Section 6.0
Environmental Impact Assessment

SECTION 6.0
ENVIRONMENTAL IMPACT ASSESSMENT

6.1 APPROACH TO IMPACT ASSESSMENT AND SIGNIFICANCE RATIONALE

The purpose of this Environmental Impact Assessment (EIA) is to identify and describe any potential environmental effects that may occur as a result of the construction and operation of the proposed OlyWest pork processing facility. This EIA is based on and in response to the Manitoba Conservation June 13, 2006, document entitled "Advice Document for OlyWest for the Preparation of an Environment Act Proposal for a New Hog Processing Plant in Winnipeg", (Appendix L).

The information presented herein on the anticipated effects from the construction and operation of the proposed OlyWest pork processing facility includes the results from public input including Open Houses, internet website feedback and meetings with a CAC. Information related to the environmental component of the study and the expected impacts on the environment was collected from a variety of sources, including:

- Published information and maps, supplemented with air photograph interpretation;
- On-site field reconnaissance and examination;
- Discussions with technical representatives from major plant component suppliers; and
- On-site examination of similar plants within Canada and the United States.

Potential environmental effects associated with the existence of the physical structures were identified by superimposing project elements of the proposed pork processing plant and ancillary structures onto existing natural conditions and by applying standard mitigation measures. An underlying assumption of this method is that the plant will be constructed and operated with due care for safety and environmental matters, using current and practical engineering methods. Wherever possible, major upsets and deviations from normal construction or operating conditions have been taken into account in the EIA.

Significance Rationale

Various terms have been used to identify and describe the potential impacts assessed. Table 6.1 provides an explanation of these terms.

Table 6. 1: Explanation of Terms Used in Impact Assessment

Project Phase:	Refers to the phase of the project as construction, operation or decommissioning of the processing facility.
Potential Impact:	Classification of the type of impacts anticipated during a specific project phase.
Magnitude of Impact:	Refers to the percentage of population or resource that may be affected by an impact from activities associated with the construction of the proposed OlyWest pork processing plant. Where possible, the population or resource base has been defined in quantitative or ordinal terms (e.g., hectares of soil types, units of habitat). Impact magnitude has been classified as less than (<) 1%, 1 to 10% or greater than (>) 10% of the population, or resource base. If there was insufficient information available to quantify the percent impacted, the change was identified only as an increase or decrease in the population or resource. Where the magnitude of an impact has been defined as <1%, the impact is virtually unmeasurable and represents a non-significant change from background in the population or resource (negligible). An exception to this is in terms of potential human health effects where, for example, deaths due to waterborne disease amounting to 1% of the population would still be considered high.
Direction of Impact:	Refers to whether an impact to a population or a resource is considered to have a positive, negative or neutral effect.
Duration of Impact:	Refers to the time it takes a population or resource to recover from the impact. If quantitative information was lacking, duration was identified as short-term (<1 year), moderate term (1 to 10 years) or long term (>10 years).
Frequency of Impact:	Refers to the number of times an activity occured over the construction or operation phase, and is identified as once, rare, intermittent, or continuous.
Scope of Impact:	Refers to the geographical area potentially affected by the impact and was rated as local, regional or provincial. Where possible, quantitative estimates of the surface area affected by the impact were provided.
Degree of Reversibility:	Refers to the extent an adverse effect is reversible or irreversible over a 10 year period.
Residual Impact:	A subjective estimate of the residual impact remaining after employing mitigation measures in reducing the magnitude and/or the duration of the identified impacts on the environment.

MAGNITUDE OF IMPACT	DIRECTION OF IMPACT	DURATION OF IMPACT	FREQUENCY OF IMPACT	SCOPE OF IMPACT	DEGREE OF REVERSIBILITY OF IMPACT
Negligible	Positive	Short term (< 1 year)	Once	Local	Reversible
Low (<1%)	Negative	Moderate (1 to 10 years)	Rare	Regional	Irreversible
Moderate (1 to 10%)	Neutral	Long term (>10 years)	Intermittent	Provincial	
High (>10%)			Continuous		

The following subsections address the various components of the environment, which were assessed to determine the level of impact by the proposed construction and operating activities. Brief summaries of the anticipated potential impacts and mitigation measures for the construction and operation phases of the project are presented at the end of this Section as Tables 6.17 and 6.18, respectively. The potential impacts on specific environmental parameters are described in terms of relative or absolute significance, where possible. Impacts are defined as negligible, low, moderate or high according to terms in Table 6.1. The mitigation measures shown in Tables 6.17 and 6.18 are also further explained under the subsections of Section 7.0.

The guidance document provided by Manitoba Conservation outlines "Impact Categories" to be considered in assessing the environmental impacts from the proposed OlyWest pork processing facility. These Impact Categories included Environment, Land Use, Natural Resource Uses, Traffic Pattern Changes, Environmental Health, and Socio-Economic Impact Categories. Within the Impact Categories several sub-categories (such as surface water and ground water under environment) exist, each of which must be analyzed over a number of project sources. Potential effects would be as a result of the inputs and outputs during both the construction and operational phases of the project.

Potential effects associated with the construction of the proposed OlyWest pork processing facility were considered from the following sources: building and construction, traffic increases and site preparation/clearing.

Potential effects associated with the operation of the proposed OlyWest pork processing facility were considered from the following sources: the plant wastewater pre-treatment facilities, residual solids management, potential atmospheric releases from processing and protein recycling, and delivery/shipping of product. The following assessment will consider the environmental Impact Categories for each of the potential impact sources.

The guidance document provided by Manitoba Conservation does not clearly state the spatial limitations of any impacts, but does require scaled mapping for the 3 and 10 km radius from the project site. For the purposes of this study, the extent of the impacts will be analyzed as to:

- Local – 3 km radius from the site
- Regional – 10 km radius from the site
- Provincial – within the Province of Manitoba

6.2 RISK ASSESSMENT

Risk and risk analysis terms used in this impact assessment will follow the definitions as given by Cohrssen and Covello (1989) as follows:

1. **Risk:** the likelihood of suffering harm from a hazard.
2. **Risk Agent:** a chemical substance, biological organism, radioactive material or other potentially hazardous substance or activity.
3. **Hazard:** a substance or action that can cause harm.
4. **Risk Analysis:** methods of risk assessment: e.g. hazard identification, risk assessment, significance of risk, risk communication.
5. **Hazard Identification:** first step in risk analysis is to determine whether a risk agent, under plausible circumstances, causes harm to human health or the environment.
6. **Risk Assessment:** second step of risk analysis; the technical assessment of the severity and likelihood of harm to human health or the environment occurring from exposure to a risk agent. Includes the following three steps:
    a) Source/release assessment: estimates the amounts, frequencies and location of the introduction, release or escape of risk agents (e.g., toxic chemicals) from specific sources.
    b) Exposure assessment: provides quantitative data on individuals, populations or ecosystems that are, or may be, exposed to a risk agent; the concentrations of a risk agent; and the duration and other characteristics of exposure.
    c) Dose-response assessment.
7. **Risk Characterization:** integrates the results of the previous steps into a risk statement that includes one or more quantitative estimates of the risk, including attendant uncertainty.
8. **Risk Estimate:** an estimate of the likelihood, or statistical probability, that harm will occur as a result of exposure to a risk agent.
9. **Risk Management:** the process involved in the determination of what action to take to reduce or eliminate a risk; includes design and implementation of policies and strategies resulting from the decision-making process. Also includes social, economic and political input.
10. **Risk Perception:** reflects how individuals perceive the risk(s) associated with exposure to the risk agent. All people perceive risks differently, depending upon the nature of the risk; and their individual experiences. Many factors may influence risk perception.

A "health effect" refers to a certain health consequence. Bernard and Lauwerys (1986) defined "biological effect" as a "biochemical, functional or structural change resulting from reaction of an organism to exposure". An adverse biological effect is the result of a negative impact on biological function or structure. Adverse biological effects can be reversible, as in

the case of the return to normal vision following blurred vision or eye irritation. These effects may also be irreversible as in the case of irreparable tissue damage (i.e. emphysema induced by excessive cigarette smoking).

In its preamble, the World Health Organization's Constitution states that "Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity". Along with potential biological effects, mental and social effects that might result from emissions from the proposed OlyWest pork processing facility have been considered.

During the construction and operation phases of the proposed OlyWest pork processing facility, appropriate workplace health and safety procedures and protocols will be followed by all construction and operation workers in accordance with the *Manitoba Workplace Safety and Health Act* and the standards and procedures developed by OlyWest. The three partners involved in the construction of the project, namely, Olymel S.E.C./L.P., Hytek Ltd. and Big Sky Farms Inc. have developed individual worker safety programs, and components of these will be included in the development of the OlyWest specific standards and procedures document. These procedures and protocols will not be discussed further during this EIA since they are beyond the scope of the terms of reference as provided by the Manitoba Conservation Advice Document and fall under the jurisdiction of the Department of Labour.

6.3 ENVIRONMENTAL IMPACTS

6.3.1 Air Quality Impacts

6.3.1.1 Greenhouse Gases

Emissions of GHG from the proposed OlyWest pork processing facility have been estimated in Section 5.3.2.1 using the procedures set out in Environment Canada's *Greenhouse Gas Inventory*.

The relevant source categories for the proposed OlyWest pork processing facility have been determined to include the following:

- Stationary Fuel Combustion
- Industrial Process
- Waste and Wastewater
- On-site Transportation

Estimates of the amount of carbon dioxide (CO_2), CH_4 and N_2O have been made for the proposed OlyWest facility. As previously stated in Section 5.3.2.1, no direct emissions of HFC, PFC and SF_6 from industrial processes and industrial product use are anticipated from the proposed OlyWest project.

In the determination of the impacts that may arise from the operation of the proposed OlyWest pork processing facility, the impact significance was determined by comparing the predicted

emissions for the proposed OlyWest facility to the published figures for the Province of Manitoba. It was not possible to determine geographical boundaries for the proposed OlyWest facility's emissions and as such the provincial totals were used as a comparison. The emissions from the proposed pork processing facility are summarized in Table 6.2. The estimation method to determine the quantities of GHG emissions include emission factors and engineering estimates based upon the latest available information.

Table 6.2: Greenhouse Gas Emissions

Greenhouse Gas	OlyWest (tonnes)	Manitoba 2003 (tonnes)	Percent of Provincial Total
CO_2	12,385	11,800,000	0.105%
CH_4	26	187,000	0.014%
CH_4 as CO_2 Equivalent	536	3,920,000	0.014%
N_2O	0.53	18,000	0.003%
N_2O as CO_2 Equivalent	166	5,700,000	0.003%
Total CO_2 Equivalent	**13,087**	**21,300,000**	**0.06%**

In all instances, GHG from the proposed OlyWest facility will be <1% of the provincial total, with a total CO_2 equivalent of 0.06%. This would be near the negligible range of impact determination.

6.3.1.2 Odour

Odour concerns related to the proposed OlyWest facility have been predominant from the original announcement of the project. Effects were expected to be as a result of two distinct sources, namely the transportation and temporary storage of live hogs and the emissions resulting from the protein recycling system. As the pre-treated wastewater is being sent off-site to the City of Winnipeg, the usual concerns with odours from wastewater treatment are reduced for this plant.

In order to evaluate the potential impacts from odour, air dispersion modeling was conducted for the proposed OlyWest facility (Appendix H). Included in the construction of this model are emissions from the proposed facility including the protein recycling facility, hog holding facility and livestock delivery trucks. Evaluation of the resulting model used the *Manitoba Ambient Air Quality Criteria* published by Manitoba Conservation, 2005.

Odour concentration was determined by a panel of trained assessors and is based upon the number of dilutions required to reach threshold. Odour concentration values are dimensionless however the pseudo dimension of OU is often applied for modeling purposes. For example one volume of fresh air combined with an equal volume of odourous air would indicate 2 OU if the odour was just barely detectable. If 6 volumes of fresh air were required

to dilute one volume of odourous air to the point where an odour panel could just detect the odour, the rating would be 7 OU. Manitoba criteria are 2 OU for residential properties, and 7 OU for industrial properties, however Manitoba Conservation utilizes an odour nuisance management strategy as an enforcement trigger for odours and uses these OU values as a guideline only.

Odour modeling for the facility was undertaken in accordance with Manitoba Conservation's *Draft Air Dispersion Modeling Protocol for Estimating Odour Nuisance Impacts.* The odour removal efficiency of the proposed emission control equipment was provided by SCP Control, Inc. Assuming that no significant background odour exists on or near the site, maximum odours are predicted to occur approximately 200 m south of the plant property and approximately 370 m south of the hog receiving area of the facility at a theoretical concentration of 4.9 OU. This maximum falls within the general area of the CN Railway's Symington Yards and is well within the industrial guideline of 7 OU. The results of the modeling also indicate a concentration of 2 OU (the residential guideline) will be met, with insignificant exceptions (see Appendix H).

6.3.1.3 Noise

Sound is the energy produced by a vibrating source as it creates pressure waves in the atmosphere and can be measured in units of decibels. Many sounds are unpleasant or unwanted in which cases the sounds are considered as noise. Interpreting noise effects for the proposed OlyWest facility were difficult due to a number of anthropogenic sources in the area, namely CN Railway's Symington Yards to the south and Intermodal Terminal to the southeast. Noise impacts are expected to be directed towards people in the surrounding area, and local fauna during both the construction and operational phases of the project.

Construction

Construction noises may be expected to arise from the use and arrival of heavy equipment at the site, air hammer and other construction tool operation, increased traffic and associated construction noises. Piles will be installed as part of the foundation for the building. Significant noise will be created from the process of driving concrete pilings into the clay soils.

Noise from these activities will be detectable within the nearby industrial park. Generally the impact from this noise will be low, with sounds in the 40 dB range. However, during certain operations such as pile driving, local noise impacts could reach into the 70 to 80 dB range. Further from the site, at a distance of approximately 1.0 km, sounds should be moderated in the 30 to 40 dB range. Although detectable, these sounds will be partially masked by ambient noise from other sources in the area.

Studies have indicated a wide variety of fauna at the site (Appendix B). Disturbances from noise are likely to have a large impact locally on some of these species, although the impacts are of relatively short duration. In particular, songbirds will be affected during construction

activities carried out during nesting periods. Boreal Chorus Frogs and Wood Frogs were present on the property and both rely on their distinctive singing sounds in the mating process. Significant construction activity would locally impact these species on a temporary basis.

Other species, including small mammals and transient birds, will either adapt to the sound or avoid the area during the construction period.

Operation

Sound from the proposed OlyWest pork processing facility will be a result of the reefer units on truck and transportation vehicles, the movement of the vehicles themselves and from mechanical equipment such as the evaporative condensers, holding facility exhaust and the protein recycling facility exhaust.

The plant has been orientated such that the hog shipping trucks will access the site and idle on the south east side of the proposed building near CN Railway's Symington Yard's to provide noise mitigation by increased residential separation. Noise nuisance during the operation phase resulting from trucks is not anticipated to be noticeable above the background noise of the surrounding road system, the CN Railway's Symington Yards and Intermodal Terminal. The site is located in an industrial area with a significant buffer zone. This buffer zone will provide sufficient sound decay from the minor mechanical equipment sound sources such as the air exchange units.

The proposed OlyWest facility will mitigate the possible impact from sound by containment within the building where possible. The proposed OlyWest facility intends to normally operate the plant with all major doors closed. The residual sound levels off-site originating from the external sources will be minimal, if detectable at all, and impacts will be local, continuous and of low magnitude.

The guidance document provided by Manitoba Conservation requested that the *Guidelines for Sound Pollution* developed by the Department be used for the criteria to assess the sound impacts. The maximum desirable sound level in a residential area listed in the *Guidelines for Sound Pollution* is 45 dBA. As indicated in Section 5.3.2.1, noise levels at the closest industrial and residential receptors are estimated to be 61 dBA and 45dBA respectively. The maximum desirable sound level for a residential receptor will not be exceeded.

Table 6.3 is taken from the MFL Occupation Health Centre Factsheet and demonstrates the relative significance of various sound levels (1991). Sound levels between 40 dBA and 60 dBA are characterized as being similar to soft music or a normal conversation. As the residential sound level criteria will be met, the sound level impacts will be of low magnitude.

Table 6.3: Relative Significance of Sound Levels

Sound Source	Sound Level dBA
Softest sounds young people can hear	0
Rustling leaves	20
Soft music, quiet conversation	40
Normal conversation	60
Busy street traffic	80
Potential for hearing damage increases rapidly above this level	85
Heavy vehicle	90
Rock drill	110
Gun shot, saw mill chipper	120
Pain level, jet plane taking off	140

6.3.1.4 Other

The following potential impact elements are included because of the possibility that they will be encountered as a result of the proposed OlyWest project. In each case, these items will be below maximum allowable levels (MAL). Overall impacts are expected to be negligible from these items.

$PM_{2.5}$

Inhalable particulate matter, with a diameter less than or equal to 2.5 micron, will be created during the operational phase of the project.

The ambient 2005 24-hour $PM_{2.5}$ maximum concentration was modeled at 19.3 $\mu g/m^3$ and does not exceed the provincial MAL guideline of 30 $\mu g/m^3$. Further information is contained in Section 6.7.2 of this report.

PM_{10}

Inhalable particulate matter, with a diameter less than or equal to 10 micron, will be created during the operational phase of the project.

The ambient 2005 24-hour PM_{10} maximum concentration was modeled at 38.1 $\mu g/m^3$ and does not exceed the provincial MAL guideline of 50 $\mu g/m^3$. Further information is contained in Section 6.7.2 of this report.

Nitrogen Oxides

The maximum 1 hour average model-predicted NO_2 maximum ambient concentration was 185.6 $\mu g/m^3$. This result was far below the provincial MAL objective of 400 $\mu g/m^3$. Further information is contained in Section 6.7.2 of this report.

Carbon Monoxide

The maximum ambient CO concentrations predicted were 3.97 mg/m^3 and 2.23 mg/m^3 for the 1 hour average and 8 hour averages respectively. Both values are well below the referenced criteria. Further information is contained in Section 6.7.2 of this report.

Sulphur Dioxide

The maximum ambient SO_2 concentration was 171.7 $\mu g/m^3$ for the 1 hour average. This result was well below the MAL of 900 $\mu g/m^3$ 1 hour average. Further information is contained in Section 6.7.2 of this report.

Local Nuisance Conditions

There is a slight possibility that short term effects on visibility could occur from dust resulting from construction activities. These effects are expected to be restricted to the local area. Most effects from dust are expected to be eliminated through dust suppression activities, resulting in negligible impacts.

Water Vapour and Fog

No anticipated changes to the air quality conditions are anticipated on a regional or provincial basis as a result of the proposed OlyWest project. Based on the low amount of water vapour emitted from the plant as described in Section 5.0, it is not anticipated that the local microclimate will be affected by water vapour resulting in icing/fog.

Studies have also indicated some potential for photochemical smog to be formed from NO_x emissions. As the estimated ambient concentration of NO_x (based on NO_2) did not exceed the MAL, it is not anticipated that the proposed facility would generate photochemical smog.

6.3.2 Groundwater Impacts

Based on the information presented in Section 2.8.1, the depth from the ground surface to the open hole from which water is drawn in the wells within the 1.5 km radius of the site ranges from 18 m to 91 m (60 to 300 ft) below the ground surface. The shallowest well within a 1.5 km radius has a depth of 23.6 m (77.4 ft) below the ground surface. Based on the soil lithology and hydrogeological information presented in Section 2.0, some groundwater at the proposed site was encountered 14 to 15 m below the existing ground surface. The groundwater is within a layer of carbonate bedrock confined by approximately 12 to 16 m of

clay. The clay layer acts as a significant impediment for any surface water permeating the soil into the groundwater.

Potential environmental impacts on the groundwater could result from spilled or leaked contaminants from the site potentially polluting local wells. It is estimated that contamination of the groundwater would likely require hundreds of years to reach nearby production wells as the pollutant would need to migrate vertically through 14 to 15 m of clay before entering the groundwater aquifer. The calculated travel time through 14 m of clay is approximate 443 years using a typical hydraulic conductivity rate for clay of 1 x 10^{-7} cm/s. The results from an investigation by the University of Manitoba into seepage from earthen animal storages indicated that in a 'worst case' scenario it would take 60 years for groundwater to become contaminated at a site that had only 7 m of clay and till above the aquifer (University of Manitoba, 2000).

There is no proposal to use groundwater at the proposed facility for heating, cooling or processing. All water used at the facility will be provided by the City of Winnipeg's water supply system.

6.3.2.1 Construction Phase

The potential environmental impacts on the groundwater during the construction phase include contamination from accidental fuel and chemical spills and the disposal of construction waste. The risk from accidental spills is negligible due to the thick clay layer present on the site. Spills would be contained on the site and cleaned up before enough time lapsed for a contaminant to migrate into the groundwater aquifer.

6.3.2.2 Operational Phase

The risk of environmental impacts on the groundwater during the operational phase of the facility comes from uncontrolled releases of pollutants from undetected spills and leaks that migrate into the groundwater aquifer.

Potential sources of spills and leaks located outside the building include the fuel and chemical delivery vehicles and storage tanks, meat and bone meal silos, blood meal storage silos, inedible oil tanks, and the truck wash area. Additional potential sources located inside the building include the wastewater infrastructure including the equalization basin, liquid blood storage tank, chemical storage room, holding pens, and the manure/bedding material storage area.

There is no direct pathway for contaminants to enter the groundwater located near the potential sources as the site is situated on approximately 14 to 15 m of clay. The nearest observation well is located south of the railroad tracks and east of Mazenod Road, with the nearest production well that is currently in use is located more than 400 m north of the building. A second production well is located on the west side of Mazenod Road north of the railroad tracks, but the well has never been used and is currently capped off.

The building will be constructed on concrete piles driven to refusal or cast in place with a structural concrete floor that serves as another barrier for sources located inside the building. Due to the difficulty of installing a liner because of the concrete piles, the concrete and reinforcing specifications have been strengthened to reduce the risk of cracking under the hog holding facility and the wastewater equalization basin where the risk is highest. The deepest part of the building will be the CO_2 asphyxiation chamber that will extend approximately 7.6 m below the hog holding facility floor level, resulting in a minimum 4.3 m clay barrier between facility and the groundwater.

6.3.3 Surface Water

6.3.3.1 Effects from Runoff

The proposed pork processing facility is located approximately 4 km east of the Seine River. The surface water from the proposed facility will drain through a new off-site retention pond and several existing retention water ponds located in the St. Boniface Industrial Park before discharging into the local ditch drainage system that discharges into the Seine River.

Potential environmental impacts on surface water include flooding, and the harmful alteration, disruption or destruction (HADD) of aquatic habitat from polluted site runoff, accidental spills and leaks, disposal of construction waste, and combined sewer overflows (CSO).

Construction

The potential environmental impacts on surface water during the construction phase of the project include contamination from accidental fuel and chemical spills, sedimentation, construction debris, and local flooding from uncontrolled site runoff. Surface water bodies at risk include the existing local ditches and retention ponds.

Operation

The proposed OlyWest site is designed to provide adequate drainage to meet City of Winnipeg standards. Surface runoff from the constructed site will be directed towards a storm water retention pond located to the east of the proposed building, as described in Section 3.1. The storm water retention pond has been designed to contain two consecutive "1 in 25 year" storm events. Surface runoff is expected to be consistent in quality with similar industrial sites. Areas of particular concern would be the hog unloading area (oil, fuel, hog manure), the truck wash area (oil, fuel, bedding material, hog manure) and the product shipping bays (fuel, oil).

The unloading area is designed to minimize impacts into the storm water ponds as sufficient drainage will be provided to direct runoff water from this area to the sanitary sewage system. Hog manure is minimal due to the delivery methods outlined in Section 4.2.2. All manure and bedding material will be gathered and stored in the enclosed bin area for removal to appropriate facilities. Fuel spills are unlikely as fueling for shunting trucks and reefer units will be conducted by OlyWest staff only, the aboveground tank will be equipped with a limit

switch to prevent over fueling. Fueling will occur on a concrete pad and the fuel storage tank will be double walled in accordance with Manitoba Conservation fuel storage and handling regulations. Only an unforeseen catastrophic failure of a transport truck fuel system or the site diesel tank would provide potential impacts. Volumes entering the surface runoff are too small to be measured, and therefore impacts from this segment of the operation are considered to be negligible.

Truck wash wastewater will be collected in compliance with City of Winnipeg standards, with a rotary screen and an oil and sand interceptor or other approved system. Wastewater from the truck wash will be directed towards the sanitary wastewater system. Volumes entering the surface runoff are too small to be measured, and therefore impacts from this operation are considered to be negligible.

The product shipping bays will have potential for fuel/oil spills from trucks to potentially entering the site runoff. The potential for impacts from these events is negligible.

6.3.3.2 Effluent Impacts to Surface Water

Effluent is only produced during the operational phase of the proposed project. Integral to the proposed OlyWest facility operational design has been the ability of the City of Winnipeg to accept and adequately treat the effluent from the operation. Agreement between the City of Winnipeg and OlyWest has been reached such that the all effluent from the proposed OlyWest operation will be directed towards the City of Winnipeg NEWPCC. In total, the effluent from the proposed facility will represent 1.6% of the current treatment volume at the NEWPCC, making potential for impacts in the medium category.

The City of Winnipeg is required to reduce the nitrogen and phosphorous loads to the Red and Assiniboine Rivers by 13% and 10%, respectively. To accomplish these reductions, the City is embarking upon a program involving installation of nutrient reduction facilities at both the West End Water Pollution Control Centre (WEWPCC) and NEWPCC. The near-future nutrient reduction facilities at the NEWPCC are focused on the treatment of centrate, which is a side stream of the sludge dewatering process that is rich in nutrients, while further upgrades are planned to occur by 2015.

6.3.3.3 Nitrogen Removal at the North End Water Pollution Control Centre

The City is required under the terms of Environmental Act Licence 2684 R to remove no less than 838 kg/d of nitrogen from the centrate stream. A centrate treatment nitrogen removal facility has been designed to meet this requirement and the construction of this facility will commence later this year with completion expected in 2008. The treated centrate will be discharged to the head end of the NEWPCC.

The treatment facility will use the sequencing batch reactor (SBR) process. A schematic of the centrate treatment nitrogen removal facility is presented in Figure 6.1. Centrate flow will

be split between the two SBRs, such that the current required load of nitrogen is removed in SBR 1.

6.3.3.4 Additional Total Nitrogen and Total Phosphorous Loading Prior to NEWPCC Upgrade

Nitrogen Loads

The process liquid effluent from the proposed OlyWest processing facility is proposed to be pre-treated and then discharged into the wastewater collection system that flows to the NEWPCC. The nitrogen loads expected to be discharged from the proposed OlyWest facility to the City's wastewater collection system, are estimated as shown in Table 6.4.

Table 6.4: Estimated Wastewater Quality During Ramp Up[2]

Year	Kills/week	Peak Nitrogen Load (kg/day)[1]	Average Nitrogen Load (kg/day)[1]
2009	18,000	252	164
2010	27,000	378	228
2011	35,000	490	319
2012	41,000	574	374
2013	45,000	630	410

Notes: 1) Nitrogen load as Total Kjehldahl Nitrogen (TKN).
2) Prorated based upon proposed OlyWest business plan projections.

Most of the ammonia and nitrogen load from the proposed OlyWest processing facility would pass through the mainstream NEWPCC and into the Red River, with little reduction occurring in the mainstream portion of NEWPCC. To compensate for the additional nutrient loading imposed on the river by the proposed OlyWest processing facility, the City is prepared to increase the removal of nitrogen from the centrate to offset the increase in nitrogen loading to the river due to the proposed OlyWest facility.

The increase in total nitrogen load due to the proposed OlyWest facility is assumed to be 410 kg/d (average weekly data based on 7 days) and 630 kg/d (daily maximum) when the proposed OlyWest facility is operating at full capacity (expected in 2013). The proposed centrate treatment facility will have the capability to increase the removal of nitrogen from the centrate by 410 kg/d measured as a daily average. The nitrogen removal capacity of the centrate treatment facility can be increased from 838 kg/d to approximately 1248 kg/d. The 1248 kg/d of nitrogen would be removed by splitting the flow equally to both SBRs and removing nitrogen in both SBRs. Figure 6.1 illustrates this approach.

Because the effluent load from the proposed OlyWest processing facility is ramping up over a period of three to five years, there will be opportunity for the City to operate only one SBR in the denitrification mode until that SBR's capacity is reached. The point in time at which this capacity is reached has yet to be determined, and will require a more detailed evaluation. Based on current information and analysis, the City will likely be able to direct more flow to

SBR 1 than SBR 2 in 2009. This action would facilitate the removal of an additional 164 kg/d of nitrogen. As production at the proposed OlyWest processing facility increases, the City will be able to further increase the centrate flow to SBR 1, resulting in further nitrogen removal. At some point between 2009 and 2013, the treatment capacity of SBR 1 will be approached, requiring the City to start operating SBR 2 in the denitrification mode.

Phosphorous Loads

There are two potential sources for phosphorous loads to the City of Winnipeg, namely process water and sanitary wastewater. In determining the effluent loads, the truck wash and process wastewater were calculated as one stream and the sanitary wastewater was determined separately. All process wastewater will receive pre-treatment prior to discharge to the City waste collection system via a DAF system (see Section 4.3.2). This system is designed to remove 98% of the total phosphorous in the process wastewater prior to discharge to the city sewer system. The resulting "sludge" formed from the DAF system is transported to the protein recycling facility, where it is processed into feed supplement. Expected wastewater quantity and phosphorous loads are shown below in Table 6.5.

Table 6.5: Wastewater Quantity Phosphorous Loads

	Time	Anticipated Effluent Load	
		Process and Truck Wash Wastewater	Sanitary Wastewater
FLOW DISCHARGED	Daily average over 7 days	2520 m^3/d	121 m^3/day
	Daily maximum	3240 m^3/d	170 m^3/day
TOTAL PHOSPHOROUS	Daily average over 7 days	1.7 mg/L	8.2 mg/l
		4 kg/d	1 kg/day
	Daily maximum	3.6 mg/L	8.2 mg/L
		9 kg/d	1.4 kg/day

The increase in phosphorous load to the NEWPCC is projected to be an average total of 5 kg/day from all sources, with a daily maximum of 10.4 kg. Although the NEWPCC is not necessarily designed for nutrient reduction, the City of Winnipeg does note that concentrations are reduced from about 6 mg/L in raw effluent to 3-4mg/L in treated effluent. According to published data from the City of Winnipeg, the Total Annual Phosphorous load from NEWPCC is approximately 711.8 kg/day (260 tonnes/yr). If no allowance is made for the potential phosphorous reduction from the NEWPCC, the total incremental contribution to the effluent load from the NEWPCC would be 1.46% at daily maximum, and 0.7% at the daily average. Total annual loading, including periods of plant shutdown is expected to be 1,270 kg (0.49%), which would indicate low significance for this impact category.

Impact of Additional CSOs

A potential source of impacts has been identified as CSOs, which occur when the capacity of the effluent pipes is exceeded resulting in deposits of untreated effluent into surface water bodies. The City of Winnipeg has studied the potential impacts and mitigation involved with CSOs and issued a final report on long term strategies (Wardrop Engineering Inc. et al., 2002).

One of the strategies is to use dedicated effluent pipes in high usage situations such that no interconnection with land drainage sewers is made. This is the situation with the proposed OlyWest facility. The effluent will be directed via an interceptor sewer which will direct flow to the NEWPCC via a routing that does not interact with any CSOs as described in Sections 3.1 and 3.2. This will eliminate any possibility of impacts arising as a result of the effluent volumes from the proposed OlyWest facility.

Endocrine Disruptors

Construction

There will be no construction considerations for EDCs.

Operation

In the past few years the public has become increasingly aware of the emerging issue related to EDCs. These compounds arise from a number of sources, both natural and man made. The common characteristic of EDCs is that they interfere with normal hormonal activity in fish and wildlife that are receptors of increased concentrations of these compounds. One of the common identified effects can be the ability for the substance to block the female sex hormones, particularly estrogen, androgen and 17 B-estradiol. However, EDCs have also been identified as affecting male sex hormones, development, behaviour, and growth (Environment Canada, 1999).

There are three primary methods by which EDCs disrupt normal hormonal activity. EDCs can:

- Mimic normal hormones
- Block or interfere with normal hormones
- Trigger hormonal activity

Any of these methods can cause problems in natural ecosystems by affecting the reproductive and growth cycles in fish and wildlife (Erice, 1995).

The primary concern with hog operations is related to manure production and handling (National Water Research Institute, 2003). Within hog manure there can be high concentrations of endocrine disrupting chemicals including estrogen. Section 5.3.2.5 indicates that the manure contained in the delivery trucks coming to the receiving facility will primarily

send solid waste to enclosed containment bins that will be removed from the site and field spread according to Manitoba regulations. Solid manure from the holding facility will be land applied with the screened solids from the truck wash, the bedding material and the manure from the hog trucks. This manure will not enter the effluent stream emanating from the proposed OlyWest site and will not be a consideration for the City of Winnipeg. Solids will enter the wastewater in the receiving barn and during processing, which will be sent to the on-site wastewater pre-treatment facility. This effluent will be pre-screened, which will remove between 12% and 50% of the solids. The remainder of the liquid manure will go to the NEWPCC for treatment. Total volume is estimated to be 2,845 kg per year at full operational capacity. Under License No. 2684 RR, the City of Winnipeg is licensed such that:

> *"…the organic loading does not exceed 117,800 kilograms over any 24 hour period during dry weather flow"*

Thus the entire hog manure contribution of organic solids to the NEWPCC from the proposed OlyWest operation will be 0.007% of licensed capacity. This is considered to be negligible.

The secondary consideration with EDCs is the lack of understanding of the scope and mechanism that exists with respect to the pathways to the environment. Environment Canada (1999) has stated that EDCs are a complex problem requiring further study. The Canadian Council of Ministers of the Environment (2003) identified the numerous information gaps that existed in the science related to EDCs. The number one identified gap was the need to continue to reduce the large uncertainty associated with scientific assessments of these types of substances and effects. The United States Environment Protection Agency (EPA) identified over 87,000 potential EDCs, with no current standards or conventional screening methods for detection (United States Environmental Protection Agency, 2005).

Alberta Agriculture (2003) reviewed the use of pharmaceutical products used in the livestock industry, and the likelihood of these substances contributing to the levels of EDCs. Their findings concluded that most of the substances were completely broken down in the animal, and that no environmental risk resulted. However, they did acknowledge that reproductive hormones could act as EDCs if they got into the environment. Secondly, some antimicrobial medications may lead to the development of some drug resistant bacteria in the environment. The difficulty was that the current level of science was not available to distinguish the different sources and effects from these compounds. They concluded by stating:

> *"There is little evidence to confirm that either of these concerns is a significant issue at this time. The risk to the environment from pharmaceuticals is low. Drug residues are excreted at very low levels and are then diluted with water and manure from other untreated animals. Drug residues are further diluted when the manure is spread on the land."*

Table 6.6 identifies some or the potential sources and types of substances that may be possible EDCs.

Table 6.6: Sources, Categories and Examples of Substances that have been Reported as Possible Endocrine Disruptors[1]

Examples of Sources	Categories (Example of Uses)	Examples of Substances
Incineration, landfill	Polychlorinated Compounds (from industrial production or by-products of mostly banned substances)	Polychlorinated dioxins, polychlorinated biphenyls
Agricultural runoff / Atmospheric transport	Organochlorine Pesticides (found in insecticides, many now phased out)	DDT, dieldrin, lindane
Agricultural runoff	Pesticides currently in use	Atrazine, trifluralin, permethrin
Harbours	Organotins (found in antifoulants used to paint the hulls of ships)	Tributyltin
Industrial and municipal Effluents	Alkylphenols (Surfactants – certain kinds of detergents used for removing oil – and their metabolites)	Nonylphenol
Industrial effluent	Phthalates (found in placticisers)	Dibutyl phthalate, butylbenzyl, phthalate
Municipal effluent and agricultural runoff	Natural Hormones (produced naturally by animals); synthetic steroids (found in contraceptives)	17-b-estradiol, estrone, testosterone; ethynyl estradiol
Pulp mill effluents	Phytoestrogens (found in plant material)	Isoflavones, lignans, coumestans

Note: 1) Environment Canada, Endocrine Disrupting Substances in the Environment, 1999.

The City of Winnipeg has actively pursued and developed procedures to deal with emerging issues, and has identified EDCs as an area of consideration. Municipal wastewater treatment plants are an acknowledged pathway for EDCs to enter into the environment. To date, the focus of industry research has been on alkylphenols, alkylphenol ethoxylate, bisphenol A, natural steroidal estrogens and synthetic estrogens (City of Winnipeg, 2003) due to their EDC potential and abundance in wastewater.

Currently, only nonylphenol (NP) is included in the Manitoba Water Quality Standards, Objectives and Guidelines (MWQSOG) and has been found in the NEWPCC effluent at low levels. At this time there are no regulations or guidelines that would deal with potential EDCs from the proposed OlyWest project. However, it is expected that the removal of most of the

manure from the waste stream and subsequently from the effluent would indicate that this effect would be of a minor nature.

As the scientific understanding and identification of compounds becomes sufficiently understood and identified, the ability to establish and adopt treatment technologies will be improved. The City of Winnipeg has plans to monitor for compounds that are identified, and to consider appropriate actions. Further, the City of Winnipeg has committed to following the scientific community's advances on a global basis, and is currently in the process of interacting with some of the field's foremost scientists (City of Winnipeg, 2003).

6.3.4 Soils

The advice document requests that impacts to soils be examined principally in light of any proposed program involving land disposal of manure and sludges. This would therefore limit discussion of impacts from the proposed OlyWest project to the operational phase. As noted in Section 5.3.2.5 solid manure from the on-site holding facility, screenings from the truck wash, and bedding material from the incoming hog trucks will be temporarily stored in a bin on-site then follow one of three options for disposal:

- Land application
- Transport to a landfill
- Composting

Approximately 3,500 tonnes per year will be generated from all sources. Currently land application is the primary option being considered and prepared for, but all disposal options are regulated by Manitoba Conservation under a variety of waste disposal regulations, and manure management legislation. The relatively small volumes of waste generated by hogs at the plant are far less than 1% of the provincial total, and impacts are expected to be negligible in comparison.

6.3.5 Heritage Resource Impacts

The potential sources for impact to heritage resources would be during the construction of the facilities from site preparation, pile installation and retention pond construction. The potential for disruption of existing heritage resources would be high, should such resources exist in the area. To this end, a qualified archaeologist was engaged to examine the site for heritage resources (Appendix D).

The location was deemed to have a low potential for archaeological resources due to the distance from water. The area would have experienced no erosion and minimal soil aggradation over the past millennia. Aeolian deposition of fine particles during extended droughts would have added slightly to the upper soil layer. The amounts would have been small, even during periods like the Hypsothermal. Also, minimal deposition would have occurred during flooding of the Red and Assiniboine Rivers.

The result of this minimal accretion of soil would be that any artifacts left behind as an indicator of past utilization of the area would be on or very near the surface. The disturbance caused by cultivation can both bring artifacts to the surface and also bury them within the plow zone. No artifacts were observed on the surface or within any of the test pits, suggesting that the area was minimally utilized, if at all.

No evidence of in situ cultural resources was observed during the archaeological impact assessment. Impacts from the construction of the plant with respect to heritage resources are therefore expected to be negligible.

6.4 LAND USE IMPACTS

6.4.1 Impacts on Local Land Use Planning Programming

No impacts on local land use planning programming are anticipated as a result of the construction or operation of the proposed OlyWest project. There may be some future considerations as suppliers and services to an operation of this magnitude wish to locate closer to their client. No changes are required or anticipated to existing planning initiatives.

6.4.2 Compatibility with Existing Area Zoning

The proposed site is an approximate 114 acre (46 ha) site within the St. Boniface Industrial Park. More specifically, the site is immediately east of (the future extension of) Mazenod Road, south of the aqueduct, west of Plessis Road and north of the CN Railway's Symington Yards. This area is designated for heavy industry by the City of Winnipeg. The closest residential property line is approximately 1.3 km from the closest edge of the plant. The location of the proposed OlyWest project is consistent with approved current land use designation, and no zoning changes are required as a result of the project.

6.4.3 Proximity to Other Businesses

A distance of approximately 440 m (1,444 ft) exists between the animal holding area for the proposed facility and nearest commercial structure in the St. Boniface Industrial Park. A listing of businesses in the St. Boniface industrial park can be found in Section 12.2.4 and maps illustrating proximity to other infrastructure and zoning areas can be found in Figures 1.1 and 2.1 of this report.

6.5 NATURAL RESOURCE USE IMPACTS

6.5.1 Existing Natural Resources

The advice document instructs OlyWest to consider the impacts to the natural resource uses in the area as a result of the operation of the proposed project. The following outlines impacts to specific components.

6.5.1.1 Groundwater

No use of groundwater during the construction or operation of the plant is anticipated. Existing uses of groundwater in the area will not be impacted.

6.5.1.2 Irrigation Water

With the exception of minor landscaping requirements, no use of water for irrigation is known in the area. No impacts are expected.

6.5.1.3 Drinking Water

The development will have an impact on water use in the City. The current average water consumption is about 400 Litres/Capita/Day (LCD) compared to the 480 LCD level that existed before the City's current Water Conservation Program began. Winnipeg's waterworks system currently delivers an average of 225 million litres of water per day to approximately 270,000 Winnipeg households (City of Winnipeg Waste and Water Department, 2002).

The City (2006) also notes that recent projections (1997) suggest that residential demand will continue to increase gradually until about the year 2020 and then level off (City of Winnipeg Water and Waste Department, 2001). However, commercial and industrial water use has decreased with significant declines in the industrial group water usage, most likely due to the loss of some very large users (packing plants, refineries) over recent years.

As shown in Table 6.7, the proposed facility's effect on Winnipeg's water demand is considered moderate.

Table 6.7: OlyWest and City of Winnipeg Water Demand

Estimated OlyWest Annual Water Demand (m^3)	Winnipeg Annual Demand (m^3)	% of Annual Demand
980,000	82,125,000	1.19%

6.5.1.4 Fisheries

Runoff pollution, as may occur from various sources as described elsewhere in this report, are expected to be negligible. Therefore, impacts to fisheries from surface runoff are also expected to be negligible.

On a Provincial basis, nutrient loading has been demonstrated to be insignificant, and unlikely to cause any significant impacts to the fisheries of the region.

Endocrine disruptors are expected to be <1% of the current levels at the NEWPCC, and impacts on fisheries from these sources are expected to be negligible. However, it should be pointed out that the existing thresholds and point source contribution mechanisms are poorly understood, and future research may provide clearer indications of the magnitude of any risks.

In any event, such findings would likely be addressed on a long term approach by the City of Winnipeg.

6.5.1.5 Wildlife

The loss of 46 ha of relatively undisturbed land will have a negligible impact on a provincial or regional basis, but will potentially affect the variety of birds, amphibians and mammals outlined in Appendix B that are known to use the site.

Within the context of the flora and fauna described for the site, no rare or endangered species were encountered. Impacts are expected to be negligible.6.6 Traffic Impacts

6.6 TRAFFIC PATTERN CHANGES

6.6.1 Construction Phase

During construction, truck traffic will include raw material shipments (i.e. concrete, lumber, steel, equipment, etc.) as well as construction equipment transportation and dump trucks for cut and fill operations. Lighter traffic will include contractor and sub-contractor vehicles. Existing roads and highways will be used during the plant construction with the exception that, once the new access road off either Ray Marius Road or Elizabeth Road from the east is completed, some traffic will use this entrance. The incremental site traffic generated by the construction phase of the project is expected to produce moderate short term local impacts in terms of potential accident rate increases and traffic congestion.

6.6.2 Operational Phase

Employee and general delivery truck traffic to the facility will enter the industrial park from both Dugald Road and Plessis Road. While both Dugald Road and Plessis Road are designated as full time truck routes (City of Winnipeg Traffic By-law 1573/77, 1999), hog delivery vehicles will avoid travel through populated areas by traveling to the proposed facility northbound on Plessis Road and turning left either onto Camiel Sys Street and left again onto a proposed extension of Ray Marius, or left onto a proposed private road off the Manitoba Hydro Substation at Plessis Road as shown in Figure 3.2.

The forecasted AADT for Dugald Road and Plessis Road in 2011, when the plant is at full production, is shown in Table 6.8. There is an estimated moderate increase in the AADT of 6.1% on Dugald Road and 5.7% on Plessis Road due to the processing plant.

Table 6.8: Estimated Dugald and Plessis Road AADT and Truck Volumes

	Dugald Road	Plessis Road
2011 AADT without Development	19,316	11,135
2011 AADT with Development	20,486	11,765
Difference	1,170	630
Percent Change	**6.1%**	**5.7%**
Number of Trucks without Development	1,352	891
Number of Trucks with Development	1,390	1,013
Difference	38	122
Percent Change	**2.8%**	**13.7%**
Trucks as % of AADT without Development	7.0%	8.0%
Trucks as % of AADT with Development	6.8%	8.6%

The impact on truck volumes is considered moderate on Dugald Road and high on Plessis Road south of the proposed truck access into the facility. However, the impact of trucks as a percentage of the AADT is negligible on both Dugald Road and Plessis Road.

OlyWest is expecting the proposed facility to operate two shifts with the majority of employees arriving before their shifts between 5:00 and 6:00, and 14:00 (2:00 p.m.) and 15:00 (3:00 p.m.) and leaving after their shifts between 23:00 (11:00 p.m.), and 24:00 (12:00 a.m.) as shown in Table 6.9. The shift times will remove most of the development traffic from current peak traffic times.

Table 6.9: Estimated OlyWest Vehicle Arrivals and Departures

Time	Arrivals		Time	Departures		Percent of Daily Traffic
	Total Vehicle Arrivals (Car)	Total Vehicle Arrivals (Truck)		Total Vehicle Departures (Car)	Total Vehicle Arrivals (Truck)	
05:00 to 06:00	209	0	05:00 to 06:00	0	0	10.9%
06:00 to 07:00	95	3	06:00 to 07:00	57	0	8.1%
07:00 to 08:00	57	5	07:00 to 08:00	6	5	3.8%
08:00 to 09:00	0	5	08:00 to 09:00	0	5	0.5%
09:00 to 10:00	0	3	09:00 to 10:00	0	3	0.3%
10:00 to 11:00	0	6	10:00 to 11:00	0	3	0.5%
11:00 to 12:00	0	6	11:00 to 12:00	0	6	0.6%
12:00 to 13:00	0	6	12:00 to 13:00	0	6	0.6%
13:00 to 14:00	0	6	13:00 to 14:00	0	6	0.6%
14:00 to 15:00	360	6	14:00 to 15:00	209	6	30.3%
15:00 to 16:00	80	8	15:00 to 16:00	85	8	9.4%
16:00 to 17:00	15	8	16:00 to 17:00	10	8	2.1%
17:00 to 18:00	0	6	17:00 to 18:00	57	6	3.6%
18:00 to 19:00	0	6	18:00 to 19:00	0	6	0.6%
19:00 to 20:00	0	6	19:00 to 20:00	0	6	0.6%
20:00 to 21:00	0	0	20:00 to 21:00	0	6	0.3%
21:00 to 22:00	0	0	21:00 to 22:00	0	0	0.0%
22:00 to 23:00	63	0	22:00 to 23:00	0	0	3.3%
23:00 to 24:00	0	0	23:00 to 24:00	356	0	18.6%
24:00 to 01:00		0	24:00 to 01:00	99	0	5.2%
Daily Totals	**879**	**80**	**Daily Totals**	**879**	**80**	
xx	Local non-OlyWest peak traffic hours					

The highest volume of traffic due to the proposed development is expected between the two shifts when employees are both arriving and leaving. This is expected to account for approximately 30% of the proposed facility's daily traffic. However, peak hour traffic contribution to the road network is minimal with only 3.8% of plant traffic during the AM peak travel time and 2.1% during the PM peak travel time. The estimated increases in traffic volume from the development at the three intersections available into the industrial park during the peak AM travel time, when the increase is greatest, is considered negligible to moderate as shown in Table 6.10.

Table 6.10: Traffic Change

Intersection	2011 Peak AM Traffic Volumes	Peak AM Development Traffic	Percent Change
Dugald Rd & Mazenod Rd	2,234	41	1.8%
Dugald Rd & Beghin Ave	2,415	9	0.4%
Plessis Rd & Camiel Sys St	1,360	32	2.4%

A traffic analysis has been carried out by Earth Tech for the City of Winnipeg to determine if any additional traffic management is required due to the increase in traffic. The traffic study findings indicate that no additional traffic management was required as a direct result of the development.

The number of reported accidents at the intersections located in and around the industrial park is shown in Table 6.11. Estimating the change in frequency or severity of accidents from the development is virtually impossible as there are many factors involved such as traffic speed, traffic volume, roadway characteristics, time of day, etc. However, using the predicted increase in AADT, the potential impact on safety is considered moderate and it is estimated that on average one additional accident would be reported every two years.

Table 6.11: Number of Intersection Accident Reports[1]

Intersection	2002	2003	2004	Average
Duglad Rd & Bournais Dr	8	5	11	8.0
Plessis Rd & Camiel Sys St	2	2		2.0
Dugald Rd & Plessis Rd	10	12	16	12.7
Dugald Rd & Mazenod Rd	2		2	2.0
Camiel Sys St & Beghin Ave				
Camiel Sys St & Ray Marius				
Plessis Rd & Manitoba Hydro Substation Access				
Beghin Ave & De Baets St		1	4	2.5
Total	**22**	**20**	**33**	**25**

Note: 1) City of Winnipeg Public Works Department, 2006.

According to the Victoria Transport Policy Institute (2006), crash rates increase with traffic density. Therefore, it can be concluded that the most likely time for an accident to occur is during peak travel times. At the intersection of Plessis and Dugald Road, the intersection with the highest number of reported accidents, it is estimated that only an additional 23 vehicles, or a 0.9% increase in volume, will use the intersection during the peak AM travel time.

6.7 ENVIRONMENTAL HEALTH IMPACTS

6.7.1 Potential Human Health Risks

This section assesses the health risks of pollutants released into the environment by the proposed development that impact neighbouring human receptors. Sources of pollutants include air and water emissions likely to occur from the operation of the development. The detailed results of the air modeling are included in Appendix H.

6.7.2 Air Emissions

The principle potential environmental impacts from the air emissions are the possible effects on human health. The air emissions that primarily have health implications are $PM_{2.5}$, PM_{10}, NO_X, CO, SO_2, odour, and noise and have been assessed in the Environmental Health Impacts Category.

The following assessment considers those possible effects by comparing the computer predicted ambient air quality during operation of the plant to the *Manitoba Air Quality Guidelines* or other criteria where appropriate. Table 6.12 provides the air quality criteria while Table 6.13 presents the background air quality used in the following assessment.

Table 6.12: Manitoba Air Quality Guidelines

Name of Pollutant	Units of Measurement	Averaging Period	Maximum Acceptable Level Concentration	Maximum Desirable Level Concentration
$PM_{2.5}$	$\mu g/m^3$	24 hour	30	
PM_{10}	$\mu g/m^3$	24 hours	50	
CO	mg/m^3	1 hour	35	15
		8 hours	15	6
NO_2	$\mu g/m^3$	1	400	
		24	200	
		Annual	100	60
Odours	OU	3 min	2 – residential 7 – industrial	<1
SO_2	$\mu g/m^3$	1	900	450
		24	300	150
		Annual	60	30

Table 6.13: Ambient Background Air Quality

Name of Pollutant	Data Source	Units of Measurement	Averaging Period	Ambient Background Air Quality
$PM_{2.5}$	2003 CWS Metric in Manitoba, CWS for PM & Ozone	$\mu g/m^3$	24 hour - 3 year average 98^{th} percentile	17
PM_{10}	Winnipeg, Manitoba 2005 – 65 Ellen St.	$\mu g/m^3$	24 hour – maximum	22.86
CO	Winnipeg, Manitoba	mg/m^3	1 hour max 8 hour max	3.96 2.22
NO_2	Winnipeg, Manitoba 2005 – 65 Ellen St.	$\mu g/m^3$	1 hour max 24 hour max Annual Mean	149 74.9 23.6
SO_2	Winnipeg, Manitoba (1990-1991) 65 Ellen Street,	$\mu g/m^3$	1 hour max 24 hour max Annual Mean	171.6 143 0
Odours		OU	3 min	Assumed None

PM_{10}

Inhalable particulate matter has been under investigation for several years. Health Canada has recently published a document that summarizes the state of the investigations (Health Canada, 1998). A national standard for inhalable particulate matter was not established. Instead target or reference levels for particulate matter less than 10 micrometers in diameter were provided. Other jurisdictions have developed guidance or objective values. British Columbia, Quebec and Ontario have established a 24-hour average standard value of 50 $\mu g/m^3$ for PM_{10}. The EPA has established National Ambient Air Quality Standards for PM_{10} of 50 $\mu g/m^3$ as an annual average and 150 $\mu g/m^3$ as a 24-hour average.

The ambient 2005 24-hour PM_{10} maximum concentration was modeled at 38.1 $\mu g/m^3$ and does not exceed the provincial MAL guideline of 50 $\mu g/m^3$ as a result of the development and therefore the risk to human health is considered negligible.

$PM_{2.5}$

The ambient 2005 24-hour $PM_{2.5}$ maximum concentration was modeled at of 19.3 $\mu g/m^3$ and does not exceed the provincial MAL guideline of 30 $\mu g/m^3$ as a result of the development and therefore the risk to human health is considered negligible.

Nitrogen Oxides

Manitoba Conservation does not have a guideline value for NO_X, rather, like other jurisdictions Manitoba has a guideline value for NO_2 and bases assessment of NO_X as if the concentration were NO_2. This guideline will be used for comparative purposes in this

assessment. The MAL 1-hour average objective value is 400 $\mu g/m^3$ and the 24-hour average MAL is 200 $\mu g/m^3$.

The maximum 1 hour average model-predicted NO_2 ambient concentration is 185.6 $\mu g/m^3$. This result was far below the Provincial MAL objective of 400 $\mu g/m^3$.

The maximum 24 hour average model predicted a maximum NO_2 ambient concentration of 103.1 $\mu g/m^3$. This result was far below the Provincial MAL objective of 200 $\mu g/m^3$.

A maximum annual average NO_2 ambient predicted concentration of 26.1 $\mu g/m^3$ was predicted, well below the referenced MAL objective of 100 $\mu g/m^3$ and the 60 $\mu g/m^3$ maximum desirable level (MDL) objective.

The results of the modeling indicate that NO_2 emissions form the facility will have negligible impacts on human health.

Carbon Monoxide

Concentrations of CO were predicted for both 1 and 8 hour averaging periods over the five years from 1996 through 2000. The highest concentrations predicted using the model were added to the 1 hour and 8 hour maximum average background concentrations.

The referenced 1 hour average MAL objective for CO is 35 mg/m^3 while the referenced 1 hour average MDL objective is 15 mg/m^3. The maximum ambient CO concentrations predicted were 3.97 mg/m^3 and 2.23 mg/m^3 for the 1 hour average and 8 hour averages respectively. Both values are well below the referenced criteria therefore the risk to human health from CO from the development is considered negligible.

Sulphur Dioxide

As SO_2 data was not collected at the 65 Ellen Street Station in 2005, 1990-1991 data collected in the City of Winnipeg that was previously provided by Manitoba Conservation was used for modeling purposes to approximate background conditions at the proposed site. The annual mean concentration was 0 ppm while the peak 1 and 24 hour data values were 0.06 ppm (172 $\mu g/m^3$) and 0.05 ppm (143 $\mu g/m^3$) respectively.

The maximum 1 hour average ambient SO_2 concentration level was 171.7 $\mu g/m^3$, a result that is far below the MAL of 900 $\mu g/m^3$.

The maximum model-predicted 24 hour average ambient SO_2 concentration level was 143.1 $\mu g/m^3$, a result that is also far below the MAL of 300 $\mu g/m^3$ (the 24 hour MAL).

The Manitoba Conservation annual average MDL is 30 $\mu g/m^3$ and the background SO_2 concentration is assumed to be 0 $\mu g/m^3$ (0 ppm). The maximum ambient concentration was

predicted as 0.01 µg/m^3. This maximum concentration meets the referenced MAL of 60 µg/m^3 and MDL of 30 µg/m^3.

The results of the modeling indicate that SO_2 emissions from the proposed facility will have negligible impacts on human health.

Odours

Odour is considered as a contaminant with the potential for health effects in terms of the mental and social well being of impacted individuals. According to Schiffman et al. (2000) health symptoms can potentially result from both the odour and the odourant (the compound that has an odour).

As discussed in Section 6.3, the potential odour for the proposed OlyWest facility was modeled and found to essentially meet established Manitoba guidelines of 7 OU for industrial and 2 OU for residential. In the case of industrial receptors the maximum odours from the development are predicted to occur approximately 200 m south of the plant property and approximately 370 m south of the hog receiving area of the building at a theoretical concentration of 4.9 OU. The results of the modeling also indicate a concentration of < 2 OU (the residential MAL) will be met prior to extending over residential property with the exception of a few of the southernmost residential properties along the northern portion of Plessis Road, south of Dugald Road. The estimated odour concentrations over these properties are predicted to be essentially 2 OU. Over the 5 year (43,848 hour) period modeled using weather data from 1996-2000 this occurred over two-1 hour periods at three of the residences; two residences at 10:00-11:00 pm on July 24, 1997 (theoretical odour concentrations of 2.19 and 2.03 OU) and one residence at 11:00-midnight on July 30, 1998 (theoretical odour concentration of 2.00 OU).

Given the precision and conservative assumptions of the model these three excursions should not be considered an exceedance of the guidelines. Therefore, odour as a result of the proposed development is not considered a risk to the health of the neighbouring human receptors.

6.7.3 Noise

Typical sounds from facility will arises from the reefer units on trucks, the movement of the vehicles themselves, and from mechanical equipment such as air make-up units, cooling fans and plant refrigeration facilities.

As indicated in Section 5.3.2.1, noise levels at the closest industrial and residential receptors are estimated to be 61 dBA and 45 dBA respectively. The maximum desirable sound level in a residential area will not be exceeded, therefore the noise impact on human health is considered negligible.

6.8 SOCIO-ECONOMIC IMPACTS

As outlined in the advice document, the socio-economic impacts are examined in this section. As there are no significant environmental effects due to the development, there are no resulting positive or negative socio-economic implications resulting from the environmental effects identified in the preceding sections. The information in the following sections is taken largely from *"The OlyWest Ltd. Facility Socioeconomic Impacts"*, a confidential report provided by Neil Loughran, Ph.D. as a sub-consultant to Earth Tech. A copy of this report is included in Appendix E.

6.8.1 Land and Property Effects

Construction

Assuming all approvals, licences, permits, contracts, and purchases occur according to schedule; site construction will begin in April 2007 and continue for 28 months through July 2009 (Earth Tech (Canada) Inc.).

On and off-site construction will follow environmental and other relevant (e.g. transport) legislation, City By-laws, and acceptable construction industry practice. In particular, care will be taken not to damage the City of Winnipeg aqueduct or its protective landscaping. Construction practices are continually monitored by construction company supervisors and construction management and testing personnel, the latter including project engineers and biophysical experts. As well, other than the aqueduct there are no immediately adjacent improved properties.

Therefore, there should be no significant socio-economic effects on adjacent land and properties due to proposed facility related construction.

Operations

As indicated in previous sections, the proposed OlyWest site is situated within the St. Boniface Industrial Park zoned M3 for heavy industry. Large areas to the east, north, and south of the site are either being used for industrial purposes or are being held by the City of Winnipeg for future industrial use. There are no immediately adjacent improved properties other than the City of Winnipeg Aqueduct although industrial plants may be built in the future within the Industrial Park along the south side of Camiel Sys Street opposite (north of) the proposed facility site.

The proposed site will generate more surface water runoff because of roads, parking lots, and other areas of compacted materials. However, the additional runoff is not likely to overwhelm existing drainage and therefore, adjacent properties should not suffer any additional significant socio-economic damage from surface water from operations of the proposed facility.

There are no other known operational outputs or consequences of the proposed facility that, under currently acceptable environmental operating parameters, should cause significant socio-economic damage to adjacent lands.

6.8.2 Road and Traffic Effects

Construction

CN Railway's activities at Symington Yards to the south and at its Intermodal Terminal to the southeast generate considerable train and truck traffic every day, twenty-four hours a day. As well, other industries within the Industrial Park generate light vehicle and truck traffic day and night.

The estimated maximum numbers of workers on site will be around 230 in the summer of 2008. At that time, maximum construction traffic to and from the site (total movements) might involve some 500 light vehicles and some 400 truck/machinery movements per day. Truck volumes in the late spring and summer of 2007, however, will be more than double that number (1,000 vehicles), but light vehicle volume will be only half the 2008 number (200 vehicles).

Given the current traffic context, the addition of these numbers of movements per day at a maximum, represent, in the spring of 2007:

- Less than 1% of the current average weekday light vehicle volume but almost 20% of the truck volume, respectively, on Dugald Road between the Industrial Park and Lagimodiere Boulevard
- Less than 1% of current average weekday light vehicle volume but over 60% of the truck volume, respectively, on Plessis Road east of the Industrial Park

In the summer of 2008, the addition of these numbers of movements per day at a maximum represent:

- Just over 1% of the current average weekday light vehicle volume and 7% of truck volume, respectively, on Dugald Road between the Industrial Park and Lagimodiere Boulevard
- Almost 2% of current average weekday light vehicle volume and 25% of truck volume, respectively, on Plessis Road east of the Industrial Park

Such additional truck volumes on Plessis Road, a two-lane road, are substantial. Construction traffic will be handled on a case specific basis according to the *Manual of Temporary Traffic Control in Work Areas on City Streets* from the City of Winnipeg Public Works Department and is expected to vary according to the various phases of construction.

Operations

As noted above, CN Railway's activities at Symington Yards to the south and at its Intermodal Terminal to the southeast generate considerable train and truck traffic every day, twenty-four hours a day. Other industries within the Industrial Park generate light vehicle and truck traffic day and night. As noted above, current average light vehicle and truck traffic on Dugald Road between the St. Boniface Industrial Park and Lagimodiere Boulevard is 24,300 and 2,700 per day, respectively (27,000 per day in total). Current average small vehicle and truck traffic on Plessis Road east of the site is 9,200 and 800 per day, respectively (10,000 per day in total).

Dugald Road from Plessis Road to Panet Road (west of Lagimodiere Boulevard), and Plessis Road between Grassie Boulevard (north of Dugald Road) and the TransCanada Highway are full time truck routes so long as trucks enter or leave Winnipeg via Lagimodiere Boulevard or the TransCanada Highway, or are traveling to a destination within the City. The Dugald Road and Plessis Road truck routes are rated for 23-metre RTAC tractor and semi-trailer trucks with a gross vehicle weight of 62,500 kilograms and 20 metre non-RTAC tractor and semi-trailer trucks with a gross vehicle weight of 56,500 kilograms. The Industrial Park is served by two Winnipeg Transit Routes:

- The #49 Dugald bus runs roughly every 10 minutes during weekday peak hours to and from Ellice and Portage on the west and Beghin and Paquin in Transcona on the east passing through the St. Boniface Industrial Park
- The #87 South Transcona – Kildonan Place bus runs roughly every 10 minutes during weekday peak hours to and from Kildonan Place in the west and just past Beghin Avenue and Pacquin Road on the east (with two different loops through Transcona) also passing through the Industrial Park

Traffic flow to and from the site during operations will be a mix of employees' vehicles, maintenance vehicles, trucks bringing hogs and supplies, and trucks transporting meat, ancillary products and solid waste. Estimated light vehicle traffic volumes are 1,758 movements per day with 5% of employees using public transit. Around 1,142 (65%) light vehicle movements per day will enter and exit the Industrial Park via Dugald Road and 616 (35%) light vehicle movements will enter and exit the Industrial Park via Plessis Road. OlyWest will negotiate a contract with Winnipeg Transit for special dedicated bus service to match its work shifts.

Essentially all heavy truck movements will enter and exit the site via Camiel Sys Street (or a private road) and Plessis Road. Earth Tech (Canada) Inc. engineers estimate total OlyWest-related truck movements on Plessis Road at 160 per day (80 moving north from Camiel Sys Street and 80 moving south from Camiel Sys Street).

Given this context, the addition of some 1,142 small vehicle movements per day on Dugald Road will add 4% to current average weekday vehicle volumes on Dugald Road between the Industrial Park and Lagimodiere Boulevard (27,000, see above). The addition of some 616

small vehicle and 160 truck movements per day (+776 movements in all) on Plessis Road east of the proposed site (but south from the Plessis Road-Camiel Sys Street junction) will add about 8% to current average weekday vehicle volumes on Plessis (10,000, see above) east of the Industrial Park. Earth Tech (Canada) Inc. engineers advise, however, that such additional light vehicle and truck volumes on both Dugald Road and Plessis Road are well within the capacity of each road. There will be no significant proposed OlyWest facility-related increase in truck traffic in front of existing homes along Plessis Road, north of the Plessis Road-Camiel Sys Street junction. Again, however, there may be safety issues with respect to the numbers of semi-trailer trucks entering and exiting Plessis Road. Truck gross vehicle weights will be within City truck route weight limits.

6.8.3 Noise (Nuisance) Effects

Construction

The nearest residences are located along Plessis Road, approximately 1.3 kilometres east and north-east of the building site. There are other industrial plants located within the Industrial Park between the proposed OlyWest site and these residences. These industries generate continuous auto and truck traffic. This traffic enters and exits the Industrial Park via Mazenod Road to Dugald Road, via Camiel Sys Street to Plessis Road or via Beghin Avenue to Dugald Road. As well, CN Railway's activities at Symington Yards to the south and at its Intermodal Terminal to the southeast generate significant train and truck noise every day, twenty-four hours a day. Some of the CN truck traffic moves along Plessis Road east and northeast of the proposed OlyWest site.

Construction noise may be generated by the driving of piles, the operation of cranes and heavy equipment, air operated equipment, and earthmoving and materials supply trucks. These noises are deemed local in scope, of short duration, and of low magnitude. Since this is an industrial area already subject to considerable daily train and truck noise at all hours and the nearest residences are located 1.3 kilometres from the site, incremental nuisance noise impacts should be minimal.

Operations

The context for assessing noise effects is as follows:

- The nearest residences to the proposed OlyWest site are located along Plessis Road, approximately 1.3 kilometres east and north-east of the site
- Industrial plants are located within the Industrial Park between the proposed OlyWest site and these residences which generate continuous auto and truck traffic. This traffic enters and exits the Industrial Park via Mazenod Road to Dugald Road, via Camiel Street to Plessis Road or via Beghin Avenue to Dugald Road
- CN Railway's activities at Symington Yards to the south and at its Intermodal Terminal to the southeast generate significant train and truck noise every day, twenty-

four hours a day. Some of the CN truck traffic moves along Plessis Road east and northeast of the proposed OlyWest site

According to Earth Tech (Canada) Inc., proposed facility operations will not generate a discernable noise difference beyond that which already occurs in-and-around the St. Boniface Industrial Park and nearby CN Railway facilities at permanent resident locations.

6.8.4 Effects of Odours

Construction

Construction should not generate any odours not normally found during large construction projects (e.g. earth smells, diesel exhaust from machinery, etc.).

Operations

Manitoba Conservation has two numerical guidelines for odours: one numerical guideline is for industrial areas and another numerical guideline is for residential areas. Emission of odours will be well below the numerical guideline for industrial areas, within the nearby industrial areas. Emission of odours will be at or below the numerical guideline for residential areas in 99.997% of the residential areas within the 5 km test area and just at (but not significantly over) the numerical guideline of 2 OU for the southern most residences on the west side of Plessis Road (north of the Plessis Road-Camiel Sys Street junction) during very short periods. At this threshold level odour becomes just barely perceptible to people. Over a five-year modelling period, the southern most residences on the west side of Plessis Road would experience barely perceptible odour for only 2 hours out of 43,848 hours (in other words these residences would experience that level of odour 0.0046% of the time). Furthermore, from 1.3 km to 2 km from the plant an odour would be barely perceptible only 0.02% of the time and during that time the location of that odour would be specific to wind direction.

Therefore, the emission of odours from the proposed OlyWest plant, while negative, will not be significant relative to either the area's industrial plant population or to nearby residences along Plessis Road or beyond.

6.8.5 Effects from the Purchase of Materials and Services

Construction

Expected purchases of most materials and services, per commodity, for constructing the proposed OlyWest on-site and off-site infrastructure are shown in Table 6.14. In addition to the amounts shown in Table 6.14, around $12 million will be spent on associated municipal infrastructure and $1.5 million will be spent on electrical and natural gas service infrastructure. The total estimated value of all purchases is around $175 million of which at least $133 million is projected to be spent in Manitoba. These purchases imply a short term,

one time increase in Manitoba's gross domestic product (GDP) of roughly $48 million, an increase in Manitoba labour income of roughly $34 million, and roughly 920 additional person- years of employment in Manitoba. The GDP value is not significant for a $44 billion provincial economy. Neither are the annual person-years of employment significant to a provincial economy of around 587,000 employed. These impacts will be short term and positive.

Table 6.14: Economic Impact on Manitoba from the Purchase of Materials and Services for Construction

Commodity	Value[1] ($million)	Manitoba Value[1] ($million)	Manitoba		
			GDP ($million)	Labour Income ($million)	Employment (Person-Years)
On-Site					
Aluminum	$1.2	$1.2	$0.0	$0.0	0.8
Concrete	8.7	8.7	3.7	2.3	62.5
Construction	55.7	49.2	29.6	22.3	594.9
Copper	5.5	5.5	0.2	0.1	3.1
Industrial equip, other	50.0	10.0	1.3	0.6	15.8
Iron & Steel, primary	7.2	7.2	0.9	0.5	13.8
Lumber	0.4	0.4	0.1	0.1	2.2
Metal, other	3.3	3.3	0.6	0.4	10.2
Metal, structural bldg prods	7.0	5.0	1.4	0.9	23.2
Nickel	6.0	6.0	0.3	0.2	4.0
Off-Site					
Construction	11.5	11.5	6.9	5.2	139.1
Iron & Steel, primary	0.5	0.5	0.1	0.0	1.0
Other					
Professional Services	12.0	12.0	2.5	1.9	47.5
Totals	$162.0	$113.0	$47.6	$34.4	918.0

Note: 1) Earth Tech (Canada) Inc.

According to OlyWest, no direct preference will be given to local firms and suppliers during bidding processes. All other things being equal, however, local firms normally will be selected over non-local firms for construction and material supply contracts and sub-contracts. Therefore, there can be no presumption that the one-time local purchasing effects will be significant.

Operations

Meat products will be transported to markets by truck. Total annual hog costs will be an estimated $497.3 million. Meat trucking costs are estimated at $45.7 million per year .

According to Earth Tech (Canada) Inc. engineers, other large commercial expenditure items required to operate the plant include:

- Electricity at $1.5 million per year

- Natural gas at $1.95 million per year
- Water and waste charges are an estimated $1.2 million per year

Since the estimated annual gross income for the proposed facility is $645 million, the estimated plant net income is $21.5 million to achieve a targeted after-tax return on capital of 8.5%, labour costs are estimated by OlyWest at $45 million per year, Workers Compensation Board (WCB) charges are estimated at 3.55% of labour, assuming a borrowing rate of 8% (6% prime plus 2%) interest on loans is estimated at $5.8 million, miscellaneous expenditures are estimated at $4 million, and all taxes are estimated at $13.5 million per year.

Total annual expenditures on goods and services before all taxes, therefore, are estimated at roughly $560 million (Table 6.15).

Table 6.15: Value of Annual Purchases of Materials and Services

Item	Estimated Value ($million's)
Hogs	$497
Transportation	46
Packaging materials	10
Electricity	2
Natural gas	2
Water and waste	1
Other	2
Total	$560

The $645 million estimated value of OlyWest's proposed production implies an annual increase in Manitoba's GDP of roughly $270 million, an increase in Manitoba household income of almost $160 million, and roughly 5,200 additional person-years of employment in Manitoba. These estimates pertain to hog processing only, it is assumed that in the absence of the proposed OlyWest facility, the 2.25 million hogs will be produced and sold to other non-Manitoba processing facilities. It is anticipated that the current Manitoba live market hog exports will offset the need for expansion of the hog industry within Manitoba. These GDP, income and employment values are positive and continuing.

According to OlyWest, no formal preference will be given to local firms and suppliers during bidding processes. All other things being equal, however, local firms normally will be selected over non-local firms for material supply and maintenance contracts.

6.8.6 Effects on the Business Economics of Transport

Construction

Transport of materials and equipment to the site will occur over a relatively short period and will not be of sufficient magnitude to significantly affect either the truck or rail transport industries.

Operations

The proposed OlyWest facility plans to source 70% of its hog supply from partners Hytek Ltd. of La Broquerie, Manitoba and Big Sky Farms Inc. of Humboldt, Saskatchewan and 30% from other sources. Both Hytek and Big Sky Farms are large producers of hogs. Livestock will be largely transported to the proposed OlyWest facility by semi-trailer trucks carrying approximately 29,500-kilogram loads. It is assumed that livestock carriers will be paid by producers, not by OlyWest.

Concerning the effect of the proposed OlyWest facility on the Manitoba trucking industry, it is the diversion to Winnipeg (from export markets) of 790,000 hogs for processing originating in southeast Manitoba and 675,000 hogs (30% of 2.25 million hogs) for processing from the rest of Manitoba (almost 1.47 million hogs in total) that is at issue.

Currently, roughly $5.75 million is spent transporting hogs that will be diverted to the proposed OlyWest facility. With the proposed OlyWest facility in operation, roughly $2.17 million will be spent transporting the hogs.

Lost revenue to Manitoba-based livestock carriers will be in the order of $3.58 million ($5.75 million - $2.17 million). However, if this entire product is shipped by Manitoba-based carriers, the Manitoba trucking industry as a whole will gain a net $42 million in revenue per year.

6.8.7 Employment and Income Effects

Construction

If necessary approvals and other events proceed as planned, construction of the proposed OlyWest facility will begin in April 2007 and continue for 28 months. A maximum of 130-140 workers will be on-site during the summer of 2007 and a maximum of over 200 workers will be on-site during the summer of 2008 (Earth Tech (Canada) Inc.). The average number of workers on-site per month in 2007 will be 90 and the average number of workers on-site per month in 2008 will be 132. Project management personnel will be present during all or most of the period while relatively few trades and construction workers will work for more than a few months.

Most construction workers are likely to reside within the Winnipeg CMA which includes the:

- City of Winnipeg
- RM's of Springfield and Tache located east of the City of Winnipeg
- RM of Ritchot located south of the City of Winnipeg
- RM's of Headingly, Rosser, and St. Francois Xavier located west of the City of Winnipeg
- RM's St. Clements, West St. Paul, and the Brokenhead First Nation Reserve located north of the City of Winnipeg

The labour force context of this area is presented in Table 6.16.

Table 6.16: Labour Force Availability

Place	2001	5-Yr	2001						
	Pop.	Pop. % Chng	Potential Labour Force 20-64	Part Rate (%)	UE Rate (%)	Available Labour Force @UERate	Available Labour Force @4%UE	Median Family Income	% Gov't Transfers
Manitoba	1,119583	+0.5	649,020	67.3	6.1	26,600	17,500	$50,934	13.4
Winnipeg CMA[1,2]	671,274	+0.6	406,005	68.6	5.6	15,600	11,100	55,634	11.8

Notes: 1) Census metropolitan area.
2) Source: Statistics Canada 2001.

Generally, this labour catchment area has seen a slowly increasing population, higher than Manitoba-as-a-whole labour force participation, a lower than Manitoba-as-a-whole unemployment rate, much higher median family incomes, and lower rates of government transfer income.

According to June 2006 monthly labour force data from Statistics Canada, the Manitoba labour force participation has increased to 68.4% and the provincial unemployment rate has decreased to 3.6%. This participation rate is high and the unemployment rate is near, or at, full employment. According to that same June 2006 labour force report, the Winnipeg CMA labour force participation rate has increased to 70.1% and the Winnipeg CMA unemployment rate has decreased to 4.5%. The Winnipeg participation rate is also high and the unemployment rate is near, or at, full employment. If an unemployment rate of 4% is taken to represent full employment of the available labour force, at the 2001 Winnipeg CMA population ages 20-64 the 0.5% (4.5%-4.0%) available unemployed would be only about 1,450 persons.

Since the Winnipeg CMA population ages 20-64 is likely higher than it was in 2001, the available unemployed would be somewhat more than 1,450. The Chief Administrative Officer (CAO) Secretariat of the City of Winnipeg estimates the current Winnipeg CMA population to have be around 711,000, 5.9% higher than 2001. If the population ages 20-64

also increased by 5.9%, the population ages 20-64 would be around 430,000 and the available unemployed (again assuming 4% is full employment) would be around 1,500.

Given normal "friction" in the labour market and inappropriate skill or personal attributes among some of the currently unemployed, it is likely that construction of the proposed OlyWest facility will draw some new people into the labour catchment area. Either these new people will be directly hired by OlyWest contractors, or they will fill vacancies created by those hired by OlyWest contractors. Given the size of the catchment area participating labour force (301,400), 100-200 new jobs will have a short-term, positive, but not significant labour force effect. Therefore, there should be no significant, additional, cumulative direct employment and income effect from construction of the proposed OlyWest facility.

Construction of the proposed OlyWest facility is likely to overlap with a number of major Manitoba construction projects. These projects include: a mine upgrade by INCO in Thompson, the Manitoba Floodway, the Manitoba Hydro office building, the Wuskwatim Generating Station and associated transmission facilities, the Ranchers' Choice beef slaughter facility in Dauphin, conversion of a Trans Canada Pipelines pipeline from natural gas to oil transmission, the Winnipeg airport redevelopment, the Winnipeg human rights museum, and the Winnipeg water treatment facility. Total construction investment is projected to range from $8.5 billion in 2006 to $8.6 billion in 2009 (with 2007 reaching a high of $9.0 billion), and in the 2010-2014 period annual construction investment is projected to be in the $10.0 billion range. In comparison, 2004 construction investment in Manitoba is estimated at $7.1 billion. Especially noteworthy is the Constructor Sector Council's view that the breadth and long-term expansion of construction investment in Manitoba is unusual among all the provinces. Except for 2008 and 2009, the demand/supply balance for skilled construction workers in Manitoba is expected to tighten further. Significant shortages could occur among: crane operators, gasfitters, heavy equipment operators, ironworkers and structural metal fitters, steam/pipefitters and sprinkler system installers, and welders. The $175 million (with extended services) construction cost of the proposed OlyWest facility, even if it is spread evenly over two years, will be around 1% of these annual estimates. With this level of construction investment, the one-time, short-term employment tightening effect will be significant for at least one year.

Operations

Most operational employees of the proposed OlyWest facility also are likely to reside in the Winnipeg CMA. Within the Winnipeg CMA, in 2001 there were 64,090 people employed in the manufacturing and construction industries. In terms of occupational distribution of the labour force, there were 25,240 people with occupations unique to processing, manufacturing and utilities. Also as noted above, as of June 2006 the:

- Manitoba labour force participation rate is high (68.4%) and the unemployment rate (3.6%) is near, or at, full employment

- Winnipeg CMA labour force participation is even higher (70.1%) and the unemployment rate (4.5%) is near, or at, full employment

OlyWest intends to employ 1,100 people when fully operating, 950 of whom will be production workers. Given:

- Normal "friction" in the labour market and inappropriate (to OlyWest's needs) skill or personal attributes among some of the unemployed
- That in 2001 there were around 11,000 non-frictional unemployed in the Winnipeg CMA and by June 2006 there were only around 1,500 non-frictional unemployed in the Winnipeg CMA
- Many of these non-frictional unemployed will have work goals, requirements, or skills inappropriate to the proposed OlyWest facility
- That in 2001 just over 25,000 people with occupations unique to processing, manufacturing and utilities

It is likely that the proposed OlyWest operation will draw some new people into the labour force and many new people into the labour catchment area. Either these newcomers will be directly hired by the proposed OlyWest facility, or they will fill vacancies created by the proposed OlyWest hires. Given the size of the catchment area participating labour force (301,400), 1,100 new jobs will have a long-term, continuing, positive effect, but not significant labour force impact. Therefore, there should be no significant, additional, cumulative direct employment and income effect from operation of the proposed OlyWest facility. However, given the near non-existence of non-frictional and appropriate unemployed and the 25,000 people with occupations unique to processing, manufacturing and utilities, operation of the proposed OlyWest facility is also likely to put upward pressure on mid- to lower level industrial wage rates within the Winnipeg CMA. This effect would simultaneously benefit many non-OlyWest industrial employees and reduce the profits or competitiveness of other industrial businesses that employ mid- to lower level industrial wage people, which will be especially felt at the local level (i.e. East St. Boniface and Transcona). The positive employee benefits effect is likely to be long term, continuing and significant at the regional and local level. The negative reduced profits/competitiveness effect is also likely to be long term, continuing and significant at the local and regional levels.

The characteristics of the available labour force in the proposed OlyWest facility catchment area and the experience of Maple Leaf in Brandon provide a foundation for estimating the sources of the proposed OlyWest facility labour force. This information suggests the number of newcomers is not significant given the catchment area population or the number of immigrants from outside Canada currently residing in the catchment area. As well, the cumulative, continuing socio-economic effect of newcomers, positive or negative, is not significant given the catchment area population.

In addition, the proposed OlyWest facility will cause a net increase of almost 550 jobs in Manitoba's trucking industry.

The discussion of the effects on the economics of hog processing indicates that:

- Total employment in Manitoba will increase by around 5,200 full-time equivalent jobs
- Total annual household income to Manitobans will increase by $160 million

The addition of 5,200 jobs in a provincial economy with 587,000 employed is positive, continuing, but not significant. The additional annual household income to Manitobans of $160 million in a provincial economy that generates some $17 billion in annual earnings is also positive, continuing, but not significant.

With respect to workplace health and safety, the WCB reports that the time-loss injury rate for the meat processing industry in 2004 (the latest year that the WCB has this information calculated) was 9.9 time-loss injuries per 100 workers. This compares to 7.8 per 100 workers for the manufacturing industry as a whole and 4.6 per 100 workers for all industries in Manitoba. The WCB reports that this higher rate has been observed consistently for each year over the previous four years. While the meat processing industry has a high time loss injury rate compared to most other industries in Manitoba, it does not have the highest injury rate. The agricultural implement manufacturing, metal works manufacturing, and vehicle manufacturing industries all have higher rates. Consequently, while the higher than average time-loss injury rate for meat processing is a continuing, negative effect, the rate is not a high "outlier" for Manitoba industry.

6.8.8 Effects on the Availability and Prices of Local Construction Trades

Construction

Given the likely overlap between construction of the proposed OlyWest facility, the Winnipeg Floodway and the Water Treatment Facility, it is likely that, depending on the amount of sub-contracting of trades work to area tradespersons, severe tightness in the local and regional availability of certain trades could occur during the 2007 and 2008 construction seasons. This could put a one-time, short-term limit on other construction and renovation projects locally and in the region, and it could put substantial short-term upward pressure on construction and renovation costs.

Operations

Not applicable.

6.8.9 Effects on Local Consumption Purchasing

Construction

Certain local firms or tradespersons are likely to receive one-time higher incomes over the short-term than they might receive in the absence of construction of the proposed OlyWest facility. These firms or people are likely to purchase more goods and services locally or in the region. With simultaneous construction of the Floodway and Water Treatment Facility, the one-time, short-term value of local or regional purchases will be even higher. Given the total value of consumption purchases within the City or even within the area around the proposed site, such increased general consumption will not have a significant local effect.

Most of the workers engaged during the construction phase will reside in the Winnipeg CMA or reside within an extended commute radius of Winnipeg. Their expenditures on food and beverage services will provide a one-time, short-term benefit to local businesses. Such benefits, however, will not be significant given the size of Winnipeg. Such benefits, however, are likely to be significant to food and beverage establishments in the immediate local area around the site.

Operations

Lacking readily available and current data per "family", Winnipeg consumption expenditures can be very roughly estimated. The addition of 1,100 employees with an average income of $41,000 will generate a total income of $45 million. If all this income accrued within the Winnipeg CMA, consumption expenditures within the CMA will therefore increase by over $31 million. This ongoing increase in consumption expenditure, while positive, is not significant.

Local, non-facility based consumption of food and beverages by employees will have a continuous, positive effect on the local economy. Given the large number of employees working in businesses in the East St. Boniface and Transcona areas and the predominant tendency of production workers to eat on-site, however, this effect is not expected to be significant.

In addition, the additional 550 trucking employees throughout Manitoba with an average income of $55,000 will generate over $30 million in income and over $20 million in consumption expenditures. This effect, while continuing and positive, is not significant.

6.8.10 Effects Resulting from the Housing of Employees

Construction

There will be no construction camp at the site. A limited number of employees may stay at local hotels and motels for short periods, especially when major equipment is installed near the end of the construction period.

Operations

The socio-economic report suggests that the proposed OlyWest facility will draw from 285 to 430 newcomer employees (not counting an unknown number of newcomers who will fill jobs in the area vacated by proposed OlyWest employees) into the labour catchment area. Most of these new people likely will reside in the Winnipeg CMA.

In 2001, Statistics Canada reports almost 270,000 dwellings in the City of Winnipeg. Around 177,000 dwellings were owner occupied and 93,000 were rented. The average value of a dwelling in 2001 was just over $105,000. The average gross monthly rental payment in 2001 was about $540. More recently there have been substantial increases in the rate of sales and housing prices in Winnipeg. Concerning prices, in May of 2006 the average price of a Winnipeg house was around $140,000 (a 33% increase from 2001, still low by national urban standards) and housing prices have been increasing at a rate of almost 10% before inflation. That said, housing ownership remains generally affordable with only 12.9% of pre-tax income going to ownership costs. In October 2005, the average rental rate for a 2-bedroom apartment was $683 (a 26% increase from 2001). Concerning availability within the Winnipeg CMA, in the spring of 2006 there was just over a seven-month supply of complete and unoccupied, single-family detached homes at the recent 12-month rate of absorption of unoccupied units (148 units), while there was an 18-month supply of multiple-family rental accommodations at the recent 12-month rate of absorption of unoccupied units (30 units).

Regarding Maple Leaf Foods, in addition to his finding that around 30% of the employees moved to the area, Rounds (2000) also found:

- Around 84% of the employees live in Brandon and 16% commute (of which almost all commute within a distance of 100 kilometres)
- 82% of the employees are 20-44 years of age
- About 50% of the employees are married
- About 50% of all employees have children and these employees have an average of 2.0 children
- 60% of the employees planned to buy or build a home, 30% plan to rent an apartment, and 10% plan to purchase or rent a mobile home or in-house room or suite

The above discussion generates a likely composition of the proposed OlyWest facility labour force:

- In the range of 670 to 815 employees will be existing residents of the area and in the range of 285-430 (midpoint 385) will be newcomers
- Almost all the newcomers will reside in the City of Winnipeg
- Newcomers to the City will include in the range of: 140-215 singles (50%) and 140-215 couples (50%) with a total of 280-430 children (140-215 2-person households, on average)
- 170 to 260 (60%) of the "newcomer" employees will want to own a home
- 110 to 170 (40%) of the "newcomer" employees will want other, mostly rental, accommodation

Given the tight market and quickly increasing prices of housing in Winnipeg and if the City's economy remains strong and if interest rates do not increase substantially, the proposed OlyWest facility will add greatly to pressure on the housing market. Housing prices should increase more than they would in the absence of the proposed OlyWest facility – especially in the lower-middle to middle price range, especially east of the Red River, and especially in the Transcona – River East areas. Availability of rental accommodation is less likely to be a problem. Accommodation rental rates, however, also will increase more than they would in the absence of the proposed OlyWest facility – especially in the lower-middle to middle price range, especially east of the Red River, and especially in the Transcona – River East areas. These one-time, short-term, effects are positive or negative at the local level depending on one's financial and business interest and one's view of newcomers and increasing housing prices and rental rates. The financial, business, and attitudinal effects, however, should not be significant at the provincial level. At the regional and local levels, however, the housing market may become very tight and the market for rental accommodation may become tight.

6.8.11 Effects from Employee-Family Use of Municipal and School Division Services

Construction

Construction employment will occur over a relatively short 28-month period. Most individual workers will be on-site for much shorter periods. As well, construction employees will either have been residing within a reasonable commuting distance from the site and those residing beyond a reasonable commuting distance from the site will not likely relocate their family for the short construction period.

Operations

The proposed OlyWest operation will consume a large amount of water and will generate a large amount of fluid waste. Earth Tech (Canada) Inc. engineers advise that Winnipeg's water and waste treatment facilities are capable of handling the anticipated volumes without capacity upgrades. As noted in Section 6.8.5, OlyWest will pay annual water and sewer fees of $1.2

million – an amount more than sufficient to cover estimated additional water and waste treatment operational costs of $480,000 (Earth Tech (Canada) Inc.).

The number of new residents within the City of Winnipeg and Winnipeg CMA will not be significant enough, given current populations, to affect municipal services except for the provision of public transit service to and from the St. Boniface Industrial Park. Existing transit service is unlikely to be sufficient.

The Louis Riel, River East-Transcona and Seine River School Divisions serve the area in and around the proposed OlyWest site. According to the River East-Transcona and Seine River School Divisions, the possible addition of 280-430 children (assuming, at the extreme, that all of the children would be of school age and all the school age children would attend in proportionately greater proportions respectively the River East-Transcona, Louis Riel and Seine River School Divisions) should not create school overcrowding or the need for major capital additions. In fact, a substantial addition of students would be positive for the River East-Transcona School Division because of substantial excess school capacity in some, especially older, parts of the division. Informal contacts suggest that the Louis Riel School Division also has excess capacity in its older areas.

6.8.12 Effects on Provincial, Municipal and School Division Budgets

Construction

Province of Manitoba

The Province of Manitoba is considering a loan (with security) to OlyWest. The principles of an agreement have been discussed, but an agreement has not been finalized. This assistance would be delivered through the longstanding Manitoba Industrial Opportunities Program (MIOP) operated by Manitoba Industry, Economic Development and Mines. MIOP is designed to "secure significant business investments which would not occur in Manitoba without provision of some level of government assistance." The business investment must be commercially viable, and it must deliver fixed asset investment and long- term job creation. The interest rates charged depend on current market rates and security offered by the borrower among other factors. In general, interest rates charged have been typically at or above the Government's cost of capital. In addition, Manitoba is willing to contribute towards site-related infrastructure.

The proposed facility construction will generate some $11.2 million in tax revenue to Manitoba. This comprises $6.3 million in provincial sales taxes, over $3.3 million in supplier corporate taxes, and over $1.6 million in income taxes from labour (i.e. personal income taxes).

The above tax revenue estimates are very sensitive to the assumptions made about financial flows, family characteristics and enacted tax rates and conditions, therefore, the amounts should be read as estimates of approximate magnitude only. This one-time, though positive,

tax revenue to Manitoba of $11.2 million is not significant given budgeted 2006 revenue of over $2.6 billion and budgeted tax revenue of over $4.7 billion.

City of Winnipeg

The City of Winnipeg Council approved construction-stage related financial benefits to bring the proposed OlyWest facility to Winnipeg. These negative, one-time and short-term amounts are not significant in light of a 2006 operating budget of $721 million in expenditures.

Through its Local Improvement District program, a program in place for many years, the City will finance public infrastructure necessary to a development. City financing is amortized over 20 years at the interest rate the City pays for borrowing on capital markets plus 1% for administrative costs. This amount will be approximately cash flow neutral to the City.

Post-construction financial impacts on the City of Winnipeg are discussed in the next section.

School Divisions

The educational property tax will not be payable until construction is complete. As noted above, construction employees will either have been residing within a reasonable commuting distance from the site and those residing beyond a reasonable commuting distance from the site will not likely relocate their family for the short construction period.

Operations

Province of Manitoba

OlyWest will be contractually required to repay the loans provided by MIOP. This amount will be approximately cash flow neutral to the Province.

The Government of Manitoba is willing to contribute towards training and recruitment of the proposed OlyWest facility labour force.

Proposed facility operations will generate around $10.0 million in annual tax revenue to Manitoba. This is comprised of over $6.4 million in corporate capital, income, and payroll taxes, $2.7 million in personal income taxes from labour, almost $0.5 million from fuel taxes, over $0.3 million in educational support taxes, and almost $0.2 million from electrical energy and natural gas purchases. This continuing, stream of tax revenue to Manitoba of $10.0 million is not significant, but it will contribute to 2006 budgeted revenue of over $2.6 billion and budgeted tax revenue of over $4.7 billion.

The meat processing industry in Manitoba has a higher than average injury time-loss rate, though not as high as some major industries in the province. Under the WCB rate assessment model, employers pay premiums based on the level of risk associated with the industry they are involved in. Employer assessment rates factor in the employer's injury experience and the

collective injury experience of other employers with the same level of risk. Each year the WCB sets assessment rates for employers. These rates are calculated by examining the costs associated with a particular firm over the preceding 12 months. Two kinds of costs are included:

- Direct costs which are composed of wage-loss, medical aid and rehabilitation expenses for the firm's injured workers
- Indirect costs are costs of running the workers compensation system, such as administration, that cannot be apportioned to any one claim

These costs, along with a calculation that represents the collective injury experience of employers with comparable risk, are used to determine the assessment rate for an individual firm. Therefore, the proposed OlyWest facility and other companies involved in meat processing will pay their share of WCB costs.

City of Winnipeg

The City of Winnipeg Council has approved operations-stage related financial benefits to bring the proposed OlyWest facility to Winnipeg. These financial benefits will flow through the City's Economic Development Incentive Grant (i.e. essentially municipal property and business tax rebates) program. The Grants will flow over nine years.

Newcomer residents will either have a minimal effect on municipal expenditures (e.g. they will be a very small proportion of the population of the City, within a likely range of 0.3%-0.9% of the 2001 population), or required additional expenditures to service the newcomers will be offset by additional service revenues (e.g. water and sewer) and municipal property taxes.

The City of Winnipeg estimates annual property tax revenue from the proposed OlyWest site at $500,000 and annual business tax revenue at $250,000. Only in year 1 will the City not receive a positive net property-tax-plus-incentives cash flow (a net $0 in year one; that is, no gain or loss in incentives plus property taxes). With the inclusion of the revenue from Development and Building Permit Fees, the City will maintain positive net cash flows.

Furthermore, OlyWest estimates that the City will receive $136,000 per year in municipal electricity natural gas taxes at the tax rates in effect in 2006. Assuming, therefore, that all such Development and Building Permit Fees would be incurred in year 1 and also that electricity and gas consumption will reach the long term annual average in year 1, the City will experience an all-in (all incentives-plus-taxes-plus-fees) positive cash flow in every year

Newcomer employees at the proposed OlyWest facility will have some positive impact on City property tax revenue. If the proposed OlyWest facility attracts 285-430 (midpoint 358) newcomers to the City of Winnipeg, if each newcomer causes there to be a new dwelling directly or indirectly paying property taxes, and if each dwelling pays a reasonable $1,000 in

municipal property taxes, the City could gain $285,000-$430,000 (midpoint $358,000) in employee property taxes per year.

This above continuing positive revenues are not significant, but will contribute to the city's operating budget which was $721 million in total revenue and $467 million in estimated tax revenue in 2006.

School Divisions

Commencing upon completion of the plant, the proposed OlyWest facility will pay full school-related property taxes to the Louis Riel School Division. Property tax revenues accruing to the School Division also can be approximated by multiplying the assessment value of the facility by the 2005 mill rates. Using the above noted assessed value, portioning, and the 2005 School Division mill rate of 26.54, School Division property tax revenue is estimated at $521,000.

Newcomer employees at the proposed OlyWest facility will have some positive impact on Louis Riel School Division property tax revenue. If the proposed OlyWest facility attracts 285-430 (midpoint 358) newcomers to the City of Winnipeg, if each newcomer causes there to be a new dwelling directly or indirectly paying property taxes, if one-third of those dwellings are in the Louis Riel School Division, and if each dwelling pays a reasonable $900 in school division property taxes, the School Division could gain $85,000-$129,000 (midpoint $107,000) in employee property taxes per year.

Total property tax revenues to the Louis Riel School Division, therefore, could be in the range of $600,000 to $650,000 per year. These amounts are 0.5% of all School Division revenues and 1.5% of property tax only revenue in 2005 (all sources). This continuing amount is positive to total School Division revenue and is significant to School Division property tax revenue. Employee-only property taxes in the similar range of $85,000-$129,000 would not be significant to the River East-Transcona or Seine River School Divisions.

As noted in the previous section, none of the surrounding school divisions (Louis Riel, River East-Transcona, and Seine River) are likely to require major capital expenses because of an OlyWest-caused increase in students.

The school divisions that receive new immigrant students are likely to face a slightly higher operating cost, on average, because many of these students who may not be sufficiently proficient in English or French. The Province, however, provides special per-student funding to school divisions for "English as an Additional Language" (Manitoba Education, Citizenship and Youth 2006).

6.9 SUMMARY OF IMPACTS

All of the environmental impacts and the corresponding mitigation measures are presented along with a subjective assessment of residual impacts in Tables 6.17 and 6.18.

In all, during construction all evaluated impacts were considered to be either negligible or low in magnitude prior to mitigation with the exception of potential noise effects during certain construction activities and traffic related concerns. The noise effects are mitigated by separation distances to residential areas and considered to present a minor residual impact. The traffic concerns represent what is considered to be a normal inconvenience for construction related traffic in Winnipeg. Mitigation for the traffic concerns and related potential increase in accident rates is achieved through the use of signage and traffic control according to City of Winnipeg guidelines.

Operational impacts that were not considered to be negligible or low in magnitude prior to mitigation included potential odours (moderate), potable water demand (moderate), traffic effects (moderate), potential flooding from runoff (high), and nutrient loads (high). Mitigation measures employed (detailed further in Section 7.0) and existing result in reducing all of these to negligible to minor residual impacts. As a result there were no socio-economic effects that stem from direct environmental effects related to this project although a summary of perceived economic effects has been provided for information.

Table 6.17: Summary of Environmental Impacts (Construction Phase)

Classification of Potential Impact	Pollutant or Activity	Magnitude of Impact	Direction of Impact	Duration of Impact	Frequency of Impact	Scope of Impact	Mitigative Measures	Degree of Reversibility	Residual Impact
Air Quality	GHG emissions from construction vehicle exhaust.	Negligible	Negative	Short Term	Continuous during working hours.	Provincial	Vehicles to be well maintained.	Irreversible	Negligible impact on Greenhouse effect.
	Construction vehicle exhaust.	Negligible	Negative	Short Term	Continuous during working hours.	Local	Vehicles to be well maintained.	Reversible	Nil, normal construction equipment emissions.
	Airborne dust and particulate.	Low	Negative	Short Term	Intermittent	Local	Earthwork to be limited to building site as much as possible; non-toxic dust control measures will be taken if necessary.	Reversible	Nil, minimum air-borne dust and particles.
	Noise from reversing beepers.	Negligible	Negative	Short Term	Intermittent	Local	None, safety issue.	Reversible	Minor annoyances to local residents.
	Equipment and construction noise.	Moderate	Negative	Short Term	Intermittent	Local	Vehicles to be well maintained and operate only during appropriate hours.	Reversible	Minor annoyances to local residents.
	VOC from paint, roofing, asphalt.	Low	Negative	Short Term	Intermittent	Local	Large buffer zone around property.	Reversible	Nil, construction odours dispersed naturally.
Groundwater	Chemical/fuel spills on the site.	Negligible	Negative	Moderate	Rare	Local	Chemicals and fuels stored and used in a designated area of the site with low permeability and berms.	Reversible	Nil, clean-up activities would be employed to remove contaminants.
	Chemical/fuel spills in ditches.	Negligible	Negative	Moderate	Rare	Local	Immediate clean-up measures will be under-taken.	Reversible	Nil, clean-up activities would be employed to remove contaminants.

CLASSIFICATION OF POTENTIAL IMPACT	POLLUTANT OR ACTIVITY	MAGNITUDE OF IMPACT	DIRECTION OF IMPACT	DURATION OF IMPACT	FREQUENCY OF IMPACT	SCOPE OF IMPACT	MITIGATIVE MEASURES	DEGREE OF REVERSIBILITY	RESIDUAL IMPACT
	Disposal of construction wastes.	Low	Negative	Short Term	Intermittent	Local	Wastes generated through the construction process will be gathered and periodically hauled to the local landfill.	Reversible	Construction site will be maintained in a clean & tidy manner.
	Disposal of hazardous wastes, solvents, etc.	Low	Negative	Moderate	Intermittent	Regional	Hazardous wastes generated on the site such as solvents, etc. will be properly stored, transported, and disposed of according to regulations.	Reversible	Hazardous wastes disposed of properly. Minimal human health risks.
Surface Water	Sediment deposition via runoff.	Low	Negative	Short Term	Intermittent	Local	Erosion and Sediment Control Best Management Practices. Disturbed areas will be re-vegetated.	Reversible	Sediment in run-off will be intercepted in retention ponds.
	Chemical spills to adjacent water bodies.	Low	Negative	Short Term	Rare	Local	Chemicals and fuels stored and used in a designated area of the site with low permeability and berms.	Reversible	Nil, clean-up activities would be employed to remove contaminants.
	Disposal of construction wastes.	Low	Negative	Short Term	Intermittent	Local	Wastes generated through the construction process will be gathered and periodically hauled to the local landfill.	Reversible	Construction site will be maintained in a clean & tidy manner.
	Disposal of hazardous wastes, solvents, etc.	Low	Negative	Moderate	Intermittent	Local	Hazardous wastes generated on the site such as solvents, etc. will be properly stored, transported, and disposed of according to regulations.	Reversible	Hazardous wastes disposed of properly. Minimal human health risks.
Soils	Chemical/fuel spills on the site.	Low	Negative	Long Term	Rare	Local	Chemicals and fuels stored and used in a designated area of the site with low hydraulic conductivity and berms to the greatest extent possible.	Reversible	Nil, clean-up activities would be employed to remove contaminants.

CLASSIFICATION OF POTENTIAL IMPACT	POLLUTANT OR ACTIVITY	MAGNITUDE OF IMPACT	DIRECTION OF IMPACT	DURATION OF IMPACT	FREQUENCY OF IMPACT	SCOPE OF IMPACT	MITIGATIVE MEASURES	DEGREE OF REVERSIBILITY	RESIDUAL IMPACT
	Disposal of construction wastes.	Low	Negative	Short Term	Intermittent	Local	Wastes generated through the construction process will be gathered and periodically hauled to the local landfill.	Reversible	Construction site will be maintained in a clean & tidy manner.
	Disposal of hazardous wastes, solvents, etc.	Low	Negative	Moderate	Intermittent	Local	Hazardous wastes generated on the site such as solvents, etc. will be properly stored, transported, and disposed of according to regulations.	Reversible	Hazardous wastes disposed of properly. Minimal human health risks.
Heritage Impacts	Disturbance or demolition of heritage resources.	Negligible	Negative	Long Term	Once	Local	Notify appropriate authorities if heritage resources encountered.	Irreversible	Heritage resources encountered on the site that are not recoverable may be damaged.
Land Use Impacts	Construction activity.	Negligible	Negative	Long Term	Once	Local	None	Reversible	None
Natural Resource Use Impacts	Wildlife habitat quality/area.	Negligible	Negative	Short Term	Intermittent	Local	Confining activities to the project area.	Reversible	Minimal habitat reduction.
	Fish habitat quality.	Negligible	Negative	Short Term	Intermittent	Local	Erosion and Sediment Control Best Management Practices.	Reversible	None
	Disturbance of nesting migratory birds.	Negligible	Negative	Short Term	Intermittent	Local	Confining activities to the project area.	Reversible	Minimal habitat reduction.
Traffic Impacts	Increase in immediate site traffic.	Negative	Neutral	Short Term	Intermittent	Local	Construction signing.	Reversible	Normal inconvenience for local traffic with turning vehicles.
	Increase in vehicle accident rate.	Moderate	Negative	Short Term	Intermittent	Local	Construction signing.	Reversible	Risk of accidents.
Environmental Heath Impacts	Particulate emissions (dust) on human health.	Low	Negative	Short Term	Intermittent during working hours.	Local	Non-toxic dust control measures will be under-taken if necessary.	Reversible	Dust etc. on work site.

Table 6.18: Summary of Environmental Impacts (Operation Phase)

CLASSIFICATION OF POTENTIAL IMPACT	POLLUTANT OR ACTIVITY	MAGNITUDE OF IMPACT	DIRECTION OF IMPACT	DURATION OF IMPACT	FREQUENCY OF IMPACT	SCOPE OF IMPACT	MITIGATIVE MEASURES	DEGREE OF REVERSIBILITY	RESIDUAL IMPACT
Air Quality	GHG emissions	Negligible	Negative	Long Term	Continuous	Provincial - Global	Modern high efficiency equipment.	Irreversible	Negligible increase in Provincial GHG emissions.
	Odour	Assumed Moderate.	Negative	Long Term	Intermittent	Local	Site location. Multi-stage air emission controls. Waste management plan.	Reversible	Negligible noticeable odours.
	Noise	Low	Negative	Long Term	Continuous	Local	Site location. Closed door operations.	Reversible	Nil, increase in ambient noise.
	Airborne dust and particulate.	Low	Negative	Long Term	Intermittent	Local	Pavement in high traffic areas. Non-toxic dust control measures will be undertaken elsewhere, if necessary.	Reversible	Minimal air-borne dust and particles.
	$PM_{2.5}$ and PM_{10}	Negligible	Negative	Long Term	Continuous	Local	Apply emission control technology.	Reversible	Nil, increased particulate emissions.
	NO_x, CO, SO_2	Negligible	Negative	Long Term	Continuous	Local	Apply emission controls.	Reversible	Nil, increased emissions.
Groundwater	Chemical /fuel spills on site.	Low	Negative	Short Term	Rare	Local	In-situ clays. Secondary containment. Indoor chemical storage. Monitoring program.	Reversible	Nil, clean-up activities would be employed to remove contaminants.
	Wastewater leakage from facility.	Low	Negative	Moderate	Rare	Local	Concrete additive added to storage tank and holding pens to reduce concrete cracking. Structural slab design. Monitoring program.	Reversible	Nil, potential groundwater contamination.
Surface Water	Sediment deposition via runoff.	Low	Negative	Moderate	Intermittent	Local	Drainage collected and transported to stormwater retention pond where suspended solids will settle.	Reversible	Sediment accumulation in retention pond.

CLASSIFICATION OF POTENTIAL IMPACT	POLLUTANT OR ACTIVITY	MAGNITUDE OF IMPACT	DIRECTION OF IMPACT	DURATION OF IMPACT	FREQUENCY OF IMPACT	SCOPE OF IMPACT	MITIGATIVE MEASURES	DEGREE OF REVERSIBILITY	RESIDUAL IMPACT
	Contaminated runoff.	Low	Negative	Short Term.	Rare	Local	Drainage collected and transported to stormwater retention pond before release. High risk source locations located indoors.	Reversible	Negligible oil/grease contamination of retention pond.
	Chemical spill to water.	Low	Negative	Moderate	Rare	Local	Check dams will be constructed, if necessary. Secondary containment on storage facilities.	Reversible	Nil, clean-up activities would be employed to remove contaminants.
	Flooding from runoff.	High	Negative	Short Term	Intermittent	Local	Design and construct stormwater retention pond as a part of the land drainage system to store back to back 25 yr storm events. Required by City of Winnipeg.	Reversible	Increased volume of stored water over long period of time.
	Nitrogen loads.	Moderate	Negative	Long Term	Continuous	Regional	Pre-treatment on the site. City of Winnipeg to increase volume of Nitrogen removal at NEWPCC.	Irreversible	Nil, increase in N loads to Red River and Lake Winnipeg.
	Phosphorus loads.	Moderate	Negative	Long Term	Continuous	Regional	Pre-treatment of effluent with DAF system to remove 98% of P.	Irreversible	Nil, increase in P loads to Red River and Lake Winnipeg.
	CSO	Low	Negative	Short Term	Intermittent	Regional	Dedicated pipeline direct to NEWPCC.	Reversible	Nil
	Endocrine disruptors.	Low	Negative	Long Term	Continuous	Regional	City of Winnipeg monitoring.	Irreversible	Negligible increase in EDCs to Red River and Lake Winnipeg.
Soils	Manure disposal.	Negligible	Negative	Long Term	Continuous	Provincial	Follow provincial manure storage and disposal regulations.	Reversible	Nil, increase in manure disposal to land.
Heritage Impacts	Not applicable.								

CLASSIFICATION OF POTENTIAL IMPACT	POLLUTANT OR ACTIVITY	MAGNITUDE OF IMPACT	DIRECTION OF IMPACT	DURATION OF IMPACT	FREQUENCY OF IMPACT	SCOPE OF IMPACT	MITIGATIVE MEASURES	DEGREE OF REVERSIBILITY	RESIDUAL IMPACT
Land Use Impacts	Facility operation.	Negligible	Negative	Long Term	Continuous	Local	OlyWest to communicate with adjacent businesses as necessary if effects are present.	Reversible	None
Natural Resource Use Impacts	Potable water supply and demand.	Moderate	Negative	Long Term	Continuous	Regional	OlyWest will be a priority user. City of Winnipeg will be required to provide alternate sources during shortages.	Reversible	Nil, increase potable water demand well within Winnipeg supply capabilities.
	Fisheries	Negligible	Negative	Long Term	Continuous	Regional	Wastewater treatment.	Reversible	None
	Wildlife	Negligible	Negative	Long Term	Continuous	Local	None	Reversible	None
Traffic Impacts	Traffic patterns.	Moderate	Negative	Long term	Continuous	Regional	Restrict hog delivery vehicles to Plessis Road. Off-peak shift starts. Access to trucking routes. Site location.	Reversible	Normal inconvenience for local traffic; more traffic.
	Increase in accident rate.	Low	Negative	Long Term	Intermittent	Regional	Restrict hog delivery vehicles to Plessis Road. Off-peak shift starts.	Reversible	Factors leading to congestion reduced.
Environmental Health Impacts	Air emissions (odour, noise, PM, SO_2, NO_x, CO)	Negligible	Negative	Long Term	Continuous	Local	Site location. Well maintained air emission control equipment.	Reversible	Nil, increase in human health risks.

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