



**Terra-Dynamics Consulting Inc.**

**432 Niagara Street, Unit 2 St. Catharines, ON L2M 4W3**

July 12, 2022

Mr. Sean Norman, PMP, MCIP, RPP  
JART Chair, Senior Planner, Planning and Development Services  
Niagara Region,  
1815 Sir Isaac Brock Way,  
P.O. Box 1042  
Thorold, Ontario L2V 4T7

Re: Peer Review Level 2 Water Study Report, Proposed Upper's Quarry, City of Niagara Falls, ON

Dear Mr. Norman,

### **1.0 Introduction, Background Information and Purpose**

Terra-Dynamics Consulting Inc. respectfully submits this peer review of the surface water and groundwater aspects related to the proposal for a new aggregate quarry, Upper's Quarry, to be situated in the City of Niagara Falls in Lots 119, 120, 136 and 137 in the geographic Township of Stamford (the Site). As part of the Upper's Quarry proposal, Walker Aggregates Inc. will be seeking an amendment to the Regional Official Plan, the City of Niagara Falls Official Plan and the City of Niagara Falls Zoning By-Law. An application to the Province under the Aggregate Resources Act (ARA) for a Category 2 Class "A" license will also be required.

The proposed quarry will be developed below the natural groundwater table, and to a maximum depth of approximately 45 metres below ground surface (approximately 141 metres above sea level) (WSP, 2021a). Consequently, future Provincial approvals with the Ministry of the Environment, Conservation & Parks will include obtaining a Permit To Take Water (PTTW) for dewatering, and an Environmental Compliance Approval (ECA) for discharge of sump dewatering water.

An application was received from Walker Aggregates Inc. which included a surface water/groundwater study (the Study) by WSP Canada Inc. (2021a). A Joint Agency Review Team (JART) has been formed, which will prepare a report summarizing the technical peer review, and the public and stakeholder process, to assist each of the public agencies in their independent decision making and comments on the provincial ARA application.

### **2.0 Terms of Reference**

#### **2.1 Scope of Review**

Our peer review was completed on behalf of the JART, considering the roles and responsibilities of Niagara Region, the City of Niagara Falls and the Niagara Peninsula Conservation Authority (NPCA). Evaluation of the technical study (the Study), and other supporting material, included consideration of legislation, policies, guidelines and best practices and to best support the JART in their roles. The surface water/groundwater study (the Study) was evaluated for appropriateness with current requirements and professional standards, (e.g. Professional Geoscientists of Ontario (PGO), 2004). The

appropriateness of proposed mitigation measures were also assessed, and technical study gaps identified.

## **2.2 Scope of Work**

Terra-Dynamics Consulting Inc. (Terra-Dynamics) scope of work included:

- A. Preliminary/pre-consultation with the applicant's consultants to discuss the project and ask initial questions conducted on May 19, 2022 via an on-line meeting;
- B. A Site Visit on June 5, 2022, limited to public roadways;
- C. Review of reporting for the Fernwood Subdivision Development (AMEC, 2002 and The V & S Engineering Group Ltd., 2008);
- D. Completion of a written review of the initial hydrogeological/groundwater study by WSP Canada Inc. (2021a). The review complies with the guidelines from the Professional Geoscientists of Ontario (2019), and has particular focus upon assessing of the adequacy of the:
  - i. Field investigations and whether additional investigation is required;
  - ii. Identification of features, e.g. water wells, aquifers, etc.;
  - iii. Monitoring, trigger mechanisms and contingency plans to '*prove minimal adverse effects to groundwater resources*';
  - iv. Conclusions; and
  - v. Recommendations.

## **3.0 Adequacy of the WSP Canada Inc. (2021a) Level 2 Water Study Report**

### **3.1 Field investigations**

The field investigations followed standard acceptable industry practice, however it is recommended borehole logs that are final have the "draft" watermark removed in the report.

#### **3.1.1 Water Quality**

The summary of the 2019 PW1 Pumping Test Discharge as presented on page 55 of Section 4.1.2.2 utilizes values from four different sample dates without explanation of presentation (e.g. pH and calcium from February 22, 2019, hardness, chloride, sodium, boron and iron from February 23, 2019, sulphate and alkalinity from February 24, 2019 and hydrogen sulphide from February 26, 2019), please clarify the data selection procedure for this table.

The Provincial Water Quality Objective for nickel of 0.025 µg/L is missing from surface water quality table criteria, please add and discuss any exceedances (MECP, 1994).

### 3.1.2 Groundwater Levels

The water levels at groundwater monitoring wells MW5A-GP and MW5AR-GP are different by approximately 3-4 m. Is the difference between two monitors believed related to gas production or another cause. Also, it is recommended a different colour line be used for one of the Gasport monitors on Figure E-6 in order to distinguish between locations (Groundwater Hydrograph for Well Nest MW16-5).

It is recommended, if appropriate, that MW16-6A be listed in Section 2.5.2.4 (Page 30) as having slow water level recovery inhibiting specific interpretation.

It is recommended to fix what appears to be a typographical error (page 33, Section 2.5.3.1, underlined added here for clarity): *“These observations show that an upward vertical gradient between the contact aquifer and the Existing Watercourse exists at MW16-16/DP3 near the south end of the Site, except for the summer months when an upward hydraulic gradient occurs.”*

### 3.1.3 Surface Water

The calculation of 35 mm/year of runoff at SW1 for 2017 (page 13, Section 2.3.1) is incredibly low compared to existing reporting for the area (e.g. 288 mm/year and 196 mm/year for NPCA catchments BDSC\_BRDC\_W100 and W200, respectively, AquaResource Inc. and NPCA, 2009). It is acknowledged that WSP has already provided clarification by email to Terra-Dynamics of the surface water flow measurement challenges at this station that may have erroneously influenced calculation of flows from stage measurements (WSP, 2022). It is recommended that this value be removed given it appears unrealistic. It is also consequently recommended the analyses in the second last paragraph of Section 2.3.1 with respect to Site recharge rates in 2017 be reworded based on removal of this low value.

## 3.2 Identification of Features

Features were adequately identified. However, it is recommended:

1. Figures 16 through 21 not truncate well identifiers;
2. References to the ‘Brown Road Landfill’ (Sections 2.4.1, Table C-2, Figure 8 and Figures H-1 and H-4) be changed to the ‘Cytec Canada Inc. Welland Plant Site’, as the ‘Brown Road Landfill’ is only a small part of that site; and
3. Section H.4.3.1, 3<sup>rd</sup> paragraph reference Figure 9, not Figure 8, with respect to the Welland Canal.

## 3.3 Monitoring, Trigger Mechanisms and Contingency Plans

The proposed groundwater monitoring and response program is acceptable.

However, it is recommended that clarification be provided with respect to the specific meaning of the columns “Interpolated” and “Predicted” on Tables 2 and 3 as it is not clear.

Also, it is acknowledged that WSP (2021a) has stated that *“There is currently limited continuous water level data for most private wells”*, but a specific reason was not provided for the discontinuous hydrographs for

private well monitoring locations R1, R2, R3, R4 and R7. Please clarify if these locations are still appropriate for listing on the Proposal Monitoring Program (Table 1) given collection of baseline background water levels appear incomplete.

### **3.4 Conclusions Presented in the WSP Canada Inc. (2021a) Report**

The conclusions in the report are acceptable.

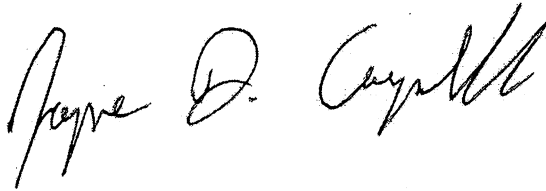
### **3.5 Recommendations Presented in the WSP Canada Inc. (2021a) Report**

The proposed recommendations in the report are acceptable.

We would like to thank Niagara Region for retaining Terra-Dynamics Consulting Inc. to complete this peer review. We trust this information is sufficient for your present needs. Please do not hesitate to contact us if you have any questions.

Yours truly,

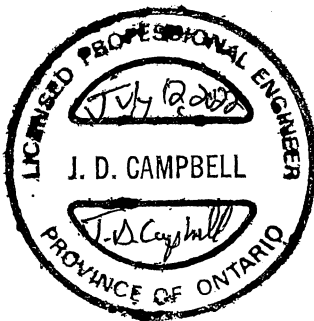
TERRA-DYNAMICS,CONSULTING INC.



Jayme D. Campbell, P. Eng.  
Senior Water Resource Engineer



David D. Slaine, M.Sc., P. Geo.  
Principal Hydrogeologist & President



#### **4.0 References**

AMEC Earth & Environmental Limited, 2002. Hydrogeological Investigation, Fernwood Development, Lundy's Lane, Niagara Falls. Submitted to Metro Development.

AquaResource Inc. and Niagara Peninsula Conservation Authority, 2009. Water Availability Study for the Central Welland River, Big Forks Creek, and Beaverdams Shriners Creeks Watershed Plan Areas, Niagara Peninsula Source Protection Area.

Ministry of the Environment (Conservation and Parks), 1994. Water Management Policies Guidelines Provincial Water Quality Objectives of the Ministry of Environment and Energy.

Professional Geoscientists of Ontario (PGO), 2004. Professional Practice Guidelines for Groundwater Resources Evaluation, Development, Management and Protection Programs in Ontario - Under Review.

Professional Geoscientists of Ontario, 2019. Professional Geoscientists reviewing work prepared by another professional geoscientist.

The V & S Engineering Group Ltd., 2008. Fernwood Subdivision, Phase 2, Contract No. 2004-335-I & Lundy's Land Watermain Replacement.

WSP, 2021a. Proposed Upper's Quarry, Level 2 Water Report, WSP Project No. 161-11633-00. Prepared for Walker Aggregates Inc.

WSP, 2021b. Proposed Upper's Quarry, Maximum Predicted Water Table Report, WSP Project No. 161-11633-00. Prepared for Walker Aggregates Inc.

WSP, 2022. Re: Follow-up to Uppers Quarry Meeting, Email from WSP (Leigh Davis, Project Engineer) to Terra-Dynamics (Jayme Campbell, Water Resource Engineer). May 20, 2022.