

RESPONSE TO MCELHANNEY REVIEW – GROUNDWATER AND ENVIRONMENTAL CONCERNS

Interior Health Authority

202 Lakeside Drive,
Nelson, BC, V1L 6B9

ATTENTION: Mike Adams, Team Leader, Health

REFERENCE: Rezoning for Spearhead Timberworks
4612, 4614-4616 Starlight Road
and 4643 Highway 3A, Nelson, BC

1 INTRODUCTION

Active Earth Engineering Ltd. (Active Earth) was asked to review and address the concerns raised by McElhanney as presented in their March 12, 2025 Technical Memo that included a review of the proposed development with respect to possible groundwater impacts.

The McElhanney review relied upon reports prepared by Active Earth (January 17 and January 29, 2025) and by Highland Consulting Ltd (January 17, 2025) in addition to other publicly available sources of information. It is important to note that there are stages to the design process and the McElhanney review was based on earlier versions to that of the current design, and all the concerns raised have subsequently been addressed.

The responses to the review presented in the following section are aimed to directly address the concerns raised by McElhanney rather than focus on the professional disagreements; our opinions differ with respect to the assertion of a health hazard being present in all versions of the design.

2 RESPONSE

For brevity and ease of confirmation, the following includes all bullet points from Section 9 (Conclusions) of the McElhanney memo followed by a response that addresses the concern:

Based on a review of the available information, potential impacts to down-gradient receptors (water wells and the Kootenay River) from the proposed development are as follows:

- *Partially renovated wastewater effluent may be directed, or eventually report, to AQ 994 via the rock pits and/or perimeter drains on the Property.*
 - **Response:** The effluent will be treated with a Type 2 system including pressure distribution (micro dosed) to imported Intermittent Sand Filter (ISF) sand beds. In addition, a Permeable Reactive Barrier (PRB) is planned for nitrogen removal. This type of system is excellent for effluent treatment prior to the effluent reaching the receiving environment immediately below the PRB. Further natural attenuation and renovation of effluent will occur along the vertical and horizontal groundwater flow paths directly beneath and down-gradient (south) from the beds. It should also be

- noted that the quantity of effluent for the proposed facility is approximately equal to that of three single-family residences and the facility is proposed over three previously existing single-family lots. As such, the disposal rate for the proposed facility is consistent with the surrounding residential development.
- *Recharge of stormwater to the subsurface at the south limit of the Property will increase via the rock pit and/or the perimeter drain.*
 - **Response:** In general, a stormwater management system is designed to limit post-development surface runoff to pre-development levels. This is achieved by infiltrating the stormwater flows collected from new impervious surfaces and directing to infiltration systems. Infiltration of collected stormwater is generally considered a positive attribute, versus an increase in runoff, as the infiltrated stormwater will recharge groundwater aquifers. For the proposed development, the magnitude of this change in recharge to the underlying aquifers will be minimal to negligible in the context of the total aquifer flows. No measurable change in groundwater levels are expected at downgradient wells as a result of the proposed development.
 - *If Well B is not completed with a surface annular casing seal, there is a risk that insufficiently treated effluent from the upslope effluent disposal fields could migrate to Well B.*
 - **Response:** If Well B was not completed with a surface seal during drilling, then a surface seal will be retrofitted. The well is currently being licenced and will be upgraded as needed to meet all regulatory requirements including those of the Groundwater Protection Regulation.
 - *Wash water from the concrete floor slab (residual wood stain and glue water quality) and from asphalt surfacing (residual hydrocarbon concentration) may report to the perimeter drain system and/or rock pit(s) on the Property and impact groundwater that will recharge AQ 1018.*
 - **Response:** There will be no floor drains and no requirement to regularly wash the floor with excess water. Floors will be kept clean primarily via sweeping and wood processing activities do not produce any liquid wastes. Any accidents will be addressed per Spearhead's Best Management Practices, and do not present a constant source of contamination. Runoff from the asphalt surfaces will be managed according to the stormwater management plan and water quality is expected to be similar to a typical paved parking area or road surface runoff. No impacts to groundwater quality in the bedrock aquifer (AQ 1018) are anticipated from the

- proposed development. The nearest well to the proposed septic disposal area (WTN 105588) indicates that the depth to water in AQ 1018 is 300 ft. This is a significant unsaturated vertical travel distance for treated effluent to reach groundwater within AQ 1018.
- *It is understood that Well B is proposed to service Spearhead with potable water. The location of Well B is within the footprint of the proposed production shop building. There are no details regarding this well, specifically when the well is drilled, what geology was encountered, the depth to water-bearing fractures and if the well is compliant with the requirements under the Groundwater Protection Regulation. As defined in the BC Water Act, if the well is used for industrial/commercial purposes, it will become a public water supply well.*
 - **Response:** Well B is located outside of the current building footprint, close to the northeast corner of the building. The well is currently being licenced and will be upgraded as needed to meet all regulatory requirements including those of the Groundwater Protection Regulation.

Generally, in our professional opinion, based on the information provided to date, the proposal has the following deficiencies:

- *There currently is no stormwater management plan for the Property.*
 - **Response:** Highland Consulting LTD (HCL) has prepared a stormwater management plan for the Property.
- *It is unlikely that there will be adequate effluent renovation prior to discharge at the south property boundary.*
 - **Response:** The proposed system designed by HCL includes a Type 2 system with pressure distribution to an imported ISF sand filter bed with underlying nitrogen removal PRB. Furthermore, the required setback distances and all other requirements of the Sewerage System Regulation will be met. The system will meet or exceed all regulatory requirements, and this will confirm adequate effluent renovation prior to discharge at the south property boundary. Monitoring of groundwater quality at the south property boundary is also proposed as an added measure to confirm no unacceptable impacts and to address public concerns.
- *There is no consideration of the high consequence, low likelihood event of a release of low VOC or petroleum hydrocarbon chemicals at the Property.*

- **Response:** The proposed operations do not include the storage or handling of any bulk liquid chemicals. Discrete quantities of pre-packaged chemicals will be utilized within machine-applied processes. Spearhead's Best Management Practices for the facility will be followed to ensure a very low risk of release and the quantities are limited to discrete packages that mitigates the magnitude of potential impacts. Concrete flooring and paved surfaces provide added barriers of protection to the environment. The planned facility fully considers the potential of a high consequence, low likelihood event within the design of the facility itself and with the operations, procedures, equipment and chemical handling methods. There is also a proven track-record with the existing facility operations.
- *Since Well B is planned to become a public water supply, well completion details at Well B are unknown.*
 - **Response:** The well is currently being licenced and will be upgraded as needed to meet all regulatory requirements including those of the Groundwater Protection Regulation.
- *There is no consideration for the fact that the proposed development on the Property is between 20 and 45 m up-gradient of a highly vulnerable aquifer that is the sole-source of potable drinking water for several homeowners.*
 - **Response:** There has been an overabundance of consideration placed on the potential impacts to groundwater from the proposed development. The siting of the septic disposal system at maximum upgradient distance on the property (northern limit), the use of a Type 2 system with pressure distribution to imported ISF sand beds and the use of nitrogen removal via a PRB are planned in consideration of the nearby homeowner concerns for their potable drinking water. The design and operations of the proposed facility consider potential and mitigate potential impacts to groundwater. The planned installation of monitoring wells along the south boundary will provide assurance to nearby water users.
- *Time for potentially contaminated groundwater to be intercepted by domestic wells located downslope (down-gradient) of the Property may be less than expected and could represent a health-hazard.*
 - **Response:** The planned facility is not considered a health-hazard as defined by the Health Hazard Regulation. The planned facility will meet all regulatory requirements for environment and health. Further, the basis for this concern is not defined by McElhanney and is considered unnecessarily alarmist. There are no calculations to support what the "potential contaminated groundwater" would comprise (what

- parameters and concentrations), nor calculations to support what the “expected” time would be for the impacts to occur, nor the identification of specific domestic wells that would be subject to a health-hazard assertion. It would be professionally prudent to provide example calculations of how the proposed development “could represent a health-hazard”.
- *There has been no consideration of installation of groundwater monitoring wells along the south Property boundary.*
 - **Response:** Monitoring wells are planned along the south property boundary. The monitoring wells are not a regulatory requirement and are being voluntarily installed as measure of good faith and to address public concerns.
 - *There has been no consideration of baseline and post operations groundwater monitoring along the south Property boundary or in the highly vulnerable aquifer.*
 - **Response:** The monitoring wells will be installed prior to facility development and baseline conditions (groundwater levels and quality) will be established. Ongoing monitoring will be conducted during construction and facility operations.

3 LIMITATIONS

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4 CLOSURE

We trust that this provides you with the information you currently require.

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