Proposed Burlington Quarry Expansion JART COMMENT SUMMARY TABLE – Blast Impact Analysis (BIA)

Please accept the following as feedback from the Burlington Quarry Joint Agency Review Team (JART). Fully addressing each comment below will help expedite the potential for resolutions of the consolidated JART objections and individual agency objections. Additional, new comments may be provided once a response has been prepared to the comments raised below and additional information provided.

	JART Comments (January 2021)	Reference	Source of Comment	Applicant Response (June 2021)	JART Response	Applicant Response (June 2022)	JART Response (June 2023)
Re	eport/Date: Blast Impact Analysis, March 24, 2020 & April	123, 2020		Author: Explot	ech Engineering Ltd.		
1.	The introduction recommends that a vibration monitoring program be continued and maintained for the duration of all blasting activities. Is this a requirement of the MECP Certificate of Approval? Are there securities or other legal assurances that the monitoring will take place? Is it possible for the language of the Official Plan Designation to include this recommendation?	General	City of Burlington	The MNRF Provincial Standards require that all new licenses monitor all blasts for ground vibration and blasts over pressure to ensure compliance with provincial guidelines. It is our understanding that provided the requirement for vibration and overpressure monitoring is included as a site plan condition, this requirement becomes legally binding. It is further our understanding that the recommendations of the Blast Impact Analysis (Pages 32–33) will be fully transcribed onto the final site plans thereby providing a vehicle for enforcement.	Request is for that monitoring to be done by a third- party engineering company independent of the explosive supplier and/or blasting contractor.	This request is not warranted. All monitoring is completed by experts independent of Nelson and conducted and reported in accordance with required standards and protocols.	
2.	In the BIA report no mention is made regarding presence of any identified water body within the proposed extraction areas or within 500.0 meter standoff distance outside the extraction areas. There are water bodies in the area.	General	DST Consulting Engineers Inc.	Please refer to the supplemental technical memorandum addressing fish bearing waterbodies in direct vicinity of the Burlington Quarry dated January 19, 2021 based on additional information provided by project biologists. In response, Explotech has revised the Blast Impact Analysis. Refer to revised BIA dated June 16, 2021	Comment addressed.		
3.	It is noted that the version of site plan drawings appended to BIA is missing the "Note" section. The same version of site plan drawings provided to the retained consultant by Halton includes "Notes" on the drawings.	General	DST Consulting Engineers Inc.	In response, Explotech has revised the Blast Impact Analysis to include the newest version of site plans dated April 2021. Refer to revised BIA dated June 16, 2021	Comment addressed conditional upon the site plan notes being updated to address the recommendations.	The Burlington Quarry Extension Site Plans dated March 2022, included as Tab 1 , include the recommendations from the updated BIA dated June 16, 2021, included as Tab 2 .	Comment addressed.

The impact of blasting in the context of production of vibration and overpressure and their effect on neighboring sensitive receptors located at various standoff distance are considered by the BIA report. The BIA report identifies a number of these receptors to be owned by the applicant, and hence considers them as non-sensitive receptors for the purpose of predictive vibration and overpressure impact calculations. Should these be considered as sensitive receptors given current use and design?	General	DST Consulting Engineers Inc.	Nelson Aggregates has advised that upon commencement of extraction in the extension lands, the owned properties will be non-sensitive either as a result of their demolition, conversion into commercial space, or suspension of active use. As such, these properties would be exempt from the guidelines set out in NPC 119. For informational purposes, Explotech has included the vibration calculations anticipated at these properties as part of the BIA report.	Comment addressed.	
In order to mitigate the potential vibration and overpressure on surrounding existing sensitive receptors, the BIA uses a well-known predictive model, namely the Bureau of Mines (BOM) prediction formula or Propagation law. The BIA states that this model has been used by Golder Associates (Golder) to develop a site-specific attenuation formula based on a study carried out at the existing Burlington Quarry in 2006. However, the attenuation curves referred to in the Appendix C of the report are dated 2004. The BIA solely relies on the site- specific attenuation curves established by Golder for the existing Burlington Quarry for their assessment of the impact of blasting on surrounding sensitive receptors in the proposed Burlington Quarry Extension area with no new data added, even though the new data is available.	General	DST Consulting Engineers Inc.	The attenuation study referenced in the Explotech BIA incorporates information gained through the attenuation study undertaken by Golder Associates in 2004 as part of an unrelated study at that time. Given the fact that this analytical effort was previously undertaken and there has been no change in material characteristics or blasting practices, it was determined that undertaking a duplicate study would provide no new information or insight. While compliance monitoring data is available for the period from 2014-2019, the majority of the data is lacking critical information regarding the location of the blasts and/or the location of the blast which is necessary to accurately append the data to the earlier attenuation study. Inclusion of this data into the attenuation equation would result in a less reliable model for predicting ground vibrations and air overpressures.	Comment addressed. Explotech has included the complete Golder's report in Appendix C of their updated BIA report of June 16, 2021 and has been reviewed by DST.	

6.	The BIA report under the heading "EXISTING CONDITIONS" identifies seventy-eight (78) sensitive receptors with respective standoff distance from the extraction zones comprising of residential dwellings and a Golf Course known as Camisle Golf Course. The civic addresses and the land use of these properties are also identified in the BIA report. Of the seventy-eight sensitive receptors, eleven (11) dwellings are presently owned by the proponent and may be converted to offices, in which case will be eliminated from the list of sensitive receptors. The properties owned by the proponent are amongst the closest to the proposed extraction areas. The BIA identifies Buildings located at 2280 No. 2 Side Road presently owned by the proponent as structures classified as "culturally significant" and will be vacant at the time of extraction, and thus will not be considered as sensitive receptors. Should all of these building be considered as sensitive receptors given current use and design?	Existi ng Condi tions	DST Consulting Engineers Inc. and Halton Region	Please refer to the answer in question 4. Additionally, the heritage structure located at 2280 No. 2 Side Road was given special consideration in the BIA due to its heritage status regardless of its status as a receptor. Specifically, the BIA recommends that "In order to safeguard the structural integrity of the structures located at 2280 No 2 Side Road, ground vibrations shall be maintained below 50mm/s (>40Hz) in accordance with research performed by the United States Bureau of Mines (USBM RI8507). The closest structure located at 2280 No 2 Side Road shall be monitored for ground vibration and overpressure when vibration calculations suggest vibrations in excess of 35mm/s". This recommendation is based on the understanding that the building need not be subject to the MECP nuisance criteria as it will be vacant but should be subject to the damage criteria so as to prevent any adverse impacts on the structure(s).	Comment addressed.		
7.	Page 7 recommends that vibrations at 2280 No. 2 Side Road be maintained below 50.0 millimeters/second, and the closest structure on the property shall be monitored for ground vibration and over pressure when vibration calculations suggest vibrations in excess of 35.0 millimeters/second. Page 8 indicates Nelson Quarry is the owner of the property, please confirm that the vibration monitoring equipment will be or has been installed and monitored	Page 7	City of Burlington	The BIA prepared by Explotech recommends that 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. Additionally, it is recommended that thestructure located at 2280 No 2 Side Road shall be monitored for ground vibration and overpressure when vibration calculations suggest vibrations in excess of 35mm/s. Provided this recommendation is included on site-plans, this will be a condition of site plan approval in the	Comment addressed conditional upon the site plan notes being updated to address the recommendations.	The Burlington Quarry Extension Site Plans dated March 2022, included as Tab 1 , include the recommendations from the updated BIA dated June 16, 2021, included as Tab 2 . Regarding the request related 2280 No. 2 Side Road this has requirement has been included in Blasting Note 2 c).	Comment addressed

				extension lands. Monitoring practices at the existing license can be confirmed by others.			
8.	Page 10 provides recommendations on blast monitoring, please provide confirmation on where the vibration monitors will be (or are currently) installed (municipal address, and location on property) and if necessary (for non-owned properties), provide written confirmation from landowners that they have given permission for the vibration monitors to be installed on their property.	Page 10	City of Burlington	The BIA prepared by Explotech recommends that 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. Specific installation locations can only be determined at the field level in response to each individual blast locations and orientation. Location of seismographs provided in the 2014 - 2019 blast documentation are provided on Page 26 of the BIA.	Comment addressed conditional upon the site plan notes being updated to address the recommendations.	The Burlington Quarry Extension Site Plans dated March 2022, included as Tab 1 , include the recommendations from the updated BIA dated June 16, 2021, included as Tab 2 .	Comment addressed.
9.	Page 20 references the Sun Canada Pipeline. The BIA report provides a detailed assessment of the impact of blasting on the Sun Canadian High Pressure Oil Pipeline and recommendation on changes in the blast design parameters to protect the pipeline based on the Sun Canadian vibration limit policy. GIS mapping indicates there is also an Enbridge Pipeline and Imperial Oil Pipe line south of the south expansion, have any of those agencies been contacted to see if there are any precautions or requirements for blasting in proximity to the pipelines?	Page 20	City of Burlington	The Enbridge specification "Third Party Requirements in the Vicinity of Natural Gas Facilities" states that Enbridge must be notified of blasting operations if they are undertaken within 300m of the pipeline. Similarly, Imperial Oil requires notification of blasting operations if they encroach within 300m of the pipeline. Given the approximate 430m from the closest point of the southern extraction area to both the Enbridge and Imperial Oil Pipelines these agencies are not required to be contacted. Additionally, both pipelines fall further removed than the Sun Canadian Pipeline and hence the Sun Pipeline will govern from both a compliance and blast design perspective.			

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10	The BIA report under the heading "REVIEW OF HISTORICAL BURLINGTON QUARRY DATA" states that vibration and overpressure data has been collected in recent years for all blasts conducted at the Nelson Aggregate Burlington Quarry (for 2014 through 2019) and provided to Explotech as part of their analysis. The historical vibration and overpressure data are included in Appendix C of the report. As part of their analysis, the BIA further confirms that the data reveals occurrence of 18 exceedances over the period from 2014 to 2019. List of exceedance occurrences, their location, exceedance level, date and time are presented in Table 5 of the BIA report. Although the data has been reviewed, it is not used in the BOM model prediction model for predicting expected vibration and overpressure levels for the quarry extension. If the prediction formula established by Golder is used for calculation of predicted vibration and overpressure levels for the new extension, then the data collected from actual quarry blasting during the period of 2014 to 2019 should have been incorporated in the model	Review of Historical Burlington Quarry Data	DST Consulting Engineers Inc.	Please refer to the answer in question 5.	Comment addressed. Please refer to JART comment #5.	
11.	have been incorporated in the model. The Recommendations section (pages 28/29) does not address warning clauses, are there any warning clauses recommended for surrounding residential properties and/or to be included in the Official Plan Designation?	Pages 28-29		At this time Explotech is not aware of any warning clauses recommended for surrounding residential properties. MHBC advises that for new or expanded mineral aggregate operations, warning clauses are not put in place on surrounding residential properties and it is the applicant's responsibility to operate in compliance with provincial guidelines to ensure no adverse impacts to surrounding properties. When the subdivisions were approved in the area (Paletta, Illingsworth and Bunkowsky), as part of that approval, the Owners were required to include in all Offers of Purchase, Agreements of Purchase and Sale, or Lease and Reservation Agreements a warning clause regarding Nelson's operation. The following is the excerpt from the Paletta subdivision. The other approvals included a similar warning clause: "Purchasers are advised that Nelson Aggregate Company ("Nelson") is the owners of lands located in Lots 1 and 2, Concession 2 and 3, N.S., City	Comment addressed.	

of Burlington, in the Regional Municipality of Halton and which lands are in proximity to those lands being developed for residential purposes by Paletta International Corporation. The Nelson lands are presently licensed and operated for aggregate extraction industrial purposes and it is the intention of Nelson, through its licensees, agents, successors and assigns, to use the lands for the purpose of extraction, processing, manufacturing and transportation of aggregates. (i) Purchasers are also advised and acknowledge that noise, vibrations, dust, visual unsightliness, large equipment, maneuvering and permitted working hours are all incidental to the lawful operation of aggregate extraction site and the lawful operation of heavy vehicles on the public roads. (j) Purchasers are further advised that even though noise and vibration control features may be incorporated within the development area, noise and vibration levels may be of potential concern."

12.	The BIA report under the heading	Recommenda	DST	Explotech has reviewed the site	Comment addressed conditional	See Response to Comment # 21.	Comment addressed.
	 "RECOMMENDATIONS" provides nine (9) recommendations as the condition of blasting in the proposed Nelson Aggregates Burlington Quarry Extension areas. The following needs to be addressed: Critical conditions recommended by the BIA be included in the site plan notes. 		Consulting Engineers Inc.	plans and all required conditions are included and MHBC will be further updating the site plans to include the additional recommendations found in the revised BIA dated June 16, 2021	upon the site plan notes being addressed. Please refer to comment #21 for the site plan recommendation related to flyrock. The critical conditions have since been revised to include conditions of approval (with the exception of reference to latest Explotech's BIA report, please refer to Explotech's BIA report of June 16, 2021, NelsonBlasting_Response_to _JART_June_2021_Package).		
13.	 The BIA report under the heading "RECOMMENDATIONS" provides nine (9) recommendations as the condition of blasting in the proposed Nelson Aggregates Burlington Quarry Extension areas. The following needs to be addressed: The Golder Associates vibration attenuation study report referred to in the BIA report be provided for ease of technical review and cross reference. 	Recommenda tions	Consulting Engineers Inc.	In response, Explotech has revised the Blast Impact Analysis. Refer to revised BIA dated June 16, 2021	Comment addressed. Please refer to JART comment #5.		
14.	The BIA report under the heading "RECOMMENDATIONS" provides nine (9) recommendations as the condition of blasting in the proposed Nelson Aggregates Burlington Quarry Extension areas. The following needs to be addressed: • The source of the Nelson Quarry vibration and Air Attenuation Curves included in Appendix C (Figures 5 and 6) of the BIA report be identified.	Recommenda tions	DST Consulting Engineers Inc.	In response, Explotech has revised the Blast Impact Analysis. Refer to revised BIA dated June 16, 2021	Comment addressed. The source of the Nelson Quarry vibration and air attenuation curves has since been identified by Explotech in their updated June 16, 2021 and reviewed by DST.		
15.	The BIA report under the heading "RECOMMENDATIONS" provides nine (9) recommendations as the condition of blasting in the proposed Nelson Aggregates Burlington Quarry Extension areas. The following needs to be addressed: • Vibration and overpressure data collected in the first 12 months of the proposed quarry extensions be incorporated in the data attenuation data base to develop a more reliable and new site-specific attenuation formula.	Recommendations	DST Consulting Engineers Inc.	In response, Explotech has revised the Blast Impact Analysis to include the following recommendation: Vibration and overpressure data collected during the first 12 months of extraction in the proposed quarry extension lands will be used to calibrate and update the 2004 Golder Associates attenuation equation. The proponent shall ensure information collected includes all relevant blast and monitoring details to permit and facilitate inclusion of the data in the attenuation data and resultant equation.	Explotech in their updated BIA report of June 16, 2021, has addressed this concern by adding the following recommendation: • "Vibration and overpressure data collected during the first 12 months of extraction in the proposed quarry extension lands will be used to calibrate and update the 2004 Golder Associates attenuation equation. The proponent shall ensure information collected includes all relevant blast		

	and monitoring details to permit and facilitate inclusion of the data in the attenuation data and resultant equation."	

 The BIA report under the heading "RECOMMENDATIONS" provides nine (9) recommendations as the condition of blasting in the proposed Nelson Aggregates Burlington Quarry Extension areas. The following needs to be addressed: Provide the rational why the attenuation formula established by Golder in 2004 was used, but the historical vibration and overpressure data from the same site was not incorporated in formula. 	Recommendations	Consulting Engineers Inc.	Please refer to the answer in question 5	Explotech has provided explanation regarding the exclusion of the historical vibration and overpressure data obtained during the 2014-2019 blasting campaigns. The exclusion is due to lack of details of blasting parameters required to establish site-specific attenuation equation. Recording of details are generally not required when vibration and overpressure monitoring are conducted for compliance purposes. DST is satisfied with Explotech rational after reviewing the historical data.	
 17. The BIA report under the heading "RECOMMENDATIONS" provides nine (9) recommendations as the condition of blasting in the proposed Nelson Aggregates Burlington Quarry Extension areas. The following needs to be addressed: According to the "Level 1 and Level 2 Natural Environment Technical Report, April 2020, page 60, Fish Habitat Summary" conducted by SAVANTA, there are potential direct fish habitat within 120.0 meters of the adjacent lands, and no fish habitat within the extraction areas. A review of historical supporting information and current Level 1 and Level 2 Natural Heritage Reports provided by the applicant was also carried out by the Halton Region Environmental Consultants Matrix Solutions Inc. (MSI). "This review provides the following overview of fish habitat within 500.0 meters of the proposed Burlington Quarry Extension areas: West Arm of the West Branch of Mount Nemo Tributary of Grindstone Creek East Arm of the West Branch of Mount Nemo Tributary of Grindstone Creek Willoughby Tributary of Bronte Creek In addition to these, there are waters containing fish within the existing quarry and proposed extension areas. Within the existing quarry, it can be assumed that all pond features contain fish. In historical reports 	Recommendations	DST Consulting Engineers Inc.	Please refer to the technical memorandum dated January 19, 2021 addressing fish bearing waterbodies in direct vicinity of the Burlington Quarry based on additional information provided by project biologists. In response and for continuity, Explotech has revised the Blast Impact Analysis to include the details of this technical memorandum. Refer to revised BIA dated June 16, 2021	Comment addressed. In their updated BIA report of June 16, 2021, Explotech has included a section under the heading "Blast Impact on Adjacent Fish Habitats'. This section provides mitigation procedures and set back distances required by DFO to allow blasting operations in the vicinity of fish habitats. DST has reviewed this section and is satisfied with Explotech's recommendation.	

prepared by ESG International (October 2000) the following features were noted:			
 Pond 1 – support a largemouth bass population Pond 2 – supports a stickleback and pumpkinseed population Pond 3 – supports a largemouth bass population Pond 4 – supports largemouth bass, pumpkinseed and stickleback population 			
Although there are fish within these features, earlier reports do not classify these as "fish habitat" due to the isolation of these watercourses. According to MSI, the applicant has been requested to provide DFO concurrence that this is the case.			
Within the West Extension area, largemouth bass is present in all of the irrigation ponds within the golf course. Although the fish are present within these watercourses, they are currently not viewed as "fish habitat" by the applicant. These irrigation ponds are hydrologically connected to Willoughby Creek Tributary. The applicant has been requested to provide DFO concurrence that this is not fish habitat".			
In the case that DFO confirms that the above noted features are considered as "fish habitat", the applicant's blasting consultant should revise their BIA to include a section addressing the impact of blasting on these features and recommend mitigation measures to address the potential impact on the fish habitat in accordance with the "Guidelines for the Use of Explosives in or Near Canadian Fisheries Waters". The document can be sourced online at https://www.racerocks.ca/wp-content/uploads/2015/09/DND-explosive-guidelines.pdf .			
The potential impact of blasting may be insignificant on the fish habitat within 120.0 meters of the adjacent lands considering the proposed blasting parameters. However, the potential impact should have been addressed by the BIA. The Location of these water bodies are also shown in the site plan drawings and described as "Water Features".			

18.	 The BIA report under the heading "RECOMMENDATIONS" provides nine (9) recommendations as the condition of blasting in the proposed Nelson Aggregates Burlington Quarry Extension areas. The following needs to be addressed: Considering that the proposed blasting operations at one point will approach a standoff distance of 12.8 meters from Sun Canadian Pipeline corridor, all requirements of their blasting specifications outlined in Appendix 2, section 8.3 to 8.5 under the heading "Vibration and Blasting Control" be implemented (copy attached for reference). 	Recommendations	DST Consulting Engineers Inc.	In response, Explotech has revised the Blast Impact Analysis. Refer to revised BIA dated June 16, 2021. Blast Impact Analysis now includes recommendations to follow the blasting specifications outlined in Appendix 2, Section 8.3 to 8.5 under the heading "Vibration and Blasting Control" be implemented.	Comment addressed conditional upon the site plan notes being addressed. Please refer to comment #21 for the site plan recommendation related to flyrock. Explotech has incorporated the requirements of the third-party pipeline company, namely Sun Canadian Pipelines guidelines for vibration and blasting control in their updated BIA report of June 16, 2021, which satisfies the pipeline companies concerns. Comment addressed condition upon the site plan notes incorporating these recommendations.	The Burlington Quarry Extension Site Plans dated March 2022, included as Tab 1 , include the recommendations from the updated BIA dated June 16, 2021, included as Tab 2 . Also see Response to Comment # 21.	Comment addressed.
	JART Technical Comments (November 2021)	Reference	Source of Comment	Applicant Response (May 2022)			JART Response (June 2023)
	Item 1 and item 7 in the response matrix refers to a "site plan" and "site plan approval", to ensure vibration monitoring but the response matrix for Registered Agreement & Reference Plan, item 1 states "the proposed quarry application does not include site plan control." If there is no site plan approval required, how will vibration monitoring be ensured?	Doined at	City of Burling ton	Burlington, however there will be a NDMNRF. This site plan includes to implement. See Burlington Qua	extension does not require Site Plan a an Aggregate Resources Act Site Pla the required vibration monitoring and rry Extension Site Plans dated March	In that is approved and enforced by therefore it will be a requirement a 2022 included as Tab 1 .	Commont addressed Evaletack
20.	At the Region's statutory public meeting, a delegate raised the issue of a 2005 blast that exceeded a vibration limit. Are there any monitoring or other records from this blast and any subsequent investigation, or any monitoring records for blasts carried out by Nelson since that time?	Raised at Public Meeting	Halton Region	monitoring records from the quarry Tab 2 , contains the monitoring restor the quarry would exist prior to 2	a blast impact analysis is to review to in question. As such, the June 2021 sults from the 2014-2019 blasting can 2014, Explotech has not reviewed the ment on the events that took place in	1 Blast Impact Analysis, included as mpaigns. While monitoring records ese records for the purpose of this	Comment addressed. Explotech has done their due diligence in respect to review of historical vibration monitoring data.
	JART Site Plan Comments (November 2021)	Reference	Source of Comment	Applicant Response (May 2022)			JART Response (June 2023)
21.	As of January 1, 2022, the aggregate Resources Act will require a licensee or permittee to take all reasonable measures to prevent flyrock from leaving the site during blasting if a sensitive receptor is located within 500 meters of the boundary of the site. Although this flyrock range prediction model is a useful tool used in proper blast design and planning to mitigate flyrock from escaping the site, visual inspection of the rock face, top bench, and communications between the drilling crew and the blasting crew plays a more crucial role. This is because the parameters in model does not include unexpected sources that may play a major role in production of flyrock in a given blast. DST recommend that the notes on the following Site Plan Drawings be revised to incorporate the changes in Explotech's updated BIA report of June 16, 2021: 1. Drawing Sheet 1 of 4, Existing Features, H. Technical Reports – References, Item 7.		DST Consulting Engineers Inc.	apply to the proposed Burlington Cagreement with DST's recommend. Drawing 1 does not require an updassessment. Drawing 2 includes the blasting requirement and the blasting requirement.	ate since it references the date of the uirements and the Burlington Quarry	tech has reviewed and is in e current Blasting Impact Extension Site Plans dated	Comment addressed conditional upon site plan notes being addressed.

2. Drawing Sheet 2 of 4, Operational Plan, N. Report	
Recommendations, Item 2.	