Environment

Barkman Concrete Ltd.

Environment Act Proposal for the Existing Barkman Concrete Ltd. Operations & Proposed Paver Plant, Steinbach, Manitoba

Prepared by:

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Project Number:

6032883 (403)

Date:

September, 2013

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AECOM: 2012-01-06

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September 17, 2013

Ms. Tracey Braun, M.Sc.
Director, Environmental Assessment and Licensing
Manitoba Conservation and Water Stewardship
123 Main Street
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Winnipeg, Manitoba R3C 1A5

Dear Ms. Braun:

Project No: **60302883 (403)**

Regarding: **Environment Act Proposal for the Existing Barkman Concrete Ltd. Operations & Proposed Paver Plant, Steinbach, Manitoba**

Please find enclosed five hard copies and two electronic copies of the *Environment Act* Proposal form and supporting information to obtain approval for the operations of the existing Barkman Concrete Ltd. facility and the proposed paver plant filed on behalf of Barkman Concrete Ltd.

We understand that the Barkman facility and proposed project is a Class 1 development as per the *Classes of Development Regulation*. According to a letter from Manitoba Conservation and Water Stewardship dated June 12, 2013, this resubmitted report will be accepted as a Notice of Alteration to the proposal previously filed by Barkman Concrete Ltd. and therefore no additional application fee will apply. We trust that the information on the form and the attached supporting information are sufficient.

Should you have any questions regarding the project or the attached information, please do not hesitate to contact Alison Weiss directly at 204-477-5381.

Sincerely,
AECOM Canada Ltd.

Ron Typliski, P.Eng.
Vice-President, Environment
Manitoba/Saskatchewan District
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KC/AW:dh
Encl.
cc: Dan Bartel, Barkman Concrete Ltd.

Distribution List

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Revision Log

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Executive Summary

Barkman Concrete Ltd. is planning to expand their concrete product production facility in Steinbach, Manitoba. A new paver plant and supporting infrastructure, including the construction of a new retention pond, is proposed to allow for modernization at the facility and to allow for a limited increase in short term paver production. As part of this process, it has been determined that a Provincial *Environment Act* Licence is required for the existing facility and any additions to the facility (including the proposed paver plant). The existing Barkman facility in Steinbach, Manitoba does not currently have an *Environment Act* Licence.

Barkman Concrete Ltd. has been located at 152 Brandt Street in Steinbach, Manitoba since 1948 on a site zoned M1 Light Industrial under the City of Steinbach Zoning By-Law (By-Law No. 1882).

This *Environment Act* Proposal provides details on the proposed project including the current operations at the Barkman Concrete Ltd. site and the predicted environmental effects with guidance provided by a letter from Manitoba Conservation and Water Stewardship dated June 12, 2013.

The proposed project includes the construction and operation of a new paver plant (approximately 3,716 m^2) in addition to the current operation of the existing main plant on Barkman's current property.

Construction activities are anticipated to begin as early as this fall (foundations) with building construction anticipated to begin in May 2014. The new facility will be completed by the end of 2014 with production commencing at the new facility in 2015.

Overview of Environmental Studies

The environmental setting for the assessment was characterized using existing information sources and two site visits. The information and site visits addressed the physical, biological and socio-economic components of the site.

Summary of Environmental Effects

The potential environmental effects of the proposed project and the current operations at the site on environmental and resulting socio-economic components were considered in the assessment.

The negative residual environmental effects related to the operation of the existing facility and the proposed construction and operation of the new paver plant were found to be negligible to minor in magnitude post mitigation.

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1. Introduction and Background

1.1 Project Overview

Barkman Concrete Ltd. (Barkman) is planning to expand their concrete product production facility in Steinbach, Manitoba (Figure 1). A new paver plant is proposed to allow for modernization at the facility and to allow for a limited increase in short term paver production. A new retention pond will also be constructed north of the proposed paver plant on leased land from the City of Steinbach to address additional surface water runoff generation on the Barkman site as a result of the development. A lease agreement is currently being negotiated between Barkman and the City of Steinbach for the retention pond. Barkman can provide a copy of the agreement to Manitoba Conservation and Water Stewardship once finalized. As part of this process, it has been determined that a Provincial *Environment Act* Licence is required for the existing facility and any additions to the facility (including the proposed paver plant). The existing Barkman facility in Steinbach, Manitoba does not currently have an *Environment Act* Licence.

This *Environment Act* Proposal has been prepared by AECOM Canada Ltd. (AECOM) on behalf of Barkman in accordance with Manitoba Conservation and Water Stewardship's Information Bulletin, "*Environment Act Proposal Report Guidelines*" and the guidance provided in a letter dated June 12, 2013 from Manitoba Conservation and Water Stewardship included in Appendix A This report documents the existing facility, the proposed paver plant and potential environmental effects and proposed mitigation measures and is submitted along with the *Environment Act* Proposal Form (Appendix B) for consideration by Manitoba Conservation and Water Stewardship.

1.2 Regulatory Framework

The existing concrete production facility and the proposed paver plant are considered a Class 1 Development under the *Classes of Development Regulation* and as described in Section 10 of Manitoba's *Environment Act*. The existing and proposed developments are not anticipated to trigger any Federal environmental assessment requirements under the *Canadian Environmental Assessment Act*, *2012*.

2. Project Description

Barkman has been in operation at the Steinbach, Manitoba location since 1948 and is located on a site zoned M1 Light Industrial under the City of Steinbach Zoning By-Law (By-Law No. 1882). This facility manufactures precast concrete products for residential, commercial, agricultural and municipal applications. Their product lines include hardscapes (e.g. pavers), landscape kits (e.g. fire pits), stone veneer, rosetta products, site furnishing (e.g. planters), steps, skate parks, agricultural products (e.g. feeders for hog and dairy barns) and concrete trenching for electrical and plumbing systems. (Barkman, 2012) For a complete list of products produced at Barkman, please visit www.barkmanconcrete.com.

A new paver plant and supporting infrastructure is proposed to allow for modernization at the facility and to allow for a limited increase in short term paver production at the site. A new retention pond will also be constructed north of the proposed paver plant, on leased land from the City of Steinbach, to address the additional surface water runoff that would be generated on the Barkman site. The following sections provide an overview of the existing operations at the Barkman facility and the proposed paver plant.

2.1 Existing On-Site Facilities and Operations

The existing Barkman facility consists of a precast concrete production facility (including cement silos, aggregate storage, mixers, moulding press and drying facilities (all located in the main plant)), warehouse, storage buildings, parking lots and outdoor storage areas as shown in Figures 2 and 3.

An existing facility process schematic is shown in Figure 4 and indicates the major steps in processing. The layout of the existing main plant is shown in Figure 5. The following subsections provide an overview of the existing processing steps at the Barkman facility.

2.1.1 Raw Materials

Powder cement, fly ash and silica sand trucks arrive at the site and unload this material via a truck-mounted blower system to one of three silos. One of the silos can hold a total weight of 80,000 kg of cement powder and a second silo can hold a total weight of 52,000 kg of fly ash. The third silo is used to store two different materials (one compartment for cement and the other compartment for silica sand) and is located in the Glass Fiber Reinforced Concrete (GFRC) production area (Figure 5). This silo can store a total weight of 50,000 kg of material.

Each silo has a baghouse filtration system with a shaker motor. As the powder cement, fly ash or silica sand is blown into the silo, air containing small particles of the material is displaced through the bag filters prior to venting outdoors. Any dust that is collected in the bag filter falls back down into the silo when the filter is mechanically shaken after each truck delivery. An emergency siren is in place at two of the silos associated with the main plant for the truck operators to shut-down the transfer of material if the silos become too full. The third silo is oversized and material is only ordered/requested when required, therefore no emergency siren is in place at this silo. The bag filters in all the silos are inspected once a month and the inspector determines if any cleaning or replacement of parts are needed. If the filters require cleaning, this is done by a large in-house industrial vacuum and/or compressed air. Any filters that cannot be cleaned are removed, replaced, and disposed of at the local landfill.

Aggregate trucks unload this material into one of four in-ground hopper buckets that deliver this product via a conveyor, and/or elevator buckets to one of 12 storage silos located above the main Programmable Logic Controller (PLC) room (Batch Plant Control Office) in the main plant. The four outdoor aggregate hoppers have individual

capacities ranging from 30,000 kg to 60,000 kg. The 12 storage silos have individual capacities ranging from 12,000 kg to 20,000 kg.

During the winter months, steam is supplied to the aggregate hoppers to allow this material to thaw prior to use. Any rainwater or drainage water entering the hoppers in this area is collected in a sump pit with a grit separator that is then pumped into a catch basin which is part of the Barkman's storm water collection system. This catch basin then drains into additional catch basins on the Barkman property prior to discharging into the City of Steinbach's storm water collection system. All of the catch basins on the Barkman's property are inspected regularly and are cleaned approximately three times a year.

The material (aggregate, cement, fly ash and silica sand) unload areas are located on the south side of the main plant (Figure 3). There are approximately 10 to 24 trucks per day delivering the raw materials to the site with a daily average of approximately 17 trucks per day. This average truck count is for production periods only. When the facility is shut down for maintenance or production breaks, no material is delivered to the facility.

2.1.2 Production

2.1.2.1 Batching and Mixing

From within the Batch Plant Control Office, operators select the types of raw materials required for the specific job as part of the batching process. There are also five keypads connected to the Batch Plant Control Office located throughout the main plant for specific mixers. The keypad request goes to the Batch Plant Control Office where the quantities/weights of the materials are selected and sent to the desired mixer.

The raw materials such as aggregates, cement, fly ash, silica sand, pigments (powder/granular form) and fiber admixes drop into an enclosed weigh scale. As the raw material drops into the enclosed scale, air containing small dust particles is displaced and is captured in a dust sock. The displaced air from the scales is then vented into the main plant.

Once the materials are weighed, they are then conveyed to one of six mixers in the main plant. Aggregates are conveyed on belt conveyors and the cement/fly ash/silica sand are conveyed in sealed screw conveyors to the mixers to minimize the amount of dust generated. Pigments are pneumatically conveyed and/or pumped into the mixer while fibers are added by hand to the desired mixture.

As the selected raw materials are added to a mixer, a suction fan is activated that draws air from inside the mixers through a cartridge filter system. The suctioned air contains small dust particles that collect on the cartridge filters. Five of the six mixers in the main plant have a cartridge filter system while one smaller mixer (used only for the Henke machine for face mixtures) is not equipped with a filter system due to its small size. A face mixture is when an 8 to 10 mm thick top layer of concrete with pigments and fine aggregates is poured over a base mix of concrete. Once in a mixer, water and other admixtures including liquid pigments (if required) are then added to the mixture to produce the specific concrete product.

A list of materials used for the production in the facility is provided in Appendix C. Depending on the type of product being produced, several materials/admixtures can be added during the batching/mixing process. Fiber admixes are used to either produce a lighter product such as GFRC planters and/or provide post-crack control/shrinkage of the final products. Admixtures such as efflorescence control assist in repelling water in the final product and accelerators speed the settling/curing time of the final product. Super plasticizer/water reducer reduces water in the concrete mixture and/or slows the settling rate of the concrete mixture while retaining the flowing properties of the mixture. Air entrainment admixtures make the final concrete product resistant to cycles of freezing and thawing

while polymers reduce drying shrinkage and moisture absorption. A list of the admixtures used at the facility is provided in Appendix C.

Depending on the product being produced, some concrete mixtures are conveyed to the Mason machine and/or the slab presses. Some concrete mixtures are poured into hopper buckets from the mixer and transported to other locations within the main plant for stone veneer, site furnishings, rosetta products, steps, ramps for skate parks, feeders and trench systems to name a few.

All sock filters and cartridge filters are inspected once a month and the inspector determines any cleaning or replacement of parts is needed. If the filters require cleaning, this is done by a large in-house industrial vacuum and/or compressed air. Any filters that cannot be cleaned are disposed of at the local landfill.

2.1.2.2 Casting and Curing

After mixing, the concrete mixture may be used in the concrete paving stone machine, slab presses or other molds/processes.

Concrete Paving Stone Machine (Mason)

The Mason machine is used to produce various pavers, slabs and masonry. The concrete mixture is machine pressed into the desired shape and is vibrated at the same time to remove any voids. Once pressed and vibrated, these products are then conveyed and stored in a climate controlled kiln over-night. This kiln uses forced air at 32ºC to maintain an even temperature throughout using thermostatically controlled forced air electric furnace system. The electric heat is supplementary to the heat of hydration. After drying, some of these pavers, slabs and masonry are then stacked/strapped on pallets for outdoor storage and/or transported to the Kits Department to be assembled and packaged for retailers.

Some of the pavers and masonry, once dried, are conveyed to the Vena machine that can either tumble the pavers and masonry or split masonry. The tumbler is located outdoors and is used to give pavers and masonry an aged appearance (Figure 5). As the pavers and masonry drop and rotate in the tumbler, fine aggregate material is broken off and/or rubbed off giving them the aged appearance. Once the pavers and masonry have gone through the tumbler, they are then conveyed back indoors where the Vena machine can then reconfigure the pavers and masonry into a bundle and then onto pallets for storage. The fine aggregate material that comes off the pavers during the tumbling process is collected in a storage bin and once it is full, this material is then transported to the outdoor bunkers for storage. There is a cyclone filtration system attached to the tumbler to collect any dust produced during this process. The dust collected from the cyclone is also transported to the bunkers.

The splitter on the Vena machine splits products, such as masonry for retaining walls, which can give the product a worn appearance on one side. Any unusable “end” pieces or damaged pieces are collected in a bin and, once full, transported to the on-site bunkers for storage.

The outdoor bunkers are located west of the proposed paver plant as shown in Figure 3 and are used to temporarily store production wastes including dust, fine aggregate, unusable “end” pieces and/or damaged pieces along with the solids collected from the settling pits when cleaned. The bunkers are regularly emptied by Diamond Construction and Gravel of Steinbach.

Slab Presses (Fielding Press and Henke Machine)

The slab press machines are used to produce various sizes of concrete slabs. Once pressed, the slabs are transported and stored in one of two kilns over-night. The Fielding Press slabs are transported into a sealed kiln room that has no additional heat added to the room; only the heat of the hydration process of the concrete assists in keeping this kiln warm. The Henke kiln uses carbon dioxide (CO_2) rich heated steam (exhaust from the combustion of natural gas) to cure the slabs. The use of CO_2 allows the concrete to cure much more quickly than it would if exposed to the atmosphere. The Henke kiln is sealed with an evacuation system in place to force the CO_2 into the atmosphere prior to staff entry into the kiln. Once the slabs are cured, they are then strapped/packaged and transported into the yard for storage.

Other Molds/Processes

The concrete mixtures that are poured into the hopper buckets are transported via forklift to other areas within the facility to be poured into molds. Barkman uses two types of mix designs when filling molds; wet casting and dry casting. Wet casting is used for more liquid concrete mixes and the concrete is poured into molds whereas dry casting is used for dryer mixes and the concrete is pressed or compacted into molds. The molds can be used to produce stone veneer, site furnishings (e.g. planters, benches), rosetta products, steps, ramps for skate parks, water tanks and trenching systems.

Mold release products (Appendix C) are added to the mold prior to the concrete mixture. These products are used to help release the final product from the mold.

Various mold materials are used to produce products, including rubber, fiberglass, metal and wooden molds. Some products including waste containers, planters, benches, snuffers, manhole rings for septic tanks and any other smaller formal drycast products use the vibration table in the Vibe Table Department to help fill all voids in a mold during casting (Figure 5).

Once the concrete mixture is placed into these molds, they are left to cure over-night. The following day when the concrete is removed from the molds, the molds are then dry wiped and put into storage, as required.

The rosetta products (e.g. walls, pond kits, steps and slabs) are placed into a retaining wall kiln located in the Rosetta Department and veneer stone products are placed in a veneer kiln located in the Veneer Stone Department (Figure 5). Both kilns use forced air at 32ºC to maintain an even temperature throughout. Any larger concrete slabs that require curing are placed in the slab curing rooms near the Henke Department over-night to cure (Figure 5). Once the products have cured, they are then removed from the molds and either packaged / wrapped / strapped / placed on pallets in the Packaging Department and are then transported into the yard for storage.

Depending on the product being produced, a retarder may be added once the concrete mixture has been poured into a mold. A spray-applied retarder is used to slow the setting of surface mortar in concrete and allows the aggregates in the concrete to be exposed using water. Once the product has been cured, water is then sprayed onto the product surface to expose the aggregates. The wash water is directed to the floor drains within the facility that drain into one of two settling pits on the property which are eventually discharged to the City of Steinbach storm water collection system via the Barkman storm water collection system.

2.1.2.3 Sanding, Finishing, Paint and Sealer

GFRC products, once cured, are transported to the sanding/finishing room. Within the sanding/finishing room, there are six booths, each equipped with a dust collection system that includes a first level collection where a shop vac is

connected to the grinding and sanding equipment to capture dust at the source. Any additional dust not captured in the shop vac is collected on a wall mounted suction hood equipped with a dust filter. A suction fan draws air through the wall mounted hood filter into a cartridge filter with a cyclone system attached. Any dust material captured in the cyclone is disposed of in the yard bunkers. This filtered air is then vented into the main plant. The cartridge filters are inspected once a month and the inspector determines if any cleaning or replacement of parts is needed with used filters sent to the local landfill for disposal. Once the products have been sanded/finished, sealer or paint is applied to the product as required.

Some of the final products for landscape kits and site furnishings are transported to the paint area for a coat of paint prior to final storage. Within this room, each paint booth is equipped with an air filtration system that exhausts outdoors. The paint room filters are changed approximately every two months depending on use and season and the filters are disposed of in the local landfill. Any gun wash or paint thinner used is collected in a 170 L steel drum and is picked up by Green for Life approximately once a year. Painted products are left to dry over-night and then are transported via forklift to be packaged/wrapped/strapped/placed on pallets in the Packaging Department.

Depending on the product produced, a sealer may be applied either once the product is removed from a mold and/or after being painted. Sealers are used to repel stains making surface cleaning of the product easier, to protect the surface from abrasion and freeze-thaw damage, to stop water seepage and to enhance the color of the product. For the most part, water based sealers are used at Barkman with a complete list of products included in Appendix C.

2.1.2.4 Final Product

Once the products have cured and have been finished (sanded, painted and sealed) as required, they are transported via forklift to the Packaging Department to be packaged/wrapped/strapped/placed on pallets. They are then placed in the yard for storage and/or shipped off-site to retailers/clients. Barkman retains qualified transportation companies to transport the final products from the site to retailers/clients.

2.1.3 Maintenance, Steel and Truck Shops

Within the main plant, there is a maintenance shop (machine shop), steel shop and truck shop (Figure 5). The machine shop is where all in-house repairs and fabrication of parts, molds and equipment is completed. There is a general air collection system in this area with a make-up air unit to remove fumes.

In the steel shop, there are three welding tables that are equipped with downdraft systems. This shop does all of the production welding, rebar frames, handrails and any other production related items that either go into a concrete casting or attach to one of the products. This area also has a general air collection system with a make-up air unit to remove welding fumes.

Within the truck shop, all maintenance of on-site trucks, forklifts, loaders and skid steers is completed including oil changes. Any used oil and filters are collected and stored outdoors in the northeast corner of the yard in steel containers in an area away from the building that is protected by concrete barriers as shown in Figure 3. These items are picked up by Green for Life, as needed. Similar to the machine shop, this area also has a smoke and fume collection system with a make-up air unit.

2.1.4 Cleaning and Site Maintenance

At the end of each work day, all hopper buckets, work stations and some machinery used during the day are pressured washed. This wash water is directed to the floor drains within the facility that drain into one of two settling

pits (each containing four chambers) on the Barkman's property. These settling pits drain into a catch basin which is part of the Barkman's storm water collection system that then drains into additional catch basins on the property prior to discharging into the City of Steinbach storm water collection system. The settling pits are inspected bi-weekly and cleaned once the first chamber is full and the second chamber is approximately half full of solids. Any material that settles out in the pits is removed by a backhoe and placed in the bunkers in the yard for storage (with disposal provided by Diamond Construction and Gravel of Steinbach). Molds used during the day are dry wiped.

As indicated in Section 2.1.1, all of the catch basins on the Barkman's property are inspected regularly by staff and are cleaned approximately three times per year.

Any empty aerosol cans are collected in waste bins throughout the main plant. Once these bins are full, the cans are collected and any remaining solvent in the cans is discharged into a designated barrel for storage. The empty cans are placed into a steel container for storage and are picked up by a local scrap recycler. Green for Life picks up the solvent barrel as required. The steel container and solvent barrel are stored in the northeast corner of the yard away from the main building in an area protected by concrete barriers as shown in Figure 3.

Yard dust from vehicle and equipment movement is managed through the application of dust control agents (magnesium hydroxide) as necessary and the use of paved areas.

2.1.5 Existing Water Management Systems

There is an existing storm water retention basin located west of the main plant along Giesbrecht Street (Figure 3). During significant rainfall events, if the site storm water collection system (catch basins connected to the City of Steinbach storm water collection system) on the Barkman site cannot handle the amount of rainfall, surface runoff backs-up into the retention basin. The Barkman storm water collection system drains either towards Brandt Street, McKenzie Avenue or Giesbrecht Street into the City of Steinbach's storm water collection system. After rainfall events, the retention basin will either drain back into the City's system and/or will evaporate.

Sanitary wastewater generated at the main plant is transferred to the City of Steinbach sanitary sewer system. The Barkman site is also connected to the City of Steinbach's water supply.

2.1.6 Storage Tanks

There are two double-walled aboveground storage tanks (one diesel and one gasoline tank) located near the clearance section of the yard (Figure 3). The diesel tank has a capacity of 4,545 L and the gasoline tank has a capacity of 2,273 L. A propane tank is also located near the clearance section of the yard that has the capacity of 1,893 L. All three tanks have concrete barriers protecting them and all the additives for the gasoline and diesel tanks are stored in a nearby flammable cabinet.

There are 23 forklifts on-site that either use diesel, propane or are electric. The gasoline is used for service vehicles, as needed. Propane is also used to heat-shrink plastic over assembled kits in the Packaging Department.

2.1.7 Facility Personnel

There are currently approximately 230 employees at Barkman including the plant, office and shipping personnel. The number of employees is reduced during the winter months when students return to school and production slows down. The existing plant operates year round from 7:00 am to 3:30 pm while some machine centers run two shifts

from May to October from 5:30 am to 9:00 pm during the facility's busy months. The mechanics on site also work two shifts from 6:00 am to 12:30 am, year round.

Barkman has an on-site health and safety officer and all employees are trained in the daily operations of the Barkman site. All new hires at Barkman are safety and WHMIS trained/tested. Employees are also trained to operate the various machinery/equipment/vehicles, as required and are provided the necessary personal protective equipment (e.g. hearing protection, eye protection, hard hats). There are multiple employees trained in first aid and first aid kits are located throughout the main plant and will also be located in the new paver plant. Training is also provided for filling on-site propane tanks and for emergency spill response. Barkman has also conducted indoor noise monitoring to determine hearing protection requirements at the site.

2.2 Proposed On-Site Facilities and Operations

2.2.1 Proposed Paver Plant

Barkman is proposing to construct a new dedicated paver plant with supporting infrastructure in order to allow for modernization at the facility and to allow for a limited increase in short term paver production. This will be accomplished by providing more "just in time" products as opposed to on-site storage to be more flexible to meet the needs of fluctuating market demand. This facility will be a 3,716 m^2 (approximate) stand-alone facility (Figure 7) located in an unused area in the northwest area of the property (Figure 3).

A new retention pond will also be constructed north of the proposed paver plant on leased land from the City of Steinbach to address surface water runoff on the Barkman site. The retention pond will have a gradual slope to a depth of approximately 1 m and will not be fenced. The retention pond will be grassed with regular maintenance (such as mowing) conducted by Barkman, as needed.

A proposed paver plant schematic indicating the major steps in processing is shown in Figure 6A. The proposed paver plant will operate in the same way as the existing Mason machine and will include cement storage silos, aggregate storage, mixers, moulding press, racking and storage for concrete drying, lunch room, offices, locker room, washrooms and a small repair shop.

Once the proposed paver plant is operational, the existing Mason machine in the main plant will be shut down. The current operations at the main plant (with the exception of the existing Mason machine) will remain the same once the proposed paver plant is operational. A schematic outlining the operations at the main plant once the proposed paver plant is in operation is shown in Figure 6B.

Within the proposed paver plant, there will be a batch plant as well as production and packaging machinery. The plant will contain three cement storage silos located outdoors on the west side of the plant. Each silo will have a baghouse filtration system with a shaker motor and will have the capacity to store 109 tonnes of material each. Any cement dust that is collected in the filter will fall back down into the silo when the filter is mechanically shaken after each truck delivery. The filters in all the silos will be inspected once a month and the inspector will determine if any cleaning or replacement of parts is needed.

There will be three in-ground aggregate hoppers located outside the proposed plant where the aggregates will be dumped and then conveyed into the plant in to one of eight aggregate storage silos. Each storage silo will have the capacity to store 163 tonnes each of material. During the winter months, steam will be applied to the aggregate hoppers to allow this material to thaw prior to use. Any rainwater or drainage water in this area will be collected in a sump pit with a grit separator which will be connected to the Barkman's storm water collect system that flows into the City of Steinbach storm water collection system. A sump pit and grit separator will also be located within the plant in

the aggregate silo area and will be used to collect any water from the aggregate material with water discharged to the City of Steinbach storm water collection system. The three outdoor aggregate storage hoppers will have individual capacities of 30 tonnes each.

Within the proposed paver plant, there will be cement, pigment and aggregate weighing and mixing systems similar to those of the existing main plant. From within the main batch/machine control room, the operator will select the quantity/weight of materials required for the type of product being produced as part of the batching process. The quantities/weights of other materials as identified in Section 2.1.2.1 will also be selected and then conveyed to the mixing area. Silica sand however, will not be used in the concrete production process at the proposed paver plant. The aggregates will continue to be conveyed on belt conveyors and the cement and pigments will continue to be conveyed in sealed screw conveyors to one of two mixers to minimize dust generation.

Once in the mixing area, water and other admixtures will then be added to the mixture to produce concrete with the concrete then conveyed to the molding press. The selected concrete shape will be formed by the pressure and vibration of the molding press.

The press in the proposed paver plant will be in an enclosed sound protection cabin and isolated on its own foundation. Within the sound enclosure for the new paving machine, the sound level will be approximately 110 dB with the enclosure providing a reduction to approximately 78 to 81 dB outside of the enclosure. A control room will also be equipped with its own sound enclosure to provide additional hearing protection for the operators.

Once pressed, the products will then be transported and stored in a climate controlled kiln over-night. This kiln will use a forced air circulation system to maintain an even temperature throughout. No heat is added to the kiln, only the heat of hydration from the concrete will heat the kiln. After drying, some of these pavers, slabs and masonry will then be stacked/strapped on pallets for outdoor storage and/or transported to the Kits Department in the existing main plant building to be assembled and packaged for retailers. Some of the pavers and masonry, once dried, will be transported to the Vena machine located in the main plant as described in Section 2.1.2.2, Concrete Paving Stone Machine (Mason).

During significant rainfall events, if the Barkman storm water collection system cannot handle the amount of rainfall, surface runoff will back-up into a new retention pond that will be constructed north of the proposed paver plant on leased land from the City of Steinbach (Figure 3). After rainfall events, the retention pond will either drain back into the City's system and/or will evaporate.

Similar to the existing facility, enclosed screw conveyors, cartridge filter systems, dust socks and baghouse filters will be used to manage dust due to material handling. Yard dust will continue to be managed with the application of dust control agents (magnesium hydroxide) and the use of paved areas. Sanitary wastewater generated at the proposed facility will be transferred to the City of Steinbach sanitary sewer system. Any water collected in the aggregate storage sump pits will be discharged to the City of Steinbach's storm water collection system. Any sediment (grit) collected in the sump will be removed as needed and transported to an on-site rubble bunker for storage prior to being picked up by Diamond Construction and Gravel of Steinbach.

Once the proposed paver plant is operational, the exiting Mason machine at the main plant will be shut down. The other remaining operations at the main plant will continue once the proposed paver plant is operational (as shown in Figure 6B).

The existing Mason machine in the main plant may be converted into a wet cast slab production machine once the new paver plant is operational. The old worn out parts on the existing machine will be scrapped and new components will be made in-house. This is an option for the existing paver machine, however, this may change

based on new technologies and new market demands. This optional production machine will only be constructed once the new paver plant is fully operational. Barkman will comply with the requirements of a Notice of Alteration as outlined by Manitoba Conservation and Water Stewardship.

It is anticipated that most of the existing staff required for the operation of the existing Mason machine in the main plant will transfer to the proposed paver plant once it is operational.

Sanitary wastewater generated at the proposed paver plant will continue to be discharged to the City of Steinbach sanitary sewer system. Potable water will be provided to the existing plant and the proposed paver plant via the City of Steinbach's existing water supply.

2.3 Construction Inputs and Outputs

During the construction of the new paver plant, materials required may include pipes, concrete, steel, rebar, survey tape, fuel and other materials. Most of these items will be brought in from other sites. Other materials that may be brought to the site include lockers, toilets, sinks and other materials and materials from manufacturers (e.g. silos, moulding press, sound enclosures).

Outputs during the construction stage will include surface runoff and construction debris. Surface runoff during construction will be typical of a construction site and will be directed to the existing catch-basins on the site and/or either a new retention pond to be constructed north of the proposed paver plant or to the existing retention basin located south of the proposed paver plant. All surface runoff will eventually flow into the City of Steinbach's storm water collection system. Construction debris will be kept to a minimum through the implementation of good housekeeping measures to ensure that surface runoff quality is not affected. Packaging materials, solvents, surplus building materials, used oils, etc. generated during construction will be transported from the site and disposed of, according to existing regulations, on a regular basis.

2.4 Existing Operational Inputs and Outputs

The existing operational inputs and outputs vary monthly and yearly depending on market demand for products and client specific projects and are outlined generally in the following sections.

2.4.1 Existing Operational Inputs

The main process inputs at the facility are cement (including fly ash), aggregates, pigments (powder, granular and liquid), other admixtures, mold release, retarders, paint, sealers and water. A list of all process input products currently used in the facility is included in Appendix C. A summary of the process inputs is provided in Table 1.

Table 1. Current Process Inputs

Process Input	Volume (annual basis)
Aggregates	79,656,600 kg
Cementitious Materials	16,864,429 kg
Water (includes cleaning and process water)[Note 2]	6,987 m^3
Pigments	326,000 kg
Fibers	17,200 kg
Efflorescence Control	62,000L
Super Plasticizer/Water Reducer	26,500 L
Air Entrainment	3,500 L
Accelerator	35,500 L
Retarder	3,675 L
Polymer	22,600 L
Mold Release	25,000 L
Paint	2,000 kg
Sealers	2,160 L

Notes:

1. *Process input data provided from 2012 production year (approximate). Some materials are purchased by weight and/or liquid volume therefore some assumptions have been made by Barkman.*
2. *Water volume is an approximate value provided by Barkman and includes water used during the mixing of concrete process in the main plant and clean-up water.*
3. *Data provided by Barkman Concrete Ltd.*

Of the water use estimated in Table 1 for both cleaning and to produce concrete, Barkman estimates that approximately1,658 m^3 is used in cleaning and 5,329 m^3 is used to produce concrete on an annual basis.

In addition to the process inputs, Barkman used approximately 5,483 L of gasoline, 72,470 L of diesel and 8,445 L of propane at the main plant for fueling the forklifts (diesel and propane), service vehicles (gasoline) and to shrink-wrap clear plastic packaging bags over assembled kits in the Packaging Department prior to shipping (propane) between July 2012 and June 2013.

The natural gas used for heating the main plant between July 2012 and July 2013 was approximately 370,641.45 m^3.

The amount of reinforcing steel/rebar used in various projects/products is dependent on market/client demands. On average, Barkman uses approximately 2.5 million pounds of rebar annually. Based on Barkman's 2012 order records, the main plant ordered 26 lifts of plywood (48 sheets/lift) and 10 lifts of 2x4s (294 pieces/lift).

As indicated in Section 2.1.1, the daily average number of trucks delivering raw materials to the Barkman site for production is approximately 17 trucks per day.

In addition to the above process inputs, other inputs including a variety of office supplies (e.g. paper, cardboard and packaging) and domestic supplies (e.g. toilet paper and paper towel) will continue to be transported to, and used at the facility as required.

2.4.2 Existing Operational Outputs

The main operational outputs from the Barkman plant are final products and wash water.

The total finished product that is shipped off-site per month is provided in the table below.

Table 2. 2013 Totals per Month of Finished Concrete Shipped Off-Site

Month	Finished Concrete Products (tonnes)
January	884
February	1,760
March	1,625
April	5,196
May	10,574
June	12,407
July	13,221
August	12,701
September	6,804
October	6,804
November	3,402
December	907
TOTAL	**76,285**

Notes:

1. *January to July, 2013 is actual tonnes of production*
2. *August to December 2013 is estimated based on 2012 production year.*
3. *Data provided by Barkman Concrete Ltd.*

As indicated in Section 2.4.1, it is estimated that approximately 1,658 m^3 of water (used for cleaning) is directed to the on-site settling pits on an annual basis. These settling pits drain into a catch basin which is part of Barkman's storm water collection system that then drains into additional catch basins on the property prior to discharging into the City of Steinbach storm water collection system.

All the dust collected during the plant processes including any unusable "end" pieces or damaged pieces are collected and then transported to the bunkers for disposal. When the bunker becomes full, Diamond Construction and Gravel of Steinbach will collect this material.

As indicated in Section 2.1.2, any used cartridge filters, baghouse filters and dust sock filters used during the plant processes that cannot be cleaned are disposed of at the local landfill. According to Barkman, approximately 40 cartridge filters are disposed of yearly. Every two years, approximately 20 dust socks and baghouse filters are purchased by Barkman.

Based on the yearly weight of final product leaving the Barkman site, it was calculated that approximately 1,589 B-Train trucks per year transport final product from the Barkman site. The daily average of trucks transporting final product from the Barkman site is approximately six trucks per day, therefore the approximate daily average of trucks traveling to and from the Barkman site is approximately 23 trucks/day.

Barkman will also continue to generate sanitary wastewater at the facility that will continue to be directed to the City of Steinbach's sanitary sewer system. Other wastes including office wastes (paper, plastic and packaging) and domestic waste (lunch room wastes) will also be generated with some of these products being recycled, as required. All office and domestic wastes are transported to the local landfill by the City of Steinbach and recycling is picked up by Eastman Recycling Services.

2.5 Proposed Operational Inputs and Outputs

Once the new paver plant is operational, it is anticipated that the operational inputs and outputs will be similar to the current inputs and outputs as Barkman is moving production from the existing paver machine to the proposed paver machine.

Following the construction of the new paver plant, the provision of more ”just in time” products will be possible as opposed to slower production runs and additional on-site storage. Long-term production increases would likely be limited to one to two percent over a five year period and there would be a corresponding small increase in the inputs and outputs at the facility, however for the purposes of this assessment, these are expected to remain similar to existing conditions.

The proposed addition of the paver plant at the Barkman site is anticipated to increase the natural gas use by approximately 30% and diesel use by approximately 15%.

2.6 Schedule

Barkman is planning to begin construction of the proposed paver plant as early as this fall (foundations) with building construction anticipated to begin in May 2014. The new facility will be completed by the end of 2014 with production commencing at the new facility in 2015.

2.7 Funding

Funding for the project will be provided by Barkman Concrete Ltd.

2.8 Public Relations

To date, Manitoba Conservation and Water Stewardship have not received any formal complaints due to the daily operations at the Barkman facility from surrounding residents. If complaints are received during the construction and operational phases of the proposed project, Barkman will address these concerns as they arise on an individual basis.

On June 11, 2013, as part of the City of Steinbach’s regular council meetings, a variance hearing was held at the Steinbach City Hall (Variation V-13-16). The City of Steinbach Zoning by-law permits a maximum of 14 m building height within the M1 Light Industrial Zone. As the proposed paver plant will be greater than the maximum height allowed within this zoning (Figure 7), Barkman had to present their request to the City of Steinbach at a council meeting for a variance. During the hearing, three citizens from the community presented their concerns which revolved around traffic, noise and dust. (City of Steinbach, 2013) The City of Steinbach approved the Variation V-13-16 on July 12, 2013.

3. Existing Environment

3.1 Land Use

Two site visits were conducted by AECOM on June 13, 2013 and August 1, 2013. Photographs from these site visits are provided in Appendix D. The land surrounding the Barkman site is a mixture of residential and commercial including:

To the north:

- Residences

To the east:

- Stonybrook Middle School
- Residences

To the south:

- Steinbach Mini Storage
- Memorial Cemetery
- Residences

To the west:

- Residences

The majority of the Barkman property has been developed with various storage buildings/quansets/tents and outdoor product storage areas (Figure 3). The proposed paver plant will be located northwest of the main plant in an area that has not yet been developed, but has been stripped and graded for the foundation of the proposed paver plant.

3.1.1 Zoning

According to the City of Steinbach Zoning By-Law No. 1882, the Barkman property is zoned M1 Light Industrial as shown in Figure 8. The neighbouring properties are zoned either RMD Residential Medium Density, RLD Residential Low Density, RSF Residential Single Family, C2 Commercial Community, E1 Educational & Institutional and O Open Space as shown in Figure 8.

3.1.2 Certificate of Title

The certificates of title indicates that Barkman Concrete Ltd. is the registered owner of the property. A copy of the certificates of title is included in Appendix E.

3.1.3 Mineral Rights

A search of the project site on the Minerals Resources Division GIS Map Gallery for Mineral Dispositions found that there are currently no mining claims or mines at the Barkman site (Mineral Resources Division, 2013).

3.2 Climate

The Steinbach meteorological station measures temperature and precipitation and is the closest weather station, with available historic data, to the project site. Table 3 summarizes the monthly temperature and precipitation over the normal year. Table 4 summarizes other relevant weather parameters for Steinbach.

Table 3. Climate Data for Steinbach, Manitoba (1971-2000)
Latitude 49° 32' N Longitude 96° 46' Elevation 253.60 m

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yr	Code
Daily Average Temperature (°C)	-17.4	-13	-5.5	4.1	11.9	16.6	19.1	18.1	12.1	5.4	-5	-14.1	2.7	A
Precipitation (mm)	21.8	14.4	19.4	28.7	58.9	95.2	80.3	68.5	59.7	44.6	26.9	21.1	539.4	A
Rainfall (mm)	0	1.6	7	20.7	58.5	95.2	80.3	68.5	59.6	39.3	8.3	1.1	440.2	A
Snowfall (cm)	21.8	12.7	12.4	7.9	0.4	0	0	0	0.1	5.4	18.6	20	99.2	A

Notes:
Data obtained from Environment Canada Steinbach Meteorological Station (2013).
"A": World Meteorological Organization (WMO) "3 and 5 rule" (i.e. no more than 3 consecutive and no more than 5 total missing for either temperature or precipitation) between 1971 and 2000.

Table 4. Other Weather Parameters for Steinbach, Manitoba

Parameter	Value
Extreme Maximum Temperature (°C)	37.5 (August 10, 1988)
Extreme Minimum Temperature (°C)	-43.5 (February 02, 1996)
Extreme Daily Rainfall (mm)	96.5 (September 01, 1973)
Extreme Daily Snowfall (cm)	55.5 (April 05, 1997)

3.3 Topography

The Barkman site is relatively flat and gently slopes either to the east towards Brandt Street, to the south towards McKenzie Avenue or northwest towards Giesbrecht Street. The elevation of the project site is approximately 262 meters above sea level (masl) (Department of Energy, Mines and Resources, 1992).

3.4 Geological Background

The Barkman site is located over the Red River Formation of the Ordovician Era. The formation consists of mottled dolomitic limestone, dolomite, high-calcium limestone, a shaly marker bed and high calcium limestone beds. (Geological Survey of Canada, 1987)

3.5 Soils

The Steinbach area consists of fine grained glaciolacustrine and lacustrine deposits. These sediment deposits occurred during deglaciation and subsequent lake drainage. The area consists of silts and clays with some areas containing stones. (Fulton, 1995)

3.6 Water

3.6.1 Surface Water

The Barkman site is located in the Seine River Watershed and is part of the Manning Canal Sub-Watershed. The nearest major waterbody to the project site is the Seine River located approximately 13 km east of the site. The Seine River flows northwest towards the Seine River Diversion Dam and then continues north discharging into the Red River within the City of Winnipeg. There is an unnamed tributary of the Manning Canal located approximately 200 m west of the site boundary, which flows north according to the topographic map of the area (Natural Resources Canada, 2013), into the Manning Canal which drains into the Seine River Diversion that discharges into the Red River. The runoff and wash water from the Barkman site drains into the City of Steinbach's storm water collection system which drains into this unnamed tributary.

3.6.2 Groundwater

A review of the GWdrill water well database for 2012 was completed and 87 registered wells were found to be within a 1.6 km radius of the Barkman site and 15 of these registered wells were found to be within 0.8 km of the Barkman site (SE-34-6-6E, SW35-6-6E, NW26-6-6E and NE27-6-6E). Of these 15 registered wells, 12 wells are registered as production wells, one as a recharge well, one as an observation well and one registered as other. Of the 12 production wells, 11 are registered for domestic use. Also according to the review of the GWdrill water well database, two registered production wells are located on the Barkman site (SE34-6-6E). According to the driller notes, one of these wells is recommended as a pump well and the other as a return well. According to Barkman, these wells are used for geothermal heating. A copy of the registered groundwater wells within 0.8 km of the Barkman site is provided in Appendix F.

The depth from the ground surface to the perforated well section in which groundwater can enter the wells within 0.8 km of the Barkman site ranges from 12 to 39 m below the ground surface. The shallowest well within the 0.8 km radius had a bottom depth of 13 m below the ground surface (NE27-6-6E). (Manitoba Water Stewardship, 2012)

According to the well logs, the soils in the vicinity of the Barkman site consist of a till layer extending to approximately 24 m below the ground surface followed by a grey clay to a depth of approximately 31 m below the ground surface. This was followed by a brown till to a depth of approximately 35 m below the ground surface with limestone to a depth of approximately 73 m below the ground surface. One of the wells encountered a sand and gravel layer between approximately 16 to 18 m below the ground surface followed by grey till to a depth of approximately 24 m below the ground surface.

Barkman is connected to the City of Steinbach's water supply. The water supply system consists of three deep wells, an iron removal plant, and 2,250,000 imperial gallons of surface and elevated storage. (City of Steinbach, 2008)

3.7 Vegetation and Wildlife

As the Barkman site is an active concrete product production facility located in the City of Steinbach, there is no natural vegetation on the site. There are some spruce trees planted along the east and south property boundary boundaries with newer smaller willow trees planted along the boulevard of Giesbrecht Street. Barkman has also planted some shrubs along their property boundary to the west along Giesbrecht Street.

During AECOM's site visit on June 13, 2013, no wildlife or bird species were observed on the Barkman site. Habitat surrounding the site was limited to some planted trees, mowed lawns and planted flowers.

3.8 Aquatic Resources

As indicated in Section 3.6.1, the nearest waterbody to the Barkman site is the Seine River located approximately 13 km east of the site. During a fish and fish habitat assessment completed in 2005 by Dillon Consulting Limited, various barriers to fish passage were noted indicating that populations of fish in the Seine River are represented largely by local stocks. It is likely that during high flow events, fish in the Red River migrate into smaller channels, such as the Seine River, for spawning. Twenty-five species of fish have been identified within the Seine River watershed including Northern Pike (*Esox lucius*), Walleye (*Sander vitreus)*, and Goldeye (*Hiodon alosoides*). Fish habitat in the Seine River is dominated by mud or soft bottoms with limited cobble and gravel areas. Overall, the riparian habitat of the Seine River is in good condition and the channel provides suitable habitat for spawning and rearing. Negative impacts to fish populations include extensive agricultural and residential development and barriers to fish passage. (Dillon Consulting Limited, 2005)

The unnamed tributary of the Manning Canal located approximately 200 m west of the Barkman site boundary is classified as a Type C Habitat according to Milani (2013). This classification indicates that flows in this tributary are intermittent or perennial with a complex habitat with non indicator (forage) fish present. This unnamed tributary of the Manning Canal flows into the Manning (Type A and B Habitat) with flows that are intermittent or perennial with indicator fish species present. A Type A Habitat is classified as having a complex habitat and Type B Habitat is classified as having a simple habitat. The Manning Canal is located approximately 8 km north of the Barkman site. The Manning Canal then discharges into the Seine River Diversion which is a Type B Habitat and is located approximately 30 km northwest of the Barkman site. (Milani, 2013) Given the proximity of the unnamed tributary of the Manning Canal to the Manning Canal, there is the potential for fish to migrate into this drainage channel but given the complexity of the habitat and barriers to fish passage, fish use of this area is unlikely.

3.9 Protected Species

To determine the potential species at risk that may occur in the Project Region, the Manitoba Conservation Data Centre, Occurrence of Species by Ecoregion (Interlake Plain) was examined (2013a). The species listed on the Manitoba Conservation Data Centre were cross referenced with Schedule 1 of the *Federal Species at Risk Act* (SARA) and the *Manitoba Endangered Species Act* to determine the provincially listed rare or sensitive species that may occur in the region. The Manitoba Conservation – Wildlife and Ecosystem Protection Branch distribution maps were also used where possible to determine provincially listed species that may occur in the region. The search results found that there is potential for 20 listed species to occur in the Interlake Plain Ecoregion as shown in the following table.

Table 5. Federally and Provincially Listed Species that May Occur in the Interlake Plain Ecoregion

Species	Federal SARA Species Status	Manitoba Conservation Endangered Species Act Status	Environmental Considerations
Invertebrate Animal			
Dakota skipper *Hesperia dacotae*	Threatened	Threatened	• Found in native tall-grass prairies that feature bluestem grasses and plants such as smooth camas, harebell, black-eyed Susan, and wood lily (nectar sources). (Note 1)
Mapleleaf Mussel *Quadrula quadrula*	Endangered	Threatened	• Found in the Red River drainage in Manitoba. • Populations documented in the Red River and the lower reaches of the Assiniboine and Roseau Rivers. • Found in medium to large rivers with slow to moderate currents and firmly packed substrate of sand, coarse gravel or clay/mud. (Note 1)
Vascular Plant			
Small white lady's-slipper *Cypripedium candidum*	Endangered	Endangered	• Found in calcareous prairie opening in wooded grasslands, or on more open, south-facing slopes. • Often found in relatively undisturbed grasslands but can also be found in disturbed areas such as roadside ditches. (Note 2)
Western Prairie Fringed Orchid *Platanthera praeclara*	Endangered	Endangered	• Found in calcareous prairies and wet meadows with tall prairie grasses, sedges and some shrubs. • Also found in relatively undisturbed grasslands and is also seen in roadside ditches. (Note 2)
Riddell's Goldenrod *Solidago riddellii*	Special Concern	Threatened	• Grows in open tallgrass prairie and shrubby fen-like habitats. • Prefers moist to wet, calcium rich soils. • Manitoba's remaining populations occur along roads. (Note 2)
Great Plains Ladies'-tresses *Cypripedium candidum*	Not Ranked	Endangered	• Found in calcareous prairies or wet meadows, along with grasses, sedges and shrubs. • Found occasionally in moist roadside ditches. (Note 2)
Western Silvery Aster *Symphyotrichum sericeum*	Threatened	Threatened	• Found in dry prairies, fields and openings in bur oak/trembling aspen woodlands. • Found often in gravelly and/or sandy soils, calcareous and well to moderately well-drained soils. • Can be found in roadside ditches and adjacent to gravel pits. (Note 2)
Culver's-root *Veronicastrum virginicum*	Not Ranked	Threatened	• Found in partially shaded, small wooded areas and in small tallgrass prairie openings. • Prefer moist, calcium-rich, sandy loam soil. • Many remaining populations are found along roads and fence lines in areas dominated by intensive agriculture. (Note 2)
Vertebrate Animal			
Whip-poor-will *Caprimulgus vociferous*	Threatened	Threatened	• Prefers to nest in semi-open forests or patchy forests with clearing, such as barrens or forests that are regenerating following major disturbances. (Note 1)

Species	Federal SARA Species Status	Manitoba Conservation Endangered Species Act Status	Environmental Considerations
Chimney swift *Chaetura pelagica*	Threatened	Threatened	• Mainly associated with urban and rural areas where the birds can find chimneys to use as nesting and resting sites. • A small portion of the population is likely to still use hollow trees for nesting. (Note 1)
Common nighthawk *Chordeiles minor*	Threatened	Threatened	• In Manitoba, found south of the treeline and inhabits mixed and coniferous forests. • Nests in a wide range of open, vegetation-free habitats including dunes, beaches, recently harvested forests, burnt-over areas, logged areas, rocky outcrops, rocky barrens, grasslands, pastures, peat bogs, marshes, lakeshores and river banks. (Note 1)
Olive-sided flycatcher *Contopus cooperi*	Threatened	Not Ranked	• Mostly associated with open ranges with tall live trees or snags for perching including forest clearings, forest edge located near natural openings (ie. Rivers or swamps) or human-made openings (ie. Logged areas), burned forest or openings within old-growth forest stands. • Nests are usually constructed in a conifer when arriving to Canada in mid-May. (Note 1)
Yellow rail *Coturnicops noveboracensis*	Special Concern	Not ranked	• Found in marshes dominated by sedges, true grasses and rushes with little to no standing water. • Also found in damp fields and meadows, on floodplains of rivers and streams. (Note 1)
Trumpeter Swan *Cygnus buccinator*	Not Ranked	Endangered	• Beaver ponds are prime nesting sites. • Early breeding occurs in April 01 and late breeding occurs in September 01. (Note 3)
Least Bittern *Ixobrychus exilis*	Threatened	Endangered	• Breeds in marshes dominated by emergent vegetation surrounded by areas of open water. • Nests are almost always within 10 m of open water which is needed for foraging. (Note 1)
Loggerhead shrike *Lanius ludovicianus*	Threatened	Endangered	• Found in relatively open, grassy sites; pastured or hayed areas are preferred; often nest in the vicinity of hedgerows or farm shelterbelts. (Note 2)
Silver chub *Macrhybopsis storeriana*	Special Concern	Not Ranked	• In Manitoba, found in large, moderate flowing rivers with a substrate of silt or sand. (Note 1)
Red-headed woodpecker *Melanerpes erythrocephalus*	Threatened	Threatened	• Found in a variety of habitat including open oak and beech forests, grasslands, forest edges, orchards, pastures, riparian forests, roadsides, urban parks, golf courses, cemeteries, along beaver ponds and brooks. • Nests are usually found in dead or dying trees but can also make nests in dead branches of live trees. (Note 1)
Golden-winged warbler *Vermivora chrysoptera*	Threatened	Threatened	• Found in regeneration zones where young shrubs grow, surrounded by mature forest. • Prefer public utility right-of-ways, the edges of fields, areas where logging has recently occurred, beaver ponds and burned-out or intermittently cultivated areas. • Nests are built on the ground in areas of herbaceous plants and low bushes.

Species	Federal SARA Species Status	Manitoba Conservation Endangered Species Act Status	Environmental Considerations
			(Note 1)
Canada Warbler *Wilsonia Canadensis*	Threatened	Endangered	• Found in a variety of forest types, but most abundant in wet, mixed deciduous-coniferous forest with well-developed shrub layer. • Also found in riparian shrub forests on slopes, in ravines, in old-growth forests and in stands regenerating after natural disturbances such as forest fires. (Note 1)

Notes:
1) Source: Species at Risk Public Registry (Government of Canada, 2013)
2) Source: Species Listed Under the Manitoba Endangered Species Act (Manitoba Conservation, 2013)
3) Source: Manitoba Species At Risk (Manitoba Breeding Bird Atlas, 2013)

As indicated in Sections 3.8, AECOM's site visit in June, no wildlife, birds or native vegetation were observed on the Barkman site.

3.10 Socio-Economic Environment

3.10.1 City of Steinbach

Steinbach is located within the Rural Municipality (RM) of Hanover and is the largest city in the municipality with a 2011 population of 13,542 people. Other communities located in the RM of Hanover include Mitchell, located approximately 5.5 km northwest of Steinbach with a population of 520 people and Grunthal located approximately 17 km southwest of Steinbach with a population of 1,479. (Statistics Canada, 2012)

Steinbach is one of the fastest growing cities in Manitoba with a variety of business and economic activity and is the regional shopping and service centre and agriculture supply centre for the surrounding areas, serving approximately 50,000 people. Recreation facilities in Steinbach include the T.G. Smith Centre Arena, the Steinbach Aquatic Centre and various baseball diamonds, soccer fields, football fields, tennis courts and a skateboard park. L.A. Barkman Park is located approximately 170 m northwest of the site which is a treed park with cycling and walking paths and a small picnic shelter. Steinbach has an RCMP detachment, a fire department, an airport, the Bethesda Hospital, three elementary schools, four high schools, the Eastman Education Centre and Steinbach Bible College. (City of Steinbach, 2013)

3.10.2 First Nations

The nearest First Nation Community to Steinbach is the Roseau River First Nation located approximately 54 km southwest of Steinbach near Dominion City with a 2013 registered population of 1,104 people living on the reserve (Aboriginal Affairs and Northern Development Canada, 2008). Roseau River is an Anishinabe Nation and is made up of two reserves. The main reserve is near the junction of the Red and Roseau River, with the second reserve (Roseau Rapids) located on an escarpment 32 km east of the main reserve. Services located on the reserve include the Dakota Ojibway Police Service, a volunteer fire department, the Roseau River Traditional Wellness Centre and the Ginew School. The Ginew School houses nursery to grade 8 and includes cultural programming, Ojibway immersion and Ojibway language classes. (Roseau River, 2013).

3.10.3 Protected Areas

St. Malo Provincial Park is located approximately 28 km southwest of the Barkman site. This park is centered around a reservoir with two beaches and walking trails through the aspen forest. (Manitoba Conservation and Water Stewardship, 2013)

There are three Wildlife Management Areas (WMAs) located approximately 31 km from the project site; Watson P. Davidson WMA located to the southeast, St. Malo WMA located to the southwest and Rat River WMA located to the south. The Watson P. WMA encompasses an area of 59.2 km^2 and is mostly aspen forest with bogs interspersed within. This WMA is a major breeding and migration corridor for northern forest owls (Great Gray, Northern Saw-whet and Boreal owls) and provides habitat for neo-tropical birds, upland game birds, White-tailed deer and the occasional moose. The St. Malo WMA occupies an area of 1.72 km^2 and is a cooperative wildlife area that consists of two parcels of land in an aspen forest that provides habitat for White-tailed deer, ruffed grouse and neo-tropical birds. The Rat River WMA occupies an area of 10.5 km^2 and is primarily a managed marsh area (cell) that provides flood protection along the Rat River by impounding spring meltwaters. This area provides a habitat for waterfowl with the aspen forest area providing habitat for White-tailed deer and grouse. (Manitoba Conservation, 2013)

The Sandilands Provincial Forest is located approximately 32 km southeast of Steinbach in the Marchand Provincial Park and provides many trails for hiking, biking or cross country skiing. Located within the Sandilands Provincial Forest is the Pocock Lake Ecological Reserve, which was designated to protect Pocock Lake and part of an ancient beach ridge. (Manitoba Conservation, 2012)

3.11 Heritage Resources

A screening request to the Heritage Resources Branch (HRB) was sent on August 2, 2013 to determine if there are any potential heritage resources that may be affected by the proposed development and if a Heritage Resources Impact Assessment (HRIA) is required. The Archaeological Unit of the HRB indicated that the potential to impact significant heritage resources was low and therefore the Branch has no concerns with the project. A copy of the correspondence received from the Historic Resources Branch is included in Appendix G.

4. Assessment Approach

To assess the potential environmental effects of the project, clearly defined temporal and geographic boundaries were utilized as presented in the following sections.

4.1 Geographic Boundaries

The following are the spatial boundaries defined for this report. However, where specifically noted, these boundaries may be adjusted to suit the environmental component affected.

- The **Project Site** includes any land on the Barkman property that is likely to be directly disturbed by project activities.
- The **Project Area** includes any area, up to 3 km beyond the Project Site, which could be disturbed by project effects. This includes effects during construction, such as noise, vehicle emissions, traffic, etc.
- The **Project Region** includes an area up to 10 km beyond the Project Site that may be affected by project activities. Effects that may be seen outside the Project Area may include items such as increased traffic.

4.2 Temporal Boundaries

The temporal boundaries of the assessment were divided into the construction, operation and decommissioning phases as outlined below.

4.2.1 Construction Phase

Barkman is planning to begin construction of the proposed paver plant as early as this fall (foundations) with building construction anticipated to begin in May 2014. Construction is anticipated to take approximately eight months.

4.2.2 Operation Phase

Assuming approximately eight months of construction, the proposed paver plant is anticipated to be completed by the end of 2014 with production commencing at the new facility in 2015.

4.2.3 Decommissioning Phase

There are currently no plans to decommission the Barkman main plant and site. As such, no specific plans to decommission the Project Site have been developed. When the Project Site needs to be decommissioned at some point in the future, a site decommissioning plan will be filed with appropriate regulators prior to decommissioning.

For the purposes of this assessment, the decommissioning phase effects are anticipated to be similar to the construction phase and as such were not assessed separately.

4.3 Environmental and Social Components

This environmental assessment considers changes to the environment caused by the project, as well as any resultant effects on the socio-economic environment by scoping for appropriate Environmental Components (ECs) and Social Components (SCs). For this project, ECs and SCs were selected based on Manitoba Conservation and Water Stewardship's Information Bulletin, "*Environment Act Proposal Report Guidelines.*"

The potential for project interactions with ECs and subsequent interactions with SCs are identified in Table 6. Potential interactions were identified based on the professional judgement of the assessor combined with assumed implementation of standard environmentally responsible construction techniques and operating practices in the course of the project construction and operation. The potential interactions identified in Table 6 are assessed in Section 5 with mitigation measures and residual effects described.

For the purpose of this assessment, ECs that were assumed not to be a potential concern or not present at the Project Site as described in Section 3 were not included in Table 6. Potential environmental effects that may be caused by malfunctions or accidents are discussed separately in Section 5.4

Table 6. Identification of Potential Environmental/Social Component Interactions with the Project

5. Potential Environmental Effects and Mitigation Measures

5.1 Effects Assessment Methodology

AECOM has applied professional judgment and an understanding of the proposed project (as described in Section 2 of this report) and the existing environment (as described in Section 3), to determine the potential for the proposed project to interact with each EC. Table 6 (in Section 4 of this report) displays these potential interactions, which are the subject of the analyses set out in the sections below. Mitigation measures that have been incorporated into the proponent's proposed plan are taken into account, as well as the environmental protection practices included in the proponent's operation.

Technical terms used in the analysis are defined in Table 7 and a summary of the potential effects, mitigation measures and residual effects is included in Table 9.

Table 7. Factors and Definitions Considered in Assessing Environmental Effects

Project Phase:	Refers to the phase of the project as construction, operation or decommissioning.
Potential Effect:	Classification of the type of effects possible during a specific project phase.
Magnitude of Effect:	Refers to the estimated percentage of population or resource that may be affected by activities associated with the construction, operation and decommissioning of the proposed project. Where possible and practical, the population or resource base has been defined in quantitative or ordinal terms (e.g., hectares of soil types, units of habitat). Magnitude of effect has been classified as either less than (<) 1%, 1% to 10%, or greater than (>) 10% of the population or resource base. Where the magnitude of an effect has been defined as virtually immeasurable and represents a non-significant change from background in the population or resource, the effect is considered negligible. An exception to this is in terms of potential human health effects where, for example health issues due to water-borne diseases amounting to 1% of the population being affected would still be considered major.
Direction of Effect:	Refers to whether an effect on a population or a resource is considered to have a positive, adverse or neutral effect.
Duration of Effect:	Refers to the time it takes a population or resource to recover from the effect. If quantitative information was lacking, duration was identified as short-term (<1 year), moderate term (1 to 10 years) and long term (>10 years).
Frequency of Effect:	Refers to the number of times an activity occurs over the project phase, and is identified as once, rare, intermittent, or continuous.
Scope of Effect:	Refers to the geographical area potentially affected by the effect and was rated as Project Site, Project Area or Project Region as defined in Section 4. Where possible, quantitative estimates of the resource affected by the effect were provided.
Degree of Reversibility:	Refers to the extent an adverse effect is reversible or irreversible over a 10-year period.
Residual Effect:	A qualitative assessment of the residual effect remaining after employing mitigation measures in reducing the magnitude and/or the duration of the identified effect on the environment.

Magnitude of Effect	Direction of Effect	Duration of Effect	Frequency of Effect	Scope of Effect	Degree of Reversibility of Effect
Negligible (immeasurable)	Positive	Short term (< 1 year)	Once	Project Site	Reversible
Minor (<1%)	Adverse	Moderate (1 to 10 years)	Rare	Project Area	Irreversible
Moderate (1 to 10%)	Neutral	Long term (>10 years)	Intermittent	Project Region	
Major (>10%)			Continuous		

5.2 Construction and Decommissioning Effects

During the construction and decommissioning phases of the proposed project, construction equipment including heavy equipment such as trucks, cranes, graders, loaders and excavators will be present at the Barkman site. It is anticipated that there will also be various material stockpiles and equipment storage areas on the Project Site. Typical construction tools will also be used including hammers, drills, saws etc.

5.2.1 Topography

Changes to the Project Site topography may result from stockpiling earthen material and from clearing, excavating, infilling and compacting within the proposed paver plant footprint during construction.

Temporary changes to site topography will occur during stockpiling of materials at the Barkman site.

The area in the northwest corner of the proposed paver plant will be built-up as the property gradually slopes downward to the northwest. This will require the construction of a retaining wall along the northwestern property line parallel to the proposed paver plant. A new retention pond will be constructed on land leased from the City of Steinbach to the north of the property to manage a portion of the surface water runoff from Barkman's property. This leased land is currently a green space. The retaining wall, leveling of the property and retention pond will be permanent changes to the topography following construction.

The construction phase will also include restoration of the site topography to match the surrounding area in the event that rutting or occurs. Restoration of the topography may include re-grading and contouring within the Project Site.

Temporary changes to site topography (stockpiling) during construction are considered negligible as they will be restored to pre-construction condition.

There will be permanent changes in topography on the Project Site and leased land following construction (retaining wall, leveling of the site and new retention pond); these are considered major changes but can be reversed during decommissioning depending on the end use of the land. Surface water drainage at the Project Site will be addressed with the construction of the retention pond and use of the Barkman storm water collection system. Residual effects on topography are anticipated to be moderate in magnitude at the Project Site and negligible in the Project Area.

During the decommissioning phase, the Project Site topography may change depending on the end use of the land. Buildings may be removed and site activities may include site grading and restoration. When the Project Site needs to be decommissioned at some point in the future, a site decommissioning plan will be filed with appropriate regulators prior to decommissioning.

5.2.2 Air Quality and Noise

5.2.2.1 Noise Generation

Noise will be generated to varying degrees during the construction phase and has the potential to negatively affect people and local wildlife in the surrounding area. Construction noise may be expected to arise from the arrival and use of heavy equipment at the Project Site, increased traffic and construction noises throughout the construction phase. The construction noises are expected to be typical of heavy equipment such as trucks, cranes, graders, loaders and excavators. Construction tools will also be used including hammers, drills, saws, etc. The proposed paver plant will also require the installation of concrete piles for the building foundation; however these are

anticipated to be poured rather than driven. General construction activities are anticipated to generate intermittent noise over the short period (approximately eight months of construction).

The closest human receptors are the workers at the Barkman site and the closest residential receptors are located 40 m immediately west of the Barkman site. To date, Manitoba Conservation and Water Stewardship have not received any formal noise complaints due to the daily operations at the Barkman facility from surrounding residents.

As indicated in Section 3.7, no wildlife was observed on the Barkman site during the site visit. It is also unlikely that there is noise sensitive wildlife in the Project Area as any species in the area are anticipated to be accustomed to some level of noise due to the daily operations of the Barkman facility, the surrounding neighbours such as Stonybrook Middle School and traffic along Brandt Street and McKenzie Avenue.

To mitigate potential noise effects on humans and wildlife, the following mitigation measures will be implemented:

- Construction work will be conducted during normal working hours (in accordance with the City of Steinbach's By-Law 1662-Noise Nuisance).
- Hearing protection will be provided to workers, as required. A Certificate of Recognition Program (COR™) certified contractor will be retained for construction and will be responsible for providing appropriate hearing protection to workers as required.
- Barkman will address noise concerns as they arise on an individual basis.
- Vehicles and equipment will be properly maintained.

With the implementation of the mitigation measures described above, the residual effects on humans and wildlife due to noise is anticipated to be minor to negligible at the Project Site and in the Project Area.

5.2.2.2 Dust Generation

During vehicle, equipment and earth movement (including stockpiling), air quality may be affected by dust and particulates with subsequent effects on human health (including respiratory issues) and vegetation (dust deposition) during the construction and decommissioning phases.

No natural vegetation was observed on the Barkman site during the site visit however, there are landscaped areas including grasses and trees/shrubs located immediately north in the location of the new retention pond and west of the proposed paver plant location. Human receptors include site workers and surrounding residents.

To mitigate potential effects due to dust, the following mitigation measures will be undertaken:

- The disturbed/exposed areas will be kept to a minimum.
- Material stockpile heights will be limited.
- If required, additional dust suppression activities, such as spraying material stockpiles and work areas with water and/or magnesium hydroxide, will be completed.
- Speed limits of 15 km/hour will continue to be enforced throughout the Barkman site.

With these mitigation methods employed as necessary, the residual effects of dust generation on air quality and subsequent effects on human health and vegetation are expected to be minor at the Project Site and minor to negligible in the Project Area.

5.2.2.3 Vehicle and Equipment Emissions

During construction activities, air quality may be affected due to vehicle and construction equipment emissions. Emissions could decrease the quality of the air by increasing the local concentration of carbon monoxide, carbon dioxide, particulate matter and nitrogen oxides in the air with potential for subsequent effects on human health.

Effects on air quality and human health due to exhaust emissions during construction will be mitigated with the implementation of the following mitigation measures:

- Vehicles and equipment will be properly maintained.
- Vehicle idling will be kept to a minimum.

With the implementation of these mitigation measures, vehicle and equipment exhaust emissions are anticipated to result in a potentially minor decrease in air quality at the Project Site and a negligible decrease in air quality off the Project Site.

5.2.3 Climate

Vehicle and equipment use and movement at the Project Site will be necessary during the construction and decommissioning phases. Vehicle and equipment movement will be required for various activities including, clearing, transportation and stockpiling of materials, excavating, infilling and compacting within the footprint of the proposed paver plant.

Some vehicle and equipment emissions are greenhouse gases including carbon dioxide and nitrous oxides. Greenhouse gas emissions have the potential to affect climate through climate change.

Effects on climate (greenhouse gas emissions) during construction will be mitigated with the implementation of the mitigation measures identified in Section 5.2.2.3.

Greenhouse gas emissions are anticipated to be generated on a continuous basis during working hours but based on the short construction period (anticipated to be 8 months or less) and small scale of project (likely 10 pieces of equipment/vehicles or less), will be negligible in magnitude in the Project Area. Negligible negative effects on climate will occur over the long term and are considered irreversible.

5.2.4 Soil

5.2.4.1 Soil Compaction

The Barkman site has been compacted/built-up over its operational history by disposing of the dust/fine aggregates/unusable “end” pieces/damaged pieces from product processes in the yard with the exception of the footprint for the proposed paver plant and surrounding area (proposed paver plant is approximately 3,716 m^2 in size). This area has not been compacted or infilled.

The proposed construction of the new paver plant in this area however will require the compaction of soils for foundation and access road construction. To mitigate potential increase in surface water runoff due to an increase in the compacted area at the site, a new retention pond will be constructed as shown on Figure 3. It is anticipated that the increase in soil compaction will be a measurable effect at the site however as the site is used for industrial purposes, effects due to soil compaction (decreased root penetration and soil water holding capacity) are not

applicable with the exception of increased runoff which will be mitigated by the construction of the new retention pond.

5.2.4.2 Soil Erosion

Soil may be lost during the construction phase due to erosion from wind and precipitation/runoff. Conditions favourable for erosion have the potential to occur during clearing, excavation and infilling work, stockpiling, site restoration, and movement of equipment on the Project Site. Erosion of soil and material stockpiles due to wind has the potential to cause subsequent effects on air quality (dust and particulate matter) and vegetation (decreased growth due to dust deposition). Erosion due to precipitation/runoff has the potential to cause subsequent effects on surface water quality and aquatic resources.

The proposed paver plant will disturb an area of approximately 3,716 m^2 in an unused area of the property (Figures 2 and 3). The new retention pond will be located north of the proposed paver plant on leased land from the City of Steinbach. The size of the new retention pond will be approximately 3,700 m^2 and is anticipated to be similar to the existing storm water retention basin on the Barkman site.

Surface water runoff from the Barkman site is directed to catch basins on the property that are part of Barkman's storm water collection system including the existing and proposed retention ponds. As indicated in Section 5.2.4.1, the Barkman site has been compacted/built-up over the years, which assists in reducing the potential scouring of the yard surface during precipitation events.

To mitigate potential erosion due to wind and subsequent effects on air quality and vegetation, the mitigation measures described in Section 5.2.2.2 will be implemented as required.

Further to mitigate potential erosion due to precipitation and subsequent effects on surface water quality and aquatic resources, soil stockpiles will not be placed near the existing and/or new storm water retention ponds or catch basins. Barkman will continue to regularly inspect the catch basins on the property, with cleaning to occur as required to reduce the potential sediment content of the runoff to the City of Steinbach's storm water collection system. Salvaged topsoil in the area of the new retention pond will be temporarily stockpiled at the Barkman site for use in the construction and restoration process in this area.

With the implementation of these mitigation measures, the residual effects on soils due to erosion from wind and precipitation during the construction phase are anticipated to be minor to negligible at the Project Site and in the Project Area.

5.2.5 Surface Water and Aquatic Resources

Erosion and subsequent transport and deposition of eroded materials has the potential to affect surface water quality and aquatic resources during construction. Conditions favorable for erosion have the potential to occur during clearing, excavation and infilling work, stockpiling, site restoration, and movement of equipment on the Project Site. Soil may be lost as a result of wind and precipitation erosive action.

The majority of the Barkman site has been compacted/built-up over the years, which reduces the potential scouring/runoff due to precipitation. The surface water runoff from the Barkman site is directed to various catch basins and retention ponds on the property that are part of Barkman's storm water collection system. This system is then directed to the City of Steinbach's storm water collection system that drains into an unnamed tributary of the Manning Canal. As outlined in Section 3.8, the unnamed tributary has forage fish present, however it is unlikely to

contain indicator fish species due to the barriers to fish passage and habitat complexity. The Manning Canal contains indicator fish species.

It is anticipated that the continued inspection and cleaning of the catch basins will continue to minimize the potential for sediment transport off-site.

Based on the separation distance from the Barkman site to the unnamed tributary of the Manning Canal and the proposed mitigation measures, negligible effects on surface water and aquatic resources due to erosive action are anticipated. Potential effects on surface water and aquatic resources due to accidents and malfunctions are identified in Section 5.4.

5.2.6 Groundwater

Based on the depth to the perforated well section in which groundwater can enter the two registered on-site wells (36 m below the ground surface), it is not anticipated that substantial groundwater dewatering will be required during construction. If dewatering is required, it is not anticipated to appreciably affect the nearby supply wells identified in Section 3.6.2 and drawdown effects in existing nearby wells are anticipated to be negligible in magnitude.

Mitigation measures for potential groundwater effects due to accidents and malfunctions are identified in Section 5.4.

5.2.7 Vegetation and Wildlife (including Protected Species)

As described in Section 5.2.2, noise will be generated to varying degrees during the construction phase of the proposed project and may affect wildlife (including protected species). Also during construction, wildlife can be affected due to habitat removal.

No wildlife (including protected species) was observed on the Barkman site during the site visit; the Barkman property is completely fenced. It is also unlikely that there is noise sensitive wildlife in the Project Area. Any potential wildlife (including potential species at risk) in the area are anticipated to be accustomed to some level of noise due to the daily operations of the Barkman facility and the urban/suburban nature of the surrounding neighbours such as Stonybrook Middle School and traffic along Brandt Street and McKenzie Avenue as well as surrounding residences and urban land use.

During the site visit, it was observed that there was no natural vegetation on the Barkman site. The leased land for the new retention pond however, is currently landscaped with grasses and will require clearing during construction. The new retention pond will be approximately 3,700 m^2 in size and is anticipated to be similar to the existing storm water retention basin on the Barkman site. The retention pond will be re-seeded with grass following construction.

Vegetation may also be affected due to dust deposition as described in Section 5.2.2.2 during construction. There was landscaped areas including grasses and trees/shrubs located off-site immediately west of the proposed paver plant location. A search for potential species at risk in the Project Region identified 20 potential listed species as described in Section 3.9 and six of these species are vascular plants. Most of these identified vascular plants prefer areas of undisturbed grasslands, meadows and/or wooded areas. Some of these species may also be found along road side ditches. Any potential effects to these areas immediately west of the proposed paver plant and road side ditches will be indirect effects due to dust deposition.

As there is a lack of natural vegetation at the Barkman site and the site for the new retention pond (landscaped grasses) and any other potential effects to vegetation off-site will be indirect (dust deposition), the implementation of mitigation measures identified in Section 5.2.2 are expected to result in the residual effects of noise and dust

deposition on vegetation and wildlife (including species at risk) being minor to negligible at the Project Site and in the Project Area.

5.2.8 Land Use

The construction of the proposed paver plant will not affect the land use at the Project Site as the site will continue to be used for industrial purposes. The new retention pond will be located on green space leased from the City of Steinbach (Figure 3) and will be seeded with grass following construction. Although the zoning for the new retention pond area will remain M1, the land use of this area will change from its current vacant, unoccupied use to accommodate the grassed retention pond (where regular mowing will also occur).

As no changes to the existing land use of the Barkman site are proposed, no effects on land use are expected as a result of the construction of the proposed paver plant. The change in the off-site land use due to the construction of the new retention pond is anticipated to be minor due to the relatively small footprint of the proposed pond, that the site will remain grassed and as the change will not affect the site zoning.

5.2.8.1 Protected Areas

The construction of the proposed project is not anticipated to affect nearby protected areas. As indicated in Section 3.10.3, the nearest protected area to the Project Site is the St. Malo Provincial Park located approximately 28 km southwest of the site. Based on the separation distance from the Project Site to the park, no effects on the protected areas are anticipated due to the construction of the proposed project.

5.2.9 Heritage Resources

As part of this assessment, a screening request was submitted to HRB to determine if there are any potential heritage resources that may be affected by the proposed project. HRB indicated that the potential to impact significant heritage resources was low and therefore the Branch had no concerns with the project (Appendix G).

If artifacts, historical features or skeletal remains are encountered during construction, work activities will stop immediately around the affected area with the find reported to the site supervisor. A qualified archaeologist may investigate and assess the find prior to the continuation of work. If skeletal remains are encountered during construction activities, the find will be immediately reported to the site supervisor and the RCMP.

5.2.10 Aesthetics

The aesthetics of the Project Site during construction could undergo changes due to the presence of construction equipment, related general disturbances (noise, dust and construction wastes) and the construction of a new building (the proposed paver plant).

To mitigate potential noise effects, the mitigation measures identified in Section 5.2.2.1 will be implemented.

To mitigation potential effects due to dust, the mitigation measures identified in Section 5.2.2.2 will be implemented.

To maintain a clean, aesthetically pleasing Project Site, the following mitigation measures will be implemented:

- The Project Site will be inspected for loose waste and debris in order to maintain a clean Project Site on a regular basis.

- Waste and debris will be stored in bins and removed on a regular basis from the Project Site.

The proposed paver plant will be a metal clad structure and will be visually similar to existing buildings at the Barkman site.

It is anticipated that after the implementation of the proposed mitigation measures, the aesthetics of the site will remain consistent with the current industrial land use.

Depending on the final end use of the site, decommissioning activities may include the removal of buildings, grading and other activities. It is anticipated that eventual decommissioning activities will affect the aesthetic value of the site, however it would depend on the end use of the site. When the Project Site needs to be decommissioned at some point in the future, a site decommissioning plan will be filed with appropriate regulators prior to decommissioning.

5.3 Operation

5.3.1 Air and Noise

5.3.1.1 Noise Generation

Noise will be generated to varying degrees during the operational phase due to traffic and plant operations and has the potential to negatively affect people and wildlife in the surrounding area. As indicated previously, the closest human receptors to the Project Site are the Barkman employees followed by the residential receptors located immediately west of the Barkman site. It is also unlikely that there are noise sensitive wildlife species in the Project Area.

Sources of noise at the Barkman site during operation will include trucks, emergency sirens and daily operations within the main plant and proposed paver plant.

The daily average number of trucks traveling to and from the Barkman site is approximately 23 trucks per day during working hours (7 am to 10 pm) with the majority of material deliveries planned to occur between 8:30 am and 6 pm. It is anticipated that the number of trucks travelling to and from the site will not substantially change once the proposed paver plant is in operation.

There is an emergency siren located on the two cement storage silos on the main building in the event that these silos are overfilled. This siren will continue to be used. The three new cement storage silos on the proposed paver plant will be oversized; therefore no emergency siren will be installed. However, emergency sirens may be installed at some point in the future if problems due to overfilling of the silos arise.

The proposed paver press machine will be in an enclosed sound protection cabin on its own isolated foundation providing a reduction in noise to approximately 78 to 81 dB outside of the press machine enclosure. This sound enclosure will be enclosed within the proposed paver plant building that will further reduce related operational noise emissions. The doors located on the west side of the proposed paver plant will also typically remain closed during operation, which will mitigate exposure of the operational noise to the neighbours. The control room within the new plant will also be equipped with its own sound enclosure to provide additional hearing protection for the operators.

In addition to the mitigation measures identified above, noise will be mitigated with the implementation of the following measures:

- Vehicles and equipment will be properly maintained.
- Vehicle idling will be kept to a minimum.
- Hearing protection will be provided to workers, as required.
- Barkman will address noise concerns as they arise on an individual basis.
- Majority of noise generating activities will occur indoors.

Barkman has been in operation at this location since 1948, located on a site zoned M1 Light Industrial and will continue to use the site for industrial purposes. To date, Manitoba Conservation and Water Stewardship have not received any formal complaints due to the daily operations at the Barkman facility from surrounding residents. If noise complaints are received during operation, Barkman will address these concerns as they arise on an individual basis.

With the implementation of the mitigation measures listed above, the residual noise effects are anticipated to be negligible to minor in the Project Area.

5.3.1.2 Dust Generation

Dust has the potential to affect air quality with subsequent effects on human health (including respiratory issues) and vegetation (dust deposition).

Dust within the main plant and the proposed paver plant will continue to be mitigated with the use of filters (baghouse, socks, cartridges) as described in Sections 2.1 and 2.2. Cyclone filtration systems within the main plant will also continue to be used along with the other dust collection systems as described in Section 2.1. Any dust collected within the main plant or the proposed paver plant will continue to be transported to the yard bunker for storage and collection by Diamond Construction and Gravel.

Yard dust from vehicle and equipment movement at the site will continue to be managed through the application of dust control agents (magnesium hydroxide) and the use of paved areas.

Some fugitive dust has the potential to be generated during the disconnection of the feed lines from the truck hoses during cement delivery. This fugitive dust however is anticipated to be very small and can be managed by continuing good housekeeping practices.

With the implementation of the proposed mitigation measures, the residual effects on air quality due to dust generation and vegetation due to dust deposition are anticipated to be minor to negligible at the Project Site and in the Project Area.

5.3.2 Climate

5.3.2.1 Greenhouse Gas Emissions

The existing facility and the proposed paver plant will generate direct greenhouse gas emissions under the Stationary Fuel Combustion and On-Site Transportation source categories.

Manitoba Conservation's *Environment Act Proposal Report Guidelines* provide for climate change implications, including a greenhouse gas inventory, to be included in an assessment of the anticipated environmental effects of a development. The Guidelines indicate that the inventory should be calculated according to guidelines developed by Environment Canada and the United Nations Framework Convention on Climate Change. According to Environment

Canada's technical guidance document, reported emissions are to include direct emissions associated with the operation of a facility. (Environment Canada 2013)

To determine the potential change in greenhouse gas emissions related to the proposed project, a facility level estimate of direct greenhouse gas emissions associated with the existing Barkman facility as well as the facility with the addition of the proposed new paver plant was completed.

For the purposes of this assessment, the IPCC technical document titled "2006 IPCC Guidelines for National Greenhouse Gas Inventories" was used to estimate the greenhouse gas emissions (Intergovernmental Panel on Climate Change, 2006). Further guidance on emission factors and methodology was obtained from Canada's National Inventory Report 1990-2011: Greenhouse Gas Sources and Sinks in Canada (Pollutant Inventories and Reporting Division, Environment Canada, 2013).

The following are the direct greenhouse gas emission sources identified at the Barkman facility and their related reporting source categories.

- Gasoline fuel used in on-site service vehicles (On-Site Transportation)
- Diesel and Propane fuel used in the on-site fork lifts (On-Site Transportation)
- Propane fuel used in the on-site fork lifts and shrink wrapping (On-Site Transportation)
- Natural gas combusted for building and process heat (Stationary Fuel Combustion)

The proposed addition of the paver plant at the facility is not anticipated to change the nature of the emission sources, however it is anticipated to increase the amount of greenhouse gas emissions generated at the facility on an annual basis.

On-Site Transportation

Both diesel-fuelled and propane-fuelled fork lifts and gasoline-fuelled site trucks are used at the facility to move materials within the plant and around the site. The combustion of these fuels generate CO_2, CH_4 and nitrous oxide (N_2O) all of which are considered greenhouse gases. The proposed addition of the paver plant will result in a 15% increase in the amount of diesel fuel used for forklifts and therefore the associated greenhouse gas emissions. No increase in gasoline or propane use at the facility is anticipated as a result of the operation of the new paver plant.

Stationary Fuel Combustion

The use of natural gas for building and process heat (steam) produces carbon dioxide, methane and nitrous oxide emissions. The current rate of natural gas usage at the facility is expected to increase by approximately 30% to provide heat for the proposed new paver plant as well as production steam to thaw and warm aggregates during colder times of the year.

Predicted Change in Greenhouse Gas Emissions

The following Table presents the current and proposed calculated emissions in carbon dioxide equivalent at the Barkman facility. Detailed calculation sheets are included in Appendix H.

Table 8. Current and Proposed Carbon Dioxide Emissions

Current Condition		
Total CO_2e	921	tonne CO_2e/year
Proposed Condition		
Total CO_2e	1,161	tonne CO_2e/year

The proposed changes are predicted to result in a 26% increase in greenhouse gas emissions at the facility. Environment Canada's mandatory reporting threshold for greenhouse gas emissions is 50,000 tonnes of CO_2e on an annual basis. As the facility is anticipated to generate less than 3% of the reporting threshold, they are not considered significant contributors of greenhouse gas emissions.

To determine the magnitude of the increase at the Provincial level, the greenhouse gas emissions reported for the Province of Manitoba in Canada's National Inventory Report 1990-2011 were examined. According to the report, the Province of Manitoba emitted a total of 19,500,000 tonnes of CO_2e (Pollutant Inventories and Reporting Division, Environment Canada, 2011). Therefore the Barkman facility greenhouse gas emissions are considered to be a negligible increase in greenhouse gas emissions at the Provincial level.

The facility is anticipated to have a negligible effect on climate which will occur continuously during facility operation over the long term.

5.3.3 Surface Water and Aquatic Resources

Negative effects on surface water quality and subsequent effects on aquatic resources may result from sediment laden runoff from the site (including wash water) and potential contaminants in wash water being discharged to the City of Steinbach storm water collection system.

The Barkman storm water collection system consists of various catch basins throughout the property. This system discharges directly to the City of Steinbach's storm water collection system that drains into an unnamed tributary of the Manning Canal or in extreme precipitation events, surface runoff in excess of catch basin capacity backs up into to one of the two retention ponds (one existing and the proposed new pond). As outlined in Section 3.8, the unnamed tributary of the Manning Canal reportedly has forage fish present, however it is unlikely to contain indicator fish species due to the barriers to fish passage and habitat complexity.

At the end of each work day, all hopper buckets, work stations and some machinery used during the day are pressured washed and the wash water is directed to the floor drains within the main plant that drain into one of two settling pits that contain four chambers. These settling pits then drain into a catch basin which is part of Barkman's storm water collection system that then drains into additional catch basins on the property prior to discharging into the City of Steinbach storm water collection system. The settling pits are inspected bi-weekly and cleaned once the first chamber is full and the second chamber is approximately half full. Any material that settles out in the pits is removed by a backhoe and placed in the bunkers in the yard for storage. As this wash water flows from catch basin to catch basin prior to draining to the City's storm water collection system, the sediment laden water has additional time to settle out. All of the catch basins on the Barkman's property are also inspected regularly by staff and are cleaned approximately three times per year to assist in reducing the potential sediment load to the City of Steinbach storm water collection system.

Within the main plant and the proposed paver plant, rainwater and drainage water collected in the sump pits (equipped with grit separators) in the aggregate hopper areas are pumped into a catch basin which is part of Barkman's storm water collection system as described in Section 2.1.1 and 2.2.1. Prior to draining into the City of

Steinbach's storm water collection system, the potential sediment laden water has additional time to settle out as it flows through the various catch basins on the Barkman's property as described previously.

The wash water from within the main plant (no substantial wash water will be generated in the proposed paver plant) has the potential to have an increased pH due to uncured cement being potentially present in the wash water. Any remaining cement in hopper buckets, equipment and work stations are pressure washed daily. The quantity of uncured cement entering the settling pits is anticipated to be minimal. The potential increase in pH will be diluted with other inputs (e.g. precipitation) once entering Barkman's storm water collection system which collects all of the surface water runoff from the property via various catch basins prior to draining into the City of Steinbach's storm water collection system and eventually into the tributary of the Manning Canal.

The wash water also has the potential to contain contaminants from concrete washed off equipment, hoppers and work stations. A list of materials used for the production of concrete products on the Barkman's site is provided in Appendix C. Some of these listed materials that are added during the mixing process have the potential to enter the settling pits during the daily cleaning of equipment including retarders that are washed off the final product. The majority of these products are considered not to be harmful to aquatic organisms but, there are some products that contain ingredients that may be harmful to aquatic organisms. The quantities of these listed materials entering the storm water system are anticipated to be minimal when compared to the quantity of wash water being used daily (approximately 7 m^3). These materials will then be further diluted with other inputs (e.g. precipitation) once entering the Barkman's storm water collection system prior to discharging into the City of Steinbach's storm water collection system.

All the materials used in/during concrete product production are stored according to Material Safety Data Sheet (MSDS) requirements. These listed materials (Appendix C) that are stored in bulk are located away from the surface drains in the main plant and will stored in a similar manner be in the proposed paver plant. Barkman will continue to handle and dispose of all materials in a responsible manner.

Barkman discharges runoff and wash water into the City of Steinbach's storm water collection system and will comply with City of Steinbach's requirements, as they may arise.

With the implementation of the mitigation measures identified, the residual effects on surface water quality and aquatic resources due to the daily operations at the Barkman site are not anticipated to substantially change. Potential effects on surface water and aquatic resources due to accidents and malfunctions are identified in Section 5.4.

5.3.4 Vegetation and Wildlife (including Protected Species)

As described in Section 5.3.1.1, noise will be generated to varying degrees during the operational phase including potential traffic noise and has the potential to negatively affect wildlife in the surrounding area. With the implementation of the mitigation measures identified in Section 5.3.1.1 and the urban nature of the immediate Project Area, the residual noise effects on wildlife are anticipated to be negligible at the Project Site and in the Project Area.

The daily operations at the Project Site may also affect vegetation due to dust deposition as described in Section 5.3.1.2. The residual effects on vegetation due to dust deposition is anticipated to be minor to negligible with the implementation of mitigation measures identified in Section 5.3.1.2 at the Project Site and in the Project Area.

5.3.5 Aesthetics

The aesthetics of the Project Site during operations could undergo changes due to the presence of a new building and general disturbances including noise, dust and operational wastes.

As indicated in Section 5.3.1, noise will be generated to varying degrees during the operational phase due to traffic and daily plant operations. Dust will also be generated during cement deliveries, movement in the yard and daily operations within the main plant and proposed paver plant.

To mitigate potential noise and dust effects, the mitigation measures identified in Section 5.3.1 will be implemented.

To maintain a clean, aesthetically pleasing Project Site, the following mitigation measures will be implemented:

- The Project Site will be inspected for loose waste and debris in order to maintain a clean Project Site on a regular basis.
- Waste and debris will be stored in bins and removed on a regular basis from the Project Site.

The proposed paver plant will be a metal clad structure and will be visually similar to existing buildings at the Barkman site.

It is anticipated that after the implementation of the proposed mitigation measures, the aesthetics of the site will remain consistent with the current industrial land use.

5.4 Accidents and Malfunctions

To prevent accidents and malfunctions, construction, operation and decommissioning activities will be conducted in accordance with all regulatory requirements. The following sections provide additional details on precautionary measures that are proposed to prevent or mitigate accidents and malfunctions. Worker protection in Manitoba is provided through standards, procedures and training legislated under the *Workplace Safety and Health Act*. All practices performed at the site will be carried out in accordance with the *Workplace Safety and Health Act* to minimize health and safety effects.

Barkman has an on-site health and safety officer and all employees are trained in the daily operations of the Barkman site. Employees are also trained to operate the various machinery/equipment/vehicles, as required and are provided the necessary personal protective equipment (e.g. hearing protection, eye protection, hard hats). Employees are trained in first aid, as required and first aid kits are located throughout the main plant and will also be located in the new paver plant.

5.4.1 Fire/Explosion

During construction, operation and decommissioning, there exists the potential for fires at the Project Site involving mechanical equipment and fuels. Effects related to fires include, but are not limited to, harm to on-site personnel, equipment, and the potential release of contaminants and hazardous materials.

All precautions necessary will be taken to prevent fire hazards at the site, including, but not limited to:

- All flammable waste will be removed on a regular basis and disposed of at an appropriate disposal site;
- Appropriate fire extinguisher(s) will be available on the site during all phases of the project. Such equipment will comply with and be maintained to, the manufacturers' standards;

- All on-site fire prevention/response equipment will be checked on a routine basis to confirm the equipment is in proper working order at all times;
- Greasy or oily rags or materials subject to spontaneous combustion will be deposited and stored in appropriate receptacles. This material will be removed from the site on a regular basis and be disposed of at an appropriate waste disposal facility; and
- All fuels will be stored in appropriate facilities (designed in compliance with regulatory requirements), to reduce the potential for accidental ignition.

5.4.2 Spills

During construction, operation and decommissioning, there is potential for environmental effects due to fuel spills and/or leaks. Accidents (including transportation accidents) could also result in the accidental release of hazardous materials and/or equipment/vehicle fluids and fuels. A number of potential environmental concerns are also associated with the accidental release of chemicals and fuels resulting from improper storage and handling procedures. As a result of spills, effects on soil, vegetation and groundwater quality, degradation of air quality and a potential threat to human health and safety are possibilities.

To prevent spills from occurring during project activities, the following procedures will be employed:

- All potentially hazardous products (if required on-site) will be stored in a pre-designated, safe and secure product storage area(s) in accordance with applicable legislation;
- Storage and disposal of liquid wastes and filters from equipment maintenance, and any residual material from spill clean-up will be contained in an environmentally safe manner and in accordance with any existing regulations.
- Storage sites will be inspected periodically for compliance with requirements.
- Service and minor repairs of equipment performed on-site will be performed by trained personnel in appropriate areas;
- Vehicles and equipment will be maintained to minimize leaks. Regular inspections of hydraulic and fuel systems on equipment/machinery will be completed on a routine basis. When detected, leaks will be repaired immediately by trained personnel;
- In the event of a spill, the following will occur:
    - The spill will be reported to Manitoba Conservation and Water Stewardship and Environment Canada as appropriate.
    - Measures will be taken immediately with a spill kit or suitable alternative to prevent migration of the spilled material. Recovery measures will also be implemented as necessary in consultation with the appropriate provincial authorities.
- If required, a remediation program will be undertaken with contaminated material appropriately managed (in accordance with federal and provincial regulations).
- On-site construction staff will be trained in how to deal with spills and clean-up procedures, including review of applicable Spill Response Plans and knowledge of how to properly deploy site spill kit materials; which will be readily accessible at the site at all times.

- All used oils, filters and empty solvent cans on the Barkman site are collected and stored outdoors in the yard in steel containers in an area away from the main building that is protected by concrete barriers. Barkman is registered with Manitoba Conservation and Water Stewardship as a hazardous waste generator (MBG04233).
- The solvent barrel is also stored in the yard away from the main building in an area protected by concrete barriers.

5.4.3 Transportation Accidents

Transportation accidents can result in the release to the environment of vehicle fluids (such as diesel, oils etc.) and the material the vehicles were transporting (such as construction wastes, aggregate, cement, etc.). Effects related to spills can include air, soil, surface water and groundwater quality effects with potential for subsequent effects on flora, fauna, aquatic resources and human health.

The traffic flow around the Barkman site (deliveries and pick-ups) has been designed to mitigate potential accidents/traffic back-up onto nearby streets as shown in Figure 3. A site speed limit of 15 km/hour has been posted throughout the Barkman property to minimize the potential for on-site transportation accidents. Further, Barkman retains qualified transportation companies to transport cement, aggregates and final products to and from the site to minimize potential transportation risks.

In the event of a transportation accident resulting in a spill, appropriate remediation measures will be coordinated with Manitoba Conservation and Water Stewardship and undertaken in accordance with the nature of the spilled material.

Table 9. Summary of Environmental Effects

6. Monitoring and Follow-Up

Follow-up programs verify the accuracy of the environmental assessment of a project and determine the effectiveness of measures taken to mitigate the adverse environmental effects of the project. For the proposed project, mitigation measures will be applied as described herein and a formal follow-up program is not anticipated to be required.

Monitoring programs involve the collection and analysis of data on the state a particular environment is in to identify changes or trends over time. Results from monitoring programs indicate the success of mitigation measures that are implemented to protect the environment. They are also used to ensure compliance with environmental standards/regulations and to assist in any potential project operational changes.

Barkman will comply with any monitoring requirements in the new *Environment Act* Licence for their facility, as required.

7. Conclusion

The negative residual environmental effects related to the operation of the existing facility and the proposed construction and operation of the new paver plant were found to be negligible to minor in magnitude post mitigation.

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Figures

Appendix A

Manitoba Conservation & Water Stewardship Letter Dated June 12, 2013

Appendix B

Environment Act Proposal Form

Appendix C

Current List of Process Materials

Appendix D
Site Photographs

Appendix E

Certificate of Title

Appendix F

GWdrill Well Search

Appendix G

Heritage Resources Branch Letter

Appendix H
Greenhouse Gas Emissions