AIR AND NOISE TECHNICAL SUPPORTING DOCUMENT FOR THE UPPER MATTAGAMI PROJECT

Submitted To:

ONTARIO POWER GENERATION

Submitted By:

Mattagami River EA Consulting Team

March 2007

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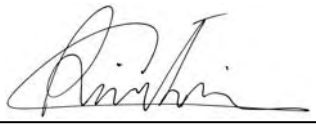
Prepared by:  5 March 2007
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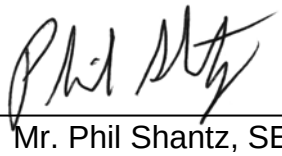
Reviewed by:  5 March 2007
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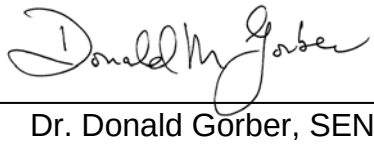
Approved by:  5 March 2007
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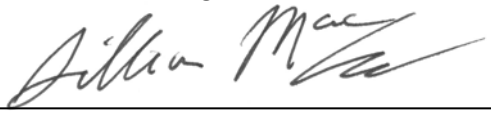
Reviewed by:  5 March 2007
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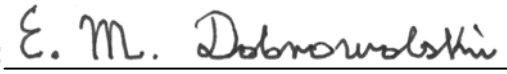
Accepted by:  5 March 2007
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1.0 OBJECTIVE

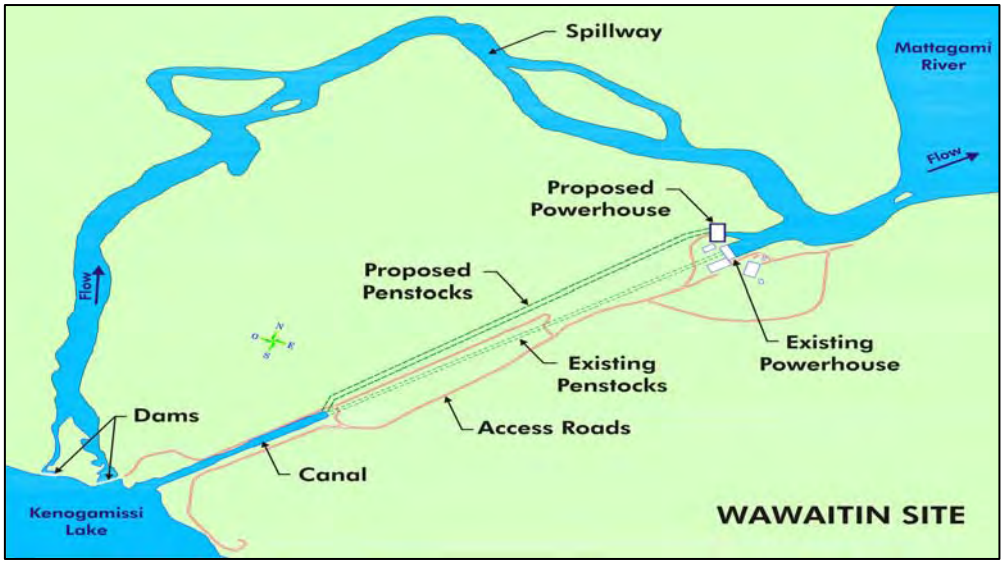
This is the technical support document for the Upper Mattagami Project assessing the affects of the proposed redevelopment of Wawaitin, Lower Sturgeon and Sandy Falls Hydro Generating stations on the ambient air and noise environment. The assessment of impacts is only for the construction phase of the proposed project, as there are no air quality and noise impacts associated with the operation of the hydro generating stations. However, it should also be noted that the generating stations will be equipped with emergency sirens.

2.0 WAWAITIN GENERATING STATION

2.1 GENERAL DESCRIPTION OF THE EXISTING FACILITY AND AREA

The Wawaitin Generating Station (GS) is located about 25 km south of the City of Timmins in Thornloe Township. The Wawaitin GS (as shown in Figure 2.1) has a main dam at the northern end of Kenogamissi Lake with two concrete control dam sluiceways that discharge into a spillway bypass channel which in turn discharges into the Mattagami River just downstream of the concrete powerhouse. An intake canal extends 360 m from Kenogamissi Lake to the intake structure. Water is conveyed from the intake structure to the powerhouse via two 800-m long underground penstocks. Water then enters the powerhouse where electricity is produced and then transferred to the grid. Water is then discharged back to the river through the tailrace.

Figure 2.1: Existing and Proposed Facilities



While the Wawaitin site is within the City of Timmins boundaries, the land around the generating station is primarily general use crown land, except for isolated pockets of private patent lands primarily along Kenogamissi Lake and Hydro Bay (MNR, 2006). This area is generally wilderness in character (Figure 2.2) and is defined as “Wilderness” in the City’s Schedule 2 of

the Official Plan. General uses in the area include forestry, cottaging, fishing, hunting and general recreation.

Figure 2.2: Wawaitin Site and Surrounding Wilderness Character

The Wawaitin Generating Station is gated and locked both for the protection of the facility and the safety of the public. Access to the Wawaitin Generating Station is via a City owned gravel road known as the Dalton Road that includes a bailey bridge maintained by Tembec Forest Products. The traffic on the road can include logging trucks operating for Tembec on the Romeo Malette Forest and cottagers and home owners with properties on Kenogamissi Lake and Hydro Bay. This is a well maintained road.

The closest receptor to the site is a small trailer park (approximately 30 trailers) and boat launch located about 500 metres east of the intake canal along the municipal road. The closest cottages are located about 1.5 km from the intake canal at Hydro Bay.

2.2 PROPOSED FACILITIES AND CONSTRUCTION WORKS

The proposed undertaking involves the demolition of the existing powerhouse and penstocks and construction of a new powerhouse and penstocks. The new powerhouse is planned to be located adjacent to the north of the existing powerhouse (see Figure 2.1). The proposed Wawaitin GS is expected to have two generating units with a total nameplate capacity of 15 MW.

Water in the existing intake canal would be conveyed through the existing intake structure via a new steel penstock about 850 m in length to the new powerhouse and the adjacent substation. The proposed facilities will be connected to the Hydro One Networks Inc. (Hydro One) Timmins Transformer Station (TS) at 27.6 kV to feed into the Timmins local distribution system. This penstock system would be buried parallel to the north of the existing twin penstocks that feed the existing Wawaitin GS.

Construction noise will mostly be concentrated near the powerhouse for approximately 18-24 months although the latter stages of the work would be done within the powerhouse itself.

Upon completion of the new generating station, the existing powerhouse with its four generating units will be decommissioned. Existing surge tanks and above ground penstock sections would be removed and backfilled. The buried penstock sections would either be excavated and removed.

The main dams, intake canal and spillways and associated equipment are in good condition but some refurbishment is required. There is a need to de-water a small portion of the intake canal to undertake the repairs. As well there is a need to remove some material blocking flow into the intake canal. It is anticipated that the work along the dams and intake canal will take less than six months to complete.

2.3 NOISE ASSESSMENT

The proposed redevelopment of Wawaitin generating station is a potential source of local noise during the demolition and construction phase. All work is expected to be completed using conventional construction methods. The noise associated with this phase of the proposed project would most likely be a result of activities such as demolition, site grading, site preparation, pile driving and foundation work. All of these activities, which are expected to take approximately 18 months, will require the use of various pieces of heavy equipment including bulldozers, front-end loaders, small trucks, backhoes, bobcats, dump trucks, compactors, ready-mix concrete trucks and cranes. Other construction activities, such as those related to the placement of the facility components (e.g., generator) and activities inside the building (once built) are expected to generate less noise. The movement of worker vehicles will also result in minor increase in the background sound levels during the 24 months construction period.

The proposed project will be constructed using standard construction best management practices (e.g., ensure equipment is in good condition and appropriate sound muffling components are working). Therefore, no unusual construction noise effects are anticipated at the nearby receptors therefore, no additional mitigation is required. As mentioned above, the closest receptor to the proposed construction site is a small trailer park (approximately 30 trailers) and a boat launch. This receptor location is approximately 500 metres east of the intake canal, and is located close to a well-travelled municipal road. The closest cottages are located about 1.5 km from the intake canal at Hydro Bay.

2.3.1 Timmins Noise By-Law

The City of Timmins By-Law No. 1983-1998, prohibits and regulates noises for areas within the Town. This By-Law states qualitative prohibitions on noise from various activities, including construction.

The By-Law states that:

a) No person shall shout or create, cause or permit any unusual noise or noises;
b) No person shall create, cause or permit any noise or noises likely to disturb the inhabitants.

Under the "Unusual Noises" Section of the By-Law, with reference to activities pertaining to demolition and construction, the By-Law prohibits:

- *the discharge into the open air of the exhaust of any hydraulic, air, or stationary engine, or any internal combustion engine, motor vehicle or motorcycle except through a muffler or other device which effectively prevents loud or explosive noises;*

- *any unnecessary noise arising between the hour of 9 o'clock p.m. of any day and 7 o'clock a.m. of the next following day from any excavation or construction work whatsoever including the erection, demolition, alteration or repair of any building, except in the case or urgent necessity.*

Since the construction site for the proposed undertaking is located within the City of Timmins, the demolition and construction activities must comply with the above noise By-Law. The hours of construction will also be limited to those specified in the By-Law.

2.4 AIR ASSESSMENT

The demolition of the existing generating station and the construction of the proposed Wawaitin Generating Station have the potential to affect the air quality in the vicinity of the site. Emissions which are associated with construction activities are primarily dust and typical combustion emissions from construction equipment such as CO, NO_x, SO_2 and Volatile Organic Compounds (VOCs). As with any construction site, these emissions will be of relatively short duration and unlikely to have any effect on the surrounding areas.

To reduce particulate emissions, effective dust suppression techniques, such as on-site watering and limiting the speed of vehicles travelling on the roads, will be used. During construction the practices and procedures outlined in the document "Best Practices for the Reduction of Air Emissions from Construction and Demolition Activities (March, 2005)" prepared by ChemInfo Services Inc. in conjunction with Construction & Demolition Multi-Stakeholders Working Group for Environment Canada should generally be followed. Some of key best practices, prepared by ChemInfo Services Inc., for the reduction of air emissions during the demolition and construction phases of the undertaking are summarized below:

- *Plan to Minimize Dust Generation* – Site planning should be conducted in order to maximize construction efficiency and consequently minimize emissions. Some key planning considerations include:

    - Design proper site layout - Location of stockpiles, access road(s), etc. should be such that the potential generation of fugitive dust is minimized. Prevailing wind direction should be considered when designing the site layout;
    - Develop dust management plan (as part of the environmental management plan) – identify potential fugitive emission sources during the construction phase; and,
    - Assess materials/tools/equipment to be used/handled - Decisions can then be made with respect to appropriate materials/tools/equipment that will serve to minimize dust generation (ChemInfo, 2005).

- *Use wind fencing* – Wind fence should be used at the permanent perimeter or temporary interior fencing of the construction site, early in the construction phase. Examples of wind fencing include: trees or shrubs left in place during site clearing; sheets of plywood; wind-screen material such as that used around tennis courts; snow fences; hay bales; crate walls; sediment walls; burlap fences; etc. Block walls, if part of the final project, can replace wind fencing during the site construction phase (ChemInfo, 2005).

- *Compact disturbed soil* – disturbed soil may be compacted with rollers or other similar equipment in order to reduce the erosion potential of the area (ChemInfo, 2005).

- *Activity scheduling* – Where feasible, reduce certain dust generating activities during periods of high wind speeds. Construction operations that generate greater levels of dust may be avoided or reduced. Instead, these activities can be conducted when more favourable weather conditions occur (ChemInfo, 2005).

- *Storage Piles Management* – Several work practices can be employed to mitigate fugitive dust emissions resulting from storage piles. These work practices, which primarily reduce the exposure of storage piles to wind, include:

    - Activities pertaining to the storage piles, such as loading and unloading, material drop, etc. should be confined to the downwind side of the storage piles. Also, the storage piles should also be located away from downwind site boundaries;

- Use partial or full enclosures or covers for the storage piles, depending on usage frequency. Examples of enclosures used for reducing fugitive dust emissions from storage piles include: three-sided bunkers that are at least as high as the stockpiled materials, storage silos for materials such as bulk cement, bentonite and similar fine dry materials. Tarpaulins, plastic, or other material can also be used as a temporary covering. Small or short-term inactive storage piles should be enclosed or kept under sheeting while larger inactive storage piles should be shrouded, capped or grassed over;
- Utilize wind fences/screens for storage piles porous wind fences/screens provide an area of reduced wind velocity that reduces wind erosion potential and fugitive dust emissions from the exposed surface on the leeward side of the fence/screen. A vertically-abrupt barrier will provide large reductions in velocity for relatively short leeward distances, whereas porous barriers provide smaller reductions in velocity but for more extended distances;
- Properly shape storage piles storage piles should be maintained so that they do not have steep sides or faces. In addition, sharp changes of shape in the final storage pile should be avoided. The disturbance of storage piles should also be minimized where feasible;
- Material delivery should be properly scheduled in order to minimize storage time and thus fugitive dust emissions (ChemInfo, 2005).

- *Minimize drop heights* – Where possible, reduce the drop height of materials in order to minimized emissions associated with material drop. This is particularly important during the demolition phase, where building debris might be dropped from high levels. To minimize dust generated during the material drop process, the debris can be dropped over several sequential stages instead of the entire distance at once (ChemInfo, 2005).

- *Barriers to Prevent Dispersion* – Enclosures, curtains or shrouds can be utilized during the demolition phase to confine dust generation. Enclosures, curtains or shrouds may be impractical during demolition activities lasting a few days or less. Prior to blasting, buildings should be screened with suitable debris screens and sheets (ChemInfo, 2005).

- *Avoid Blasting When Feasible* – Blasting with explosives has the potential to generate large amounts of fugitive dust emissions in a very short period of time. Blasting should be avoided and other demolition and deconstruction methods used wherever possible. It is noted that in some instances, blasting is the safest manner in which to quickly bring down a structure. Blasting operations can significantly reduce the size of the building and its component materials. The generation of a large amount of fugitive dust in the short term through blasting may reduce the potential for prolonged periods of fugitive dust emissions that would otherwise occur in ongoing size reduction operations (ChemInfo, 2005).

- *Work Practices for Loading Debris* – Loaders should tip debris into haulage trucks with a minimum fall distance to minimize dust emissions from tumbling debris. If possible, fine debris should be placed into the truck bin first, followed by larger debris on top. Alternatively, if possible, dry debris should be placed into the truck bin first, followed by wet debris on top. Debris loads should be balanced in truck bins. Debris loads should not be compacted using the impact of a loader bucket (ChemInfo, 2005).

- *Avoid Prolonged Storage of Debris* – Avoid prolonged storage of debris on site and its exposure to wind. Waste and refuse bins should be covered when they are being removed from the construction site (ChemInfo, 2005).

These recommended mitigation measures are relevant to Wawaitin, Sandy Falls and Lower Sturgeon.

Other emissions associated with construction activities include Volatile Organic Compounds (VOCs) emitted during surface coating operations. Architectural surface coating operations consist of applying a thin layer of coating such as paint, paint primer, varnish or lacquer to architectural surfaces. Surface coatings are applied to a variety of surfaces including, metal, wood, plastic, concrete, bricks and plaster. VOCs that are used as solvents in coatings are emitted during the application of the coating as well as when the coating dries. The amount of coating used and the VOC content of the coating are the primary factors that determine emissions from this source. Solvents are also used as thinners in the coatings and for cleanup activities. Some of the ways of reducing the VOC emissions include:

- Use durable and high performance coatings with a low VOC content;
- Minimize VOC emissions from the storage, handling and preparation of coatings;
- Minimize coatings wastage through spillage and splashing;
- Properly prepared the surface to be coated, prior to coating;
- Where possible, paint heaters should be used instead of paint thinners;
- Technologically advanced spray-guns should be utilized to apply coatings;
- Spray-gun operators should apply correct application techniques;
- Proper technique should be used when cleaning spray guns;
- Alternative coating application techniques should be used;
- Use alternative cleaners or low-VOC cleaners;
- Minimize the amount of solvents used for cleaning; and,
- Where possible, alternative finishing practices should be used (ChemInfo, 2005).

For more details regarding the above methods of reducing emissions during the demolition and construction phase, please refer to the ChemInfo document: “Best Practices for the Reduction of Air Emissions from Construction and Demolition Activities (March, 2005).”

It is anticipated that the net effects on the local air quality during construction phase of the proposed undertaking would be negligible and thus no other mitigative measures are required.

3.0 SANDY FALLS GENERATING STATION

3.1 GENERAL DESCRIPTION OF THE EXISTING FACILITY AND AREA

The Sandy Falls Generating Station is located in a rural/agricultural area about 10km northwest of the City of Timmins centre. Sandy Falls is accessed by Mahoney Drive which terminates at the Generating Station. This road is maintained by the City of Timmins.

The Sandy Falls GS (shown in Figure 3.1) receives water upstream of a 216 m long spillway weir dam across the Mattagami River. The dam consists of an overflow spillway in two sections, two log chutes and a concrete intake structure. Water is conveyed to the powerhouse via three 150 m long steel penstocks and three surge tanks. The powerhouse is a wooden frame structure with galvanized sheeting atop of a concrete foundation.

Figure 3.1: Sandy Falls - Existing and Proposed Site Layout

Most of the land around the Sandy Falls Generating Station is private patent land except for a thin riparian crown general use area along the Mattagami River. The Sandy Falls Generating Station was established prior to the City's establishment of an Official Plan. The GS is located in Mountjoy Township in an area known as the Mountjoy Planning Area. The area around the facility is identified as "Agricultural" in the City's Official Plan. This area around the GS is generally zoned "Rural-Agriculture" and referred to as "AT" in the City's Zoning By-Law. The

area around the generating station is rural in character (Figures 3.2 and 3.3) with some cleared fields used for agricultural use, although large blocks of forest cover remain in patches over these lands. The area is not densely population but there are numerous homes in the area including one approximately 100 metres from the facility situated on the hill above.

Figure 3.2: Sandy Falls and the Adjacent Rural/Wooded Lands

Figure 3.3: Rural Area around Sandy Falls

3.2 PROPOSED FACILITIES AND CONSTRUCTION WORKS

The proposed undertaking involves the demolition of the existing powerhouse and penstocks and construction of a new powerhouse and penstocks. The new powerhouse is planned to be located adjacent to the north of the existing powerhouse (see Figure 3.1).

The proposed Sandy Falls GS is located adjacent to the east of the existing powerhouse and the new powerhouse will enclose one generating unit with a nameplate capacity of 5.5 MW. A water canal will connect the new powerhouse to the existing intake structures No. 2 and No. 3.

Upon completion of the new generating station, the existing powerhouse with its three generating units will be decommissioned. The existing surge tanks and above ground penstock would be removed and backfilled. The buried penstocks would either be excavated and removed. The obsolete electrical switching equipment and transformers would also be removed.

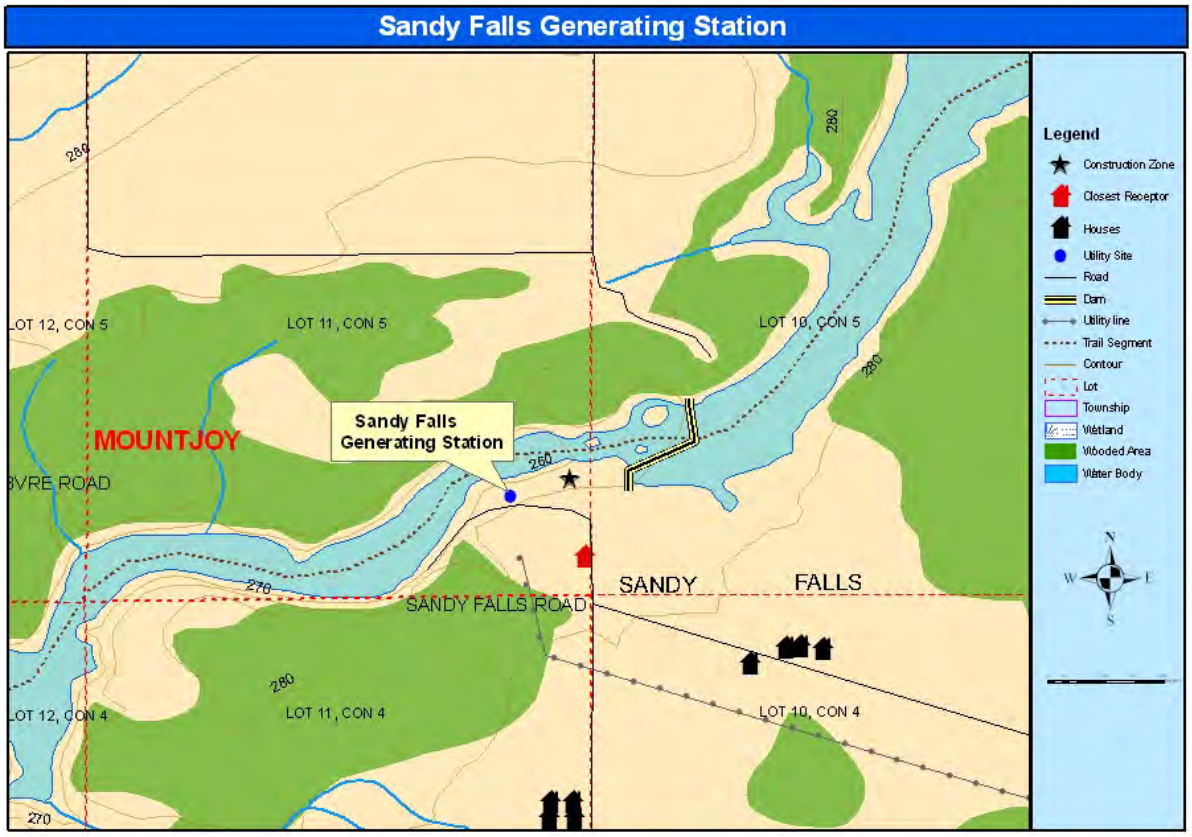
Most of the noise will be emanating from near the powerhouse as that is where construction will be extended the longest, however shorter term construction will also occur at the intake structure.

3.3 NOISE ASSESSMENT

The proposed redevelopment of Wawaitin generating station is a potential source of local noise during the demolition and construction phase. All work is expected to be completed using conventional construction methods. The noise associated with this phase of the proposed project would most likely be a result of activities such as demolition, site grading, site preparation, pile driving and foundation work. All of these activities, which are expected to take approximately 18 months, will require the use of various pieces of heavy equipment including bulldozers, front-end loaders, small trucks, backhoes, bobcats, dump trucks, compactors, ready-mix concrete trucks and cranes. Other construction activities, such as those related to the placement of the facility components (e.g., generator) and activities inside the building (once built) are expected to generate less noise. The movement of worker vehicles will also result in minor increase in the background sound levels during the 24 months construction period.

The proposed project will be constructed using standard construction Best Management Practices. Therefore, no unusual construction noise effects are anticipated at the nearby sensitive receptors therefore, no mitigation is required. The closest potential noise receptor to the proposed construction site is a house located approximately 200 m south of the construction zone. There are also homes at approximately 500m and 700m southeast and southwest of the construction zone (see Figure 3.4).

Figure 3.4: Sandy Falls Generating Station and Nearby Potential Receptors



3.3.1 Timmins Noise By-Law

Since the construction site for the proposed undertaking is located within the City of Timmins, the demolition and construction activities are to comply with the noise By-Law discussed in Section 2.3.1, above. As mentioned above, Standards Construction Best Management Practices will be implemented, to ensure compliance with the Town of Timmins noise By-Law. The hours of construction activities (7:00 a.m. to 9:00 p.m.) which may impact on the noise by-law will be limited to those specified in the By-Law.

3.4 AIR ASSESSMENT

The demolition of the existing generating station and the construction of the proposed Sandy Falls Generating Station have the potential to affect the air quality in the vicinity of the site. Emissions which are associated with construction activities are primarily dust and typical combustion emissions from construction equipment such as CO, NO_x, SO_2 and Volatile Organic Compounds (VOCs). As with any construction site, these emissions will be of relatively short duration and unlikely to have any effect on the surrounding areas.

To reduce particulate emissions, effective dust suppression techniques, such as on-site watering, street cleaning and limiting the speed of vehicles travelling on the roads, will be used. During construction the practices and procedures outlined in Section 2.4 above should be considered as mitigation measures. In summary, it is anticipated that the net effects on the local air quality during construction would be negligible and short term and thus no other mitigative measures are required.

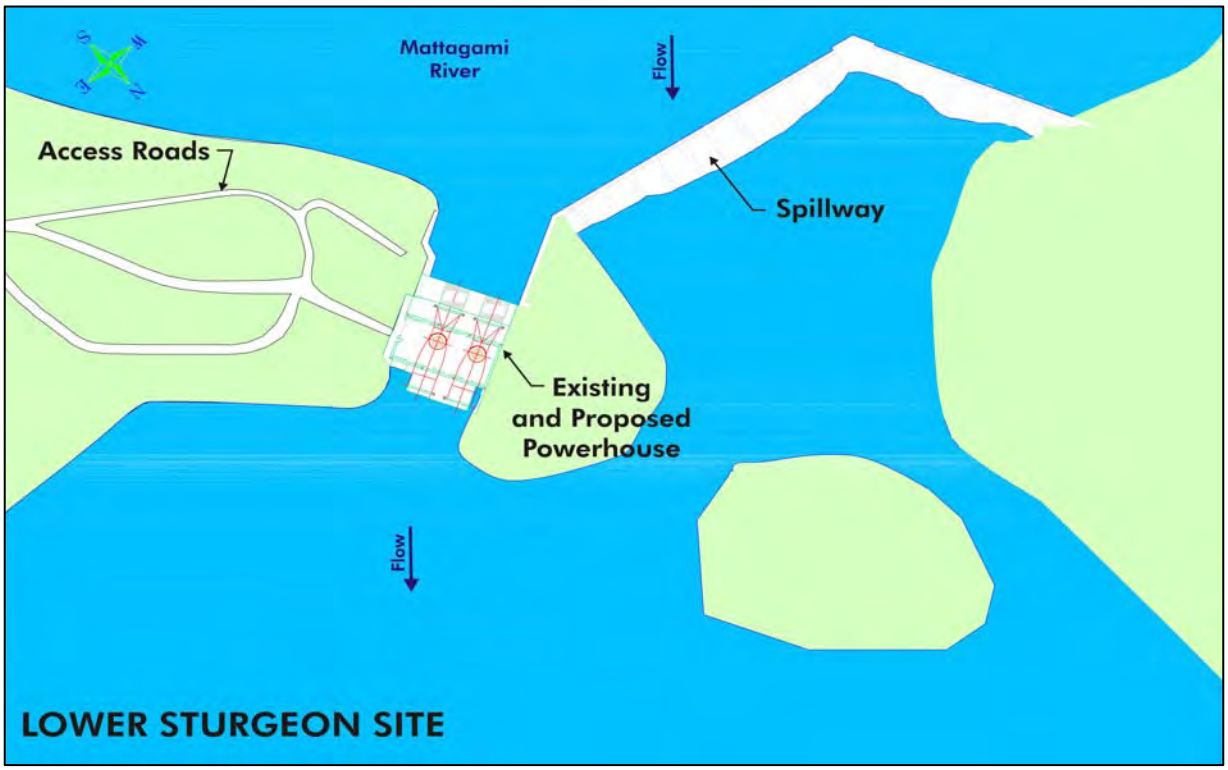
4.0 LOWER STURGEON GENERATING STATION

4.1 GENERAL DESCRIPTION OF THE EXISTING FACILITY AND AREA

The Lower Sturgeon Generating Station is located in Mahaffy Township, 48 km north of Timmins and accessed via Highway 655 and then a gravel road leading west. This road is open to the public for about 10 km and then gated by OPG about 2 km from the station. The transmission line connecting the facility generally runs north-south along this section of the river.

The general layout of the Lower Sturgeon Generating Station is shown in Figure 4.1. The Lower Surgeon GS has a dam, 165 m in length, constructed in three differently angled sections, extending across rock outcrops along almost the entire width of the river.

Figure 4.1: Lower Sturgeon - Existing and Proposed Site Layout



Water flows from the upstream head pond into penstocks contained within the powerhouse and discharges back to the river from the downstream side of the powerhouse. The powerhouse is of tile construction, steel frame, concrete roof and steel sash.

The Lower Sturgeon Generating Station is located in an area of crown general land use land known as the Kidd Creek Complex a 103,000 hectare area of land traversing the northern most part of Timmins District. The primary resource use in the area is resource extraction and hydroelectric development is permitted. Private patent land occurs east of the generating

station beyond the Kidd Creek Complex general use area. The Mahaffy Township Ground Moraine Conservation Reserve Complex is located a couple km northwest of the complex.

Lower Sturgeon is located in an unorganized township and therefore there are no local planning controls. There are no Minister's zoning orders in this section of the Province.

4.2 PROPOSED FACILITIES AND CONSTRUCTION WORKS

The proposed Lower Sturgeon GS is planned to be located on the site of the existing powerhouse. The old powerhouse will be demolished followed by the construction of the new powerhouse. The proposed new powerhouse will enclose two generating units with a station capacity of 14 MW. It is anticipated that demolition and construction at the new site will last from 18 to 24 months.

Lower Sturgeon occurs in largely a wilderness setting (Figures 4.2 and 4.3). Use along the public portion of the road is very light and likely by anglers and hunters. While the road is not currently used for logging it is possible that harvest blocks are occasionally identified in the area requiring this road for access.

Canoeists along the Mattagami River are very rarely observed in this location. A portage exists on the western side of the river for canoers to traverse the facility.

Figure 4.2: Lower Sturgeon and Surrounding Wilderness Area

Figure 4.3: Lower Sturgeon View Upstream

4.3 NOISE ASSESSMENT

The Lower Sturgeon GS occurs in a wilderness setting and there are no homes or cottages within 5km of the site. Therefore, no receptor noise impact during the demolition and construction phase of the undertaking is expected. Although the City of Timmins does not have planning, or land use jurisdiction over Lower Sturgeon, it is recommended that construction practices follow the recommendations of the City Noise By-Law.

4.4 AIR ASSESSMENT

The demolition of the existing generating station and the construction of the proposed Lower Sturgeon Generating Station have the potential to affect the air quality in the vicinity of the site. Emissions which are associated with construction activities are primarily dust and typical combustion emissions from construction equipment such as CO, NO_x, SO_2 and Volatile Organic Compounds (VOCs). As with any construction site, these emissions will be of relatively short duration and unlikely to have any effect on the surrounding areas.

To reduce particulate emissions, effective dust suppression techniques, such as on-site watering, street cleaning and limiting the speed of vehicles travelling on the roads, will be used. During construction the practices and procedures outlined in Section 2.4 above should be considered as mitigation measures. In summary, it is anticipated that the net effects on the local air quality during construction would be negligible and short term and thus no other mitigative measures are required.

5.0 SUMMARY

On a land use continuum the Sandy Falls, Wawaitin and Lower Sturgeon Generating Stations range from rural to accessible wilderness to remote wilderness. Sandy Falls Generating Station is located in the rural area just outside of Timmins and its air quality largely reflects that of the City. Its noise environment is characterized by rural land uses. Wawaitin Generating Station is located in largely a wilderness area that is well accessed and used by the public. Local air quality is reflective of a wilderness area with the predominant noise being truck and vehicle traffic on local roads. Lower Sturgeon is located in a remote wilderness area with no other permanent use. No other human noises are generally present in the area and local air quality is good. At all three sites, the most significant source of noise is the sound of water being spilled around the generating stations.

The air and noise effects associated with the proposed redevelopment of the Wawaitin, Lower Sturgeon and Sandy Falls Generating Stations will be limited to the construction period and will be typical of most construction sites. There are no receptors near the Lower Sturgeon Generating Station. Receptors at Wawaitin are located a significant distance from where construction will be occurring. At Sandy Falls a few homes are located in closer proximity and it is important that the Design Build Contractor adheres to the City of Timmins Noise By-Law.

A variety of best practices with respect to the control of air emissions have been identified and should be implemented on the construction site. The best practices should include:

- Plans to minimize dust generation through planning, site layout and the proper use of materials, tools and equipment;
- Use of wind fencing;
- Compacting disturbed soil;
- Activity scheduling;
- Storage piles management;
- Minimization of drop heights;
- Barriers to prevent dispersion of materials;
- Avoidance of blasting where feasible;
- Work practices for loading debris;
- Avoidance of prolonged storage of debris; and,
- Proper techniques for the use of materials that include VOCs.

Overall, the air and noise impacts of the proposed projects at Wawaitin, Sandy Falls and Lower Sturgeon are likely to minor and temporary during the course of the project.

6.0 REFERENCES

ChemInfo Services Ltd. Best Practices for the Reduction of Air emissions from Construction and Demolition Activities. Environment Canada. 2005.

City of Timmins. City of Timmins By-Law No. 1983-1998.