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BURNSIDE
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September 1, 2021

Via: Email

Mayor Cornell and Members of Council
c/o Sue Walton,
Director of Legislative Services/Clerk
Township of Tiny
130 Balm Street West
Tiny ON N0L 2J0

Dear Mayor Cornell and Members of Council:

Re: Teedon Pit – 40 Darby Road
OWRA S53 Environmental Compliance Application
Township of Tiny, County of Simcoe, Ontario
Project No.: 300031221.0000

R.J. Burnside & Associates Limited (Burnside) was retained by the Township of Tiny (Township) to complete a peer review of the documentation prepared by GHD in support of a Ministry of Environment Conservation and Parks (MECP) Environmental Compliance Approval (ECA) application for the wash water facility at the Teedon Pit, which is owned by Dufferin Aggregates, a Division of CRH Canada Group Inc. The documents reviewed included:

- "OWRA S53 Environmental Compliance Approval (ECA) Application and Supporting Information, Dufferin Aggregates Teedon Pit", prepared by GHD, dated February 16, 2021(Report)
- Completed ECA application form
- Engineering Drawing and Specifications
- Impact Assessment

In addition, Burnside has reviewed numerous other documents that have been prepared as part of the Permit to Take Water (PTTW) application for the Teedon Pit along with documents prepared in support of the expansion of the pit onto the adjacent lands to the north (2 Darby Road). As a result, Burnside is familiar with the hydrogeology of the area.

The original PTTW application was submitted in 2018 with the MECP issuing PTTW No. 6258-BRDJ2M in January 2021. The PTTW approval is now under appeal and no final decision has been made.

This subsequent ECA application was submitted in February 2021. The proposal details on the Ministry's website states that the proposal is for a new ECA for existing sewage works. The existing sewage works consist of settling ponds designed for the collection, transmission, treatment and reuse of wash water from an existing aggregate wash plant. The treated wash water is reused in the existing aggregate wash plant operations. The Ministry may require effluent monitoring for the overflow discharge leaving the site.

The rationale as to why an ECA is required is explained below:

According to the MECP, “sewage (wastewater) includes everything that you flush down your toilet or rinse down the drain; water that has been used by industries, businesses, institutions (i.e. hospitals); and rainwater and runoff (stormwater) that goes down street gutters or flows into surface water. If you operate an industrial facility and do not have an agreement with the municipality to allow you to discharge your sewage into a municipal sanitary sewage collection system, you likely own and operate an industrial sewage works that requires an ECA from the MECP.”

1.0 GHD Report

The February 2021 GHD report was prepared in support of the ECA application. The information below was obtained from the GHD report and provides a general overview of the ECA application.

1.1 Background

The February 2021 ECA application for the existing on-site Teedon Pit aggregate washing operations indicates the sump and settling ponds are considered to be a treatment facility for industrial process wastewater. This activity is regulated under Section 53 of the Ontario Water Resource Act (OWRA). The required ECA is specifically for a sump pond, wash plant and silt pond, which will operate as a recirculating aggregate washing system.

The ECA application is associated with existing aggregate washing operations, constructed in 2008/2009, for an above water table aggregate extraction operation at the Teedon Pit. Dufferin Aggregates (Dufferin) has an existing Permit to Take Water (PTTW) No. 6258-BRDJ2M.

1.2 Teedon Pit Water Use

The aggregate washing operation involves washing of the aggregate after extraction to remove fine soil particles from the sand and gravel for the preparation of high-quality aggregate products.

The washing operations will use a recirculating aggregate washing system where the water after washing is re-circulated through two silt ponds to remove the fine particulates and reused in the process. This operational design requires "make-up" water to compensate for moisture retained on the sand and gravel and for evaporation. Supply (production) well PW1-09 is used to provide the “make up” water to supplement the Sump Pond in accordance with PTTW No. 6258-BRDJ2M.

A small amount of water will also be used for dust control during dry weather conditions.

1.3 Process Description

Water used for the recirculating aggregate washing system is obtained from the Sump Pond, used in the Wash Plant and discharged to the Silt Pond prior to recirculation into the Sump Pond.

The bottom of the Sump Pond is constructed into naturally occurring clay or silt deposits with the base of the Sump Pond approximately 12 m below existing ground surface (bgs). The Sump Pond was designed to have a capacity equivalent to approximately 12 days of the

maximum volume of water pumped for washing at a rate of 7,274 L/min. This equates to a maximum pond area of approximately 13,400 square metres (m^2).

The Silt Pond was created by removing aggregate material from above the water table along with the installation of berms around the edges. The bottom of the Silt Pond is constructed into naturally occurring clay or silt deposits with berms to provided additional capacity/freeboard. The base of the Silt Pond is designed with an approximate operating water depth of 6 m.

The aggregate wash water is drawn from the Sump Pond through a floating intake located about 1 m below the pond surface. The water is pumped through the wash plant where it is used to wash aggregate. The water is then recirculated via a 450 mm diameter HDPE pipeline back to the Silt Pond where the fines are allowed to settle before the water is discharged, by gravity, back to the Sump Pond.

Some loss of water from the system is expected through evaporation, moisture remaining on the aggregate following washing, and groundwater recharge.

1.4 Wellhead Protection Areas

The Teedon Pit is outside of any municipal wellfields and is outside of the Wellhead Protection Areas (WHPAs) associated with wellfields in the area. The closest municipal well is located in Wyevale approximately 5 km to the northwest of the Site.

1.5 Site Specific Hydrologic Setting

Drainage of surface water from the Teedon Pit is primarily via infiltration into the groundwater flow system with a component flowing to the north towards the Wye River. There are no Environmentally Sensitive Areas or Provincially Significant Wetlands (PSWs) near (within 120 m) the Site.

The main surface water features are the existing aggregate washing system ponds (Sump Pond and Silt Pond). A small unnamed pond is located directly north of the Sump Pond which is connected to an unnamed creek tributary north of this pond.

The small unnamed tributary is considered to be a small ephemeral (seasonal) tributary that only flows during spring freshet or periods of extremely heavy rain. When the Sump Pond was established, the small unnamed pond was retained. The Sump Pond was constructed with a catch basin style drainage system to act as an emergency overflow to the unnamed pond to prevent catastrophic berm failure as a result of overtopping.

The Sump Pond water elevation is also controlled with float style high level shutoff that shuts down the supply of make-up water from PW1-09 should the elevation of the pond approach the overflow invert (approximate 0.2 m below the invert).

A thick silt and clay aquitard appears to underlie the Sump Pond, Silt Pond, and the unnamed pond and the unnamed tributary. The aquitard layer limits the interconnections between this surface water system and the deeper aquifer as is evidenced by the large water level difference between shallow and deep monitoring wells.

1.6 Sump Pond

No surface overflow discharge from the recirculation aggregate wash system is anticipated given the controls established within the Sump Pond, described below; except possibly under extreme climatic circumstances. The ECA does not specify a rate of discharge.

The base elevation of the Sump Pond is approximately 257 m AMSL. Any sediments in the Sump Pond may be removed by excavator and/or dragline, as needed.

At this time, the Sump Pond will remain in the current size and configuration; however, the exact footprint of the Sump Pond may be modified in the future to increase capacity, as required to support operational demand within the Aggregate Wash Pond Area.

Any modifications to the Sump Pond construction will be designed and approved by a qualified engineer and documented in an Annual Performance Report.

The Sump Pond is equipped with a float control that stops the supply of water to the Sump Pond (from PW1-09) when the water elevation within the Sump Pond approaches the overflow invert (approximately 0.2 m below the invert). This shut-off elevation provides freeboard below the emergency overflow invert to prevent overflow during regular climactic conditions. The emergency overflow will only be used in extreme circumstances to prevent overtopping of the berm and potential damage to the structure. The emergency overflow is not used as part of the regular operations of the Works.

Maintenance of the Sump Pond will include periodic excavation of sloughed and/or settled materials in order to maintain capacity. Maintenance activities will typically occur from December to April but may occur at other times of the year if necessary.

1.7 Silt Pond

Fines suspended in the effluent water from the Wash Plant will be settled out in the Silt Pond. The Silt Pond will be operated through gravitational settling. Accumulated sediments in the Silt Pond will be excavated, as needed, to restore capacity. The existing Silt Pond was constructed to allow up to 6 m of operating depth in two cells.

Clarified water from the Silt Pond overflows back to the Sump Pond for re-use in the Wash Plant.

The berms around the Silt Pond were constructed as part of historic operations and will be regularly inspected and maintained, as necessary. Any modifications to the Silt Pond construction will be designed and approved by a qualified engineer and documented in an Annual Performance Report. The exact footprint of the Silt Pond and the number of cells may be modified in the future to increase capacity, as required to support operational demand within the Aggregate Wash Pond Area.

The deposition of sediments in the Silt Pond does not affect the chemical or physical quality of the local groundwater since the fines are a natural component of the sand and gravel aquifer. Furthermore, the fines are filtered out by the pond base for any pond water that seeps through the pond base and recharges groundwater.

Maintenance of the Silt Pond will include periodic excavation of settled materials to maintain capacity. This typically occurs every 4 to 6 weeks during the operating season and may also be done during the winter period or during a wash plant shutdown. Settled materials will be stockpiled on Site for future sale or utilized for rehabilitation purposes.

1.8 Stormwater Management

There is no surface water drainage onto the Site and no substantial overland flow under normal conditions due to the high permeability soils and rapid infiltration.

All surface drainage of undisturbed areas will continue as presented on the Site Plans.

Make-up water to the pond is controlled by a float style shutoff to provide sufficient freeboard and stormwater retention capacity within the Sump Pond. Additional stormwater management (quantity and/or quality control) is not required at the Site.

1.9 Environmental Impact Assessment

The Teedon Pit will not use chemicals or other contaminants in the washing of aggregates. Processing that is done includes physical separation (i.e., screening), crushing, and washing (i.e., rinsing fine soil particles off sand and gravel with water). Therefore, no risk of contamination of water sources is anticipated.

The washing operation removes unwanted fines from the aggregate (naturally occurring fine sand/silt/clay fraction). The fines are removed from the wash plant as suspended sediment that is transferred to the Silt Pond for deposition. As the wash water flows through the Silt Pond, the suspended sediment progressively settles out, resulting in a reduced sediment load in the water at the downstream end of Silt Pond before it is returned to the Sump Pond. The sediment will generally settle out in the Pond.

The deposition of sediments in the Silt Pond does not affect the chemical or physical quality of the local groundwater since the fines are a natural component of the sand and gravel aquifer. Furthermore, the fines are filtered out by the pond base for any pond water that seeps through the pond base and recharges groundwater.

Fuel, lubricants, and engine coolant will be stored and used on the property in support of the Site operations equipment. Dufferin's fuel handling and spill response management procedures would apply to these liquids.

Despite previous groundwater quality assessments conducted by Alpha in 2015 on behalf of the previous owner/operator of Teedon Pit, and assessments by the MECP in 2015 which have concluded that groundwater quality in domestic wells has not been affected by the aggregate washing operations, Dufferin collected groundwater samples from five nearby domestic wells in late summer 2017. The groundwater samples collected from the nearby domestic wells in late summer 2017 were due to complaints of silt in the wells.

1.10 Proposed Monitoring Program

There is no off-Site discharge from the Works and therefore no prescribed discharge volume or rate. The volume and rate of water taking from the Sump Pond for use in the aggregate washing system is limited as part of PTTW No. 6258-BRDJ2M to less than 7,274 L/min.

Groundwater and surface water hydraulic monitoring is completed as part the PTTW. No further hydraulic monitoring, in the vicinity of the Sump Pond, other than that associated with the PTTW will be conducted as part of the ECA.

The Sump Pond water elevation is monitored as part of the PTTW. The Sump Pond is equipped with a float control that stops the supply of water to the Sump Pond (from PW1-09) in the event that the water elevation within the Sump Pond approaches the overflow invert (approximately 0.2 m below the invert).

There is no off-Site discharge from the Works. However, the Sump Pond is equipped with an emergency overflow.

To provide baseline water quality in the unexpected event that an emergency overflow does occur, it is proposed to complete tri-annual sampling of the Sump Pond at the overflow and unnamed pond for a period of two years.

Following the two-year monitoring period Dufferin may submit a letter to the MECP presenting the associated monitoring data and analysis along with a recommendation to cease or modify the discharge quality monitoring program as appropriate.

Samples will be collected following the commencement of the operating season (April/May), in the middle of the operating season (July/August), and at the end of the operating season (October/November). Samples will to be analyzed for Total Suspended Solids (TSS), dissolved metals, Total Oil and Grease as well as field parameters pH, temperature, and conductivity.

In the event of an unexpected overflow event, Dufferin will promptly collect a sample from each of the Sump Pond and unnamed pond to confirm the water quality at that time and report the results to the MECP.

1.11 Reporting

The water use data will be reported yearly by March 31 of the following calendar year to the MECP's Water Taking Reporting System (WTRS) in accordance with the Site PTTW.

An ECA Performance Report will be prepared on an annual basis by April 30th of each calendar year. The reports will be retained at the Site and may be submitted to the District Manager upon request.

The reports will contain, but may not be limited to, the following information:

- A summary and interpretation of all monitoring data including an overview of the success and adequacy of the Sewage Works;
- A description of any operating problems encountered, and corrective actions taken;
- A summary of all maintenance carried out on any major structure, equipment, apparatus, mechanism or thing forming part of the sewage works; and
- A summary of any effluent quality assurance or control measures undertaken in the reporting period.

2.0 Burnside Comments

2.1 Silt and Sump Ponds

As noted in Section 2.0 of the Report, stormwater runoff is not impacted by this application. The Report describes the silt ponds and sump pond as having a surrounding berm so that no external runoff can leave or enter the system.

However, Drawing D-1 does not show the location of the berms.

In addition, the drawing has the following note: "*if silt pond is developed with multiple cells, discharge into pond may be split to allow discharge into each cell*". This suggests that the design of the settling ponds has not been finalized.

2.2 Environmental Impact Assessment

Many local residents have expressed concerns about siltation of their wells since aggregate washing began at the Teedon Pit. There have been suggestions that fine-grained silt from the wash water could migrate out of the bottom of the settling/sump ponds, passing through the coarse-grained sand and gravel and enter nearby residential wells.

Information presented by GHD indicates that a "thick silt and clay aquitard appears to underlie the Sump Pond, Silt Pond, and the unnamed pond and the unnamed tributary. The aquitard layer limits the interconnections between this surface water system and the deeper aquifer as is evidenced by the large water level difference between shallow and deep monitoring wells."

Also, as indicated above, GHD indicates "furthermore, the fines are filtered out by the pond base for any pond water that seeps through the pond base and recharges groundwater."

Drawing D-1 also indicates *"Silt pond and or sump pond area may be lined to prevent water loss"*. This suggests that the natural silt/clay layer is not as impermeable as indicated in the GHD report.

The geological information provided by GHD confirms that there are naturally occurring fine grained silts and clays below and in the vicinity of the wash/sump pond. The fine-grained silts and clays that settle out of the wash water will provide an additional layer of protection to the underlying aquifer from potential water quality/quantity impacts. Burnside is concerned that removal of this material as part of routine pond maintenance will have the potential to lessen the extra degree of protection to the aquifer.

The GHD report indicates "*There are no wetlands that have been classified by the Ministry of Natural Resources and Forestry (MNRF) as either "evaluated" or "provincially significant" located on the Site or in the vicinity of the Site*." However, the Adopted Tiny OP indicates there is an identified significant woodland and unevaluated wetland 2 ha or larger on the west side of the property. These features are not shown on any of the GHD figures and the potential impacts to these areas in the event of an overflow from the ponds is not discussed.

2.3 Maintenance

The Report indicates that the settled material will be excavated from the silt pond every 4 to 6 weeks, which will be stockpiled on site for site restoration or sale.

There is no indication of the anticipated volume of material that will be dredged from the pond(s)or where it will be stockpiled.

The material will be saturated and will need to drain before it can be used on-site or removed and there is no indication in the report or on Drawing D-1 on how the effluent from the dredged silt will managed.

The report indicates “Settled materials will be stockpiled on Site for future sale or utilized for rehabilitation purposes”. This is not very specific and typically the management of “waste” material produced as part of a process water treatment system would be detailed in an ECA application.

Only the extreme western portion of the site is mapped as a significant recharge area and Highly Vulnerable Aquifer. However, boreholes drilled at the site indicate most of the surficial material consist of sand and gravel, which will still allow for groundwater recharge. As a result, if the material is spread out on top of areas of sand and gravel as part of the site rehabilitation, it has the potential to reduce recharge to the aquifer.

The Report does not identify maintenance tasks that could minimize the potential for silt leaving the site, such as drawing down the silt pond water level, protection or capture of the runoff from the stockpiled silt, dry weather operation, etc. There is no indication of what contingencies are in place in the event the siltation/sump ponds are breached during a significant precipitation event or failure of the float control that shuts off the flow from PW1-09.

Drawing D-1 does not show pond bottom, top or berm elevations, inlet/outlet elevations or maintenance locations.

2.4 Monitoring

Although GHD proposes a water quality sampling program, there is no indication of what criteria the results will be compared to or what actions will take place if criteria are exceeded.

Drawing D-1 shows the location of the emergency overflow from the sump pond, but there is no indication of what controls will be in place to ensure that the silt laden overflow water does not impact downstream surface water features.

Similarly, it is not clear what would happen if the siltation ponds overflow during a storm event.

3.0 Recommendations

The Report provides a general description of the wash water treatment in support of the ECA application for the aggregate washing operation at the Teedon Pit. Silt contained in the wash water is expected to settle out in the silt pond before entering the sump pond, and is not anticipated to leave the site.

Since the design of the silt pond(s) is what has the greatest control of the silt loading in the sump pond, it is Burnside's opinion that the application cannot be approved until the treatment method is finalized. Burnside recommends that any permanent or temporary silt or sump pond(s) constructed on the site be lined to prevent water loss as per the note on Drawing D-1.

In Addition, Burnside recommends that the Proponent provide:

1. A finalized design of the silt and sump ponds.
2. Confirmation that inadvertent discharge from the ponds will not adversely impact nearby environmentally significant features.
3. A detailed maintenance plan describing:
    a) Elevation of bottom of existing settling and sump ponds;
    b) Maintenance tasks and methods for cleaning out the ponds;
    c) The thickness of silt that will trigger dredging activities;
    d) Estimated volume of silt to removed annually (dredgate);
    e) Silt stockpile dewatering method;
    f) The storage location of dredgate;
    g) The proposed use of dredgate for site restoration; and
    h) The proposed testing required before dredgate material can be sold for off-site use.
4. On the following additions to Drawing D-1:
    a) The elevations for pond inverts and berms;
    b) Location of settled material removal;
    c) A cross section showing the current base of the ponds and the minimum thickness of settled silt/clay that will remain after dredging;
    d) Details on the features in place to prevent overflow form the ponds; and
    e) A mitigation plan to minimize impacts to the natural environment in the event that silt laden water is discharged from the ponds.

We trust that you will find the above to be of assistance.

Yours truly,

R.J. Burnside & Associates Limited

David Hopkins
Senior Hydrogeologist
DH:jm:sc

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