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MEMORANDUM

TO: Malek Tawashy
Development Project Manager
Lark Group

Our file: 3583-M002

Date: January 19, 2017

FROM: Matthew L. Cleary, P.Geo.
Email: mcleary@piteau.com

RE: Hydrogeological Update (January 4, 2017 Meeting Summary)
13610 Banks Crescent, Summerland, BC

INTRODUCTION AND BACKGROUND

Piteau Associates Engineering Ltd. (Piteau) was retained by the Lark Group in May 2016 to conduct a hydrogeological assessment addressing potential impacts to a nearby groundwater spring associated with construction of a proposed retirement and assisted living facility at the above referenced address (the Site). The findings of this assessment were presented in a memorandum dated July 12, 2016.

Working on behalf of Freshwater Fisheries Society BC (FFSBC), who utilize flow from Shaughnessy Spring (the Spring) to supply a nearby fish hatchery (the Hatchery), MDM Groundwater Consulting Ltd. (MDM) reviewed Piteau's July 12, 2016 memorandum. In an e-mail dated December 16, 2016 MDM reiterated the need for an erosion and sediment control plan (ESCP) and a groundwater monitoring plan (herein referred to as an environmental monitoring plan (EMP)) to be implemented during construction.

Development of ESCP documents is considered standard practice within the construction industry. As such, the development of an ESCP would have been conducted in the normal course of project development, with a specific focus on potential impacts to the Spring and the Hatchery. As per the request of FFSBC, CTQ and Piteau have developed concepts for an ESCP and an EMP, which were provided along with concept drawings to the Lark Group in December 2016.

A meeting (the Meeting) was held on January 4, 2017 to discuss the current status of the proposed development and preliminary plans plus concept drawings for the ESCP and EMP. The following persons were in attendance:

Malek Tawashy	Lark Group
Gary Tamblyn	New Essence Care Management
Kyle Girgan	Freshwater Fisheries Society BC
Matt Cameron	CTQ Consultants Ltd.
Matt Cleary	Piteau Associates Engineering Ltd.

Minutes from the Meeting were prepared by Mr. Malek Tawashy and made available for comment by meeting attendees and their respective organizations. In response, FFSBC outlined their outstanding concerns regarding construction related hazards and associated risks to the Spring water quality, specifically highlighting concerns regarding elevated turbidity and the possible release of contaminants during construction at the Site.

FFSBC CONCERNS AND ASSOCIATED ACTION ITEMS

This memorandum has been prepared to address the FFSBC's concerns. These are set out below, along with action items suggested by Piteau:

1) FFSBC emphasized that the magnitude and duration of events with elevated turbidity are equally important in assessing the risk to the Hatchery. While not currently defined, there would be a maximum turbidity level in the Spring, irrespective of the duration of the event, for which trout would not be able to survive.

   FFSBC is gathering information on the impacts of elevated turbidity on trout and will use this to further develop threshold criteria. These criteria will be included in the ESCP and EMP. In the event that an elevated turbidity event is observed during the construction period, a route cause analysis would be conducted to determine the cause(s) of the elevated turbidity.

   Action: FFSBC turbidity criteria to be included in the ESCP and EMP, as appropriate.

2) FFSBC indicated that there have been brief events (up to two hours duration) of high turbidity following historical precipitation events and that they were manageable. One such event was reported to have occurred in September 2015. The specific source(s) of the elevated turbidity (eg., sloughing of a portion of the slope above the Spring, and/or entrainment of sediment in overland flow) was not identified.

   Action: Review photographic documentation to help understand the cause of the September 2015 turbidity event.

3) As indicated by CTQ, a detailed spill response plan (SRP) would be included within the ESCP and EMP documentation. FFSBC has requested that the two existing monitoring wells (MW-1 and MW-2) be used to monitor groundwater quality during construction to provide early detection of potential impacts.

   It is important to note that the relatively thick layer of overlying finer-grained silt and clay (10 to 25 m) has low permeability and will impede vertical contaminant migration, thus resulting in a low risk to water quality at the Spring.

   Action: The SRP will be implemented in the event of releases of potentially hazardous substances on Site (eg., gasoline, diesel, hydraulic fluid and coolant). This would include recovery of spilled material and contaminated media, along with analysis of confirmation soil samples and groundwater and surface water monitoring.

4) FFSBC has indicated that monitoring wells MW-1 and MW-2 should be used to monitor potential vibration-induced turbidity within the aquifer, unless there is technical justification that disqualifies the monitoring wells for that purpose.

Under extreme conditions, vibration-induced turbidity may be generated within an aquifer by heavy machinery and trucks (live loads) operating at construction sites. Due to the depth to the water table at the Site (20 to 30 m below ground surface), it expected that the energy generated from construction activities will be dissipated.

Vibration-induced turbidity within the aquifer is expected to be orders of magnitude lower than that of erosion-induced turbidity on the Site and therefore the associated risk to water quality within the Spring is interpreted to be very low.

It is worth noting that groundwater sampling for turbidity within the aquifer is possible, although remnant turbidity within the wells may preclude them from providing useful turbidity data.

Action: No action recommended.

5) Erosion-induced turbidity within the Spring has two interpreted generation mechanisms, including mobilization of fine sediment during high precipitation events and the rapid release of material from the slope (sloughing). Erosion-induced turbidity is interpreted to be a higher risk to water quality. Such turbidity events result when high intensity precipitation events mobilize sediment-laden runoff.

To mitigate against impacts associated with erosion-induced turbidity generated from the slopes below the Site, tiered silt fencing will be constructed on the vegetated portion of the slope above the Spring. Timing for installation of these works will be conducted in coordination with FFSBC.

The risk associated with erosion-induced turbidity is significantly reduced with the implementation of a system of tiered silt fences that are properly installed, monitored and maintained. The current ESCP concept drawing (attached) provides details regarding the proposed silt fencing. Ultimately, the locations of the silt fencing will be agreed to with FFSBC. With the incorporation of silt fencing, the risk associated with erosion-induced turbidity is interpreted to be low.

Action: Incorporate above described measures in the ESCP.

6) As presented in the Piteau (2016) memo, the bottom level parkade slab elevations are between 398 and 404 m-asl. Based on the groundwater elevations in MW-1 and MW-2 (370.1 and 370.0 m-asl, respectively), the water table is at least 20 m below the parkade slab and therefore the proposed structures would not intersect or impede the natural groundwater flow system.

As confirmed by the Lark Group, the proposed development will neither withdraw groundwater from the aquifer for water supply nor dispose of water to the aquifer. In accordance with the MDM review email dated October 20, 2016, MDM concurred with the Piteau (2016) memo, concluding that the proposed development posed “no potential impact” to water quantity discharging to the Springs.

Action: No action recommended.

LIMITATIONS AND CLOSURE

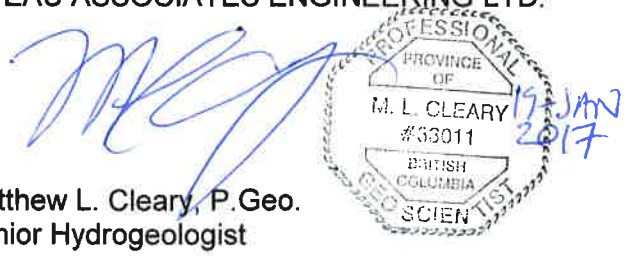
This memorandum has been prepared by Piteau for the Lark Group and reflects Piteau's best judgement based on the information available at the time of preparation. Any use that a third party makes of this report, or any reliance on or decisions based upon it, are the responsibility of such third parties. Piteau accepts no responsibility for damages, if any, suffered by any third party as a result of decisions or actions made based on this report.

The findings, conclusions and recommendations in this report have been developed in a manner consistent with the level of skill normally exercised by environmental professionals currently practicing under similar conditions in British Columbia. No warranty is expressed or implied.

We trust this memorandum is sufficient for your current needs. Please contact the undersigned if you require further information.

Respectfully submitted,

PITEAU ASSOCIATES ENGINEERING LTD.



Matthew L. Cleary, P.Geo.
Senior Hydrogeologist

Reviewed by:

Remi J.P. Allard, P.Eng.
Principal Hydrogeologist

MLC/RJPA/DJT/lm

Att.

1. Construction Erosion and Sediment Control Plan, CTQ (January 17, 2016)

CONSTRUCTION EROSION AND SEDIMENTATION CONTROL PLAN

KEY POINTS:

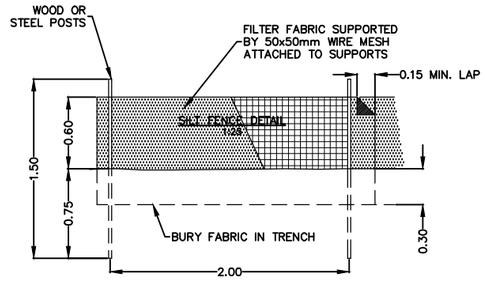
SURFACE STORM WATER RUNOFF IS CAPTURED AND DIRECTED TOWARDS THE WEIR INTERCEPTOR BY WAY OF THE INTERCEPTOR DITCH. FILTRATION AND TREATMENT OCCURS AT THE WEIR PRIOR TO BEING DISCHARGED DIRECTLY INTO THE MUNICIPAL STORM SYSTEM BYPASSING THE HATCHERY.

A CONTINGENCY BERM AND SILT FENCING INSTALLED ALONG THE SOUTH EAST PERIMETER OF THE SITE WOULD CAPTURE AND FILTER SURFACE RUNOFF AS REQUIRED.

SIMILAR BERM AND SILT FENCING DETAILED WILL BE INSTALLED IN A TIERED FASHION AT THE HEAD OF THE SPRING, PROVIDING PROTECTION FROM NATIVE EARTH THAT PRESENTS A RISK OF SLOUGHING INTO THE WATER SOURCE.

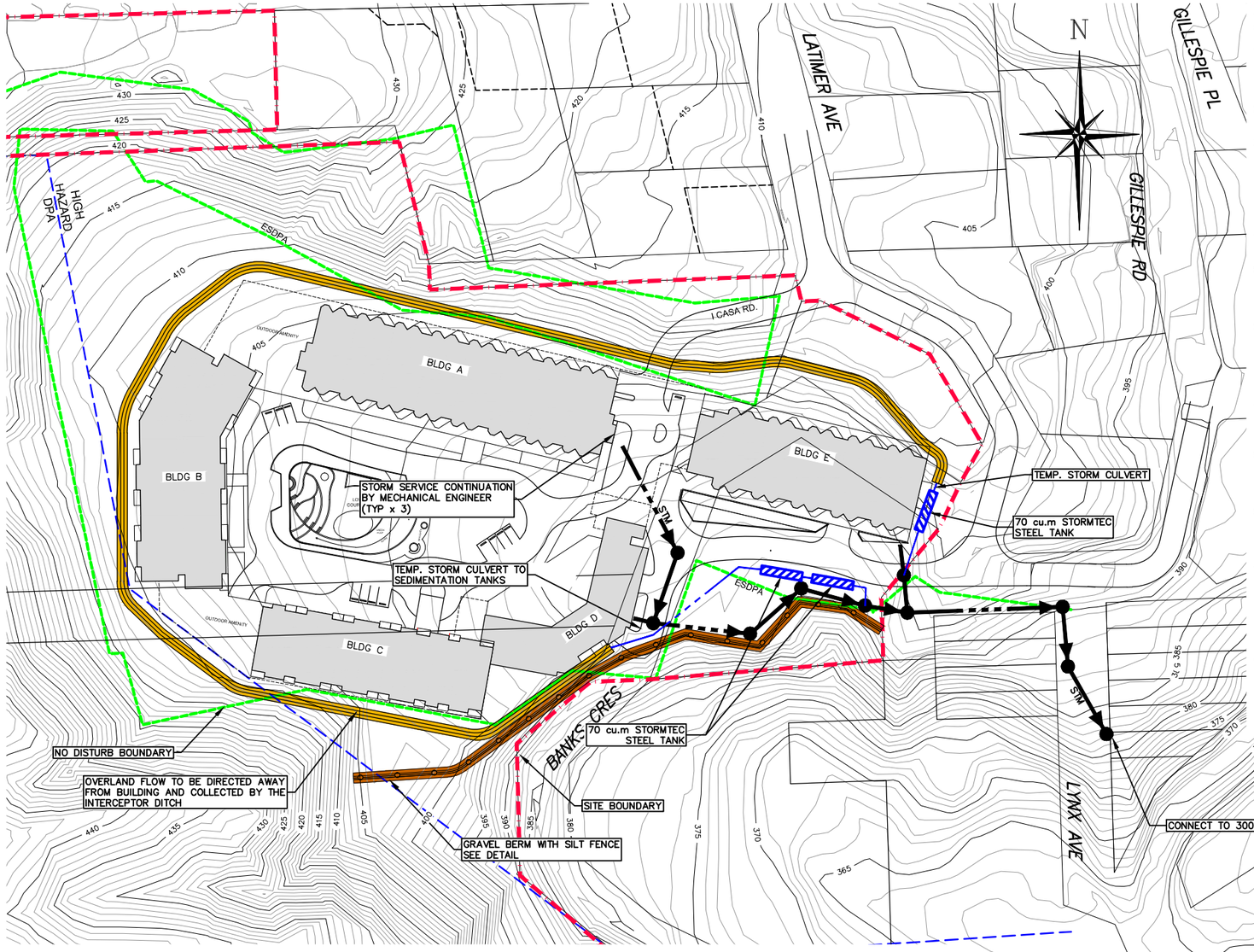
ONGOING REVIEW AND MAINTENANCE OF ALL INSTALLATIONS WILL BE CONDUCTED ON A REGULAR BASIS AND AFTER EACH RAINFALL EVENT. (AS PER NOTE 8.)

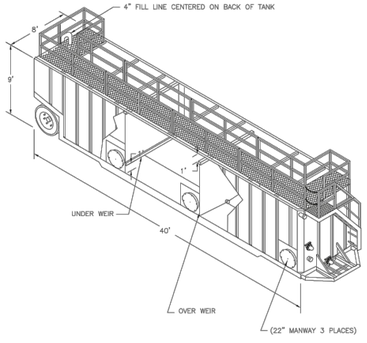
A "Spill Containment Plan" is to be prepared prior to the start of construction outlining the procedures to be undertaken in the event of a spill including but not limited to emergency response, procedures to mitigate and protect, notification and communications, reporting and documentation



NOTES:

1. INSPECT AND REPAIR FENCE AFTER EACH STORM EVENT AND REMOVE SEDIMENT WHEN NECESSARY.
2. SEDIMENT MUST BE REMOVED FROM SILT FENCE WHEN IT REACHES APPROXIMATELY ONE-THIRD THE HEIGHT OF THE FENCE AND DEOPIST OFF-SITE
3. SILT FENCE TO BE PLACED ON SLOPE CONTOURS TO MAXIMIZE PONDING EFFICIENCY.
3. THE SILT FENCE TO BE REMOVED ONCE THE SITE IS STABILIZED.
4. FOR FURTHER DETAILS SEE CITY OF KELOWNA 'BEST MANAGEMENT PRACTICES OF EROSION AND SEDIMENT CONTROL - UPLAND WORKS'





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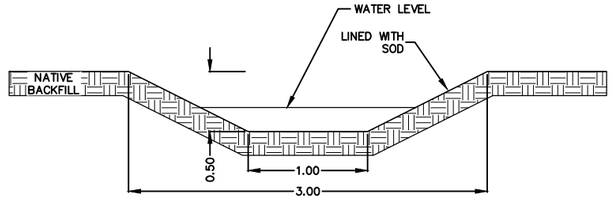

INTERCEPTOR DITCH DETAIL
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EROSION AND SEDIMENT MANAGEMENT NOTES - ALL STAGE OF CONSTRUCTION

1. ALL WORK IS TO BE UNDERTAKEN AND COMPLETED BY THE CONTRACTOR IN SUCH A MANNER AS TO PREVENT THE RELEASE OF SILT, SEDIMENT, OR ANY OTHER DELETERIOUS SUBSTANCES INTO ANY STORM SEWER OR WATERCOURSE.
2. ALL EXISTING CATCH BASINS ON SITE TO HAVE FILTER FABRIC INSTALLED PRIOR TO ANY WORK STARTING.
3. TO PREVENT EROSION:
   - 3.1. PREVENT CONCENTRATED OVERLAND FLOWS FROM OCCURRING
   - 3.2. COVER STOCKPILES, EXPOSED EARTH AND DISTURBED AREAS WITH TARP OR ANY APPROVED PRODUCT.
   - 3.3. LIMIT CLEARING AS MUCH AS POSSIBLE TO AREAS TO BE IMMEDIATELY WORKED.
4. PREVENT WIND BLOWN EROSION BY WATERING, COVERING EXPOSED EARTH OR BY OTHER APPROVED MEASURES.
5. EROSION & SEDIMENT MANAGEMENT WORKS SHALL BE INSTALLED BY THE CONTRACTOR PRIOR TO ANY WORK IN THE AREA FOR WHICH THE EROSION & SEDIMENT MANAGEMENT WORKS ARE INTENDED INCLUDING REMOVALS, CLEARING AND EARTHWORKS.
6. ALL EROSION & SEDIMENT MANAGEMENT WORKS TO BE MAINTAINED BY THE CONTRACTOR AT ALL TIMES TO ASSURE PROPER OPERATIONS. REPLACEMENT OF SILT FENCES AND FILTER CLOTHS (CATCH BASINS), THE FLUSHING OF SEWERS AND CLEANING OF SUMPS ARE REQUIRED DURING THE COURSE OF CONSTRUCTION.
7. REMOVE AND DISPOSE OF ACCUMULATED SEDIMENT FROM SEDIMENT MANAGEMENT FACILITIES BEFORE SEDIMENT REACHING ONE THIRD OF THE HEIGHT OF THE FACILITY.
8. MONITOR EROSION AND SEDIMENT MANAGEMENT WORKS DAILY AND AFTER HEAVY RAINFALL OR SNOW MELT EVENTS. ENSURE INSPECTIONS AREA COMPLETED AT END OF WORK WEEK OR HOLIDAYS.
9. PRIOR TO CONSTRUCTION ACTIVITIES, CONTRACTOR TO INSPECT ALL CATCH BASINS TO ENSURE FILTER FABRIC IS SECURE AND CLEAR OF DEBRIS TO PREVENT SEDIMENT FROM ENTERING ANY STORM SYSTEM.
10. DURING CONSTRUCTION THE CONTRACTOR IS TO FLUSH AND CLEAN STORM SYSTEM AS REQUIRED AND AT THE COMPLETION OF THE PROJECT. THE CONTRACTOR MAY NEED TO EMPLOY ADAPTIVE MEASURES, AND/OR ADDITIONAL MEASURES, AND/OR ADJUST THE INSTALLED EROSION AND SEDIMENT MANAGEMENT WORKS TO PREVENT THE RELEASE OF SEDIMENT LADEN WATER AS SITE CONDITIONS CHANGE.
11. ALL EROSION AND SEDIMENT MANAGEMENT WORK ARE TO REMAIN IN PLACE UNTIL ALL BUILDING ACTIVITIES ARE 97% COMPLETE AND UNTIL VEGETATION HAS DEVELOPED ON EXPOSED AND DISTURBED AREAS WHICH CONTRIBUTE FLOWS TO EROSION AND SEDIMENT MANAGEMENT WORKS.

SUMMERLAND
INDEPENDENT AND ASSISTED LIVING
EROSION AND SEDIMENT CONTROL PLAN
PROJECT No.16028
DRAWING No.SK-06
SCALE 1:1500
December 23, 2016

CTQ