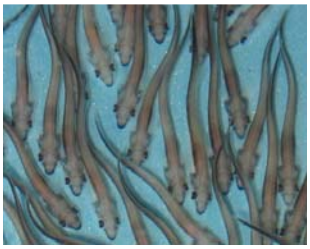
- 2007: Manitoba Hydro purchased hatchery
  - Province continued to operate
- 2012: Manitoba Hydro assumed full operation
  - 7 permanent staff, 2 seasonal staff

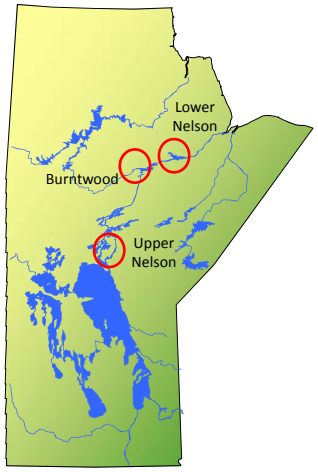
Current Operations

- Walleye (fry)
  - Saskatchewan River
    - Grand Rapids Fisherman's Co-op
    - Misipawistik Cree Nation
  - Southern Indian Lake
    - Southern Indian Lake Environmental Steering Committee

Current Operations

- Lake Sturgeon (fingerlings, yearlings)
  - Upper Nelson River
    - Nelson River Sturgeon Board
  - Lower Nelson River
  - Burntwood River
    - Keeyask Hydropower Limited Partnership





Current Operations

- Live Fish Handling Permit
  - Implement Biosecurity & Standard Operating Procedures
    - Pathogen-free water source (well water)
    - Egg disinfection
    - Equipment disinfection
    - Separation between species, populations & families
    - Virus testing


Need for Change

- No water temperature control
  - 5°C well water; surface water
- Water treatment equipment does not support a water recirculation system
  - built as flow-through system
- No effluent treatment
  - solids & micro-organisms released directly to river


Need for Change

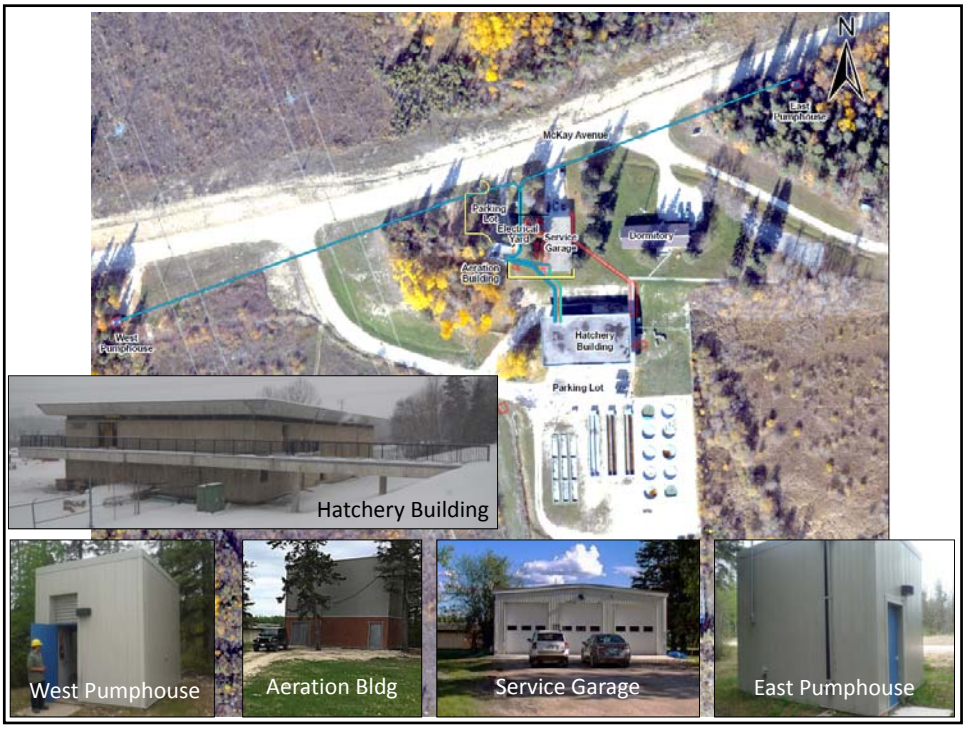
- Deteriorating infrastructure
  - piping, pumphouses, aeration tower
- Health & safety concerns
  - dangerous electrical panels, no safety showers, no potable water
- Capacity constraints
  - unable to meet sturgeon stocking commitments, 1500 vs 4000 yearlings
- No back-up power

Site Upgrades

- Well water supply
  - temperature control; piping; pumphouses; and treatment to support water recirculation system (95% reuse)
- Biosecurity
  - remove surface water to hatchery & service garage, separation of fish species and families
- Effluent treatment
  - collect solids & sterilize aquaculture effluent water prior to release
- Safety and reliability upgrades to facilities
  - electrical panels, safety showers, domestic water supply, backup power generator

Site 'Expansions'

- Reconfigure Hatchery layout
  - replace 18 troughs with 60 circular tanks (population & family separation)
- Renovate service garage
  - support Walleye hatch (species separation)
  - modular water treatment facility
- Parking lot along McKay Ave for staff & visitors
- Electrical yard, includes back-up generator



Schedule

- Design: March 2019
- Licensing: October 2019
- Tendering: October 2019
- Construction: October 2021

Regulatory Process

- *Environment Act* License
  - Provincial legislation
  - Class 1 Development (least disruptive)
- Components of the *Environment Act* Application
  - Project Description
  - Public Engagement Process
  - Environmental Effects Assessment
    - Identify potential environmental effects of Construction and Operation on existing conditions
  - Project Mitigation

Regulatory Process

- Environmental Effects Assessment
  - Assessed the following environmental components:
    - Air Quality
    - Climate
    - Soil
    - Ground and Surface water
    - Flora and Fauna
    - Vehicle Congestion
    - Waste Management
    - Aesthetics
    - Land Use
    - Heritage Resources
    - Socio Economic
    - Human health and Well-being
    - Accidents and Malfunctions
  - Little to no negative effects on assessed components
    - Previously disturbed site
    - Minimal work outside the buildings

Monitoring and Follow-up

- Construction
  - Environmental Protection Plan
    - Provides details and direction on environmental mitigation measures that must be followed
- Operation
  - Monitoring
    - Routine water quality testing of aquaculture effluent prior to the discharge point into the SK river
  - Additional Follow-up
    - Not necessary due to lack of measurable environmental effects with implementation of mitigation measures

Environmental Components

- Ground and Surface water
  - Reduced volume of groundwater used
    - Water Recirculation System (95% reuse)
  - Effluent Treatment
    - Bag Filters (solids)
    - UV Disinfection (microorganisms)

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Environmental Components

- Waste Management (uneaten food/fish waste):
  - Solids Removal
    - Drum Filter (water recirculation system)
    - Bag Filter (effluent)
  - Solids Disposal
    - Licensed landfill (preferred site is Grand Rapids); or
    - Provide as domestic fertilizer to partnering businesses/ individuals

Estimated annual weight of solids = 1,500 kg

Environmental Components

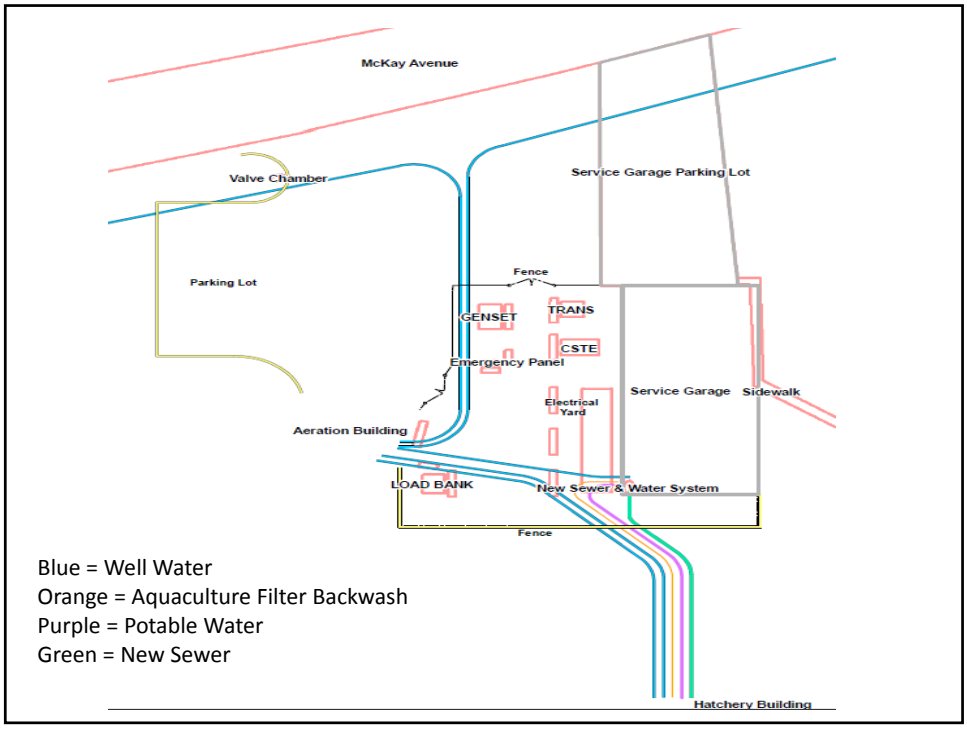
- Vehicle Congestion
  - Traffic associated with the project will be routed down Government road
- Heritage Resources
  - The Provincial Historic Resources Branch completed a preliminary review of the project footprint and indicated construction within the previously developed hatchery grounds has low potential to impact significant heritage resources
- Business Opportunities
  - Indigenous Content included as a Tender evaluation criteria
  - Potential Contractor use of local businesses (accommodation, restaurants, service station, etc.)

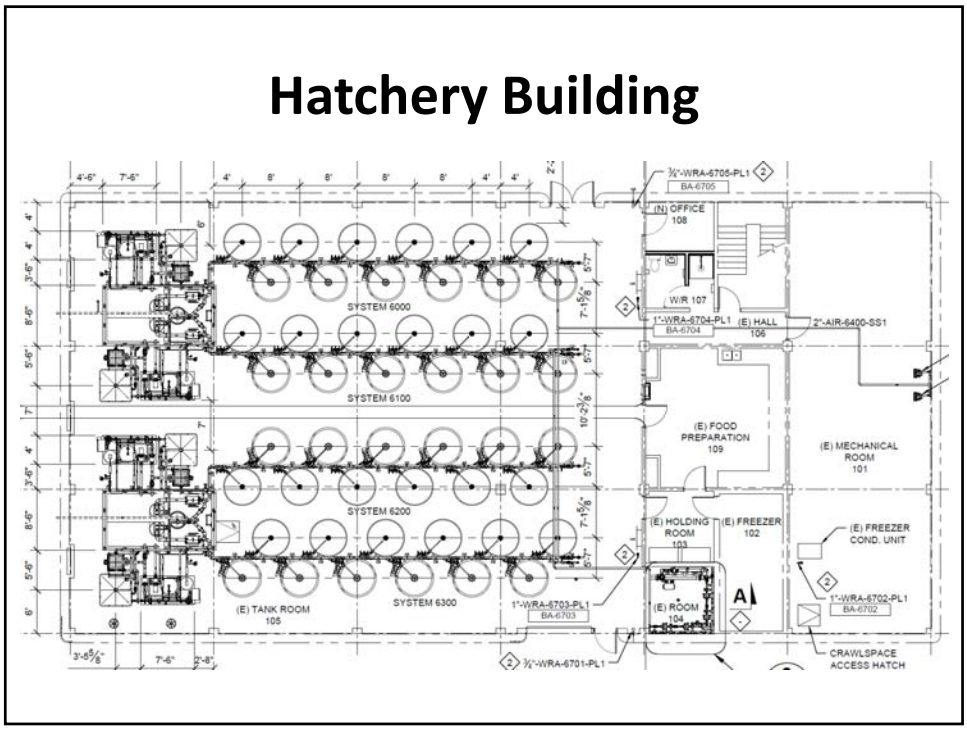
Environmental Components - Flora and Fauna -

- Fish and fish habitat
  - No measurable impact due to ongoing biosecurity measures & aquaculture effluent treatment
- Garter snakes
  - Potential for pipe replacement (digging) to disrupt hibernaculum
  - Survey to be completed in spring/fall 2019
  - Efforts to avoid digging in winter
- Migratory Birds and Raptors
  - A small amount of clearing required
  - Surveys to be completed prior to work
  - Clearing will be done in winter

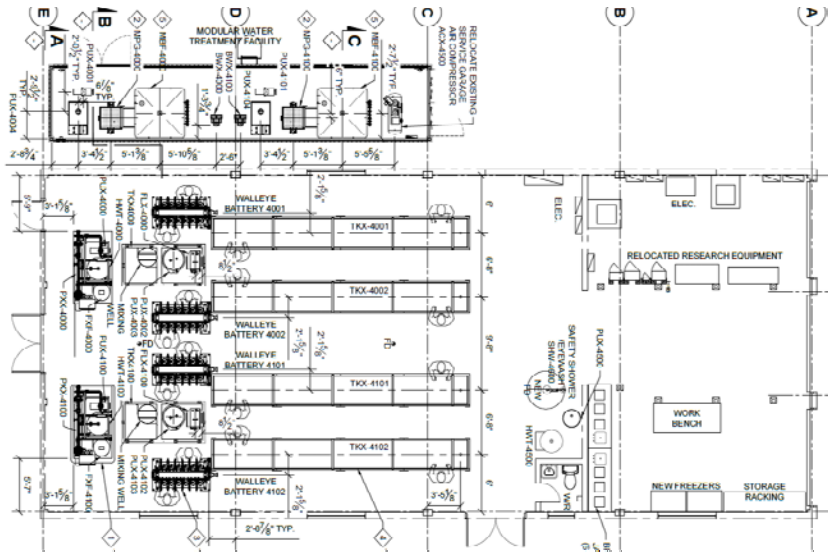
Environmental Components - Flora and Fauna -

- Barn Swallows
  - Listed as Threatened (Canada's *Species at Risk Act)*
  - Building exteriors will be surveyed for nests. If nests found:
    - work on building exteriors will be scheduled outside of the nesting period; or
    - Birds will be excluded from the site before the start of the nesting period.
- Bats (Little Brown & Northern Long-Eared)
  - Listed as endangered (Canada's *Species at Risk Act*; *Manitoba Endangered Species and Ecosystems Act)*
  - May roost or have maternity colonies in the Service Garage or Aeration Building
  - Survey to be completed summer 2019. If found, bats will be excluded from area prior to 2020 construction activities
  - Bat Boxes will be installed on site to provide additional habitat


McKay Avenue
Valve Chamber
Service Garage Parking Lot
Parking Lot
Fence
GENSET
TRANS
CSTE
Emergency Panel
Service Garage
Sidewalk
Electrical Yard
Aeration Building
LOAD BANK
New Sewer & Water System
Fence
Blue = Well Water
Orange = Aquaculture Filter Backwash
Purple = Potable Water
Green = New Sewer
Hatchery Building


Hatchery Building
SYSTEM 6000
SYSTEM 6100
SYSTEM 6200
SYSTEM 6300
(E) TANK ROOM 105
(N) OFFICE 108
W/R 107
(E) HALL 106
(E) FOOD PREPARATION 109
(E) MECHANICAL ROOM 101
(E) HOLDING ROOM 103
(E) FREEZER 102
(E) FREEZER COND. UNIT
(E) ROOM 104
CRAWLSPACE ACCESS HATCH

Service Garage & Water Treatment Facility



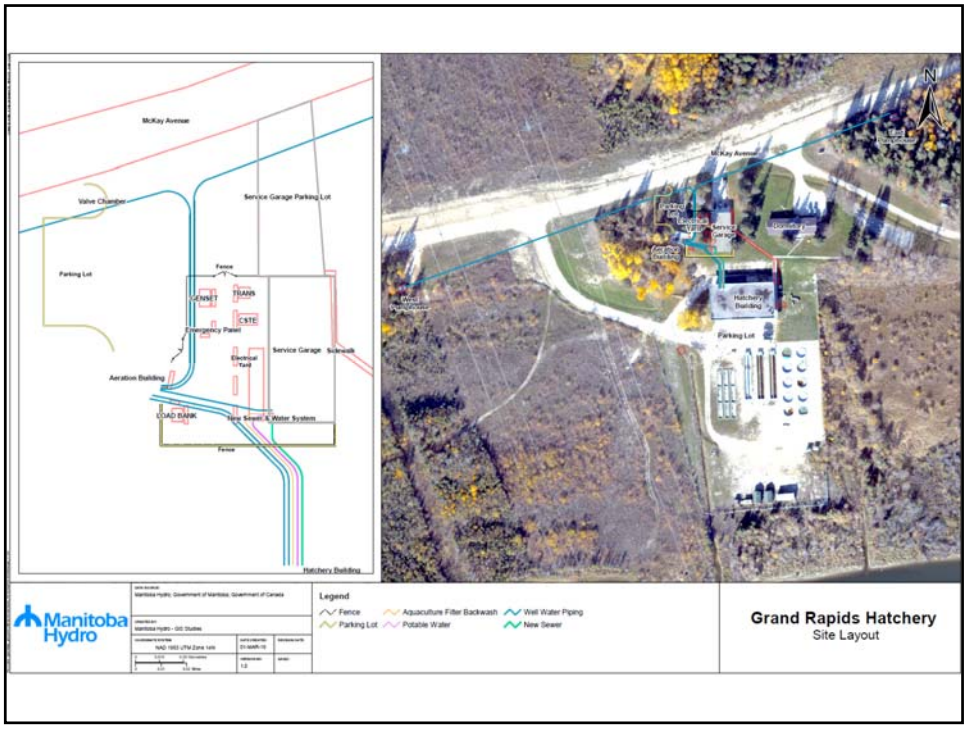

McKay Avenue
Valve Chamber
Service Garage Parking Lot
Parking Lot
Fence
GENSET
TRANS
CSTE
Emergency Panel
Electrical Yard
Service Garage
Sidewalk
Aeration Building
LOAD BANK
New Sewer & Water System
Fence
Hatchery Building
N
Manitoba Hydro
Legend
Fence
Parking Lot
Aquaculture Filter Backwash
Potable Water
Well Water Piping
New Sewer
Grand Rapids Hatchery
Site Layout

Table A2-1: Issues Concordance from Public Engagement undertaken as part of the Grand Rapids Fish Hatchery Upgrade and Expansion: Project Planning Phase

Issue	Description	Response to Issue
Stocking Programs	Are the walleye released into the Saskatchewan River Tracked?	Survival of the released walleye is monitored. Newly hatched Walleye (called fry) are marked with oxytetracycline (OTC) prior to release. Fry are stocked out within 4 days of hatching. Recently, when sampling occurred, up to 25% of the walleye assessed were identified as hatchery walleye. Annual reports are available.
Stocking Programs	Is stocking of walleye in the Saskatchewan River is demonstrating a benefit to the commercial fishery	Sampling efforts demonstrate stocked fish are surviving; some are returning to the Saskatchewan River while others are expected to disperse throughout Lake Winnipeg and its tributaries. OTC marks have been found in Walleye samples collected from the local Fish Plant, indicating that hatchery fish are contributing to the commercial fishery.
Potable Water	GRT inquired if pictures could be taken of where the in-ground infrastructure tie in to the Towns potable water system will occur and if these pictures would be shared with the Town for their records	MH noted this request would be accommodated
Stocking Programs	GRT inquired as to the number of hatcheries in Manitoba	MH noted the Grand Rapids hatchery owned and operated by Manitoba Hydro, the Whiteshell Fish Hatchery operated by the Province of Manitoba and the Swan Creek Hatchery.
Waste Management	GRT inquired as to the disposal location and quantity of construction waste. GRT noted the local landfill currently has limited space available.	MH indicated that the Contractor will be responsible for proper disposal of waste at a licensed facility.
Employment Opportunities	GRT inquired as to the number of potential jobs during the Upgrade and Expansion Project	MH indicated that due to the specialized nature of the upgrade work, local employment and business opportunities will be limited. Manitoba Hydro will encourage the contractor to use local services, like accommodations for work crews.
Waste Management	GRT inquired if the fish waste would be going to a landfill	MH indicated the plan was to utilize a registered landfill for the waste. The specific landfill for use has not been determined at this time.
Waste Management	GRT inquired if local GRT citizens can have access to the fish waste as fertilizer?	MH noted this is a possible opportunity but MH would look into this request. Additionally, MH noted that there would be a requirement for GRT to delegate a person to work with MH if the opportunity is feasible.
Construction	GRT asked about the location of Government Road.	MH noted this is the service road north of GRT and will be utilized for Project construction vehicles. MH explained this road will be used to avoid and alleviate "wear-and-tear" on the local GRT road. MH also communicated this was viewed as a safer option to limit interaction between GRT citizens and Project vehicles.
Construction	GRT inquired as to the timelines for the Project.	MH noted the Project construction is anticipated to be 2 years in duration with a start-date of Fall 2019. MH noted there may be opportunities to advance project components following discussions with the Contractor upon the awarding of the tender in Fall 2019.
Potable Water	GRT requested that GRT lead water operator be informed as to when the water hook-up work is undertaken and be permitted to view the work underway.	MH will inform when work would be scheduled to occur and would inform the Contractor of this requirement. MH clarified that the potable water connection is for Hatchery staff use (toilets, sinks etc.). Potable water will not be used in fish hatching operations.
Potable Water	GRT asked MH to discuss water hook-up plan with GRT lead water operator.	MH staff met with GRT lead water operator on February 28, 2019. Introductions were undertaken followed by MH sharing plans to hook-up the Hatchery to the local potable water system for water use by Hatchery staff (toilets, sinks etc.). This hook up would require a new water meter to be installed. GRT lead water operator provided a water meter for MH to share with Project designers. Additionally, GRT lead water operator indicated the anticipated volume of potable water contemplated for use by the Hatchery would be negligible.
Future Engagement	GRT requested a subsequent meeting to be undertaken in the short-term where more time is able to be allocated to this planned Project.	MH indicated we can accommodate this request. MH asked if the CAO can act as a contact liaison for the scheduling of the meeting. GRT agreed. The subsequent meeting took place March 22, 2019 (Meeting included the PowerPoint presentation)

APPENDIX 3:
PLANT SPECIES (AND REGULATORY STATUS) FOUND IN THE GRAND RAPIDS AREA

Table A3-1: List of Plant Species identified in all potentially disturbed areas within the Project area

Scientific Name	Common Name	
Abies balsamea	balsam fir	
Acer negundo	Manitoba maple	
Achillea millefolium	yarrow	
Alnus spp.	alder	
Amelanchier alnifolia	Saskatoon	
Anemone canadensis	Canada anemone	
Antennaria sp.	pussy toes	
Apiaceae sp.	parsley family species	
Apocynum androsaemifolium	spreading dogbane	
Aralia nudicalis	wild sarsparilla	
Arctium minus	lesser burdock	nonnative
Arctostaphylos uva-ursi	bearberry	
Artemisia absinthium	wormwood	nonnative
Asclepias sp.	milkweed	
Betula papyrifera	paper birch	
Betula pumila	bog birch	
Bromus inermis	smooth brome grass	nonnative
Campanula rotundifolia	harebell	
Capsella bursa-pastoris	shepherd's purse	nonnative
Carex atherodes	slough sedge	
Chamaenerion angustifolium	fireweed	
Chenopodium album	lambsquarter	
Chrysanthemum leucanthemum	ox-eye daisy	invasive
Cicuta maculata	water hemlock	
Cirsium arvense	Canada thistle	invasive
Comandra umbellata	bastard toadflax	
Cornus canadensis	bunchberry	
Cornus stolonifera	red osier	
Corylus cornuta	hazelnut	
Crataegus rotundifolia	hawthorn	
Crepis tectorum	hawksbeard	
Cypripedium calceolus	Yellow lady's-slipper	
Epilobium palustre	marsh willowherb	
Equisetum arvense	common horsetail	
Erigeron philadelphicus	Philadelphia fleabane	
Fragaria virginiana	smooth wild strawberry	
Galium boreale	northern bedstraw	
Galium triflorum	fragrant bedstraw	
Gentianopsis crinita	greater fringed gentian	

Scientific Name	Common Name	
Geum aleppicum	yellow avens	
Grindelia squarrosa	gumweed	
Hordeum jubatum	foxtail barley	nonnative
Impatiens capensis	common jewelweed	
Juniperus communis	common juniper	
Lactuca pulchella	blue lettuce	nonnative
Larix laricina	tamarack	
Lathyrus ochroleucus	cream-coloured vetchling	
Ledum groenlandicum	bog Labrador tea	
Lilium philadelphicum	wood lily	
Linnaea borealis	twinflower	
Lonicera dioica	twining honeysuckle	
Maianthemum canadense	false lily-of-the-valley	
Malva pusilla	round-leaved mallow	
Matricaria discoidea	pineappleweed	nonnative
Medicago lupulina	black medic	nonnative
Medicago sativa	alfalfa	nonnative
Melilotus albus	white sweetclover	invasive
Melilotus officinalis	yellow sweetclover	invasive
Mentha arvensis	common mint	
Mitella nuda	bishop's cap	
Moneses uniflora	one-flowered wintergreen	
Parnassia palustris var. *tenuis*	northern Grass-Of-Parnassus	
Petasites frigidus var. *palmatus*	arctic sweet coltsfoot	
Phleum pratense	timothy grass	nonnative
Phragmites australis ssp. *Americanus*	common reed	
Picea mariana	black spruce	
Picea glauca	white spruce	
Plantago major	common plantain	nonnative
Platanthera hyperborea	northern green orchid	
Populus balsamifera	balsam poplar	
Populus deltoides	cottonwood	
Populus tremuloides	aspen	
Potentilla anserina	silverweed	
Potentilla fruticosa	shrubby cinquefoil	
Potentilla norvegica	rough cinquefoil	
Prunus pensylvanica	pin cherry	
Prunus virginiana	chokecherry	
Prunus virginiana 'Schubert'	Schubert chokecherry	cultivated
Pyrola spp.	wintergreen	
Ranunculus cymbalaria	alkali buttercup	
Rhinanthus crista-galli	yellow rattle	

Scientific Name	Common Name	
Ribes spp.	currant/gooseberry	
Rosa acicularis	rose	
Rubus ideaus	raspberry	
Rubus pubescens	dewberry	
Rumex occidentalis	western dock	
Salix spp.	willow	
Salix interior	sandbar willow	
Sanicula marilandica	black snakeroot	
Scirpus cyperinus	wool-grass	
Sheperdia canadesis	buffalo berry	
Silene cserei	smooth catchfly	nonnative
Smilacina stellata	starry false Solomon's seal	
Solidago canadensis	Canada goldenrod	
Sonchus arvensis	perennial sow thistle	invasive
Sonchus asper	prickly sowthistle	nonnative
Sorbus americana	American mountain-ash	
Symphoricarpos occidentalis	western snowberry	
Symphyotrichum laeve	smooth aster	
Taraxacum officinale	common dandelion	nonnative
Thalictrum spp.	meadow rue	
Tofieldia coccinea	northern false asphodel	
Tofieldia glutinosa	sticky false asphodel	
Toxicodendron rydbergii	western poison ivy	
Trifolium pratense	red clover	nonnative
Trifolium repens	white clover	nonnative
Tripleurospermum inodorum	scentless chamomile	invasive
Typha latifolia	cattail	
Urtica dioica	nettles	
Vicia cracca	tufted vetch	

Table A3-2: List of Provincially Protected Plant Species within the Mid Boreal Lowlands Ecoregion

Scientific name	Common Name	S rank
Gymnocarpium robertianum	Limestone Oak Fern	S1
Listera auriculata	Auricled Twayblade	S1
Pellaea gastonyi	Gastony's Cliffbrake	S1
Pogonia ophioglossoides	Rose Pogonia	S1
Carex garberi	Elk Sedge	S1?
Eleocharis engelmannii	Engelmann's Spike-rush	S1S2
Platanthera lacera	Fringed Orchid	S1S2
Thalictrum sparsiflorum	Few-flowered Meadow-rue	S1S3
Aralia racemosa	Spikenard	S2
Arethusa bulbosa	Dragon's-mouth	S2
Calopogon tuberosus	Swamp-pink	S2
Carex flava	Yellow Sedge	S2
Dulichium arundinaceum	Three-way Sedge	S2
Eriophorum callitrix	Beautiful Cotton-grass	S2
Goodyera tesselata	Tesselated Rattlesnake Plantain	S2
Pellaea glabella	Smooth Cliffbrake	S2
Pellaea glabella ssp. *occidentalis*	Western Dwarf Cliffbrake	S2
Plantago maritima	Seaside Plantain	S2
Viola selkirkii	Long-spurred Violet	S2
Woodsia glabella	Smooth Woodsia	S2
Drosera linearis	Slender-leaved Sundew	S2?
Malaxis monophyllos	White Adder's-mouth	S2?
Malaxis unifolia	Green Adder's-mouth	S2?
Nymphaea odorata	Fragrant Water-lily	S2?
Pyrola americana	Round-leaved Pyrola	S2?
Cyperus houghtonii	Houghton's Umbrella-sedge	S2S3
Cypripedium arietinum	Ram's Head Lady's-slipper	S2S3
Heteranthera dubia	Water Star-grass	S2S3
Osmunda claytoniana	Interrupted Fern	S2S3
Pinus resinosa	Red Pine	S2S3
Potamogeton strictifolius	Straightleaf Pondweed	S2S3
Rhynchospora capillacea	Horned Beakrush	S2S3
Carex hystericina	Porcupine Sedge	S3
Carex pedunculata	Stalked Sedge	S3
Carex vulpinoidea	Fox Sedge	S3
Galium aparine	Cleavers	S3
Polypodium sibiricum	Siberian Polypody	S3
Rhynchospora alba	White Beakrush	S3
Sceptridium multifidum	Leathery Grape-fern	S3
Taxus canadensis	Canada Yew	S3
Vaccinium caespitosum	Dwarf Bilberry	S3
Viola labradorica	Early Blue Violet	S3

Scientific name	Common Name	S rank
Carex projecta	Necklace Sedge	S3?
Onoclea sensibilis	Sensitive Fern	S3?
Drosera anglica	Oblong-leaved Sundew	S3S4
Gymnocarpium continentale	Nahanni Oak Fern	S3S4
Leucophysalis grandiflora	Large White-flowered Ground-cherry	S3S4
Liparis loeselii	Yellow Twayblade	S3S4
Platanthera orbiculata	Round-leaved Bog Orchid	S3S4

Source: Manitoba Conservation Data Centre 2019. Ecoregions, Mid Boreal Lowland, Plants [Online] https://www.gov.mb.ca/sd/environment_and_biodiversity/cdc/ecoregions/index.html [accessed January 15, 2019].

Table A3-3: Occurrences of S-ranked Species found within a 2 km buffer of the fish hatchery

Scientific Name	Common Name	S Rank	Year last observed	Location observed
Eriophorum callitrix	beautiful cotton-grass	S2	6/26/1977	Across from fisheries Research Station, Grand Rapids, moist holes between hummocks
Malaxis monophyllos	white adder's-mouth	S2?	6/22/1985	Grand Rapids, airport road west of town
Pellaea glabella ssp. *occidentalis*	western dwarf cliffbrake	S2	9/25/2013	Limestone cliffs, near Grand Rapids, 1/4 mile inland from Lake Winnipeg
Platanthera orbiculata	round-leaved bog orchid	S3S4	6/22/1985	Grand Rapids, airport road west of town
Polypodium sibiricum	Siberian polypody	S3	9/6/1925	Grand Rapids – general area
Sceptridium multifidum	leathery grape-fern	S3	9/6/1925	Grand Rapids – general area
Woodsia glabella	smooth woodsia	S2	8/29/1948	Limestone cliffs, near Grand Rapids, 1/4 mile inland from Lake Winnipeg

Source: Manitoba Conservation Data Centre (2019)

Table A3-4: Manitoba plant species with COSEWIC status or SARA status

Scientific name	Common name	COSEWIC status	On Schedule 1	SARA status
Fraxinus nigra	black ash	Threatened	No	No Status
Bouteloua dactyloides	buffalograss	Special Concern	Yes	Special Concern
Vernonia fasciculata	fascicled ironweed	Endangered	No	No Status
Agalinis gattingeri	Gattinger's agalinis	Endangered	Yes	Endangered
Dalea villosa	hairy prairie-clover	Special Concern	Yes	Special Concern
Solidago riddellii	Riddell's goldenrod	Special Concern	Yes	Special Concern
Agalinis aspera	rough agalinis	Endangered	Yes	Endangered
Cypripedium candidum	small white lady's-slipper	Threatened	Yes	Endangered
Chenopodium subglabrum	smooth goosefoot	Threatened	Yes	Threatened
Platanthera praeclara	western prairie fringed orchid	Endangered	Yes	Endangered
Symphyotrichum sericeum	western silvery aster	Threatened	Yes	Threatened
Tradescantia occidentalis	western spiderwort	Threatened	Yes	Threatened

Source: Government of Canada, 2019. Species at Risk Public Registry Advance search, Vascular Plants, Manitoba [Online] https://wildlife-species.canada.ca/species-risk-registry/search/advSearchResults_e.cfm?stype=species&lng=e&advkeywords=&op=2&locid=4&taxid=12& [accessed January 15, 2019].

APPENDIX 4:

BIRD SPECIES (AND REGULATORY STATUS) WITH DISTRIBUTION OF BREEDING HABITAT THAT OVERLAPS WITH THE GRAND RAPIDS FISH HATCHERY

Table A4-1: Bird species (and regulatory status) with distribution of breeding habitat that overlaps with the Grand Rapids Fish Hatchery

Common Name[1]	Scientific Name	SARA Listed	MESEA Listed
Canada Goose	*Branta Canadensis*	No	No
Wood Duck	*Aix sponsa*	No	No
American Wigeon	*Mareca americana*	No	No
Mallard	*Anas platyrhynchos*	No	No
Blue-winged Teal	*Spatula discors*	No	No
Northern Shoveler	*Spatula clypeata*	No	No
Northern Pintail	*Anas acuta*	No	No
Green Winged Teal	*Anas crecca*	No	No
Canvasback	*Aythya valisineria*	No	No
Ring-necked Duck	*Aythya collaris*	No	No
Lesser Scaup	*Aythya affinis*	No	No
White-winged Scoter	*Melanitta fusca*	No	No
Bufflehead	*Bucephala albeola*	No	No
Common Goldeneye	*Bucephala clangula*	No	No
Hooded Merganser	*Lophodytes cucullatus*	No	No
Common Merganser	*Mergus merganser*	No	No
Red-breasted Merganser	*Mergus serrator*	No	No
Ruffed Grouse	*Bonasa umbellus*	No	No
Spruce Grouse	*Falcipennis canadensis*	No	No
Sharp-tailed Grouse	*Tympanuchus phasianellus*	No	No
Common Loon	*Gavia immer*	No	No
Pied Billed Grebe	*Podilymbus podiceps*	No	No
Red-necked Grebe	*Podiceps grisegena*	No	No
American White Pelican	*Pelecanus erythrorhynchos*	No	No
Double-crested Cormorant	*Phalacrocorax auritus*	No	No
American Bittern	*Botaurus lentiginosus*	No	No
Great Blue Heron	*Ardea herodias*	No	No
Turkey Vulture	*Cathartes aura*	No	No
Osprey	*Pandion haliaetus*	No	No
Bald Eagle	*Haliaeetus leucocephalus*	No	No
Northern Harrier	*Circus hudsonius*	No	No
Sharp-shinned Hawk	*Accipiter striatus*	No	No
Northern Goshawk	*Accipiter gentilis*	No	No
Broad-winged Hawk	*Buteo platypterus*	No	No
Red-tailed Hawk	*Buteo jamaicensis*	No	No
American Kestrel	*Falco sparverius*	No	No
Merlin	*Falco columbarius*	No	No
Yellow Rail	*Coturnicops noveboracensis*	Yes-Special Concern	No
Virginia Rail	*Rallus limicola*	No	No
Sora Rail	*Porzana carolina*	No	No
Sandhill Crane	*Antigone canadensis*	No	No

Common Name[1]	Scientific Name	SARA Listed	MESEA Listed
Killdeer	*Charadrius vociferus*	No	No
Spotted Sandpiper	*Actitis macularius*	No	No
Solitary Sandpiper	*Tringa solitaria*	No	No
Greater Yellowlegs	*Tringa melanoleuca*	No	No
Lesser Yellowlegs	*Tringa flavipes*	No	No
Wilson's Snipe	*Gallinago delicata*	No	No
American Woodcock	*Scolopax minor*	No	No
Wilson's Phalarope	*Phalaropus tricolor*	No	No
Bonaparte's Gull	*Chroicocephalus Philadelphia*	No	No
Ring-billed Gull	*Larus delawarensis*	No	No
Herring Gull	*Larus argentatus*	No	No
Caspian Tern	*Hydroprogne caspia*	No	No
Black Tern	*Chlidonias niger*	No	No
Common Tern	*Sterna hirundo*	No	No
Forster's Tern	*Sterna forsteri*	No	No
Mourning Dove	*Zenaida macroura*	No	No
Black-billed Cuckoo	*Coccyzus erythropthalmus*	No	No
Great Horned Owl	*Bubo virginianus*	No	No
Northern Hawk Owl	*Surnia ulula*	No	No
Barred Owl	*Strix varia*	No	No
Great Gray Owl	*Strix nebulosa*	No	No
Long-eared Owl	*Asio otus*	No	No
Short-eared Owl	*Asio flammeus*	Yes-Special Concern	Yes-Threatened
Boreal Owl	*Aegolius funereus*	No	No
Northern Saw-whet Owl	*Aegolius acadicus*	No	No
Common Nighthawk	*Chordeiles minor*	Yes-Threatened	Yes-Threatened
Eastern Whip-poor-will	*Antrostomus vociferus*	Yes-Threatened	Yes-Threatened
Ruby-throated Hummingbird	*Archilochus colubris*	No	No
Belted Kingfisher	*Megaceryle alcyon*	No	No
Yellow-bellied Sapsucker	*Sphyrapicus varius*	No	No
Downy Woodpecker	*Picoides pubescens*	No	No
Hairy Woodpecker	*Picoides villosus*	No	No
American Three-toed Woodpecker	*Picoides dorsalis*	No	No
Black-backed Woodpecker	*Picoides arcticus*	No	No
Northern Flicker	*Colaptes auratus*	No	No
Pileated Woodpecker	*Dryocopus pileatus*	No	No
Olive-sided Flycatcher	*Contopus cooperi*	Yes-Threatened	Yes-Threatened
Yellow-bellied Flycatcher	*Empidonax flaviventris*	No	No
Alder Flycatcher	*Empidonax alnorum*	No	No
Least Flycatcher	*Empidonax minimus*	No	No
Eastern Phoebe	*Sayornis phoebe*	No	No
Eastern Kingbird	*Tyrannus tyrannus*	No	No
Philadelphia Vireo	*Vireo philadelphicus*	No	No
Blue-headed Vireo	*Vireo solitarius*	No	No

Common Name[1]	Scientific Name	SARA Listed	MESEA Listed
Red-eyed Vireo	*Vireo olivaceus*	No	No
Canada Jay	*Perisoreus canadensis*	No	No
Blue Jay	*Cyanocitta cristata*	No	No
Black-billed Magpie	*Pica hudsonia*	No	No
American Crow	*Corvus brachyrhynchos*	No	No
Common Raven	*Corvus corax*	No	No
Tree Swallow	*Tachycineta bicolor*	No	No
Bank Swallow	*Riparia riparia*	Yes-Threatened	No
Cliff Swallow	*Petrochelidon pyrrhonota*	No	No
Barn Swallow	*Hirundo rustica*	Yes-Threatened	No
Black-capped Chickadee	*Poecile atricapillus*	No	No
Boreal Chickadee	*Poecile hudsonicus*	No	No
Red-breasted Nuthatch	*Sitta canadensis*	No	No
White-breasted Nuthatch	*Sitta carolinensis*	No	No
Brown Creeper	*Certhia americana*	No	No
House Wren	*Troglodytes aedon*	No	No
Winter Wren	*Troglodytes hiemalis*	No	No
Sedge Wren	*Cistothorus platensis*	No	No
Marsh Wren	*Cistothorus palustris*	No	No
Golden-crowned Kinglet	*Regulus satrapa*	No	No
Ruby-crowned Kinglet	*Regulus calendula*	No	No
Eastern Bluebird	*Sialia sialis*	No	No
Swainson's Thrush	*Catharus ustulatus*	No	No
Hermit Thrush	*Catharus guttatus*	No	No
American Robin	*Turdus migratorius*	No	No
Gray Catbird	*Dumetella carolinensis*	No	No
Brown Thrasher	*Toxostoma rufum*	No	No
European Starling	*Sturnus vulgaris*	No	No
Cedar Waxwing	*Bombycilla cedrorum*	No	No
Tennessee Warbler	*Oreothlypis peregrina*	No	No
Orange-crowned Warbler	*Oreothlypis celata*	No	No
Nashville Warbler	*Oreothlypis ruficapilla*	No	No
Northern Parula	*Setophaga americana*	No	No
Yellow Warbler	*Setophaga petechia*	No	No
Chestnut-sided Warbler	*Setophaga pensylvanica*	No	No
Magnolia Warbler	*Setophaga magnolia*	No	No
Cape May Warbler	*Setophaga tigrina*	No	No
Yellow-rumped Warbler	*Setophaga coronata*	No	No
Black-throated Green Warbler	*Setophaga virens*	No	No
Blackburnian Warbler	*Setophaga fusca*	No	No
Palm Warbler	*Setophaga palmarum*	No	No
Bay-breasted Warbler	*Setophaga castanea*	No	No
Blackpoll Warbler	*Setophaga striata*	No	No
Black-and-White Warbler	*Mniotilta varia*	No	No

Common Name[1]	Scientific Name	SARA Listed	MESEA Listed
American Redstart	*Setophaga ruticilla*	No	No
Ovenbird	*Seiurus aurocapilla*	No	No
Northern Waterthrush	*Parkesia noveboracensis*	No	No
Connecticut Warbler	*Oporornis agilis*	No	No
Mourning Warbler	*Geothlypis philadelphia*	No	No
Common Yellowthroat	*Geothlypis trichas*	No	No
Wilson's Warbler	*Cardellina pusilla*	No	No
Canada Warbler	*Cardellina canadensis*	Yes-Threatened	Yes-Threatened
Chipping Sparrow	*Spizella passerina*	No	No
Clay-colored Sparrow	*Spizella pallida*	No	No
Vesper Sparrow	*Pooecetes gramineus*	No	No
Savannah Sparrow	*Passerculus sandwichensis*	No	No
LeConte's Sparrow	*Ammodramus leconteii*	No	No
Nelson's Sparrow	*Ammodramus nelsoni*	No	No
Song Sparrow	*Melospiza melodia*	No	No
Lincoln's Sparrow	*Melospiza lincolnii*	No	No
Swamp Sparrow	*Melospiza georgiana*	No	No
White-throated Sparrow	*Zonotrichia albicollis*	No	No
Dark-eyed Junco	*Junco hyemalis*	No	No
Rose-breasted Grosbeak	*Pheucticus ludovicianus*	No	No
Indigo Bunting	*Passerina cyanea*	No	No
Red-winged Blackbird	*Agelaius phoeniceus*	No	No
Rusty Blackbird	*Euphagus carolinus*	Yes	No
Common Grackle	*Quiscalus quiscula*	No	No
Brown-headed Cowbird	*Molothrus ater*	No	No
American Goldfinch	*Spinus tristis*	No	No
Purple Finch	*Haemorhous purpureus*	No	No
Red Crossbill	*Loxia curvirostra*	No	No
White-winged Crossbill	*Loxia leucoptera*	No	No
Pine Siskin	*Spinus pinus*	No	No
House Sparrow	*Passer domesticus*	No	No

1 This list was compiled using range information from (Artuso et al. 2014), however this does not mean that suitable habitat for all bird species on the list is present at the Grand Rapids Fish Hatchery.

APPENDIX 5:
DRAFT ENVIRONMENTAL PROTECTION PLAN

GRAND RAPIDS HATCHERY UPGRADE AND EXPANSION

ENVIRONMENTAL PROTECTION PLAN

DRAFT

Prepared by

Manitoba Hydro

Winnipeg, Manitoba

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1.0 INTRODUCTION

This document outlines the efforts that will be undertaken by Manitoba Hydro (MH) to protect the environment and mitigate environmental effects during the expansion and upgrade of the Grand Rapids Fish Hatchery (Project).

1.1 MANITOBA HYDRO COMMITMENT TO ENVIRONMENTAL PROTECTION

Manitoba Hydro is committed to protecting natural environments and heritage resources affected by its projects and facilities. This commitment and a commitment to continually improve environmental performance is demonstrated through the company's Environmental Management System, which follows the ISO 14001 standard.

Environmental protection can only be achieved with the full engagement of Manitoba Hydro employees, consultants and contractors at all stages of a project from planning and design through construction and into operation.

As stated in the Corporate Environmental Management Policy:

"Manitoba Hydro is committed to protecting the environment by:

- *preventing or minimizing any adverse impacts on the environment, and enhancing positive impacts*
- *continually improving our Environmental Management System*
- *meeting compliance obligations*
- *considering the interests and recognizing the knowledge of our interested parties who may be affected by our actions*
- *reviewing our environmental objectives and targets regularly to ensure improvement in our environmental performance*
- *documenting and reporting our activities and environmental performance"*

Manitoba Hydro's environmental management policy has been used to guide the development of the environmental protection plan for the Project. Implementation of the plan is a practical application of the policy and will demonstrate Manitoba Hydro's dedication to environmental stewardship.

2.0 OVERVIEW OF THE ENVIRONMENTAL PROTECTION PLAN

This Environmental Protection Plan (EnvPP) is a key element in implementing effective environmental protection and minimizing the environmental effects associated with this Project.

Environmental protection plans provide protection measures that supplement Project design, construction and operating specifications to prevent or minimize potential adverse environmental effects arising from the construction of the Project. They are designed for use as reference documents by contractors and Manitoba Hydro personnel. This EnvPP prescribes practical measures to meet regulatory requirements for environmental protection specific to this Project. This EnvPP is organized by construction component and activity to assist Project personnel with implementing appropriate measures specific to the construction site.

All personnel working on the Project, including all Contractor personnel, shall be familiar with the contents of this EnvPP. This EnvPP will be reviewed with the contractor at the post contract award pre-job meeting and copies of the EnvPP will be made available to the contractor's staff.

2.1 ENVIRONMENTAL PROTECTION PLAN ROLES AND RESPONSIBILITIES

The Project Engineer (The Engineer) will be the senior management authority during this Project. The Contract Administrator, who will be onsite during construction, will report to the The Engineer.

The Engineer and the Contract Administrator will have the responsibility and first-line authority to confirm that all environmental protection measures are implemented and that the Contract is followed to ensure compliance with environmental regulatory requirements.

The following table outlines the environmental roles and responsibilities of personnel during the Project.

Table 2-1: Environmental Roles and Responsibilities of Project Personnel

Role	Key Responsibilities
Contractor(s)	• Conducts work in accordance with the EnvPP, licence permits, regulations and guidelines. • Ensures all contractor staff, including sub-contractors and agents, are adequately trained/informed of pertinent environmental requirements of the Project related to their position. • Confirms, in writing, that the EnvPP has been reviewed by all personnel working on the Project • Obtains burn permits, if required, from Manitoba Sustainable Development as identified in Table 4-1 • Obtains any other required permits or approvals related to the Project. • Provides resources and documentation, as required, by The Engineer to ensure

Role	Key Responsibilities
	compliance with all applicable environmental regulations. • Reports any discoveries of non-compliance or accidents to the Contract Administrator. • Reports all environmental spills or releases as soon as practical, but no more than 24 hours after they occur, to the Contract Administrator. • Provides a written environmental incident report investigation to the Contract Administrator within 48 hours of the spill or release • Maintains detailed records of inventories, wastes, incidents, alterations, accidents, equipment maintenance and any public complaints. • Provides a hazardous materials release (spill) response plan and waste management plan for the construction project to Manitoba Hydro for review. • Follows their hazardous materials release (spill) response and waste management plan. • Cleans up spills with supervision by Manitoba Hydro. • Stores and collects all hazardous and non-hazardous construction wastes in separate waste streams. • Stops work and reports any discoveries of heritage resources (or human remains) to the Contract Administrator. • Removes all equipment, investigates and rehabilitates any sites of potential contamination from construction activities during decommissioning of their work areas. • Conducts a final inspection of any rehabilitated sites with The Engineer and/or Contract Administrator, Manitoba Hydro Area Spill Response Coordinator and the Conservation Officer (Manitoba Sustainable Development).
The Engineer (Off-Site)	• Ensures the EnvPP, licence, permits and approvals are in place for the Project. • Supervises Manitoba Hydro Project staff. • Ensure that a post contract award pre-job meeting is completed. • Confirms that all Project activities are conducted in accordance with the EnvPP, licences, permits, approvals, regulations or guidelines. • Ensures that Manitoba Hydro personnel and contractors are aware of the contents of the EnvPP, licence, permits, approvals, regulations or guidelines. • Supports the Contract Administrator in overseeing construction activities to ensure that the terms of the contract, licence, permits and the EnvPP are followed.
Manitoba Hydro Environmental Licensing and Protection (EL&P) Staff	• Obtains required permits or approvals from Manitoba Sustainable Development as identified in Table 4-1. • Liaises with local Manitoba Sustainable Development regional office personnel on Project related issues. • Reviews MH Daily Construction Reports and identifies any environmental issues during construction or any potential upcoming environmental concerns. • Conducts periodic construction environmental inspections to support the CA in ensuring that site construction activities are conducted in accordance with the terms of the EnvPP, licence, permits, approvals, regulations or guidelines. • Conducts a post-construction inspection of the Project site with the Conservation Officer (Manitoba Sustainable Development), if required, to confirm compliance with the licence and identifies any deficiencies to be

Role	Key Responsibilities
	addressed.
Contract Administrator (On-Site)	• Provides oversight to ensure that site construction activities are conducted in accordance with the terms of the EnvPP, licence, permits, approvals, regulations or guidelines. • Provides an orientation to the contractor(s), their staff and Manitoba Hydro regarding environmental requirements. • Works with the contractor to confirm regulatory compliance and implementation of the EnvPP. • Determines action or response to spills or releases with The Engineer and Manitoba Hydro Area Spill Response Coordinator • Determines action or response to non-compliance situations, in consultation with The Engineer and/or EL&P. • Authorizes the issuing of stop work orders, with the contractor. • Maintains a record of all construction environmental site inspections. • Documents any construction related environmental issues or mitigation measures required to address unanticipated environmental effects. • Reports environmental spills or releases within 24 hours to The Engineer and the Manitoba Hydro Area Spill Response Coordinator. • Obtains written environmental incident report investigations from contractors within 48 hours of the spill or release. • Completes the Environmental Health and Safety Management report and forwards the contractor's spill/release report to Manitoba Hydro Area Spill Response Coordinator. • Takes soil samples as requested by the Manitoba Hydro Area Spill Response Coordinator for any hazardous materials releases that occur in soil during the Project. • Submits and reviews construction site inspection reports with The Engineer. Confirms that construction activities cease at a particular location if heritage resources (or human remains) are discovered, and contacts The Engineer. • Provides notes on compliance monitoring to EL&P, after construction is complete, in order for the EL&P to provide the Environmental Protection Plan Report to Manitoba Sustainable Development.
Manitoba Hydro Area Spill Response Coordinator (Off-site)	• Reviews the Contractor's hazardous materials release (spill) response plan. • Serves as the spill/release resource for the Contract Administrator. This includes acting as the initial contact person for releases – providing response and guidance. • Confirms that Manitoba Hydro's Environmental Health and Safety Management incident report has been completed for all hazardous materials releases. • Confirms that the contractor has reported all releases externally when required. • Contact Regulatory Agencies on behalf of the responders, if requested. • Confirms that all releases are remediated to appropriate Manitoba Hydro or legislated standards. • Provides support during spill cleanup as required. • Acts as liaison with Manitoba Hydro's Senior Hazardous Materials Specialist.
Project Personnel on Site	• Reports any discoveries of heritage resources (or human remains) to the

Role	Key Responsibilities
	Contract Administrator. • Follows all clauses set out in the EnvPP, licence, permits and any other environmental approvals. • Reports any regulation violations to the Contract Administrator. • Exercises due diligence in carrying out Project activities.
Conservation Officer (Manitoba Sustainable Development)	• Issues work permits. • Responds and provides advice, where appropriate, on wildlife or other resource issues. • Conducts compliance inspections. • Completes Work Permit Inspection Reports and follows up on actions of non-compliance. • Conducts post-construction site inspection(s).

2.2 ENVIRONMENTAL PROTECTION PLAN IMPLEMENTATION

Manitoba Hydro is ultimately responsible for safeguarding the environment affected by the proposed Project. The Engineer will be responsible for implementing this EnvPP and for ensuring that all requirements within it are met. Project personnel (all staff working on the Project including Manitoba Hydro and the Contractor's staff) will be familiar with the EnvPP, licence, permits, local environmental sensitivities (as identified in APPENDIX B) ***[Drafter's note: Appendix B – Sensitive Sites Maps - will be prepared after biological surveys in summer 2019 are complete****]* and environmental protection requirements for this Project.

A post contract award pre-job meeting will be conducted to discuss with Project personnel (MH and Contractor) their roles and responsibilities concerning environmental protection during Project activities. Project personnel will be made familiar with incident reporting and spill response plans. Copies of this EnvPP will be made available to onsite Project personnel. All Project personnel will be required to exercise due diligence in carrying out their work activities.

Questions regarding the implementation of this EnvPP will be directed to the Contract Administrator. Where there is a discrepancy, the regulatory licence, permits, other approvals and legislation supersede this EnvPP. Environmental issues (including implementation of the EnvPP) will be an agenda item at progress meetings during the Project.

2.3 COMPLIANCE REPORTING

The Contract Administrator will be responsible for monitoring compliance during the Project to confirm that licences, permits and the EnvPP are followed. Information, including field notes and photos, will be provided to EL&P so they may prepare the final EnvPP report for Manitoba Sustainable Development once construction is complete.

Mitigation measures that address unanticipated environmental effects will be documented as part of the monitoring process. Non-compliance issues, as well as any changes required to the EnvPP, will be reviewed with EL&P.

Full cooperation will be given to representatives of government environmental departments and agencies conducting compliance inspections and to Manitoba Sustainable Development personnel with interests in protecting natural resources from the effects of construction activities. Following construction and site clean-up, a post-construction inspection will occur. The inspection will be carried out by The Engineer and Contract Administrator, FSO/ASRC, along with the Conservation Officer (Manitoba Sustainable Development). This inspection will confirm compliance with the Project licence and permits.

If deficiencies are identified, site-specific actions will be developed and carried out. These sites will be monitored after corrective measures have been taken to confirm that deficiencies have been addressed satisfactorily

2.4 IMPROVEMENT ORDER

Failure to comply with the EnvPP, licence, permits and/or unsatisfactory performance in regards to any other environmental-related matter may result in the Contract Administrator issuing a Field Instruction to the Contractor.

The Field Instruction once communicated verbally (to be followed by a written communication within 24 hours) or in writing, is effective immediately. A compliance date will be established by the Contract Administrator for each Field Instruction issued. The Contractor must provide written documentation of the actions taken regarding the Field Instruction as follows:

The Contractor shall:

1. Within the compliance period specified in the order or any extension thereof, prepare a written report on the measures taken to remedy the contravention and on any measures yet to be taken;
2. Send a copy of the report to the Purchaser's representative who made the order;
3. If applicable, provide a copy of the report to the employee(s) involved; and
4. If applicable, review the contravention with all employees at regular meetings and post in a prominent place at or near the workplace.

2.5 STOP WORK ORDER

Where the Contract Administrator is of the opinion that any activities which are being, or are about to be, carried on in a workplace, involve or are likely to involve an imminent risk of serious impact to the environment, or where a contravention specified in an Improvement Order was not remedied and warning was given, the Contract Administrator may issue an order (hereinafter called a "Stop Work Order"). The Stop Work Order, once communicated verbally (to be followed by a written

communication within 24 hours) or in writing, is effective immediately as stipulated with respect to any one or more of the following matters:

1. The cessation of those activities;
2. That all or part of the workplace be vacated;
3. That no resumption of those activities be permitted by the Contractor;
4. That the Stop Work Order remains in effect until it is withdrawn in writing by the Contract Administrator; and
5. If the Stop Work Order resulted from acts or omissions of the Contractor or any Contractor Party in breach of this Contract or applicable Law, any costs arising out of such Stop Work Order shall be considered Ineligible Costs and the Contractor will not be entitled to any Change in the Contract Schedule.

Note: A Stop Work Order does not prevent the Contractor from completing any work or activity that may be necessary in order to remove the risk of further impact referred to above.

3.0 PROJECT DESCRIPTION

Manitoba Hydro is revising the current operations of the Grand Rapids Fish Hatchery (GRFH) to meet increased fish production requirements and achieve a standard of fish production that is required to meet national and provincial regulations.

The GRFH is located in Grand Rapids, Manitoba, approximately 450 kilometers north of Winnipeg (on Provincial Trunk Highway 6); it was constructed by the Province in 1973. In 2007, Manitoba Hydro purchased the GRFH from the Province, and in 2012, assumed full operations to produce fish for Manitoba Hydro's mitigation and community relations program. Upgrades to most of the supporting infrastructure and treatment processes currently being used at the GRFH are necessary in order to meet current regulatory requirements, facilitate best management practices for conservation stocking programs, and maximize efficiency in the hatchery to meet future production targets. The work will take place both inside and outside of the buildings on the GRFH site between the fall of 2019 and 2021.

3.1 CONSTRUCTION ACTIVITIES

The scope of work for construction activities for the Project relevant to the EnvPP includes but is not limited to the following:

- Mobilization;
- Development of work areas (lay down, stockpiles, office/trailer);
- Installation of portable toilets for the construction phase;
- Site preparation (clearing and grubbing);
- Installation of temporary security and safety facilities for the construction phase;
- Excavating trenches and installing water piping (for both potable and hatchery process) and wastewater piping to connect various buildings; backfilling to follow
    - The new piping will connect to an existing potable water line on the property (potable water), groundwater wells (hatchery process water) and sanitary sewer line/lift station on the property;
- Excavation to replace electrical service to the aeration building, service garage, east and west pump houses;
- Installation of a service padmount, oil filled transformer, diesel genset and diesel tank;
- Structural, electrical, piping replacement to the three well buildings; surface grading around the well casings, where required;
- Upgrading processes within the hatchery, service garage and aeration buildings;
- Installing outdoor lighting, new fencing, a new parking lot, sidewalks, etc;
- Site cleanup, decommissioning and rehabilitation; and
- Demobilization.

4.0 ENVIRONMENTAL REGULATORY REQUIREMENTS

Environment Act Licence No. XXX ***[Drafter's Note: the licence has not been issued at the time of providing this EnvPP –any additional mitigation listed in the licence will be incorporated into the EnvPP]*** and all applicable work permits will be obtained prior to Project construction; the terms and conditions in these documents will be adhered to for the duration of the Project. Site-specific regulatory requirements for this Project will be listed in the Manitoba Sustainable Development work permit(s). A post-construction site inspection will occur with Manitoba Sustainable Development to confirm that all work has been completed to their satisfaction.

Copies of the licence and all permits will be kept on-site by the Contract Administrator. These are included in APPENDIX C.

The *Migratory Birds Convention Act*, 1994, (MBCA) also governs the Project and it requires the prevention of harm to migratory birds and nests. Any nests or eggs found on the Project site during the Project will be left intact and their location will be reported to the Contract Administrator.

If any new heritage artifact or material (of any size) is found prior to or during construction, the location will be flagged and construction activities in the vicinity halted until an Archaeologist has examined the artifacts, recorded pertinent data and determined their heritage significance as per The *Heritage Resources Act*. In the event that human remains are exposed during construction, all activity will cease at that location and an Archaeologist will be contacted so that the procedures outlined in the Province of Manitoba's Policy Concerning the Reporting, Exhumation and Reburial of Found Human Remains (1987) can be implemented.

Table 4-1: List of Required Environmental Licences, Authorizations, Permits and Approvals

Approval Required, Applicable Legislation / Regulation	Type of Approval needed	Responsible for Obtaining
Environment Act Licence (Class 1)	Licence	Manitoba Hydro (EL&P)
Dangerous Goods Handling and Transportation Act –Storage and Handling of Gasoline and Associated Products Regulation (registration of the long term diesel genset tank for operation)	Permit	Manitoba Hydro (EL&P)
Heritage Resources Act (application by archaeologist to conduct work if artifact is found)	Permit	Project Archaeologist
Wildfires Act (work permit)	Permit	Manitoba Hydro (EL&P)
Wildfires Act (permit to burn wood – outside of timing windows only)	Permit	Contractor
Manitoba Endangered Species and Ecosystems Act (Bats)	Permit	Manitoba Hydro (EL&P)
Manitoba Wildlife Act (snake hibernaculm)	Permit	Manitoba Hydro (EL&P)

5.0 CONTRACTOR DEVELOPED ENVIRONMENTAL PLANS

5.1 SPILL RESPONSE PLAN

Prior to construction, the contractor will prepare a Project-specific hazardous materials release (spill) response plan including prevention planning and response for hazardous material releases. The plan will be reviewed by Manitoba Hydro's Area Spill Response Coordinator.

The contractor is responsible for all releases regardless of quantity, related to their work, in their work areas. All releases and spills will be reported to the Contract Administrator. Site clean-up and disposal of contaminated material will be managed as stated in the Hazardous Materials Release Response Plan in consultation with the Contract Administrator. All hazardous materials on site will have the corresponding Safety Data Sheet (SDS) accessible to the contractor's workers, supervisor and Manitoba Hydro's staff. The SDS will be referenced by the contractors worker's during hazardous materials releases incidents.

Absorbent pads or booms used to mitigate liquid fuel or hydrocarbon releases will be wrung out into a barrel or pail to capture the gross liquids for recycling rather than having the hydrocarbons enter the waste stream. Unlike hydrocarbons will not be mixed in the same container, example: fuel and oils.

5.2 WASTE MANAGEMENT PLAN

The contractor will develop a solid waste reduction, re-use and recycling plan for the construction project site waste streams. Plans for office, construction recyclables, and hazardous materials must be included. The plan will be reviewed and accepted by Manitoba Hydro.

Examples of materials that may be recovered include, but are not limited to:

- aluminum;
- paper and cardboard;
- plastic; and
- wire, piping and scrap metal.

Garbage and residual construction waste that cannot be recycled will be disposed of in a licensed waste disposal ground. The Waste Management Plan should include a section on how and where asbestos and lead found during the Project will be disposed. An agreement must be in place with the local municipal authority to accept Project related solid waste.

Dangerous goods and handling will follow *Manitoba Regulation 188/2001*, respecting the *Storage and Handling of Petroleum Products and Allied Products*, the *Dangerous Goods Handling and Transportation*

Act and the Office of the Fire Commissioner – Province of Manitoba. Dangerous goods shall not be placed in municipal waste disposal sites.

Inventories of all solid waste exiting the site for final disposal must be kept. Confirmation of final destination must be recorded on inventory sheets, along with the date and amounts. These records must be provided to the Contract Administrator on a monthly basis.

6.0 ENVIRONMENTAL PROTECTION MEASURES

6.1 SCHEDULING

The Contractor will be responsible for scheduling Project activities to avoid sensitive dates as outlined in Table 6-1. There may be an opportunity to mitigate effects for certain activities; however, this will require approval in advance from The Engineer to confirm compliance with the licence and regulations.

Table 6-1: Construction Scheduling

Activity	Environmental restriction
Clearing	• Clearing should avoid the sensitive breeding period for birds from April 19 to August 29. • Clearing during this window can only occur if a pre-clearing survey (Section 6.2) overseen by EL&P shows that the activities will not disturb any birds or active nests.
Burning	• Burning is not permitted between April 1 - November 15 without a burn permit from Manitoba Sustainable Development.
Excavation	• Excavation work at known snake den sites will only occur when the den is not occupied (generally June to September).
Masonry Repair	• In areas of known occupied bat maternity or roosting sites, work such as masonry repair that has the potential to disturb the bats, will be scheduled when no bats are present (generally November 1 to March 31).
Work in/on Buildings Containing Nests	• The contractor will schedule Project work on/in buildings containing known nesting sites to avoid the nesting period of April 19 and August 28 (or when a nest is active).

6.2 FISH, WILDLIFE AND TERRESTRIAL HABITAT PROTECTION

[***Drafter's Note: the locations of dens and nests discussed below are unknown at the time of preparing this document and will be identified in the spring/summer of 2019. Their locations will be included on Sensitive Site Maps, to be included in Appendix B, prior to construction commencing**.]*

The following is required for the protection of fish, wildlife and terrestrial habitat:

1. Wildlife that affects, or has the potential to affect, worker health and safety will be reported immediately to the Contract Administrator, who will then contact the local Conservation Officer (Manitoba Sustainable Development).
2. The contractor will schedule clearing work between August 29-April 18 which is outside of the general nesting period for migratory birds for this region (April 19-August 28). If a small area (less than 1 ha) of clearing is required during the general nesting period, EL&P will conduct a survey for active nests prior to the start of any clearing. If nests are found during the survey, clearing will be restricted within species specific buffer areas identified by EL&P.
3. The contractor will schedule Project work on/in buildings containing known nesting sites to avoid the nesting period of April 19 and August 28 (or when a nest is active). These sites will be identified on the Project environmental sensitive sites map (APPENDIX B) and will include a species specific buffer.
4. The contractor may install physical exclusion materials (such as chicken wire, tarps, plywood, netting etc) on buildings prior to the nesting season (April 19) to prevent nesting on/in the buildings. If physical exclusion methods are used on buildings, they will be checked throughout the nesting season by the Contract Administrator to determine they are functioning as intended and no birds are nesting in the excluded area. If nesting birds are found, a species appropriate buffer from the nest will be established until the nest is no longer in use.
5. Buildings, equipment and materials arriving on site will be inspected by EL&P staff for their potential to become nesting sites for birds. If necessary, physical exclusion will have to be supplied and applied by the contractor, prior to the nesting period (April 19-August 28).
6. Any nests found within the project site (i.e. on equipment, the ground, in stockpiles or in/on buildings) will be reported to the Contract Administrator who will contact EL&P for identification. A species appropriate buffer will be established around the nest.
7. The contractor will construct material stockpiles (organics and fine material) such that they are sloped at 70 degrees or less to prevent the creation of nesting habitat for bank swallows.
8. Though not anticipated to occur on the Project site, if a raptor's nest is found, it will be left in place and the Contract Administrator will contact EL&P for advice.
9. Known snake dens on the Project site will be identified by EL&P staff on the Project sensitive sites map (APPENDIX B). If excavation in known snake den areas is required for the Project, the contractor will be required to schedule work when the den is not occupied (generally between June-September). A permit under the Manitoba Wildlife Act will be obtained by EL&P prior to excavation

in known snake den areas. If a snake den is damaged as a result of the Project, Manitoba Hydro will design and construct replacement denning habitat.

10. If a snake den that has not previously been identified is discovered during the Project, work at the snake den will stop. The Contractor will inform the Contract Administrator who will contact The Engineer and EL&P. A permit will be obtained under the *Manitoba Wildlife Act* by EL&P before work in the area of the den can proceed. If a den is damaged as a result of the Project, Manitoba Hydro will design and construct replacement denning habitat.
11. Bat maternity/roosting sites (i.e. potentially the service garage, hatchery building and aeration building) will be identified on the Project environmental sensitive sites map (APPENDIX B).
12. Buildings found to contain bat maternity/roosting sites will have exclusion measures applied by the Contractor in the winter of 2019/2020, when no bats are present.
13. If a bat maternity/roosting site is located in an area of a building despite exclusion measures having been put in place, work in the particular area may have to be deferred until the period between November 1 and March 31, when no bats are present.
14. If an occupied, large mammal den (such as black bear) is encountered during Project construction, it will be reported to the Contract Administrator, who will inform EL&P who will report the information to Sustainable Development.
15. To reduce the possibility of vehicle and wildlife collisions, posted speed limits will not be exceeded.
16. All vehicle collisions with wildlife such as moose, caribou, wolves, bear, fox, raptor and bats within the town of Grand Rapids that occur while conducting Project activities will be reported to the Contract Administrator, who will report it to the local Conservation Officer (Manitoba Sustainable Development).
17. No person on-site will feed or harass wildlife. Failure to comply could lead to dismissal from the Project.
18. Hunting, fishing or harvesting wildlife by Project personnel will not be allowed on the Project site.
19. Areas where there are patches of noxious weeds outside of the active construction area will be flagged for avoidance by EL&P to reduce the spread of noxious weeds around the site.

6.3 HERITAGE RESOURCES

1. All personnel working at the site will be made aware of the potential for heritage resources to be discovered during clearing and earth moving activities.
2. When heritage resources and/or human remains are discovered (or if a person is not sure), work will stop immediately in the area, the find will be left where it was found (it should not be picked up) and the Contract Administrator will be notified immediately.
3. The Contract Administrator will establish a 35 m (minimum) buffer zone around the find with flagging tape and fencing and notify the Project Archaeologist, The Engineer and Historic Resources Branch (HRB). Construction outside of the buffer area may continue.

4. The Project Archaeologist will assess the find, arrange for permits and arrange for the RCMP to attend the site if human remains are found.
5. Work may take place in the area of the find once the Project Archaeologist and/or RCMP give the all clear.
6. No worker will take ownership of, or give away any heritage resource found.

6.4 EQUIPMENT

1. To prevent the spread of invasive species, equipment will arrive at site in a clean condition. There should be no mud visible on machines, other equipment or work boots.
2. All equipment will remain within the Construction Project Footprint shown on the map(s) in APPENDIX B, unless otherwise approved by The Engineer.
3. Vehicle idling will be minimized, where practical.
4. Equipment will be operated at and within load tolerances, be regularly maintained, and be in good working order to reduce noise and vibration emissions.
5. Emergency spill kits will be kept on-site at all times in case of fluid spills.
6. Machinery, vehicles and equipment will arrive on-site in good working order and maintained as such and be free of fluid leaks.
7. Equipment maintenance activities will take place in contained areas on impermeable surfaces. These surfaces will be surrounded by berms to contain spills.
8. Drip pans will be placed under machinery, vehicles and equipment during maintenance and at the end of each shift, after use.
9. Washing machinery, vehicles and equipment will not take place at the Project site.

6.5 HAZARDOUS MATERIALS AND PETROLEUM PRODUCTS

6.5.1 TRANSPORTATION

1. Dangerous goods will be transported, according to the *Transportation of Dangerous Goods Act* SOR/2012-245 (TDG Act) and Regulations (TDGR), the *Dangerous Goods Handling and Transportation Act* C.C.S.M.c D12 M.R. 195/2015 (DGHT Act) and ICOA Technical Instructions for the Safe Transport of Dangerous Goods by Air (ICAO).
2. Any person who handles, offers for transport, or transports dangerous goods must be adequately trained and hold a current training certificate that meets the requirements of the legislation associated with the mode of transport.

6.5.2 TESTING AND STORAGE

1. Any known hazardous materials on the Project Site have been identified within the contract documents.
2. The Contractor must provide hazardous materials abatement and remediation in accordance with applicable safety regulations.
3. All chemicals, fuels, and other harmful materials will be stored a minimum of 100 metres from a watercourse/body.
4. Storage of hazardous materials will be limited to only the necessary quantities to conduct work.
5. Site selection for hazardous materials and petroleum product storage must be approved by The Engineer, or delegate.
6. Hazardous materials and petroleum products will be stored in compliance with regulatory requirements and only within dedicated sites at staging areas.
7. All hazardous material and petroleum product containers will be correctly labeled with applicable weather resistant WHMIS and/or Transportation of Dangerous Goods labels to disclose contents.
8. Hazardous materials are to be stored in cool, dry, well-ventilated areas, away from all sources of heat including sparks, open flames and excessive heat and out of direct sunlight.
9. Hazardous materials must be stored with all shut off valves on piping closed and locked.
10. Hazardous materials must be stored to ensure they do not come into contact with incompatible materials/substances.
11. Conspicuous signs will be posted in clearly visible locations near the storage facility.
12. If the hazardous materials are also dangerous goods, the storage area should have displayed appropriate TDG placards posted.
13. The storage area must have displayed signs prohibiting smoking.
14. Sites dedicated to hazardous material and petroleum product storage will provide the following features:
    - Bermed storage areas;
    - Clear identification of the materials present;
    - Restricted access to authorized personnel and vehicles only; and
    - Dedicated spill response equipment.
15. If stored outside, all materials will be stored in weatherproof containers on appropriately sized spill containment pallets and under a weatherproof tarp (with the exception of hazardous waste, see below).
16. Hazardous waste stored outdoors must be covered by roofing or another means to prevent precipitation from entering the storage area or secondary containment system.

17. Hazardous waste storage areas must be designed and maintained so that surface run-off from outside the storage area cannot enter any secondary containment system.
18. Storage areas will be protected from accidental vehicle collisions via concrete filled bollards or other methods approved by The Engineer or delegate.
19. Warning signs will be posted in clearly visible locations near the storage facility.
20. Hazardous waste containers must not be stacked on each other unless the containers are specifically designed to be stacked.
21. Hazardous waste containers and all piping and ancillary equipment used to transfer hazardous waste in a liquid form must be protected by a secondary containment system.

6.5.3 INVENTORY CONTROL

1. The contractor will establish a documented inspection process for all hazardous materials and petroleum products.
2. Hazardous material and petroleum product containers will be inspected daily for signs of leaks, corrosion or other damage.
3. Product inventory and inspection sheets will be recorded regularly and retained for Manitoba Hydro and regulatory authorities (as required).
4. A material inventory covered by Workplace Hazardous Materials Information Systems will be maintained on-site.

6.5.4 PETROLEUM PRODUCTS

1. All portable petroleum storage containers (< 230 litres) will be located on spill trays in the construction area when not in use.
2. Spill trays will remain impervious at very low temperatures (-45°C) and be maintained daily to remove accumulated precipitation when in use.
3. All petroleum storage sites (> 230 litres) will incorporate secondary containment features (double-walled tanks, containment dikes, or concrete pads).
4. Containment systems other than double walled tanks must be liquid proof and maintained to remove accumulated precipitation daily.
5. Containment systems must have 110% capacity of the largest tank's volume.

6.5.5 REFUELING AND FUEL TRANSFER

1. There will be no refueling of machinery, vehicles and equipment within 100 metres of a watercourse/body. If 100 metres cannot be attained, machinery, vehicles and equipment will be refueled in an approved fuelling area, in a contained manner, as approved by the Contract Administrator.

2. When fueling equipment in water (i.e. barges) spill containment equipment must be utilized at both the fuelling and receiving ends of transfer hoses.
3. Portable petroleum storage containers will be refueled in a designated area.
4. Fuel nozzles will not contain a filling lock flap.
5. All portable petroleum storage containers must be removed from the back of the vehicle and placed on a spill pad or inside a berm for filling.
6. No person shall transfer a petroleum product from a storage tank system to a tank vehicle or from a tank vehicle to storage tank system, without properly grounding the tank system.
7. The transfer of petroleum products will be supervised at all times and in such a manner as to be able to immediately shut off the flow of the petroleum product during transfer.
8. Tanks must provide spill containment at all connection points during a fuel delivery.
9. The grounding connection points will be free from corrosion and contamination, and all pieces of equipment must be free from defects.
10. All fuel dispensing systems will be secured and locked by authorized personnel when not in use.

6.5.6 PETROLEUM PRODUCT TANKS 5000 L (OR GREATER)

1. Tanks will consist of all above ground double-walled tanks.
2. Tanks will be registered with Manitoba Sustainable Development.
3. Tanks will meet all standards and codes outlined in The Storage and Handling of Petroleum Products and Allied Products Manitoba Regulation, 188/2001.
4. The contractor will provide all valid documentation to The Engineer or delegate for all tanks.
5. Tanks will have a valid operating permit issued by Manitoba Sustainable Development.
6. The installation or removal of petroleum product storage tank systems identified in Manitoba Regulation, 188/2001 will only occur under the supervision of a registered licensed petroleum technician.

6.6 HAZARDOUS WASTE DISPOSAL

1. The contractor is responsible for the proper disposal of hazardous materials waste products.
2. All used oil products (including empty containers and filters) and other hazardous wastes will be collected and disposed of in approved storage containers.
3. All used oils and hazardous wastes (including asbestos and lead paint) will be removed from the site for recycling or disposal at a licensed facility.
4. An inventory of materials shipped for recycling and/or disposal must be maintained, as well as a record of receipt of materials from the licensed facility.

6.7 NON-HAZARDOUS WASTE MANAGEMENT AND RECYCLING

1. Littering is prohibited. This includes solid waste tobacco products - this is a fire hazard.
2. The entrance to each building will have a proper receptacle for the disposal of tobacco products.
3. Work area(s) will be kept neat and tidy at all times.
4. All solid waste (including construction waste) will be collected for proper disposal.
5. Solid waste containing food wastes will be collected on a regular basis to prevent wildlife attraction to work area(s).
6. Animal (bear)-proof bins, buildings and/or electric fences will be used to contain food waste until it is disposed. Where deficiencies are noted, additional improvements will be made.
7. Construction waste will be separated and sorted for reuse or recycling.
8. Waste will be disposed of at a facility approved under an operating permit issued pursuant to The Waste Management Facilities Regulation 37/2016 or a *Manitoba Environment Act* Licence.
9. On-site burning of waste will be limited to readily combustible materials such as boughs, leaves, straw, paper products, cardboard, non-salvageable wood and packaging materials derived from wood. Burning other types of waste is not permitted. Burning will follow the details in Table 6-2.
10. Wood containing resins, glues and any other chemicals (plywood, pressure treated lumber, MDF, etc.) will not be burned, and should be disposed at a permitted landfill or reused in a different manner.

6.8 DRAINAGE

1. Stockpiled materials will not impede natural drainage.
2. Drainage activities will not be intentionally directed to watercourses/bodies.
3. If drainage is directed into dense vegetation, a velocity dispersion device will be placed at the outlet and the area will be monitored to confirm the receiving environment is not eroding.
4. If it is imperative that an area must be used as a drainage route, even though it is susceptible to erosion, proper erosion and sediment control measures will be put in place to prevent site degradation.

6.9 EROSION AND SEDIMENT CONTROL

1. Prior to construction activities, as soon as it is feasible, Erosion and Sediment Control (ESC) measures will be put into place.
2. All ESC measures will remain in place and be maintained throughout construction.
3. All ESC measures will be maintained in proper working condition during all phases of the Project. In addition, the following will be adhered to by the contractor:

- Construction will be designed and executed to prevent the release or settling of any sediment outside of construction boundaries;
- Disturbed areas will be stabilized, vegetated and/or seeded as soon as practical following construction;
- Accumulated sediment will be removed from sediment fences, check dams, straw bales, etc. as required, to confirm proper function;
- ESC measures will be maintained until either natural vegetation or permanent measures are established to prevent further erosion or sediment loss.

4. All temporary and permanent ESC measures will be inspected regularly by the Contract Administrator for effectiveness. Shortcomings will be rectified to restore their proper function.
5. Routine maintenance (at least once per week) of sediment fencing, check dams and erosion control blankets, etc. will be completed to confirm proper function.
6. All ESC measures (structures and procedures), either temporary and/or permanent, will be maintained in proper working condition for the duration of the Project.
7. Completed work areas will be graded and permanently stabilized.
8. ESC measures will be left in place until at least 50% vegetative cover is established in the seeded area.
9. Only water and dust suppression products approved by EL&P will be used to control dust at the Project site, where required. Oil, petroleum products and wastewater will not be used to control dust.

6.10 CLEARING

6.10.1 GENERAL

1. Clearing will be scheduled in accordance with Table 6-2.
2. In all cases, clearing will be kept to the minimum area required to carry out construction.
3. No chemical vegetation control will be utilized during clearing.
4. Existing access will be used.
5. Trees will be felled towards the cleared area to avoid damage to standing trees.
6. Any trees located outside the designated clearing area that overhang the construction area will be identified and felled by hand. These trees (known as danger trees) present a risk to human safety.
7. Slash will not be pushed within six metres of standing trees.
8. Firewood will be available for pickup by members of the community, if practical.
9. The majority of the remaining timber/slash will be stockpiled and mulched for erosion control or used during site rehabilitation, where required.

6.10.2 BURNING AND FIRE PREVENTION

The timelines and approval processes provided in Table 6-2 will be adhered to regarding the burning.

Table 6-2: Burning Restrictions

Timeline	Permit Required	Other Required Action
April 1 - November 15	Yes	• Acquire burn permit from Manitoba Sustainable Development. • A copy of the permit must be provided to the Contract Administrator or delegate. • Written notification must be provided to the Contract Administrator or delegate regarding intent to burn and when burn is extinguished
November 16 – March 31*	No	• Written notification must be provided to the Contract Administrator or delegate regarding intent to burn and when burn is extinguished.
November 16 - March 31*	No	• Written notification to Manitoba Sustainable Development district office.

*Note: Extinguish all fires by March 31
Immediately inform Manitoba Sustainable Development if not extinguished before March 31

1. Mixing soil in with the materials to be burned will be avoided.
2. To prevent damage to standing trees, burning will take place within the cleared area at least 15 metres from standing trees.
3. Firefighting equipment will be kept in working condition and at the Project site during clearing and construction operations and in accordance with work permit conditions for the Project.
4. Burning will take place under low wind conditions and when the wind direction is not towards the Town of Grand Rapids.
5. Burning will be supervised and all occurrences of fire spreading beyond the intended burn area will be reported to The Engineer or delegate immediately, who will report them to the Manitoba Hydro Corporate Fire Marshal, at (204) 360-4177 and Grand Rapids Manitoba Sustainable Development Office at (204)639-2241.
6. As much as practical, any unburned material remaining post-burn will be piled and removed or it will be spread out for erosion control.

6.11 GRUBBING

1. Grubbing will not occur within six metres of standing timber to prevent damage to the root system and to reduce the occurrence of blow down.
2. The contractor will stabilize (grade, seed, etc.) construction-sites requiring extensive grubbing as soon as practical to minimize erosion.

3. Work will be halted during heavy rains, if practical, when grubbing in areas of finely textured soils (clays, silts, fine sands, etc.).
4. Stumps will be mulched for use in erosion control or rehabilitation, where practical.

6.12 STRIPPING AND GRADING

1. Where there is sufficient depth of materials, stripping will take place in two phases:
   - Removal of organics; and
   - Removal of inorganics.
2. Organic material, topsoil and overburden will be stripped and piled separately and will be used for future site rehabilitation.
3. All stockpiles will be protected from rain and snowmelt as they occur; measures include biodegradable mats or tarps.
4. Grading activities will halt during heavy rains, where/when practical, to reduce the potential for erosion.

6.13 TEMPORARY ACCESS TRAILS

1. Existing road access points will be used.

6.14 LAY DOWN AREAS (FOR EQUIPMENT, VEHICLES AND MACHINERY)

1. Lay down areas will be identified by Manitoba Hydro.
2. Equipment and servicing will only be permitted in specified areas.
3. Spill containment equipment must be available at all refuelling and service areas within the lay down area.

6.15 DRILLING

1. All sediment laden drill water will be treated before release.
2. Only non-toxic drilling additives and muds will be used.
3. Any artesian flow (water bubbling out of a hole) will be plugged and permanently sealed immediately after drilling.
4. Fluids will be contained at the drill hole locations to allow sediment to settle.

6.16 EXCAVATION

1. All temporary shoring, bracing, sheeting, pumping, will be removed after excavation activities are complete.
2. Excavated material will be separated by size/type and stockpiles will be spaced appropriately to allow for drainage.
3. Non-combustible materials (rock, sand, clay) will be stockpiled to maintain a minimum 3 m buffer from the edge of a stockpile to standing timber.
4. Excavated material comprised of many fines will be covered to prevent erosion during precipitation events.
5. Where temporary pumping may be required to empty water (seepage or surface runoff) from an excavated area, water will be released on to a vegetated area of land and the discharge point will be monitored for erosion.

6.17 DECOMMISSIONING AND REHABILITATION

1. Construction areas that are not required for Project operations will be decommissioned and rehabilitated, where practical.
2. Decommissioning and rehabilitation will occur as soon as practical.
3. Decommissioning and rehabilitation activities will be completed and a joint inspection will take place at the end of the work, to confirm it meets the Province's requirements, if required.
4. With respect to decommissioning, it will include (but is not limited to):
    - Removal of equipment, fuel, chemicals, etc.;
    - Removal of all Project structures, including buildings, tanks, stockpiles and other features not required for Project operation;
    - Collection and disposal of any remaining wastes, recyclables and hazardous materials;
    - Removal and disposal of survey tapes, stakes, and other markers;
    - Removal and disposal of temporary erosion and sediment control devices if they are no longer required;
    - Cleaning up areas of contaminated soils/sediment;
    - Cutting off water and sewer pipes below the surface, if not used for long-term operation, filling with sand or gravel (as much as possible) and sealing the open ends with concrete.
5. With respect to rehabilitation, it may include:
    - Spreading organic material/seeding/planting tree seedlings in other appropriate areas;
    - Site preparation, if necessary, to re-establish vegetation. These activities may consist of scarification, grading and/or contouring (to stabilize slopes) and fertilizing;

- Spreading organic material, topsoil and subsoil that was stripped and piled separately from areas required for construction over decommissioned areas;
- Seeding and/or sodding; and
- Placing barricades to block newly rehabilitated areas to promote rehabilitation success.

APPENDIX A: ENVIRONMENTAL REPORTING TEMPLATE

APPENDIX B: SENSITIVE SITE MAPS

APPENDIX C: COPIES OF LICENCES, APPROVALS, AUTHORIZATIONS AND PERMITS