
SECTION 6.0

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MITIGATIVE MEASURES

The mitigative measures described in this section have been formulated to directly address the potential impacts that were identified previously in Section 5. This section follows the general organization of Section 5 by presenting proposed mitigation measures that correspond to each potential impact.

The impact tables presented at the end of Section 5 identify the proposed method of mitigation, as well as its anticipated effectiveness by assigning a degree of reversibility to each impact. Each impact that is classified as reversible, means that the proposed mitigation can successfully restore the environment or resource within 10 years, and irreversible, means that the proposed mitigation will likely not be able to restore the environment or resource within 10 years. A residual impact category is also shown which describes the remaining impacts following mitigation measures.

6.1 AIR QUALITY IMPACT MITIGATION

6.1.1 Introduction

During the construction and operation phase of the expanded IWWTF, air quality impacts are expected to occur and have been identified in Section 5.3. Mitigation measures taken to reduce these impacts typically include efforts to minimize the contributing activity and assess the risk associated with the remaining emissions.

6.1.2 Air Emissions

Air quality regulators in provinces and states with waste water facilities associated with known large hog processing facilities were contacted to obtain input data that would be applicable to air quality modeling from the Brandon expanded IWWTF. Provincial or state environmental agencies contacted had no relevant data and indicated that they did not view the emissions as particularly problematic. Manitoba Conservation was contacted, and it was mutually agreed that meaningful air quality modeling would not be undertaken at this time because of lack of input data to a model. If Manitoba Conservation decides at some time in the future that air quality modeling is required at the expanded IWWTF, the City of Brandon has committed to monitoring the emissions from the IWWTF. This would provide actual data on which to base any air quality modeling, rather than transposing data measured elsewhere, if in fact, any relevant data could be found. Appropriate mitigative measures would flow from this approach, if required.

During construction and operation of the expanded IWWTF, airborne emissions generated from vehicle exhausts will be minimized through the proper operation and maintenance of vehicles and other equipment. The dust, generated as a result of excavation and equipment travel, will be minimized by limiting work to the minimum area required to construct the new facilities. Should dust generation present a problem, dust control measures will be employed because the operating pork processing plant cannot tolerate dust in the area. These dust control measures will be non-chemical/non-toxic to prevent contamination of the underlying aquifer. Mitigation of odours emanating from various construction products and processes will be achieved through natural dispersion processes provided by the prevailing winds. The majority of immediate neighbours to the site are not residential. In fact there is only a single residential dwelling within about 0.5 km (0.3 mile) of the proposed development building area. With the site being relatively unsheltered, the air emissions from construction machinery are anticipated to be well dispersed by the prevailing westerly winds, and should not significantly impact the health of the nearby residents.

6.1.3 Meteorology

During construction and operation of the expanded IWWTF, dispersion and mixing characteristics of the atmosphere in general will be sufficient to dilute vehicle emissions. However, should a severe temperature inversion occur and there are a significant number of complaints from workers and/or residents combined, consideration would be given to suspending construction or operation for a few hours; or, at minimum excusing those workers adversely affected.

6.1.4 Mitigation of Air Quality Impacts Due to the Expanded Industrial Wastewater Treatment Facility

Odours from the expanded IWWTF may become problematic with winds out of the west southwest because odours have been identified from the existing IWWTF by Terhune/Denbow. There is the only residence within one kilometer of the site. All other residents within a 3 km radius are to the southwest with annual winds out of the northeast 14.5% of the time. None of the nearby residents have registered complaints or concerns about odours from the existing pretreatment plant. Terhune/Denbow have noticed odours not so much at their property, but westward from their property when they walk to the west. The City of Brandon is aware of this potential problem and will undertake appropriate measures should this intermittent concern persists.

6.1.5 Mitigation of Greenhouse Gas Emissions

Greenhouse gas emissions generated during the construction phase of the project are expected to be largely attributable to construction vehicle exhaust emissions. Mitigation of these

emissions will be undertaken by ensuring proper use of maintained vehicles and machinery on the site.

Greenhouse gases generated by the expansion of the IWWTF are considered minor since by far the greatest gas volume emitted will be nitrogen gas. In addition, the potential for the release of green house gas from the IWWTF has been cut by two-thirds, because less carbon will be available in the anaerobic lagoon to produce methane. In any event, the greenhouse gas emissions will continue to be minimized through the recovery of methane gas from the anaerobic lagoon for use to fire a water heater for plant process water; or, to be flared when not required for heating purposes. Maple Leaf Pork had also initially incorporated a Biogas Conditioning System into the processing plant design to bring the biogas to a higher quality, so that the biogas will burn at a higher efficiency. Natural gas units now used for heating water will be of a Low Emissions (L.E.) type and will be kept in good working order, so as to maintain a high burning efficiency and to minimize the emission of greenhouse gases.

Minor amounts of greenhouse gases may be emitted from the expanded IWWTF; and, the operation vehicles and traffic. Greenhouse gases from operation vehicles will be minimized by ensuring properly maintained vehicles and machinery are used on the site.

6.1.6 Noise Abatement

Noise generated as a result of the construction process and the construction equipment is anticipated to be sporadic with relatively low levels of noise. Noise from back-up “beepers” will not be mitigated as it is considered to be a safety requirement. However, other vehicle and equipment noise will be addressed by maintaining the equipment in good working order and operating the equipment only during appropriate hours. In general, the noise produced by the construction vehicles and equipment is anticipated to present only minor annoyances in what is a sparsely populated area. Pile drivers are not anticipated to be used during the construction of the expanded IWWTF. If they were to be used, pile driver use would be limited to normal working hours; and, the minimum buffer zone of at least 240 m (800 ft) from the property line will provide a definite mitigation advantage.

Some additional noise during construction may be generated during the construction phase from on-site aggregate crushing. Unanticipated on-site aggregate crushing occurred early in the original pork processing plant and IWWTF construction phase, and Earth Tech (Canada) Inc. personnel visited the closest residents at the time to obtain their reaction. They were disturbed in the night by the 24-hour crushing operation, but they suggested that it should continue as it was to be completed within a couple of days. Other than this one incident, we are not aware of any other noise complaints associated with the construction phase of the project. It is recommended that any crushing operation, if required for the expanded IWWTF

construction be coordinated with Denbow/Terhune prior to undertaking crushing outside of normal working hours.

Noise during the operation of the expanded IWWTF is anticipated to be minimal because the majority of the activities that will occur and the equipment utilized will generally be indoors. Some outdoor noise will be generated by traffic and muffled indoor activities. The blowers in the Zenon equipment building are potentially noisy; however, mufflers will be installed on both the intakes and exhausts to mitigate noise; and the fact, that they are located within an enclosed building will ensure acceptable levels of noise at the property line. Noise has not been identified as a problem at the Terhune/Denbow property to date. Should noise be identified as a problem in future, the City of Brandon will undertake appropriate measures.

6.2 HUMAN HEALTH RISK MITIGATION

6.2.1 Worker Health and Safety

On all construction sites, the presence of heavy equipment, excavations, machinery; and, other circumstances provide the opportunity for minor, severe; and, possibly fatal injuries. In Manitoba, worker protection is provided through legislated standards, procedures; and, training under the Workplace Health and Safety Act. All construction practices undertaken on the site will be carried out in accordance with the Workplace Health and Safety Act to minimize health and safety impacts.

The City of Brandon, in the case of a severe injury on site would deploy the Brandon Emergency Support Team operated in conjunction with Maple Leaf Pork and other major industrial players in the Brandon area. Response to major medical emergencies will form a part of the plant contingency plans. Worker training is a part of the Brandon Emergency Response Team's responsibilities. Ambulance service is also available in the case of major injury.

6.2.2 Mitigation of Airborne Emission Impacts to Human Health

Impacts to human health from site construction activities are anticipated to be low and confined to the vicinity of the site. Mitigation measures will be reactive to potentially legitimate complaints expressed to the City of Brandon and other contacts. Dust generation should not pose genuine human health risks since sprinkling of water will be employed if dust becomes a problem on site during construction. During operation of the expanded IWWTF, operators will be fully trained and experienced. Additionally, all of the expanded equipment will be covered or contained within a building to minimize heat loss and this will also minimize odour emissions.

6.3 SURFACE WATER IMPACT MITIGATION

6.3.1 On-site Drainage System

Potential surface water impacts due to soil erosion transport will first be minimized by limiting the disturbed soils only to necessary areas and by stockpiling excavated top-soil on the site for future use in leveling and landscaping activities. Potential impacts will also be abated through two direct systems of sediment interception, silt fences and storm water detention ponds. Silt fences will be installed at strategic locations around the new construction site to intercept particulates suspended in the storm water runoff during construction. Soil erosion transport will also be mitigated through seeding and landscaping once construction is completed. Ditches will be seeded and areas of bare soil will also be seeded; or otherwise, stabilized to provide a suitable protection. A storm water detention pond already exists to provide a flow buffer that will limit the post-development storm water runoff to the peak pre-development storm water runoff of 0.34 m³/s (12 cfs). The pond will also act as a settling basin where the reduced flow velocity will allow some settlement of particulates to occur prior to discharging to ditches which ultimately lead to the Assiniboine River.

Potential direct surface water impacts due to chemical spills to ditches will be mitigated with the immediate construction of check dams to intercept and prevent contaminant transportation to the Assiniboine River. In addition, storm water discharges will be monitored if necessary to confirm the absence of contamination. No spills with potential to affect surface waters have occurred at the site to date.

There will be no discharge of contaminants into the surface water drainage system as part of the normal operations of the expanded IWWTF other than the discharge of treated effluent to the Assiniboine River. Any accidental spill associated with the operation will be investigated and managed in accordance with the Maple Leaf Pork plant's Spill Response Plan or by the City of Brandon. In the event that the investigation indicates impacts to surface water, then appropriate mitigative measures will be taken.

The retention capacity provided for drainage waters on the site means that both the potential for downstream surface erosion and any large effect on increase of downstream flows have been eliminated. Therefore, we believe any off-site impacts from site drainage on surface water will be minimal and insignificant.

6.3.2 Assiniboine River Drainage System

The expanded IWWTF is an environmental mitigative development in itself; that is, its' sole purpose is to improve the quality of effluent being discharged to the Assiniboine River. The pretreatment plant removes solids and reduces the biological oxygen demand (B.O.D.) coming from the Maple Leaf Pork processing plant effluent before the effluent is sent to the City of

Brandon's IWWTF. The expanded IWWTF further reduces the B.O.D. and solids, as well as removing a high percentage of nitrogen, phosphorous, ammonia, coliform; and, pathogens.

No other mitigation is considered to be necessary at this time. The City of Brandon intends to continue monitoring the Assiniboine River albeit on a reduced schedule compared to the past five years. The proposed monitoring program is described under Section 8.0 Monitoring.

6.4 SUBSURFACE IMPACT MITIGATION

6.4.1 Groundwater Impact Mitigation

A central refueling area will be constructed on the site in a location of low permeability soils or with a liner to mitigate the potential ground water impacts related to refueling spills during construction. A good area for a lined refueling area would be the former contractors lay-down area located immediately east of the Maple Leaf Pork processing plant. A similar refueling site will be constructed near the entrance (northeast corner of Brandon's property) to the IWWTF site. A similar refueling area was constructed at this site for the original construction by leveling the surface and constructing small berms on three sides, while facilitating surface water drainage on the fourth side. In the event of a spill, the fourth side would be quickly bermed to contain a significant spill in the unlikely event one occurred. If a spill occurs, contaminated soil will be excavated and hauled to an approved land treatment facility, depending on the level of contamination. Lubricants and other petroleum products that will be utilized will also be temporarily stored to the largest extent possible within the area used for refueling. Fuel for construction equipment purposes will not be stored on the site; and, refueling trucks will leave the site when equipment is not working.

Under normal operating conditions, there is no discharge of contaminants from the plant or process into the ground water system. The expanded IWWTF has been designed for complete containment of effluent with no release to the ground water system. There will be no land application of waste materials as part of the expanded IWWTF operations at the site. Land application of sludge from the expanded IWWTF will take place as part of the City of Brandon's ongoing sludge management (See Section 7.6). Therefore, under normal operating circumstances there will be no potential for contamination of the ground water at the development site. Also, the potential for ground water contamination plays a major role in the selection of lands for spreading biosolids in that lands where ground water contamination is a significant risk are avoided.

Extensive investigation of existing ground water quality at the site has been undertaken to identify ground water impacts associated with past and surrounding land uses; and, during first shift operations. A monitoring program designed to detect unexpected leakage into the ground water system from any of the plant or process facilities, and from surrounding land uses has been operated by Maple Leaf Pork since 1998. In the event that a potential adverse impact to

ground water quality is noted as a result of plant, pretreatment or IWWTF process operations then further investigation will be undertaken to determine the source and nature of contamination. Any ground water contamination investigations at the site to date have indicated that the potential for contamination has been minor. Most often what has been identified are natural fluctuations in groundwater quality at the site rather than any ongoing source of contamination associated with the operation of facilities on the site. Were the potential for contamination identified, appropriate mitigative measures would then be undertaken to ensure there are no adverse off-site impacts with respect to groundwater quality.

The ongoing ground water monitoring program conducted by Maple Leaf Pork incorporates monitoring the City of Brandon's existing and expanded IWWTF, which is situated to the north of the pretreatment plant site.

As a precaution, ground water monitoring wells have been installed around the perimeter of the site and at strategic locations within the property and are part of a periodic sampling and monitoring program to help indicate the presence of any contamination prior to its migration onto or off of the site. Any existing monitoring wells destroyed during construction of the expanded IWWTF will be replaced in appropriate locations relative to existing and new facilities.

In general, should chemical/fuel spills occur on the site, immediate clean-up/isolation measures will be undertaken to prevent the further spread of any soil contamination, as well as impingement upon the aquifer, which underlies the site. This along with the mitigation and monitoring methods outlined above will ensure that any potential impacts will be contained on the property and properly cleaned up to the satisfaction of Manitoba Conservation.

6.4.2 Soil Impact Mitigation

During construction, impacts on land associated with this site are expected to be restricted to that portion of the site where site leveling and drainage works have been constructed. No significant impacts on land beyond the boundaries of the site are anticipated.

The abundance of sands and gravels naturally available on the site and in the general area will make it economical to construct the final surfaces of the graded areas mainly of coarser-grained soils such as sands and gravels. This will alleviate to a very large degree any concern about erosion of the site either during or after preliminary construction. In the long-term, soil erosion will be minimized through the site grading and land leveling, as well as seeding runoff ditches.

Any spills of fuels or lubricants will undergo clean-up immediately by excavation and appropriate disposal of the contaminated soil. Mitigation by excavation is considered to be highly effective in limiting impacts from hydrocarbons on soils. The construction and use of

an on-site central refueling area with low permeability soils will limit soil contaminant migration and further minimize the potential impact of fuel/chemical spills on the soils and ground water.

Topsoil will be salvaged from all disturbed areas, stored in stockpile berms and used for landscaping the site upon completion of construction. The stockpile berms will be revegetated within one growing season to minimize erosion.

The loss of the limited agricultural capability soil will be partially offset by topsoil salvage and revegetation; therefore, the residual impact is rated low. Training and contingency plans will minimize the risk of fuel or chemical spills, thus the residual impact is considered to be negligible.

Under normal operating conditions, there is no discharge of contaminants from the plant or process into the soil. The expanded IWWTF has been designed for complete containment of effluent with no release to the soil. There will be no land application of waste or byproduct materials, as part of the plant processing operations, at the site. Therefore, under normal operating circumstances there will be no potential for contamination of the soil at the site. Off site it is recognized a separate application will be required identifying the landowners and documenting the exact tracts of land, types of soil, nitrogen levels in soils, spreading rates, depth to ground water, and proximity to neighbours among other criteria. This will be handled under the City of Brandon's Biosolids Management Plan described in more detail in Section 7.6.

6.5 TERRESTRIAL IMPACT MITIGATION

6.5.1 Mitigation of Impacts on Wildlife

The site is already home to heavy industrial activity with truck traffic nearby throughout most of the day with hog deliveries. The incremental impacts are anticipated to be minimal. Confining activities to the project area and landscaping will minimize habitat loss and alienation impacts. Construction and operation staff will be advised of the deer collision hazard, and will be expected to adhere to speed limits throughout this area.

In summary, the land that will be disturbed by the construction of the expansion is considered to be marginal since it was disturbed during the work completed for the original IWWTF construction. As was previously done, the remaining disturbed areas will be reseeded following completion of the expansion.

6.5.2 Mitigation of Impacts to Vegetation

The reclamation and landscaping program will restore vegetation to disturbed areas not required for project facilities. Impacts of potential fuel or chemical spills will be minimized by employee training programs and application of contingency plans for spill detection, containment and cleanup. The potential fuel or chemical spills are unlikely to affect natural vegetation, hence the residual impact is rated negligible. Since there will be no loss of natural vegetation, the residual impact is considered negligible.

In the case of the small white lady slipper (*Cypripedium passerinum*) which exists in the area, but is not known at this time to exist on the site, a field reconnaissance to view the areas of proposed ditches was undertaken with Mr. David Hatch, Greenspaces Environmental Consulting, prior to the original plant construction. Mr. Hatch has suggested that if the small white lady slipper does exist where construction of ditches is planned, a few plants can be moved to a secure area on the site. The chances of this plant species existing where the expanded IWWTF is to be constructed are considered to be non-existent, because the area has been previously cultivated for some years. No small white lady slippers have been found on site, following attempts to identify them by Earth Tech personnel.

6.5.3 Mitigation of Impacts on Current Land Uses

The land use in the immediate vicinity of the plant site and including the plant site was zoned as heavy industrial previous to Maple Leaf's selection of the site. Therefore, no impacts were exerted on the local land use by the plant; and therefore, no mitigation measures are deemed to be required or necessary.

6.6 MITIGATION OF POPULATION IMPACTS

The construction of the expanded IWWTF will involve up to a maximum of about 40 construction workers. For a community that has experienced major worker influxes for major projects such as the Simplot expansion and the Maple Leaf Pork original construction, the effect of 40 construction workers will hardly be noticeable. Because the construction workers report early to work, normally work late and generally bring their lunches to eat on the site, the impacts on the community will be minor, short-term and will not require specific mitigation.

The impact of, and mitigation for, the two-shift operation at Maple Leaf Pork was considered for the original licencing of Maple Leaf Pork; and, at that time the number of additional workers required was predicted to include an additional 1,000 people. Some carcasses are presently shipped off site from Maple Leaf Pork. This will be continuously evaluated by management in the future. This was not anticipated in 1999, but results in reduced population impacts on Brandon as compared to original projections. Therefore, the population impact on

Brandon will not exceed original projections. The two-shift operation at Maple Leaf Pork and its effect on population growth in Brandon is anticipated to involve more people from outside the Brandon region than first-shift. Up to 450 workers (some may come from the Brandon region) representing a population increase of 1.1% are anticipated to arrive in the Brandon region for the second-shift. With spouses and children the actual population increase will likely be closer to 2 or 3%. This is not a particularly high rate of growth for a city the size of Brandon. However, the fact that this impact is anticipated at present; that a couple of years remain prior to the event occurring and then it will occur gradually; and, the foresight the City of Brandon and Maple Leaf Pork has displayed to date in accommodating this major project, we anticipate the final population impact from the second-shift at the processing plant will be relatively minor. With respect to the operation of the expanded IWWTF, the workforce is anticipated to increase from two operators to five operators once constructed. This will not require mitigation in terms of Brandon's ability to accommodate the personnel.

6.7 COMMUNITY SUPPORT

During the construction and operation of the expanded waste water plant, the City of Brandon anticipates little public curiosity largely because a major facility currently occupies the site. Neighbours within a 3 km radius of the site have all been visited by a representative of the City of Brandon/Maple Leaf Pork; and, it was found that the project has been positively accepted by virtually all neighbours.

The City of Brandon is traditionally supportive of community life and activities. It owns and operates a community parks and recreation program; is a regional service center for the region (Westman); and, it is a funding partner with the Province of Manitoba of the Keystone Centre.

6.8 EMPLOYMENT IMPACT MITIGATION

No specific mitigative measures are anticipated to be necessary for the provision of qualified personnel during the construction phase of the project. The employment aspects for the construction of the project will be left up to the selected individual contractors. It is anticipated that during its construction the peak labour force will reach 30 to 40 people.

6.9 MITIGATION OF OZONE DEPLETING SUBSTANCE (ODS) IMPACTS

ODS use will be minimized to the maximum practicable extent through the use of alternative products, should a need for their use be identified.

6.11 SOCIO-ECONOMIC IMPACTS

The adverse socio-economic impacts related to the proposed development will be minor and insignificant. With respect to community support, virtually all neighbours have positively accepted the Maple Leaf Pork development, which was already licenced for the second-shift

operation. This project will not adversely affect the City of Brandon's or Maple Leaf Pork's commitment to the community; and in fact, it demonstrates their commitment to the environment.

The employment impacts of the project will not require mitigation. The workforce required to construct and operate the proposed expansion of the IWWTF and the pretreatment plant will be much smaller than that recently required for other larger projects in Brandon including work on the Simplot fertilizer plant and the original Maple Leaf Pork plant, both of which were easily accommodated by the City of Brandon and the contractor's workforce capacities.

Regionally the minor increase in traffic was approved under the existing Maple Leaf Pork licence. This alteration request will result in a negligible increase in traffic volumes on 65th Street East from Richmond Avenue East, north to the existing entrance to the IWWTF site. With only one residence on 65th Street East north of Richmond Avenue, the impact is anticipated to be minor and improvements will be made to the intersection and road to better accommodate the increase in traffic.

No impacts to heritage resources are anticipated as the site was previously examined by a qualified archaeologist and the area of the proposed expansion was previously disturbed. No mitigation with respect to heritage resources is necessary.

No impacts to the local land use planning program are anticipated as the site was previously slated for this development. No mitigation with respect to land use planning is necessary as the site can already accommodate both the construction and operation of the proposed alterations.

6.12 WASTE GENERATION MITIGATION

The operation of the City of Brandon's expanded IWWTF, generates very little solid waste is generated. As much of the solid waste generated as possible will be recycled. Opportunities for recycling such as glass, drink cans; and, paper will also be encouraged. All other solid waste generated will be collected from site on a weekly basis and hauled to the City of Brandon landfill.

Waste generated during the construction process will be collected and periodically hauled to the local landfill. Domestic sewage generated during construction will be collected in tanks at portable toilet facilities and hauled by a licensed contractor. Recycling during construction will be encouraged to the maximum extent possible.