

## EXISTING FEATURES – DRAWING 1 OF 6

### A. General

1. This Site Plan is prepared under the Aggregate Resources Act for a Class A Licence for a quarry below the ground water table.
2. Area to be licenced                      103.6 ha. (±256.0 ac.)  
Area to be extracted                      89.1 ha. (±220.2 ac.)

### B. References

1. Contour information was obtained from a topographic survey prepared by TEC Engineering (formerly Renishaw (Canada) Limited) using October 2016 and February 2017 aerial photography and are displayed in one metre intervals. Elevations shown are in metres above sea level (masl).
2. Topographic information was obtained from numerous sources including Ontario GeoHub (Land Information Ontario), Google Earth Pro aerial photography captured on July 18, 2018 and field investigations for technical reports.
3. All topographic features and structures are shown to scale in Universal Transverse Mercator (UTM) with North American Datum 1983 (NAD83), Zone 17 (metre), Central Meridian 81 degrees west coordinate system.
4. Property boundaries were obtained from a Plan of Survey prepared by Matthews, Cameron, Heywood-Kerry T. Howe Surveying Ltd. dated April 5, 2012. Other property boundaries were established using Municipal Property Assessment Corporation (MPAC) parcel fabric data.
5. Zoning categories on or within 120 metres of the licence boundary are from the City of Niagara Falls Zoning By-law No. 79-200 (Schedules A3 and A4 - Consolidation April 2015).
6. Land use information on or within 120 metres of the licence boundary has been compiled from October 2016 orthophotography, site visits and water well survey data.

### C. Groundwater

1. The maximum predicted water table is 184.9 masl and the contact aquifer potentiometric contours ranges between 176.0 and 184.9 masl (as per WSP's "Proposed Upper's Quarry - Maximum Predicted Water Table Report", dated October 2021).

### D. Drainage

1. Existing surface water drainage on and within 120 metres of the licence boundaries are by overland flow in the direction shown by arrows on the plan view.

### E. Site Access and Fencing

1. There are two (2) existing site accesses on Thorold Townline Road, six (6) existing site accesses on Upper's Lane, and three (3) existing site accesses on Beechwood Road.

2. Post and wire fencing (unless otherwise noted) exists in the locations shown on the plan view.

## **F. Significant Features**

1. All significant natural features on and within 120 metres of the licence boundary are shown on the Key Natural Heritage Features Schematic on this drawing.
2. All significant human-made features on and within 120 metres of the licence boundary are shown on the plan view.

## **G. Aggregate Related Site Features**

1. There are no existing aggregate operations or features within the licence boundaries such as stationary or portable equipment, stockpiles, recyclable materials, scrap, fuel storage, haul roads, berms or excavation faces.

## **H. Technical Reports - References**

1. Upper's Quarry: Acoustic Assessment Report, RWDI, ~~October 2021~~ August 2, 2023.
2. Agricultural Impact Assessment for Upper's Quarry, Colville Consulting Inc., October 2021.
3. Upper's Quarry: Air Quality Assessment, RWDI Air Inc., ~~October 2021~~ July 12, 2023
4. Archaeological Assessments:
  - a. Stage 1 Archeological Resource Assessment of Walker Aggregates Proposed South Niagara Quarry, Part of Lots 102, 119, 120, 136 & 137, Archeological Services Inc., December 2008.
  - b. Stage 1-2 Archeological Assessment of Part 9764 Uppers Lane, Part of Lots 119 & 120, Archeological Assessments Ltd., November 3, 2005.
  - c. Stage 2-3 Archeological Assessment, Part of Lots 102, 119, 120, 136 & 137, Archeological Assessments Ltd., November 21, 2012.
  - d. Stage 1-2 Archeological Assessments, Upper's Quarry Additional Lands, Part of Lots 119 & 120, Archaeological Research Associates Ltd., April 20, 2020.
  - e. Stage 3 Mitigation of Development Impacts, Final Excavation Report, Walker XI (AgGT-411), Upper's Quarry, Archaeological Research Associates Ltd., May 26, 2021.
  - f. Stage 4 Mitigation of Development Impacts, Final Excavation Report, Walker XI (AgGT-178), Upper's Quarry, Archaeological Research Associates Ltd., July 22, 2021.
5. Blast Impact Analysis, Upper's Quarry, Explotech, ~~October 2021~~ August 2023.
6. Cultural Heritage Impact Assessment Report, Proposed Upper's Quarry, MHBC, October 2021.

7. Economic Benefits Analysis, Prism, ~~October 2021~~ February 2023.
8. Level 2 Water Study Report and Response to JART Hydrogeological Comments ~~October 2021~~ October 3, 2022.
9. Maximum Predicted Water Table Report, WSP, October 2021.
10. Upper's Quarry, Niagara: Level 1 and Level 2 Natural Environment Technical Report and Environmental Impact Study, Stantec, ~~October 2021~~ August 2023.
11. Planning Justification Report and Summary Statement, MHBC, ~~October 2021~~ August 2023.
12. Traffic Impact Study and TIS Addendum, Upper's Quarry, ~~TMIG TYLin~~ ~~October 2021~~ March 23, 2023.
13. Visual Impact Assessment, Proposed Upper's Quarry, MHBC, October 2021.

**OPERATIONAL PLAN – DRAWING 2 OF 6**

**A. General**

1. Area to be licenced                              103.6 ha. (±256.0 ac.)  
 Area to be extracted                              89.1 ha. (±220.2 ac.)
  
2. The maximum amount of aggregate to be removed from this site in any calendar year is 1,800,000 tonnes.
  
3. In the event that Walker obtains permission from the City of Niagara Falls to extract the road allowance(s), the licensee may apply to the ~~MND~~MNRF to amend the licence and site plan to expand the licence boundary to include the road allowance directly adjacent to the licence boundary (i.e. Upper's Lane and/or the road allowance between Lots 120 and 136). An expansion to the licence boundary for this purpose will not require a new licence under Section 7 of the Aggregate Resources Act (ARA).
  
4. All technical reports have taken into consideration the potential removal of the road allowance(s).
  
5. Table 1 on this drawing identifies the number of sensitive receptors within 500 metres of the licence boundary and the distance from the licence boundary to each receptor.

**B. Hours of Operation**

1. The proposed quarry will have the following hours of operation:

<b>Activity</b>	<b>Monday to Friday</b>	<b>Saturday</b>	<b>Sunday</b>
Drilling, extraction (at working face)	7:00 am to 7:00 pm	7:00 am to 7:00 pm	N/A
Blasting	8:00 am to 6:00 pm	N/A	N/A
Aggregate processing at mobile crusher plant	7:00 am to 7:00 pm	7:00 am to 7:00 pm	N/A
Asphalt plant operations	24 hours per day	24 hours per day	24 hours per day
Internal hauling of aggregate and/or recycled material: - From working face (shot rock) to mobile crusher plant - From mobile crusher plant/stockpiles to asphalt plant	7:00 am to 7:00 pm  24 hours per day	7:00 am to 7:00 pm  24 hours per day	N/A  24 hours per day
Aggregate and recycling shipping to and/or from the quarry (including hot mix asphalt shipping from quarry and receiving recycled asphalt to quarry)	24 hours per day	24 hours per day	24 hours per day
Maintenance	24 hours per day	24 hours per day	24 hours per day
<b>Conveyor to the mobile crusher plants</b>	<b>7:00 am to 7:00 pm</b>	<b>7:00 am to 7:00 pm</b>	<b>N/A</b>

Activity	Monday to Friday	Saturday	Sunday
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No operations shall occur on Statutory Holidays except as noted below.

A response to emergencies is not limited by the hours of operations shown on this plan.

### C. Proposed Entrances/Exits and Fencing

1. For the Mid Extraction Area:

a. All traffic for operations will enter and exit the Mid Extraction Area from Upper's Lane using a main entrance/exit in the location generally shown on the plan view.

~~b. If an entrance/exit off of Upper's Lane is not permitted, traffic for operations will enter and exit the Mid Extraction area from Thorold Townline Road. If approved, the site plan will be updated to accurately depict the location of the entrance/exit off of Thorold Townline Road.~~

2. For the South Extraction Area:

a. Material will be transported to the Mid Extraction Area for processing via a conveyor over the unopened road allowance between Lots 120 and 136. Limited traffic required for operations will enter and exit the South Extraction Area via a crossing over the unopened road allowance between Lots 120 and 136, subject to approval from the City, in the location generally shown on the plan view.

~~b. If permission to cross the unopened road allowance is not granted, traffic for operations will enter and exit the South Extraction area from Thorold Townline Road. If approved, the site plan will be updated to accurately depict the location of the entrance/exit off of Thorold Townline Road.~~

3. For the North Extraction Area:

a. All traffic for operations will enter and exit the North Extraction Area from Upper's Lane using a main entrance/exit in the locations generally shown on the plan view.

~~b. If an entrance/exit off of Upper's Lane is not permitted, traffic for operations will enter and exit the North Extraction area from Thorold Townline Road. If approved, the site plan will be updated to accurately depict the location of the entrance/exit off of Thorold Townline Road.~~

~~4. Only one operational entrance/exit will be utilized at any one time.~~

5. Once established, each operational entrance/exit shall be gated. All gates shall be kept closed during hours of non-operation and shall be maintained throughout the life of the licence.

6. The licence boundaries shall be fenced in the locations shown on the plan view (prior to the commencement of operations) and shall be maintained for the life of the licence with upkeep during periodic inspections (see Section N Variations from Control and Operation Standards on this drawing).

### D. Drainage and Siltation Control

1. Silt fencing/sediment control measures will be installed within the Watercourse Realignment Transition Area prior to extraction in each extraction area and along the easterly and northerly limits of Phase 1B after the watercourse realignment is completed.

## **E. Site Preparation**

1. All existing structures within the licence boundary shall be demolished or removed (and any associated residential entrances closed off) prior to extraction in each extraction area. Prior to erecting or demolishing a building, all necessary Permits shall be obtained by the City in accordance with the Ontario Building Code Act, to the satisfaction of the Building Services Division and the Fire Prevention Division.
2. Timber resources (if any) will be salvaged for use as saw logs, fence posts and fuel wood where appropriate. Stumps and brush cleared will be burned (with applicable permits), used for shoreline habitat enhancement or mulched for use in progressive rehabilitation.
3. Areas of the site will be stripped of topsoil/overburden in stages in accordance with the phases. Topsoil and overburden will be stripped and stored in berms and/or stockpiles wherever feasible.
4. Topsoil and overburden shall be placed in perimeter acoustic/visual berms, pond construction, watercourse realignment or used immediately for progressive rehabilitation in this licence or existing Licence Numbers 11175 and 4437 (see Section N Variations from Control and Operation Standards on this drawing).
5. Excess topsoil and overburden not required for immediate use in berms or rehabilitation may be temporarily stockpiled on the quarry floor. Topsoil and overburden stockpiles shall be located within the limit of extraction and remain a minimum of 30 metres from the licence boundary and 90 metres from a property with a residential use.
6. Temporary topsoil and overburden stockpiles which remain for more than one year shall have their slopes vegetated to control erosion. Seeding shall not be required if these stockpiles have vegetated naturally in the first year.

## **F. Setbacks, Berms and Screening**

1. Setbacks are as shown on the plan view. Excavation will occur within the extraction setback area along the west and northwest area of the licensed boundary to accommodate grading required for the realignment of the existing watercourse. Furthermore, areas within the setbacks will be accessed as necessary to perform general site servicing, maintenance (berming, fencing etc.) and progressive rehabilitation. See Section N Variations from Control and Operation Standards on drawing 2 of 6.
2. Locations and heights for all acoustic/visual berms are provided on the plan view. All proposed berms shall be constructed in accordance with the "Typical Acoustic Berm Detail" (on this drawing), "Typical Visual Berm Detail" (on drawing 4 of 6) and, more specifically, berms adjacent to Beechwood Road will be constructed in accordance with "Typical Berm - Adjacent to Beechwood Berm Detail" (on this drawing). Where the proposed berm transects the existing watercourse along the north perimeter, a culvert shall be installed in accordance with DFO requirements. Culverts will also be installed under berms, where

necessary, to maintain existing drainage to and from off-site and to the existing watercourse. All proposed berms ~~and~~ will be vegetated **with non-invasive plant species** and maintained to control erosion. Temporary erosion control will be implemented as required.

3. Perimeter acoustic berms may be removed for final rehabilitation in the final Phase when they are no longer required for noise attenuation.
4. Any natural treed buffer areas in the setbacks will be maintained where feasible subject to berm requirements.

## **G. Site Dewatering**

1. Surface water will be discharged from the sump areas to the existing watercourse until the watercourse is realigned to the location of Phases 1B and 2B. Once the watercourse realignment has been completed, surface water will be discharged from the sumps to the realigned watercourse in Phase 1B.
2. Sump: During quarry development, a portable submersible pumps will be installed in each Initial Sinking Cut Area for the purpose of dewatering to maintain a dry working area and/or aggregate washing. Water will be pumped from the sumps to a pond where it is either used for aggregate washing or discharged to the existing watercourse. The sumps shall be relocated (as required) within each extraction area during the operational life of the quarry.

## **H. Extraction Details**

1. The extraction sequence is outlined on drawing 3 of 6.
2. The proposed maximum depth of extraction is indicated by the spot elevations shown on the plan view. Extraction shall proceed to a maximum depth of approximately 42 m below ground surface (ranging in elevation from 141 masl in the southwest to 149 masl in the northeast portions of the site), corresponding to the geologic base of the Gasport dolostone of the Lockport Group.
3. For the "Watercourse Realignment Transition Area", the maximum depth of extraction is approximately 1 metre (down to an elevation of 174 masl) and any extraction in the "Watercourse Realignment Transition Area" shall be completed as part of site preparation (construction of compensatory ponds). No drilling or blasting shall be permitted in the "Watercourse Realignment Transition Area".
4. Internal haul road locations shall vary as extraction progresses and will be located on the quarry floor with the exception of at grade crossings.
5. Blasted aggregate will be transported back to the mobile crusher plant and processing area on the quarry floor for processing and shipping.
6. An office/scale house and weigh scale will be established on site. A maintenance shop and shed(s) may be constructed on site. Portable office/storage trailers and structures associated with fuel storage may be brought onto the site for temporary periods for uses associated with quarry activity. All structures shall remain 30 metres from the licence boundary / Trans Canada Pipelines easement or 90 metres from the licence boundary if the

boundary abuts land that is used for residential purposes or is restricted to residential use by the Zoning By-law at the time the licence is issued.

7. Aggregate stockpiles (including recyclable material) shall be located within the limits of extraction and remain a minimum of 30 metres from the licence boundaries (except where the licence boundaries abut Upper's Lane and the unopened road allowance - See Section N Variations from Control and Operation Standards on this drawing) and 90 metres from a property with a residential use.

## I. Equipment and Processing

1. A portable processing plant (including primary, secondary and tertiary crushing and screening units) will be permitted within the North and Mid Extraction Areas inclusive.
2. Processing shall be located within the limit of extraction and remain a minimum of 30 metres from the licence boundary and 90 metres from a property with a residential use.
3. During the sinking cuts and early phases of operation, the primary crusher will be integrated into a single processing plant located near the working face. In later phases, the primary crusher will split from the single integrated plant and start to follow the working face. The processing plant, which contains the secondary and tertiary crushers, ~~will remain close to the quarry entrance~~ shall be placed in the location identified on the Extraction Sequence Schematic on drawing 3 of 6 during each stage of extraction. The processing plant will be located at varying elevations, beginning at the top of rock during the sinking cut portion of operations, and moving to the first bench and then the final quarry floor as space becomes available. See note A.3. on drawing 4 of 6 for additional information.
4. Once processing has progressed to Phase 2A, a hot mix asphalt (HMA) batch plant facility shall be established on the quarry floor (in the location shown on the plan view) in Phase 1A. The HMA batch plant shall remain in the location shown on the plan view for the life of the quarry until extraction is complete and shall be removed during progressive rehabilitation.
5. In Phase 4, the portable processing plant shall require additional shielding in accordance with note A.5 on drawing 4 of 6.
6. A wash plant and temporary wash ponds may be established and located to move together with the portable processing plant, subject to permit approval from MECP.
7. Equipment to be used onsite may include, but shall not be limited to:
  - a. Working Face - 1 silenced rock drill; 1 loader;
  - b. Processing - 1 portable processing plant including crushers, screeners, and stackers; 2 loaders (at stockpiles);
  - c. Asphalt - 1 asphalt plant; 2 loaders, 1 compressor vent, 1 dust controller blower (motor and stack); elevator motor, conveyor motor, oven motor, pug mill (door and motor);
  - d. Conveyor(s);



- e. Generator(s) (diesel-fueled); and
- f. Rock trucks, haul trucks, shipment trucks and fuel trucks.

~~8. If required, an Environmental Compliance Approval will be obtained for processing equipment to be used on-site.~~

- 8. Wash pond(s) and sump(s) may be permitted in accordance with Environmental Compliance Approval or Permit to Take Water Requirements. The pond(s) and sump(s) will move throughout operations and as extraction progresses horizontally and vertically.
- 9. Equipment used for construction of the perimeter berms/barriers, overburden stripping, rehabilitation, the new watercourse corridor, as well as other quarry related construction projects will be utilized on site.

#### **J. Frequency / Timing of Blasts**

- 1. Prior to blasting being permitted within the ~~400~~ 300 metre setback of the TransCanada Pipeline, identified as 'TransCanada Blasting Buffer Area' on this Plan, the licensee shall address the requirements of notes D.5 on drawing 4 of 6.
- 2. All blast monitoring reports shall be retained by the licensee for a period of seven years after each blast and made available upon request for audit purposes. See Section D on drawing 4 of 6 for detailed blasting requirements.

#### **K. Fuel Storage**

- 1. Fuel storage tanks will be located in close proximity to the main processing plant (or in an alternative location subject to approval by the MNDNR). Fuel storage tanks shall be installed and maintained in accordance with Technical Standards and Safety Act, 2000. Liquid Fuels Handling Code, 2000 and Liquid Fuels Regulation Reg. 217/01.
- 2. All fuel tanks shall be doubled sided or placed in containment facilities large enough to hold the tanks maximum volume.
- 3. Fuel trucks shall be used to transfer fuel to on-site equipment in accordance with the Liquid Fuels Handling Code, 2000.
- 4. A Spills Contingency Plan shall be prepared and implemented prior to site preparation. The Spills Contingency Plan shall be available on site and all employees and contractors shall be informed and required to comply with this plan.

#### **L. Spills Plan**

- 1. In case of an accidental spill of petroleum products, the following contingency plan will be activated:
  - a. The Ministry of Environment, Conservation and Parks (MECP) (see address and phone number below) and surrounding landowners will be notified.

- b. For a leakage or spill, immediate action will be taken to stop it. At the same, measures will be taken to prevent spreading. These measures may include building a berm or construction of a ditch, for instance.
- c. The quarry operator shall commence recovery procedures by collecting the spilled substance into containers.
- d. The soil in the area affected by the spill or leak shall be removed and disposed of at a location prescribed by the MECP.

**Ministry of Environment, Conservation and Parks**

Niagara District Office  
Garden City Tower 9th Floor Suite 15  
301 St. Paul Street  
St. Catharines, Ontario  
L2R 7R4

Spills Action Centre: 1-800-268-6060

**M. Scrap and Recycling**

- 1. Scrap may be stored on-site and shall be removed on an on-going basis.
- 2. Scrap shall only include material generated directly as a result of the aggregate operation such as refuse, debris, scrap metal, lumber, discarded machinery, equipment and motor vehicles.
- 3. All fluids shall be drained from any discarded equipment, machinery or motor vehicle prior to storage and disposed of in accordance with the Environmental Protection Act.
- 4. Scrap shall not be stored within 30 metres of any body of water or the licence boundary and shall be kept in close proximity to the main processing plant.
- 5. Recycling of asphalt, concrete, porcelain and glass shall be permitted on-site.
- 6. Recyclable asphalt materials shall not be stockpiled within:
  - 6.1. 30 metres of any waterbody or man-made pond; or
  - 6.2. 2 metres of the ground water table.
- 7. Recyclable material shall be kept in close proximity to the main processing plant **and shall be stored separately on the quarry floor and within the extraction area limit.**
- 8. Rebar or other structural metal shall be separated from recyclable aggregate material during processing and placed in a designated scrap pile on-site which shall be removed on an on-going basis.
- 9. Recycled aggregate shall be removed on an on-going basis.

10. Recycling activities shall not interfere with the operational phases of the site or with rehabilitation.
11. Once the site is depleted, no further importation of recyclable material shall be permitted.
12. Once final rehabilitation has been completed and approved in accordance with the site plan, all recycling operations shall cease.
13. The site shall be kept in an orderly condition.

#### N. Variations from Control and Operation Standards

Variations from Control and Operation Standards			
No.	Variation	Rationale	Standard (0.13)
1	<p>Extraction shall occur within 30 metres but no closer than 15 metres from the Upper's Lane road allowance and the unopened road allowance between Lots 120 and 136.</p> <p>In addition, <del>as part of construction of any access shown on the Site Plan and the existing watercourse realignment</del>, extraction may occur:</p> <ul style="list-style-type: none"> <li>- Within the 15 metre setback from the Upper's Lane road allowance and the unopened road allowance between Lots 120 and 136 <del>for access purposes</del>,</li> <li>- Within the 15 metre setback from the north and south boundaries of the site <del>for riparian corridor</del> construction and</li> <li>- Within the 30 metre setback from Thorold Townline Road <del>for riparian corridor construction</del></li> </ul>	<p>Upper's Lane and the unopened road allowance are isolated since no road allowance exists for either to the west of Thorold Townline Road or east of Beechwood Road.</p> <p>Setbacks will be disturbed in order to facilitate construction associated with the site access points and watercourse realignment.</p>	(1) 9 and 10

Variations from Control and Operation Standards			
No.	Variation	Rationale	Standard (0.13)
2	<p>Overburden may be removed from the extraction setback area to permit:</p> <ul style="list-style-type: none"> <li>- Extraction within 30 metres but no closer than 15 metres from Upper's Lane road allowance and the unopened road allowance between Lots 120 and 136</li> </ul> <p>Overburden and aggregate may be removed from the excavation setback areas <del>to permit the construction of any access or to implement the existing watercourse realignment</del> as follows:</p> <ul style="list-style-type: none"> <li>- Within the 15 metre setback from the Upper's Lane road allowance and the unopened road allowance between Lots 120 and 136 <del>for access purposes,</del></li> <li>- Within the 15 metre setback from the north and south boundaries of the site <del>for riparian corridor construction</del> and</li> <li>- Within the 30 metre setback from Thorold Townline <del>Road for riparian corridor construction</del></li> </ul>	<p>Upper's Lane and the unopened road allowance are isolated since no road allowance exists for either to the west of Thorold Townline Road or east of Beechwood Road.</p> <p>Setbacks will be disturbed in order to facilitate construction associated with the site access points and watercourse realignment.</p>	(1) 11
3	<p>Topsoil and overburden may be moved between this Licence and Licence Numbers 11175 &amp; 4437. <del>to provide for effective rehabilitation of these licences.</del></p>	<p>This will provide for effective rehabilitation of these licences.</p>	(1) 18
4	<p>A portion of the quarry face shall remain vertical. See Rehabilitation Plan, drawing 5 of 6.</p>	<p>Vertical faces above and below the lake level will create a more diverse habitat and visually appealing rehabilitated landform.</p>	(1) 19
5	<p>The licence boundary for the North Extraction Area shall not be fenced on or west of the Trans Canada Pipeline easement. Fencing shall be erected on the eastern extent of the easement.</p>	<p>This will allow Trans Canada to have unobstructed access to the easement for maintenance purposes.</p>	(3)(a)

## O. Trans Canada Pipeline (TCPL)

1. The licensee shall notify TCPL if it intends to blast within 300 metres of their right-of-way (easement). No blasting shall occur until written consent is obtained from TCPL.
2. Any other work (other than blasting) within 30 metres of TCPL's right-of-way requires written consent from TCPL.

3. Crossing of the TCPL right-of-way with vehicles is not permitted without written consent from TCPL.
4. No material extraction shall be permitted within 40 metres of TCPL's right-of-way without written consent from the Canada Energy Regulator (CER), formerly NEB or National Energy Board.
5. No buildings or structures shall be constructed anywhere on TCPL's right-of-way. Permanent buildings and structures shall be located a minimum of 7 metres from the edge of the TCPL right-of-way. Temporary or accessory buildings shall be located a minimum of 3 metres from the edge of the right-of-way.
6. A minimum setback of 7 metres from the nearest portion of a TCPL pipeline right-of-way shall also apply to any parking area or loading area, including any parking spaces, loading spaces, stacking spaces, bicycle parking spaces, and any associated drive aisle or driveway.

## EXTRACTION SEQUENCE – DRAWING 3 OF 6

### General

1. This plan depicts a schematic operations sequence for the property based on the best information available at the time of preparation.
2. Phases do not represent any specific or equal time period.
3. The direction of extraction will **generally** be in accordance with the General Direction of Excavation (shown on the plan view) **unless otherwise authorized by MNRF**. **Notwithstanding the operational and rehabilitation notes, demand for certain products, blending of materials or Water Study Contingency measures may require minor deviations in the extraction and rehabilitation sequence. Any major deviations from the operations sequence shall require approval from the MNRF. The maximum combined disturbed area which includes the processing plant, berms, stockpiles, silt pond, active extraction area and area being stripped for the next area of extraction within the licence boundary identified on this Drawing but excludes the area of Phase 1A needed for the continued operation of the asphalt plant for the life of the quarry. Concurrent extraction of phases is permitted for blending purposes provided the overall maximum combined disturbed area does not exceed 40 hectares to ensure progressive rehabilitation of the site is being undertaken as required by the Site Plans.**
4. Progressive and final rehabilitation will be completed in direct correlation to the development of the quarry as the extraction limits are reached and enough area is available to ensure that rehabilitation activities will not interfere with the production, stockpiling and processing of aggregate materials.

### B. Initial Site Preparation

1. Generally, site preparation in Phases 1 and 2 to include but not limited to:
  - a. Constructing the main entrance and cross over(s) in accordance with entrance permit approvals
  - b. Establishing fencing around licenced boundary (see Section N Variations from Control and Operation Standards on drawing 2 of 6)
  - c. Removal of trees and existing buildings (in accordance with all site plan requirements and applicable regulations)
  - d. Proceed with stripping of overburden/topsoil from Phase 1 and, if necessary, Phase 2
  - e. Construction of berms/acoustic barriers within the perimeter setback of the licence boundary (as shown on the plan view).
2. Install water management and erosion and sediment control measures (silt fencing) in accordance with note D.1 on this drawing and note E.1.c on drawing 4 of 6.
3. Commence portable crushing/screening plant set up. The plant shall operate in accordance with Section A on drawing 4 of 6 for all Phases.

### **C. Phase 1 (1A and 1B)**

1. Commence extraction in the 'Initial Sinking Cut Area' identified in the Mid and South Extraction Area (see plan view for location).
2. Phase 1A shall be extracted in up to three (3) lifts to a depth ranging between 140 masl and 145 masl.
3. Phase 1B shall be extracted in one (1) to two (2) lifts to a depth of 155 masl.
4. A portable pump shall be utilized as necessary in the Mid Extraction Area and the South Extraction Area to discharge water to a man-made pond for aggregate washing or to a sediment forebay before being discharged to the existing watercourse. During heavy rainfall events (25 mm or more), the pump will be deactivated as necessary to prevent flooding along the watercourse downstream of the site. The discharge pond and forebay locations will move with the quarry face until the final quarry depth is reached in each extraction area. At this point, a permanent sump shall be established in each extraction area.
5. During Phase 1, a new watercourse channel shall be constructed along the east side of Thorold Townline Road (within Phase 1B) for the eventual realignment of the existing watercourse. As resource extraction is completed in Phase 1B, this area will be filled with clay overburden material from on-site to an elevation ranging between 173 to 178 masl. The new watercourse and riparian wetland channel shall be constructed, designed and vegetated in accordance with DFO's authorization and this Rehabilitation Plan (drawing 5 of 6).
6. As extraction reaches the final quarry floor, and there is sufficient separation from the quarry floor working areas in Phase 1A, a 2:1 sideslope along the easterly and northerly limit of Phase 1B shall be backfilled with either: (i) overburden stockpiled on-site; (ii) overburden in Phase 2; or (iii) material imported from Licence Numbers 11175 4437.
7. Commence site preparation of Phase 2.

### **D. Phase 2 (2A & 2B)**

1. Commence extraction in the 'Initial Sinking Cut Area' identified in the North Extraction Area (see plan view for location).
2. Phase 2A shall be extracted in up to three (3) lifts to a depth ranging between 141 masl to 145 masl.
3. Phase 2B shall be extracted in one (1) to two (2) lifts to a depth of 155 masl.
4. A portable pump shall be utilized as necessary to discharge water to a man-made pond for aggregate washing or to a sediment forebay before being discharged to the existing watercourse. During heavy rainfall events (25 mm or more), the pump will be deactivated as necessary to prevent flooding along the watercourse downstream of the site. The discharge, pond and forebay locations will move with the quarry face until the final quarry depth is reached. At this point, a permanent sump will be established.

5. Similar to Phase 1, the new watercourse channel shall be constructed within Phase 2 running along the east side of Thorold Townline Road (Phase 2B) for the eventual realignment of the existing watercourse. As resource extraction is completed in Phase 2B, this area will be filled with clay overburden material from on-site to an elevation ranging between 173 to 178 masl. The new watercourse and riparian wetland channel will be constructed, designed and vegetated in accordance DFO authorization and Rehabilitation Plan (drawing 5 of 6).
6. As extraction reaches the final quarry floor, and there is sufficient separation from the quarry floor working areas in Phase 2A, a 2:1 sideslope along the easterly and northerly limit of Phase 2B shall be backfilled with either: (i) overburden stockpiled on-site; (ii) overburden in Phase 3B; or (iii) material imported from Licence Numbers 11175 and 4437.
7. Commence site preparation of Phase 3.

#### **E. Phase 3 (3A & 3B)**

1. Proceed with stripping of overburden/topsoil.
2. Prior to undertaking any works within Phase 3A that may result in any serious harm to fish, according to 35(1) of the Fisheries Act, the Licensee shall obtain a Fisheries Act Authorization from the Department of Fisheries and Oceans (DFO) and shall fulfill any other conditions required by the DFO as stated on its authorization. **Once obtained, a copy of the Fisheries Act Authorization shall be provided to the MNRF.** Once the watercourse has been realigned to the satisfaction of DFO, stripping of overburden and topsoil can proceed in Phase 3A.
3. In the event that watercourse relocation has not been approved or completed, extraction in Phase 3B may proceed before extraction in Phase 3A.
4. In the event that Phase 3B is extracted before Phase 3A, a portable pump shall be utilized as necessary to discharge water to a man-made pond for aggregate washing or to a sediment forebay before being discharged to the existing watercourse. During heavy rainfall events (25 mm or more), the pump will be deactivated as necessary to prevent flooding along the watercourse downstream of the site. The discharge, pond and forebay locations will move with the quarry face until the final quarry depth is reached. At this point, a permanent sump will be established.
5. Phase 3A and 3B shall be extracted in up to three (3) lifts to a depth ranging between 145 masl to 149 masl. Extraction will proceed in an easterly direction, moving gradually from north to south.
6. Once the existing watercourse has been realigned, extraction in Phase 3A may proceed.
7. Continue progressive rehabilitation of the quarry perimeter where limits of extraction have been reached and there is sufficient separation from the quarry floor working areas.
8. Commence site preparation of Phase 4.

#### **F. Phase 4**



1. Proceed with stripping of overburden/topsoil.
2. Commence Phase 4 extraction in an easterly direction, moving gradually from north to south.
3. Phase 4 shall be extracted in up to three (3) lifts to a depth ranging between 142 masl in and 147 masl.
4. Continue progressive rehabilitation of the quarry perimeter where limits of extraction have been reached and there is sufficient separation from the quarry floor working areas.

#### **G. Phase 5**

1. Proceed with stripping of overburden/topsoil.
2. Commence Phase 5 extraction in an easterly direction, moving gradually from north to south.
3. Phase 5 shall be extracted in up to three (3) lifts to a depth ranging between 140 masl and 143 masl.
4. Continue progressive rehabilitation of the quarry perimeter where limits of extraction have been reached and there is sufficient separation from the quarry floor working areas.

#### **H. Final Phase**

1. Complete extraction of any remaining resource in the extraction limit near the entrance in Phase 1A and 1B (e.g. ramp).
2. As part of the final operations of the site, remove office/scale house and scales, **-asphalt plant, recycled asphalt material** and any other equipment and scrap from the site.
3. Continue with final rehabilitation of the site. Complete quarry face backfilling on the remaining quarry faces as identified on drawing 5 of 6.

## RECOMMENDATIONS – DRAWING 4 OF 6

### Acoustic Assessment

1. Minimum 3 metre tall acoustic berms shall be constructed in the locations shown on the plan view.
2. The acoustic berms shall be constructed during site preparation and prior to extraction.
3. The primary crusher shall stay within 30 metres of the working face to maximize shielding effect of the quarry terrain, **except when extraction is in the South Extraction Areas as per note A.4 below.**
4. Material extracted from the South Extraction Area shall be processed in the Mid Extraction Area.
5. While processing in Phase 4, the licensee shall maintain an 8 metre tall barrier at a radius of 40 metres to the southeast of the processing plant's secondary crushers (see plan view for location). The barrier can be material stockpiles, noise walls, or a combination of both. The barrier shall extend long enough to shield receptors R4 and R5 (see plan view) from the secondary crushers.
6. All construction equipment shall meet the sound emission standards defined in MECP Publication NPC-115.
7. The following best practice measures shall be undertaken to minimize the potential for construction noise impacts related to site preparation, berm creation and rehabilitation but not related to extraction and processing activities:
  - a. Construction will be limited to time periods allowed by the City's applicable by-laws. If construction activities are required outside of these hours, the licensee will seek permits / exemptions directly from the City in advance.
  - b. All internal combustion engines will be fitted with appropriate muffler systems.
  - c. The licensee's operating procedures will contain a provision that any initial complaint will trigger verification that the general noise control measures agreed to on this Plan are in effect.
  - d. In the presence of persistent noise complaints, all construction equipment will be verified to comply with MECP's NPC-115 guidelines.
  - e. In the event of verified noise complaints, alternative noise control measures may be required where reasonably available. In selecting appropriate noise control and mitigation measures, consideration will be given to the technical, administrative and economic feasibility of the various alternatives.

### B. Air Quality

1. The licensee shall apply water or another provincially approved dust suppressant to internal haul roads and processing areas, as necessary to mitigate dust.

2. Processing equipment shall be equipped with dust suppressing or collection devices, where the equipment creates dust and is operating within 300 metres of an air quality sensitive receptor (as set out in the Air Quality Impact Assessment).
3. The licensee shall obtain an environmental compliance approval under the Environmental Protection Act where required to carry out operations at the quarry.
4. The site will operate in accordance with the Best Management Practices Plan (BMPP) for Fugitive Dust Emissions. The BMPP may be amended from time to time, considering actual impacts and operational considerations. The recommendations in the BMPP are based on the maximum daily production rates. At lower production rates, the control measures specified in the BMPP can be reduced accordingly, provided dust remains mitigated on site.
5. The following mitigation measures shall be incorporated into the BMPP:
  - a. Blasting operations occurring within 300 metres of a residential receptor shall have a smaller blast area, not exceeding 200 m<sup>2</sup> in area.
  - b. Aggregate extraction, processing and shipping does not exceed 9,000 tonnes per day.
  - c. Under dry conditions, the capacity to apply water on an hourly basis to all traveled haul routes within the licence boundaries.

### C. Archaeology

1. Areas identified as "Archaeological Site - Protected Areas Requiring Further Archaeological Assessment" on this drawing reflect areas that require further archaeological assessment and are protected by a 20 to 30 metre protective buffer. A 50 metre monitoring buffer is also identified on this drawing.
2. No ground alterations including overburden stripping and excavation, or development of any kind shall occur within areas identified as "Archaeological Site - Protected Areas Requiring Further Archaeological Assessment" and their respective protective buffers until:
  - a. the required investigations are completed in accordance with the Stage 1 and 2 Archaeological Assessment prepared by Archaeological Research Associates Ltd. (April 2020),
  - b. any recommendations that the respective site(s) has no further cultural heritage value or interest are made as a result of completing further investigations, and,
  - c. the associated reports are entered into the Ontario Public Register of Archaeological Reports and copies are provided to the MNRF.
3. Until note C.2 has been satisfied, a temporary barrier shall be established around the perimeter of each 'Archaeological Site - Protected Areas Requiring Further Archeological Assessment' identified on this drawing as part of site preparation and in advance of extraction ground alteration.
4. All soil disturbing activities within the 50 metres monitoring buffers shall be monitored by a licensed archaeologist to ensure the effectiveness of the avoidance strategy. The archaeologist shall ensure that the temporary barrier is in the appropriate location and shall

be empowered to stop construction if there is a concern for impacts to an archaeological site. 'No go' instructions shall be issued to all work crews for the protected areas, and the locations of the protected areas shall be shown on all appropriate contract drawings. The protected areas shall be inspected by a licensed archaeologist once the strategy is no longer required, and the effectiveness of the strategy shall be reported to the MHSTCI.

5. Immediately upon issuance of the Licence, and once the construction schedule has been finalized, a licensed archaeologist will be retained by the licensee so that monitoring can occur where required. The remaining archaeological fieldwork will be completed upon issuance of the licence by the ~~MND~~MNRF.
6. Should deeply buried archaeology remains be found during the course of site preparation and/or extraction related activities, the MHSTCI shall be notified.
7. In the event that human remains are encountered during construction or extraction activities, the licensee shall immediately contact both the MHSTCI and Registrar or Deputy Registrar of the Cemeteries Regulation Unit of the Ministry of Government and Consumer Services (MGCS).

#### **D. Blasting**

1. An attenuation study shall be undertaken by an independent blasting consultant during the first 12 months of operation in order to obtain sufficient quarry data to confirm the initial guideline parameters and assist in refining future blast designs.
2. All blasts shall be monitored for both ground vibration and overpressure at the closest privately owned sensitive receptors adjacent the site, or closer, with a minimum of two (2) instruments - one installed in front of the blast and one installed behind the blast.
3. Blasts shall be designed to maintain vibrations below 13mm/s at the location of the closest identified active spawning bed as per DFO guidelines. When blasting during active spawning season, a minimum of one supplemental vibration monitor shall be installed on the shoreline closest to the spawning bed to confirm the vibration levels.
4. The guideline limits for vibration and water overpressure shall adhere to standards as outlined in the Guidelines For the Use of Explosives In or Near Canadian Fisheries Waters (1998) or any such document, regulation or guideline which supersedes this standard.
5. All blasts shall be monitored for ground vibration at the adjacent Trans Canada Energy High Pressure Natural Gas Pipeline when blasting within 100m of the pipeline or when calculations suggest vibrations in excess of 35mm/s.
6. Blasts shall be designed to maintain vibrations at the transmission towers in the Hydro One Corridor below 50mm/s or any such document, regulation or corporate policy in effect at the time. When vibration calculations suggest vibrations at the towers may exceed 35mm/s, the towers shall be monitored for ground vibration.
7. Blasts shall be designed to maintain vibrations at the 4832 Thorold Townline Road utility buildings below 50mm/s. When vibration calculations suggest vibrations at the utility buildings may exceed 35mm/s, the buildings shall be monitored for ground vibration.

8. The guideline limits for ground vibration and air overpressure shall adhere to standards as outlined in the Model Municipal Noise Control By-law publication NPC 119 (1978) or any such document, regulation or guideline which supersedes this standard.
9. Orientation of the aggregate extraction operation shall be designed and maintained so that the direction of the overpressure propagation will be away from structures as much as possible.
10. Blast designs shall be continually reviewed with respect to fragmentation, ground vibration and overpressure. Blast designs shall be modified as required to maintain compliance with current applicable guidelines and regulations.
11. Detailed blast records shall be maintained in accordance with current industry best practices.

## **E. Natural Heritage**

### **1. General**

- a. Existing vegetation within the setbacks shall be maintained except where berms, haul roads and conveyors are required.
- b. New vegetation shall be maintained in accordance with note G.5 on this drawing.
- c. Silt fencing shall be installed at the easterly limit of Phases 1A and 2A where field drainage enters the existing watercourse. Silt fencing will serve to demarcate the limit of protected area until the watercourse is diverted.
- d. Stockpiling of all excavated material shall be in accordance with note H.7 on drawing 2 of 6.
- e. Topsoil and overburden stockpiles shall be maintained in accordance with the Best Management Practices for the Protection, Creation and Maintenance of Bank Swallow Habitat in Ontario (MNRF 2017). Stripped overburden and topsoil for rehabilitation shall be utilized in accordance with notes E.4, E.5 and E.6 on drawing 2 of 6.
- f. Dust control will be implemented in accordance with Section B on this drawing.
- g. Fuel storage shall be in accordance with the notes under Section K on drawing 2 of 6.

### **2. Natural Channel Design**

- a. The existing watercourse will remain open (not culverted) where it enters the south limit of the South Extraction Area.
- b. Where the watercourse exits the North Extraction Area, a culvert will be installed to maintain the watercourse while allowing an acoustic berm to be constructed. As part of final rehabilitation, the berm and culvert shall be removed to allow for the watercourse to be open.

- c. As part of site preparation, a compensation pond will be constructed in the Watercourse Realignment Transition Area within Phase 2B, in accordance with the Natural Channel Design Report (Stantec 2021). The compensation pond will be excavated to a maximum depth of 174 masl in this area and in accordance with DFO authorization. No drilling or blasting shall occur in this Transition Area.
- d. As extraction is completed in Phases 1B and 2B, these areas will be filled with clay overburden material to an elevation ranging between 173 to 178 masl. In accordance with the Natural Channel Design Report (Stantec 2021), a new watercourse channel will be constructed, vegetated and designed in these areas and will include the following design elements:
  - d.1. Floodplain wetlands
  - d.2. Fish habitat ponds, including new pike spawning habitat as well as foraging, spawning and rearing habitat for other fish species
  - d.3. Creek sections
  - d.4. Wood debris toe protection and wood reinforced banks
  - d.5. Log sills
  - d.6. Augmented riffle.
- e. Culverts will be installed under Upper's Lane and the unopened road allowance.
- f. 2:1 side slopes shall be established on the east side of the new watercourse channel down to the quarry floor.
- g. Once the realigned watercourse channel has been constructed in Phases 1B and 2B and adequate vegetation **to mitigate potential erosion** has been established (as confirmed by an ecologist), water from the existing watercourse will be diverted to the realigned watercourse in consultation with regulatory authorities. **A fish rescue will be undertaken prior to dewatering and channel relocation. A License to Collect Fish for Scientific Purposes will be obtained for the fish rescue.**

### 3. Woodland and Terrestrial Habitat Enhancement

- a. The 2.0 ha woodland situated on the east side of Thorold Townline Road shall be removed during the advancement of operations in Phase 1A/1B. Tree clearing in the woodlot shall be undertaken outside of the breeding bird period and the active bat season from March 23 and August 26.
- b. The lands identified off-site as "Woodland Compensation Area" on this drawing, an area of 4.7 ha, shall be planted in accordance with the Rehabilitation Plan (drawing 5 of 6).
- c. The lands identified on-site as Deciduous Woodland, Treed Deciduous Swamp and Swamp Thicket / Marsh Meadow on drawing 5 of 6, an area of 4.0 ha, shall be planted in accordance with the Rehabilitation Plan.

- d. Planting for the off-site woodland compensation will commence in the appropriate planting season following licence approval.

#### 4. Significant Wildlife Habitat and Wildlife

- a. Vegetation clearing where milkweed plants are present will proceed when monarch larvae are absent (September 30 to April 1).
- b. The setbacks along Thorold Townline Road and Beechwood Road shall be planted with a mix of deciduous and coniferous trees and shrubs with a range of sizes. Native plant materials that are complementary to the regional and local landscape shall be used (see Rehabilitation Plan, drawing 5 of 6).

#### 5. Woodland and Wildlife Habitat Compensation Plan

- a. A woodland and wildlife habitat compensation plan shall be prepared in consultation with regulatory authorities to: (i) allow practices and management to respond to changing forest dynamics in the Woodland Compensation Areas such as pest infestations, climatic conditions (e.g. species selection) and restoration ecology; and (ii) achieve a net gain in the ecological functions of the local and regional landscape through:
  - a.1. Increasing the total area of woodland cover in the regional landscape;
  - a.2. Improving associated landscape functions such as vegetative linkages and interior forest areas
  - a.3. Improving forest ecological characteristics such as species diversity, age class distribution and structural diversity, while retaining native genetics through seed collection and replanting. For example, prior to the removal of the existing 2 ha woodland:
    - a.3.1. Tree seeds and nuts will be gathered from the woodland for direct planting in the Woodland Compensation Area to promote the continuity of local genetic stock and a similar community composition to the removed vegetation community (FOD9)
    - a.3.2. Leaf litter and sods containing native understory vegetation will be transplanted to promote rapid establishment of a healthy forest soil microbiome
    - a.3.3. Transplanting of native saplings and small shrubs from the woodland to the compensation planting area, where feasible.
  - a.4. Incorporating specific wildlife habitat features for bats, deer and other wildlife, such as bat roosting structures (bat boxes or condos), coniferous tree clusters for cover, browse-tolerant shrubs and mast producing trees;
  - a.5. Incorporating specific planting in setbacks and the watercourse realignment channel. For example, plantings that provide habitat for monarch including

common milkweed (*Asclepias syriaca*), swamp milkweed (*Asclepias incarnata*) and nectar producing plants.

#### 6. Fish and Fish Habitat

- a. Implement notes D.3 and D.4 on this drawing.
- b. Water shall be discharged from the sump area to the existing watercourse until water flow is diverted to the watercourse realignment channel. Once the watercourse realignment has been completed, water shall be discharged from the sump locations to the realigned watercourse. Pumping and discharge shall occur as required to support fish habitat.
- c. Water collected from the sump area shall be directed to a holding pond for storage to allow for settling of suspended solids and dissipation of other constituents such as hydrogen sulfide and alkalinity. Following this pond treatment, water will be discharged to the existing watercourse until water flow is diverted to the watercourse realignment channel. Once the watercourse realignment has been completed, water shall be discharged from the holding pond to the realigned watercourse. Pumping and discharge shall occur as required to support fish habitat.

#### 7. Wetlands

- a. Wetlands along the existing watercourse will be maintained until the watercourse has been diverted to the watercourse realignment channel.
- b. Once the watercourse has been diverted, the created wetlands in the watercourse realignment channel shall be maintained.

#### 8. Monitoring Program

- a. A monitoring plan shall be prepared in consultation with regulatory authorities to assess the performance of the watercourse realignment channel and to confirm that impacts to off-site wetlands are not occurring as a result of dewatering.
- b. A monitoring program of compensation planting shall be prepared in consultation with regulatory authorities to confirm stable conditions have been established.
- c. A trigger mechanism and contingency plan, as detailed in WSP's Water Study Report, shall be implemented upon licence approval to proactively ensure natural heritage features and their functions are maintained (i.e. fish habitat, wetland features downstream and at 5584 Beechwood Road, and woodlands) during operational and rehabilitation phases.

### **F. Traffic**

1. Prior to commencement of extraction operations, the required entrance improvements, road improvements and road widenings (to Thorold Townline Road) shall be completed to the satisfaction of the applicable road authorities and in general accordance with the figures titled "Uppers Lane Conceptual Intersection Design" and "Uppers Lane Vehicle Movement Diagram" provided on this drawing.



## G. Visual

1. Where possible and to the extent to which it is present, existing vegetation located along the site perimeter within the setback area shall be retained.
2. 3.0 metre high acoustic berms and 2.4 metre high visual berms shall be established in the locations shown on the plan view. Berms shall be constructed in a smooth, rolling manner with varying highpoints (where space permits while respecting minimum height requirements), and variations along the berm frontage to create a more natural appearance. Berms shall be seeded with a naturalizing mix of wildflowers and grasses to stabilize slopes and minimize mowing and maintenance.
3. Within the "Extended Planting Areas" (as shown on this drawing), trees shall be planted at a spacing of 5 to 10 metres on centre, depending on species. Where possible, plantings shall be randomly spaced and staggered up on the berm up to one third of its maximum height to appear more natural. Plantings shall also extend a minimum of 3 metres out from the berm towards the road where available space permits. All vegetation shall be selected for wind and salt tolerance and hardiness. Native **non-invasive** species that complement the existing surroundings shall be utilized.

Where "Large Planting Stock" is indicated (see plan view and "Typical Visual Berm Detail" on this drawing), this area shall be planted with deciduous trees of minimum 40 millimetres caliper, coniferous trees of minimum 1.0 metre in height, and shrub species of minimum 40 centimetres height.

Where "Small Planting Stock" is indicated (see plan view and "Typical Visual Berm Detail" on this drawing), this area shall be planted with deciduous tree whips of minimum 1.2 metres in height, coniferous trees of minimum 0.6 metre in height, and shrub species of minimum 20 centimetres height (or bare root stock when in season).

Planting shall occur for 40 metre stretches on either side of Upper's Lane and the unopened road allowance facing Thorold Town Line Road. The large planting stock shall be planted 3 metres beyond the berm and small planting stock shall extend from the toe of the berm to 2 metres up the berm.

Plant species for berms may include, but shall not be limited to the following:

### Trees

White Pine	Common Hackberry	Chokecherry
White Spruce	Paper Birch	Pin Oak
Sugar / Silver Maple	Trembling Aspen	Basswood
White Pine	White Spruce	White Cedar

### Shrubs

Staghorn Sumac	Nannyberry	Common Ninebark
American Elder	Dogwood	Highbush Cranberry

4. To ensure survival and positive growth rate, the vegetative screening shall be maintained as an effective visual screen over time. Allowance of natural succession is encouraged.
5. During the first year, planted trees shall be watered and monitored until established. After the first year and up to five years, trees shall be inspected biannually (end of Year 1, beginning of Year 3 and end of Year 4). Trees which are in poor condition at the time shall be fertilized, watered and monitored to improve their health and vigor.
6. A mortality rate of up to 15% of all trees planted over the course of the five year maintenance period is expected. Trees that die exceeding this percentage shall be replaced yearly, preferably in the spring or late summer.

## H. Water Study

1. A long-term monitoring program will be implemented during the quarry operational and rehabilitation phases, until stable conditions are observed after quarry decommissioning.
2. In the event a well interference claim is received, the licensee shall implement the following mitigation plan to protect the local groundwater users.
  - a. Prior to extraction, landowners shall be provided with a copy of the water well interference plan as well as the contact information for the licensee and MECP (Wells Help Desk 1-888-396-9355 or email [wellshelpdesk@ontario.ca](mailto:wellshelpdesk@ontario.ca)).
  - b. If a water well interference claim is received by the licensee the following actions shall be taken:
    - b.1. The licensee shall immediately notify ~~MND~~NRF and MECP of the complaint.
    - b.2. The licensee shall contact a well contractor in the event of a well malfunction and residents will be provided a temporary water supply within 24 hours, if the issue cannot be easily determined and rectified.
  - c. The well contractor shall contact the resident with the supply issue to rectify the problem as expeditiously as possible, provided landowner authorization of the work.
  - d. If the issue raised by the landowner is related to loss of water supply, the licensee shall have a qualified hydrogeologist / well contractor determine the likely causes of the loss of water supply, which can result from a number of factors, including pump failure (owner's expense), extended overuse of the well (owner's expense), lack of well maintenance / well cleaning (owner's expense) or lowering of the water level in the well from the quarry development (licensee expense). This assessment process shall be carried out at the expense of the licensee and the results provided to the homeowner.
  - e. If it has been determined that the quarry caused the water supply interference (i.e., lowering of the water level), the licensee shall continue to supply water at their expense until the problem is rectified. The following mitigation measures shall be considered, and the appropriate measure(s) implemented at the expense of the licensee:
    - e.1. Adjust pump pressure;

- e.2. Lowering of the pump to take advantage of existing water storage within the well;
  - e.3. Deepening of the well to increase the available drawdown, if the well deepening changes the water quality a water treatment shall be provided;
  - e.4. Widening of the well to increase the available storage of water;
  - e.5. Relocation of the well to another area on the property; or
  - e.6. Drilling multiple wells.
- f. If the issue raised by the landowner is related to water quality, the licensee shall have a qualified hydrogeologist / well contractor determine the likely causes of the change in water quality, and review monitoring results at the quarry and background monitoring results from the baseline well survey to determine if there is any potential correlation with the quarry. If it has been determined that the quarry caused a water quality issue, the licensee shall continue to supply water at their expense until the problem is rectified. The licensee shall be responsible for restoring the water supply by replacing the well or providing a water treatment system. The licensee is responsible for the expense to restore the water quality.
3. A spill action plan shall be carried out in accordance with the notes in Section N Spills Plan on drawing 2 of 3.
4. A trigger mechanism and contingency plan as set out in WSP's Level 2 Water Study Report shall be implemented.
5. WSP's Water Study Report confirms that drawdown impacts do not extend to areas identified in the Niagara Peninsula Source Protection Plan as Intake Protection Zones.

## REHABILITATION PLAN – DRAWING 5 OF 6

### PROGRESSIVE REHABILITATION

#### A. General

1. Area calculations:

a. Licenced area	<b>103.6 ha</b>
b. To be extracted	<b>89.1 ha</b>
c. Final rehabilitation within licence (total)	<b>103.6 ha</b>
c.a. Lake	68.8 ha
c.b. Shoreline wetland	1.3 ha
c.c. Wetland/pond/stream	2.9 ha
c.d. Terrestrial	22.7 ha
c.e. Deciduous Woodland	1.2 ha
c.f. Treed Deciduous Swamp	2.0 ha
c.g. Swamp Thicket & Marsh Meadow	0.8 ha
c.h. Undisturbed	3.9 ha
d. To be rehabilitated outside of licence:	<b>4.7 ha</b>
d.a. Woodland Compensation Area	4.7 ha

2. The maximum predicted water table is 184.9 masl and the contact aquifer potentiometric contours ranges between 176.0 and 184.9 masl (as per WSP's "Proposed Upper's Quarry - Maximum Predicted Water Table Report", dated October 2021).

#### B. Phasing

1. As excavation reaches the limit of extraction or maximum depth, progressive rehabilitation shall commence.
2. Progressive rehabilitation shall follow the general direction and sequence of extraction identified on the plan view and described in the notes on drawing 3 of 6. Minor deviations in operational/rehabilitation sequence will be permitted in order to adjust for any variable resource and market conditions. **Any major deviations from the operations sequence shall require approval from the MNRF.**
3. Prior to extraction commencing in Phases 3A and 3B, side sloping adjacent to Phases 1B and 2B shall be completed to allow for the existing watercourse realignment to be finalized.

4. Dewatering of the quarry will ultimately discharge to the watercourse (pre and post realignment). The quarry will continue dewatering operations to maintain a dry quarry floor. When the rock is fully extracted, it is proposed that dewatering operations will cease and the quarry will be permitted to fill naturally with surplus precipitation, surface water and any contribution from groundwater seepage to form a lake. As shown on the plan view, shallow shoreline wetland areas shall be created to provide aquatic habitat.
5. Watercourse Realignment Channel Area - As portions of the watercourse realignment channel are constructed, the channel shall be planted according to the requirements of each respective planting zone: (i) riparian planting zone; (ii) upland planting zone; (iii) shoreline planting zone and (iv) life staking planting zone. Details relating to construction, planting and monitoring requirements for the watercourse realignment corridor are contained within the "Natural Channel Design Report" prepared by Stantec Consulting Ltd. (dated October 2021).
6. Reforestation Areas - There are two main reforestation areas:
  - 6.1. The Woodland Compensation Area (Off-site) to be no less than 4.3 ha in area. Plantings in this area are set out in Table 1 on this drawing. Planting for this Area (Off-site) will commence in the appropriate planting season following licence approval.
  - 6.2. The on-site Woodland Compensation Area includes the areas identified as the Deciduous Woodland, Treed Deciduous Swamp and Swamp Thicket/Marsh Meadow, to be no less than 4.0 ha in total area. Plantings in these areas are set out in Tables 1 to 3 on this drawing respectively. In the Deciduous Woodlands (on-site), additional conifer species will be added to the species mix to provide additional screening.
7. A woodland and wildlife habitat compensation plan shall be prepared in consultation with regulatory authorities in accordance with Note E.5.a on drawing 4 of 6.

### **C. Slopes and Grading**

1. Progressive rehabilitation will utilize a variety of rehabilitation techniques including:
  - a. backfilling extraction faces and quarry floors; or
  - b. Leaving extraction faces vertical

~~2. Excess soil, as defined by Ontario Regulation 406/19 under the Environmental Protection Act, may be imported for the following rehabilitation purposes:~~

2. Excess soil, as defined in Ontario Regulation 244/97 may be imported to this site to facilitate the following rehabilitation:

3. Liquid soil, as defined in Ontario Regulation 406/19 under the Environmental Protection Act, is not authorized for importation to the site.

4. The quality of excess soil imported to the site for final placement must be equivalent to or more stringent than the applicable excess soil quality standards as determined in accordance with Ontario Regulation 244/97, as amended from time to time, and must be consistent with the site conditions and the end use identified in the approved rehabilitation plan.
5. Where a qualified person is retained or required to be retained in accordance with Ontario Regulation 244/97, the quality, storage, and final placement of excess soils shall be done according to the advice of the qualified person.
6. Excess soil imported to facilitate rehabilitation as described on this site plan shall be undertaken in accordance with Ontario Regulation 244/97 under the Aggregate Resources Act, as amended from time to time.
7. The cumulative total amount of excess soil that may be imported to this site for rehabilitation purposes is 2,400,000 m<sup>3</sup>.

~~3. Excess soil imported for the rehabilitation purposes described above shall meet the soil quality standards set out in Table 1: "Full Depth Background Site Condition Standards", of the Rules for Soil Management and Excess Soil Quality Standards published by the Ministry of Environment, Conservation and Parks, as amended from time to time.~~

~~4. The maximum total amount of excess soil that may be imported to this site for rehabilitation purposes is 2,400,000 m<sup>3</sup>.~~

~~5. The licensee shall ensure that the acceptance and reuse of excess soil imported for rehabilitation purposes is compliant with Part 1: Rules for Soil Management of the "Rules for Soil Management and Excess Soil Quality Standards" published by the Ministry of Environment, Conservation and Parks, as amended from time to time.~~

8. The final rehabilitated landforms established using the rehabilitation techniques will consist of a lake, shoreline wetlands, riparian corridor, woodlands, gradually sloping grades, 2:1 and 3:1 side slopes, and vertical faces as shown on the plan view.

#### **D. Seeding and Planting**

1. Side slopes steeper than 3:1 shall be seeded with ~~a naturalizing mix of native, non-invasive wildflowers and grasses to stabilize slopes and minimize mowing and maintenance. the Ministry of Transportation's (MTO) Ontario Roadside Seed Mix (Creeping Red Fescue, Kentucky Bluegrass, Perennial Ryegrass and White Clover) or equivalent.~~
2. The deciduous woodlands, treed deciduous swamp, swamp thicket/marsh meadow, shoreline wetland, and realigned watercourse channel (riparian corridor) shall be planted with species identified in Tables 1-5 on this drawing respectively.

#### **E. Drainage**

1. Final surface drainage will follow the rehabilitated contours and directional arrows shown on the plan view.

2. Once the quarry is depleted, pumping will cease and portions of the site below the ground water table will fill with water.
3. The quarry dewatering discharge will be directed to the watercourse (pre and post alignment) and ultimately flow to Beaverdams Creek to support fish habitat and downstream wetlands.
4. The licensee shall operate in accordance with the conditions of the MECP, PTTW and ECA for the ongoing dewatering of the site.

## F. Trigger Mechanism and Contingency Plan

1. During progressive rehabilitation, until surrendering the licence, the licensee is required to operate in accordance with the Trigger Mechanism and Contingency Plan ~~outlined below. included in the Upper's Quarry Level 2 Water Study Report prepared by WSP, dated October 2021, as may be amended from time to time with approval from MNDMNR.~~
2. The monitoring program will allow a comparison of observed conditions throughout the quarry development to baseline conditions. The predicted effects of the quarry have been reviewed and are based on the numerical groundwater model simulations and baseline water quality. Should the observed quarry effects differ from those predicted, a trigger mechanism has been developed to trigger the implementation of appropriate contingency measures to mitigate impacts before they occur. The quarry dewatering discharge will be directed to the Existing Watercourse, and ultimately flow to Beaverdams Creek. The discharge water will consist of a mixture of direct precipitation and groundwater inflows from the contact aquifer, shallow bedrock aquifer, deep bedrock aquifer and likely a small contribution from the underlying lower aquitard. The ratio of groundwater contribution from each unit is related to the relative hydraulic conductivities. Based on the hydraulic testing completed as part of this study, it is interpreted that the majority of the groundwater inflow will originate from the shallow bedrock aquifer. Therefore, it is predicted that the quarry discharge will have similar water quality to the shallow bedrock aquifer baseline ranges. The observed 2019 pumping test discharge water quality, which is predicted to be similar to the future quarry discharge water quality, supports this interpretation.
3. Monthly sampling of the quarry sump discharge has been included in the monitoring program, for the analysis of parameters with an associated Provincial Water Quality Objectives (PWQO), as well as selected parameters which aid in the assessment of influence from the various bedrock units. The trigger mechanism for the sump discharge to the Existing Watercourse is to assess the monthly sump water quality results against the list of trigger concentrations summarized in the table below.

Parameter	Proposed Trigger Mechanism	Applicable Standard
pH (pH units)	6.5 – 8.5	PWQO / MISA
TSS	25	MISA
Hydrogen Sulphide (undissociated)	0.002	PWQO
Total Oil and Grease	No visible sheen or odour	PWQO
Note: Trigger concentrations in mg/L unless otherwise noted.		

4. The shallow bedrock aquifer groundwater is more mineralized / harder than the surface water in the vicinity of the Site; however, it satisfies the PWQO for most parameters. The two exceptions are undissociated hydrogen sulphide and total phosphorus. A trigger for hydrogen sulphide has been included in the trigger mechanism for quarry discharge. In the case of total phosphorus, the median total phosphorus concentration in the baseline surface water quality currently exceeds the PWQO, making the Existing Watercourse a Policy 2 receptor for this parameter. It is predicted that the total phosphorus concentration in the future quarry discharge will be below that of the upstream surface water in the Existing Watercourse. As such, total phosphorus has not been included in the trigger mechanism.
5. The Municipal Industrial Strategy for Abatement (MISA) was also considered; as such, pH, total suspended solids (TSS) and total oil and grease have also been included in the trigger mechanism.
6. The monthly sump discharge sample results shall be compared with the background conditions in the Existing Watercourse (station SW3) and Beaverdams Creek (station SW1). If parameter concentrations in the sump discharge exceed the above trigger concentrations without a corresponding exceedance in the background surface water, then weekly sampling of the quarry sump shall be initiated. Weekly sampling will continue until less than two parameter concentrations in the sump discharge exceed the trigger concentrations.
7. If weekly sampling is required for a period of more than four (4) weeks, contingency measures shall be implemented to reduce concentrations in the quarry discharge. Trigger exceedances for pH, TSS and total oil and grease would initiate a review of the design and operation of the quarry discharge sump. Where required, improvements shall be made to reduce discharge concentrations.
8. At existing pits and quarries within southern Ontario, hydrogen sulphide is typically not routinely included in the trigger mechanism. In southwestern Ontario, where the bedrock geology can favour hydrogen sulphide in groundwater, an Effluent Objective for hydrogen sulphide has been included in site ECAs. A sump or holding pond with a large surface area normally allows enough off-gassing of the hydrogen sulphide to meet the Effluent Objectives. For the quarry, the need for sufficient off-gassing of hydrogen sulphide shall be taken into consideration during the design and construction of the internal ditch network and sump pond for the Site. It is anticipated that the hydrogen sulphide concentration in the discharge to the Existing Watercourse will be lower than the PWQO / trigger concentration as a result of the off-gassing. If the hydrogen sulphide concentrations in the discharge are found to consistently exceed the trigger once the operational phase of the quarry begins, then a review of the design and operation of the internal ditch network and sump pond shall be completed with the objective of increasing the rate of off-gassing prior to discharge. Additional measures, such as aeration of the pond, may also be employed to enhance the off-gassing of hydrogen sulphide.

## **FINAL REHABILITATION**

### **G. General**

1. All equipment and buildings/structures shall be removed from the licenced areas.



2. ~~A field/property access points entrance shall remain~~ may be established to access the site for maintenance and monitoring purposes ~~watercourse (as realigned)~~. All operational access points shall be decommissioned and fenced as part of final rehabilitation.

3. The long term average surface water and lake level elevation is estimated to be approximately 175.15 masl.

4. At final rehabilitation, outflow from the realigned watercourse and the quarry lake will continue to discharge from the licence area at the present location where the existing watercourse channel crosses the northern licence boundary.