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December 23<sup>rd</sup>, 2015

Mr. Walt Cobb – City of Williams Lake, Mayor  
City Hall  
450 Mart St  
Williams Lake, BC  
V2G 1N3

Cariboo Regional District  
File No. ..... 6410-04 .....

DEC 24 2015

Referred To ..... CRA .....

Mr. Al Richmond - Cariboo Regional District Chair and Area G Director.....  
Cariboo Regional District  
Suite D, 180 North 3rd Avenue  
Williams Lake, BC  
V2G 2A4

Re: Hodgson Road Landslide Williams Lake

Dear Sirs,

Hodgson Road Landslide is an active landslide in Williams Lake with a recorded history of movement and structural damage over the past 25 years as discussed in the September 18<sup>th</sup>, 2015 letter written to Pioneer Family Land Partnership (Pioneer), by Evergreen Geotechnical Inc., (EGI). There is visible evidence that the Hodgson Road Landslide has increased in activity over the past two or three years, that the severity of the movement and associated damage appears to be increasing each year, and that the landslide is retrogressing, (upslope expansion of the landslide mass). A building in Terra Ridge Village required repairs this past summer for recent damage associated with landslide movement. The Pioneer Complex required extensive repairs to the northern wall as discussed in a detailed letter to you by Scouten Engineering dated December 16<sup>th</sup>, 2015. Highway 20 required extensive re-grading and resurfacing as a result of landslide movement. There is shear movement evident on Wotzke Drive near Terra Ridge Village. The City of Williams Lake, (City), water main has had recent breaks within the Landslide perimeter. Further upslope, on Dog Creek Road south of Wotzke Drive, there has been recent, (2015), associated landslide movement that has required resurfacing repairs. Even further upslope of this repair work, in the spring of 2015, a gas main break occurred at the intersection with Roberts Drive and Dog Creek Road.

Available survey data confirms the magnitude of recent landslide movements. Exton and Dodge Land Surveying Inc. has monitored the slide movement indicated by displacement of the Pioneer Complex and found that nearly 300 mm of movement (to the north) occurred between May 2006 and October 2015. Based on changes to their building, Pioneer believes that the vast majority of this movement has occurred in the past couple of years, with the severity of the movement increasing each year. This interpretation is also supported by the reoccurrence of heaving on the Highway 20 over the past couple of years. Based on this interpretation that nearly all of the nearly 300 mm of displacement since 2006 has occurred in the past couple of years, the recent rate of ground displacement is likely to have been as much as 100 to 150 mm per year.

As recently presented at their November 19<sup>th</sup>, 2015 community meeting, the City of Quesnel considers the maximum acceptable rate of movement to be 1mm per year for structures located on the West Quesnel Landslide. In comparison, the apparent current rate of movement of the Hodgson Road Landslide is 100 to 150 times greater than that deemed the maximum acceptable rate of movement in Quesnel. Even if the Exton and Dodge survey results were to be expressed as an average annual rate of movement, that is, about 30mm per year, the rate of movement of the Hodgson Road Landslide is still 30 times greater than the maximum acceptable rate of movement in Quesnel.

The West Quesnel and Hodgson Road Landslides have some similarities, but it is also important to note some of the differences as well, as summarized in the following table.

	<b>West Quesnel Landslide (1)</b>	<b>Hodgson Road Landslide (2)</b>
Ancient Landslide	Yes	Yes
Slide sensitive to groundwater pressure	Yes	Yes
Dewatering only viable option	Yes	Yes
Typical Rate of Movement	40 mm/year	Average 30 mm/year, with recent rates of order of 100 to 150 mm/year
Approximate Size of treatment area	1,000m x 1,000m	600m x 600m (assuming early treatment)
Dewatering Wells	17	5 to 9 proposed
Horizontal Drains	10	None proposed
Treatment Cost	\$8.7 million to 2014	\$1M to \$2M *

\* Rough cost, inflation adjusted from Golder's 1999 estimate (subject to updated costing)

(1) <http://www.quesnel.ca/DocumentBank/WQLS/2014-10-01-OpenHousePanels.pdf>

(2) Golder 1999, Bosdet, B., October 1999, Technical Memorandum 3, Slope Stability Analysis, Hodgson Road Slide, Williams Lake B.C.

Despite the similarities between the two landslides, the West Quesnel Landslide is much larger and far more complex at this point in time. It consists of a number of discrete slide blocks with movement in different directions. The Hodgson Slide is significantly smaller; it has a narrow throat or outlet which, if stabilized, is likely to serve to buttress and help stabilize the upslope areas as well. The anticipated scope of treatment and costs described by Golder for the Hodgson Road Landslide (Golder 1999) are roughly 12 to 25% of that already expended on the West Quesnel Slide.

Three key new behaviours / characteristics of the Hodgson Road Landslide are:

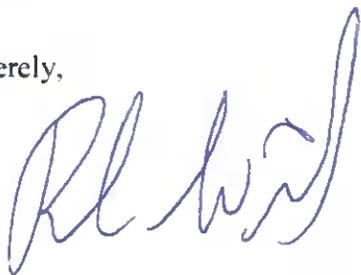
- The Landslide has recently picked up speed after a period of relative quiet,
- The area of detected ground movement has increased by half since the landslide was last investigated in 1998-1999, and
- The damage/distress is now more widely distributed, affecting roads, utilities, businesses and private residences.

If the Hodgson Road Landslide remains untreated, it is considered likely that the area of ground movement may continue to expand into a wider area, possibly into a much wider area in the CRD; the rate of ground movements may continue to accelerate, making the landslide more difficult to treat in the future; damage to roads, wells, utilities and buildings, including private homes, may become more widespread and common throughout the expanding landslide area; many more persons will be directly impacted; and the cost of repairs to existing facilities and the cost to remediate the landslide are likely to increase substantially. Though it is possible the slide may slow again for a period, the current trend suggests acceleration of movement is more likely.

With consideration for the above noted points, it is my belief that it is both timely and prudent to work toward implementing remedial treatment of the Hodgson Road Landslide as soon as reasonably practical. Considering the previously completed investigations and landslide characterization done by Golder, it is anticipated that the next steps would be planning for the installation of some test wells, along with some instrumentation, then performing pumping tests. If the results show an effective decrease in the water pressure at the slide surface, these wells would become permanent treatment wells and an integral start to the effective stabilization of the Landslide.

If you have any questions regarding these discussions on the imminent need for stabilizing the Hodgson Road Landslide as discussed herein, please do not hesitate to contact me.

Sincerely,



Robert G. Wilson, P.Eng., P.Geo.

cc Andre Chevigny, Pioneer Family Land Partnership  
Dave Scouten, P.Eng., Scouten Engineering  
Bruce Bosdet, P.Eng., Golder Associates